

Govind S. Krishnaswami

CONTACT INFORMATION	Chennai Mathematical Institute (CMI) Plot H1 SIPCOT IT Park, Siruseri Kelambakkam, 603103, India	Work: +91-44-7196-1011 E-mail: govind@cmi.ac.in Website: www.cmi.ac.in/~govind
EMPLOYMENT	<ul style="list-style-type: none">Chennai Mathematical Institute, Chennai, India: Professor (2020-), Associate Professor (2010-2019), Ramanujan fellow (2010-2015), Visiting faculty (2007-2010).EPSRC fellow in Theoretical Physics, Dept. Mathematical Sciences & Centre for Particle Theory, Durham University, UK (2007-2010).Marie Curie postdoctoral fellow in Theoretical Physics (mentor: G. 't Hooft), Spinoza Institute and Institute for Theoretical Physics, Utrecht University, The Netherlands (2004-2007).	
EDUCATION	University of Rochester, Rochester NY, USA (1995-2004) <ul style="list-style-type: none">Ph.D in Theoretical Physics, 2004: Thesis: <i>Large-N Limit as a Classical Limit: Baryon in Two-Dimensional QCD and Multi-Matrix Models</i> [hep-th/0409279]. Advisor: S. G. Rajeev.Master of Arts in Physics, 2001.Bachelor of Science in Physics & Bachelor of Arts in Mathematics, <i>summa cum laude</i>, 1999. Thesis: <i>A model of interacting partons for hadronic structure functions</i> [hep-th/9911538].	
GRANTS AND AWARDS	Matrices and Core Research Grants: SERB, Govt. of India, 2019-2022. Ramanujan Fellowship: Dept of Science & Tech. Govt. of India, 2010-2015. EPSRC Fellowship: Awarded by UK Research Council, 2007-2010. Marie Curie Fellowship: Awarded by the European Union, 2005-2007. Susumu Okubo Prize: For Master's degree, U of Rochester, 2001. Sproull Fellowship: For graduate study at the U of Rochester, 1999-2001. Apker Award: American Physical Society, 1999. Stoddard Prize: Best senior thesis in Physics, U of Rochester, 1999. Arthur Gale Prize: Best graduating senior in Mathematics, U of Rochester, 1999.	
RESEARCH INTERESTS	Theoretical and Mathematical Physics: Quantum field theory & Particle physics, Large- N limits, Matrix models, Fluid and Plasma dynamics, Nonlinear dynamics, Integrable systems.	
RESEARCH EXPERIENCE	Neutrino-nucleon deep inelastic scattering experiment. Distribution of inverses modulo a prime in short intervals. Interacting parton model for hadronic structure functions. Baryon & its excitations as solitons in 1+1D large- N QCD. Variational principles for large- N matrix models, Free entropy and Fisher information for operator-valued random variables. Loop equations of matrix models and gauge theory: algebraic properties, approximation methods. Schwinger-Dyson operators as invariant vector fields on a matrix model analogue of the group of loops. Phase transition in large- N matrix model for gluons in baryons. 2+1D classical integrable model inspired by ideal hydrodynamics. Nontrivial UV fixed points & naturalness for 4D $O(N)$ scalar fields. KdV-like scale-invariant nonlinear advection-dispersion equation. Spin quantum plasmas. Higgs mechanism & added mass effect. Conservative regularization of vortical & shock singularities in Euler, gas dynamics, MHD, 2-fluid plasmas. Curvature and geodesic instabilities in geometric approach to 3-body problem. Hamiltonian formulation, integrability, invariant tori, action-angle variables of the Rajeev-Ranken model. Quantum RR model as anharmonic oscillator, screwon spectral statistics, dispersion relation. Classical 3-rotors: periodic solutions, instabilities, chaos, ergodicity, bifurcation cascade, self-similarity, duality. Quantum 3-rotors in the identity representation. Instabilities in inviscid compressible Couette flow.	
BOOK	Classical Mechanics: From Particles to Continua and Regularity to Chaos , Texts and Readings in Physical Sciences (TRiPS) Volume 22, Hindustan Book Agency (2024) and Springer-Nature (2025).	
MENTORING	PhDs: S Sachdev, H Senapati, S S Phatak (2020), T R Vishnu (2021), current: A Yadav & P Sinha.	
PROFESSIONAL	Referee for Chaos, Int. J. of Mod. Phys. A, JHEP, J. Phys. A, J Phys. G, Mod. Phys. Lett., Nucl. Phys. B, Physica D, Pramana, Resonance. Editorial Board of Resonance - Journal of Science Education ('15-'20). Resource person for SERB THEP Schools ('18, '19), Science Academies' Refresher Courses and Workshops. Serve on doctoral committees, selection panels, as PhD examiner, etc.	
TEACHING	CMI: Class Mech 2 (S23, S16, S14, S13), CM 1 (F22, F21), Nonlin Dyn (S20, S19), Thermal Phys (F19, F16), Quantum Fields (F18), Continuum Mech (S18), Applied Complex Var (S18), Group Theory & Phys (S17), Particle Phys 1,2 (S15, F14), Grad Class Mech (F20, F13), Quantum Mech (F12), QM3 (S12), QM2 (F11), QM1 (S11), Computational Projects (S10), Math Phys (F09, S24, S25), Fluid Dyn (F24). Schools: Probability (Mavelikara Jun 23), Integrable Systems (Delhi Dec 19), Symmetries & Path Integrals in QM (Awantipora Jul 19), QFT (Hyderabad Aug 18) Scattering in QM (Irinjalakuda June 18), Approx. meth. in QM (Erode Sep 18, Coimbatore Oct 17), QM (Mavelikara June 23, Chennai Jul 20, Kozhikode Feb 20, Thalassery Oct 18, Vandalur Dec 16, Chennai May 15), Fluid Mech (Pune Sep 18, Oct 16, Moodbidri Feb 16), Lin Alg & QM (Coimbatore June 16, Chennai Aug 19), Analytical Dyn. (Ujire Dec 14), Quant. theory of Radiation (Mavelikara May 14), QM (Suttur Dec 13), Relativistic QM (Changanacherry May 13).	