

# Philip Zaleski

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## Education

- Ph.D. in Applied Mathematics, New Jersey Institute of Technology, Newark, NJ (Expected May 2026)
  - Advisor: David Shirokoff
  - GPA: 4.0
- B.S. in Applied Mathematics, New Jersey Institute of Technology, Newark, NJ (2017 Spring–2021 Spring)
  - GPA: 3.98

## Publications

- D. Shirokoff and P. Zaleski. Convergence of Markov chains for constant step-size stochastic gradient descent with separable functions. *SIAM J. Appl. Dyn. Syst.*, 24(3), 2025.
- C. B. Muratov, M. Novaga, and P. Zaleski. A variational model of charged drops in dielectrically matched binary fluids: the effect of charge discreteness. *Arch. Ration. Mech. Anal.*, 248(76), 2024.
- M. Lee, A. Shelke, S. Singh, J. Fan, P. Zaleski, and S. Afkhami. Numerical simulation of superparamagnetic nanoparticle motion in blood vessels for magnetic drug delivery. *Phys. Rev. E*, 106(1), 2022.
- J. Zaleski, P. Zaleski, and Y. V. Lvov. Excitation of interfacial waves via surface–interfacial wave interactions. *J. Fluid Mech.*, 887(14), 2020.
- P. Zaleski and S. Afkhami. Dynamics of an ellipse-shaped meniscus on a substrate-supported drop under an electric field. *Fluids*, 4(4), 2019.
- On the geometric ergodicity of constant step-size stochastic gradient descent for Morse objectives (*in preparation*).

## Conferences & Talks

- Convergence of Markov chains for stochastic gradient descent, NJIT Statistics Seminar, 2025 (invited talk).
- Convergence of Markov chains for stochastic gradient descent with separable functions, SIAM NNP, 2025 (contributed talk).
- Convergence of Markov chains for constant step-size stochastic gradient descent, FACM, 2025 (poster).
- Convergence of Markov chains for constant step-size stochastic gradient descent, SIAM-DS, 2025 (minisymposium talk).
- Convergence of Markov chains for constant step-size stochastic gradient descent with separable functions. SIAM-NNP, 2024 (poster).
- Iterated function systems and stochastic gradient descent. Faculty and student summer talks, NJIT, 2024.
- A basin of attraction theory for stochastic gradient descent. Dana Knox Showcase, 2024 (poster).
- Uniqueness and convergence to invariant measures of stochastic gradient descent Markov operators. SIAM-NNP, 2023 (minisymposium talk).
- Convergence rates for stochastic gradient descent Markov operators. Faculty and student summer talks, NJIT, 2023.
- Variational models of charged drops: the effect of charge discreteness. Faculty and student summer talks, NJIT, 2022.
- Dynamics of a cone-shaped meniscus on a substrate-supported drop under an electric potential. NJIT 12th International Undergraduate Summer Research Symposium, 2019 (poster).

## Teaching Experience

- Instructor: Math 110, University Mathematics II (Fall 2023)
- NJIT teaching & lab assistant (2021 Fall–2024 Spring)
  - Math 451, Methods of Applied Mathematics II (Spring 2024)

- Math 111, Calculus I (Fall 2021, Fall 2022, Spring 2023)
  - Math 112, Calculus II (Fall 2021)
- Virtual high school teacher at Prime Academy, Tenafly NJ
  - Taught and developed curriculum for Introductory Physics (Spring 2022)
- Tutor at NJIT’s mathematics learning center (2018–2022)
- MATLAB tutor at NJIT (Spring 2022, Fall 2024)
- Advised high school students that were part of the Liberty Science Center Partners in Science summer Program (Summer 2021)
  - Resulted in a publication in *Phys. Rev. E*
- Tutor at Northampton Community College (2020–2021)

## Honors and Awards

- SIAM Travel Award (2025)
- NJIT Gregory A. Kriegsmann Graduate Fellowship (2025)
- NJIT Gary Thomas Doctoral Fellowship (2021–2023)
- Barry M. Goldwater Scholarship (2020)
- NJIT Outstanding Undergraduate Student Award (2020)
- NJIT provost undergraduate summer research fellowship (2019)
- NJIT chapter of Pi Mu Epsilon National Mathematics Honorary Society (inducted Fall 2018)
- NJIT Ahluwalia Scholarship for Applied Math (2017–2018)
- NJIT Dean’s List (2017–2019)