# John Steinman

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## Education

**Ph.D., Computational Applied Mathematics and Operations Research** — (expected) May 2027
Rice University
Advisor: Matthias Heinkenschloss
GPA: 4.0

**M.A., Computational Applied Mathematics and Operations Research** — Dec. 2024
Rice University
Advisor: Matthias Heinkenschloss
GPA: 4.0

**B.S. Computational Engineering** — May 2022
The University of Texas at Austin
GPA: 3.98

**B.S. Mathematics** — May 2022
The University of Texas at Austin
GPA: 3.98

## Research and Work Experience

**Rice University** Graduate Student Researcher, — Aug 2022-Present
*Dept. of Computational Applied Mathematics & Operations Research*
- Developed convergence results and a new preconditioner for spectral collocation

**Sandia National Laboratories,** Summer Intern, — June 2024-Aug 2024
*Optimization and Uncertainty Quantification*
- Worked on preconditioning for spectral collocation methods
- Developed computational results using the Rapid Optimization Library (ROL)

**Willerson Center for Cardiovascular Modeling and Simulation** Undergraduate Student Researcher, — Sep 2020-May 2022
*The University of Texas at Austin*
- Developed a computational framework for estimating material parameters in hydrogel media

**Firefly Aerospace, Cedar Park, TX** Summer Intern, — June 2020-Aug 2022
*Guidance, Navigation, and Control Team*
- Worked on simulation of rocket trajectory and optimization of flight parameters

**MD Anderson Cancer Center, Houston TX** Summer Intern, — June 2019-Aug 2019
*Department of Biostatistics*
- Developed statistical models for breast cancer diagnoses based on gene expression data

## Publications

1. J. D. Steinman. Convergence results and a new preconditioner for spectral collocation in time. Master's thesis, Department of Computational Applied Mathematics and Operations Research, Rice University, Houston, TX, 2024

2. A. Javeed, D. P. Kouri, D. Ridzal, and J. D. Steinman. A preconditioner for spectral collocation. Submitted to SIAM Journal on Scientific Computing, 2024

3. A. Javeed, D. P. Kouri, D. Ridzal, I. M. Ross, and J. D. Steinman. Matrix-free linear algebra for trajectory optimization. Submitted to Journal of Guidance, Control, and Dynamics, 2024

4. A. Khang, J. Steinman, R. Tuscher, X. Feng, and M. S. Sacks. Estimation of aortic valve interstitial cell-induced 3d remodeling of poly(ethylene glycol) hydrogel environments using an inverse finite element approach. *Acta Biomaterialia*, 160:123–133, 2023. doi:10.1016/j.actbio.2023.01.043

## Talks and Presentations

1. J. Steinman. A scalable collocation method for trajectory optimization. Presentation, Research Training Group in Numerical Mathematics and Scientific Computing at Rice University Annual Ranch Retreat, 4 May. 2025, Houston, TX

2. J. Steinman. Matrix-free linear algebra for trajectory optimization. Presentation, Lamar University EXPO 2024 Conference, 23 Apr. 2025, Beaumont, TX

3. J. Steinman. Matrix-free linear algebra for trajectory optimization. Presentation, East Coast Optimization Meething (ECOM), 18 Apr. 2025, Arlington, VA

4. J. Steinman. Matrix-free linear algebra for trajectory optimization. Presentation, 2025 SIAM Conference on Computational Science and Engineering (CSE25), 4 Mar. 2025, Fort Worth, TX

5. J. Steinman. A preconditioner for spectral collocation. Poster, 7th Annual Meeting of the SIAM Texas-Louisiana Section, 11 Oct. 2024, Waco, TX

6. J. Steinman. On the convergence of collocation methods for initial value problems. Presentation, Research Training Group in Numerical Mathematics and Scientific Computing at Rice University Annual Ranch Retreat, 20 April 2024, Houston, TX

7. J. Steinman. On the convergence of collocation methods for initial value problems. Presentation, Research Training Group in Numerical Mathematics and Scientific Computing at Rice University Annual Workshop, 8 Oct. 2024, Houston, TX

8. J. Steinman. On the convergence of collocation methods for initial value problems. Presentation, Research Training Group in Numerical Mathematics and Scientific Computing at Rice University Annual Ranch Retreat, 20 April 2024, Houston, TX

9. J. Steinman. Impact of representation of collocation methods on dynamic optimization problems. Poster, 6th Annual Meeting of the SIAM Texas-Louisiana Section, 4 Nov. 2023, Lafayette, LA

10. J. Steinman. Impact of representation of collocation methods on dynamic optimization problems. Poster, Research Training Group in Numerical Mathematics and Scientific Computing at Rice University Annual Workshop, 13 Oct. 2023, Houston, TX

11. J. Steinman, A. Khang, X. Feng, and M. S. Sacks. Simulation of the local mechanical behavior of 3d poly(ethylene glycol) hydrogels for studying cell mechanics. Presentation, Annual Gulf Coast Undergraduate Research Symposiuma at Rice University, Oct. 16, 2021, Houston, TX, 2021

## Honors and Awards

**Best Oral Presentation in Graduate STEM**   April 2025
*Lamar University Spring Expo 2025*

**Ken Kennedy Institute Computational Science and Engineering Recruiting Fellowship**   2022-Present
*Rice University*
- $15,000 awarded over 4 years

**Dr. Hans M. Mark Scholars Endowment in Engineering Honors**   2018-2022
*The University of Texas at Austin*
- $56,000 awarded over 4 years

**H. Bascom Funchess Jr. Scholarship**   2018-2022
*The University of Texas at Austin*
- $12,000 awarded over 4 years

**Distinguished College Scholar** The University of Texas at Austin        2019-2022

**University Honors,** The University of Texas at Austin        2018-2022

**National Merit Scholarship**        2018
- $1,500 award

## Service

**Ranch Retreat Organizer,** Rice University        Jan 2024-April 2024
*Research Training Group (RTG) in Numerical Mathematics and Scientific Computing*
- Organized first annual RTG Ranch Retreat in Houston, TX
- Invited graduate student and postdoctoral speakers from neighboring universities

**Graduate Recruitment Organizer,** Rice University        Feb 2024
*Dept. of Computational Applied Mathematics & Operations Research*
- Organized visit weekends for prospective Ph.D. students

**Academic Coach,** The University of Texas at Austin        Jan 2020-Sep 2020
*Ramshorn Scholar Program*
- Mentored freshmen engineering students and provided supplemental course instruction

**After-School Coach,** Score Athletics, Austin, TX        Jan 2020-May 2020
- Coached after-school sports at elementary schools in under-served communities

## Teaching

**Grader,** Rice University        Aug 2022-Present
*Dept. of Computational Applied Mathematics & Operations Research*
- CMOR 433/533, Spring 2025
- CMOR 431/531, Fall 2024
- CMOR 421/521, Spring 2024
- CMOR 420/520, Fall 2023
- CAAM 336, Fall 2022, Spring 2023

**Academic Tutor,** The University of Texas at Austin        Jan 2020-May 2020
- Calculus, differential equations, physics, chemistry, and other engineering classes

## Skills

**Programming:** Python, C++, Linux, MATLAB, Julia, R, FORTRAN
**Software:** FEniCS, Jax, ParaView, OpenFOAM, SolidWorks, Git, LaTeX, Excel, Word, PowerPoint

## References

Matthias Heinkenschloss, Ph.D.
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(Undergraduate research mentor)