Atul Anurag

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Education

New Jersey Institute of Technology (NJIT), USA Sept 2019 – May 2025
Ph.D. in Applied Mathematics
Dissertation Advisor: Roy H. Goodman

National Institute of Technology (NIT), Warangal, India Aug 2015 – Jun 2017
M.Sc. in Applied Mathematics
Dissertation Advisor: Poosan Muthu Moopanar

Ramjas College, University of Delhi, New Delhi Jul 2012 – Jul 2015
B.Sc. (Honors) in Pure Mathematics

Experience

- Research Assistant for Prof. Roy H. Goodman, Mathematical Sciences, NJIT, Spring 2022 –
- Developed MATLAB algorithms to plot the global phase space of a three-point vortex problem on a sphere by introducing a novel reduction technique
- Developed algorithms for Generalization of Leapfrogging orbits of Point Vortices on AUTO
- Developing a novel coordinate system that functions effectively when the sum of vortices is zero, where conventional methods encounter limitations
- Teaching Assistant and Recitation Leader, Calculus 1 & 2, Matlab programming, NJIT, Fall 2019 – Spring 2022
- Research co-mentor for summer undergraduate students (E. O' Grady), NJIT, Summer 2023 –
- Summer Research, Indraprastha Institute of Information Technology (New Delhi, India), Summer 2018
  Advisor: Ashish Kumar Pandey
  Worked on the applications of Operator Theory to conduct Analysis of Non-linear PDEs
- Indian Academy of Sciences Intern, Tata Institute of Fundamental Research, Center for Applied Mathematics (Bangalore, India), Summer 2014
  Advisor: Kayyunnapara Thomas Joseph
  Implemented various image processing and digital signal processing algorithms utilizing the principles of Laplace Transformation

Publications

- A New Canonical Reduction of Three-Vortex Motion and its Application to Vortex-Dipole Scattering, Atul Anurag, Roy H. Goodman, and Ellison O' Grady, Physics of Fluids, 36, 067110 (2024) [Link].
- (In preparation) The global phase plane analysis of the three-vortex interactions,
  Atul Anurag and Roy H. Goodman (2025).
- (In preparation) The four-vortex motion with zero total circulation,
  Atul Anurag and Roy H. Goodman (2025).

Selected Graduate Coursework

Asymptotic Methods, Theoretical Optimization, Applied Statistics, Computational Fluid Dynamics, Discrete Mathematics, Functional Analysis, Finite Volume Methods, Topology, Integral and Discrete Transforms, Finite Element Methods, Theoretical Operations Research, Number Theory, etc.

Conference and Seminar Presentations

- (Poster) Global Phase Plane Analysis of the three-vortex problem, SIAM New York-New Jersey-Pennsylvania Section Conferences (SIAM-NNP), Rochester Institute of Technology, USA, November (2024)
- (Talk) The Phase Space of the Three-Vortex Problem and its Application to Vortex-Dipole Scattering, Faculty and Student Summer Talks, Mathematics, NJIT, June (2024)
- (Talk) The Phase Space of the Three-Vortex Problem, SIAM Conference on Nonlinear Waves and Coherent Structures, Lord Baltimore Hotel, Baltimore, June (2024)
- (Poster) Point Vortex Dipole Scattering, SIAM-NNP, NJIT, October (2023)

- (Talk) Continuation of Periodic Orbits in Symmetric Hamiltonian and Conservative Systems, Faculty and Student Summer Talks, Mathematics, NJIT, July (2023)
- (Problem Solver) Mathematical Problems in Industry Workshop, NJIT, June (2023)
- (Volunteer, Attendee) Frontiers in Applied and Computational Mathematics, NJIT, May (2023)
- (Attendee) Second Drexel Waves Workshop, Drexel University, March (2023)
- (Thesis Proposal Defense) Generalization of Leapfrogging Orbits of Point Vortices, NJIT, January (2023)
- (Volunteer) Frontiers in Applied and Computational Mathematics, NJIT, May (2022)
- (Talk) Walking Droplet Dynamics Research, NJIT, June (2021)

Skills

Programming Languages: Python, MATLAB, Mathematica, Julia, FORTRAN, C++, HTML, R

Other Softwares: LaTeX, AUTO

Languages: Fluent in Hindi, English, and Sanskrit

Awards and Honors

- Indian Institute of Technology, Joint Admission Test for M.Sc. (IIT–JAM)
  Secured All India Rank 354 among 15,000 (approx) students, 2015
- Council of Scientific & Industrial Research (CSIR)
  Award Junior Research Fellowship and appointment as Assistant Professor
  Secured All India Rank 46 among 40,000 (approx) students, 2018
  Only top 200 students are fully funded in their PhD program

Leadership and Service

- Student Chapter of SIAM at NJIT, Vice-President, June 2022 – June 2024
- UCAN Executive Committee, Grad executive board member-at-large, June 2024 –
  A Union of Student Workers, Researchers, and Adjunct Instructors
- Class Representative (M.Sc.), Department of Mathematics, NIT, Warangal, India, July 2015 – May 2017

References

Prof. Roy H. Goodman, Mathematical Sciences, NJIT, goodman@njit.edu (dissertation advisor)

Prof. Anand U. Oza, Mathematical Sciences, NJIT, oza@njit.edu (former dissertation committee member)

Prof. Jonathan Jaquette, Mathematical Sciences, NJIT, jonathan.jaquette@njit.edu (dissertation committee member)

Prof. Enkeleida Lushi, Mathematical Sciences, NJIT, lushi@njit.edu (dissertation committee member)

Prof. David Shirokoff, Mathematical Sciences, NJIT, david.shirokoff@njit.edu (dissertation committee member)

Prof. Renato Calleja, Mathematical Sciences, IIMAS–UNAM, Mexico, calleja@mym.iimas.unam.mx (dissertation committee member)

Prof. Joseph Zaleski, Mathematical Sciences, NJIT, joseph.zaleski@njit.edu (teaching reference)