

# Atul Anurag

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## Education

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**Ph.D. in Applied Mathematics**    [New Jersey Institute of Technology, USA](#)    2019–Present  
*Thesis: Generalization of the three-vortex interactions and its application to vortex-dipole scattering*  
Advisor: [Roy Goodman](#)

**M.Sc. in Applied Mathematics**    [National Institute of Technology, Warangal, India](#)    2015–2017  
*Thesis: Pulsatile Flow in a Circular Rigid Tube*  
Advisor: [P. Muthu](#)

**B.Sc. in Mathematics**    [Ramjas College, University of Delhi, India](#)    2012–2015

## Professional Experience

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**Research Assistant, Ph.D. in Applied Mathematics**  
[New Jersey Institute of Technology](#)    Fall 2022–Present

- Currently working on vortex dynamics and nonlinear systems.

**Recitation Leader, Calculus I & II**  
[New Jersey Institute of Technology](#)    Fall 2019–Spring 2022

- Led recitation sessions, assisted students with calculus problems.
- Solutions to previous exams available at [Calculus I & II](#).

**Teaching Assistant, Ph.D. in Applied Mathematics**  
[New Jersey Institute of Technology](#)    Fall 2019–Fall 2022

**Intern, Laplace Transformation and Its Applications**  
[TIFR - Centre for Applicable Mathematics](#)    Summer 2014

- Worked on image processing problems under the supervision of [K. T. Joseph](#).

**Intern, Operator Theory, Analysis of Non-linear PDEs**  
[Indraprastha Institute of Information Technology, New Delhi](#)    Summer 2018

- Conducted research under the supervision of [Ashish Kumar Pandey](#).

## Publications

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[A new canonical reduction of three-vortex motion and its application to vortex-dipole scattering](#), with Roy Goodman, and Ellison O'Grady (2024). *Physics of Fluids*

## Working Papers

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Global phase plane analysis of the three-vortex interactions, with Roy Goodman.

Four-vortex motion with zero total circulation, with Roy Goodman.

## Conferences

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- **November 2024:** [Global Phase Plane Analysis of the three-vortex problem](#), SIAM-NNP, Rochester Institute of Technology
- **June 2024:** [The Phase Space of the Three-Vortex Problem and its Application to Vortex-Dipole Scattering](#), Summer Talk, New Jersey Institute of Technology
- **June 2024:** [The Phase Space of the Three-Vortex Problem](#), 2024 SIAM Conference on Nonlinear Waves and Coherent Structures, Speaker, Baltimore, MD
- **October 2023:** [Point Vortex Dipole Scattering](#), SIAM-NNP, New Jersey Institute of Technology
- **July 2023:** Continuation of Periodic Orbits in Symmetric Hamiltonian and Conservative Systems, Summer Talk, New Jersey Institute of Technology
- **June 2023:** Mathematical Problems in Industry Workshop, Problem Solver, New Jersey Institute of Technology
- **May 2023:** Frontiers in Applied and Computational Mathematics, Volunteer, Attendee, New Jersey Institute of Technology
- **March 2023:** Second Drexel Waves Workshop, Attendee, Drexel University
- **January 2023:** Generalization of Leapfrogging Orbits of Point Vortices, Thesis Proposal Defense, New Jersey Institute of Technology
- **May 2022:** Frontiers in Applied and Computational Mathematics, Volunteer, New Jersey Institute of Technology
- **June 2021:** Walking Droplet Dynamics Research, Summer Talk, New Jersey Institute of Technology

## Skills

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- **Programming Languages:**  $\text{\LaTeX}$ , Python, Matlab, Auto-Bifurcation Software

## Awards and Honors

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IIT-JAM, All India Rank: 354	IIT	2015
CSIR NET/JRF, All India Rank: 46	CSIR	2018

## Leadership and Service

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- **Vice-President**, [Society for Industrial and Applied Mathematics](#)  
New Jersey Institute of Technology June 2022–June 2024
- **UCAN Executive Committee**  
[Grad executive board member-at-large](#) June 2024–Present
- **Class Representative (M.Sc.)**  
Department of Mathematics, National Institute of Technology July 2015–May 2017

## Languages

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- Fluent in Hindi, English, and Sanskrit

## Interests and Activities

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- Reading Books, Solving Problems, Blogging at [atulanurag.com](http://atulanurag.com)
- Cricket, Travelling, Photography

## References

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### **Prof. Roy H. Goodman**

Associate Chair of Graduate Studies  
Department of Mathematical Sciences  
New Jersey Institute of Technology  
[goodman@njit.edu](mailto:goodman@njit.edu)

### **Ellison O'Grady**

PhD Student  
Department of Mathematical Sciences  
New Jersey Institute of Technology  
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