Himalaya Senapati

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Work

Equity Derivate Quant, HSBC	Aug 2023 – Present
Visiting Faculty, CMI	Jan 2025 – Present
Instructor, Erdos Institute	Nov 2025 – Present
Editor, Leelavati	Jan 2026 – Present
Core Quant Strat, GS	May 2021 – Aug 2023

Education

Postdoc, IIT Madras	Feb 2021 – Apr 2021
Postdoc, CMI	Aug 2020 – Jan 2021
PhD in Physics, CMI	Aug 2015 – July 2020
M.Sc. in Physics, CMI	Aug 2013 – July 2015
B.Sc. in Physics, CMI	Aug 2010 – July 2013

Industry Experience

Skills: Probability, Statistics, Stochastic Calculus, Coding

Analyzing Dispersion, Var Swaps and Cliquet with a focus on risk (Aug 2023 - Jan 2026, HSBC).

- Developed a calibration framework for pricing.
- Investigated greeks and PnL explain to minimize hedging costs.

Porting pricing logics from Slang to C++ (May 2021 - Aug 2023, Goldman Sachs).

- Developed parts of the C++ pricing engine for USD vanilla swaps to be called from a Java stack.
- Backtested the flow against existing Slang stack and resolved diffs for correct pricing.
- Developed and implemented curve fitting algorithms in C++ for faster and accurate pricing.

Teaching Experience

Introduction to Math Finance at Chennai Mathematical Institute, 2025 and 2026

- Introduced key mathematical tools: Markov processes, Martingales etc.
- Covered core topics: binomial option pricing, Itó's lemma, stochastic calculus, risk-neutral measures.
- Included basic numerical methods and special topics like Value at Risk.

Quantitative Finance at Logic Labs, 2024 and 2025

- Taught a cohort of PhDs and Postdocs to help them transition to math finance industry.
- Designed and taught the modules on Probability, Statistics and Stochastic Calculus.

Outreach at various Schools and NGOs, 2023 – 2025

- Conducted one/two day workshops.
- Focused on fostering mathematical intuition and problem-solving.

Honors and Awards

Best Poster Presentation Award, *Conference on Nonlinear Systems and Dynamics, IIT Kanpur* 2019

Oberwolfach Leibniz Graduate Students Grant, *Awarded by MFO, Germany* 2018

International Travel Support Grant, *Awarded by SERB, India* 2017

Indian National Mathematics Olympiad, *Selected among top 30 students countrywide* 2007,'08,'09,'10

Indian National Astronomy Olympiad, *Selected among top 30 students countrywide* 2007,'08,'09,'10

Zonal Informatics Olympiad, *Selected among top 229 students countrywide* 2009

KVPY Fellowship, *Awarded to 200 students by Dept. of Science & Technology, Govt. of India* 2008–2013

National Child Award for Exceptional Achievement, *Awarded by Department of Women & Child Development, Govt. of India* 2008

XII International Astronomy Olympiad, *Silver Medal* 2007

Schools & Conferences

Statistical Physics of Machine Learning,	Jan 6-10, 2020, **ICTS, Bengaluru**
Conference on Nonlinear Systems and Dynamics	Dec 12 - 15, 2019, **IIT Kanpur**
CIMPA school on Finsler geometry and applications	Dec 5 - 12, 2019, **BHU, Varanasi**
Workshop on Data Analysis and Machine Learning	May 24-28, 2019, **IISER Tirupati**
Workshop on Topological Dynamics and Number Theory	Jan 04 - 13, 2019, **RKMVERI, Belur Math**
Populations: Interactions and Evolution,	Sep 10-14, 2018, **Institut Henri Poincaré, Paris**
Recent trends in Teichmuller theory and Mapping class groups	Sep 2-8, 2018, **MFO, Oberwolfach**
SERB School on Nonlinear dynamics	Jan 02 - 29, 2018, **SPPU, Pune**
Geometry, Groups and Dynamics	Nov 06 - 24, 2017, **ICTS, Bengaluru**
Probabilistic and statistical methods for networks	Aug 21 - Sep 1, 2017, **Berlin Mathematical School**

Academic Projects

Gaussian Process based understanding of Deep Learning Machines (with David Saad, unfinished): The goal of the project was to design scalable and interpretable machine learning methods via Deep Gaussian Processes. This would have had application in high-risk areas such as Health and Finance.

Instabilities, chaos and ergodicity in the three-rotor problem: Analytical methods along with numerical tools and statistical measures were used to investigate dynamics of a model of coupled Josephson junctions. *Publications* –

- *Quantum three-rotor problem in the identity representation*, G. S. Krishnaswami and H. Senapati, Phys. Rev. E, 111 (1), 014221 (2025).
- *Ergodicity, mixing and recurrence in the three rotor problem*, G. S. Krishnaswami and H. Senapati, Chaos, 30 (4), 043112 (2020). [**Editor's pick**].
- *Stability and chaos in the classical three rotor problem*, G. S. Krishnaswami and H. Senapati, Indian Academy of Sciences Conference Series, 2(1), 139-143 (2019).
- *Classical three rotor problem: periodic solutions, stability and chaos*, G. S. Krishnaswami and H. Senapati, Chaos, 29 (12), 123121 (2019). [**Editor's pick, Featured article**].

Geometric approach to the planar three-body problem: Techniques from Riemannian Geometry and variational principle were used to analyze instabilities in a Sun-Earth-Moon type problem. *Publications* –

- *An introduction to the classical three-body problem: From periodic solutions to instabilities and chaos*, G. S. Krishnaswami and H. Senapati, Resonance, 24, 87-114 (2019).
- *Curvature and geodesic instabilities in a geometrical approach to the planar three-body problem*, G. S. Krishnaswami and H. Senapati, J. Math. Phys., 57, 102901 (2016). [**Featured Article**].

Non-Euclidean geometry: Inequalities and monotonicity properties in spherical and hyperbolic geometries. *Publications* – Three chapters in "Eighteen Essays in Non-Euclidean Geometry", Eds. V. Alberge and A. Papadopoulos, European Mathematical Society Publishing House, Zurich (2019):

- *On a theorem of Lambert: Medians in spherical and hyperbolic geometries*, H. Senapati, pp. 57-65.
- *Inscribing a triangle in a circle in spherical geometry*, H. Senapati, pp. 67-79.
- *Monotonicity in spherical and hyperbolic triangles*, H. Senapati, pp. 81-91.

Others

Created a network of about hundred researchers in complex systems and ran a biweekly seminar series from October 2020 to April 2021.

Participated as an organizational member of the Academic team in the 10^{th} International Olympiad on Astronomy and Astrophysics, Bhubaneswar, December 2016.

Taught at winter camps for children selected in Rural Mathematics Talent Search, Odisha, 2010,'11,'12.