Gabriel H. Brown

gabriel.h.brown@gmail.com // 727-771-3949 // ghbrown.net // GitHub/GitLab: ghbrown

Education

2022 – **present**	PhD in Computational Science, Engineering, and Mathematics Oden Institute, University of Texas at Austin; Austin, TX GPA: 3.97/4.00
2020 – 2022	MS in Theoretical and Applied Mechanics University of Illinois at Urbana-Champaign; Champaign, IL GPA: 3.84/4.00
2016 – 2020	BS in Mechanical Engineering University of Notre Dame; Notre Dame, IN GPA: 3.84/4.00

Research Experience

2023, January – **present**	**Graduate Research Assistant – Well-posedness of Tensor Approximation** Joseph Kileel, Mathematics Department University of Texas at Austin
2024, May – 2024, August	**Research Intern – Extracting Climate Phenomena with Tensors and Optimization** Eric Phipps, Scalable Algorithms Group Sandia National Laboratory
2021, March – 2022, August	**Graduate Research Assistant – Tensor Eigenpairs** Edgar Solomonik, Computer Science Department University of Illinois at Urbana Champaign
2020, June – 2022, May	**Graduate Research Assistant – Tight Binding in Multiscale Modeling of Materials** Harley T. Johnson, Mechanical Science and Engineering Department University of Illinois at Urbana Champaign
2019, May – 2019, August	**Research Intern – Enhancement of Atmospheric Pressure Plasma** Plasma Applications Section, Plasma Physics Division United States Naval Research Laboratory
2017, August – 2020, May	**Undergraduate Research Assistant – Modeling Reaction and Diffusion at Plasma Liquid Interface, Mechanically Actuated Plasma Source, Plasma Catalyst Synergy** David Go, Department of Aerospace and Mechanical Engineering University of Notre Dame
2017, May – 2017, August	**Undergraduate Research Assistant – Beam Target Fabrication** Nuclear Science Laboratory, Department of Physics University of Notre Dame

Leadership, Teaching, and Advising

Fall 2024	Teaching Assistant, CSE392C: Numerical Linear Algebra University of Texas at Austin
	Organizer, Data and Algebra Seminar University of Texas at Austin
Fall 2023	Teaching Assistant, M348: Scientific Computing in Numerical Analysis University of Texas at Austin
2023 – 2025	Student Mentor, Oden Institute University of Texas at Austin
2018 – 2020	Ambassador, Aersopace and Mechanical Engineering Department University of Notre Dame
2018 – 2020 (yearly)	Presenter and Demonstrator, Science Alive! South Bend

Honors and Awards

Argonne Training Program on Extreme Scale Computing, Oden Institute CSEM Fellowship, National Science Foundation Graduate Research Fellowship Honorable Mention, Mechanical Science and Engineering Distinguished Graduate Fellowship, Vincent P. Slatt Research Fellow for Energy Systems and Processes (ND Energy), Tau Beta Pi Member, Pi Tau Sigma Member, Eagle Scout

Skills and Strengths

- scientific computation, numerical analysis, numerical linear algebra, continuous optimization, high performance computing, free and open source software
- Python, Fortran, Chapel, C (some), MPI, OpenMP (some)
- GNU/Linux, bash and shell scripting, Apptainer, virtualization, git, LaTeX
- electronic circuits, imaging and spectroscopy, machining and fabrication, additive manufacturing

Publications

1. **G. H. Brown**, J. Kileel, and T. G. Kolda, "The Fascinating World of $2 \times 2 \times 2$ Tensors: Its Geometry and Optimization Challenges," *arXiv*, 2025.

2. **[Editors' Pick, Cover Art]** M. J. Johnson, **G. H. Brown**, D. R. Boris, T. B. Petrova, and S. G. Walton, "Phase-shifted counterpropagating atmospheric pressure plasma jets: Characterization and interaction with materials," *Journal of Vacuum Science and Technology B*, 2024.

3. M. J. Johnson, **G. H. Brown**, D. R. Boris, T. B. Petrova, and S. G. Walton, "Two Atmospheric Pressure Plasma Jets Driven by Phase-Shifted Voltages: A Method to Control Plasma Properties at the Plasma–Surface Interface," *IEEE Transactions on Plasma Science*, 2022.

4. H. E. Delgado, **G. H. Brown**, D. M. Bartels, P. Rumbach, and D. B. Go, "The scaling of kinetic and transport behaviors in the solution-phase chemistry of a plasma–liquid interface," *Journal of Applied Physics*, 2021.

5. F. A. Herrera, **G. H. Brown**, P. Barboun, N. Turan, P. Mehta, W. F. Schneider, J. C. Hicks, and D. B. Go, "The impact of transition metal catalysts on macroscopic dielectric barrier discharge (DBD) characteristics in an ammonia synthesis plasma catalysis reactor," *Journal of Physics D: Applied Physics*, 2019.

6. D. P. Burdette, M. Brodeur, T. Ahn, J. Allen, D. W. Bardayan, F. D. Becchetti, D. Blankstein, **G. Brown**, B. Frentz, M. R. Hall, S. King, J. J. Kolata, J. Long, K. T. Macon, A. Nelson, P. D. Omalley, C. Seymour, M. Skulski, S. Y. Strauss, and A. A. Valverde, "Resolving the discrepancy in the half-life of ^{20}F," *Physical Review C*, 2019.

7. A. A. Valverde, M. Brodeur, T. Ahn, J. Allen, D. W. Bardayan, F. D. Becchetti, D. Blankstein, **G. Brown**, D. P. Burdette, B. Frentz, G. Gilardy, M. R. Hall, S. King, J. J. Kolata, J. Long, K. T. Macon, A. Nelson, P. D. Omalley, M. Skulski, S. Y. Strauss, and B. V. Kolk, "Precision half-life measurement of ^{11}C: The most precise mirror transition $\mathscr{F}t$ value," *Physical Review C*, 2018.

Presentations

1. **G. H. Brown**, "A geometric perspective on matrix and tensor rank", CSEM Student Forum, University of Texas at Austin, 2025. (talk)

2. **G. H. Brown**, J. Kileel., T. G. Kolda, "Rank geometry for small sized tensors: singularities and nearest point problems", SIAM Texas-Louisiana Sectional Meeting, Baylor University, 2024. (talk)

3. **G. H. Brown**, "Being a responsible open source citizen", CSEM Student Forum, University of Texas at Austin, 2024. (talk)

4. **G. H. Brown**, J. Kileel., T. G. Kolda, "A geometric investigation of ill-posedness for small tensors", ICERM Workshop on Connecting Higher-order Statistics and Symmetric Tensors, Brown University, 2024. (poster)

5. **G. H. Brown**, "The Chapel parallel programming language: a user introduction", CSEM Student Forum, University of Texas at Austin, 2023. (talk)

6. K. Krongchon, N. Ferdous, **G. H. Brown**, E. Ertekin, H. T. Johnson, L. K. Wagner, "Stacking-dependent binding energy of bilayer graphene from quantum Monte Carlo", DOE Energy Frontier Research Center Principal Investigator Meeting, virtual, 2021. (poster)

7. Nathaniel Shaffer, **Gabriel Brown**, et al., "What's new in the Fortran standard library?", FortranCon 2021, virtual, 2021. (talk)

8. **G.H. Brown**, D. B. Go, "Development and Characterization of Plasma Catalytic Reactors", Summer Undergraduate Research Symposium, University of Notre Dame 2018. (poster)

9. **G.H. Brown**, D. B. Go, "Macroscopic Electrical Characterization of a Plasma Catalytic Reactor", NDnano Student Presentations, University of Notre Dame, 2018. (talk)

References

- Joe Kileel, jkileel@math.oden.utexas.edu
- Edgar Solomonik, solomon2@illinois.edu