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1 Profile of the University

1. Name and Address of the University:

Name:	Chennai Mathematical Institute	
Address:	H1, SIPCOT IT Park, Siruseri	
City: Kelambakkam	PIN: 603103	State: Tamil Nadu
Website:	http://www.cmi.ac.in	

2. For communication:

Designation	Name	Telephone	Mobile	Fax	Email
Vice Chancellor/ Director	Prof. Rajeeva L. Karandikar	O: (044) 67480906 R: (044) 24513296	+91 81448 13296	(044) 27470225	director@cmi.ac.in
Pro Vice Chancellor(s)	N.A.				
Registrar	S. Sripathy	O: (044) 67480901 R: (044) 22530304	+91 94449 94840	(044) 27470225	sripathy@cmi.ac.in
Steering Committee/ IQAC Coordinator	N.A.				
Dean of Studies	Madhavan Mukund	O: (044) 67480923 R: (044) 24570321	+91 94449 92990	(044) 27470225	madhavan@cmi.ac.in

3. Status of the University:

State University	<input type="checkbox"/>
State Private University	<input type="checkbox"/>
University under Section 3 of UGC (Deemed University)	<input checked="" type="checkbox"/>
Institution of National Importance	<input type="checkbox"/>
Any other (please specify)	<input type="text"/>

4. Type of University:

Unitary	<input checked="" type="checkbox"/>
Affiliating	<input type="checkbox"/>

5. Source of funding:

Central Government	<input checked="" type="checkbox"/>
State Government	<input type="checkbox"/>
Self-financing	<input type="checkbox"/>
Any other (please specify)	<input type="text"/>

6. a. Date of establishment of the university: 15/12/2006

b. Prior to the establishment of the university, was it a/an

- i. PG Centre Yes No
- ii. Affiliated College Yes No
- iii. Constituent College Yes No
- iv. Autonomous College Yes No
- v. Any other (please specify): Research centre recognized by University of Madras

If yes, give the date of establishment: 10/10/1989

7. Date of recognition as a university by UGC or any other national agency:

Under Section	dd	mm	yyyy	Remarks
i. 2f of UGC*				
ii. 12B of UGC*				
iii. 3 of UGC#	15	12	2006	
iv. Any other ^ (specify)				

* Enclose certificate of recognition.

Enclose notification of MHRD and UGC for all courses / programmes / campus/ campuses.

^ Enclose certificate of recognition by any other national agency/agencies, if any.

8. Has the university been recognized

a. By UGC as a University with Potential for Excellence?

Yes No

If yes, date of recognition : (dd/mm/yyyy)

b. For its performance by any other governmental agency?

Yes No

If yes, Name of the agency and date of recognition : (dd/mm/yyyy)

9. Does the university have off-campus centres?

Yes No

If yes, date of establishment : (dd/mm/yyyy)
date of recognition : (dd/mm/yyyy)

10. Does the university have off-shore campuses?

Yes No

If yes, date of establishment : (dd/mm/yyyy)

date of recognition : (dd/mm/yyyy)

11. Location of the campus and area

		Location*	Campus area in acres	Built up area in sq mts
i.	Main campus area	Chennai, Urban	5.35	13409
ii.	Other campuses in the country	N.A.		
iii.	Campuses abroad	N.A.		

* Urban, Semi-Urban, Rural, Tribal, Hilly Area, Any other (please specify)

If the university has more than one campus, it may submit a consolidated self-study report reflecting the activities of all the campuses.

12. Provide information on the following: In case of multi-campus University, please provide campus-wise information.

- Auditorium/seminar complex with infrastructural facilities ✓
- Sports facilities
 - Playground ✓
 - Swimming pool
 - Gymnasium ✓
 - Any other (please specify)
- Hostel
 - Boys’ hostel
 - i. Number of hostels: 1
 - ii. Number of inmates: 176
 - iii. Facilities: Internet, 24 Hours Power Supply (Two Generators are available in case of EB power failure)
 - Girls’ hostel
 - i. Number of hostels: 1
 - ii. Number of inmates: 25
 - iii. Facilities: Internet, 24 Hours Power Supply (Two Generators are available in case of EB power failure)
 - Working women’s hostel
 - i. Number of hostels: None
 - ii. Number of inmates: N.A.
 - iii. Facilities
- Residential facilities for faculty and non-teaching
No
- Cafeteria
Yes

- Health centre - Nature of facilities available - inpatient, outpatient, ambulance, emergency care facility, etc.
No
- Facilities like banking, post office, book shops, etc.
No
- Transport facilities to cater to the needs of the students and staff
Yes
- Facilities for persons with disabilities
Yes
- Animal house
No
- Incinerator for laboratories
N.A.
- Power house
Yes
- Waste management facility
Yes

13. Number of institutions affiliated to the university

Nil

14. Does the University Act provide for conferment of autonomy (as recognized by the UGC) to its affiliated institutions? If yes, give the number of autonomous colleges under the jurisdiction of the University

Yes

No

Number

15. Furnish the following information:

Particulars	Number	Number of Students
a. University Departments		
Undergraduate	3	96
Post graduate	3	74
Research centres on the campus	3	47
b. Constituent colleges	N.A.	
c. Affiliated colleges	N.A.	
d. Colleges under 2(f)	N.A.	
e. Colleges under 2(f) and 12B	N.A.	
f. NAAC accredited colleges	N.A.	
g. Colleges with Potential for Excellence (UGC)	N.A.	
h. Autonomous colleges	N.A.	
i. Colleges with Postgraduate Departments	N.A.	
j. Colleges with Research Departments	N.A.	
k. University recognized Research Institutes/Centres	N.A.	

16. Does the university conform to the specification of Degrees as enlisted by the UGC?

Yes No

If the university uses any other nomenclatures, please specify.

17. Academic programmes offered by the university departments at present, under the following categories: (Enclose the list of academic programmes offered)

Programmes	Number
UG	2
PG	3
Integrated Masters	–
M.Phil.	–
Ph.D.	3
Integrated Ph.D.	–
Certificate	–
Diploma	–
PG Diploma	–
Any other (please specify)	–
Total	8

18. Number of working days during the last academic year.

19. Number of teaching days during the past four academic years.

(‘Teaching days’ means days on which classes were engaged. Examination days are not to be included.)

20. Does the university have a department of Teacher Education?

Yes No

If yes,

a. Year of establishment (dd/mm/yyyy)

b. NCTE recognition details (if applicable)

Notification No.:

Date: (dd/mm/yyyy)

c. Is the department opting for assessment and accreditation separately?

N.A.

21. Does the university have a teaching department of Physical Education?

Yes No

If yes,

a. Year of establishment (dd/mm/yyyy)

b. Year of establishment (dd/mm/yyyy)

c. NCTE recognition details (if applicable)
 Notification No.:
 Date: (dd/mm/yyyy)

d. Is the department opting for assessment and accreditation separately?
 N.A.

22. In the case of Private and Deemed Universities, please indicate whether professional programmes are being offered?

Yes No

If yes, please enclose approval / recognition details issued by the statutory body governing the programme.

N.A.

23. Has the university been reviewed by any regulatory authority? If so, furnish a copy of the report and action taken there upon.

Yes, the university has undergone annual reviews by UGC committees, as well as reviews by an Expert Committee set up by NBHM, an Expert Committee set up by DST and the P.N. Tandon Committee set up by UGC.

The reports of the annual UGC reviews are enclosed. The reports of the other committees are available with the respective departments.

24. Number of positions in the university

Positions	Teaching Faculty			Non-teaching staff	Technical staff
	Professor	Associate Professor	Assistant Professor		
Sanctioned by the UGC / University / State Government					
<i>Recruited</i>	12	12	11	5	–
<i>Yet to recruit</i>	–	–	–	–	–
Number of persons working on contract basis	16	–	–	3	–

25. Qualifications of the teaching staff

Highest qualification	Professor		Associate Professor		Assistant Professor		Total
	Male	Female	Male	Female	Male	Female	
Permanent teachers							
D.Sc./D.Litt.	–	–	–	–	–	–	–
Ph.D.	12	–	10	2	9	2	35
M.Phil.	–	–	–	–	–	–	–
PG	–	–	–	–	–	–	–
Temporary teachers							
D.Sc./D.Litt.	–	–	–	–	–	–	–
Ph.D.	14	2	–	–	–	–	16
M.Phil.	–	–	–	–	–	–	–
PG	–	–	–	–	–	–	–
Part-time teachers							
D.Sc./D.Litt.	–	–	–	–	–	–	–
Ph.D.	1	1	–	–	–	–	2
M.Phil.	–	–	–	–	–	–	–
PG	–	–	–	–	–	–	–

26. Emeritus, Adjunct and Visiting Professors.

	Emeritus	Adjunct	Visiting
Number	1	16	1

27. Chairs instituted by the university:

	Chairs
School / Department	None

28. Students enrolled in the university departments during the current academic year, with the following details:

Students	UG	PG	Integ- rated Mas- ters	M.Phil.	Ph.D.	Integ- rated Ph.D.	D.Litt. / D.Sc.	Certi- ficate	Dip- loma	PG Dip- loma
	*M *F	*M *F	*M *F	*M *F	*M *F	*M *F	*M *F	*M *F	*M *F	*M *F
From the state where the university is located	7 M, 4 F	4 M, 1 F	–	–	13 M, 1 F	–	–	–	–	–
From other states of India	82 M, 7 F	61 M, 6 F	–	–	32 M, 7 F	–	–	–	–	–
NRI students	0 M, 0 F	0 M, 0 F	–	–	0 M, 0 F	–	–	–	–	–
Foreign students	0 M, 0 F	0 M, 0 F	–	–	0 M, 0 F	–	–	–	–	–
Total	89 M, 11 F	65 M, 7 F	–	–	45 M, 8 F	–	–	–	–	–

*M – Male, *F – Female

29. Unit cost of education

(Unit cost = total annual recurring expenditure (actual) divided by total number of students enrolled)

(a) including the salary component = Rs. 6,65,853

(b) excluding the salary component = Rs. 2,95,358

30. Academic Staff College

No

- Year of establishment: N.A.
- Number of programmes conducted (with duration) : Nil
 - UGC Orientation
 - UGC Refresher
 - Universitys own programmes

31. Does the university offer Distance Education Programmes (DEP)?

Yes No

If yes, indicate the number of programmes offered.

Are they recognized by the Distance Education Council?

32. Does the university have a provision for external registration of students?

Yes No

If yes, how many students avail of this provision annually?

33. Is the university applying for Accreditation or Re-Assessment? If Accreditation, name the cycle.

Accreditation: Cycle 1 Cycle 2 Cycle 3 Cycle 4

Re-Assessment:

34. Date of accreditation* (applicable for Cycle 2, Cycle 3, Cycle 4 and re- assessment only)

Cycle 1: (dd/mm/yyyy),
Accreditation outcome/Result

Cycle 2: (dd/mm/yyyy),
Accreditation outcome/Result

Cycle 3: (dd/mm/yyyy),
Accreditation outcome/Result

Cycle 4: (dd/mm/yyyy),
Accreditation outcome/Result

35. Does the university provide the list of accredited institutions under its jurisdiction on its website? Provide details of the number of accredited affiliated / constituent / autonomous colleges under the university.

Not applicable.

36. Date of establishment of Internal Quality Assurance Cell (IQAC) and dates of submission of Annual Quality Assurance Reports (AQAR).

IQAC has not been established.

37. Any other relevant data, the university would like to include:

CMI had been recognised as a deemed university under the de-novo category with a mandate to pursue research and teaching in mathematical sciences. The funding structure of CMI is a mix of public and private funding and is not covered by fees by students. Indeed, all eligible students get fellowship from CMI. The number of students is small (as compared to most universities) and we have a very small administrative staff, with just one officer (Registrar).

We have courses broadly in three areas: Mathematics, Computer Science and Physics. All our faculty members are active researchers and have Ph.D. degrees. The education system at CMI is similar to that followed at IITs, IISc, ISI, where the instructor of the course sets the question paper and evaluates the answer books. Being a small institution, we have not felt the need for setting up Internal Quality Assurance Cell, and we achieve this objective via informal mechanisms.

Each year, CMI attracts several students from the Indian team for the International Mathematics Olympiad and International Olympiad in Informatics, as well as those who go for final selection camps for these events.

A large proportion of graduates from CMI in the past decade have gone on to pursue further studies at the best academic institutions in India and abroad, and a good proportion of these

have completed their Ph.D. The institutions where our students have gone for higher studies include Berkeley, Caltech, Chicago, Harvard, MIT, NYU (Courant), Princeton, Penn, Yale in USA, ENS Paris, ENS Cachan, Univ Paris-Sud and Univ Bordeaux in France, the Max Planck Institutes and Humboldt University in Germany and the Harish-Chandra Research Institute, IITs, IMSc, ISI and TIFR in India.

Over a dozen CMI graduates have returned to India after completing their doctoral studies (Ph.D.) to take up academic positions at institutions like TIFR, CMI, IMSc, IIT Bombay, IIT Kanpur, IISER Kolkata, IISER Mohali, IISER Pune as well as in research labs such as Microsoft Research, ABB Research and IBM India Research Lab. An equal number, or more, have faculty or postdoctoral research positions at academic and research institutions across the world.

Students with a Ph.D. degree from CMI have taken up academic positions at IIT Bombay, IIT Guwahati and IIM Indore.

CMI graduates have also moved into areas such as financial mathematics, management and economics, both in India and abroad. The organizations where they have found placements include IBM, TCS R&D, Veritas, Barclays, Goldman Sachs, HSBC, ICICI, Mu Sigma and some startups.

2 Criteria - wise Inputs

CRITERION I : CURRICULAR ASPECTS

1.1 Curriculum Design and Development

1.1.1. How is the institutional vision and mission reflected in the academic programmes of the university?

CMI is a centre of excellence for research and teaching in the mathematical sciences. The BSc and MSc programmes in Mathematics and allied subjects run by CMI have consistently attracted some of the best students in the country. After graduating from CMI, these students have gone on to join leading institutions throughout the world.

1.1.2. Does the university follow a systematic process in the design and development of the curriculum? If yes, give details of the process (need assessment, feedback, etc.).

Yes. CMI has four Boards of Studies, one each in Mathematics, Computer Science, and Physics, and one for the undergraduate programme. These Boards are made up of senior faculty members from CMI as well as external experts. The Boards meet regularly to design, develop, and fine tune the curriculum. The recommendations of the Boards are ratified by the Academic Council, which is made up of leading academicians from across the country.

1.1.3. How are the following aspects ensured through curriculum design and development?

- Employability

The course contents are designed to equip students with skills to pursue careers in research as well as to take up leading technical positions in industry.

- Innovation

The course content is regularly reviewed and updated to take into account changes in the focus of academic research and technological advances in industry.

- Research

All teaching faculty are actively involved in research and students are encouraged to participate in research alongside their regular courses.

1.1.4. To what extent does the university use the guidelines of the regulatory bodies for developing and/or restructuring the curricula? Has the university been instrumental in leading any curricular reform which has created a national impact?

CMI follows UGC guidelines for the overall structure of the programmes.

1.1.5. Does the university interact with industry, research bodies and the civil society in the curriculum revision process? If so, how has the university benefitted through interactions with the stakeholders?

Yes. CMI has consistently interacted with industry. Many leading industrialists are members of the CMI Trust. An important initiative that has come out of this exercise is the formation of AlgoLabs—a meeting place for academicians and industry to work on mutually beneficial projects.

1.1.6. Give details of how the university facilitates the introduction of new programmes of studies in its affiliated colleges.

Not applicable.

1.1.7. Does the university encourage its colleges to provide additional skill-oriented programmes relevant to regional needs? Cite instances (not applicable for unitary universities).

Not applicable.

1.2 Academic Flexibility

1.2.1. Furnish the inventory for the following:

- Programmes taught on campus
All courses are taught on campus.
- Overseas programmes offered on campus
None.
- Programmes available for colleges to choose from
None.

1.2.2. Give details on the following provisions with reference to academic flexibility

a. Core / Elective options

Yes, the course requirements are clearly divided into core and elective components.

b. Enrichment courses

Advanced level courses are offered for high-achieving students. Many students take research oriented courses during BSc and MSc.

c. Courses offered in modular form

The entire course structure is designed to have a core component which is modular, for example, Analysis is taught over three semesters in the form of Analysis I, Analysis II, Analysis III; quantum mechanics is taught as Quantum Mechanics I and Quantum Mechanics II; programming is taught as Programming and Advanced Programming. The electives are more advanced topics which require as pre-requisites one or more of the modules from the core courses.

d. Credit accumulation and transfer facility

Credit accumulation is allowed. Transfer facility is not allowed.

e. Lateral and vertical mobility within and across programmes, courses and disciplines

Lateral mobility is provided for in the BSc programme and the MSc Applications of Mathematics programme, the two programmes that have multiple streams. In both these programmes, the first semester of is common to all students. At the end of the first semester, BSc students are free to choose between the Mathematics/Computer Science and the Mathematics/Physics streams. Likewise, at the end of the first semester, students in MSc Applications of Mathematics can choose between the Financial Mathematics and Analytics streams.

Vertical mobility is provided through internal selection criteria to move from the BSc programme to the MSc programme and from the MSc programme to the PhD programme. Bright students can directly join higher degree programmes if they maintain

consistently good academic records. Students also have the freedom to move across disciplines when moving from BSc to MSc and MSc to PhD.

1.2.3. Does the university have an explicit policy and strategy for attracting international students?

The Institute has active programmes for student exchanges with the Ecole Normale Supérieure, Paris and Ecole Normale Supérieure, Cachan in France. CMI is also one of two non-European partners in ALGANT, a multi-institution Masters programme in Algebra, Geometry and Number Theory funded by the European Union. The Institute also accepts international students selected and recommended by organizations such as International Centre for Theoretical Physics (ICTP), Trieste.

1.2.4. Have any courses been developed targeting international students? If so, how successful have they been? If 'no', explain the impediments.

No specific courses have been designed to target international students. The Institute has signed an MoU with ENS Paris and ENS Cachan for regular exchanges of students. CMI is a partner in ALGANT, a multi-institution master's programme in Algebra, Geometry and Number Theory funded by the European Union.

1.2.5. Does the university facilitate dual degree and twinning programmes? If yes, give details.

No

1.2.6. Does the university offer self-financing programmes? If yes, list them and indicate if policies regarding admission, fee structure, teacher qualification and salary are at par with the aided programmes?

No

1.2.7. Does the university provide the flexibility of bringing together the conventional face-to-face mode and the distance mode of education and allow students to choose and combine the courses they are interested in? If 'yes', give operational details.

No

1.2.8. Has the university adopted the Choice Based Credit System (CBCS)? If yes, for how many programmes? What efforts have been made by the university to encourage the introduction of CBCS in its affiliated colleges?

Yes. All programmes are covered by the credit system. In each programme, students have to complete certain core requirements and the remaining credits are obtained through elective courses.

1.2.9. What percentage of programmes offered by the university follow:

- Annual system
0%
- Semester system
100%
- Trimester system
0%

- 1.2.10. How does the university promote inter-disciplinary programmes? Name a few programmes and comment on their outcome.

After completing the core requirements in each programme, students have great flexibility in choosing elective courses. Through a judicious combination of electives, students can specialize in the subject of their choice. It is not uncommon for students to shift from one stream to another. For example, a student with a physics degree at the undergraduate level is presently pursuing a PhD in mathematics at MIT, USA. Other students have shifted from physics to MSc in computer science. A student with an undergraduate degree in physics from CMI has gone on to win the best PhD thesis award in Biological Sciences from the American Physical Society.

1.3 Curriculum Enrichment

- 1.3.1 How often is the curriculum of the university reviewed and upgraded for making it socially relevant and/or job oriented / knowledge intensive and meeting the emerging needs of students and other stakeholders?

The curriculum is reviewed periodically by the Boards of Studies to update its content and improve its effectiveness. The Boards of Studies meet at least once a year.

- 1.3.2 During the last four years, how many new programmes at UG and PG levels were introduced? Give details.

- Inter-disciplinary

None.

- Programmes in emerging areas

At the postgraduate level, a new programme, MSc Applications of Mathematics, was started 2010, with two streams of specialisation—financial mathematics and analytics. At the undergraduate level, a new programme, BSc (Honours) in Mathematics and Physics, was started in 2012.

- 1.3.3 What are the strategies adopted for the revision of the existing programmes? What percentage of courses underwent a syllabus revision?

CMI has four Boards of Studies—one each in Mathematics, Computer Science, Physics, and one for undergraduate studies. These boards periodically review the courses and their contents. In each programme, the list of core courses is typically reviewed every 3 years. For instance, in the current academic year, 2015–2016, the undergraduate programme has been restructured to decrease the number of core courses and increase the number of electives by about 30%, to enhance flexibility. Moreover, the curriculum of all mathematics courses has been reviewed and updated. In all programmes, the list of electives is updated every year to ensure that the curriculum remains aligned to contemporary trends in each of the subjects.

- 1.3.4 What are the value-added courses offered by the university and how does the university ensure that all students have access to them?

CMI has a steady stream of very distinguished visitors both from India and abroad. This list includes Nobel Laureates, Field Medalists, Abel Prize Winners, and Fellows of the

Royal Societies. These visitors spend time at CMI giving lectures and interacting with faculty and students.

Under the auspices of the CMI Arts Initiative, CMI supports two international writers each year for a residency of 4-6 weeks. The objective of the CMI Arts Initiative is to provide a space for students, professionals and anybody else keenly interested in the humanities and arts to interact and learn from experts in these areas.

- 1.3.5 Has the university introduced any higher order skill development programmes in consonance with the national requirements as outlined by the National Skills Development Corporation and other agencies?

No

1.4 Feedback System

- 1.4.1. Does the university have a formal mechanism to obtain feedback from students regarding the curriculum and how is it made use of?

There is no formal mechanism for student feedback, but students do provide feedback on individual courses via their faculty advisors and this is discussed by the faculty in their regular meetings.

- 1.4.2. Does the university elicit feedback on the curriculum from national and international faculty? If yes, specify a few methods such as conducting webinars, workshops, online discussions, etc. and its impact.

The Boards of Studies in Mathematics, Computer Science and Physics as well as the Academic Council all have eminent members from leading academic institutions across the country. They provide regular feedback on the course content, and the curriculum is updated on a regular basis.

- 1.4.3. Specify the mechanism through which affiliated institutions give feedback on curriculum enrichment and the extent to which it is made use of.

Not applicable

- 1.4.4. What are the quality sustenance and quality enhancement measures undertaken by the university in ensuring the effective development of the curricula?

The periodic reviews of the Boards of Studies take care of these needs of the curricula.

Any other information regarding Curricular Aspects which the university would like to include.

CRITERION II: TEACHING-LEARNING AND EVALUATION

2.1 Student Enrolment and Profile

- 2.1.1. How does the university ensure publicity and transparency in the admission process?

The advertisement for admissions into CMI appears in leading newspapers and on the CMI website. Admission is based on a national entrance examination, conducted at

several centres across the country. Entrance examination question papers from previous years, with solutions, are posted on the CMI website.

After the entrance examination, the solutions to the question papers are put up on the CMI website. All requests for re-evaluation of answer-books are honoured.

- 2.1.2. Explain in detail the process of admission put in place by the university. List the criteria for admission: (e.g.: (i) merit, (ii) merit with entrance test, (iii) merit, entrance test and interview, (iv) common entrance test conducted by state agencies and national agencies (v) other criteria followed by the university (please specify).

Admission to the undergraduate programme at CMI is through a national entrance examination conducted at several centres across the country, with an optional interview at the discretion of the Admissions Committee. In addition to this, direct admission is offered to students who are selected for the national level camps in the Olympiads in mathematics, informatics, and physics. For the MSc and PhD programmes, students are selected based on their performance in CMI's national entrance examination as well as in external examinations such as JEST and NBHM, supplemented by interviews.

- 2.1.3. Provide details of admission process in the affiliated colleges and the university's role in monitoring the same.

Not applicable

- 2.1.4. Does the university have a mechanism to review its admission process and student profile annually? If yes, what is the outcome of such an analysis and how has it contributed to the improvement of the process?

CMI regularly reviews the admissions process and the student profile. The number of centres where the entrance exam is conducted has grown steadily over the years. For certain programmes, interviews have been introduced to supplement the entrance examination.

- 2.1.5. What are the strategies adopted to increase / improve access for students belonging to the following categories:

- SC/ST
- OBC
- Women
- Persons with varied disabilities
- Economically weaker sections
- Outstanding achievers in sports and other extracurricular activities

CMI has relaxed cut-offs for SC/ST, OBC and general students during the admission process. CMI's advertisement encourages students from SC/ST and OBC categories, and people with disabilities to apply for admission. CMI offers scholarships to students that are substantial enough to cover their living expenses.

- 2.1.6. Number of students admitted in university departments in the last four academic years:

Categories	Year 1 (2012)		Year 2 (2013)		Year 3 (2014)		Year 4 (2015)	
	Male	Female	Male	Female	Male	Female	Male	Female
SC	2	0	0	0	1	0	3	0
ST	0	0	0	0	0	0	1	0
OBC	4	0	3	0	7	0	9	1
General	48	4	50	6	65	7	60	10
Others	0	0	1	0	0	0	0	0

- 2.1.7. Has the university conducted any analysis of demand ratio for the various programmes of the university departments and affiliated colleges? If so, highlight the significant trends explaining the reasons for increase / decrease.

The figures below are for 2015. The university does not maintain detailed data about trends, but the number of applicants has been rising by approximately 10-15% each year, mainly due to greater awareness about CMI. The number of students admitted has remained roughly the same, based on infrastructural constraints. Hence the demand ratio has been steadily increasing.

Programmes	Number of applications	Number of students admitted	Demand ratio
UG	3748	105	35.70
PG	1017	48	21.19
Integrated Masters	–	–	–
M.Phil.	–	–	–
Ph.D.	891	11	81
Integrated Ph.D.	–	–	–
Certificate	–	–	–
Diploma	–	–	–
PG Diploma	–	–	–
Others (please specify)	–	–	–

- 2.1.8. Were any programmes discontinued/staggered by the university in the last four years? If yes, please specify the reasons.

The BSc Physics programme that was introduced in 2003 was suspended in 2012 and replaced by an integrated BSc programme in Mathematics and Physics. The Academic Council felt that such an integrated programme would be more suitable given CMI's position as a centre of excellence in mathematical sciences. Also, the structure of the new programme is symmetric with respect to the existing integrated BSc programme in Mathematics and Computer Science, so all BSc students graduate with the same core background in Mathematics.

2.2 Catering to Student Diversity

- 2.2.1. Does the university organize orientation / induction programme for freshers? If yes, give details such as the duration, issues covered, experts involved and mechanism for using the feedback in subsequent years.

The Director, Dean and other faculty and staff members participate in a one-day induction-cum-orientation programme which includes an informal meeting with the parents of the new students.

- 2.2.2. Does the university have a mechanism through which the “differential requirements of the student population” are analysed after admission and before the commencement of classes? If so, how are the key issues identified and addressed?

CMI students write a rigorous entrance examination, and the number of students overall is not large, so the selection procedure ensures that all students are capable of coping with the courses. However, each batch is assigned a faculty advisor who actively monitors the progress of the students across all courses and recommends corrective action for students who are not performing well.

- 2.2.3. Does the university offer bridge / remedial / add-on courses? If yes, how are they structured into the time table? Give details of the courses offered, department-wise/faculty-wise?

CMI does not have such courses. However, each batch is assigned a faculty advisor who actively monitors the progress of the students across all courses and recommends corrective action for students who are not performing well. This includes personalized assistance for such students.

- 2.2.4. Has the university conducted any study on the academic growth of students from disadvantaged sections of society, economically disadvantaged, physically handicapped, slow learners, etc.? If yes, what are the main findings?

No

- 2.2.5. How does the university identify and respond to the learning needs of advanced learners?

Students who do well in the programme have several opportunities to advance their knowledge and skills. There is sufficient flexibility in the system for them to take advanced courses. They can also sign up for reading courses on special topics with faculty members. It is also common for students to take up research projects. Some of the research done by undergraduate students has resulted in publications in international peer reviewed journals. The institute has also instituted a prize, given during the annual convocation, for the research done during the year by an undergraduate.

2.3 Teaching-Learning Process

- 2.3.1. How does the university plan and organise the teaching, learning and evaluation schedules (academic calendar, teaching plan, evaluation blue print, etc.)?

CMI follows a two-semester system. Each semester has fifteen weeks of teaching and two weeks for examinations. The academic calendar is announced well in advance and is prominently displayed on the CMI website.

Instructors have complete academic freedom in the teaching and evaluation process. CMI has continuous evaluation. A minimum of 30% and a maximum of 70% weightage is given to both continuous (mid-semester examination/quizzes/assignments/projects) and the final (end-semester examination) assessments.

A grade monitoring committee, chaired by the Dean of Studies, ensures that there are no serious discrepancies and/or anomalies in grading policies acrosses courses and/or instructors.

- 2.3.2. Does the university provide course outlines and course schedules prior to the commencement of the academic session? If yes, how is the effectiveness of the process ensured?

The overall course structure along with the syllabus and other details is made available on the CMI website. These details are updated on a regular basis.

- 2.3.3. Does the university face any challenges in completing the curriculum within the stipulated time frame and calendar? If yes, elaborate on the challenges encountered and the institutional measures to overcome these.

No

- 2.3.4. How is learning made student-centric? Give a list of participatory learning activities adopted by the faculty that contributes to holistic development and improved student learning, besides facilitating life-long learning and knowledge management.

The lectures are complemented and supplemented by assignments which the students are expected to work out to improve their understanding of the subject. The faculty members are available outside class hours to cater to any special needs the students may have. Besides, every batch has a faculty advisor who facilitates the management of time, learning and knowledge.

- 2.3.5. What is the university's policy on inviting experts / people of eminence to deliver lectures and/or organize seminars for students?

CMI has a steady stream of distinguished visitors who are experts in various fields who deliver lectures and interact with students.

- 2.3.6. Does the university formally encourage blended learning by using e-learning resources?

CMI is covered by a wifi network and the library is open round the clock. The computer lab is also open round the clock. Students are encouraged to use online resources to supplement classroom material. CMI has state of the art computational facilities with access to packages such as Mathematica, MatLab and Sage. CMI is also a part of the National Knowledge Network.

- 2.3.7. What are the technologies and facilities such as virtual laboratories, e-learning, open educational resources and mobile education used by the faculty for effective teaching?

Faculty members use the Moodle LMS as well as individual webpages to make course material available.

- 2.3.8. Is there any designated group among the faculty to monitor the trends and issues regarding developments in Open Source Community and integrate its benefits in the university's educational processes?

All the computer systems available for common use run open source software. The Computer Committee, made up of faculty members, that regularly monitors and upgrades the open source software on campus.

- 2.3.9. What steps has the university taken to orient traditional classrooms into 24×7 learning places?

CMI is covered by a wifi network. The library and computer lab are open round the clock.

- 2.3.10. Is there a provision for the services of counsellors / mentors/ advisors for each class or group of students for academic, personal and psycho-social guidance? If yes, give details of the process and the number of students who have benefitted.

Each batch of students in each discipline has a faculty advisor who acts as a friend, philosopher and guide to cope with the academic requirements of the students.

The institute also engages a professional counsellor to help students cope with stress arising from personal and academic issues. All students meet the counsellor when they join CMI, to become acquainted. Subsequently, appointments are arranged based on individual needs. Consultations between students and the counsellor are bound by a professional confidentiality clause. Hence, no detailed statistics are available about the number of students who make use of this facility. However, it has generally been observed that many students do appreciate and benefit from having access to a professional counsellor on the campus.

- 2.3.11. Were any innovative teaching approaches/methods/practices adopted/put to use by the faculty during the last four years? If yes, did they improve learning? What were the methods used to evaluate the impact of such practices? What are the efforts made by the institution in giving the faculty due recognition for innovation in teaching?

Each faculty member enjoys complete academic freedom and innovates as per requirement.

- 2.3.12. How does the university create a culture of instilling and nurturing creativity and scientific temper among the learners?

CMI has a regular series of seminars and colloquia, both by faculty and students of CMI and by visitors. This activity often goes beyond the subjects that CMI specialises in.

- 2.3.13. Does the university consider student projects mandatory in the learning programme? If yes, for how many programmes have they been (percentage of total) made mandatory?

Student projects are not mandatory for undergraduate students. However, many students do taken on summer projects, typically in academic institutions.

A project/dissertation is compulsory for the MSc Computer Science and MSc Mathematics programmes and is an option in the MSc Applications of Mathematics programme.

- Number of projects executed within the university
10–15 per year
- Names of external institutions associated with the university for student project work
IIT Madras, IIT Bombay, ISI Kolkata, National Centre for Biological Sciences, Microsoft Research, Cognizant Technology Solutions, Tata Consultancy Services
- Role of faculty in facilitating such projects
The faculty are actively involved in helping and guiding the students through their projects at CMI. Faculty also help fix up external projects for students whose interests lie outside the range of topics pursued at CMI.

- 2.3.14. Does the university have a well qualified pool of human resource to meet the requirements of the curriculum? If there is a shortfall, how is it supplemented?

CMI has access to 50–60 full-time and part-time faculty, all with PhDs, for teaching courses. CMI invites well-qualified guest faculty from other academic and research institutions to teach courses in areas that are not within the range of expertise available locally.

- 2.3.15. How are the faculty enabled to prepare computer-aided teaching/ learning materials? What are the facilities available in the university for such efforts?

All faculty members are provided with computers for their individual use and are adept at using software for preparing documents and preparations. All classrooms are equipped with projection facilities. The learning management system Moodle is available to faculty to organize their course material and make it available online to students. CMI is also a part of the National Knowledge Network.

- 2.3.16. Does the university have a mechanism for the evaluation of teachers by the students / alumni? If yes, how is the evaluation feedback used to improve the quality of the teaching-learning process?

There is no formal mechanism for student feedback, but students do provide feedback on individual courses via their faculty advisors and this is discussed by the faculty in their regular meetings.

2.4 Teacher Quality

- 2.4.1. How does the university plan and manage its human resources to meet the changing requirements of the curriculum?

All teaching faculty at CMI have PhDs and are experts in their respective fields. They are well-equipped to adapt to changes in the content of the courses being taught. For some subjects, such as the Humanities, where there may be no local experts available, external faculty members with strong academic credentials are invited to teach.

- 2.4.2. Furnish details of the faculty

Highest Qualification	Professors		Associate Professors		Assistant Professors		Total
	Male	Female	Male	Female	Male	Female	
Permanent teachers							
D.Sc./D.Litt.							
Ph.D.	13	-	10	2	7	1	33
M.Phil							
PG							
Temporary teachers							
D.Sc./D.Litt.							
Ph.D.	10	1					11
M.Phil							
PG							
Part-time teachers							
Ph.D.	1	2					3
M.Phil							
PG							

- 2.4.3. Does the university encourage diversity in its faculty recruitment? Provide the following details (department / school-wise).

Department / School	% of faculty from the same university	% of faculty from other universities within the State	% of faculty from universities outside the State	% of faculty from other countries
Mathematics	0.00%	10.00%	50.00%	40.00 %
Computer Science	0.00%	9.09%	54.55%	36.36 %
Physics	0.00%	0.00%	60.00%	40.00 %

- 2.4.4. How does the university ensure that qualified faculty are appointed for new programmes / emerging areas of study (Bio-technology, Bio-informatics, Material Science, Nanotechnology, Comparative Media Studies, Diaspora Studies, Forensic Computing, Educational Leadership, etc.)? How many faculty members were appointed to teach new programmes during the last four years?

The focus of CMI is on subjects related to the mathematical sciences. The Institute has full time faculty in the areas of mathematics, computer science, physics and statistics. Adjunct faculty have been appointed in related areas such as economics and mathematical finance. As the Institute's activities expand in scope to areas related to mathematical sciences, active steps will be taken to recruit new faculty in these areas.

- 2.4.5. How many Emeritus / Adjunct Faculty / Visiting Professors are on the rolls of the university?

Emeritus: 1, Adjunct Faculty: 11

- 2.4.6. What policies/systems are in place to academically recharge and rejuvenate teachers (e.g. providing research grants, study leave, nomination to national/international conferences/ seminars, in- service training, organizing national/international conferences etc.)?

CMI allows faculty members to take one year of sabbatical leave every six years, which is the standard in leading academic institutions. Besides this, CMI has a very liberal policy that encourages and supports faculty members to participate in and/or organise workshops and national/international conferences. Research grants are available to support these activities from the Faculty Development Fund.

- 2.4.7. How many faculty received awards / recognitions for excellence in teaching at the state, national and international level during the last four years?

Nil

- 2.4.8. How many faculty underwent staff development programmes during the last four years (add any other programme if necessary)?

CMI faculty do not normally attend training programmes. Rather, CMI faculty serve as resource persons for such programmes conducted by organizations such as NBHM in Mathematics and IARCS/ACM in Computer Science.

Academic Staff Development Programmes	Number of faculty
Refresher courses	
HRD programmes	
Orientation programmes	
Staff training conducted by the university	
Staff training conducted by other institutions	
Summer / Winter schools, workshops, etc.	

2.4.9. What percentage of the faculty have

- been invited as resource persons in Workshops / Seminars / Conferences organized by external professional agencies?
100%
- participated in external Workshops / Seminars / Conferences recognized by national / international professional bodies?
100%
- presented papers in Workshops / Seminars / Conferences conducted or recognized by professional agencies?
100%
- teaching experience in other universities / national institutions and other institutions?
100%
- industrial engagement?
30%
- international experience in teaching?
80%

2.4.10. How often does the university organize academic development programmes (e.g.: curriculum development, teaching-learning methods, examination reforms, content / knowledge management, etc.) for its faculty aimed at enriching the teaching-learning process?

Given the nature of the faculty and students at the Institute, there is no need perceived to organize such programmes.

2.4.11. Does the university have a mechanism to encourage

- Mobility of faculty between universities for teaching?
CMI faculty often teach courses in conjunction with neighbouring institutions such as the Institute of Mathematical Sciences. In addition, some CMI faculty have taught online courses organized through NPTEL, IIT Madras. In return, CMI regularly invites guest faculty from other leading institutions to teach courses at CMI.

- Faculty exchange programmes with national and international bodies?

CMI is also one of two non-European partners in ALGANT, a multi-institution Masters programme in Algebra, Geometry and Number Theory funded by the European Union. CMI also has exchange programmes with the Ecole Normale Supérieure and Ecole Polytechnique, of France.

CMI is a partner in an International Associated Laboratory (LIA) on Formal Methods set up by the French National Centre for Research in Science (CNRS). CMI is also a partner in the Indo-US Virtual Institute for Mathematical and Statistical Sciences (VI-MSS) jointly funded by the National Science Foundation, USA and the Department of Science and Technology, India.

If yes, how have these schemes helped in enriching the quality of the faculty?

Participation in research activities through exchange visits, collaborations, conferences and workshops is an integral part of the academic structure in place at CMI. The above programmes have greatly contributed not only to enhance the research activities at CMI, but also to showcase to the world the work being done at CMI.

2.5 Evaluation Process and Reforms

- 2.5.1. How does the university ensure that all the stakeholders are aware of the evaluation processes that are in place?

At the time of admission, the students are informed about the evaluation process. Details are also available on the webpage. Faculty members inform students about the specific evaluation pattern at the start of each course.

- 2.5.2. What are the important examination reforms initiated by the university and to what extent have they been implemented in the university departments and affiliated colleges? Cite a few examples which have positively impacted the examination management system.

There is no centralized process for setting examinations. Examinations are set by the individual instructors based on the material taught by them. This has been found to be the most effective way to meaningfully assess students' understanding of the material taught in class.

- 2.5.3. What is the average time taken by the university for declaration of examination results? In case of delay, what measures have been taken to address them? Indicate the mode / media adopted by the university for the publication of examination results e.g. website, SMS, email, etc.).

Results are announced within a fortnight for the odd semester and within a month for the even semester.

The Dean of Studies monitors delays and ensures that the results are announced in a timely manner.

Individual transcripts are prepared and distributed to the students by email.

- 2.5.4. How does the university ensure transparency in the evaluation process? What are the rigorous features introduced by the university to ensure confidentiality?

The students are free to examine their corrected answer-books and request re- evaluation. There is also a grade monitoring committee to ensure that there are no anomalies in the grading process.

2.5.5. Does the university have an integrated examination platform for the following processes?

- Pre-examination processes - Time table generation, OMR, student list generation, invigilators, squads, attendance sheet, online payment gateway, etc.

This is not required given the relatively small number of students involved.

- Examination process - Examination material management, logistics, etc.

This is not required given the relatively small number of students involved.

- Post-examination process - Attendance capture, OMR-based exam result, auto processing, generic result processing, certification, etc.

This is not required given the relatively small number of students involved. Marks and grades are recorded electronically in a database to facilitate automatic generation of transcripts.

2.5.6. Has the university introduced any reforms in its Ph.D. evaluation process?

CMI follows a standard procedure whereby Ph.D. theses are sent to two external examiners who provide written feedback. This is followed by an oral viva-voce examination. No reform has been deemed necessary.

2.5.7. Has the university created any provision for including the name of the college in the degree certificate?

Not applicable.

2.5.8. What is the mechanism for redressal of grievances with reference to examinations?

Students can raise their grievances with the concerned instructor, or the faculty advisor, or the Dean of Studies.

2.5.9. What efforts have been made by the university to streamline the operations at the Office of the Controller of Examinations? Mention any significant efforts which have improved the process and functioning of the examination division/section.

Given the size of CMI, there is no separate Office of the Controller of Examinations. All aspects of the examination process are handled by the administrative staff handling of student affairs along with the Dean of Studies and the faculty advisors.

2.6 Student Performance and Learning Outcomes

2.6.1. Has the university articulated its Graduate Attributes? If so, how does it facilitate and monitor its implementation and outcome?

These are not explicitly articulated, but it is implicit in the charter of the Institute that all graduates will acquire proficiency in mathematics and related subjects.

- 2.6.2. Does the university have clearly stated learning outcomes for its academic programmes? If yes, give details on how the students and staff are made aware of these?

CMI is a centre for excellence in mathematics and related subjects. Students attending the academic programmes are required to clear a specified set of core courses which are designed to give them a certain degree of proficiency and have a choice of electives to cater to their interests.

- 2.6.3. How are the university's teaching, learning and assessment strategies structured to facilitate the achievement of the intended learning outcomes?

This is considered an integral part of our system.

- 2.6.4. How does the university collect and analyse data on student learning outcomes and use it to overcome the barriers to learning?

Faculty advisors monitor the performance of students in courses and collect informal feedback from students about difficulties faced. These are discussed in faculty meetings to take corrective action, where necessary.

- 2.6.5. What are the new technologies deployed by the university in enhancing student learning and evaluation and how does it seek to meet fresh/ future challenges?

Courses are taught in a traditional lecture format. However, class sizes are small and interaction is encouraged. Most courses have assignments and projects in addition to exams and the Moodle learning management system is available to instructors to organize their course material, collect submissions and deliver feedback.

Any other information regarding Teaching, Learning and Evaluation which the university would like to include.

CRITERION III: RESEARCH, CONSULTANCY AND EXTENSION

3.1 Promotion of Research

- 3.1.1. Does the university have a Research Committee to monitor and address issues related to research? If yes, what is its composition? Mention a few recommendations which have been implemented and their impact.

CMI only has research faculty. Hirings and promotion are based primarily on the research profile. CMI does not have any full time faculty appointed purely for teaching.

For PhD students, the three Boards of Studies in Mathematics, Computer Science, and Physics monitor the activities in the respective departments. Their recommendations are incorporated in the ordinances of the institute and implemented by the respective departments. Some of the prominent recommendations in this regard concern the comprehensive examinations, and the setting up of doctoral committees for each student.

- 3.1.2. What is the policy of the university to promote research in its affiliated / constituent colleges?

Not applicable

3.1.3. What are the proactive mechanisms adopted by the university to facilitate the smooth implementation of research schemes/ projects?

- advancing funds for sanctioned projects
CMI advances funds for sanctioned projects so that they do not suffer from time delays.
- providing seed money
Seed money is not required given that the research in the Institute is typically of a theoretical nature. CMI does provide computational and library resources required for specific research directions. In addition, CMI has generous private endowments to enable faculty and research scholars to travel to conferences and workshops and undertake collaborative visits.
- simplification of procedures related to sanctions / purchases to be made by the investigators
CMI has a very small and efficient administration. Every attempt is made to simplify procedures with regard to purchases, without compromising on standard accounting and auditing practices.
- autonomy to the principal investigator/coordinator for utilizing overhead charges
Principal investigators have full control over how the overhead charges are to be utilized.
- timely release of grants
Grants are released without any delays.
- timely auditing
Both internal and external auditing of Institute accounts, including project related funding, is done on a regular basis.
- submission of utilization certificate to the funding authorities
The administration ensures that utilization certificates are submitted to funding agencies in a timely manner.

3.1.4. How is interdisciplinary research promoted?

- between/among different departments /schools of the university
Researchers have complete freedom in pursuing research in the topic of their choice and these often cut across disciplines. Also, CMI has a vibrant programme of research seminars throughout the year, combined with regular visits by distinguished academic visitors. This fosters an atmosphere where cross-fertilization of ideas is naturally encouraged.
- collaboration with national/international institutes / industries.
CMI is an active member of the Algebra, Geometry, and Number Theory (ALGANT) programme of the European Union, and is one of the very few non-European members. CMI also has exchange programmes with CNRS, the Ecole Normale Supérieure and Ecole Polytechnique, of France. CMI is also a part of the Indo-French Centre for the Promotion of Advanced Research (IFCPAR) that promotes bilateral cooperation in Science and Technology.

CMI is engaged in long-term collaborative research projects in formal methods and system verification with Tata Research Development and Design Centre and Honeywell Technology Solutions.

CMI also undertakes short-to-medium term research projects with other industries in a variety of areas spanning mathematics, statistics and computer science. Many leading industrialists are members of the CMI Trust. A important new initiative is the formation of AlgoLabs – a meeting place for academicians and industry to work on mutually beneficial projects.

3.1.5. Give details of workshops/ training programmes/ sensitization programmes conducted by the university to promote a research culture on campus.

1. Workshop and Conference on Fifty Years of the Narasimhan-Seshadri Theorem, October 5–16, 2015.
2. International Conference on Algebra, Geometry and History of Mathematics, July 27–29, 2015.
3. Research Workshop and Conference on Statistical Methods in Finance, July 13–17, 2015.
4. Astronomy, Cosmology and Fundamental Physics with Gravitational Waves, March 2–4, 2015.
5. 4th Workshop on Automata, Concurrency and Timed Systems, February 9–13 2015.
6. Recent Developments in Commutative Algebra and Applications to Classical Rings, January 12–14, 2015.
7. 1st CMI Alumni Conference, January 7–10, 2015.
8. NCM Advanced Instructional School in Algebraic Number Theory, July 7–26, 2014.
9. Reading Manuscripts in Sanskrit Mathematical Sciences, December 16–19, 2013.
10. Prof. K.R. Nagarajan's 80th Birthday Meet, December 9, 2013.
11. XIII Discussion Meeting on Harmonic Analysis 2013, December 9–14, 2013.
12. Instructional Workshop on Harmonic Analysis and Ergodic Theory, December 9–14, 2013.
13. Conference on Analytic Theory of Automorphic Forms, December 9–13, 2013.
14. Workshop on h -principle and its applications to contact and symplectic geometry, July 1–12, 2013.
15. Making Formal Verification Scalable and Useable, January 9–10, 2013.
16. Topics in Probability, December 18–20, 2012.
17. Mathematical Panorama Lectures series workshop on Syzygies and Free Resolutions, December 17–28, 2012.
18. Ninth AFS-1, NBHM Advanced Training in Mathematics School, December 3–29, 2012.
19. Formal Methods Update Meeting 2012, July 19–21, 2012.
20. CMI-IMSc Mathematics Colloquium 2012, January 23-27, 2012.
21. NBHM Advanced Instructional School on Invariant Theory, December 12–30, 2011.

22. Workshop on Pseudorandomness, August 22–25, 2011.
 23. NBHM Advanced Instructional School on Lie Algebras, July 4–23, 2011.
 24. Automata, Concurrency and Timed Systems, ACTS III, January 27–29, 2011.
 25. ICM satellite conference on Mathematical Logic and Set Theory, August 15–17, 2010.
 26. Automata, Concurrency and Timed Systems, ACTS II, February 1–3, 2010.
 27. Sixth AFS-1, NBHM Advanced Training in Mathematics School, December 3–30, 2009.
 28. Principal Bundles in Geometry, February–March, 2009.
 29. Automata, Concurrency and Timed Systems, ACTS, January 29–31, 2009.
 30. Perspectives in Concurrency Theory on the occasion of P.S. Thiagarajan’s 60th birthday, December 15–16, 2008.
 31. Translating Through Literature, April 11, 2008.
 32. Literary Seminar, October 13, 2007.
 33. Galois Representations and Modular Forms, September-October, 2007.
- 3.1.6. How does the university facilitate researchers of eminence to visit the campus as adjunct professors? What is the impact of such efforts on the research activities of the university?
- CMI has a regular stream of very eminent and distinguished researchers including Nobel Laureates, Abel Laureates, Fields Medallists, and members of the Royal Societies and Academies. The Infosys Foundation has provided funding to establish a visiting chair to invite distinguished faculty to spend extended periods at the institute. CMI also has a residency programme under the auspices of which writers and artists of eminence spend 1–2 months at time at CMI.
- These visits contribute greatly to the research activity on campus. They enable faculty and students to explore new ideas and keep current with the latest ideas in circulation across the world.
- 3.1.7. What percentage of the total budget is earmarked for research? Give details of heads of expenditure, financial allocation and actual utilization.
- About 60% of the budget is for faculty salaries. Research is an integral part of faculty duties.
- Another 10% of the budget is for the library, academic travel to conferences and inviting visitors, all of which contribute to research productivity.
- The remaining 30% is for basic recurring expenses such as maintenance, security, communication, postage etc.
- Hence, about 70% of the total budget may be deemed to be earmarked for research.
- 3.1.8. In its budget, does the university earmark funds for promoting research in its affiliated colleges? If yes, provide details.
- Not applicable.

3.1.9. Does the university encourage research by awarding Post Doctoral Fellowships/Research Associateships? If yes, provide details like number of students registered, funding by the university and other sources.

Yes, CMI has an active post-doctoral programme. Post-doctoral scholars are called visiting faculty members and are supported by Institute fellowships. They are also encouraged to participate in the teaching programme to gain valuable teaching experience. Some post-doctoral fellow are also supported through the INSPIRE and Ramanujan fellowships of Department of Science and Technology (DST).

3.1.10. What percentage of faculty have utilized the sabbatical leave for pursuit of higher research in premier institutions within the country and abroad? How does the university monitor the output of these scholars?

25% of faculty have availed of sabbatical leave. Work done during the sabbatical is included in the annual progress report submitted by each faculty member, which is used to compile the annual report of the Institute.

3.1.11. Provide details of national and international conferences organized by the university highlighting the names of eminent scientists/scholars who participated in these events.

1. NS@50: Fifty Years of the Narasimhan-Seshadri Theorem

The Narasimhan-Seshadri Theorem establishes a correspondence between stable vector bundles over a compact Riemann surface and unitary representations of the fundamental group of the surface. Since its publication in 1965, this result has played a central role in many branches of mathematics, including differential geometry, algebraic geometry, low dimensional topology, Teichmüller theory, etc., and more surprisingly in various areas of theoretical physics, like conformal field theory and string theory.

The goal of this activity is to present a comprehensive view of some of the most important developments that have taken place in the last 50 years derived from the Narasimhan-Seshadri Theorem, and explore further directions of the theory.

The themes to be covered will include: Vector bundles, Principal bundles, Higgs bundles, Parabolic bundles and Higgs bundles, Surface group representations, Gauge theory on higher dimensional Kahler manifolds, Real bundles and Higgs bundles, Geometric Langlands correspondence, Mirror symmetry and Higgs bundles, Irregular connections.

There will be background talks delivered by the organizing team, historical talks given by Narasimhan and Seshadri, invited research talks, and minicourses.

Minicourses (3 lectures each)

- P. Boalch (Orsay): Connections on curves and wild character varieties
- O. Biquard (Ecole Polytechnique): Milnor-Wood inequality from the Higgs bundle viewpoint
- C. Sabbah (Ecole Polytechnique): Twistor D-modules
- Du Pei (Caltech): A New TQFT from Equivariant Integration over Moduli Space of Higgs Bundles
- T. Pantev (Philadelphia) : Foliations in derived geometry, symplectic structures, and potentials

Participants

- J Andersen (Aarhus)
- G. Berczi (Oxford)
- O. Biquard (ENS, Paris)
- P. Boalch (ENS, Paris)
- L. Brambila-Paz (Guanajuato)
- B. Collier (UIUC, Urbana)
- Du Pei (Caltech)
- E. Franco (Campinas)
- J. Heinloth (Essen)
- M. Garcia-Fernandez (ICMAT, Madrid)
- T. Gomez (ICMAT, Madrid)
- J. Iyer (Chennai)
- J. Hurtubise (McGill)
- I. Mundet i Riera (Barcelona)
- A. Oliveira (Porto)
- T. Pantev (Philadelphia)
- A.J. Parameswaran (Bombay)
- A. Peon (Heidelberg)
- B. Pym (Oxford)
- S. Ramanan (CMI, Chennai)
- C. Sabbah (Paris)
- F. Schaffhauser (Bogota)
- L. Schaposnik (UIUC, Urbana)
- S. Szabo (Budapest)
- G. Thompson (Trieste)
- S. Venugopalan (Chennai)
- F. Villegas (Trieste)
- J. Weitsman (Northeastern)
- R. Wentworth (Maryland)
- G. Wilkin (Singapore)

2. International Conference on Algebra, Geometry and History of Mathematics, in honour of R. Sridharan on the occasion of his 80th birthday, July 27-29, 2015

Organizers

V. Balaji (CMI), R. Parimala (Emory), C.S. Seshadri (CMI), R. Sujatha (TIFR), V. Suresh (Emory)

Participants

- Ravi Rao - TIFR, Mumbai
- Sudhesh Khanduja - IISER, Mohali
- Nivedita Bhaskhar - Emory, Atlanta
- Preeti Raman - IITB, Mumbai

- M.D. Srinivas - Centre for Policy Studies, Chennai
- D.S. Nagaraj - IMSc., Chennai
- Senthamarai Kannan - CMI, Chennai
- Raja Sridharan - TIFR, Mumbai
- Amit Kulshrestha - IISER, Mohali
- Jean Barge - Ecole Polytechnique/CNRS, Paris
- Max-Albert Knus - ETH, Zurich
- Manuel Ojanguren - Ecole polytechnique federale de Lausanne
- M.S. Raghunathan - NCM, IITB, Mumbai
- S. Ramanan - CMI, Chennai
- R. Sujatha - TIFR, Mumbai
- V. Balaji - CMI, Chennai
- C.S. Seshadri - CMI, Chennai
- R. Parimala - Emory, USA
- Chetan Balwe - TIFR, Mumbai
- K.R. Nagarajan
- Anant Shastri - IITB, Mumbai
- Parvin Sinclair - IGNOU, Delhi

3. Research Workshop and Conference on Statistical Methods in Finance, July 13-17, 2015.

Organizing Committee:

Sourish Das (CMI), Rituparna Sen (ISI Chennai), Sitabhra Sinha (IMSc)

Speakers

- Susan Thomas, IGIDR, minicourse on *The working of financial markets*
- T V Ramanathan, University of Pune, minicourse on *Volatility: Modeling and Estimation*
- Rudra Pradhan, IIT Kharagpur: Financial Market Forecasting
- N Balakrishna, CUSAT: Financial Time Series Analysis
- Diganta Mukherjee, ISI Kolkata: Pricing a Class of Levy Driven Barrier Options using PIDE
- Pulak Ghosh, IIM Bangalore: Statistics, Big Data and Finance
- Anindya Goswami, IISER Pune: Statistical Inference in a Regime Switching Market
- Ananya Lahiri, CMI: Fractional Brownian Motion
- P Manimaran, AIMSCS: Time Series Analysis
- Tapen Sinha, ITAM, Mexico: Pricing of Microinsurance of Solar Panels
- Anirban Chakraborti, JNU: Econophysics
- Tapen Sinha, ITAM, Mexico: Time Series Methods in Geological Time Scale

4. Astronomy, Cosmology and Fundamental Physics with Gravitational Waves, March 2015

As a part of Silver Jubilee activity, CMI organized a workshop on Astronomy, Cosmology and Fundamental Physics with Gravitational Waves at CMI in March 2015.

The workshop aimed to focus on prospective collaborative projects in the emerging field of Gravitational Wave Astronomy through a series of intensive discussions between leading scientists, researchers and students working in the field.

Local Organization:

K G Arun (CMI), Chinmay Kalaghatgi (CMI), N V Krishnendu (CMI)

Scientific Organization:

P Ajith (ICTS-TIFR, Bangalore), K G Arun (CMI), Bala Iyer (ICTS-TIFR, Bangalore)

Speakers

- (i) Implications of GW observations for Short GRBs, Resmi L (IIST-Tvm).
- (ii) Seeing what we hear: finding electromagnetic counterparts for gravitational wave sources, Varun Bhalerao (IUCAA).
- (iii) Silver Jubilee Colloquium: LIGO-India: Towards Multi-messenger Astronomy, Bala R Iyer (ICTS-TIFR).
- (iv) Observational constraints on the standard cosmological model and beyond, L Sriramkumar (IITM).
- (v) Inflation after Planck, Jerome Martin (IAP, Paris).
- (vi) Parameter estimation and cosmology with gravitational waves, Archisman Ghosh (ICTS-TIFR).
- (vii) Silver Jubilee Colloquium: In pursuit of elusive cosmic gravitational waves, Tarun Souradeep (IUCAA).
- (viii) Strong-field Tests of Gravity, K G Arun (CMI).
- (ix) Tests of theories of gravity using gravitational-wave observations, P Ajith (ICTS-TIFR).
- (x) Silver Jubilee Colloquium: What Physics and Astrophysics of Compact Objects will Gravitational Wave Observations Teach Us?, Sukanta Bose (IUCAA).

5. 4th Workshop on Automata, Concurrency and Timed Systems, February 2015

ACTS 2015 was envisioned as a follow-up to the three ACTS workshops held in CMI in February 2011, February 2010 and January 2009 . It is one of the events being organized to mark the 25th year since the founding of CMI.

Scientific Committee:

Paul Gatin (LSV, ENS Cachan), M Praveen (CMI), B Srivathsan (CMI), Pascal Weil (LaBRI, Bordeaux)

Local Organization:

K Narayan Kumar (CMI), Madhavan Mukund (CMI)

Speakers

- (i) C Aiswarya (Uppsala University, Sweden): Communicating Recursive Programs: Control and Split-width.
- (ii) Mohamed Faouzi Atig (Uppsala University, Sweden): The Best of Both Worlds: Trading Efficiency and Optimality in Fence Insertion for TSO.
- (iii) Benedikt Bollig (LSV, ENS Cachan, France): Towards a Regular Theory of Parameterized Concurrent Systems.
- (iv) Christopher Broadbent (TU Munich, Germany): Model-Checking Untyped Recursion Schemes over the Modal Mu-Calculus.

- (v) Thomas Colcombet (LIAFA, University Paris 7, France): Characterizing logics over infinite words.
- (vi) Diego Figueira (LaBRI, University of Bordeaux, France): On reflexive-transitive navigation in the presence of data values.
- (vii) Pierre Ganty (IMDEA Software Institute, Madrid, Spain): Parameterized Verification of Asynchronous Shared-Memory Systems.
- (viii) Christoph Haase (LSV, ENS Cachan, France): Pushing the boundaries of the complexity of the reachability problem in vector addition systems one step at a time.
- (ix) Marcin Jurdzinski (University of Warwick, UK): The perfect half-spaces technique for multi-dimensional energy games.
- (x) Manfred Kufleitner (University of Stuttgart, Germany): Omega-terms and automata.
- (xi) Akash Lal (MSR Bengaluru, India): A Program Transformation for Faster Goal-Directed Search.
- (xii) Anthony Widjaja Lin (Yale-NUS College, Singapore): Parikh's Theorem: Complexity and Applications.
- (xiii) Jerome Leroux (LaBRI, University of Bordeaux, France): Hyper-Ackermannian Bounds for Pushdown Vector Addition Systems.
- (xiv) Rupak Majumdar (MPI Kaiserslautern, Germany): What's decidable about asynchronous programs?
- (xv) Thomas Place (LaBRI, University of Bordeaux, France): Climbing Up the Quantifier Alternation Hierarchy of First-Order Logic over Words.
- (xvi) Gabriele Puppis (LaBRI, University of Bordeaux, France): The Cost of Repairs.
- (xvii) M Praveen (CMI, Chennai, India): Defining relations on graphs: how hard is it in the presence of node partitions?
- (xviii) Jean-Francois Raskin (ULB, Brussels, Belgium): Variations on the stochastic shortest path problem.
- (xix) Arnaud Sangnier (LIAFA, University Paris 7, France): Distributed local strategies in broadcast networks.
- (xx) Sylvain Schmitz (LSV, ENS Cachan, France): Towards Complexity Upper Bounds for VASS Reachability.
- (xxi) Simoni Shah (TIFR, Mumbai, India): Recursive po2DFA: Hierarchical Automata for FO-definable languages.
- (xxii) B Srivathsan (CMI, Chennai, India): Fast detection of cycles in timed automata.
- (xxiii) Ashutosh Trivedi (IIT Bombay, Mumbai, India): Bounded-Rate Multi-Mode Systems Based Motion Planning.
- (xxiv) Marc Zeitoun (LaBRI, University of Bordeaux, France): The separation problem: an introduction and a transfer theorem.
- (xxv) Martin Zimmermann (Saarland University, Saarbruecken, Germany): How Much Lookahead is Needed to Win Infinite Games.

6. 1st CMI Alumni Conference, January 2015

Organisers: Krishna Hanumanthu and Sourav Chakraborty (CMI).

As part of year-long Silver Jubilee celebrations, CMI organized a conference at CMI where speakers were alumni (former members and students). Various alumni of CMI

who have established themselves in academia in Mathematics, Computer Science, Physics and other related subjects gave talks in the conference.

Speakers:

- (i) S Akshay, IIT Bombay, Reachability problems for Markov chains.
- (ii) C S Aravinda, TIFR CAM, Bangalore, Dynamics of geodesic conjugacies.
- (iii) Baskar Balasubramanyam, IISER Pune, Special values of adjoint L-functions and congruences between automorphic forms.
- (iv) Anandam Banerjee, IISER Mohali, Equivalence relations on algebraic cobordism cycles.
- (v) Kuntal Banerjee, Presidency University, Kolkata, Widths of Arnold tongues and Herman rings.
- (vi) Shiladitya Banerjee, University of Chicago, USA, Geometry, mechanics and fluctuations in Life.
- (vii) Pabitra Barik, IIT Madras, Hitchin pairs on a singular curve.
- (viii) Rajesh Chitnis, Weizmann Institute of Science, Israel, Coping with Big Data and Big Time.
- (ix) Amit Deshpande, Microsoft Research, Bangalore, The geometry of semidefinite programs.
- (x) Deepak D'Souza, IISc, Bangalore, Refinement-Based Verification of Functional Correctness.
- (xi) Sushmita Gupta, Kyoto University, Japan, Online computation with advice.
- (xii) Nagarajan Krishnamurthy, IIM Indore, Stochastic Social Cloud.
- (xiii) Raghav Kulkarni, NTU, Singapore, Decision Trees, Solvable Groups, and Music of Primes.
- (xiv) Debapriyo Majumdar, ISI Kolkata, Query Suggestions without Query Logs.
- (xv) Swarna Mukhopadhyay, University of Maryland, USA, Strange Duality of G-theta functions.
- (xvi) Debajyoti Nandi, Rutgers University, USA, Interplay between partitions, representation theory and VOAs.
- (xvii) Yashonidhi Pandey, IISER Mohali, Brauer Group of moduli of torsors under parahoric group scheme G over a curve.
- (xviii) Vimala Ramani, Anna University, Chennai, On some fractional differential equations in electro chemistry.
- (xix) Rajarshi Ray, NIT Meghalaya, Shillong, Parallelizing State Space Exploration Algorithm of Hybrid Systems using Support Functions.
- (xx) Arnab Saha, Australian National University, Arithmetic Jet Spaces.
- (xxi) Parameswaran Sankaran, IMSc, Chennai, Twisted conjugacy in PL homeomorphism groups of the interval.
- (xxii) Saket Saurabh, IMSc, Chennai, Algorithmic Applications of Two Families Theorem.
- (xxiii) Raghunath Tewari, IIT Kanpur, Simultaneous Time-Space Bounds for the Graph Reachability Problem.

7. Recent Developments in Commutative Algebra and Applications to Classical Rings, January 2015

An India-UK Scientific Seminar supported by the Department of Science and Technology (India) and the Royal Society (UK).

Organizers: Manoj Kummini (CMI) and Peter Symonds (Manchester).

Participants:

Adam Booher (Edinburgh)

Clare D’Cruz (CMI)

Arijit Dev (IIT-Madras)

Jonathan Elmer (Aberdeen)

Krishna Hanumanthu (CMI)

A V Jayanthan (IIT-Madras)

Senthamarai Kannan (CMI)

Moty Katzman (Sheffield)

Neeraj Kumar (IMSc)

Manoj Kummini (CMI)

Shreedevi Masuti (IMSc)

K N Raghavan (IMSc)

R J Shank (Kent)

Kavita Sutar (CMI)

Peter Symonds (Manchester)

Jugal Verma (IIT-Bombay)

8. NCM Advanced Instructional School in Algebraic Number Theory (July 2014)

The goal of this instructional school is to cover some of the salient features, both algebraic as well analytic, of algebraic number fields which every beginning researcher of number theory should be aware of.

- Krishna Hanumanthu, CMI and Clare D’Cruz, CMI: Module-1: Basic Commutative Algebra Prerequisites (Four lectures).
- Kaneenika Sinha, IISER, Pune and Sanoli Gun, IMSc.: Module-2: Introduction to algebraic number fields (Seven Lectures).
- D.S. Ramana, HRI and R. Balasubramanian, IMSc.: Module-3: Arithmetic and Analysis on Quadratic fields (Eight Lectures).
- R. Thangadurai, HRI, A. Mukhopadhyay, IMSc. and Purusottam Rath, CMI: Module-4: Arithmetic and Analysis on Cyclotomic fields (Nine Lectures).
- M. Ram Murty, Queen’s University, Kingston and V. Kumar Murty, University of Toronto: Module-5: Arithmetic and Analysis on Arbitrary Number fields (Eight Lectures).
- *Tutors:* Anwesh Ray, CMI, Prem Prakash Pandey, CMI, Sumit Giri, IMSc., Ekata Saha, IMSc., Biswajyoti Saha, IMSc. and A. Vatwani, Queen’s University.

9. Reading Manuscripts on Mathematical Sciences in Sanskrit, December 2013

This reading was arranged under the auspices of the Working Group for History of Astronomical and Mathematical Sciences in India (HAMSI). The participants read together and discussed the various Sanskrit manuscripts that each of them was currently working on. "Field Trips" were also organised to see Sanskrit scientific manuscripts in the area, at the K. V. Sarma Library and/or the Manuscripts Library at University of Madras. The participants were

- Prof. Christopher Minkowski, Boden Professor of Sanskrit, Oriental Institute, University of Oxford, UK.
- Dr Clemency Montelle, Senior Lecturer, Department of Mathematics and Statistics, University of Canterbury, New Zealand.
- Prof. Kim Plofker, Department of Mathematics, Union College, New York, U.S.A.
- Prof. K. Ramasubramanian, Department of Humanities and Social Sciences, IIT Bombay, India.
- Prof. Kenneth Zysk, Department of Cross-Cultural and Religious Studies, University of Copenhagen, Denmark.

10. Lectures to honour Prof. K.R. Nagarajan on his 80th Birthday, December 2013

- Krishna Hanumanthu, CMI, *Hilbert coefficients of local rings*
- Rohith Varma, CMI, *Higgs bundles on Elliptic surfaces*

11. Workshop and XIII Discussion Meeting On Harmonic Analysis (DMHA), December 2013

The workshop was held at the Chennai Mathematical Institute, Chennai and the Conference was held at the Institute of Mathematical Sciences, Chennai. The organizers were : V S Sunder (IMSc.), Sundari Maddala (CMI), Shrihari Sridharan (CMI) and Murali Vemuri (CMI).

The following topics were covered in the lectures that took place during the workshop.

- S. Sundar, CMI
Basic Measure Theory, Product Spaces, Fubini's Theorem, Infinite Product Spaces, Hilbert Spaces, Radon - Nikodym Theorem, Spectral Theorem for Self-adjoint Operators, Banach - Alaoglu Theorem
- R. L. Karandikar, CMI
Conditional Expectations, Martingale Convergence Theorem, Borel - Cantelli Lemma.
- Amritanshu Prasad, IMSc
The Fourier Transform on T and R , Generalisation to LCA Groups, Plancherel Theorem, Hausdorff - Young Inequality, Pontryagin Duality.
- M. K. Vemuri, CMI
Locally Compact Groups, Representations in Hilbert Space, Irreducible Representations, The Dual Object, Fourier Transforms, A Statement of Plancherel for Type I Groups.
- B. V. Rao, CMI
Partitions, Kolmogorov and Sinai Entropy, Basic Ergodic Theory, Theorems of Birkhoff and von Neumann, Poincare's Recurrence Theorem, Transitivity.

12. h -principle and its applications to contact and symplectic geometry, July 2013

This workshop was organized by V. Balaji, Dishant M. Pancholi and Shiva Shankar to cover the preliminaries necessary to follow Prof. Yakov Eliashberg's lectures at CMI.

- M. Dutta and D.M.Pancholi, *Introduction to h -principle*
- S. Shankar, *Basic symplectic geometry and Arnold conjecture*

- Gautam Bharali, *An introduction to plurisubharmonic functions and Stein manifolds*
- S. Venugopalan, *Introduction to contact geometry*

13. Making Formal Verification Scalable and Useable, January, 2013

While Formal Methods (FM) and Formal Verification (FV) have had an impact in specific areas, notably in hardware (HW) and protocol verification, they are far from realizing their promise and potential in practice, especially in software (SW) and embedded systems. The main bottlenecks blocking wider application of FM/FV techniques are their lack of scalability and the lack of enough successful models using these techniques in a way that can be replicated.

The aim of this workshop was to bring together a group of experts from both industry and academia to share their experiences and exchange new ideas and solutions to this problem. The presentations and discussions at the workshop included the following topics.

- State-of-art FV tools and techniques in use in industry
- Technical challenges and bottlenecks for scalability and useability
- New areas of applications and related correctness issues
- New techniques and solutions for scaling FM/FV

The list of talks at the workshop was as follows:

- (i) Jason Baumgartner, IBM
Formal Verification at IBM: Applications and Algorithms
- (ii) Supratik Chakraborty, IIT Bombay
Practical Quantifier Elimination for Linear Bit-vector Inequalities
- (iii) Pallab Dasgupta, IIT Kharagpur
Formal verification in informal worlds
- (iv) Manoj Dixit, Mathworks
Early time-budgeting in Distributed Embedded Control Systems
- (v) Deepak D'Souza, IISc
Verification of Free-RTOS
- (vi) Ambar Gadkari and Pradeep Kumar Nalla, IBM
Formal Verification at IBM: Applications and Algorithms
- (vii) A Kirankumar, Intel
Symbolic Trajectory Evaluation: The Prime Validation Vehicle for Intel's Next Generation Processor Graphics FPU
- (viii) N V Krishna, IIT Madras
Correctness Issues in Transforming Task Parallel Programs
- (ix) Daniel Kroening, Oxford
Reasoning about floating-point arithmetic with abstract conflict-driven clause learning
- (x) Aditya Nori, MSR
Program Verification via Machine Learning
- (xi) Madhusudan Parthasarathy, UIUC/MSR
Natural Proofs for Verification of Dynamic Heaps
- (xii) K V Raghavan, IISc
Precise, on-demand null-dereference verification for Java

- (xiii) Prahlad Sampath, Mathworks
Translation Validation for Stateflow Code Generation
- (xiv) Nishant Sinha, IBM
Big-step Bounded Model Checking for Software
- (xv) R Venkatesh, TRDDC
Challenges in applying formal verification to industry applications

14. Topics in Probability, December 2012

This workshop was jointly organized by Chennai Mathematical Institute (CMI), the Institute of Mathematical Sciences (IMSc) and the Statistical and Mathematical Sciences Institute (SAMSI) as an activity of the DST-NSF Indo-US Virtual Institute for Mathematical and Statistical Sciences (VI-MSS).

The list of talks at the workshop was as follows:

- (i) Siva Athreya, Indian Statistical Institute, Bangalore
Convergence of Nearest Neighbor Markov chains on discrete trees towards Brownian Motion on real-trees
- (ii) Richard Bass, University of Connecticut
A stability theorem for the elliptic Harnack inequality
- (iii) Vivek Borkar, Indian Institute of Technology Bombay, Mumbai
Certain small noise limits for diffusions
- (iv) Arup Bose, Indian Statistical Institute, Kolkata
Limiting spectral distribution of patterned random matrices
- (v) Sandra Cerrai, University of Maryland
Pathwise uniqueness of stochastic partial differential equations in Banach spaces
- (vi) Manjunath Krishnapur, Indian Institute of Science, Bangalore
Nodal length of random eigenfunctions of the Laplacian on the 2-d torus
- (vii) Tom Kurtz, University of Wisconsin
Time-change equations for diffusion processes
- (viii) Krishanu Maulik, Indian Statistical Institute, Kolkata
Rates of convergence of color count in balanced urn models
- (ix) Anish Sarkar, Indian Statistical Institute, Kolkata
Brownian Web in the Scaling Limit of Supercritical Oriented Percolation in Dimension $1 + 1$
- (x) Ramon Van Handel, Princeton University
Conditional ergodicity in infinite dimension
- (xi) Mathukumalli Vidyasagar, University of Texas at Dallas
A metric between probability distributions of different sizes and applications to order reduction

15. Mathematical Panorama Lectures series workshop on Syzygies and Free Resolutions, December 2012

This workshop was organized as part of the Mathematical Panorama Lectures during the National Mathematical Year (2012) celebrations on the occasion of the 125th birthday of Srinivasa Ramanujan. It consisted of a week-long preparatory workshop (17–22 December 2012), for graduate students and young researchers, on syzygies and free resolutions followed, in the next week (24–28 December 2012), by lectures on recent developments in this area. The principal speaker for the second week was

Prof. David Eisenbud (University of California, Berkeley, USA), who gave a series of lectures on free resolutions. In addition to Prof. Eisenbud's talks, there were a series of lectures by experts in the area of syzygies and free resolutions.

Speakers for the preparatory workshop (17–22 December 2012):

- Krishna Hanumanthu, CMI, Siruseri.
- Manoj Kummini, CMI, Siruseri.
- Pramathanath Sastry, CMI, Siruseri.
- Sudhir Ghorpade, IIT Bombay, Mumbai.

Speakers at the workshop (24–28 December 2012).

- Srikanth Iyengar, University of Nebraska, USA.
- Jaya Iyer, IMSc, Chennai.
- Vikram Mehta, TIFR, Mumbai.
- Bangere Purnaprajna, University of Kansas, USA.
- S. Ramanan, CMI, Siruseri.
- Hema Srinivasan, University of Missouri, USA.
- Kavita Sutar-Deshpande, CMI, Siruseri.

16. Ninth AFS-1, NBHM Advanced Training in Mathematics School, December 2012

This AFS covered Algebra, Analysis and Topology and Geometry. The resource persons were:

- (i) S. Senthamarai Kannan, CMI
- (ii) Krishna Hanumanthu, CMI
- (iii) S. Vishwanath, IMSc
- (iv) Purusottam Rath, CMI
- (v) Amritanshu Prasad, IMSc
- (vi) B.V. Rao, CMI
- (vii) M. Sundari, CMI
- (viii) E.K. Narayanan, IISc
- (ix) Priyavrat Deshpande, CMI
- (x) Sukhendu Mehrotra, CMI
- (xi) Vimala Ramani, Anna University
- (xii) Mahan Mj, RKM Vivekananda University

17. Formal Methods Update Meeting 2012, July 2012

This is an annual event where speakers present recent developments in areas related to formal methods. The list of talks at the workshop was as follows:

- (i) Deepak D'Souza, IISc
Program Analysis Techniques for Under and Over Approximations
- (ii) Shibashis Guha, IIT Delhi
Prebisimulation for Timed Automata
- (iii) Kamal Lodaya, IMSc
Verification of Probabilistic Systems
- (iv) Bastien Maubert, IRISA
Dependence Logic

- (v) Madhavan Mukund, CMI
Statistical Model Checking
- (vi) Prakash Saivasan, CMI
Parity Games on Higher Order Push Down Systems
- (vii) Gautham Shenoy R, CMI
Convergent/Commutative Replicated Data Types (CRDTs)
- (viii) Mandayam Srivas
Application of Bounded-Model-Checking (BMC) in an Industrial Setting
- (ix) S P Suresh, CMI
Selected Papers from LICS 2012

18. CMI-IMSc Mathematics Colloquium 2012 - January 2012

Organisers: V. Balaji (CMI), V. Lakshmbai (Northeastern Univesity, U.S.A.), A. J. Parameswaran (TIFR, Mumbai), K. N. Raghavan (IMSc, Chennai) and Pramathanath Sastry (CMI).

This colloquium consisted of talks in algebraic geometry and related areas of mathematics, celebrating the work of C. S. Seshadri, on the occasion of his 80th birthday. The following speakers gave lectures at the colloquium.

- (i) Michel Brion (Grenoble, France) - The cohomology algebra of an algebraic group
- (ii) Corrado DeConcini (Roma I, Italy) - Index, infinitesimal Index of transversally elliptic operators and splines
- (iii) Jochen Heinloth (Essen, Germany) - On motivic classes of moduli spaces of Higgs bundles
- (iv) Mohan Kumar (St. Louis, U.S.A.) - Spaces of rational curves in general hypersurfaces
- (v) Adrian Langer (Warsaw, Poland) - On a positive equicharacteristic version of the Grothendieck-Katz conjecture
- (vi) Laurent Lafforgue (IHES, France)
- (vii) Vikram Mehta (TIFR, India)
- (viii) Patrick Polo (Jussieu, France) - On torsion in integral intersection cohomology of Schubert varieties
- (ix) Tadao Oda (Tohoku, Japan) - (Semi)stability and (quasi)crystals.
- (x) Claudio Procesi (Roma I, Italy) - Algebraic and geometric aspects of the non linear Schroedinger equation
- (xi) C.S. Rajan (TIFR, Mumbai) - Spectrum and Arithmetic
- (xii) M. S. Raghunathan (IIT-Bombay, India)
- (xiii) Arun Ram (Melbourne, Australia) - Views from 20 years trekking on the LS path
- (xiv) T. R. Ramadas (ICTP, Italy)
- (xv) V. Srinivas (TIFR, India) - Abelian Varieties and Theta Functions associated to certain compact Riemannian manifolds: constructions inspired by superstring theory
- (xvi) Constantin Teleman (Berkeley, USA) - Geometric Langlands correspondence after Beilinson-Drinfeld and deformed opers

- (xvii) Ravi Vakil (Stanford, USA) - Stabilization of discriminants in the Grothendieck ring
- (xviii) Jonathan Weitsman (Northeastern, USA) - Semiclassical analysis, loop group characters, and the modular group action (joint with Victor Guillemin and Shlomo Sternberg)

19. Advanced Instructional School on Invariant Theory (AIS) Supported by NBHM - December 2011

Conveners: V. Balaji, CMI and A.J. Parameswaran (TIFR, Mumbai).

Main Lectures:

- (i) D.S. Nagaraj, IIMSc, Chennai - Initial aspects of GIT. Hilbert-Mumford etc.
- (ii) Jugal Varma, IIT, Mumbai - Commutative Algebra aspects of GIT.
- (iii) K.N. Raghavan, IIMSc - Work of Kempf and Hasslink on instability flags.
- (iv) A.J. Parameswaran, TIFR, Mumbai - Characteristic p methods, Ramanan-Ramanathan, ramifications, Luna's slice theorem
- (v) V. Balaji, CMI - Rousseau's work on instability, Bogomolov's work on instability.
- (vi) Pramathanath Sastry, CMI - Mumford's conjecture, various aspects.

Unity Lectures:

- (i) S. Ramanan, CMI - Three talks on classical Invariant theory.
- (ii) C.S. Seshadri, CMI - GIT construction of moduli of abelian varieties.
- (iii) Pierre Cartier, Institut des Hautes Etudes Scientifiques, France - On invariants in geometry, algebra, and mechanics (classical, relativistic and quantum): a century of developments

20. Workshop on Pseudorandomness - August 2011

The workshop aimed at highlighting the latest tools and techniques in the area of pseudorandomness.

This workshop was supported by the CMI-TCS Academic Alliance.

Broadly, the scope of the workshop was: Expanders and applications, Additive combinatorics and its applications to pseudorandomness, Codes, and their relation to extractors and expanders.

Organisers: K. V. Subrahmanyam (CMI), Partha Mukhopadhyay (CMI), Sourav Chakraborty (CMI) and V Balaji(CMI).

Lectures:

- (i) Introductory Talk - Jaikumar Radhakrishnan , TIFR, Mumbai.
- (ii) Lossless expanders/extractors from algebraic codes, Expander codes, Euclidean Sections - Venkatesan Guruswami, Carnegie Mellon University.
- (iii) Application of Boolean function analysis to computational randomness - Andrej Bogdanov, Chinese University of Hongkong, Hongkong.
- (iv) The Kakeya Problem and the Joints Conjecture - Neeraj Kayal, Microsoft Research, Bangalore.
- (v) Pseudorandom generators for threshold functions using invariance principles - Prahladh Harsha, TIFR, Mumbai

21. Advanced Instructional School (sponsored by NBHM) on Lie Algebras during July 2011 at Chennai Mathematical Institute (CMI) and Institute of Mathematical Sciences (IMSc)

This AIS aimed to develop basics of the theory as the classification of the algebras by means of root systems, the structure of an algebra in terms of a Cartan subalgebra and root spaces, complete reducibility of representations, parametrization of the irreducible representations by means of highest weights, well known character formulas for representations, Chevalley groups and their basic properties and affine Kac-Moody Lie algebras and their representations, up to the Kac-Weyl character formula and the proof of the Macdonald identities.

Conveners: Upendra Kulkarni (CMI), K. N. Raghavan (IMSc), and S. Viswanath (IMSc).

Resource persons:

- Punita Batra (HRI, Allahabad)
- Anuradha Garge (CEBS, Mumbai)
- Shripad Garge (IIT, Bombay)
- Senthamarai Kannan (CMI)
- Upendra Kulkarni (CMI),
- Brajesh Mishra (Allahabad University, Allahabad)
- K.N. Raghavan (IMSc)
- Ravindra
- P. Shukla (Allahabad University, Allahabad)
- Anupam Kumar Singh (IISER, Pune)
- K.V. Subrahmanyam (CMI)
- S. Viswanath (IMSc).

Unity of Mathematics lectures: In addition to the lectures on the syllabus proper, there were two lectures on relations to physics (“The uses of Lie groups and Lie algebras in physics”) by N. Mukunda, IISc, Bangalore and a lecture on relations to computational complexity (“Positivity and plethysms in geometric complexity theory”) by Ketan Mulmuley.

22. Automata, Concurrency and Timed Systems, ACTS III - January 2011

ACTS III is envisioned as a follow-up to the ACTS workshops held in CMI in January 2009 and February 2010. The main theme of the workshop is the use of logic and automata for modelling and verifying distributed, open and timed systems.

Speakers:

- (i) Benedikt Bollig, LSV, ENS Cachan - An automaton over data words that captures EMSO logic.
- (ii) Tayssir Touili, LIAFA, Paris 7 - On Model Checking Multi-threaded recursive programs.
- (iii) Benoit Razet, TIFR, Mumbai - Tracing the decision procedure for regular expressions equality.
- (iv) Nathalie Bertrand, INRIA - A game approach to determinize timed automata.
- (v) Stefan Haar, INRIA/LSV, ENS Cachan - A Concurrency-Preserving Translation from Time Petri Nets to Networks of Timed Automata.

- (vi) Hugo Gimbert, LaBRI, Bordeaux - Stochastic Games with Partial Observation: Decidable and Undecidable Problems.
- (vii) Manfred Kufleitner, Stuttgart - On languages of dot-depth one over infinite words.
- (viii) Loic Helouet, IRISA - Diagnosis with Dynamic MSC Languages.
- (ix) Paritosh Pandya, TIFR, Mumbai - Unambiguity in Timed Regular Languages: Automata, Logics and Expressiveness.
- (x) K. Vasanta Lakshmi, IISc., Bangalore - Verification of Requirement Specifications Using Counter Automata.
- (xi) Yaron Velner, Tel Aviv - Church Synthesis Problem for Noisy Input.
- (xii) Ramchandra Phawade, IMSc., Chennai - A Kleene functor for a subclass of net systems.
- (xiii) Soumya Paul, IMSc., Chennai - Neighbourhood structures in games.
- (xiv) B. Srivathsan, LaBRI, Bordeaux - A lazy reachability algorithm for timed automata.
- (xv) Supratik Chakraborty, IIT, Mumbai - Ranking function based disambiguation techniques for Bchi automata.
- (xvi) Stefan Schwoon, LSV, ENS Cachan - Towards an efficient contextual unfold.
- (xvii) S.P. Suresh, CMI, Chennai - A DEXPTIME-complete Dolev-Yao theory with distributive encryption.
- (xviii) Hrishikesh Karmarkar, IIT, Mumbai - Determinization of ω -automata unified.
- (xix) Sylvain Salvati, LaBRI, Bordeaux - Towards an algebraic classification of recognizable sets of lambda-terms.
- (xx) S. Akshay, NUS, Singapore - Approximate methods for probabilistic inference in Dynamic Bayesian Networks.
- (xxi) Deepak D'Souza, IISc. Bangalore - Conflict Tolerant Specifications for Hybrid Systems.
- (xxii) M Praveen, IMSc., Chennai - Small Vertex Cover makes Petri Net Coverability and Boundedness Easier.

23. ICM satellite conference on Mathematical Logic and Set Theory - August 2010

In the successful tradition of logic satellite meetings at recent ICMs, CMI hold a satellite conference on mathematical logic and set theory in India to provide a specialized venue for logicians and set theorists connected with ICM 2010 in Hyderabad. The conference was co-hosted by the Institute of Mathematical Sciences and the Chennai Mathematical Institute on behalf of the Association for Logic in India. The scope of the intended meeting is all of mathematical logic, including its areas of application (theoretical computer science, algebraic logic and others).

- (i) Theodore A. Slaman, University of California, U.S.A. - Structures Recursive in a Random Real.
- (ii) Dilip Raghavan, University of Toronto, Canada - Cofinal types of ultrafilters.
- (iii) Andre Nies, University of Auckland, New Zealand - Borel Structures.
- (iv) Justin T. Moore, Cornell University, U.S.A. - Forcing Axioms and the Continuum Hypothesis.
- (v) Andrew Brooke-Taylor, University of Bristol - Zero-one laws for Fraisse limits over infinite languages.

- (vi) Gunnar Wilken, Okinawa Institute of Science and Technology, Japan - Tracking Chains of σ_2 -Elementarity.
 - (vii) Denis I. Saveliev, Moscow State University, Russia - Groupoids of ultrafilters.
 - (viii) Anand Pillay, University of Leeds, U.K. - Measures in model theory.
 - (ix) Joan Bagaria, ICREA & Universitat de Barcelona, Spain - Structural Reflection and the Hierarchy of $C(n)$ cardinals.
 - (x) Janak Ramakrishnan, Universit Claude Bernard, France - Definable linear orders definably embed into lexicographic orders in o-minimal structures.
 - (xi) Cedric Milliet, Universit Claude Bernard, France - Groups with few types.
 - (xii) Menachem Magidor, Hebrew University of Jerusalem, Israel - Square like principles and Forcing axioms.
 - (xiii) Rob Goldblatt, Victoria University of Wellington, New Zealand - Elementary Classes Generating Varieties of Complex Algebras.
 - (xiv) S.M. Srivastava, Indian Statistical Institute, Kolkata - Stochastic Kripke models.
 - (xv) Kobi Peterzil, University of Haifa, Israel - O-minimal ingredients in solutions to arithmetic conjectures in Algebraic Geometry.
 - (xvi) Wolfgang Thomas, Rheinisch-Westflische Technische Hochschule Aachen, Germany - Refining determinacy results for infinite games.
24. Automata, Concurrency and Timed Systems (ACTS) II - February 2010
- ACTS II (sponsored by the CMI-TCS Academic Alliance) is envisioned as a follow-up to the ACTS workshop held in CMI in January 2009.
- The main theme of the workshop is the use of logic and automata for modelling and verifying distributed, open and timed systems.
- (i) Dietmar Berwanger (LSV, ENS Cachan): Information tracking in distributed games.
 - (ii) Benedikt Bollig (LSV, ENS Cachan): Realizability of Dynamic MSC Languages.
 - (iii) Ahmed Bouajjani (LIAFA, Paris 7): On the Verification Problem for Weak Memory Models.
 - (iv) Deepak D'Souza (IISc, Bangalore): On the equivalence of the pointwise and continuous semantics of First-Order Logic with linear constraints.
 - (v) Laurent Doyen (LSV, ENS Cachan): Energy and Mean-payoff Games.
 - (vi) Paul Gastin (LSV, ENS Cachan): Weighted MSO versus Probabilistic Logics.
 - (vii) Stefan Haar (LSV, ENS Cachan): Event structure framework for supervising partially observable systems.
 - (viii) Loic Helouet (IRISA, Rennes): Discovering covert channels with information theory.
 - (ix) Akash Lal (MSR, Bangalore): Concurrency and Weighted Automata.
 - (x) Kamal Lodaya (IMSc, Chennai): LTL can be more succinct.
 - (xi) Antoine Meyer (Marne-la Vallee): Counting CTL.
 - (xii) Joel Ouaknine (Oxford): On Classical, Real-Time, and Time-Bounded Verification.
 - (xiii) Paritosh Pandya (TIFR, Mumbai): Chop Expressions.

- (xiv) Sylvain Salvati (LaBRI, Bordeaux): Recognizability in the simply typed lambda-calculus.
 - (xv) Stefan Schwoon (LSV, ENS Cachan): Unfoldings of contextual Petri nets.
 - (xvi) S.P. Suresh (CMI, Chennai): Extensions of Dolev-Yao theory and the secrecy problem.
 - (xvii) P.S. Thiagarajan (NUS, Singapore): Asynchronous Automata Based Approximations of Distributed Hybrid behaviors.
 - (xviii) Tayssir Touili (LIAFA, Paris 7): Reachability Analysis of Networks of Communicating Pushdown Systems.
 - (xix) James Worrell (Oxford): Reachability in Parametric One-Counter Machines.
25. Sixth AFS-1, NBHM Advanced Training in Mathematics School Funded by National Board for Higher Mathematics
- AFS-I organised in Chennai in December 2009 was the first of the 6th Annual Foundation Schools organised on behalf of NBHM.

Algebra

S.S. Kannan	Modules over PID
K.N Raghavan	Galois Theory
P. Rath	Applications of Galois Theory

Analysis

M. Krishna	Differential Equations
S. Sridharan	Measure Theory
S. Kesavan	Fourier Analysis

Topology and Geometry

Kingshook Biswas	Differential Geometry
V. Uma	Smooth manifolds
P. Sankaran	Intro. to Algebraic Topology

26. Special Semester on Analysis (January-April 2010)

As part of this programme, visitors to CMI throughout the semester delivered a series of lectures on various topics in Analysis. All lectures start at the beginning and the lecturers build a body of basic theory required to understand their subsequent lectures. The target audience for this activity was students from final year BSc Mathematics, students from both years of MSc Mathematics and students enrolled for PhD.

January 2010

- Prof. P Veeramani, IIT Madras: Best Approximation in Normed Linear Spaces (3 lectures).
- Prof. Michael G Cowling, University of Birmingham: Mappings of groups with geometric properties (2 lectures).
- Prof. T.S.S.R.K. Rao, ISI Bangalore: Some applications of the principle of local reflexivity (3 lectures).

- Prof. V.S. Sunder, IMSc Chennai: An invitation to free probability (3 lectures).

February 2010

- Prof. B.V. Rao, CMI: Excursions into probability (3 lectures).
- Prof. S. Thangavelu, IISc Bangalore: on the role of special functions in harmonic analysis (3 lectures).

March 2010

- Prof. Rajaram Bhat, ISI Bangalore: Dilation Theory (3 lectures).
- Prof. Somesh Bagchi, ISI Kolkata: Hardy-Littlewood Maximal Function (4 lectures).
- Prof. V. Muruganandam, NISER Bhubaneswar: Harmonic functions and all that (3 lectures).
- Prof. Alladi Sitaram, IISc Bangalore: An Introduction to Non-commutative Harmonic Analysis (4 lectures).
- Prof. R. Radha, IIT Madras: Time-Frequency Analysis (3 lectures).
- Prof. Gautam Bharali, IISc Bangalore: Analytic continuation in several complex variables (3 lectures).

April 2010

- Prof. Ajit Iqbal Singh, ISI Delhi: Uniformly continuous functions and some locally compact groups (4 lectures).
- Prof. C.S. Aravinda, TIFR Bangalore: A dynamic Borel-Cantelli Lemma (3 lectures).
- Prof. K. Parthasarathy, RIASM Chennai: Fourier algebra (3 lectures).

27. Workshop in Principal Bundles in Geometry (February - March 2009)

- (i) Norbert Hoffmann, University of Gottingen: “Line bundles on stacks of principal G -bundles” and “On moduli of special instanton bundles”.
- (ii) S. Subramaniam, TIFR Mumbai: “Principal Bundles on the projective line”.
- (iii) Usha Bhosle, TIFR Mumbai: “Coherent systems on nodal curves”.
- (iv) Jochen Heinloth, University of Amsterdam: “Semistable reduction for principal bundles” and “Picard groups of moduli spaces for twisted groups and degenerations of the affine Grassmanian”.
- (v) H. Lange, University of Erlangen: “Abelianization and polarization on Prym varieties”.
- (vi) Yashonidhi Pandey, CMI: “Prym Varieties and abelianization of G -bundles” and “Some remarks on abelianisation”.
- (vii) S.Ramanan, CMI: “Kostant TDS and Vector bundles”.
- (viii) Alexander Schmitt, Freie Universitat Berlin: “Geometric Invariant Theory and Principal Bundles” and “Principal Bundles on Nodal Curves”.
- (ix) V. Balaji, CMI: “Holonomy Group Schemes of Algebraic Varieties”.
- (x) Arijit Dey, TIFR Mumbai: “Restriction of tangent bundle and semistability”.
- (xi) A.J. Parameswaran Tata Institute of Fundamental Research, Mumbai: “Picard Bundles & Brill-Noether Loci”
- (xii) Vivek, Institute of Mathematical Sciences, Chennai: “Zero cycles and Roitman’s theorem”.

- (xiii) D.S. Nagaraj, Institute of Mathematical Sciences, Chennai: “Vector bundles generated by section on P^2 ”
28. Weekly Seminar on Fluid Dynamics (January - March 2009)
- (i) S.G. Rajeev, University of Rochester, U.S.A., “Geometrical Aspects of Fluid Dynamics”.
 - (ii) G. Baskaran, IMSC, Chennai, “Quantum Fluids: Superfluidity and Superconductivity”.
 - (iii) S.R.S Varadhan, Courant Institute, New York, “Derivation of Euler Equations” and “A class of examples of interacting particle systems and their scaling limits”.
 - (iv) K.R. Sreenivasan, ASICTP, Trieste, Italy, “Cryogenic Turbulence”.
 - (v) Siddhartha Sen, University College, Dublin, “Quantum Weak Turbulence”.
 - (vi) A. Thyagaraja, Culham Labs, U.K. Atomic Energy Agency, “Introduction to Plasma Turbulence and its Transport Consequences in Fusion Plasmas”.
 - (vii) Shiraz Minwalla, TIFR, Mumbai, “Fluid Dynamics from Gravity”.
 - (viii) Rajaram Nityananda, NCRA, Pune, “Stellar Dynamics: the gravitational N-body problem in the fluid limit”.
 - (ix) S. Sridhar, RRI, Bangalore, “Dynamo action in astrophysical shear flows” and “Dynamo action in linear shear flows”.
 - (x) K. Subramanian, IUCAA, Pune, “Magnetizing the universe” and “Magnetic helicity and dynamos”.
 - (xi) R. Narasimha, JNCASR, Bangalore, “The fluid dynamics of the cumulus cloud”.
 - (xii) Gautam Menon, IMSc, Chennai, “Random Organization and the Reversible-Irreversible Transition” and “Hydrodynamics of Biological Membranes”.
 - (xiii) A.M. Srivastava, IOP, Bhubaneswar, “Quark-Gluon Plasma”.
 - (xiv) R. Shankar, IMSc, Chennai, “Quantum Hall Fluids”.
 - (xv) Madan Rao, RRI, Bangalore, “Active Hydrodynamics in a Variety of Cellular Systems”.
 - (xvi) R. Rajesh, IMSc, Chennai, “Constant Flux Relation for Turbulent Systems”.
 - (xvii) M. Vanninathan, TIFR-Centre for Applied Mathematics, Bangalore, “Navier-Stokes Equations – A Millennium Problem”.
 - (xviii) V.V. Sreedhar, CMI, Chennai, “Symmetries and Conservation Laws in Fluid Dynamics”.

29. Workshop on Automata, Concurrency and Timed Systems, ACTS (Logic, Automata and the Modelization and Verification of Distributed, Open and Timed Systems) - January 2009

Aim and Scope

The scientific scope of this Workshop is described in its title. It is the concluding meeting of the 4-year Indo-French project Timed-Discoveri, jointly funded by CNRS, the Foreign Affairs Ministry (France) and the Department of Science and Technology (Government of India). However, this meeting is open to all, whether they participated in the project’s actions or not, and whether they are based in France, in India or elsewhere.

Speakers

- (i) Dietmar Berwanger (LSV, ENS Cachan) The order of moves in a game: When does it matter?
 - (ii) Benedikt Bollig (LSV, ENS Cachan) Realizability of Concurrent Recursive Programs
 - (iii) Patricia Bouyer (LSV, ENS Cachan) Quantitative timed games
 - (iv) Philippe Darondeau (INRIA Rennes). Opacity control
 - (v) Volker Diekert (FMI, Stuttgart) Fragments of first-order logic over infinite words
 - (vi) Deepak D'Souza (IISc Bangalore) Automata and Logics over Signals
 - (vii) Paul Gastin (LSV, ENS Cachan). How to get decidability of distributed synthesis for asynchronous systems
 - (viii) Hugo Gimbert (LaBRI, U. Bordeaux) Qualitative Determinacy and Decidability of Stochastic Games with Partial Observation
 - (ix) Stefan Haar (LSV, ENS Cachan). Diagnosability and a covering relation in occurrence nets
 - (x) Hrishikesh Karmakar (IIT Bombay). Improved state-count for determinization of non-deterministic Buchi automata: A Safra-tree based approach
 - (xi) K. Narayan Kumar (CMI, Chennai) Analyzing time-constrained message sequence graphs
 - (xii) Dietrich Kuske (IfI, Leipzig) Which local temporal logics for traces are tractable?
 - (xiii) Kamal Lodaya (IMSc, Chennai) Around dot-depth two
 - (xiv) Anca Muscholl (LaBRI, U. Bordeaux) A look at the control of asynchronous automata
 - (xv) Paritosh Pandya (TIFR, Mumbai) A Sampling Approach to the Analysis of Metric Temporal Logic
 - (xvi) Soumya Paul (IMSc, Chennai). Thiagarajan's conjecture
 - (xvii) M. Praveen (IMSc, Chennai). Petri nets with small path property
 - (xviii) R. Ramanujam (IMSc, Chennai) Counting multiplicity over infinite alphabets
 - (xix) Abhisekh Sankaran (IIT Bombay). A FOL Fragment for Safety Checking in Infinite State Systems
 - (xx) Anil Seth (IIT, Kanpur). Parity Games on Multi-Stack Pushdown Systems
 - (xxi) Vijay Suman (TIFR Bombay). Determinization and Expressiveness of Integer Reset Timed Automata with Silent Transitions
 - (xxii) Pascal Weil (LaBRI, U. Bordeaux) Independence monoids and recognizable trace languages
 - (xxiii) Marc Zeitoun (LaBRI, U. Bordeaux) Tree Pattern Rewriting Systems
 - (xxiv) Wiesiek Zielonka (LIAFA, Paris). Positional equilibria in infinite perfect information games
30. Perspectives in Concurrency Theory on the occasion of P.S. Thiagarajan's 60th birthday December 15-16, 2008.
- Speakers*
- (i) Gerard Boudol, INRIA, Sophia-Antipolis: True concurrency at work: relaxed memory models
 - (ii) Javier Esparza, TU Muenchen: Scheduling stochastic branching processes

- (iii) David Harel, Weizmann, Rehovot: In silico biology, or On comprehensive and realistic modeling
 - (iv) Mogens Nielsen, Aarhus U: Computational trust
 - (v) Amir Pnueli, NYU and Weizmann, Rehovot: Using abstraction to verify arbitrary temporal properties
 - (vi) Wolfgang Thomas, RWTH Aachen: Path logics with synchronization
 - (vii) Igor Walukiewicz, LaBRI, Bordeaux: Traces and distributed synthesis
31. Galois Representations and Modular Forms - Workshop in Arithmetic Geometry - September 24-October 05, 2007 (Sponsored by the Centre for Theoretical Studies, Tata Institute of Fundamental Research, Mumbai)

Speakers

- (i) Supriya Pisolkar: Local and global fields, Infinite Galois theory
- (ii) Soumya Das: Decomposition, inertia, ramification subgroups
- (iii) Debargha Banerjee/ Arati Khairnar: Elliptic modular forms
- (iv) Satadal Ganguly / Brundaban Sahu: Hilbert modular forms
- (v) Ganesh: Galois representations attached to elliptic modular forms
- (vi) Chandrakant Sarma: Galois representations attached to Hilbert modular forms
- (vii) R. Sujatha: Statement of Serre's conjecture (Level/Character)
- (viii) Anand: Statement of Serre's conjecture (Weight)
- (ix) Parvati Shastry: Evidence: level 1 and $p = 2, 3$
- (x) Tejaswi Navilarekallu / Chandan Singh Dalawat: Deformation theory
- (xi) Sarah Zerbes: p -adic Hodge theory
- (xii) Eknath Ghate: Overview of the proof in the level 1 case
- (xiii) Anand: Existence of minimal lifts
- (xiv) Najib: Compatible systems
- (xv) Amit Hogadi / Laurent Ducrochet: Moret-Bailly's theorem
- (xvi) R. Sujatha: Potential Serre
- (xvii) C.S. Rajan: Classification of p -divisible groups
- (xviii) Chandan Singh Dalawat: Modularity lifting theorems
- (xix) Eknath Ghate: Overview of the proof in the general case

3.2 Resource Mobilization for Research

3.2.1. What are the financial provisions made in the university budget for supporting students' research projects?

No special provisions are deemed necessary since all the needs of the students' projects are covered adequately in the existing set-up.

3.2.2. Has the university taken any special efforts to encourage its faculty to file for patents? If so, how many have been registered and accepted?

Not Applicable.

3.2.3. Provide the following details of ongoing research projects of faculty:

	Year wise	Number	Name of the project	Name of the funding agency	Total grant received
A. University awarded projects					
Minor projects					
Major projects					
B. Other agencies - national and international (specify)					
Minor projects	2015	1	Indo-Swedish (DST-VR) joint research project "Verification of Concurrent Software"	Department of Science & Technology	Rs.8,59,000
	2015	2	Indo-French (CNRS-CEFIPRA) joint research project "Automated Verification of Concurrent Software"	Department of Science & Technology	Rs.16,55,448
Major projects	2013	1	FIST Program	Department of Science & Technology	Rs.50,00,000

3.2.4. Does the university have any projects sponsored by the industry / corporate houses? If yes, give details such as the name of the project, funding agency and grants received.

- Honeywell Technology Solutions Ltd, *Use of Formal Verification in Avionics Software Development*, 2015–2016, total project amount Rs 16.73 lakhs, invoice raised for Rs 6.5 lakhs
- Tata Research Development and Design Centre, *Formal Verification Techniques for Industry-Scale Code*, 2015–2019, Rs 30 lakhs.

3.2.5. How many departments of the university have been recognized for their research activities by national / international agencies (UGC-SAP, CAS; Department with Potential for Excellence; DST-FIST; DBT, ICSSR, ICHR, ICPR, etc.) and what is the quantum of assistance received? Mention any two significant outcomes or breakthroughs achieved by this recognition.

The mathematics department has been recognised by DST through the award of a FIST grant.

CMI is also one of two non-European partners in ALGANT, a multi-institution Masters programme in Algebra, Geometry and Number Theory funded by the European Union. CMI also has exchange programmes with the Ecole Normale Supérieure and Ecole Polytechnique, of France.

CMI is a partner in an International Associated Laboratory (LIA) on Formal Methods set up by the French National Centre for Research in Science (CNRS).

CMI is also a partner in the Indo-US Virtual Institute for Mathematical and Statistical Sciences (VI-MSS) jointly funded by the National Science Foundation, USA and the Department of Science and Technology, India.

3.2.6. List details of

- (a) research projects completed and grants received during the last four years (funded by National/International agencies).

Insert table

S.No	Project Name	Amount Received	Funding Agency	Name of Faculty
1	BRNS-DST(Center of Excellence for Research & Teaching in Mathematical Sciences)	32521500	Department of Science & Technology	Prof C S Seshadri, Prof Madhavan Mukund
2	BRNS-DST(Center of Excellence for Research & Teaching in Mathematical Sciences)	10840500	Department of Atomic Energy	Prof C S Seshadri, Prof Madhavan Mukund
3	UGC Special Development Grant under XI Plan (Construction Of Multi-storied Building) Instalment I Instalment II Instalment III Instalment IV	45000000 13500000 27720000 9580000	University Grants Commission	
4	FIST Program 2011 (5 Years) Instalment I	5000000	Department of Science & Technology	Prof V Balaji
5	UGC Special Development Grant under XII Plan (Additional Floors to Multi-storied Building) Instalment I	40000000	University Grants Commission	
6	Toolkit for Security Analysis of Cryptographic Protocols(project duration 18 months)	1000000	Defence Res & Dev Organisation,Scientific Analysis Group,Ministry of Defence	Prof S P Suresh
7	Derivatives Of Lyapunov exponents,Structural stabilityof Systems and the pressure function(Project Duration:3 years)	480000	Science & Engineering Research Board,Department of Science and Technology	Prof Shrihari Sridharan

(b) Inter-institutional collaborative projects and grants received

- i) All India collaboration Nil
- ii) International

3.3 Research Facilities

- 3.3.1. What efforts have been made by the university to improve its infrastructure requirements to facilitate research? What strategies have been evolved to meet the needs of researchers in emerging disciplines?

The main infrastructural requirements for research at CMI are a good library and computational resources. Both of these are updated regularly through a suitable allocation of funds. In addition, CMI actively seeks contributions from private donors to fund travel to international conferences and for inviting distinguished scientists to visit the institute for academic collaboration.

- 3.3.2. Does the university have an Information Resource Centre to cater to the needs of researchers? If yes, provide details of the facility.

No

- 3.3.3. Does the university have a University Science Instrumentation Centre (USIC)? If yes, have the facilities been made available to research scholars? What is the funding allotted to USIC?

No

- 3.3.4. Does the university provide residential facilities (with computer and internet facilities) for research scholars, post-doctoral fellows, research associates, summer fellows of various academies and visiting scientists (national/international)?

Yes

- 3.3.5. Does the university have a specialized research centre/ workstation on-campus and off-campus to address the special challenges of research programmes?

No

- 3.3.6. Does the university have centres of national and international recognition/repute? Give a brief description of how these facilities are made use of by researchers from other laboratories.

CMI as an institute is recognised both nationally and internationally for its research and teaching. It has a vibrant internship programme through which students from other universities/institutes visit CMI and benefit by interacting with the faculty and students.

CMI is also one of two non-European partners in ALGANT, a multi-institution Masters programme in Algebra, Geometry and Number Theory funded by the European Union. CMI also has exchange programmes with the Ecole Normale Supérieure and Ecole Polytechnique, of France.

CMI is a partner in an International Associated Laboratory (LIA) on Formal Methods set up by the French National Centre for Research in Science (CNRS).

CMI is also a partner in the Indo-US Virtual Institute for Mathematical and Statistical Sciences (VI-MSS) jointly funded by the National Science Foundation, USA and the Department of Science and Technology, India.

3.4 Research Publications and Awards

3.4.1. Does the university publish any research journal(s)? If yes, indicate the composition of the editorial board, editorial policies and state whether it/they is/are listed in any international database.

No

3.4.2. Give details of publications by the faculty:

- Number of papers published in peer reviewed journals (national / international)
Mathematics: 150, Computer Science: 300, Physics: 65, Total: 515.
(Note: CS publications include refereed conferences that are considered equivalent to peer reviewed journals.)
- Monographs
 - (a) Ram Murty and Purusottam Rath: Transcendental Numbers, Springer-Verlag, New York. ISBN: 978-1-4939-0831-8
 - (b) N. D. Hari Dass: The Principles of Thermodynamics, CRC Press ISBN 9781466512085.
 - (c) R. Parthasarathy: Relativistic Quantum Mechanics, Narosa Publications, (2010) ISBN: 978-81-8487-004-6
 - (d) R. Parthasarathy: Introduction to General Relativity, Narosa Publications (2015) ISBN: 978-81-8487-428-0
- Chapters in Books
 - (a) M Mukund: Regular languages: From automata to logic and back, in *Math Unlimited: Essays in Mathematics* H.,N. Ramaswamy, R. Sujatha and C.S. Yogananda (eds), Science Publishers (2012).
 - (b) M Mukund: Automata on Distributed Alphabets, in *Modern Applications of Automata Theory*, Deepak D'Souza and Priti Shankar (eds), World Scientific (2012) 45-78.
 - (c) M Mukund: Finite-state Automata on Infinite Inputs, in *Modern Applications of Automata Theory*, Deepak D'Souza and Priti Shankar (eds), World Scientific (2012) 257-288.
 - (d) P Gastin, M Mukund and K Narayan Kumar: Reachability and boundedness in time-constrained MSC graphs, in *Perspectives in Concurrency Theory*, K Lodaya, M Mukund and R Ramanujam (eds.), Universities Press (2008) 157-183.
 - (e) P Chandrasekaran and M Mukund: Adding time to scenarios, in *Next Generation Design and Verification Methodologies for Distributed Embedded Control Systems*, S Ramesh and P Sampath (eds.), Springer (2007) 83-97.
 - (f) M Mukund, K Narayan Kumar, P S Thiagarajan and Shaofa Yang: Anchored Concatenation of MSCs, in *Formal models, languages and applications*, K G Subramanian, K Rangarajan and M Mukund (eds.), World Scientific (2006) 274-288.
 - (g) M Mukund: From global specifications to distributed implementations, in *Synthesis and Control of Discrete Event Systems*, B Caillaud, P Darondeau, L Lavagno (eds), Kluwer (2002) 19-34.

- (h) K Narayan Kumar: The Theory of MSC Languages, in *Modern Applications of Automata Theory*, IISc Research Monographs Series, Vol 2, World Scientific, Singapore (2012) 289-324
 - (i) Samir Datta and Raghav Kulkarni: Space Complexity: What makes planar graphs special? *Bulletin of the EATCS*, Vol 109 (2013) 35-53.
 - (j) Alok Laddha: Loop Quantum Gravity, volume to be published in the series *100 Years of General Relativity* by World Scientific.
 - (k) G. Rajasekaran and M. S. Raghunathan: "Science in Modern India: An Institutional History, c 1784-1947" (Vol XV, Part 4, History of Science...) Ed: Uma Das Gupta, Pearson Longman, p669 (2010).
- Books edited
 - (a) S Chakraborty and M Mukund (eds.): *Proceedings of the 10th International Symposium on Automated Technology for Verification and Analysis (ATVA 2012)*, Springer Lecture Notes in Computer Science, 7561, (2012).
 - (b) Venkatesh Raman and S.P. Suresh (Eds.): *Proceedings of the 34th IARCS Annual Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS 2014)*, Schloss Dagstuhl - Leibniz-Zentrum fuer Informatik LIPIcs **29** 2009.
 - (c) Ravi Kannan, K. Narayan Kumar (Eds.): *Proceedings of the 29th IARCS Annual Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS 2009)*, Schloss Dagstuhl - Leibniz-Zentrum fuer Informatik LIPIcs **4** 2009.
 - (d) R Hariharan, M Mukund and V Vinay (eds.): *Proceedings of the 28th International Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS 2008)*, Leibniz International Proceedings in Informatics (LIPICS), **2** (2008).
 - (e) K G Subramanian, K Rangarajan and M Mukund (eds.): *Formal Models, Languages and Applications*, World Scientific (2006).
 - (f) K Lodaya, M Mukund and R Ramanujam (eds.): *Perspectives in Concurrency Theory*, Universities Press (2008).
 - (g) R Hariharan, M Mukund and V Vinay (eds.): *Proceedings of the 21st International Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS 2001)*, Springer Lecture Notes in Computer Science, 2257, (2001).
 - Books with ISBN with details of publishers
 - Number listed in International Database (For e.g. Web of Science, Scopus, Humanities International Complete, EBSCO host, etc.)
 - Citation Index - range / average
 - SNIP
 - SJR
 - Impact Factor - range / average
 - h-index
- In the areas of Mathematics, Computer Science and Physics that are represented at CMI, numeric indicators such as impact factor and h-index are not meaningful.

CMI faculty publish their research in international journals and conferences that are recognized by the academic community as the leading publication outlets in the corresponding areas.

3.4.3. Give details of

- faculty serving on the editorial boards of national and international journals
 - Rajeeva Karandikar
 - (a) Currently editor of Indian Journal of Pure and Applied Mathematics (by INSA).
 - (b) In the past have served as the editor of Sankhya (Journal of Indian Statistical Institute)
 - (c) As associate editor/editorial board member for Annals of Probability
 - (d) Journal of Statistical Planning and Inference
 - (e) Applied Stochastic Models in Business and Industry.
 - Govind Krishnaswami
 - (a) Editorial Board of Resonance, Journal of Science Education
 - H. S. Mani
 - (a) Served on the editorial board of Current Science.
 - (b) One of the managing editors for Texts and Readings in Physical sciences (series brought out by Hindustan Book Agency).
 - T. R. Ramadas
 - (a) Editor, Mathematical Proceedings of the Indian Academy of Sciences
 - Madhavan Mukund
 - (a) Leibniz International Proceedings in Informatics, an open access series for conference proceedings published by Schloss Dagstuhl - Leibniz Center for Informatics, Germany. (This is not specific to one conference. It equivalent to being on the Editorial Board for an entire series like Springer Lecture Notes in Computer Science etc)
 - (b) Acta Informatica
 - (c) Transactions on Petri Nets and Other Models of Concurrency (ToPNoC), a subseries of Springer Lecture Notes in Computer Science (LNCS).
 - (d) Sadhana, Academy Proceedings in Engineering Sciences, Indian Academy of Sciences, Bangalore.
 - Narayan Kumar
 - (a) On the Editorial Board of the CSI Journal of Computing published by the Computer Society of India.
 - Shiva Shankar
 - (a) Associate Editor, “Multidimensional Systems and Signal Processing” (published by Springer Verlag), 1995-2013
 - (b) Member, Editorial Board, “Multidimensional Systems and Signal Processing”, 2014-
 - (c) Member, Editorial Board, “Mathematics Newsletter” of the Ramanaujam Mathematical Society, 2005-2006

- (d) Member of the IEEE technical committee on “Behavioral Control Theory”, 2006-2012
- T. R. Govindarajan
 - (a) Member, Editorial Board, Physics Education - e-journal of IAPT.
 - (b) Editorial member, SIGMA issue “Symmetry, Integrability and Geometry: Methods and Applications”.
- Senthamarai Kannan
 - (a) On the editorial board for “International Journal of Mathematics and Scientific Computing”. ISSN: 2231 5330.
- C. S. Seshadri
 - (a) On the editorial board of Transformation Groups (International Journal) 23. Proceedings of the Indian Academy of Sciences (Mathematics)
 - (b) Chief Editor of TRIM Series published by Hindustan Book Agency.
- V. Balaji
 - (a) Editorial Board of the Journal of the Ramanujan Mathematical Society.
- faculty serving as members of steering committees of international conferences recognized by reputed organizations / societies
 - R. L. Karandikar
 - (a) Organised Indo-Russian conference on Probability and Statistics. Rajeeva Karandikar was one of the four organisers, along with Abhay Bhatt (ISI, Delhi) and I. Ibragimov and Y. Nikitin (Russia) at ISI Delhi, January 2015.
 - (b) Rajeeva Karandikar was a member of the organising committee and a Patron of the Annual meeting of the Indian Academy of Sciences held in Chennai, November 2014.
 - (c) Rajeeva Karandikar organised (along with A Budhiraja, UNC, Chapel Hill USA) an Indo-US conference on Probability under the SAVI programme as a collaboration between CMI and SAMSI, USA funded by National Science Foundation, USA and DST, India.
 - T. R. Ramadas
 - (a) Manipal Workshop on Algebraic Geometry, January 2015.
 - (b) 50 years of the Narasimhan-Seshadri Theorem, at CMI, in October 2015
 - (c) Indo-French Program for Mathematics, IMSc. January, 2016
 - Madhavan Mukund
 - (a) ATVA, International Symposium on Automated Technology for Verification and Analysis
 - * 13th Symposium, Shanghai, China, 2015.
 - * 12th Symposium, Sydney, Australia, 2014.
 - * 11th Symposium, Hanoi, Vietnam, 2013.
 - * 10th Symposium, Thiruvananthapuram, India, 2012 (co-chair).
 - (b) CONCUR, International Conference on Concurrency Theory
 - * 26th Conference, Madrid, Spain, 2015.
 - * 22nd Conference, Aachen, Germany, 2011.
 - (c) CSR, International Computer Science Symposium in Russia - 5th Symposium, Kazan, Russia, 2010.

- (d) FM, Formal Methods - 15th International Symposium, Abo Akademi University, Turku, Finland, 2008.
- (e) FSTTCS, Foundations of Software Technology and Theoretical Computer Science
 - * 34th Conference, Delhi, 2014.
 - * 32nd Conference, Hyderabad, 2012.
 - * 28th Conference, Bangalore, 2008 (co-chair).
 - * 26th Conference, Kolkata, 2006.
- (f) ICALP, International Colloquium on Automata, Languages and Programming
 - * 41st Colloquium, Copenhagen, Denmark, 2014.
 - * 35th Colloquium, Reykjavik, Iceland, 2008.
 - * 33rd Colloquium, Venice, Italy, 2006.
- (g) LICS, Logic in Computer Science
 - * 30th Symposium, Kyoto, Japan, 2015.
 - * 28th Symposium, New Orleans, USA, 2013.
- (h) MFCS, Mathematical Foundations of Computer Science
 - * 39th International Symposium, Budapest, Hungary, 2014.
 - * 38th International Symposium, IST, near Vienna, Austria, 2013.
 - * 35th International Symposium, Brno, Czech Republic, 2010.
 - * 32nd International Symposium, Cesky Krumlov, Czech Republic, 2007.
- (i) Petri Nets, International Conference on Application and Theory of Petri Nets and Concurrency
 - * 36th Conference, Brussels, Belgium, 2015.
 - * 35th Conference, Tunis, Tunisia, 2014.
 - * 33rd Conference, Hamburg, Germany, 2012.
 - * 32nd Conference, Kanazawa, Japan (relocated to Newcastle-upon-Tyne, UK), 2011.
 - * 31st Conference, Braga, Portugal, 2010.
 - * 30th Conference, Paris, France, 2009.
 - * 29th Conference, Xian, China, 2008.
 - * 27th Conference, Turku, Finland, 2006.
 - * 26th Conference, Miami, Florida, 2005.
- (j) SEFM, IEEE International Conference on Software Engineering and Formal Methods
 - * 9th Conference, Montevideo, Uruguay, 2011.
 - * 8th Conference, Pisa, Italy, 2010.
 - * 7th Conference, Hanoi, Vietnam, 2009.
 - * 4th Conference, Pune, India, 2006.
- (k) STACS, Symposium on Theoretical Aspects of Computer Science, 23rd Symposium, Marseilles, France, 2006.
- (l) TACAS, International Conference on Tools and Algorithms for the Construction and Analysis of Systems, 16th Conference, Paphos, Cyprus, 2010. K. Narayan:

- (m) National Organizing Committee, Indian Strings Meeting (ISM-12) international string theory conference, Dec 16-21, 2012, Puri, India.
- (n) National Organizing Committee, Indian Strings Meeting (ISM-08) international string theory conference, Dec 6-13, 2008, Pondicherry, India.
- (o) Local Organizing Committee, Indian Strings Meeting (ISM-08) international string theory conference, Dec 6-13, 2008, Pondicherry, India.
- K. Narayan Kumar
 - (a) The Sixth International Symposium on Games, Automata, Logics and Formal Verification September 21-23, 2015, Genova, Italy
 - (b) 16th International Workshop on Verification of Infinite-State Systems IIT Delhi, India, 18th of December 2014
 - (c) 25th International Conference on Concurrency Theory (CONCUR'14), Rome, Italy, Sep 2014.
 - (d) 33rd International Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS'13), Guwahati, India, Dec 2013.
 - (e) 7th International Workshop on Reachability Problems 2013 (RP'13), Uppsala, Sweden, Sep 2013.
 - (f) Member, Programme Committee, 10th International Symposium on Automated Technology for Verification and Analysis (ATVA 2012), Thiruvananthapuram, Oct 2012.
 - (g) 31st International Conference on the Foundations of Software Technology and Theoretical Computer Science, IIT Bombay, Bombay, India, 2011.
 - (h) 21st International Conference on Concurrency Theory, Paris, France, 2010.
 - (i) 29th International Conference on the Foundations of Software Technology and Theoretical Computer Science, IIT Kanpur, India, 2009. (co-Chair and co-Editor of Proceedings with Ravi Kannan)
 - (j) 26th International Symposium on Theoretical Aspects of Computer Science, Freiburg, Germany, 2009.
- Shiva Shankar
 - (a) Member, International Program Committee, MTNS, Melbourne, 2012
- S.P. Suresh
 - (a) Programme committee co-chair for FSTTCS 2014
 - (b) Programme committee member for ICLA 2015 32. Programme committee member for FSTTCS 2015.
- Samir Datta
 - (a) STACS 2014 (Symposium on Theoretical Aspects of Computer Science), Lyon, France
 - (b) CSR 2010 (Computer Science in Russia), Kazan
 - (c) FSTTCS 2007 (Foundations of Software Technology and Theoretical Computer Science), Delhi
- V. Balaji:
 - (a) Steering Committee of Indo-European Conference in September 2015

- (b) Steering Committee of Indo-French Conference to be held in January 2016.

3.4.4. Provide details of

- research awards received by the faculty and students
 - (a) T.R. Ramadas has been elected as a Fellow of Indian National Science Academy, 2015.
 - (b) V. Balaji has been elected as a Fellow of Indian National Science Academy, 2015.
 - (c) T.R. Ramadas awarded the J.C. Bose National Research Fellowship in 2015.
 - (d) Rajeeva Karandikar received P C Mahalonobis Birth Centenary Award, Indian Science Congress 2014.
 - (e) Ramprasad Saptharishi won ACM India Doctoral Dissertation Award for 2013.
 - (f) C S Seshadri awarded Doctorate Honoris Causa by Univ Paris et Marie Curie, Paris 6, France in 2013.
 - (g) C S Seshadri awarded Doctorate Honoris Causa by University of Hyderabad in 2013.
 - (h) Alok Laddha awarded the Ramanujan National Research Fellowship in 2012.
 - (i) Govind Krishnaswami awarded the Ramanujan National Research Fellowship in 2009.
 - (j) V. Balaji awarded the J.C. Bose National Research Fellowship in 2008.
 - (k) K. Narayan awarded the Ramanujan National Research Fellowship in 2008.
 - (l) C.S. Seshadri awarded the Padma Bhushan by the Government of India in 2009.
 - (m) C.S. Seshadri awarded the Rathindra Puraskar by Viswa Bharati University, December, 2008.
 - (n) C.S. Seshadri awarded the H K Firodia Award 2008 for Excellence in Science and Technology in October, 2008.
 - (o) C.S. Seshadri awarded Trieste Science Prize for the year 2006.
 - (p) V. Balaji awarded Shanti Swarup Bhatnagar Prize for the year 2006.
- national and international recognition received by the faculty from reputed professional bodies and agencies
 - (a) Rajeeva Karandikar has been named as a member of the governing council of the TIFAC (Technology Information Forecasting and Assessment Council).
 - (b) Rajeeva Karandikar has been a member of the Council of the Indian National Science Academy (2013-2015).
 - (c) Rajeeva Karandikar is the convenor for UGC CSIR NET examination for mathematical sciences (2010-2015).
 - (d) Rajeeva Karandikar was a member of the NET review committee appointed by the UGC in 2013.
 - (e) Rajeeva Karandikar was Chairman of the committee constituted by UGC to consider the conferment of autonomous status to Vaagdevi Engineering college, Warangal (2014).

- (f) Rajeeva Karandikar is a member of the governing council of Indian Statistical Institute - as a nominee of West Bengal Government (2013-2015).
- (g) Rajeeva Karandikar is a member of the governing council of Presidency University - as a nominee of West Bengal Government (2013-2015).
- (h) Rajeeva Karandikar was a member of the review committee appointed to review Mathematics department, IIT Kanpur (2014).
- (i) Rajeeva Karandikar was a member of the review committee appointed to review Mathematics department, IISER Mohali (2014).
- (j) Rajeeva Karandikar has been a member of the advisory committee of Pune University, Delhi University and Calcutta University for the UGC special assistance programmes.
- (k) Rajeeva Karandikar has been invited to give Institute colloquium/special lecture/public lecture by IIT Mumbai (2012), IIT, Indore (2013), IIM Indore (2013), IISER Pune (2014), IISER Mohali (2014), IIT Kanpur (2014), Indian Academy of Sciences (2014), Indian National Science Academy (2014), IIT Chennai (2015).
- (l) C.S. Seshadri appointed National Research Professor by the Government of India.
- (m) V. Balaji elected Fellow of Indian Academy of Sciences in 2006.
- (n) Madhavan Mukund elected to the European Association of Theoretical Computer Science (EATCS) Council (2007-2011).
- (o) C.S. Seshadri elected to the National Academy of Sciences, USA in 2010.
- (p) Madhavan Mukund appointed Executive Director, International Olympiad in Informatics (2011-2014).
- (q) Madhavan Mukund elected Vice-President of ACM India Council (2014-2016).

3.4.5. Indicate the average number of successful M.Phil. and Ph.D. scholars guided per faculty during the last four years. Does the university participate in Shodhganga by depositing the Ph.D. theses with INFLIBNET for electronic dissemination through open access?

The Institute has no M.Phil students. Currently there are two PhD students per faculty and in the last four years 0.23 students per faculty has been awarded PhD. CMI has tried to register with Shodhganga, but the process has not been completed.

3.4.6. What is the official policy of the university to check malpractices and plagiarism in research? Mention the number of plagiarism cases reported and action taken.

The institute has a zero-tolerance policy towards malpractice and plagiarism. No cases of plagiarism have been reported from CMI.

3.4.7. Does the university promote interdisciplinary research? If yes, how many interdepartmental / interdisciplinary research projects have been undertaken and mention the number of departments involved in such endeavours?

Researchers have complete freedom in pursuing research in the topic of their choice and these often cut across disciplines. Also, CMI has a vibrant programme of research seminars throughout the year, combined with regular visits by distinguished academic visitors. This fosters an atmosphere where cross-fertilization of ideas is naturally encouraged.

3.4.8. Has the university instituted any research awards? If yes, list the awards.

The Dr. S. Parthasarathy Commemorative Prize is awarded for exceptional research work at the undergraduate level.

3.4.9. What are the incentives given to the faculty for receiving state, national and international recognition for research contributions?

No special incentives are considered necessary. Recruitment and promotion is based on research productivity.

3.5 Consultancy

3.5.1. What is the official policy of the university for structured consultancy? List a few important consultancies undertaken by the university during the last four years.

Faculty members are permitted to take on external consultancy projects, so long as the time spent on this activity does not interfere with regular teaching and research.

Sample projects

- 1 Tata Consultancy Services : 2008-2011 (Training programmes for fresh recruits)
- 2 Power Exchange India Limited : 2010-2012 (Auction mechanism for electricity spot market)
- 3 Hexaware Technologies: 2014 (Optimal purchase strategy of gas from multiple suppliers)
- 4 Cognizant Technologies: 2015 (Analysis of internal expenditure claims)

3.5.2. Does the university have a university-industry cell? If yes, what is its scope and range of activities?

CMI has recently started a society called AlgoLabs, a meeting place for academicians and industry to work on mutually beneficial projects.

3.5.3. What is the mode of publicizing the expertise of the university for consultancy services? Which are the departments from whom consultancy has been sought?

One of the goals of AlgoLabs is to publicize the expertise available at CMI.

3.5.4. How does the university utilize the expertise of its faculty with regard to consultancy services?

CMI only takes on projects that involve significant mathematical modelling. Depending on the domain, appropriate faculty members are assigned to oversee these projects.

3.5.5. List the broad areas of consultancy services provided by the university and the revenue generated during the last four years.

Education and training: Rs 50 lakhs (TCS, final year, 2011)

Algorithms and modelling: Rs 30 lakhs (PXIL, Hexaware)

Analytics: Rs 6 lakhs (Cognizant)

3.6 Extension Activities and Institutional Social Responsibility (ISR)

- 3.6.1. How does the university sensitize its faculty and students on its Institutional Social Responsibilities? List the social outreach programmes which have created an impact on students' campus experience during the last four years.

CMI has regular lectures and presentations on environmental issues. CMI students have been involved in campus clean-up campaigns. They have organized programmes to educate children of construction labourers.

- 3.6.2. How does the university promote university-neighbourhood network and student engagement, contributing to the holistic development of students and sustained community development?

CMI conducts outreach programmes where students from schools throughout the city visit the campus and are exposed to concepts from the mathematical sciences.

- 3.6.3. How does the university promote the participation of the students and faculty in extension activities including participation in NSS, NCC, YRC and other National/ International programmes?

These programmes are not present in CMI.

- 3.6.4. Give details of social surveys, research or extension work, if any, undertaken by the university to ensure social justice and empower the underprivileged and the most vulnerable sections of society?

None

- 3.6.5. Does the university have a mechanism to track the students' involvement in various social movements / activities which promote citizenship roles?

No

- 3.6.6. Bearing in mind the objectives and expected outcomes of the extension activities organized by the university, how did they complement students' academic learning experience? Specify the values inculcated and skills learnt.

Not applicable

- 3.6.7. How does the university ensure the involvement of the community in its outreach activities and contribute to community development? Give details of the initiatives of the university which have encouraged community participation in its activities.

Not applicable

- 3.6.8. Give details of awards received by the institution for extension activities and/contributions to social/community development during the last four years.

None

3.7 Collaboration

- 3.7.1 How has the university's collaboration with other agencies impacted the visibility, identity and diversity of activities on campus? To what extent has the university benefitted academically and financially because of collaborations?

CMI has had active support from agencies such as the Indo-French Centre for Promotion of Advanced Research (IFCPAR) and the Indo-US Science and Technology Forum (IUSSTF). This has established CMI's reputation as an internationally renowned centre for research in mathematical sciences.

The CMI Arts Initiative has been set up to provide opportunities for students and faculty to interact and learn from experts in the humanities and arts. In addition to organizing 2-3 day courses on special topics, the CMI Arts Initiative collaborates with Sangam House, an international writers' residency program based in Bangalore, to support two writers in residence at CMI each year.

3.7.2 Mention specific examples of how these linkages promote

- Curriculum development
- Internship
- On-the-job training
- Faculty exchange and development
- Research
- Publication
- Consultancy
- Extension
- Student placement
- Any other (please specify)

Activities organized in collaboration IFCPAR and IUSSTF have resulted in exchange visits, research collaborations and workshops.

The CMI Arts Initiative has enabled students to interact with international writers from different countries and get a valuable insight into ideas and cultures across the world.

3.7.3 Has the university signed any MoUs with institutions of national/international importance/other universities/ industries/corporate houses etc.? If yes, how have they enhanced the research and development activities of the university?

At the national level, CMI has signed an MoU with the Institute of Mathematical Sciences, IISER Pune, and the Indian Statistical Institute. At the international level, CMI has signed an MoU with the Ecole Normale Supérieure in France.

3.7.4 Have the university-industry interactions resulted in the establishment / creation of highly specialized laboratories / facilities?

CMI is part of an International Associated Laboratory (LIA) on Formal Methods, established by the French National Centre for Scientific Research (CNRS).

Any other information regarding Research, Consultancy and Extension, which the university would like to include.

CRITERION IV: INFRASTRUCTURE AND LEARNING RESOURCES

4.1 Physical Facilities

- 4.1.1. How does the university plan and ensure adequate availability of physical infrastructure and ensure its optimal utilization?

The institute currently has 12 class rooms, fully equipped office rooms for faculty members and research scholars, discussion rooms, a well stocked library, a computer lab and a physics lab. Besides, we have a Seminar Hall and an Auditorium for holding research seminars and conducting conferences and workshops. We have recently expanded our physical infrastructure to meet our requirements for a few years to come. When the need arises we will plan a further expansion.

We have a hostel that can accommodate about 220 students and 9 guest rooms for visitors. The hostel and guest house facilities are currently adequate for our needs. We have plans for expansion in the future.

- 4.1.2. Does the university have a policy for the creation and enhancement of infrastructure in order to promote a good teaching-learning environment? If yes, mention a few recent initiatives.

The university is continuously engaged in raising resources to enhance its infrastructure, to keep up with the expanding activity in research and teaching. In 2012, a new building was constructed using a grant from MHRD as well as private contributions, incorporating an auditorium, 2 class rooms, 22 faculty offices, additional library space and 9 guest rooms. In 2015, the Institute has added three floors to this building with 4 classrooms and 22 faculty offices, again funded through an MHRD grant and private contributions.

- 4.1.3. How does the university create a conducive physical ambience for the faculty in terms of adequate research laboratories, computing facilities and allied services?

There is a physics lab and a computer lab for students. The library is well stocked with books, physical journals and electronic journals and is designed with plenty of reading space. There are spacious discussion rooms. A high-capacity central computational server is available to all members of the institute. The institute has a high-speed Internet connection that is distributed throughout the campus through a wired and wireless local area network. All faculty members and research scholars are provided individual desktops or laptops. Many students also have personal laptops.

- 4.1.4. Has the university provided all departments with facilities like office room, common room and separate rest rooms for women students and staff?

Each faculty member has his/her own office. Research scholars are also provided individual desks in shared offices. Besides, there are common rooms and discussion areas. There are separate rest rooms for women students and staff.

- 4.1.5. How does the university ensure that the infrastructure facilities are disabled-friendly?

Ramps have been installed in appropriate places. We have also ensured that much of the core infrastructure (like seminar rooms, library, computer lab etc.) are on the ground floor. In addition, we have conducted an accessibility audit whose recommendations will be implemented.

4.1.6. How does the university cater to the requirements of residential students? Give details of

- Capacity of the hostels and occupancy (to be given separately for men and women)
96 rooms for men and 16 for women
- Recreational facilities in hostel/s like gymnasium, yoga centre, etc.
The hostel has a common room with TV, gym, library, etc. There are also open playgrounds with facilities for volleyball, basketball, cricket and football.
- Broadband connectivity / wi-fi facility in hostels.
The hostel is covered by the campus-wide wireless network and students have 24 hour access to the Institute's high-speed Internet link.

4.1.7. Does the university offer medical facilities for its students and teaching and non-teaching staff living on campus?

We have an arrangement with Chettinad Hospitals, nearby, to provide immediate care to students in case of a medical emergency. There is a vehicle available 24/7 on campus to transport students to the hospital, if needed.

4.1.8. What special facilities are available on campus to promote students' interest in sports and cultural events/activities?

The hostel has basketball and volleyball courts and a playground for the students to play cricket and football. There is a cultural committee and film club run by students, both of which are active.

4.2 Library as a Learning Resource

4.2.1. Does the library have an Advisory Committee? Specify the composition of the committee. What significant initiatives have been taken by the committee to render the library student/user friendly?

The library has a committee composed of faculty members from each research discipline. We ensure that the collection in each discipline covers all the basic text books and books of fundamental importance, and also ensure that specialized books in each research area are procured on demand. The collection is growing at a good pace. The entire collection is catalogued electronically and is available through an online public access catalogue (OPAC).

The library is designed to be used as a work space. It is very spacious, with a nice view, and provides a conducive atmosphere for reading and study.

4.2.2. Provide details of the following:

- Total area of the library (in Sq. Mts.)
Area 317.82 Sq. Mts
- Total seating capacity
36

- Working hours (on working days, on holidays, before examination, during examination, during vacation)
Open 24 hours, 365 days
- Layout of the library (individual reading carrels, lounge area for browsing and relaxed reading, IT zone for accessing e- resources)
All the reading tables have facility to connect personal laptops. Free wi-fi is available. Area for relaxed reading is present. Computer terminals also present to look up the OPAC and also access the Internet.
- Clear and prominent display of floor plan; adequate sign boards; fire alarm; access to differently-abled users and mode of access to collection
Adequate information regarding shelving of collections is displayed for each floor and shelf wise. Fire alarm is installed.

4.2.3. Give details of the library holdings:

- a) Print (books, back volumes and theses)
8947
- b) Average number of books added during the last three years
450
- c) Non Print (Microfiche, AV)
Nil
- d) Electronic (e-books, e-journals)
e-books = Nil; e-journals = 33. In addition we subscribe to the Mathematics & Statistics package of JSTOR and are part of a DAE consortium to access Science Direct from Elsevier.
- e) Special collections (e.g. text books, reference books, standards, patents)
Text books are not classified separately, Reference books = 223, Standards = Nil, Patents = Nil.
- f) Book Banks
Nil
- g) Question Banks
Nil

4.2.4. What tools does the library deploy to provide access to the collection?

- OPAC
Yes
- Electronic Resource Management package for e-journals
Yes
- Federated searching tools to search articles in multiple databases
No
- Library Website
Yes

- In-house/remote access to e-publications

Yes

4.2.5. To what extent is ICT deployed in the library? Give details with regard to

- Library automation

Library is fully automated. Catalogue is available online. Members are issued RFID tagged library cards. Circulation is via an electronic RFID-enabled kiosk without human intervention.

- Total number of computers for general access

Two

- Total numbers of printers for general access

One

- Internet band width

100 mbps

- Institutional Repository

No

- Content management system for e-learning

Not applicable

- Participation in resource sharing networks/consortia (like INFLIBNET)

INFLIBNET, Consortia - MathSciNet

4.2.6. Provide details (per month) with regard to

- Average number of walk-ins

120

- Average number of books issued/returned

500 / 25

- Ratio of library books to students enrolled

50:1

- Average number of books added during the last four years

Approximately 450 books per year

- Average number of login to OPAC

1000

- Average number of login to e-resources

Approximately 20 per day

- Average number of e-resources downloaded/printed

Approximately 10 per day

- Number of IT (Information Technology) literacy trainings organized

Nil

4.2.7. Give details of specialized services provided by the library with regard to

- Manuscripts
Nil
- Reference
Separate Reference Section is available in the library
- Reprography/Scanning
Scanner is available in the library
- Inter-library Loan Service
ILL service for books and journals are provided
- Information Deployment and Notification
Notifications are sent via emails
- OPACS
OPAC is available
- Internet Access
Free wi-fi with access to the Institute's high-speed Internet link.
- Downloads
Members can download using the terminal/personal laptops
- Printouts
Printouts can be taken
- Reading list/ Bibliography compilation
Lists can be generated by the members depending on their interest using OPAC
- In-house/remote access to e-resources
Available
- User Orientation
Orientation is conducted for new members
- Assistance in searching Databases
No databases
- INFLIBNET/IUC facilities
CMI library is part of INFLIBNET

4.2.8. Provide details of the annual library budget and the amount spent for purchasing new books and journals.

Budget for the year 2014-15: Rs.37,50,000/=

Spent: Rs.27,54,503/=

4.2.9. What initiatives has the university taken to make the library a 'happening place' on campus?

Students and faculty at CMI are naturally inclined to make active use of the library and no special initiatives are required to attract users to the library.

4.2.10. What are the strategies used by the library to collect feedback from its users? How is the feedback analysed and used for the improvement of the library services?

Users are free to provide feedback. The library committee which meets periodically analyses the feedback and takes necessary steps towards improvement.

4.2.11. List the efforts made towards the infrastructural development of the library in the last four years.

- (i) RFID technology was introduced in 2010 to fully automate Check-in / Check-out to ensure that members can use the library 24 hours.
- (ii) Seating capacity was increased.
- (iii) Leisure reading area was added.
- (iv) Facility to connect personal laptops was provided on every reading table.

4.3 IT Infrastructure

4.3.1. Does the university have a comprehensive IT policy with regard to

- IT Service Management

The IT infrastructure is managed by the Computer Committee, made up of faculty members, together with some technical staff. These issues are typically addressed by this group of people.

- Information Security

All sensitive information is stored securely. Faculty and student data are stored on separate servers with strict permissions for access.

- Network Security

Firewalls are in place to prevent unauthorized access to the network from outside the Institute.

- Risk Management

Essential services are being moved to virtual servers that can be copied and deployed on backup hardware in case of physical server failure. Regular backups are taken of user data and all sensitive data.

- Software Asset Management

Almost all the software used at CMI is open source. This is updated regularly to the latest versions, with security fixes as required. Commercial software is used for accounts, which is maintained and updated regularly. Matlab is installed on a central server for scientific computation.

- Open Source Resources

Almost all the software used at CMI is open source.

- Green Computing

The institute does not have power intensive servers.

4.3.2. Give details of the university's computing facilities i.e., hardware and software.

- Number of systems with individual configurations
 - 2 IBM 24-core Xeon Servers with 2TB storage
 - 1 IBM 4-core Xeon Server with 1TB storage
 - 2 HP Proliant servers with 500 MB storage
 - 35 IBM Desktop PCs running Linux in Computer Lab

- 3 IBM Desktop PCs running Windows in Physics Lab
- 4 IBM Desktop PCs running Linux in Library, Faculty Lounge
- 15 IBM Desktop PCs running Linux in faculty offices
- 2 IBM Desktop PCs running Windows in admin offices
- 17 Apple iMac Desktops in faculty and admin offices
- 20 Apple laptops in faculty offices
- 52 Netbooks assigned to research scholars
- Computer-student ratio
1:4 for BSc/MSc students, 1:1 for PhD students
- Dedicated computing facilities
 - 2 IBM 24-core Xeon Servers with 2TB storage
 - 1 IBM 4-core Xeon Server with 1TB storage
 - 2 HP Proliant servers with 500 MB storage
- LAN facility
LAN covers entire campus with both wired and wireless connectivity.
- Proprietary software
Most of the computers run Linux and have only open source software installed.
Tally accounting software installed in admin office Matlab installed on computational server as a common facility.
- Number of nodes/ computers with internet facility
Approximately 80 desktop machines and 80 laptops
- Any other (please specify)

4.3.3. What are the institutional plans and strategies for deploying and upgrading the IT infrastructure and associated facilities?

The IT infrastructure is managed by the Computer Committee, made up of faculty members, together with some technical staff. This group monitors the state of the current hardware and prepares plans for replacement/expansion of machines.

4.3.4. Give details on access to on-line teaching and learning resources and other knowledge and information database/packages provided to the staff and students for quality teaching, learning and research.

Students can access course material taught at CMI through the Moodle LMS as well as individual webpages of faculty members. All library data is available online through Koha.

All students and faculty have 24/7 Internet access through a high-speed connection and are able to reach out to online educational content throughout the world.

4.3.5. What are the new technologies deployed by the university in enhancing student learning and evaluation during the last four years and how do they meet new / future challenges?

The Moodle LMS has been deployed extensively in the last 4 years and has helped to make course material available more readily to students as well as to provide for systematic collection and assessment of assignments.

- 4.3.6. What are the IT facilities available to individual teachers for effective teaching and quality research?

All faculty members have individual laptops/desktops with 24/7 internet connectivity. All classrooms have facilities to project lecture material, in addition to traditional blackboards.

- 4.3.7. Give details of ICT-enabled classrooms/learning spaces available within the university? How are they utilized for enhancing the quality of teaching and learning?

There is one video-enabled classroom connected to the National Knowledge Network. All other classrooms have internet connectivity and facilities for projecting course material.

- 4.3.8. How are the faculty assisted in preparing computer-aided teaching-learning materials? What are the facilities available in the university for such initiatives?

Faculty typically prepare such material on their own. There is a systems engineer to assist with technical issues.

- 4.3.9. How are the computers and their accessories maintained?

The IT infrastructure is managed by the Computer Committee, made up of faculty members, together with some technical staff. All equipment is covered by annual maintenance contracts for ready replacement of defective parts.

- 4.3.10. Does the university avail of the National Knowledge Network connectivity? If so, what are the services availed of?

CMI has a video classroom set up through the National Knowledge Network. Due to technical issues with the location of the campus, the actual NKN network connectivity has not yet reached CMI. Nevertheless, the classroom is being used regularly to share lectures with other institutions using CMI's existing internet connection.

- 4.3.11. Does the university avail of web resources such as Wikipedia, dictionary and other education enhancing resources? What are its policies in this regard?

Students and faculty regularly use resources on the Internet to supplement the material available in textbooks and other traditional printed material.

- 4.3.12. Provide details on the provision made in the annual budget for the update, deployment and maintenance of computers in the university.

The budget for maintenance and replacement of computers in 2014–2015 was approximately Rs 50 lakhs.

- 4.3.13. What plans have been envisioned for the gradual transfer of teaching and learning from closed university information network to open environment?

CMI has always placed all its teaching material on a publicly accessible website. CMI's Moodle page is also accessible from outside the Institute.

4.4 Maintenance of Campus Facilities

4.4.1 Does the university have an estate office / designated officer for overseeing the maintenance of buildings, classrooms and laboratories? If yes, mention a few campus specific initiatives undertaken to improve the physical ambience.

Yes. All classrooms and airconditioned to cope with the local climate. Trees and green spaces are maintained carefully to make the campus an attractive place to live and work.

4.4.2 How are the infrastructure facilities, services and equipments maintained? Give details.

The Institute has a very small core of permanent administrative staff. External contract-based services are used for housekeeping, gardening, catering, electrical and computer maintenance and security.

Any other information regarding Infrastructure and Learning Resources which the university would like to include.

CRITERION V: STUDENT SUPPORT AND PROGRESSION

5.1 Student Mentoring and Support

5.1.1. Does the university have a system for student support and mentoring? If yes, what are its structural and functional characteristics?

Yes. Each batch of students has faculty advisors. The students can talk to them for any support, both academic and non-academic.

5.1.2. Apart from classroom interaction, what are the provisions available for academic mentoring?

Faculty are easily accessible to the students. Students may approach teachers any time they have questions. In addition, most instructors have teaching assistants to help the students.

5.1.3. Does the university have any personal enhancement and development schemes such as career counselling, soft skill development, career-path-identification, and orientation to well-being for its students? Give details of such schemes.

Faculty have regular contact with students to continuously help them with all matters related to their career.

5.1.4. Does the university provide assistance to students for obtaining educational loans from banks and other financial institutions?

CMI charges very nominal fees and provides tuition waivers and scholarships to students by default, so there is no requirement for educational loans.

5.1.5. Does the university publish its updated prospectus and handbook annually? If yes, what are the main issues / activities / information included / provided to students through these documents? Is there a provision for online access?

CMI annually publishes a brochure at the time of admission with all the relevant academic details. This brochure is available online on the CMI website. All other information is also easily accessible on the website.

5.1.6. Specify the type and number of university scholarships / freeships given to the students during the last four years. Was financial aid given to them on time? Give details (in a tabular

All fresh students (BSc/MSc/PhD) receive scholarship and it is given at the end of each month. The continuation of the scholarship depends on the academic performance of the student.

5.1.7. What percentage of students receive financial assistance from state government, central government and other national agencies (Kishore Vaigyanik Protsahan Yojana (KVPY), SN Bose Fellow, etc.)?

20%

5.1.8. Does the university have an International Student Cell to attract foreign students and cater to their needs?

Not considered necessary at this time.

5.1.9. Does the university provide assistance to students for obtaining educational loans from banks and other financial institutions?

CMI charges very nominal fees and provides tuition waivers and scholarships to students by default, so there is no requirement for educational loans.

5.1.10. What types of support services are available for

- overseas students
- physically challenged / differently-abled students
- SC/ST, OBC and economically weaker sections
- students participating in various competitions/conferences in India and abroad
- health centre, health insurance etc.
- skill development (spoken English, computer literacy, etc.)
- performance enhancement for slow learners
- exposure of students to other institutions of higher learning/ corporates/business houses, etc.
- publication of student magazines

All students receive continuous support of the faculty and the university as a whole. No separate support services are considered necessary at this time. Students who are going to participate in conferences get strong support in terms of guidance for preparation of their presentation and in deserving cases, financial assistance.

5.1.11. Does the university provide guidance and/or conduct coaching classes for students appearing for Civil Services, Defence Services, NET/SET and any other competitive examinations? If yes, what is the outcome?

Students from CMI do not typically appear for these kinds of examinations.

5.1.12. Mention the policies of the university for enhancing student participation in sports and extracurricular activities through strategies / schemes such as

- additional academic support and academic flexibility in examinations
Not considered necessary at this time.
- special dietary requirements, sports uniform and materials
Not considered necessary at this time.
- any other (please specify)
Not considered necessary at this time.

5.1.13. Does the university have an institutionalized mechanism for students' placement? What are the services provided to help students identify job opportunities, prepare themselves for interview, and develop entrepreneurship skills?

There is no formal placement cell. Two faculty members are assigned to coordinate campus placement activities. Prospective employers visit the campus to make presentations and conduct selection tests/interviews.

5.1.14. Give the number of students selected during campus interviews by different employers (list the employers and the number of companies who visited the campus during the last four years).

The number of companies visiting the campus each year is about 10–15. These include Bally Technologies, Canon, Credit Suisse, Crisil, Ernst and Young, Ford, Goldman Sachs, Google, iNautix, Mu Sigma, Oracle, Standard Chartered and Tata Consultancy Services.

5.1.15. Does the university have a registered Alumni Association? If yes, what are its activities and contributions to the development of the university?

CMI has an alumni association. It supports the current students by funding their activities, helping them with applications for higher studies and enabling better communication between past and present students.

5.1.16. Does the university have a student grievance redressal cell? Give details of the nature of grievances reported. How were they redressed?

Not considered necessary at this time.

5.1.17. Does the university promote a gender-sensitive environment by (i) conducting gender related programmes (ii) establishing cell and mechanism to deal with issues related to sexual harassment? Give details.

The Disciplinary Committee deals with this matter. No instances of sexual harassment have been reported at CMI.

5.1.18. Is there an anti-ragging committee? How many instances, if any, have been reported during the last four years and what action has been taken in these cases?

There is a Disciplinary Committee that deals with this. No instances of ragging have been reported at CMI.

5.1.19. How does the university elicit the cooperation of all its stakeholders to ensure the overall development of its students?

Every member of CMI is committed to the overall development of its students.

- 5.1.20. How does the university ensure the participation of women students in intra- and inter-institutional sports competitions and cultural activities? Provide details of sports and cultural activities where such efforts were made.

Not considered necessary at this time.

5.2 Student Progression

- 5.2.1. What is the student strength of the university for the current academic year? Analyse the Programme-wise data and provide the trends for the last four years.

Student progression	Percentage against enrolled
UG to PG	100%
PG to M.Phil.	–
PG to Ph.D.	75%
Ph.D. to Post-Doctoral	100%
Employed	
Campus selection	80%
Other than campus recruitment	20%
Entrepreneurs	–

- 5.2.2. What is the programme-wise completion rate during the time span stipulated by the university?

BSc 95%, MSc 95%, PhD 80%

- 5.2.3. What is the number and percentage of students who appeared/ qualified in examinations like UGC-CSIR-NET, UGC-NET, SLET, ATE / CAT / GRE / TOFEL / GMAT / Central / State services, Defense, Civil Services, etc.?

Around 250 students (90%) appeared since 2006.

- 5.2.4. Provide category-wise details regarding the number of Ph.D./ D.Litt./D.Sc. theses submitted/ accepted/ resubmitted/ rejected in the last four years.

PhD accepted in Mathematics: 2

PhD accepted in Computer Science: 6

5.3 Student Participation and Activities

- 5.3.1. List the range of sports, cultural and extracurricular activities available to students. Furnish the programme calendar and provide details of students' participation.

Students have volleyball and, basketball courts, table-tennis facility and a playground for playing football and cricket. Students regularly make use of these.

- 5.3.2. Give details of the achievements of students in co-curricular, extracurricular and cultural activities at different levels: University / State / Zonal / National / International, etc. during the last four years.

CMI students organize an annual inter-collegiate festival called Fiesta. CMI students take part in inter-collegiate festivals organized by other colleges in the region. CMI students regularly take part in the ACM Inter-Collegiate Programming Contest (ICPC).

5.3.3. Does the university conduct special drives / campaigns for students to promote heritage consciousness?

Not considered necessary at this time.

5.3.4. How does the university involve and encourage its students to publish materials like catalogues, wall magazines, college magazine, and other material? List the major publications/ materials brought out by the students during the last four academic sessions.

In some years, students have brought out an online magazine but this has not been a regular activity. There is a proposal to revive this activity under the guidance of an external faculty member who teaches English.

5.3.5. Does the university have a Student Council or any other similar body? Give details on its constitution, activities and funding.

Students have various committees such as hostel committee, sports committee, cultural committee. Students elect these committees themselves. These committees bring student issues to the faculty, organise sports and cultural events.

5.3.6. Give details of various academic and administrative bodies that have student representatives on them. Also provide details of their activities.

Students have their own Hostel Committee that interacts with the Institute's Hostel Committee to oversee matters pertaining to the hostel. Students do not have any representatives on any formal academic bodies.

Any other information regarding Student Support and Progression which the university would like to include.

CRITERION VI: GOVERNANCE, LEADERSHIP AND MANAGEMENT

6.1 Institutional Vision and Leadership

6.1.1. State the vision and the mission of the university.

CMI has already earned a reputation as one of the best places in India to pursue studies and research in mathematics, computer science and theoretical physics. CMI's vision is to grow organically around its core strength in mathematics and become a full-fledged centre of excellence which attracts academicians from different fields to benefit from collaborations and exchanges.

It is CMI's mission to reach its rightful place in the academic world by scaling up its activities to attract more students and quality faculty members and to also establish means to foster a meaningful academia-industry interactions.

6.1.2. Does the mission statement define the institution's distinctive characteristics in terms of addressing the needs of the society, the students it seeks to serve, the institution's tradition and value orientations, its vision for the future, etc.?

Yes.

6.1.3. How is the leadership involved

- in ensuring the organization's management system development, implementation and continuous improvement?

The Director and the Dean of Studies continuously monitor the implementation of the management systems that are already in place.

- in interacting with its stakeholders?

The Director and Dean of Studies interact with the stakeholders on a regular basis.

- in reinforcing a culture of excellence?

There is a well-oiled and time-tested hierarchy of checks starting from the Academic Council through the Boards of Studies down to the faculty advisors of each batch of students who play a crucial role in maintaining and reinforcing the culture of excellence.

- in identifying organizational needs and striving to fulfill them?

The organizational needs are attended to as and when needed.

6.1.4. Were any of the top leadership positions of the university vacant for more than a year? If so, state the reasons.

No

6.1.5. Does the university ensure that all positions in its various statutory bodies are filled and meetings conducted regularly?

Yes

6.1.6. Does the university promote a culture of participative management? If yes, indicate the levels of participative management.

Yes, CMI promotes the culture of participative management. There is very lean administrative staff and most faculty members are involved in running of the institute through committees.

6.1.7. Give details of the academic and administrative leadership provided by the university to its affiliated colleges and the support and encouragement given to them to become autonomous.

Not applicable.

6.1.8. Have any provisions been incorporated / introduced in the University Act and Statutes to provide for conferment of degrees by autonomous colleges?

Not applicable.

6.1.9. How does the university groom leadership at various levels? Give details.

The correct faculty member is identified for each task, and is either given full freedom, or encouraged to work in a team. Faculty members gain experience from these activities.

6.1.10. Has the university evolved a knowledge management strategy? If yes, give details.

No

6.1.11. How are the following values reflected the functioning of the university?

- Contributing to national development
Several CMI graduates are now faculty members in Indian institutions such as CMI, IMS, IITs, IISc, IISERs, IIMs, ISI and BITS.
- Fostering global competencies among students
Several CMI students are selected for internship programmes in international institutions. In particular, the MoU with ENS and Ecole Polytechnique in France allows for regular exchange visits by the best senior BSc students each year. In addition, CMI regularly hosts international scientists who lecture and interact with students.
- Inculcating a sound value system among students Promoting use of technology
CMI maintains very high academic standards for faculty hiring and promotion and this naturally promotes a culture of sound values in students. Computers are a regular part of the educational process in CMI. Most of the announcements and material are circulated electronically, so students are very comfortable with technology.
- Quest for excellence
CMI maintains very high academic standards for faculty hiring and promotion. Students are selected through an entrance exam and are among the most talented in the country. This combination naturally ensures a culture of academic excellence.

6.2 Strategy Development and Deployment

6.2.1. Does the university have a perspective plan for development? If yes, what aspects are considered in the development of policies and strategies?

- Vision and mission
CMI's vision and mission is to achieve excellence in research and teaching of mathematical sciences.
- Teaching and learning
Teaching and learning are an integral part of the present and future plans for CMI's development. All faculty members are active researchers and also participate in the teaching activities
- Research and development
Research is the key for all faculty members and the research output is the main criterion on which faculty are judged for promotion.
- Community engagement
CMI conducts outreach programmes for school students to promote awareness and interest in mathematics and science.
- Human resource planning and development
Not considered necessary at this stage.
- Industry interaction
CMI interacts with industry under the auspices of AlgoLab, a society set up in 2015.. The CMI Trust has had leading personalities from Industry as Trustees, including Mr A C Muthaiah (SPIC Group), Mr Kris Gopalakrishnan (Infosys) and Mr Laxminarayanan (Cognizant).

- Internationalisation

All CMI faculty have strong academic ties with leading scientists around the world. The Institute has participated in a number of bilateral international collaborative research projects. Each year, the Institute hosts a number of international visitors who deliver seminars and engage in collaborative research with CMI faculty. The Institute also regularly organizes seminars and symposia in which leading experts from around the world participate.

CMI welcomes international students nominated by external organizations such as ICTP, Trieste or through programmes such as the European Union ALGANT programme.

6.2.2. Describe the university's internal organizational structure and decision making processes and their effectiveness.

The Director of CMI is both the academic and administrative head of the institute. He is assisted in academic matters by the Dean of Studies and in administrative matters by the Registrar. The Governing Council and the Board of Trustees oversee and facilitate the administrative issues, while the Academic Council and the Boards of Studies ensure smooth functioning of the academic matters.

6.2.3. Does the university have a formal policy to ensure quality? How is it designed, driven, deployed and reviewed?

CMI maintains very high academic standards for faculty hiring and promotion, as well as selection of students. This combination naturally ensures academic quality.

6.2.4. Does the university encourage its academic departments to function independently and autonomously and how does it ensure accountability?

Faculty members in all areas are encouraged to function independently and enjoy full academic autonomy.

6.2.5. During the last four years, have there been any instances of court cases filed by and against the institute? What were the critical issues and verdicts of the courts on these issues?

No. There were no court cases involving the institute.

6.2.6. How does the university ensure that grievances / complaints are promptly attended to and resolved effectively? Is there a mechanism to analyse the nature of grievances for promoting better stakeholder relationship?

Given the small size, a mechanism to analyse the nature of grievances is not considered necessary at this stage. As and when issues come up, they are addressed immediately by the Director, Dean and senior colleagues. There have been no serious complaints or grievances.

6.2.7. Does the university have a mechanism for analyzing student feedback on institutional performance? If yes, what was the institutional response?

No

6.2.8. Does the university conduct performance audit of the various departments?

Not considered necessary at this stage.

6.2.9. What mechanisms have been evolved by the university to identify the developmental needs of its affiliated institutions?

Not applicable.

6.2.10. Does the university have a vibrant College Development Council (CDC) / Board of College and University Development (BCUD)? If yes, detail its structure, functions and achievements.

The Board of Trustees and the Governing Council jointly oversee planning and development of the Institute and as such serve as (CDC/BCUD).

6.3 Faculty Empowerment Strategies

6.3.1. What efforts have been made to enhance the professional development of teaching and non-teaching staff?

CMI encourages colleagues to develop professionally by providing an atmosphere conducive to research and ensuring that there are reasonable funds to invite visitors and to attend conferences.

6.3.2. What is the outcome of the review of various appraisal methods used by the university? List the important decisions.

Given its size, such an exercise has not been taken up. All faculty members file annual progress reports. Individual performance reviews take place when promotions are taken up.

6.3.3. What are the welfare schemes available for teaching and non-teaching staff? What percentage of staff have benefitted from these schemes in the last four years? Give details.

We follow standard central government norms with respect to welfare schemes. In addition, CMI has put in place a group medical insurance scheme for its employees and their families. 100% of staff have benefited from these scheme.

6.3.4. What are the measures taken by the University for attracting and retaining eminent faculty?

One of the main attractions of CMI is its vibrant research programme, with visits of leading researchers and support for faculty to attend conferences with minimal paperwork. This attracts high-quality faculty and also helps us retain them. We have been able to attract a steady stream of distinguished visitors and good set of young applicants. Thanks to a grant from Infosys Foundation, CMI is able to provide generous fellowships and grants for travel to faculty members to make their benefits comparable to those in IITs, IISc etc.

6.3.5. Has the university conducted a gender audit during the last four years? If yes, mention a few salient findings.

No

6.3.6. Does the university conduct any gender sensitization programmes for its faculty?

Not considered necessary

6.3.7. What is the impact of the University's Academic Staff College Programmes in enhancing the competencies of the university faculty?

Not applicable

6.4 Financial Management and Resource Mobilization

6.4.1. What is the institutional mechanism available to monitor the effective and efficient use of financial resources?

The Director monitors the effective and efficient use of the financial resources. On the academic front he is assisted in these matters by a Professors' Committee. On the administrative front, he is assisted by the Registrar. The Board of Trustees plays an important role in raising additional financial resources.

6.4.2. Does the university have a mechanism for internal and external audit? Give details.

CMI's accounts are audited annually by both internal and external auditors.

6.4.3. Are the institution's accounts audited regularly? Have there been any major audit objections, if so, how were they addressed?

CMI's accounts are audited annually by both internal and external auditors. In 2011, CMI was audited by the CAG. There were no major audit objections. All minor issues raised have been dealt with.

6.4.4. Provide the audited income and expenditure statement of academic and administrative activities of the last four years.

Please see the enclosures.

6.4.5. Narrate the efforts taken by the university for resource mobilization.

The CMI trust which comprises of eminent academicians and industrialists works constantly to mobilize resources for the institute. Recurring expenditure is met through a regular grant from the Dept of Atomic Energy (DAE), via National Board of Higher Mathematics. UGC has been generous in providing grants for the constructing a new academic block. Efforts are on to get additional funding from Dept of Science and Technology (DST), which has been promised. Further, active efforts are being made to get donations from the corporate sector.

6.4.6. Is there any provision for the university to create a corpus fund? If yes, give details.

CMI has a corpus fund for Faculty Development which has been growing steadily. Currently, the corpus fund amount is about Rs 40 crores. A separate corpus fund for Growth and Infrastructure is being set up.

6.5 Internal Quality Assurance System

6.5.1. Does the university conduct an academic audit of its departments? If yes, give details.

Since CMI is a small institution, the need has not felt so far to undertake this exercise.

6.5.2. Based on the recommendations of the academic audit, what specific measures have been taken by the university to improve teaching, learning and evaluation?

Not applicable

6.5.3. Is there a central body within the university to continuously review the teaching learning process? Give details of its structure, methodologies of operations and outcome?

The Director and Dean of Studies interact with faculty advisors (there is a separate faculty advisor for each batch) to review the teaching and learning process.

6.5.4. How has IQAC contributed to institutionalizing quality assurance strategies and processes?

Not applicable

6.5.5. How many decisions of the IQAC have been placed before the statutory authorities of the university for implementation?

Not applicable

6.5.6. Does the IQAC have external members on its committees? If so, mention any significant contribution made by such members.

Not applicable

6.5.7. Has the IQAC conducted any study on the incremental academic growth of students from disadvantaged sections of society?

No

6.5.8. What policies are in place for the periodic review of administrative and academic departments, subject areas, research centres, etc.?

Not considered at this stage.

Any other information regarding Governance, Leadership and Management which the university would like to include.

The Board of Trustees of CMI trust consists of

1. Dr. A.C. Muthiah, *Chairman Emeritus, SPIC Ltd., Chennai,*
2. Shri Arun Duggal, *Former Chairman, Shriram Capital Ltd, New Delhi,*
3. Shri S. Gopalakrishnan, *Former Vice-Chairman, Infosys Ltd, Bangalore,*
4. Dr. Anil Kakodkar, *Former Chairman, Atomic Energy Commission,*
5. Shri N. Lakshmi Narayanan, *Vice Chairman, Cognizant Technology Solutions, Chennai,*
6. Prof. M.S. Raghunathan, F.R.S., *Director, National Centre for Mathematics, IIT Bombay, Mumbai,*
7. Dr. M.R. Srinivasan, *Former Chairman, Atomic Energy Commission*
8. Shri Jawahar Vadivelu, *Chairman, Navia Corporate Services Ltd., Chennai.*

The governing council of CMI consists of

1. Prof. R. Balasubramanian (Chairman) *Institute of Mathematical Sciences, Chennai,*
2. Prof. V. Balaji *Chennai Mathematical Institute, Chennai,*

3. Dr. Ravi Kannan *Microsoft Research, Bangalore,*
4. Prof. Rajeeva L. Karandikar *Director, Chennai Mathematical Institute, Chennai,*
5. Prof. Madhavan Mukund *Dean of Studies, Chennai Mathematical Institute, Chennai,*
6. Prof. Nitin Nitsure *Tata Institute of Fundamental Research, Mumbai,*
7. Prof. Bimal Roy *Former Director, Indian Statistical Institute, Kolkata,*
8. Prof. C.S. Seshadri, F.R.S., *Director-Emeritus, Chennai Mathematical Institute, Chennai,*
9. Prof. K.V. Subrahmanyam *Chennai Mathematical Institute, Chennai,*
10. Prof. P.S. Thiagarajan, *National University of Singapore, Singapore.*

CRITERIA VII: INNOVATIONS AND BEST PRACTICES

7.1 Environment Consciousness

7.1.1. Does the university conduct a Green Audit of its campus?

No

7.1.2. What are the initiatives taken by the university to make the campus eco-friendly?

- Energy conservation
Solar heater is used in the hostel complex for hot water.
- Use of renewable energy
CMI is too small for such measures becoming effective.
- Water harvesting
CMI harvests rain water.
- Check dam construction
Not applicable, given the size and nature of the campus.
- Efforts for Carbon neutrality
CMI has a mechanism for use of biogas.
- Plantation
The campus is extensively covered by plants and trees. Several gardeners attend to the maintenance of the gardens.
- Hazardous waste management
CMI does not generate any hazardous waste.
- e-waste management
All e-waste is disposed of in a responsible manner.
- any other (please specify)
CMI has a sewage treatment plant. The treated water is used for watering trees.

7.2 Innovations

Give details of innovations introduced during the last four years which have created a positive impact on the functioning of the university.

1. Active use of teaching assistants to conduct problem solving sessions and guide students with difficulties in specific topics.
2. Use of internet enabled National Knowledge Network classroom to share seminars and lectures with other institutions.
3. Installation of RFID tags and automated kiosk in the library for smooth check-in, checkout of books and effective inventory management.

7.3 Best Practices

Give details of any two best practices which have contributed to better academic and administrative functioning of the university.

I. **Title** Use of Learning Management System Moodle

Objective To disseminate teaching material and coordinate activities such as submission and evaluation of assignments, as well as to share grade sheets and other material with faculty.

The Context With the increasing class sizes, an efficient method of communicating with students was needed.

The Practice All faculty members and students have access to the system. Faculty members create pages for their courses and students are subscribed to it. Then this page is used in many ways: posting of teaching material, assignments, grades etc. Evidence of success: Students are better informed and faculty members find it easier to communicate with the students. Office also finds it efficient to manage and circulate grade sheets.

Problems Encountered and Resources Required Nil

Notes

II. **Title** Integrating all information pertaining to teaching program.

Objectives Integrating information about courses, instructors, student registration and grades into a common database for automated generation of enrolment lists, transcripts and other academic reports.

The Context Different aspects of the teaching process needed to be integrated for a smoother running of the program.

The Practice All the relevant data (information about courses, registration details, grades etc) is entered and accessed from a single interface. Everyone concerned will have access to this common database. Evidence of success: This practice has streamlined the various processes and simplified the work required to be done.

Problems Encountered and Resources Required Nil

Notes

Any other information regarding Innovations and Best Practices which the university would like to include.

3 Evaluative Report of the Department

Mathematics

1. Name of the Department
Mathematics
2. Year of establishment
2006
3. Is the Department part of a School/Faculty of the university?
No
4. Names of programmes offered (UG, PG, M.Phil., Ph.D., Integrated Masters; Integrated Ph.D., D.Sc., D.Litt., etc.)
 - B.Sc. (Hons) in Mathematics and Computer Science
 - B.Sc (Hons) in Mathematics and Physics
 - M.Sc in Mathematics
 - M.Sc in Applications of Mathematics
 - Ph.D in Mathematics
5. Interdisciplinary programmes and departments involved
 - B.Sc. (Hons) in Mathematics and Computer Science, with Computer Science department
 - B.Sc (Hons) in Mathematics and Physics, with Physics department
6. Courses in collaboration with other universities, industries, foreign institutions, etc.
Nil
7. Details of programmes discontinued, if any, with reasons
Nil
8. Examination System: Annual/Semester/Trimester/Choice Based Credit System
CMI follows a semester system. The odd semester runs from August to November, and the even semester runs from January to April.
9. Participation of the department in the courses offered by other departments
Not applicable.
10. Number of teaching posts sanctioned, filled and actual (Professors/Associate Professors/Asst Professors/others)

	Sanctioned	Filled	Actual (including CAS & MPS)
Professor	–	7	7
Associate Professor	–	7	7
Assistant Professor	–	5	5
Others	–	–	–

11. Faculty profile with name, qualification, designation, area of specialization, experience and research under guidance

Name	Qualification	Designation	Specialization	No. of Years of Experience	No. of Ph.D/ M.Phil students guided for the last 4 years
Rajeeva L. Karandikar	Ph.D.	Professor, Director	Probability Theory, Stochastic Processes	34	0
C.S. Seshadri	Ph.D.	Professor, Director-Emeritus	Algebraic Geometry	57	0
V. Balaji	Ph.D.	Professor	Algebraic Geometry	24	3
Clare D'Cruz	Ph.D.	Associate Professor	Commutative Algebra	17	0
Sourish Das	Ph.D.	Assistant Professor	Financial Mathematics	7	0
Priyavrat Deshpande	Ph.D.	Assistant Professor	Algebraic Topology	4	0
Krishna Hanumanthu	Ph.D.	Assistant Professor	Algebraic Geometry	7	0
S. Senthamarai Kannan	Ph.D.	Professor	Representation Theory, Algebraic Geometry	14	2
Upendra Kulkarni	Ph.D.	Associate Professor	Representation Theory	16	2
Manoj Kummini	Ph.D.	Associate Professor	Commutative Algebra	7	0
Sukhendu Mehrotra	Ph.D.	Assistant Professor	Algebraic Geometry	10	0
Dishant Pancholi	Ph.D.	Associate Professor	Contact and Symplectic Topology	8	0
T.R. Ramadas	Ph.D.	Professor	Differential and Algebraic Geometry	33	0
Purusottam Rath	Ph.D.	Associate Professor	Number Theory	9	0
Pramathanath Sastry	Ph.D.	Professor	Algebraic Geometry	25	0

Name	Qualification	Designation	Specialization	No. of Years of Experience	No. of Ph.D/ M.Phil students guided for the last 4 years
Shiva Shankar	Ph.D.	Professor	Partial Differential Equations, Mechanics, Control Theory	32	0
R. Srinivasan	Ph.D.	Associate Professor	Operator Algebras, Operator Theory	17	1
S. Sundar	Ph.D.	Assistant Professor	Operator Algebras	5	0
M. Sundari	Ph.D.	Associate Professor	Representation Theory of Lie Groups, Harmonic Analysis	17	0

12. List of senior Visiting Fellows, adjunct faculty, emeritus professors

Visiting Faculty

- Seshadri Chintapalli
- Krishanu Dan
- Dhriti Ranjan Dolai
- Ananya Lahiri
- Sauvik Mukherjee
- Debajyoti Nandi
- Vijay Ravikumar
- Pranab Sardar
- Sachin Sharma
- Kavita Sutar
- Sushmita Venugopalan

Adjunct Faculty

- S Kesavan
- V Lakshmibai

- T Parthasarathy
- S Ramanan
- B V Rao
- R Sridharan
- V Swaminathan

13. Percentage of classes taken by temporary faculty - programme-wise information

- B.Sc (Hons) in Mathematics and Computer Science 10%
- B.Sc (Hons) in Mathematics and Physics 10%
- M.Sc in Mathematics 10%
- M.Sc in Applications of Mathematics 20%
- Ph.D in Mathematics 10%

14. Programme-wise Student Teacher Ratio

- B.Sc (Hons) in Mathematics and Computer Science: 25:9
- B.Sc (Hons) in Mathematics and Physics: 10:9
- M.Sc in Mathematics: 10:9
- M.Sc in Applications of Mathematics: 10:9
- Ph.D in Mathematics: 10:9

15. Number of academic support staff (technical) and administrative staff: sanctioned, filled and actual

Academic/administrative support staff: 5 (shared across all departments)

16. Research thrust areas as recognized by major funding agencies

Algebraic Geometry, Commutative Algebra, Representation Theory, Dynamical Systems, Functional Analysis, Operator Algebras, Number Theory, Combinatorics, Harmonic Analysis, Symplectic Topology, Algebraic Topology, Application of Statistics and Financial Mathematics.

17. Number of faculty with ongoing projects from a) national b) international funding agencies and c) Total grants received. Give the names of the funding agencies, project title and grants received project-wise.

1. **Project Name:** FIST Programme 2011 (5 years)
Amount Received: Rs. 50,00,000 (first installment)
Funding Agency: Dept of Science and Technology
Name of Faculty: V. Balaji

18. Inter-institutional collaborative projects and associated grants received

- a) National collaboration

b) International collaboration

CMI is a partner in the Indo-US Virtual Institute for Mathematical and Statistical Sciences (VI-MSS) jointly funded by the National Science Foundation, USA and the Department of Science and Technology, India.

CMI is a partner in a joint collaboration with Centre for Quantum Geometry of Moduli Spaces, Aarhus University, Denmark and Tata Institute of Fundamental Research, Mumbai.

19. Departmental projects funded by DST-FIST; UGC-SAP/CAS, DPE; DBT, ICSSR, AICTE, etc.; total grants received.

- FIST Program 2011 — DST — Rs. 50,00,000
- UGC (Building Grant) — UGC — Rs. 4,00,00,000

20. Research facility / centre with

- state recognition
- national recognition
- international recognition

CMI is a partner in the Indo-US Virtual Institute for Mathematical and Statistical Sciences (VI-MSS) jointly funded by the National Science Foundation, USA and the Department of Science and Technology, India.

CMI is a partner in a joint collaboration with Centre for Quantum Geometry of Moduli Spaces, Aarhus University, Denmark and Tata Institute of Fundamental Research, Mumbai.

21. Special research laboratories sponsored by / created by industry or corporate bodies

No.

22. Publications:

- Number of papers published in peer reviewed journals (national / international)
Around 150.
- Monographs
Ram Murty and Purusottam Rath: *Transcendental Numbers*, Springer-Verlag New York. ISBN: 978-1-4939-0831-8
- Chapters in Books
- Edited Books
- Books with ISBN with details of publishers
- Number listed in International Database (For e.g. Web of Science, Scopus, Humanities International Complete, Dare Database - International Social Sciences Directory, EBSCO host, etc.)
- Citation Index - range / average
- SNIP

- SJR
- Impact Factor - range / average
- h-index

In the areas of Mathematics that are represented at CMI, numeric indicators such as impact factor and h-index are not meaningful. CMI faculty publish their research in international journals and conferences that are recognized by the academic community as the leading publication outlets in the corresponding areas.

23. Details of patents and income generated

None.

24. Areas of consultancy and income generated

1. **Area:** Cryptography

Partner: WESEE (Indian Navy)

Faculty Member: Rajeeva L. Karandikar

Amount Received: Rs. 10,00,000

2. **Area:** Predictive Modelling

Partner: Cognizant Ltd

Faculty Member: Sourish Das

Amount Received: Rs. 6,00,000

25. Faculty selected nationally / internationally to visit other laboratories / institutions / industries in India and abroad

Rajeeva L. Karandikar

1. Invited speaker at India Finance Conference, IIM Bangalore.
2. Visited ITAM (Instituto Tecnológico Autónomo de México) and gave talks on “Martingale problem approach to Markov processes” and “Copulas, tail dependence and Value-at-Risk” in April 2011.
3. Visited National Science Foundation (NSF), U.S.A. and gave a talk about CMI and its activities.
4. Visited ISI, Delhi in May 2011.
5. Gave an invited talk on “On Differential equations and Diffusion Processes” at Ramanujan Mathematical Society annual conference in Allahabad, in October 2012.
6. Gave an invited plenary talk on “Portfolio theory in the spirit of Markowitz in non-gaussian world” - at the India Finance Conference, IIM, Bangalore.
7. Gave a talk on “Randomness and its role in design and analysis of Blockciphers” at Indo-US workshop on Cryptology at Indian Statistical Institute, Kolkata.
8. Gave an invited at the Institute colloquium at IIT, Bombay on “Is there a science behind opinion polls?” in March 2012.
9. Gave an invited talk at the Institute colloquium at IIT, Bombay on “Is there a science behind opinion polls?” in March 2012.
10. Attended Pre-conference tutorial on Stochastic Calculus at India Finance Conference, IIM, Bangalore.

11. Gave a 6-hour tutorial on Stochastic Calculus at ICTS School in Math Finance, TIFR Mumbai.
12. Visited Stanford University for Young Researchers Meet (Mathematics and Computer Science) during May 26-27, 2012. Also gave a talk on “Opinion Polls in the context of Indian Parliamentary Democracy”.
13. Visited University of North Carolina at Chapel Hill, June 2012.
14. Talked on “Introduction to Cryptography” at a conference for college teachers and students organised by IIT Bombay, Mumbai, January 2013.
15. Talked on “Modeling in the Spirit of Markowitz Portfolio Theory in a Non Gaussian World” at IIM, Indore.
16. Gave invited talks on “Opinion Polls in the context of Indian Parliamentary Democracy” at
 - IIT, Indore,
 - At the Bayes by the Bay conference organised by Institute of Mathematical Sciences, January 2013.
 - At the annual conference of International Indian Statistical Association at Chennai January 2013.
 - . At national seminar at St. Xavier’s College, Kolkata, January 2013.
17. Invited talk on “Limit Theorems in Finitely Additive Probability Theory” at the conference on “Limit theorems in probability” at IISc, January 2013.
18. Gave invited talks on Opinion Polls in the context of Indian Parliamentary Democracy at IISER, Pune in September 2013.
19. Visited Indian Statistical Institute, Delhi, in December 2013.
20. Gave an invited talk at National Meet of Research Students in Mathematical Sciences, University of Pune on “Introduction to Monte Carlo Simulation” in February 2014.
21. Gave invited talks on Opinion Polls in the context of Indian Parliamentary Democracy at University of Pune as part of Science day celebrations (2014).
22. Gave invited talks on Opinion Polls in the context of Indian Parliamentary Democracy at IIT, Kanpur, in March 2014.
23. Gave invited talk at a discussion meeting on “Nonlinear Filtering and Data Assimilation”, at ICTS, Bangalore on “Introduction to Nonlinear Filtering”.
24. Gave an invited talk at the Indo French Technology summit, New Delhi, on “Economic Benefits of Mathematical Science Research?”.
25. Delivered a invited public lecture at Indian National Science Academy, New Delhi on “Interface of Mathematics with Society”, under Science & Society Public Engagement Programme in April 2014.
26. Delivered a popular talk on “Power and Limitations of Opinion Polls” at Indian Association Of Investment Professionals, CFA society, India Chapter in April 2014.
27. Gave a special invited lecture at the Annual Meeting of Indian Academy of Sciences in November 2014 on “Power and Limitation of opinion polls”.
28. Visited Indian Institute of Science Education and Research and gave seminar titled “On Differential equations and Diffusion Processes” and “Power and Limitation of opinion polls”

29. Visited Indian Institute of Technology, Indore and gave a colloquium talk on “Introduction to Monte Carlo Simulation”.
30. Gave an invited talk at National Seminar in Statistics at Presidency College, Kolkata, in February 2015 on “Introduction to Option Pricing”.
31. Gave an invited talk at IISER (Indian Institute of Science Education and Research), Kolkata in February 2015 on “Power and Limitations of Opinion Polls”.
32. Gave an invited talk at Ramanujam Symposium at C R Rao Institute, Hyderabad, in March 2015 on “Introduction to Martinagles”.

C.S. Seshadri

1. attended the CAAG 2012 Conference held at Puducherry in March 2012.

V. Balaji

1. Gave invited talk in Madrid in September 2012 in the Indo-Spanish Conference in honour of Professor M.S. Narasimhan’s 80th birthday.
2. Gave a Course of Lectures in the “Geometry of Principal bundles” in University of Milan in September 2012.
3. Gave invited talk in University of Roma I on “Higher dimensional analogues of Narasimhan-Seshadri theorem” in September 2012.
4. Gave three invited talks in University of Paris 7 and Paris 8 on
 - (i) Higher dimensional analogues of Narasimhan-Seshadri theorem
 - (ii) Parahoric torsors on algebraic curves
 - (iii) Tensor product theorems of semistable bundles and Hitchin pairs.
5. Gave invited talk in the International Conference in the Indian Institute of Science in honour of Professor M.S. Narasimhan.
6. Invited to give a Master’s Class Course at the QGM Center in Aarhus University.
7. Invited to the ICM Satellite Conference in Singapore on “Higgs Bundles” to give a talk.
8. Conducted AIS in Algebraic Geometry in the Kerala School of Mathematics in December 2014 (along with D.S. Nagaraj) and gave a series of 5 talks in the Workshop.

Clare D’Cruz

1. Attended Summer School in Commutative Algebra at ISI, Kolkata, during July-August 2012.
2. Assisted in tutorial of the Summer School in Commutative Algebra in July 2011 at the Indian Institute of Technology, Mumbai.
3. Gave lectures on Groebner Basis and Introduction to the package “Singular”: ATMW Computational Commutative Algebra and Algebraic Geometry in January 2012.
4. Gave a talk on “Solving polynomial equations, Groebner basis and applications” on June 15, 2012 at the Development program on Discrete Mathematics from 11–18 June, 2012.
5. Visited the Department of Mathematics, ISI Calcutta, July 20–August 3, 2012.

6. Attended the ATM Workshop on Singularity Categories in Algebraic Geometry and Commutative Algebra, IIT Madras, Jan 2–12 2013
7. Gave a talk on “Integral points, convex polytopes and applications” at the Department of Mathematics, Anna University, Chennai on January 4, 2013.
8. Gave a talk on “Polynomials, Blowing up and Integrally closed ideals” at the National Conference on Topics in Commutative Algebra, Institute of Science, Mumbai on January 25, 2013.
9. Gave a talk on “Polynomial, blowing up and integrally closed ideals” at the Department of Mathematics, Periyar University, Salem in March 2013.

Sourish Das

1. Taught “Linear Models” at ISI Chennai in Fall 2013 semester (September - December 2013).
2. Gave a talk on “Some Perspective on Efficient Market Hypothesis and Multiple Testing Problem” at ISI-Chennai, in January 2014.
3. Gave a talk on “Bayesian Solution to Some Ill-Posed Problems”, at CMI.
4. Presented at the Statistics Department of National University of Singapore titled “Some Perspective on Efficient Market Hypothesis and Multiple Testing Problem” in May 2014.
5. Gave a course on “Linear Models” at ISI Chennai Center during April - September 2014.
6. Presented at SSN Institute titled “Statistical Data Analysis using R” in September 2014.
7. Taught a course on “Linear Models” at ISI, Chennai Center.
8. Presented at the International Conference on Applied Statistics at Colombo, Sri Lanka titled “Efficient Algorithms for Gaussian Process for Big Data” in December 2014.
9. Presented Poster at the Indo-Russian Conference on Probability and Statistics, at ISI, Delhi on “Efficient Algorithms for Gaussian Process for Big Data” in January 2015.
10. Presented Tutorial at National Conference on Distributed Machine Learning on “Systematic Approach towards Research on Machine Learning and Distributed Computing”.

Krishna Hanumanthu

1. Attended the ATM Workshop on combinatorial commutative algebra. at IIT Madras in May, 2012. Lectured on combinatorial commutative algebra .
2. Attended the 27th Annual Conference of Ramanujan Mathematical Society, New Delhi, October 2012. Gave a lecture on “Bounding first Hilbert coefficient”.
3. Attended the ATM Workshop on singularity categories in algebraic geometry and commutative algebra at IIT Madras in January, 2013. Tutorial instructor on singularity categories.
4. Lectured on “Differential Topology” in the Annual Foundational School - 2 at Kerala School of Mathematics, Kozhikode during May 2014.
5. Lectured on Schemes and Cohomology during the Annual Instructional School at Kerala School of Mathematics, Kozhikode during December 2014.
6. Lectured on algebra (group theory) in the Annual Foundational School - 1 at IIT Madras during December 2014.

S.Senthamarai Kannan.

1. Gave a talk in RMS held at the University of Allahabd during October 2011.
2. Gave a talk in the Vaidhyanadha Samy Memorail lecture at Ramanujan Institute for Advanced Study in Mathematics, Chennai.
3. Attended the Groups and Geometry Conference at ISI, Bangalore in December, 2012.
4. Attended the Algebraic Geometry Conference at KSOM, Kozhikode in March, 2013.
5. Attended Vector Bundles conference at KSOM during March 2014.

Upendra Kulkarni

1. Gave five lectures in Advanced Instructional School on “Lie Algebras” at CMI, in July 2011
2. Visited IIT Mumbai, and gave two lectures on “Schur-Weyl duality and representation theory of $GL(n)$ ”, in November 2011.
3. Attended ATM Workshop in Representation theory of finite group of Lie-type: Deligne-Lusztig theory at TIFR, Mumbai, in December 2011.
4. Gave lectures on representations of Chevalley groups in the ATM school on Chevalley Groups, in May 2013 at IISER Pune.
5. Attended Workshop on Cohomological Finite Generation by Wilberd van der Kallen during June - July 2013 at IMSc., Chennai.
6. Attended Workshop on Sheaves on affine flag manifolds, combinatorics of Bruhat graphs and modular representations of algebraic groups by Professor Peter Fiebig in October 2013 at IMSc., Chennai.
7. Gave lectures on Clifford algebras in AIS on Classical Groups and Introduction to K-theory, in December 2013 at IISER, Pune.
8. Attended Workshop on Soergel bimodules and Kazhdan-Lusztig theory by Ben Elias during January - February 2014 at IMSc., Chennai

Manoj Kummini

1. Visited Mathematical Sciences Research Institute (MSRI), Berkeley during August-December 2012.
2. Attended the Joint Introductory Workshop: Cluster Algebras and Commutative Algebra at MSRI, Berkeley in August-September, 2012.
3. Visited Purdue University in August 2012, University of Missouri, Columbia in September 2012 and Northeastern University in October 2012.
4. Attended KUMUNU at University of Missouri, September 2012.
5. Gave a talk on “Hilbert functions and Betti numbers” at University of Missouri, Columbia in September 2012.
6. Gave a talk on “Multilinear free resolutions from higher tensors”, Washington University, St. Louis, in September 2012.
7. Attended Combinatorial Commutative Algebra and Applications at MSRI, Berkeley in December, 2012.

8. Gave a talk on “Poset embeddings of Hilbert functions” at City University of New York, New York, NY in October, 2012.
9. Gave a talk on Local Boij-Söderberg theory, Northeastern University, Boston, MA. October 2012.
10. Lectured in the preparatory workshop for Panaroma Lectures on “Syzygies and Free Resolutions” by David Eisenbud in CMI in December, 2012.
11. Lectured in the ATM workshop on Singularity Categories in Algebra and Geometry in IIT Madras in Januar, 2013.
12. Visited IMSc, Chennai, in July 2013.
13. Gave an invited talk at Hanoi, Vietnam, in December 2013.
14. Attended KSOM at Kozhikode, in February 2014.
15. Gave a talk at International Conference on Algebra and Applications, Aligarh Muslim University, Aligarh, Uttar Pradesh.
16. Instructor at Advance Instructional School on ‘Schemes and Cohomology’, Kerala School of Mathematics, Kozhikode, Kerala.
17. Instructor at Annual Foundational School, IIT-Madras, Chennai, Tamilnadu.
18. Gave a talk on “A geometric technique of constructing interesting complexes” at the Indian Statistical Institute, Bangalore, in February 2015.
19. Gave a talk on “Free resolutions of some determinantal-line varieties” at CAAG 2015 Conference held at IIT-Guwahati, Guwahati, in February 2015.
20. Gave a talk on “Betti tables of p-Borel-fixed ideals” at the Indian Statistical Institute, Kolkata, in February 2015.

Sukhendu Mehrotra

1. Attended the workshop on “Brauer groups and obstruction problems” at the American Institute of Mathematics, Palo Alto from February 25 to March 1, 2013.
2. Visited the National University of Singapore from November 6–11, 2012. Gave a talk on “Hyperholomorphic sheaves and deformations of K3 surfaces” in the Geometry Seminar on November 9, 2012.
3. Lectured in Module 2, Geometry and Topology in the Ninth AFS at CMI in December, 2012.
4. Lectured in the ATM Workshop on Singularity Categories in Algebraic Geometry and Commutative Algebra at IIT Madras, January 2–12, 2013.
5. Visited TIFR, Mumbai from January 27 to February 1, 2013. Gave a Colloquium on “Hyperholomorphic sheaves and deformations of K3 surfaces” on January 31, 2013.
6. Gave invited workshop lecture at National University of Singapore, Singapore in July 2014 on “Noncommutative K3 surfaces and moduli spaces of sheaves”.
7. Gave a course on “Representation theory of finite groups” at Universidad Católica de Chile.
8. Taught a course on “Representation theory of finite groups” at the Catholic University of Chile (PUC, Santiago).

9. Gave a talk entitled “Non commutative K3 surfaces and moduli spaces of sheaves” at the LXXXIII Annual Meeting of the I Sociedad de Matemática de Chile in December 2014.
10. Year-long academic visit to Catholic University of Chile (PUC, Santiago).
11. Gave multiple talks in a seminar on derived categories at the Department of Mathematics, PUC.

Dishant Pancholi

1. Visited the International Centre for Theoretical Physics (ICTP), Trieste, Italy from 7–14 January, 2013.

T.R. Ramadas

1. Attended 50th Anniversary Conference of ICTP, Trieste.

Purusottam Rath

1. Gave a talk in the Institut de Mathematiques de Jussieu in May 2011 on Non-vanishing of periodic L-functions, irrationality and a question of Chowla.
2. Gave a talk in the international conference on Number theory at HRI in December 2011 on Subspace theorem and complexity.
3. Gave a series of lectures on transcendence and diophantine approximation in IMSc in relation to the Special year in Number theory.
4. Co-organiser of the Special year in Number theory at IMSc.
5. Gave an invited talk in the international conference on “The Legacy of Srinivasa Ramanujan” held at New Delhi commemorating the 125th birth anniversary of Srinivasa Ramanujan.
6. Gave a 12-hour course of lectures on Commutative Algebra in an instructional school at Kerala School of Mathematics, Kozhikode, in May 2014.

Pramathanath Sastry

1. Attended Workshop on local cohomology at IIT-B in July 2011.
2. Gave series of lectures on “Geometric Invariant theory and Mumford’s conjecture” in the advanced ATM workshop on Invariant theory held at CMI in December 2011.
3. Attended CMI-IMSc Maths colloquium, in Jan 2012.
4. Attended Commutative Algebra and Algebraic Geometry conference at Pondicherry in March 2012.
5. Visited the University of Toronto May–July, 2012. Gave four lectures at the GANITA Lab at University of Toronto during this period.
6. Attended the Workshop on Syzygies and Free Resolutions at CMI, December 24–28, 2012.
7. Attended the ATM Workshop on Singularity Categories in Algebraic Geometry and Commutative Algebra, IIT Madras, January 2–12, 2013.

Shiva Shankar

1. Attended CAAG, and gave a talk on ‘Arithmetic’ results in PDE.
2. Lectured on ‘symplectic reduction and completely integrable systems’ in a workshop on Ergodic Theory at KSOM.
3. Visited the University of Padova, September-October 2012, and gave a graduate level course on control of systems of PDE.
4. Gave two seminar talks at the Institute of Mathematics, Innsbruck, Austria, October, 2012.
5. Attended the Ramanujam Mathematical Society Annual Meeting, Bangalore, 2013 and delivered a plenary talk on “The Fundamental Principle: from Euler to Palamodov”.

R. Srinivasan

1. Attended a workshop on “Functional Analysis of Quantum Information Theory” at The institute of Mathematical sciences, Chennai, during December 2011- January 2012.
2. Attended the conference on “Quantum Probability, Noncommutative Geometry, Quantum Information.” held at ICMS, Edinburgh, Scotland, in January 2012, and gave a talk titled “Hilbert Von Neumann Modules”.
3. Attended an Instructional Workshop on “Subfactors and planar algebras” held at The Institute of Mathematical Sciences, Chennai, during March - April 2012.
4. Attended the SunderFest held at The Institute of Mathematical Sciences, Chennai, during April 2012 and gave a talk titled “ E_0 -semigroups on type II_1 factors”.
5. Visited the University of Lancaster, U.K., during June-July 2011 and gave a series of six lectures on “Generalized CCR flows” and “Toeplitz CAR flows”.
6. Gave a talk on “CCR flows” in the ATM Workshop on Operator Algebras, held at The Institute of Mathematical Sciences, Chennai, during January - February 2012.
7. Attended the conference on “Operator Algebras in Non-Equilibrium Statistical Mechanics” between December 17-21, 2012, at Bambolim Resort, Goa. Gave a talk titled “Invariants for E_0 -semigroups on type II_1 factors”.
8. Attended a workshop and a subsequent conference on “Recent advances in Operator Theory and Operator Algebras”, between December 31, 2012 and January, 11, 2013, held at Indian Statistical Institute, Bangalore. Gave a talk titled “Non-cocycle-conjugate E_0 -semigroups on non-type-I factors”.
9. Attended and gave a talk titled “CCR flows on type III factors” in the conference in honor of 70th birth day of Prof Kalyan B. Sinha at KSOM.
10. Visited University of Kyoto, Japan, during June-July 2013.
11. Gave a talk at RIMS, Kyoto, Japan titled “Non-cocycle-conjugate E_0 -semigroups on non-type-I factors” in July 2013.
12. Gave a talk at IMSc titled “Many CCR flows” in March 2014.
13. Gave a talk titled ‘Cohomology for spatial super-product systems’ in the conference on “Recent Advances in Operator Theory and Operator Algebras” held at ISI, Bangalore, in December 2014.

14. Visited Indian Statistical Institute, Bangalore in February 2015.

S. Sundar

- (a) Visited Université d'Orleans, France from September 23 to October 18, 2012.
- (b) Visited Prof. Renault at University of Orleans for a month during September-October 2013 to collaborate. The collaboration ended in a research article titled "Groupoids associated to Ore semigroup actions" which is accepted by J. Operator theory.
- (c) Attended the workshop held in Kerala School of Mathematics in February 2014 on the occasion of 70th birthday of Prof. Kalyan B. Sinha.
- (d) Attended a conference at Oberwolfach, Germany during the period October 2014.

M. Sundari

- (a) Attended Discussion meeting in Harmonic Analysis during December 2011.
- (b) Gave an invited talk on "An analogue of Benedicks theorem for the Heisenberg group" at the Mathematics Department of IIT Madras in April 2013.
- (c) An Instructional Workshop on Harmonic Analysis and 13th Discussion Meeting on Harmonic Analysis was organised in December 2013 with co-organisers V.S. Sunder, Murali K. Vemuri and Shrihari Sridharan. The conference is supported by NBHM, IMU-CDC, IMSc and CMI.

26. Faculty serving in (a) National committees, (b) International committees, (c) Editorial Boards, (d) any other (please specify)

Rajeeva Karandikar:

- 1. Currently editor of Indian Journal of Pure and Applied Mathematics (by INSA).
- 2. In the past have served as the editor of Sankhya (Journal of Indian Statistical Institute)
- 3. As associate editor/editorial board member for Annals of Probability
- 4. Journal of Statistical Planning and Inference
- 5. Applied Stochastic Models in Business and Industry.

C. S. Seshadri:

- 1. On the editorial board of Transformation Groups (International Journal)
- 2. Proceedings of the Indian Academy of Sciences (Mathematics) and
- 3. Chief Editor of TRIM Series published by Hindustan Book Agency.

V. Balaji:

- 1. Editorial Board of the Journal of the Ramanujan Mathematical Society.

Shiva Shankar:

- 1. Associate Editor, 'Multidimensional Systems and Signal Processing' (published by Springer Verlag), 1995-2013

2. Member, Editorial Board, 'Multidimensional Systems and Signal Processing', 2014-
3. Member, Editorial Board, 'Mathematics Newsletter' of the Ramanaujam Mathematical Society, 2005-2006
4. Member of the IEEE technical committee on 'Behavioral Control Theory', 2006-2012

Senthamarai Kannan:

1. On the editorial board for "International Journal of Mathematics and Scientific Computing". ISSN: 2231 5330.

T. R. Ramadas:

1. Editor, Mathematical Proceedings of the Indian Academy of Sciences
27. Faculty recharging strategies (UGC, ASC, Refresher / orientation programs, workshops, training programs and similar programs).

Not Considered Necessary.

28. Student projects

- percentage of students who have done in-house projects including inter-departmental projects
40%
- percentage of students doing projects in collaboration with other universities / industry / institute
30%

29. Awards / recognitions received at the national and international level by

- Faculty
 1. T.R. Ramadas was awarded J.C. Bose National Fellowship by the Department of Science and Technology in 2015.
 2. Rajeeva L. Karandikar was awarded the P C Mahalanobis Gold Medal by the Prime Minister at the Indian National Science Congress in February 2014.
 3. C.S. Seshadri was awarded Doctoate Honoris Causa by Univ Paris et Marie Curie, Paris, France in 2013
 4. C.S. Seshadri was elected the Fellow of the American Mathematical Society, U.S.A. In 2013.
 5. C.S. Seshadri was awarded the degree of Doctor of Science (Honoris Causa) by the University of Hyderabad in 2012.
 6. Purusottam Rath was awarded ICTP Regular Associateship until December 2016.
 7. C.S. Seshadri was elected to the National Academy of Sciences, U.S.A in April 2010.
 8. V. Balaji was awarded J.C. Bose National Fellowship by the Department of Science and Technology in December 2008.
 9. C. S. Seshadri was awarded H.K. Firodia Award for Excellence in Science and Technology, Pune, in October 2008.

10. C.S. Seshadri was awarded Padma Bhushan by the President of India in January 2009.
 11. S. Kesavan was elected as a Fellow of the Indian Academy of Sciences.
 12. V. Balaji was elected as a Fellow of the Indian Academy of Sciences.
 13. V. Balaji was awarded the Shanti Swarup Bhatnagar Prize in Mathematics for the year 2006.
 14. C.S. Seshadri was awarded the Trieste Science Prize for the year 2006.
 15. C.S. Seshadri was appointed as National Research Professor by the Government of India.
- Doctoral / post doctoral fellows
 - Students
30. Seminars/ Conferences/Workshops organized and the source of funding (national / international) with details of outstanding participants, if any.
1. NS50: Fifty Years of the Narasimhan-Seshadri Theorem, October 5-16, 2015
Funded by CMI and IMSc.
 2. International Conference on Algebra, Geometry and History of Mathematics, July 27-29, 2015
Funded by CMI.
 3. Research Workshop and Conference on Statistical Methods in Finance, July 13-17, 2015
Jointly organized by CMI and ISI Chennai.
 4. Recent Developments in Commutative Algebra and Applications to Classical Rings, January 12-14, 2015.
India-UK Scientific Seminar supported by the Department of Science and Technology (India) and the Royal Society (UK).
 5. NCM Advanced Instructional School in Algebraic Number Theory, July 7-26, 2014.
Funded by National Centre for Mathematics, TIFR and IIT Bombay.
 6. Instructional Workshop on Harmonic Analysis and Ergodic Theory, December 9-14, 2013.
Funded by National Board for Higher Mathematics (NBHM) and International Mathematics Union (IMU).
 7. Conference on Analytic Theory of Automorphic Forms, December 9-13, 2013.
Jointly organized with Institute of Mathematical Sciences, Chennai.
 8. Workshop on h -principle and its applications to contact and symplectic geometry, July 1-12, 2013.
Funded by CMI.
 9. Topics in Probability, December 18-20, 2012.
Jointly organized with Institute of Mathematical Sciences (IMSC) and Statistical and Mathematical Sciences Institute (SAMSI) under VI-MSS programme.
 10. Mathematical Panorama Lectures series workshop on Syzygies and Free Resolutions, December 17-28, 2012.
Funded by National Board for Higher Mathematics (NBHM).

11. Ninth AFS-1, NBHM Advanced Training in Mathematics School, December 3-29, 2012.
Funded by National Board for Higher Mathematics (NBHM).
 12. CMI-IMSc Mathematics Colloquium 2012, January 23-27, 2012.
Jointly organised with Institute of Mathematical Sciences, Chennai.
 13. NBHM Advanced Instructional School on Invariant Theory, December 12-30, 2011.
Funded by National Board for Higher Mathematics (NBHM).
 14. NBHM Advanced Instructional School on Lie Algebras, July 4-23, 2011.
Funded by National Board for Higher Mathematics (NBHM).
 15. Sixth AFS-1, NBHM Advanced Training in Mathematics School, December 3-30, 2009.
Funded by National Board for Higher Mathematics (NBHM).
 16. Principal Bundles in Geometry, February-March, 2009.
Funded by the CMI-TCS Academic Alliance.
 17. Galois Representations and Modular Forms, September-October, 2007.
Funded by the Centre for Theoretical Studies, Tata Institute of Fundamental Research
31. Code of ethics for research followed by the departments
None. We implicitly trust the departments to act ethically.

32. Student profile programme-wise:

Name of the Programme (refer to question no. 4)	Applications received	Selected		Pass percentage	
		Male	Female	Male	Female
B.Sc. (Hons) in Mathematics and Computer Science/Physics	1732	19	2	79%	100%
M.Sc in Mathematics	501	2	1	100%	100%
M.Sc in Applications of Mathematics	255	10	1	100%	100%
Ph.D in Mathematics	198	5	2	0%	100%

33. Diversity of students

Name of the Programme (refer to question no. 4)	% of students from the same university	% of students from other universities within the State	% of students from universities outside the State	% of students from other countries
M.Sc in Mathematics	33%	0%	67%	0%
M.Sc in Applications of Mathematics	10%	10%	80%	0%
Ph.D in Mathematics	29%	0%	71%	0%

34. How many students have cleared Civil Services and Defense Services examinations, NET, SET, GATE and other competitive examinations? Give details category-wise.

None.

35. Student progression

Student progression	Percentage against enrolled
UG to PG	95%
PG to M.Phil.	–
PG to Ph.D.	50%
Ph.D. to Post-Doctoral	100%
Employed	
Campus selection	50%
Other than campus recruitment	50%
Entrepreneurs	–

36. Diversity of staff

Percentage of faculty who are graduates	
of the same university	0%
from other universities within the State	10%
from universities from other States	50%
from universities outside the country	40%

37. Number of faculty who were awarded M.Phil., Ph.D., D.Sc. and D.Litt. during the assessment period

Not Applicable. Only people who already have a Ph.D. are hired as faculty.

38. Present details of departmental infrastructural facilities with regard to

- a) Library

CMI Library has an extensive collection of mathematics books.

- b) Internet facilities for staff and students

CMI campus has 24 hours high-speed (32 Mbps) internet connection.

- c) Total number of class rooms

12 (Shared by all departments)

- d) Class rooms with ICT facility

All classrooms are equipped with projector and internet facility.

- e) Students' laboratories

No.

- f) Research laboratories

No.

39. List of doctoral, post-doctoral students and Research Associates

- a) from the host institution/university

Doctoral students:

- Sarjick Bakshi

b) from other institutions/universities

Doctoral students:

- Anbu Arjunan
- Suratno Basu
- Abhishek T Bharadwaj
- Narasimha Chary B
- Debayudh Das
- Sourav Das
- Abhijeet Ghanwat
- Mitra Koley
- Naveen Kumar
- Subramani Muthukrishnan
- S P Murugan Paramasivam
- Praveen Kumar Roy
- Kuldeep Saha
- Pinakinath Saha
- Rajib Sarkar
- Shraddha Srivastava

Post Doctoral students:

- Seshadri Chintapalli
- Krishanu Dan
- Dhriti Ranjan Dolai
- Ananya Lahiri
- Sauvik Mukherjee
- Debajyoti Nandi
- Vijay Ravikumar
- Pranab Sardar
- Sachin Sharma
- Kavita Sutar
- Sushmita Venugopalan

40. Number of post graduate students getting financial assistance from the university.

Fifty.

41. Was any need assessment exercise undertaken before the development of new programme(s)?
If so, highlight the methodology.

No.

42. Does the department obtain feedback from

- a. faculty on curriculum as well as teaching-learning-evaluation? If yes, how does the department utilize the feedback?

The department has regular faculty meetings to discuss feedback on courses and other issues and makes appropriate recommendations to address any issues that may be raised.

- b. students on staff, curriculum and teaching-learning-evaluation and how does the department utilize the feedback?

There is no formal mechanism for student feedback, but students to provide feedback on individual courses via their faculty advisors and this is discussed by the faculty in their regular meetings.

- c. alumni and employers on the programmes offered and how does the department utilize the feedback?

There is no formal mechanism for feedback from alumni and employers, but any comments or suggestions received are discussed by the faculty in their regular meetings.

43. List the distinguished alumni of the department (maximum 10)

Arul Shankar, now a faculty member at Harvard University, was named in the Fields Medal citation of Manjul Bhargava in 2014 for his joint work while a PhD student at Princeton University.

44. Give details of student enrichment programmes (special lectures / workshops / seminar) involving external experts.

Students participate in all the academic activities, such as seminars and workshops.

45. List the teaching methods adopted by the faculty for different programmes.

Each faculty member has complete academic freedom in the teaching methods he or she adopts and varies from person to person and time to time. General methods include close personal monitoring, continuous assessment through assignments, and exams; and term papers and presentations.

46. How does the department ensure that programme objectives are constantly met and learning outcomes are monitored?

The Board of Studies and Academic Council of the institute meet periodically to ensure that the programme objectives are met. Each PhD student has a doctoral committee which monitors his/her progress.

47. Highlight the participation of students and faculty in extension activities.

Not applicable.

48. Give details of “beyond syllabus scholarly activities” of the department.

Not applicable.

49. State whether the programme/ department is accredited/ graded by other agencies? If yes, give details.

No.

50. Briefly highlight the contributions of the department in generating new knowledge, basic or applied.

CMI is a major center for algebraic geometry, with Prof. C.S. Seshadri, the Founder-Director of CMI being a leading expert in this area. He along with his collaborators have made substantial contributions to the theory of moduli of bundles, Free resolutions of some Schubert singularities. Dishant Pancholi (with Roger Casals and Francisco Presas) has completed a major piece of work, to appear in *Annals of Mathematics*. In this paper, the existence of a contact structure is proved in any homotopy class of almost contact structures on a closed 5-dimensional manifold.

Other areas of significant work at CMI in mathematics include symplectic topology, algebro-geometric foundations of conformal field theory, diagram categories and their representations, Hoskin-Deligne formula for the length of complete ideals of height two in a two-dimensional regular local ring, transcendental number theory, Euclidean Ramsey theory, controllability of a Kalman state space system, theory of E_0 -semigroups, Ore semigroup, quadratic variation of martingales and stochastic calculus. These contributions have resulted in publications in high quality journals.

CMI has a vigorous programme on the history of mathematics, with Professor Kim Plofker visiting CMI every year and leading this activity.

51. Detail five major Strengths, Weaknesses, Opportunities and Challenges (SWOC) of the department.

Strengths • High quality research faculty

- Excellent infrastructure for research and teaching
- Proximity to active research groups in other institutions
- Strong ties with national and international collaborators
- Access to talented pool of undergraduate students

Weaknesses • Relatively small faculty size

- Some research areas not well represented

Opportunities • National need for manpower trained in mathematical sciences

- Actively pursue international students
- Interact with industry to provide specialized training

Challenges • Talented undergraduate students prefer career-oriented engineering courses

- Lack of good quality post-graduate candidates
- Talent pool for faculty hiring is limited
- Raising resources to expand infrastructure such as hostel

52. Future plans of the department.

- Build a world-class department which is active in a broad range of mathematical areas.
- Expand CMI's role as facilitator of exchanges between historians of mathematics from India and abroad.

Computer Science

1. Name of the Department
Computer Science
2. Year of establishment
2006
3. Is the Department part of a School/Faculty of the university?
No
4. Names of programmes offered (UG, PG, M.Phil., Ph.D., Integrated Masters; Integrated Ph.D., D.Sc., D.Litt., etc.)
 - B.Sc. (Hons) in Mathematics and Computer Science
 - M.Sc in Computer Science
 - Ph.D in Computer Science
5. Interdisciplinary programmes and departments involved
 - B.Sc. (Hons) in Mathematics and Computer Science, with Mathematics department
6. Courses in collaboration with other universities, industries, foreign institutions, etc.
None
7. Details of programmes discontinued, if any, with reasons
None
8. Examination System: Annual/Semester/Trimester/Choice Based Credit System
CMI follows a semester system. The odd semester runs from August to November, and the even semester runs from January to April.
9. Participation of the department in the courses offered by other departments
Not applicable
10. Number of teaching posts sanctioned, filled and actual (Professors/Associate Professors/Asst Professors/others)

	Sanctioned	Filled	Actual (including CAS & MPS)
Professor	–	4	4
Associate Professor	–	3	3
Assistant Professor	–	5	5
Others	–	–	–
11. Faculty profile with name, qualification, designation, area of specialization, experience and research under guidance

Name	Qualification	Designation	Specialization	No. of Years of Experience	No. of Ph.D/ M.Phil students guided for the last 4 years
Madhavan Mukund	Ph.D.	Professor, Dean of Studies	Formal verification, Concurrency theory	23	2
Aiswarya Cyriac	Ph.D.	Assistant Professor	Automata Theory, Verification, Logic, Concurrency	2	0
Sourav Chakraborty	Ph.D.	Associate Professor	Complexity theory, Algorithms	7	3
Samir Datta	Ph.D.	Professor	Complexity theory, Graph algorithms	11	2
Partha Mukhopadhyay	Ph.D.	Associate Professor	Complexity theory, Additive combinatorics	6	1
Prajakta Nimbhorkar	Ph.D.	Assistant Professor	Complexity theory, Algorithms	5	0

Name	Qualification	Designation	Specialization	No. of Years of Experience	No. of Ph.D/ M.Phil students guided for the last 4 years
K. Narayan Kumar	Ph.D.	Professor	Distributed automata, verification, logic	20	2
Geeverghese Philip	Ph.D.	Assistant Professor	Parameterized Algorithms Complexity	4	0
M. Praveen	Ph.D.	Assistant Professor	Concurrency, Infinite state systems, Logic and parametrized complexity	3	0
B. Srivathsan	Ph.D.	Assistant Professor	Formal verification, Formal language theory	3	0
K.V. Subrahmanyam	Ph.D.	Professor	Algorithms and Complexity, Algebraic Methods and Algebraic Complexity, Polyhedral Combinatorics	3	0
S.P. Suresh	Ph.D.	Associate Professor	Logic in computer science, Concurrency and distributed computing, Reasoning about security	12	3

12. List of senior Visiting Fellows, adjunct faculty, emeritus professors

- Manindra Agrawal
- Ramesh Hariharan
- Neeraj Kayal
- Raghav Kulkarni
- Rani Siromoney
- Mandayam Srivas
- V. Vinay

13. Percentage of classes taken by temporary faculty - programme-wise information

10%

14. Programme-wise Student Teacher Ratio

- B.Sc. Honours (Mathematics and Computer Science) 25:6
- M.Sc. (Computer Science) 2:1
- Ph.D. (Computer Science) 5:3

15. Number of academic support staff (technical) and administrative staff: sanctioned, filled and actual

Academic/administrative support staff: 5 (shared across all departments)

16. Research thrust areas as recognized by major funding agencies

Formal verification, Automata, Logic, Complexity, Algorithms, Security

17. Number of faculty with ongoing projects from a) national b) international funding agencies and c) Total grants received. Give the names of the funding agencies, project title and grants received project-wise.

1. **Project Name:** CNRS LIA on Formal Methods (2012–2016)

Amount Received: Nil

Funding Agency: CMI

Name of Faculty: Madhavan Mukund

2. **Project Name:** Indo-Swedish Research Project on “Verification of Concurrent Software”

Amount Received: Rs 25,77,000 (2015–2017)

Funding Agency: Dept of Science and Technology

Name of Faculty: K. Narayan Kumar

3. **Project Name:** Indo-French Research Project on “Automated Verification of Concurrent Software”

Amount Received: Rs 30,80,008 (2015–2017)

Funding Agency: CEFIPRA, Dept of Science and Technology

Name of Faculty: Madhavan Mukund

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18. Inter-institutional collaborative projects and associated grants received

- a) National collaboration
- b) International collaboration
- i. CMI is a partner in an International Associated Laboratory (LIA) on Formal Methods set up by the French National Centre for Research in Science (CNRS).
 - ii. Indo-Swedish Research Project on “Verification of Concurrent Software” with Uppsala University, Sweden.
 - iii. Indo-French Research Project on “Automated Verification of Concurrent Software” with University of Paris 7, France.
19. Departmental projects funded by DST-FIST; UGC-SAP/CAS, DPE; DBT, ICSSR, AICTE, etc.; total grants received.
- None
20. Research facility / centre with
- state recognition
 - national recognition
 - international recognition
- CMI is a partner in an International Associated Laboratory (LIA) on Formal Methods set up by the French National Centre for Research in Science (CNRS).
- CMI has an Indo-Swedish Research Project on “Verification of Concurrent Software” with Uppsala University, Sweden.
21. Special research laboratories sponsored by / created by industry or corporate bodies
- None
22. Publications:
- Number of papers published in peer reviewed journals (national / international)
Around 300, including refereed conferences which are treated on par with peer-reviewed journals in Computer Science.
 - Monographs
 - Chapters in Books
 1. Automata on Distributed Alphabets, M Mukund, *Modern Applications of Automata Theory*, Deepak D’Souza and Priti Shankar (eds), World Scientific (2012) 45-78.
 2. Finite-state Automata on Infinite Inputs, M Mukund, *Modern Applications of Automata Theory*, Deepak D’Souza and Priti Shankar (eds), World Scientific (2012) 257-288.
 3. Reachability and boundedness in time-constrained MSC graphs, P Gastin, M Mukund and K Narayan Kumar *Perspectives in Concurrency Theory*, K Lodaya, M Mukund and R Ramanujam (eds.), Universities Press (2008) 157-183.
 4. Adding time to scenarios, P Chandrasekaran and M Mukund, *Next Generation Design and Verification Methodologies for Distributed Embedded Control Systems*, S Ramesh and P Sampath (eds.), Springer (2007) 83-97.

5. Anchored Concatenation of MSCs, M Mukund, K Narayan Kumar, P S Thiagarajan and Shaofa Yang *Formal models, languages and applications*, K G Subramanian, K Rangarajan and M Mukund (eds.), World Scientific (2006) 274-288.
 6. From global specifications to distributed implementations, M Mukund, *Synthesis and Control of Discrete Event Systems*, B Caillaud, P Darondeau, L Lavagno (eds), Kluwer (2002) 19-34.
 7. K Narayan Kumar: The Theory of MSC Languages, in *Modern Applications of Automata Theory*, IISc Research Monographs Series, Vol 2, World Scientific, Singapore (2012) 289-324
- Edited Books
 1. Proceedings of the 34th IARCS Annual Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS 2014), Venkatesh Raman, S.P. Suresh (Eds.), Schloss Dagstuhl - Leibniz-Zentrum fuer Informatik LIPIcs **29** 2014.
 2. Proc 10th International Symposium on Automated Technology for Verification and Analysis (ATVA 2012), S Chakraborty and M Mukund (eds.), Springer Lecture Notes in Computer Science, 7561, (2012).
 3. Proceedings of the 29th IARCS Annual Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS 2009), Ravi Kannan, K. Narayan Kumar (Eds.), Schloss Dagstuhl - Leibniz-Zentrum fuer Informatik LIPIcs **4** 2009.
 4. Proc 28th International Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS 2008), R Hariharan, M Mukund and V Vinay (eds.) Leibniz International Proceedings in Informatics (LIPICS), **2** (2008).
 5. Perspectives in Concurrency Theory, K Lodaya, M Mukund and R Ramanujam (eds.), Universities Press (2008).
 6. Formal Models, Languages and Applications, K G Subramanian, K Rangarajan and M Mukund (eds.), World Scientific (2006)
 7. Proc 21st International Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS 2001), R Hariharan, M Mukund and V Vinay (eds.), Springer Lecture Notes in Computer Science, 2257, (2001).
 - Books with ISBN with details of publishers
 - Number listed in International Database (For e.g. Web of Science, Scopus, Humanities International Complete, Dare Database - International Social Sciences Directory, EBSCO host, etc.)
 - Citation Index - range / average
 - SNIP
 - SJR
 - Impact Factor - range / average
 - h-index

In the areas of Computer Science that are represented at CMI, numeric indicators such as impact factor and h-index are not meaningful. CMI faculty publish their research in international journals and conferences that are recognized by the academic community as the leading publication outlets in the corresponding areas.

23. Details of patents and income generated

None.

24. Areas of consultancy and income generated

1. **Area:** Price discovery in auctions

Partner: Power Exchange India Ltd

Faculty Member: Rajeeva L. Karandikar, Madhavan Mukund, K.V. Subrahmanyam

Amount Received: Rs. 30,00,000

2. **Area:** Cryptographic protocols

Partner: Scientific Analysis Group, DRDO **Faculty Member:** S.P. Suresh

Amount Received: Rs. 10,00,000

3. **Area:** Business Process Modelling

Partner: Infosys Ltd

Faculty Member: K. Narayan Kumar

Amount Received: Rs. 1,60,000

4. **Area:** Optimized gas pricing

Partner: Hexaware Ltd

Faculty Member: Madhavan Mukund, Sasanka Roy, K.V. Subrahmanyam

Amount Received: Rs. 1,00,000

25. Faculty selected nationally / internationally to visit other laboratories / institutions / industries in India and abroad

Madhavan Mukund

1. Visited LSV, ENS de Cachan, France and IRISA, Rennes, France in April-May 2010

2. Attended ICALP 2010 at Bordeaux, France, in July 2010.

3. Attended 9th Update Meeting on Advanced Formal Methods, at DA-IICT, Gandhinagar, in July 2010 and presented a talk on "Verification of weak memory models"

4. Gave a talk on "Who's afraid of concurrent programming?" in ACM, Chennai Professional Chapter at IMSc., in November 2010.

5. Attended 76th annual conference of the Indian Mathematical Society at NIT, Surat, in December 2010 and presented an invited talk on "The Interplay between Automata Theory and Mathematical Logic".

6. Attended RMIT Symposium on Mathematics and Information Technology at NIT, Surat, in December 2010 and presented an invited talk on "Formal Verification".

7. Co-organizer of Workshop on Automata, Concurrency and Timed Systems III, at the Chennai Mathematical Institute, in January 2011.

8. Co-organizer of Mysore Park Workshop on "The Chemistry of Concurrent and Distributed Programming", at Mysore, during February 2011.

9. Attended Fourth Indo-American Frontiers of Science Symposium (IAFOS) 2011, Irvine, U.S.A., in April 2011. Member of Organizing Committee.

10. Visited LSV, ENS de Cachan, France, LaBRI, Bordeaux, France and IRISA, Rennes, France in April-May 2011 and gave a talk on "Assembling Sessions" at LSV, ENS de Cachan

11. Attended 10th Update Meeting on Advanced Formal Methods, at VIT University, Vellore, July 2011 and gave a talk on “The decidability frontier for Petri nets”, 10th Update Meeting on Advanced Formal Methods, VIT University, Vellore, July 12-14, 2011.
12. Organized ACM Chennai Faculty Workshop on Formal Methods for Specification and Verification, CMI, July 2011 and gave a talk on “Adding time to automata”.
13. Participated in ACM Education Council meeting, at Denver, Colorado, U.S.A. in September 2011.
14. Visited Tata Research Development and Design Centre (TRDDC), Pune in September 2011.
15. Attended ATVA 2011, at Taipei, Taiwan, October 2011 and presented a talk.
16. Visited LSV, ENS de Cachan, France, LaBRI, Bordeaux, France and IRISA, Rennes, France in November 2011.
17. Attended FSTTCS 2011, IIT Bombay, Mumbai, in December 2011 and chaired a session.
18. Attended Mysore Park Workshop on “The Future of Debugging”, Mysore, during February-March 2012.
19. Visited LaBRI, Bordeaux, France, LSV, ENS de Cachan, France, and IRISA, Rennes, France in May-June 2012. Presented a talk entitled “Tagging Makes Local Testing of Message-Passing Systems Feasible” at LaBRI, Bordeaux, France.
20. Gave a talk on “Statistical Model Checking” at the 11th Update Meeting on Advanced Formal Methods, CMI, July 1921, 2012.
21. Gave a talk on “Timed Automata”, as part of the Golden Jubilee Thematic Lectures on “Automata for the Real World”, IMSc, July 21, 2012.
22. Gave a talk on “Automata and Program Verification”, SSN College of Engineering, September 12, 2012
23. Was Chair of the Programme Committee for 10th International Symposium on Automated Technology for Verification and Analysis (ATVA 2012), Thiruvananthapuram, India, October 3-6, 2012.
24. Gave a talk on “Software Model Checking” at the Alan Turing Centenary Year Workshop on Advanced Topics in Theoretical Computer Science, Anna University, November 1618, 2012.
25. Attended 32nd conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS 2012) at IIIT Hyderabad, in December 2012. Was a member of the Programme Committee and chaired a session.
26. Visited Tata Research Development and Design Centre (TRDDC), Pune in December, 2012.
27. Co-organizer of the ACM India Annual Event, IIT Madras, January 2013. 1 Attended the MSR-ACM India Faculty Summit, New Delhi, February, 2013.
28. Gave series of video lectures on Algorithms, Microsoft Research Massively Empowered Classrooms online course, during January-May 2013.
29. Gave an invited talk on “Concurrent programming: old problems, new challenges” at TACTiCs 2013, 9th Global TCS Technical Architects Conference, at Tata Consultancy Services, Chennai, in April 2013.

30. Visited LSV, ENS de Cachan, France and LIAFA, Univ Paris 7, France in May 2013. Presented a talk entitled “Deterministically Communicating MDPs” at LSV, ENS de Cachan, France. Presented a talk entitled “Optimized OR-Sets Without Ordering Constraints” at LIAFA, Univ Paris 7, France in May 2013.
31. Gave an invited talk on “Concurrent programming: old problems, new challenges” at Global Analytics, Chennai, in June 2013.
32. Attended 12th Update Meeting on Advanced Formal Methods at New Delhi, in July 2013.
33. Presented a talk at the Round Table on “IT Systems in the industry: how to ensure software reliability?” at India-France Technology Summit, New Delhi, in October 2013.
34. Visited IRISA, Rennes, France in September-October 2013 and presented a talk entitled “Deterministically Communicating MDPs” at IRISA, Rennes, France in October 2013.
35. Gave an invited talk on “Correctness in a connected world”, IDRBT Doctoral Colloquium at Institute for Development and Research in Banking Technology, Hyderabad, in December 2013.
36. Participated in ACM India Annual Event at IIT Delhi, in February 2014.
37. Gave an invited talk on “Whos Afraid of Algorithms”, at MSR MEC Workshop, Chennai, in February 2014.
38. Gave lectures on Data Mining and Machine Learning in the Business Analytics Training Programme at ISI Chennai, in March 2014.
39. Gave lectures on NP-Completeness at SSN College of Engineering, Chennai, in March 2014.
40. Gave a talk on “Life and work of Leslie Lamport, Turing Tech Talk Series, Persistent Systems” at Pune, in June 2014.
41. Gave a talk on “Concurrent programming: old problems, new challenges” at SV College of Engineering, Sriperumbudur, in July 2014.
42. Gave a course on “Programming for Mathematics” at IMSc., Chennai, in August 2014.
43. Gave a talk on “Concurrent programming: old problems, new challenges” at NGP Institute of Technology, Coimbatore, in August 2014.
44. Gave MHRD QEEE online course on “Data Structures and Algorithms” at IIT Madras, during August-September 2014.
45. Gave a talk on “Machine Learning” at Hindustan University, Chennai, in September 2014.
46. Gave a talk on “Efficient processing of range queries” at SSN College of Engineering, in September 2014
47. Gave an invited tutorial at CSI National Conference on Formal Methods, IISc, Bangalore, in October 2014 on “Statistical Model Checking”.
48. Visited National University of Singapore, in December 2014 Collaborative research with P S Thiagarajan.
49. Attended 34th Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS) 2014 New Delhi, in December 2014.

50. Attended 16th International Conference on Verification, Model Checking, and Abstract Interpretation (VMCAI) 2015 at Mumbai, in January 2015.
51. Attended 42nd SIGACT/SIGPLAN Symposium on Principles of Programming Languages (POPL) 2015 at Mumbai, in January 2015.
52. Gave an NPTEL MOOC course on Design and Analysis of Algorithms during January - February 2015.
53. Gave AlgoLabs Certification Course on Machine Learning, in February 2015.
54. Attended ACM iSIGCSE workshop on "Effective ways of teaching Computer Science" at Pune, in February 2015.
55. Attended ACM India Annual Event and chaired a panel discussion on "Overcoming challenges within the university system" at Goa, in February 2015.
56. Attended Workshop on Automata, Concurrency and Timed Systems (ACTS) 2015 at CMI, in February 2015.
57. Delivered a keynote talk on "Formalizing the Cloud", International Symposium on Big Data and Cloud Computing Challenges (ISBCC) at VIT, Chennai, in March 2015.
58. Gave an NPTEL MOOC course on Design and Analysis of Algorithms during July - September 2015.
59. Gave an NPTEL MOOC course on Functional Programming in Haskell during July - October 2015.

K V Subrahmanyam:

1. Attended 31st Foundations of Software Technology and Theoretical Computer Science (FSTTCS 2011) at IIT Bombay, Mumbai, in December 2011.
2. Gave 5 lectures on "Groebner basis and the Hilbert Basis theorem" at the Advanced School for Lecturers held in Kumaon University, Almora campus in February 2012.
3. Attended Workshop on Representations of Algebraic Groups, by Peter Feibeg, in October 2013, at IMSc.
4. Attended Workshop on Generators and Relations for Soergel Bimodules by Prof. Ben Elias, held in February 2014 at IMSc.
5. Visited Prof Bharat Adsul in IIT Mumbai, in February 2014.
6. Visited IISc, Bangalore for a machine learning workshop in January 2015.

K Narayan Kumar

1. Visited LSV, ENS de Cachan in May-June 2010 funded by the ARCUS project of Ile-de-France.
2. Attended 9th Update Meeting on Advanced Formal Methods at Ahmedabad and gave a talk on "Analysis of Multi-stack Systems", in July 2010.
3. Attended 21st International Conference on Concurrency Theory, Paris, France, in August 2010.
4. Attended 30th Foundations of Software Technology and Theoretical Computer Science (FSTTCS 2010), at IMSc, Chennai, in December 2010.

5. Attended Workshop on Automata, Concurrency and Timed Systems III, CMI, Chennai, in February 2011.
6. Visited LSV, ENS de Cachan in May-June 2011 and November 2011 on the ARCUS project as well as the CNRS LIA “Informel”.
7. Attended 31st Foundations of Software Technology and Theoretical Computer Science (FSTTCS 2011) at IIT Bombay, Mumbai, in December 2011.
8. Attended 15th International Conference on the Foundations of Software Science and Computation Structures (FoSSaCS 2012), as part of ETAPS 2012, at Tallin, Estonia, in March 2012.
9. Visited LSV, ENS de Cachan in May 2012 and as part of the CNRS LIA “Informel”.
10. Attended the 10th International Conference on Automated Techniques for Verification and Analysis (ATVA 2012), Thiruvananthapuram, October 2012.
11. Visited Uppsala University, Sweden, in Nov-Dec 2012.
12. Attended the 32nd Foundations of Software Technology and Theoretical Computer Science (FSTTCS 2012), IIIT, Hyderabad, December 2012.
13. Gave a talk titled “Verifying Temporal Properties of Multi-pushdown Systems” at the IMPECS Workshop on Program Analysis, IISc Bangalore.
14. Attended CEFIPRA Workshop on “Challenges in overcoming complexity, from big data to cyber-physical systems”, in April 2013.
15. Visited Uppsala University, Sweden, in May 2013.
16. Visited LSV, ENS de Cachan in June 2013 and as part of the CNRS LIA “Informel”.
17. Gave a talk on “Split-width and the Verification of Concurrent Recursive Programs”, at TIFR, Mumbai, in July 2013.
18. Gave a talk on “Split-width and the Verification of Concurrent Recursive Programs”, at IISc, Bangalore, in October 2013.
19. Visited LSV, ENS Cachan, France in May 2014.
20. Visited LaBRi, Univ. of Bordeaux, France in May 2014.
21. Visited Uppsala University, Sweden in June 2014.
22. Attended the 42nd ACM Symposium on Principles of Programming Language (POPL 2015), in TIFR Bombay, Mumbai, in January 2015.

Samir Datta

1. Visited Kristoffer Hansen at Aarhus University, Denmark, in August 2011.
2. Participated in the Dagstuhl Seminar on Algebraic and Combinatorial Methods in Computational Complexity.
3. Visited the University of Ulm, Germany and gave a talk entitled: “Bipartite Matching and Reachability: Topological Twins in Space”
4. Visited Leibnitz University of Hannover as Guest Professor (W3) during April-July 2013 and gave a course on Logspace Computation.
5. Visited TU Dortmund, Germany during June - July 2014.

6. Gave a talk at TCS mini workshop, TU Dortmund on “Dynamic Complexity of Reachability and Matching”
7. Gave a reading course on Advanced Algorithms.
8. Gave a talk on “The Dynamic Complexity of Reachability and related problems” in Indo-UK workshop on Computational Complexity Theory, in January 2015 at IMSc, Chennai.

Sourav Chakraborty

1. Visited Technion, Israel, during November 2010.
2. Attended the 30th International Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS 2010), at IMSc., Chennai, in December 2010.
3. Attended IMPECS School on Parameterized and Exact Computation, in December 2010, at IMSc Chennai.
4. Visited University of Chicago, U.S.A., in January 2011 and gave a talk on “Testing Function Isomorphism”.
5. Visited TIFR, Mumbai, in January 2011 and gave a talk on “Testing Function Isomorphism”.
6. Visited MSR, Bangalore, in February 2011.
7. Attended ACM-SIAM Symposium on Discrete Algorithms (SODA 2011), San Francisco.
8. Attended Innovations in Computer Science (ICS 2011), Beijing. 58 Chennai Mathematical Institute
9. Visited Karnatak University, Dharwad and attended a Workshop on Graph Theory and graph algorithms.
10. Attended conferences WorKer2011, FSTTCS2011, GTORA2011, SODA2012.
11. Gave a talk on “Property Testing: Sublinear Algorithms for Promise Problems” as a keynote speaker at Workshop on Kernelization (WorKer 2011) held at Vienna.
12. Gave a talk on “Generalized Matroid Secretary Problem” at International Conference on Game Theory, Operations Research and their Applications (GTORA 2012) held at ISI Chennai.
13. Visited Eldar Fischer at Technion, Israel in May and December 2011.
14. Visited Raghav Kulkarni at LIAFA Paris for couple of weeks in June 2011.
15. Visited Harry Buhrman at CWI, Amsterdam for couple of weeks in July 2011.
16. Visited Satya Lokam at Microsoft Research, India for couple of weeks in October 2011 and couple of weeks in February 2011.
17. Visited Ragesh Jaiswal at IIT Delhi, in September 2011. Attended the conferences CCC 2012, FSTTCS 2012, CTW 2012.
18. Attended the Mysore Park Workshop on Algorithms and Complexity in August 2012.
19. Gave a talk on “Testing of Function Isomorphism”, Dagstuhl Seminar on Algebra in Computational Complexity, 2012.
20. Visited Eldar Fischer at Technion, Israel in the month of May 2012.

21. Visiting MPI, Saarbrucken for one month in June 2012.
22. Visited Raghav Kulkarni at CQT, Singapore for couple of weeks in December 2012.
23. Visited Harry Buhrman at CWI, Amsterdam for couple of weeks in October 2012.
24. Visited Anna Gal at University of Texas, Austin for couple of weeks in March 2013. Gave a talk on “Property Testing”.
25. Visited Alexander Razborov at University of Chicago for couple of weeks in March 2013. Gave talk on “Testing of Junto-symmetric Functions”.
26. Visited Satya Lokam at Microsoft Research, India multiple times.
27. Attended Property Testing Workshop at Haifa.
28. Attended CTW 2013.
29. Attended Mysore Park Workshop 2013.
30. Visited Harry Buhrman at CWI, Amsterdam, in May 2013.
31. Visited Sophie Laplante in Laboratoire d'Informatique Algorithmique: Fondements et Applications (LIAFA), in May 2013.
32. Visited Eldar Fischer at Technion, Israel, in June 2013.
33. Attended LATIN 2014.
34. Was a visiting Associate professor at University of California, San Diego from January to March 2014.
35. Gave a series of 30 lectures on Algorithms for UGC program.
36. Gave a talk on “Testing Function Isomorphism” at the CS department in University of California, San Diego (UCSD) in April 2014.
37. Was on sabbatical at the University of California, San Diego (UCSD) during April - June 2014.
38. Taught “Introduction to Discrete Mathematics” at University of California, San Diego during April - June 2014.
39. Visited Moshe Vardi at the Rice University, U.S.A. in June 2014.
40. Gave a series of talks at University of Chicago for the program “Research for Undergraduates (REU)” in July 2014.
41. Attended the workshop on “Algebra in Computation Complexity” at Dagstuhl.
42. Visited ISI Delhi for a couple of days in December 2014.
43. Visiting faculty at Rice University from March 2015.

Partha Mukhopadhyay

1. Attended Mysore Park workshop on Algorithms and Complexity at Infosys, Mysore, in October 2010.
2. Organized a Workshop on Pseudorandomness at CMI, in August 2011.
3. Visited the Institute of Mathematics, Prague, Czech Republic.
4. Gave a talk on “Explicit Cayley Expanders Construction” in the Indo-German Workshop at the Indian Statistical Institute, Kolkata.

Prajakta Nimbhorkar

1. Attended Mysore Park workshop on Algorithms and Complexity at Infosys, Mysore, in October 2010.
2. Attended a Workshop on Pseudorandomness at CMI, in August 2011.
3. Gave a lecture on Popular matchings in IMSc Golden Jubilee Thematic Lectures in Theoretical Computer Science.
4. Visited Institute of Mathematics, Prague, Czech Republic, during February-March 2014.
5. Visited Institute of Mathematics of the Czech Academy of Sciences, Prague during April - July 2014.

B Srivathsan

1. Attended Formal Methods Update Meeting, in July 2013 at IIT Delhi.
2. Visited IIT Bombay in September 2013 and delivered two guest lectures to Masters students.
3. Visited LaBRI, University of Bordeaux (Collaborators: F. Herbreteau, I. Walukiewicz) in May 2014.
4. Gave a talk at Formal Methods Update Meeting at IIT Kharagpur in July 2014.
5. Gave a talk at Workshop for school students organized by National Academy of Sciences at Chennai Mathematical Institute in July 2014.
6. Gave a talk at P.S. Senior Secondary School, Chennai, in August 2014.
7. Attended FSTTCS conference in New Delhi.
8. Attended Kickoff meeting of an Indo-French joint project at FSTTCS.
9. Gave a lecture to school students at Bala Vidya Mandir, Chennai about Number theory in Computer Science.
10. Visited LaBRI, Bordeaux, France, in January 2015.
11. Visited RWTH-Aachen, Germany and presented a talk during January-February 2015.
12. Visited University of Oldenburg, Germany, in February 2015.

S P Suresh

1. Attended 32nd conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS 2012) at IIIT Hyderabad, in December 2012.
2. Attended the Conference on Theoretical Aspects of Rationality and Knowledge (TARK) 2013, January 79, 2013 at IMSc, Chennai.
3. Attended the Indian Conference on Logic and its Applications (ICLA) 2013, January 1012, 2013 at IMSc, Chennai.
4. Attended Foundations of Software Technology and Theoretical Computer Science (FSTTCS) 2013, during December 2013 at IIT Guwahati and presented a paper on primal infon logic.
5. Attended Indian School on Logic and its Applications (ISLA) 2014, in January 2014 at Tezpur University and gave a course of lectures on modal logic.

6. Attended Foundations of Software Technology and Theoretical Computer Science (FSTTCS) 2014, in December 2014 at New Delhi.
 7. Attended International Conference on Information Systems Security (ICISS 2014), in December 2014 at IDRBT Hyderabad.
 8. Attended Asian Logic Conference (ALC 2015), in January 2015 at IIT Bombay.
 9. Attended Indian Conference on Logic and its Applications (ICLA) 2015 in January 2015 at IIT Bombay.
 10. Attended Instructional School on Logical Aspects of Multi-Agent Systems (ISLAMAS 2015) in February 2015 at IMSc., Chennai.
26. Faculty serving in (a) National committees, (b) International committees, (c) Editorial Boards, (d) any other (please specify)
- Madhavan Mukund
- Member, Programme Committee of:
1. ATVA, International Symposium on Automated Technology for Verification and Analysis:
(13th Symposium, Shanghai, China, 2015, 12th Symposium, Sydney, Australia, 2014, 11th Symposium, Hanoi, Vietnam, 2013, 10th Symposium, Thiruvananthapuram, India, 2012 (co-chair).)
 2. CONCUR, International Conference on Concurrency Theory
(26th Conference, Madrid, Spain, 2015, 22nd Conference, Aachen, Germany, 2011)
 3. . CSR, International Computer Science Symposium in Russia
(5th Symposium, Kazan, Russia, 2010.)
 4. FM, Formal Methods
(15th International Symposium, Abo Akademi University, Turku, Finland, 2008)
 5. FSTTCS, Foundations of Software Technology and Theoretical Computer Science
(34th Conference, Delhi, 2014, 32nd Conference, Hyderabad, 2012, 28th Conference, Bangalore, 2008 (co-chair), 26th Conference, Kolkata, 2006)
 6. ICALP, International Colloquium on Automata, Languages and Programming
(41st Colloquium, Copenhagen, Denmark, 2014, 35th Colloquium, Reykjavik, Iceland, 2008, 33rd Colloquium, Venice, Italy, 2006)
 7. LICS, Logic in Computer Science
(30th Symposium, Kyoto, Japan, 2015, 28th Symposium, New Orleans, USA, 2013)
 8. MFCS, Mathematical Foundations of Computer Science
(39th International Symposium, Budapest, Hungary, 2014, 38th International Symposium, IST, near Vienna, Austria, 2013, 35th International Symposium, Brno, Czech Republic, 2010, 32nd International Symposium, Cesky Krumlov, Czech Republic, 2007)
 9. Petri Nets, International Conference on Application and Theory of Petri Nets and Concurrency
(36th Conference, Brussels, Belgium, 2015, 35th Conference, Tunis, Tunisia, 2014, 33rd Conference, Hamburg, Germany, 2012, 32nd Conference, Kanazawa, Japan (relocated to

Newcastle-upon-Tyne, UK), 2011, 31st Conference, Braga, Portugal, 2010, 30th Conference, Paris, France, 2009, 29th Conference, Xian, China, 2008, 27th Conference, Turku, Finland, 2006, 26th Conference, Miami, Florida, 2005)

10. SEFM, IEEE International Conference on Software Engineering and Formal Methods (9th Conference, Montevideo, Uruguay, 2011, 8th Conference, Pisa, Italy, 2010, 7th Conference, Hanoi, Vietnam, 2009, 4th Conference, Pune, India, 2006)
11. STACS, Symposium on Theoretical Aspects of Computer Science (23rd Symposium, Marseilles, France, 2006)
12. TACAS, International Conference on Tools and Algorithms for the Construction and Analysis of Systems (16th Conference, Paphos, Cyprus, 2010)

Member, Editorial Board:

1. Leibniz International Proceedings in Informatics, an open access series for conference proceedings published by Schloss Dagstuhl - Leibniz Center for Informatics, Germany.
2. Acta Informatica
3. Transactions on Petri Nets and Other Models of Concurrency (ToPNoC), a subseries of Springer Lecture Notes in Computer Science (LNCS).
4. Sadhana, Academy Proceedings in Engineering Sciences, Indian Academy of Sciences, Bangalore.

K. Narayan Kumar

Member, Programme Committee:

1. The Sixth International Symposium on Games, Automata, Logics and Formal Verification September 21-23, 2015, Genova, Italy
2. 16th International Workshop on Verification of Infinite-State Systems IIT Delhi, India, 18th of December 2014
3. 25th International Conference on Concurrency Theory (CONCUR'14), Rome, Italy, Sep 2014.
4. 33rd International Conference on Foundations of Software Technology and Theoretical Computer Science (FSTTCS'13), Guwahati, India, Dec 2013.
5. 7th International Workshop on Reachability Problems 2013 (RP'13), Uppsala, Sweden, Sep 2013.
6. 10th International Symposium on Automated Technology for Verification and Analysis (ATVA 2012), Thiruvananthapuram, Oct 2012.
7. 31st International Conference on the Foundations of Software Technology and Theoretical Computer Science, IIT Bombay, Bombay, India, 2011.
8. 21st International Conference on Concurrency Theory, Paris, France, 2010. 9) 29th International Conference on the Foundations of Software Technology and Theoretical Computer Science, IIT Kanpur, India, 2009. (co-Chair and co-Editor of Proceedings with Ravi Kannan)

9. 26th International Symposium on Theoretical Aspects of Computer Science, Freiburg, Germany, 2009.

Samir Datta

Member, Programme Committee:

1. STACS 2014 (Symposium on Theoretical Aspects of Computer Science),
2. CSR 2010 (Computer Science in Russia), Kazan
3. FSTTCS 2007 (Foundations of Software Technology and Theoretical Computer Science), Delhi

S P Suresh

1. Programme committee co-chair for FSTTCS 2014
 2. Programme committee member for ICLA 2015 Programme committee member for FSTTCS 2015.
27. Faculty recharging strategies (UGC, ASC, Refresher / orientation programs, workshops, training programs and similar programs).

Not considered necessary.

28. Student projects

- percentage of students who have done in-house projects including inter-departmental projects
40%
- percentage of students doing projects in collaboration with other universities / industry / institute
40%

29. Awards / recognitions received at the national and international level by

- Faculty
 - Madhavan Mukund elected President of Indian Association for Research in Computing Science, IARCS (2011-2017)
 - Madhavan Mukund elected Vice-President of ACM India Council (2014-2016)
 - Madhavan Mukund elected to the European Association of Theoretical Computer Science (EATCS) Council (2007-2011)
 - Madhavan Mukund appointed Executive Director, International Olympiad in Informatics (2011-2014)
- Doctoral / post doctoral fellows
 - Ramprasad Saptharishi awarded ACM India Doctoral Dissertation Award 2013 for best Computer Science PhD thesis in India.
- Students
None

30. Seminars/ Conferences/Workshops organized and the source of funding (national / international) with details of outstanding participants, if any.

1. Automata, Concurrency and Timed Systems (ACTS II) - January 2010, Local Organizers - Madhavan Mukund, K. Narayan Kumar
Funded by CMI-TCS Academic Alliance and ARCUS programme, Ile-de-France, Indo-French Network Project Timed-Discoveri
2. Automata, Concurrency and Timed Systems (ACTS II) - January 2010, Local Organizers - Madhavan Mukund, K. Narayan Kumar
Funded by CMI-TCS Academic Alliance and ARCUS programme, Ile-de-France.
3. ICM satellite conference on Mathematical Logic and Set Theory - August 2010, Local organizer - S P Suresh.
Funded by International Mathematical Union (IMU) and Association for Symbolic Logic (AS)
4. Automata, Concurrency and Timed Systems (ACTS III) - January 2011, Organizers - Madhavan Mukund, K. Narayan Kumar
Funded by CMI-TCS Academic Alliance and ARCUS programme, Ile-de-France.
5. Workshop on Pseudorandomness - August 2011, Organizers - K. V. Subrahmanyam, Partha Mukhopadhyay, Sourav Chakraborty and V Balaji.
Funded by CMI-TCS Academic Alliance.
6. . Formal Methods Update Meeting 2012, July 2012, Organizers: Madhavan Mukund, K. Narayan Kumar, S.P. Suresh
Funded by CMI
7. Making Formal Verification Scalable and Useable, January, 2013 Organizers: Madhavan Mukund, Mandayam Srivas
Funded by CMI
8. 4th Workshop on Automata, Concurrency and Timed Systems, February 9-13 2015. Organizers: M. Praveen and B. Srivathsan
Funded by CMI

31. Code of ethics for research followed by the departments

None. We implicitly trust the departments to act ethically.

32. . Student profile programme-wise:

Name of the Programme (refer to question no. 4)	Applications received	Selected		Pass percentage	
		Male	Female	Male	Female
B.Sc. (Hons) in Mathematics and Computer Science	1732	19	2	79%	100%
M.Sc in Computer Science	299	4	1	100%	100%
Ph.D in Computer Science	83	2	0	100%	0%

33. Diversity of students

Name of the Programme (refer to question no. 4)	% of students from the same university	% of students from other universities within the State	% of students from universities outside the State	% of students from other countries
M.Sc in Computer Science	29%	0%	71%	0%
Ph.D in Computer Science	0%	0%	100%	0%

34. How many students have cleared Civil Services and Defense Services examinations, NET, SET, GATE and other competitive examinations? Give details category-wise.

Nil.

35. Student progression

Student progression	Percentage against enrolled
UG to PG	95%
PG to M.Phil.	–
PG to Ph.D.	50%
Ph.D. to Post-Doctoral	100%
Employed	
Campus selection	50%
Other than campus recruitment	50%
Entrepreneurs	–

36. Diversity of staff

Percentage of faculty who are graduates	
of the same university	0%
from other universities within the State	9%
from universities from other States	55%
from universities outside the country	36%

37. Number of faculty who were awarded M.Phil., Ph.D., D.Sc. and D.Litt. during the assessment period

Not Applicable. Only people who already have a PhD can join as faculty.

38. Present details of departmental infrastructural facilities with regard to

a) Library

CMI Library has an extensive collection of mathematics books.

b) Internet facilities for staff and students

CMI campus has 24 hours high-speed (32 Mbps) internet connection.

c) Total number of class rooms

12 (Shared by all departments)

d) Class rooms with ICT facility

All classrooms are equipped with projector and internet facility.

- e) Students' laboratories
Computer laboratory with 35 desktop PCs.
- f) Research laboratories
No.

39. List of doctoral, post-doctoral students and Research Associates

- a) from the host institution/university

Doctoral students

- Arjun Arul
- Abdullah Kadir
- Kumar Madhukar
- Anish Mukherjee

- b) from other institutions/universities

Doctoral students

- Vipul Arora
- Nikhil Balaji
- Suryajith Chillara
- Varunkumar Jayapaul
- Nitesh Jha
- K Sandesh Kamath
- Shyamlal Karra
- R Keerthan
- Muthuvelmurugan
- Vinoth Kumar Raman
- Prakash Saivasan
- Rajiv Sambasivan
- Gautham Shenoy R
- Vaishnavi Sundararajan
- Rajeswaran Viswanathan

40. Number of post graduate students getting financial assistance from the university.

44

41. Was any need assessment exercise undertaken before the development of new programme(s)?
If so, highlight the methodology.

No.

42. Does the department obtain feedback from

- a. faculty on curriculum as well as teaching-learning-evaluation? If yes, how does the department utilize the feedback?

The department has regular faculty meetings to discuss feedback on courses and other issues and makes appropriate recommendations to address any issues that may be raised.

- b. students on staff, curriculum and teaching-learning-evaluation and how does the department utilize the feedback?

There is no formal mechanism for student feedback, but students to provide feedback on individual courses via their faculty advisors and this is discussed by the faculty in their regular meetings.

- c. alumni and employers on the programmes offered and how does the department utilize the feedback?

There is no formal mechanism for feedback from alumni and employers, but any comments or suggestions received are discussed by the faculty in their regular meetings.

43. List the distinguished alumni of the department (maximum 10)

Ramprasad Sapharishi was awarded the ACM India Doctoral Dissertation Award for best PhD thesis in Computer Science in India in 2013.

44. Give details of student enrichment programmes (special lectures / workshops / seminar) involving external experts.

Students participate in all the academic activities, such as seminars and workshops.

45. List the teaching methods adopted by the faculty for different programmes.

Each faculty member has complete academic freedom in the teaching methods he or she adopts and varies from person to person and time to time. General methods include close personal monitoring, continuous assessment through assignments, and exams; and term papers and presentations.

46. How does the department ensure that programme objectives are constantly met and learning outcomes are monitored?

The Board of Studies and Academic Council of the institute meet periodically to ensure that the programme objectives are met. Each PhD student has a doctoral committee which monitors his/her progress.

47. Highlight the participation of students and faculty in extension activities.

None.

48. Give details of “beyond syllabus scholarly activities” of the department.

Not applicable.

49. State whether the programme/ department is accredited/ graded by other agencies? If yes, give details.

No.

50. Briefly highlight the contributions of the department in generating new knowledge, basic or applied.

The members of the department have published over 300 papers in reputed journals and conferences. We are in the cutting edge of research in several areas of theoretical computer science. We are one of the very few centres in India for research in some areas allied to formal verification, logic, and complexity theory. The members of the department also contribute to the CS teaching community by making widely available their lecture notes

/ slides / videos on the mathematical aspects of computer science. This is an invaluable resource to the community in general. Many of the members also routinely take part in training programs in theoretical computer science for college teachers around the country. Many of us are also actively involved in training students for the International Olympiad in Informatics.

51. Detail five major Strengths, Weaknesses, Opportunities and Challenges (SWOC) of the department.

Strengths • High quality research faculty

- Excellent infrastructure for research and teaching
- Proximity to active research groups in other institutions
- Strong ties with national and international collaborators
- Access to talented pool of undergraduate students

Weaknesses • Relatively small faculty size

- Some research areas not well represented

Opportunities • National need for manpower trained in mathematical sciences

- Actively pursue international students
- Interact with industry to provide specialized training

Challenges • Talented undergraduate students prefer career-oriented engineering courses

- Lack of good quality post-graduate candidates
- Talent pool for faculty hiring is limited
- Raising resources to expand infrastructure such as hostel

52. Future plans of the department.

The Computer Science department at CMI has been an integral part of the institute since its inception. We have established a reputation as a major centre for excellence in computer science. Computer Science is a major component in the BSc Honors (Mathematics and Computer Science) program. We are also involved in a major way in the International Olympiad in Informatics. The department is well known for its research in fundamental areas of theoretical computer science. The topics of research include complexity theory, algorithms, formal verification, logic, automata theory, and security. The department also has collaboration with members of other institutes and some collaboration with research labs in the industry.

We plan to attract new members working in key areas of research not already covered, and also increase interaction with the industry. Theoretical computer science and mathematical abstractions of real-life problems are an invaluable resource in increasing demand in the industry. The department is in a unique position to contribute to this vital need.

Physics

1. Name of the Department

Physics

2. Year of establishment

2006

3. Is the Department part of a School/Faculty of the university?

No

4. Names of programmes offered (UG, PG, M.Phil., Ph.D., Integrated Masters; Integrated Ph.D., D.Sc., D.Litt., etc.)

- B.Sc. (Hons) in Mathematics and Physics
- Ph.D in Physics

5. Interdisciplinary programmes and departments involved

- B.Sc. (Hons) in Mathematics and Physics, with Mathematics department.

6. Courses in collaboration with other universities, industries, foreign institutions, etc.

None.

7. Details of programmes discontinued, if any, with reasons

The BSc Physics programme that was introduced in 2003 was suspended in 2012 and replaced by an integrated BSc programme in Mathematics and Physics. The Academic Council felt that such integrated programme would be more suitable given CMI's position as a centre of excellence in mathematical sciences. Also, the structure of the new programme is symmetric with respect to the existing integrated BSc programme in Mathematics and Computer Science, so all BSc students graduate with the same core background in Mathematics.

8. Examination System: Annual/Semester/Trimester/Choice Based Credit System

CMI follows a semester system. The odd semester runs from August to November, and the even semester runs from January to April.

9. Participation of the department in the courses offered by other departments

No.

10. Number of teaching posts sanctioned, filled and actual (Professors/Associate Professors/Asst Professors/others)

	Sanctioned	Filled	Actual (including CAS & MPS)
Professor	–	2	2
Associate Professor	–	2	2
Assistant Professor	–	1	1
Others	–	5	5

11. Faculty profile with name, qualification, designation, area of specialization, experience and research under guidance

Name	Qualification	Designation	Specialization	No. of Years of Experience	No. of Ph.D/ M.Phil students guided for the last 4 years
V.V. Sreedhar	Ph.D.	Professor	Theoretical Physics	20	0
K. Narayan	Ph.D.	Professor	Theoretical Physics	13	2
Govind Krishnaswami	Ph.D.	Associate Professor	Theoretical Physics	11	1
K.G. Arun	Ph.D.	Associate Professor	Theoretical Physics	9	0
Alok Laddha	Ph.D.	Assistant Professor	Theoretical Physics	7	0

12. List of senior Visiting Fellows, adjunct faculty, emeritus professors

- G. Rajasekaran
- H. S. Mani
- R. Parthasarathy
- R. Jagannathan
- T. R. Govindarajan

13. Percentage of classes taken by temporary faculty - programme-wise information

0%

14. Programme-wise Student Teacher Ratio

- B.Sc. (Hons) Mathematics and Physics, 17:10,
- PhD Physics, 2:1

15. Number of academic support staff (technical) and administrative staff: sanctioned, filled and actual

- One Laboratory In-charge, and one laboratory assistant.
- Academic/administrative support staff: 5 (shared across all departments)

16. Research thrust areas as recognized by major funding agencies

Mathematical physics, fluid dynamics, classical gravity, gravitational waves, astrophysics, plasma and condensed matter physics, quantum field theory, particle physics, string theory, loop quantum gravity

17. Number of faculty with ongoing projects from a) national b) international funding agencies and c) Total grants received. Give the names of the funding agencies, project title and grants received project-wise.

Nil.

18. Inter-institutional collaborative projects and associated grants received

a) National collaboration

Nil

b) International collaboration

Nil

19. Departmental projects funded by DST-FIST; UGC-SAP/CAS, DPE; DBT, ICSSR, AICTE, etc.; total grants received.

Nil

20. Research facility / centre with

- state recognition

Nil

- national recognition

Nil

- international recognition

Nil

21. Special research laboratories sponsored by / created by industry or corporate bodies

None

22. Publications:

- Number of papers published in peer reviewed journals (national / international)

Around sixty-five.

- Monographs

1. N.D. Hari Dass: The Principles of Thermodynamics, CRC Press ISBN 9781466512085.

2. R.Parthasarathy: Relativistic Quantum Mechanics, Narosa Publications, (2010) ISBN: 978-81-8487-004-6

3. R.Parthasarathy: Introduction to General Relativity, Narosa Publications (2015) ISBN: 978-81-8487-428-0

- Chapters in Books

1. Alok Laddha: In Loop Quantum Gravity volume to be published in the series 100 Years of General Relativity by World Scientific.

2. G. Rajasekaran and M. S. Raghunathan in "Science in Modern India: An Institutional History, c 1784-1947" (Vol XV, Part 4, History of Science...) Ed: Uma Das Gupta, Pearson Longman, p669 (2010).

- Edited Books
- Books with ISBN with details of publishers
- Number listed in International Database (For e.g. Web of Science, Scopus, Humanities International Complete, Dare Database - International Social Sciences Directory, EBSCO host, etc.)
- Citation Index - range / average
- SNIP
- SJR
- Impact Factor - range / average
- h-index

In the areas of Physics that are represented at CMI, numeric indicators such as impact factor and h-index are not meaningful. CMI faculty publish their research in international journals and conferences that are recognized by the academic community as the leading publication outlets in the corresponding areas.

23. Details of patents and income generated

None.

24. Areas of consultancy and income generated

None.

25. Faculty selected nationally / internationally to visit other laboratories / institutions / industries in India and abroad

V.V. Sreedhar

1. Visited Theoretisch-Physikalisches-Institut Friedrich-Schiller-Universität, Jena, Germany, 16–18 July, 2012, and gave a talk on “Electromagnetic Field of Torus Knots”.
2. Attended the 3rd O’Raifeartaigh Conference on Symmetry and Integrability, July 19–21, 2012, Arnold Sommerfeld Centre for Theoretical Physics, Ludwig Maximilians Universität, München, Germany, and gave a talk on “An Exact Expression for a Flat Connection on the Complement of a Torus Knot”.
3. Visited Institut für Theoretische Physik, Heidelberg, Germany, 22–28 July, 2012, and gave a talk on “An Exact Expression for a Flat Connection on the Complement of a Torus Knot” at
4. Attended the International Conference on New Trends in Field Theories, 23–26 November 2012 at DST-Centre for Interdisciplinary Mathematical Sciences & Department of Physics, Faculty of Science Banaras Hindu University, Varanasi and gave a talk on “An Exact Expression for a Flat Connection on the Complement of a Torus Knot”.
5. Visited University of Hyderabad on 18–20 January, 2013, and gave a talk on “An Exact Expression for a Flat Connection on the Complement of a Torus Knot”
6. Visited IISER, Pune on 24–27, February, 2013 and gave a talk on “An Exact Expression for a Flat Connection on the Complement of a Torus Knot”

K. Narayan

1. Attended “Conference on Cold Materials, Hot Nuclei and Black Holes: Applied Gauge/Gravity Duality?” held at the Abdus Salam ICTP, Trieste, Italy, in August 2011.
2. ICGC2011 (International Conference on Gravitation and Cosmology) conference, Goa, in December 2011 and gave a talk on “Cosmological singularities, AdS/CFT and de Sitter deformations?”.
3. Visited TIFR String theory group, in July 2011, and December 2011.
4. Visited the Kavli Institute for Theoretical Physics (KITP), University of California Santa Barbara, and the Physics Departments at Stanford University and University of Kentucky, USA, May–Jun 2012. Gave a talk on “Aspects of Lifshitz scaling in string theory” at KITP and the University of Kentucky.
5. Attended the Indian Strings Meeting (ISM2012), international string theory workshop, Puri, India, Dec 2012. Gave a talk on “*AdS* plane waves, Lifshitz scaling, hyperscaling violation and entanglement entropy”.
6. Visited the International Center for Theoretical Sciences (ICTS) and attended “Discussion Meeting on String Theory”, Bangalore, Jun 2012. Gave a talk on “Aspects of Lifshitz scaling in string theory”.
7. Visited the String Theory group, TIFR, Mumbai, July 2012.
8. Gave a Seminar at the Institute of Mathematical Sciences (IMSc), Chennai, Sep 2012 on “Lifshitz scaling and hyperscaling violation in string theory”.
9. Attended the workshop on “Non-perturbative gauge theories, holography and all that”, Center for High Energy Physics, IISc, Bangalore, Jan 2013. Gave a talk on “Hyperscaling violation and entanglement entropy in gauge/string theory”.
10. Attended the Discussion Meeting on “String Theory”, TIFR, Mumbai, Jan 2013.
11. Visited String theory group, Institute for Advanced Study (IAS), Princeton, U.S.A., in May 2013 and gave a talk on “D-brane plane waves, hyperscaling violation and entanglement entropy”.
12. Attended Great Lakes Strings Conference, in May 2013, at U. Kentucky, U.S.A. and gave a talk on “D-brane plane waves, hyperscaling violation and entanglement entropy”.
13. Visited Center for Particle Physics, MIT, USA, in May 2013.
14. Attended “The Information Paradox, Black Holes and Entanglement” workshop, at ICTS Bangalore, in September 2013.
15. Attended Prospects in Theoretical Physics, advanced school on string theory, Institute for Advanced Study (IAS) & Princeton Univ., Princeton, U.S.A., in June 2014.
16. Attended “Strings 2014”, international conference on string theory, Institute for Advanced Study (IAS) & Princeton Univ., Princeton, U.S.A., in June 2014.
17. Gave a talk on “Aspects of extremal surfaces in (A)dS” at “Entanglement from Gravity” Discussion Meeting around the Chandrasekhar Lectures given by Rob Myers, ICTS, Bangalore, in December 2014.
18. Gave a talk on “Aspects of extremal surfaces in (A)dS” at Indian Strings Meeting, international string theory workshop, Puri, in December 2014.

Govind S. Krishnaswami

- (a) Gave a talk on “A KdV-like wave equation with some remarkable properties”, at IISER Thiruvananthapuram, in August 2011.
- (b) Attended the first Meeting of DST-Ramanujan Fellows, Pune, 4–6 May, 2012.
- (c) Along with Profs G. Rajasekaran and H. S. Mani, co-organised a national Refresher Course on quantum mechanics (May 2013) at SB College Changanacherry, Kerala for college and university faculty. This course is conducted by the three Indian science academies under the chairmanship of Prof. N. Mukunda. Taught a lecture course (13 lectures) on relativistic quantum mechanics and gave some supplementary lectures on non-relativistic quantum mechanics.
- (d) Visited Thiruvananthapuram for physics discussions with Prof. S.G. Rajeev during June 2013.
- (e) Gave a talk on “Higgs mechanism and fluid mechanics” at the Second Ramanujan Fellows Conclave at IISER Pune, during December 2013.
- (f) Along with Professors G. Rajasekaran, H. S. Mani and K. S. Mallesh, co-organised a national Refresher Course on quantum mechanics (December 2013) at JSS Mahaviyapeetha, Suttur, Karnataka for college and university faculty. Taught a lecture course (13 lectures) on Quantum Mechanics: Formalism, Harmonic oscillator, Angular momentum, Identical particles, Atoms.
- (g) Gave a talk on “A fluid analogy for the Higgs mechanism” in the International conference on New Trends in Field Theories, in November 2014 at Banaras Hindu University, Varanasi.
- (h) Resource person for Science Academies national Refresher Course on Classical Mechanics and Electromagnetism at SDM College, Ujire, Karnataka for faculty and research scholars and students in December 2014. Taught a lecture course (12 lectures, each 90 minutes) on Lagrangian and Hamiltonian mechanics, Poisson brackets and Canonical transformations, Oscillations and Rigid bodies.
- (i) Gave a reading course on “Geometrical and group theoretical methods in physics”.
- (j) Hosted Prof A. Thyagaraja, Bristol, UK, in January 2015 for a collaboration meeting.

K.G. Arun

- (a) Gave a colloquium on Gravitational Waves named “Audible Universe” at IIT Madras in August 2011.
- (b) Visited Raman Research Institute, Bangalore (May, September 2011 & February 2012).
- (c) Visited IISER Thiruvananthapuram in July 2011 for research collaborations and gave a seminar on “Parametrized Tests of Post-Newtonian theory using Gravitational Wave Observations”.
- (d) Attended International Conference on Cosmology & Gravitation, Goa, December 2011. Gave a talk on “Generic bounds on dipolar Gravitational Radiation from inspiralling compact binaries” in the work shop session. Contributed poster on “New accurate set of PN phase parameters using singular value decomposition” with Archana Pai.
- (e) Attended Indo-Japan Cooperative Science program (IJCSP) meeting at IISER Thiruvananthapuram in December 2011.
- (f) Attended one week long IndIGO work shop at IUCAA, Pune in March 2012.

- (g) Visited IISER Thiruvananthapuram in May 2012.
- (h) Visited IUCAA, Pune in June-July 2012 (IndIGO data analysis camp).
- (i) Attended the ASTROD symposium at the Raman Research Institute, Bangalore, July 2012. Gave an invited talk on “Testing General Relativity & Alternative theories of gravity using space-based GW detectors”.
- (j) Visited IISER, Thiruvananthapuram in December 2012 (Indo-Japanese collaboration meeting).
- (k) Attended the IUCAA workshop on Gravitational Wave Data Analysis at Birla Institute of Technology, Goa Campus in December 2012. Gave a set of 2 lectures.
- (l) Visited Cardiff University, UK in February 2013 and attended the Conference on “Astronomy with the Global Gravitational-Wave Detector Network”. Gave an invited talk on “Strong field tests of General Relativity using Gravitational Wave observations”.
- (m) Visited Osaka University Japan, March 2013.
- (n) Visited ICTS, Bangalore, during June-July and December 2013.
- (o) Gave an invited talk at Field Theory and Gravitation (FTAG) held at IIT Gandhinagar in September 2013.
- (p) Attended Gravitational Wave Physics and Astronomy Workshop at IUCAA, Pune, in December 2013.
- (q) Visited IISER-Thiruvananthapuram in July 2014 and gave a seminar.
- (r) Visited Institute of Mathematical Sciences and gave a talk on “Synergy of Short GRBs and Gravitational Waves” in October 2014.
- (s) Gave a talk on “Strong field Tests of gravity using gravitational waves”, at the Workshop on Astronomy, Cosmology & Fundamental Physics with Gravitational Waves at CMI, in March 2015.
- (t) Gave a plenary talk on “Towards first detection of Gravitational Waves: Challenges Prospects” at the IAGRG 2015 meeting at the Raman Research Institute.

Alok Laddha

1. Institute Colloquium entitled “Hamiltonian constraint in Loop Quantum Gravity” at Institute of Mathematical Sciences, Chennai.
 2. Plenary talk entitled “Recent advances in Loop Quantum Gravity” at 27th Meeting of the Indian Association for General Relativity and Gravitation (IAGRG-13), Garhwal University, Uttarakhand, March 2013.
 3. Delivered three seminars at the Horac Hearne Institute for Gravitational physics, Louisiana State university, U.S.A. in March 2014.
 4. Visited Raman research Institute, Bangalore in May 2014.
26. Faculty serving in (a) National committees, (b) International committees, (c) Editorial Boards, (d) any other (please specify)
- (i) National Organizing Committee, Indian Strings Meeting (ISM-12) international string theory conference, Dec 16-21, 2012, Puri, India.

- (ii) National Organizing Committee, Indian Strings Meeting (ISM-08) international string theory conference, Dec 6-13, 2008, Pondicherry, India.
 - (iii) Local Organizing Committee, Indian Strings Meeting (ISM-08) international string theory conference, Dec 6-13, 2008, Pondicherry, India.
 - (iv) Editorial Boards: Resonance, Current Science, Managing Editor: Texts and Readings in Physics (Hindustan Book Agency), Physics Education, SIGMA: Symmetry, Integrability, and Geometry: Methods and Applications.
27. Faculty recharging strategies (UGC, ASC, Refresher / orientation programs, workshops, training programs and similar programs).
- None.
28. Student projects
- percentage of students who have done in-house projects including inter-departmental projects
Not applicable.
 - percentage of students doing projects in collaboration with other universities / industry / institute
Not applicable.
29. Awards / recognitions received at the national and international level by
- Faculty
 1. Alok Laddha awarded the Ramanujan National Research Fellowship in 2012.
 2. Govind Krishnaswami awarded the Ramanujan National Research Fellowship in 2009.
 3. K. Narayan awarded the Ramanujan National Research Fellowship in 2008.
 - Doctoral / post doctoral fellows
None
 - Students
None
30. Seminars/ Conferences/Workshops organized and the source of funding (national / international) with details of outstanding participants, if any.
1. A semester-long activity was organised in fluid mechanics which was completely funded by CMI. It attracted distinguished experts in the field both from India and abroad. The list of speakers included Abel Laureate S.R.S.Varadan from Courant Institute, New York University, K.R. Sreenivasan, Director, Abdus Salam Institute for Theoretical Physics, Italy and Courant Institute, A. Thyagaraja from Culham Laboratories, U.K., S. G. Rajeev, University of Rochester, Shiraz Minwalla, Tata Institute of Fundamental Research, R. Narasimha, JNCASR, Bengaluru.
 2. Asymptotia: A three-day workshop on asymptotic symmetries in Classical and Quantum Gravity was conducted.

3. A three-day workshop was held on Astronomy, Cosmology and Fundamental Physics with Gravitational Waves was held with distinguished lecturers like Bala Iyer, ICTS, Bangalore, Tarun Souradeep, IUCAA, Pune, and Sukanta Bose, Washington, U.S.
4. Outstanding seminar speakers on other occasions include Nobel Laureates G.'t Hooft from the Netherlands, David Gross from Santa Barbara, U. S., A. Leggett from University of Chicago, Urbana Champaign, U.S., and Sir Michael Berry, FRS from U.K. and J. V. Narlikar from Pune, Ashoke Sen from HRI, Allahabad, and Rajesh Gopakumar from ICTS, Bengaluru.

31. Code of ethics for research followed by the departments
None. We implicitly trust the departments to act ethically.

32. . Student profile programme-wise:

Name of the Programme (refer to question no. 4)	Applications received	Selected		Pass percentage	
		Male	Female	Male	Female
B.Sc (Hons) in Mathematics and Physics	1732	9	0	89%	0%
Ph.D in Physics	136	2	1	50%	0%

33. Diversity of students

Name of the Programme (refer to question no. 4)	% of students from the same university	% of students from other universities within the State	% of students from universities outside the State	% of students from other countries
Ph.D in Physics	33%	0%	67%	0%

34. How many students have cleared Civil Services and Defense Services examinations, NET, SET, GATE and other competitive examinations? Give details category-wise.
None.

35. Student progression

Student progression	Percentage against enrolled
UG to PG	95%
PG to M.Phil.	–
PG to Ph.D.	40%
Ph.D. to Post-Doctoral	–
Employed	
Campus selection	–
Other than campus recruitment	–
Entrepreneurs	–

36. Diversity of staff

Percentage of faculty who are graduates	
of the same university	0%
from other universities within the State	0%
from universities from other States	60%
from universities outside the country	40%

37. Number of faculty who were awarded M.Phil., Ph.D., D.Sc. and D.Litt. during the assessment period

None. Only people who already have a PhD are hired as faculty.

38. Present details of departmental infrastructural facilities with regard to

a) Library

CMI Library has an extensive collection of mathematics books.

b) Internet facilities for staff and students

CMI campus has 24 hours high-speed (32 Mbps) internet connection.

c) Total number of class rooms

11 (Shared by all departments)

d) Class rooms with ICT facility

All classrooms are equipped with projector and internet facility.

e) Students' laboratories

There is a fully functional physics teaching laboratory which is small but sufficiently well-equipped to meet the needs of students of the BSc(Hons) Mathematics and Physics students.

f) Research laboratories

No.

39. List of doctoral, post-doctoral students and Research Associates

a) from the host institution/university

Doctoral students

- Debangshu Mukherjee
- Sachin Phatak
- Sonakshi Sachdev
- Himalay Senapati

b) from other institutions/universities

Doctoral students

- Aneesh P.B.
- Athira P.V.
- Kedar Kolekar
- T.R. Vishnu
- Krishnendu N.V.
- A. Manu

- Ramadas N.
- Vishnu T.R.

40. Number of post graduate students getting financial assistance from the university.
10.
41. Was any need assessment exercise undertaken before the development of new programme(s)?
If so, highlight the methodology.
No.
42. Does the department obtain feedback from
- a. faculty on curriculum as well as teaching-learning-evaluation? If yes, how does the department utilize the feedback?
The department has regular faculty meetings to discuss feedback on courses and other issues and makes appropriate recommendations to address any issues that may be raised.
 - b. students on staff, curriculum and teaching-learning-evaluation and how does the department utilize the feedback?
There is no formal mechanism for student feedback, but students to provide feedback on individual courses via their faculty advisors and this is discussed by the faculty in their regular meetings.
 - c. alumni and employers on the programmes offered and how does the department utilize the feedback?
There is no formal mechanism for feedback from alumni and employers, but any comments or suggestions received are discussed by the faculty in their regular meetings.
43. List the distinguished alumni of the department (maximum 10)
Shiladitya Bannerjee: Winner of the best PhD thesis award in Biophysics of the American Physical Society for work done at Syracuse University, U.S.A..
44. Give details of student enrichment programmes (special lectures / workshops / seminar) involving external experts.
Students actively participate in all academic activities including seminars and workshops.
45. List the teaching methods adopted by the faculty for different programmes.
Each faculty member has complete academic freedom in the teaching methods he or she adopts and varies from person to person and time to time. General methods include close personal monitoring, continuous assessment through assignments, and exams; and term papers and presentations.
46. How does the department ensure that programme objectives are constantly met and learning outcomes are monitored?
The Board of Studies and Academic Council of the institute meet periodically to ensure that the programme objectives are met. Each PhD student has a doctoral committee which monitors his/her progress.

47. Highlight the participation of students and faculty in extension activities.

Not Applicable.

48. Give details of “beyond syllabus scholarly activities” of the department.

Not Applicable.

49. State whether the programme/ department is accredited/ graded by other agencies? If yes, give details.

No.

50. Briefly highlight the contributions of the department in generating new knowledge, basic or applied.

The department has published over sixty research papers in peer-reviewed national and international journals of repute in its relatively short period of existence. It has also published three books.

51. Detail five major Strengths, Weaknesses, Opportunities and Challenges (SWOC) of the department.

Strengths • High quality research faculty

- Excellent infrastructure for research and teaching
- Proximity to active research groups in other institutions
- Strong ties with national and international collaborators
- Access to talented pool of undergraduate students

Weaknesses • Relatively small faculty size

- Some research areas not well represented

Opportunities • National need for manpower trained in mathematical sciences

- Actively pursue international students
- Interact with industry to provide specialized training

Challenges • Talented undergraduate students prefer career-oriented engineering courses

- Lack of good quality post-graduate candidates
- Talent pool for faculty hiring is limited
- Raising resources to expand infrastructure such as hostel

52. Future plans of the department.

The physics department at CMI is the youngest of the three departments. In the relatively short time since its inception, it has established a reputation to be one of the most sought after places for undergraduate education in theoretical physics. This is borne out by the ever-increasing clamour for the programme as evidenced by the increasing number of applications. The department should be in a position to handle the increase in the number of students opting for physics.

The department is also well-known for its research in frontier areas of theoretical physics, primarily in String Theory, Quantum Field Theory, Mathematical Physics, Fluid Dynamics and Classical and Quantum Gravity. The research group is young and active, but it is small, and its research interests do not cover several topics which are important. Notable amongst

them are Statistical Mechanics, Integrable Systems, Nonlinear Dynamics, and Classical and Quantum Information Sciences all frontier areas of physics with close and natural connections to Mathematics and Computer Science.

For the department to grow and take its rightful place as one of the leading centres of excellence, it is necessary that a vibrant graduate programme is established. It is a challenge for a small group to compete with more established groups with large faculty strengths and diverse research interests.

In view of the foregoing challenges, the department would like to attract promising candidates that will complement and supplement our current strengths. Having a critical mass of active faculty members with a reasonably diverse range of expertise is crucial in attracting good quality research students and post-doctoral scholars. Once this is in place, the problem of handling large number of students at the undergraduate level will also be automatically solved.

Having said that, we are also acutely aware of both our strengths and limitations. So, we plan to focus, at least in the foreseeable future, to restrict our interests to theoretical physics so that we can establish a synergy between the mathematics and computer sciences departments at CMI.