Peter Nekrasov

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Education

2021 – present	🔖 **University of Chicago, PhD Candidate** in Computational & Applied Mathematics. *From Capillary to Flexural: Integral Equation Methods for Surface Wave Scattering.* Advisor: Jeremy Hoskins.
2017 – 2021	🔖 **Yale University, B.A. *cum laude*** in Mathematics.

Research interests

Numerical methods for fluid dynamics; flexural mechanics of ice; asymptotic and applied analysis.

Experience

2021 – present	🔖 **Graduate Research and Teaching Assistant,** University of Chicago. Thesis Comittee: Jeremy Hoskins, Douglas MacAyeal, Mary Silber, & Travis Askham. Developing integral formulations for surface wave boundary value problems. Writing high performance code for volumetric and obstacle scattering. Exploring band gaps and Bragg scattering in Arctic ice shelves with surface rolls.
Summer 2024	🔖 **Data Science Graduate Intern,** Liberty Mutual Insurance. Project leaders: April Mu & Terrie Tin. Created a pipeline to extract and interpolate weather data for geographic modeling. Trained LightGBMs to predict home insurance losses due to hail and tornadoes.
2018 – 2021	🔖 **Research Assistant,** Yale University, Department of Chemistry. Advisors: Victor Batista, Uriel Morzan & Jessica Freeze. Performed computational chemistry research. Simulated molecular dynamics and analyzed protein motion using graph centrality. Trained neural networks to learn Hamiltonians and generate molecular geometries.

Peer-Reviewed Publications

1. **P. Nekrasov**, Z. Su, T. Askham, and J. G. Hoskins, "Boundary integral formulations for flexural wave scattering in thin plates," *Journal of Computational Physics*, vol. 542, p. 114 355, 2025, ISSN: 0021-9991. 🔗 DOI: https://doi.org/10.1016/j.jcp.2025.114355.

2. F. Maschietto, U. N. Morzan, F. Tofoleanu, A. Gheeraert, A. Chaudhuri, G. W. Kyro, **P. Nekrasov**, B. Brooks, J. P. Loria, I. Rivalta, and V. S. Batista, "Turning up the heat mimics allosteric signaling in imidazole-glycerol phosphate synthase," *Nature Communications*, vol. 14, no. 1, p. 2239, Apr. 2023, ISSN: 2041-1723. 🔗 DOI: 10.1038/s41467-023-37956-1.

3. **P. Nekrasov** and D. R. MacAyeal, "Ocean wave blocking by periodic surface rolls fortifies Arctic ice shelves," *Journal of Glaciology*, vol. 69, no. 278, pp. 1740–1750, 2023. 🔗 DOI: https://doi.org/10.1017/jog.2023.58.

Pre-Prints

1. T. Askham, J. G. Hoskins, **P. Nekrasov**, and M. Rachh, "Integral equations for flexural-gravity waves: analysis and numerical methods," *arXiv preprint arXiv:2501.00887*, 2025.

2. **P. Nekrasov**, J. Freeze, and V. Batista, "Using restricted boltzmann machines to model molecular geometries," *arXiv:2012.06984*, 2020.

Skills

Coding   ▉   Matlab, Fortran, Python, Java, R, bash, Git.

Languages   ▉   Fluent in English. Competent in Russian.

Misc.   ▉   Academic research, advising, teaching, and publishing.

Awards and Achievements

2024   ▉   Flatiron Institute "Computational Tools for PDEs with Complicated Geometries" Poster Award.

        ▉   CCAM Student Research Day, 2nd Place Poster Award.

2023   ▉   Inaugural CCAM Student of the Week.

Teaching Assistant Experience

Fall 2025   ▉   Applied Analysis.

Spring 2025   ▉   Basic Numerical Analysis.

Winter 2025   ▉   Introduction to Mathematical Probability.

Spring 2024   ▉   Dynamical Systems with Applications.

Fall 2023   ▉   Applied Dynamical Systems.

Spring 2023   ▉   Applied Partial Differential Equations.

Winter 2023   ▉   Dynamical Systems with Applications.

Fall 2022   ▉   Applied Dynamical Systems.

Leadership

2025 - present   ▉   UChicago Computation and Modeling Group, Graduate Student Liaison.

2022 - present   ▉   Forest Preserves of Cook County, Illinois, Ecological Steward.

                ▉   Departmental Intramural Sports Organizer and Team Captain.

2022 - 2023   ▉   UC Intramural Volleyball Referee.

2017 - 2021   ▉   WYBC Yale Radio Host, Treasurer, and RDBNPNG Magazine Editor.

Invited Talks

July 2026   ▉   **TBA**
AIMS 2026 - Athens, Greece.

July 2025   ▉   **Integral Equation Formulations for Flexural Wave Scattering in Sea Ice and Ice Shelves**
ICOSAHOM 2025 — McGill University, Montreal, CA.

June 2025   ▉   **Ice-fast integral equations: wave dynamics in icy seas**
Scientific Computing Seminar — Flatiron Institute, New York, NY.

May 2023   ▉   **Surface Meltwater Pattern Formation by Flexural Wave Excitation of Ice Shelves**
SIAM Dynamical Systems (DS23) — Portland, OR.

References

Available upon request.