

Gary K. Nave, Jr.

Postdoctoral Research Associate

D317 JSCBB
3415 Colorado Avenue
Boulder, CO 80303
✉ Gary.Nave@colorado.edu
📧 garynave.com

Current Position

2018-Pres **Postdoctoral Research Associate**, *Biofrontiers Institute*, University of Colorado Boulder.
Supervisor: Orit Peleg

Education

July 2018 **Ph.D. Engineering Mechanics**, *Virginia Tech*, Blacksburg, VA.
Dissertation: Nonlinear models and geometric structure of fluid forcing on moving bodies
Advisors: Shane Ross and Mark Stremler
Committee: Jake Socha, Nicole Abaid, and Craig Woolsey
Preparing the Future Professoriate Graduate Certificate.
This program, developed by Dean Karen DePauw of Virginia Tech, is designed to prepare graduate students for a faculty career. Features coursework on contemporary pedagogical practices and issues in higher education. Additionally, I visited 10 universities in Europe and Ecuador to gain a global perspective in higher education.

2012 **B.S. Engineering Science and Mechanics**, *Virginia Tech*, Blacksburg, VA.
Senior Design: Dispersed sensing through chaotic motion
Minor: Mathematics

Publications and Presentations

Journal Articles

- Nave Jr., Gary K.**, Peter J Nolan, and Shane D Ross (2019). “Trajectory-free approximation of phase space structures using the trajectory divergence rate”. In: *Nonlinear Dynamics* 96.1, pp. 685–702.
- Nave Jr., Gary K.** and Shane D. Ross (2019). “Global phase space structures in a model of passive descent”. In: *Communications in Nonlinear Science and Numerical Simulation* 77, pp. 54 –80.
- Chang, Brian, **Gary K. Nave Jr.**, and Sunghwan Jung (2012). “Drop formation from a wettable nozzle”. In: *Communications in Nonlinear Science and Numerical Simulation* 17.5, pp. 2045–2051.
- Nave Jr., Gary K.** and Mark A. Stremler. “Wake stiffness as a nonlinear spring”. In preparation.
- Nave Jr., Gary K.**, Brock Davis, Katrina Somers, Hope Gruszewski, Shane D. Ross, and David G. Schmale III. “3D-printed maple seeds for atmospheric sensing”. In preparation.

Peer-reviewed Conference Proceedings

- Nave Jr., Gary K.**, Amy L. Hermundstad, Chelsea Corkins, Emily Garner, Jeena R. Jayamon, Mohammed Seyam, Michael Stewart, Michele Waters, and Karen P. DePauw (June 2017). “Global perspectives: graduate students’ experiences with global higher education”. In: The American Society of Engineering Education annual conference. Columbus, Ohio.
- Nave Jr., Gary K.**, Mark Stremmer, and Shane D. Ross (Aug. 2016). “Wake stiffness and its application: oscillating cylinders and flying snakes”. In: *Proceedings of the 24th International Congress on Theoretical and Applied Mechanics (ICTAM)*. Montreal, Canada.

Conference Presentations

- Nave Jr., Gary K.** and Shane D. Ross (Jan. 2018). *Slow manifolds in the aerodynamic descent of animals and plants*. Denver, Colorado: Poster and short talk presented at Dynamics Days 2018.
- Nave Jr., Gary K.** (Nov. 2017). *Understanding gliding flight with the terminal velocity manifold*. Blacksburg, Virginia: Presented at the southeast regional Society of Integrative and Comparative Biology meeting.
- Nave Jr., Gary K.** and Shane D. Ross (May 2017). *Phase space structures in velocity space for gliding and falling bodies*. Mini-symposium: Recent advances in characterization of nonautonomous dynamical transport. Snowbird, Utah: Presented at the Society of Industrial and Applied Mathematics Dynamical Systems Meeting.
- Yeaton, Isaac J., Grant A. Baumgardner, Talia M. Weiss, **Gary K. Nave Jr.**, Shane D. Ross, and John J. Socha (2016). *Snakes in a Cube: high-resolution kinematics of gliding in flying snakes*. Presented at the Society for Integrative and Comparative Biology. Portland, OR.
- Nave Jr., Gary K.** and Mark Stremmer (2015). *Regimes of flow induced vibration for tandem, tethered cylinders*. Presented at the 68th Annual American Physical Society Division of Fluid Dynamics Meeting. Boston, MA.
- Yeaton, Isaac J., Grant A. Baumgardner, Talia M. Weiss, **Gary K. Nave Jr.**, Shane D. Ross, and John J. Socha (2015). *What’s its wave? A 3D analysis of flying snake locomotion*. Presented at the 68th Annual American Physical Society Division of Fluid Dynamics Meeting. Boston, MA.
- Nave Jr., Gary K.**, Tyler Michael, Pavlos Vlachos, and Mark Stremmer (2014). *Flow-induced oscillations of tandem tethered cylinders in a channel flow*. Presented at the 67th Annual American Physical Society Division of Fluid Dynamics Meeting. San Francisco, CA.

Professional Development

Aug. 2019 **Evidence-Based Introduction to Teaching**, Boulder, CO.

This week-long workshop was offered by the Center for the Integration of Research, Teaching, and Learning. In the course, participants learned about active teaching techniques, discussed discipline-based education research, and put new ideas into practice by developing a microteaching module.

- Mar. 2018 **Critical Transitions in Complex Systems Winter School: Mathematical theory and applications**, *Wöltingerode, Germany*.
This event is part of the activities of the “Critical Transitions in Complex Systems” Marie Curie Initial Training Network bringing together scientists in mathematics and applications on progressing the understanding of critical transitions in complex systems ranging from ecology and climate to economic theory. Discussions covered slow-fast systems, stochastic differential equations, and equation-free detection of attracting manifolds.
- June 2017 **SHIFT 21st Century Faculty Institute**, *Blacksburg, VA*.
helped organize and participated in a week-long faculty development program at Virginia Tech with visiting faculty members from Universidad San Francisco de Quito.
- Nov. 2016 **Global Perspectives Program**, *Ecuador*.
The global perspectives program is a selective program run by Dean DePauw of the graduate school at Virginia Tech. Through this program, I was selected as one of five Virginia Tech graduate students to visit Universidad San Francisco de Quito and Escuela Politecnica Nacional to help form partnerships with these universities.
- June 2016 **Global Perspectives Program**, *Switzerland, France, and Italy*.
The global perspectives program is a selective program run by Dean DePauw of the graduate school at Virginia Tech. The program consists of two weeks of visiting higher education institutions primarily in Switzerland. Our group visited a total of 8 universities of varying size and emphasis and had a number of conversations with students, staff, and faculty about the future of higher education in Europe and around the world.
- 2014 **VT KnowledgeWorks Tech Transfer Challenge**, Finalist.
Led a team pitching “Hydrokinetic Energy Systems” that was a finalist in the Tech Transfer Challenge, an entrepreneurial pitch competition for technology transfer from the research lab to the market.
- 2014 **ACC Clean Energy Challenge**, *University of Maryland*, Semi-finalist.
Led a team selected as a semi-finalist in the ACC Clean Energy Challenge, a competition for schools across the Southeast United States. Our project was entitled “enVIV: Energy from Vortex Induced Vibration”
- 2013 **Ambassador Leadership Forum**, *Eastman Chemical Company*.
Facilitated a collaborative partnership between the Virginia Tech College of Engineering and Eastman Chemical Company. As a result of this collaboration, Eastman invited myself and a group of student ambassadors under my supervision to participate in this leadership development forum.

Teaching Experience

Workshops

Introduction to Python

Developed a workshop to provide a basic introduction to programming in Python for fellow postdocs. Available at github.com/gknave/Python_Intro.

L^AT_EX Workshop

Developed a workshop to provide fellow graduate students with an introduction to L^AT_EX, a document preparation software.

Guest Lectures

Dynamics, ESM 2304

I taught two substitute lectures for a sophomore-level dynamics course. The first lecture was an introduction to the impulse-momentum equations and the dynamics of collisions. The second lecture was an introduction to rigid body rotation about a fixed axis and the parallel axis theorem.

Foundations of Engineering II, ENGE 1216

I was a guest lecture on two occasions in the freshman-level foundations of engineering course at Virginia Tech. I discussed the Engineering Science and Mechanics major at Virginia Tech and highlighted my own research and potential opportunities in engineering.

Advanced Dynamics, ESM 6314

Taught a two-lecture series in a PhD-level survey of advanced research in dynamical systems. The lectures provided an introduction to the theory of smooth manifolds, including the tangent bundle, Lie groups and Lie algebras, and their relevance to the study of dynamics.

Mentorship and Advising

Senior Design

Advised a senior design team which built upon my own research. Held regular meetings with the team, advised them on experimental methods, and provided broader context to their research project.

Work Experience

2016-2018 **Graduate Research Assistant**, *BioTrans Program*, Virginia Tech.

Virginia Tech Graduate School funded interdisciplinary research assistantship. Under this funding, I have worked to understand the underlying mechanics of falling and gliding objects, such as animal gliders.

2014-2016 **Graduate Research Assistant**, *MultiSTEPS Program*, Virginia Tech.

NSF-funded interdisciplinary research assistantship focused on material transport at the boundary between biologists and engineers. In the first year of the program, I conducted research projects with 3 different advisors in different fields to develop as an interdisciplinary researcher and took courses in engineering, and biology as well as interdisciplinary grant writing.

2012-2014 **Director of Undergraduate Recruiting**, *College of Engineering*, Virginia Tech.

Coordinated all recruiting activities for the College of Engineering. Led the Dean's Team, a group of 38 undergraduate students who aid in recruiting activities. Planned and coordinated annual Engineering Open House for over 1,000 visitors each year. Presented daily to prospective undergraduate students.

Service

2019-Pres **Executive Board Member**, Postdoctoral Association of Colorado (PAC) Boulder

2016-2018 **Founder and President**, Graduate Engineering Mechanics Society

2017 **Director of Programs**, Graduate Student Assembly (GSA)

2016-2017 **Mentor**, Virginia Tech Early Engineering Mentoring Program

2016 **Funding Programs Chair**, Graduate Student Assembly (GSA)

2015-2017 **Mentor**, Graduate Undergraduate Mentoring Program

2014-2017 **Delegate**, Graduate Student Assembly

- 2015-2016 **Member**, GSA Committee on Graduate Inclusion and Diversity Policies
2015 **Member**, Virginia Tech Graduate Student of the Year Selection Committee
2014-2015 **Advisor**, Undergraduate Senior Design team
2012-2016 **Mentor**, Student Transition to Engineering Program

Awards & Recognition

- 2018 Dynamics Days 2018 Student Travel Award
2017 **Virginia Tech Outstanding Graduate Student Leader.**
Nominated by the faculty of my department and peers and was selected to win this award through the Virginia Tech University Student Leader Awards. Granted on the basis of my leadership through organization and service to the University community.
2017 SIAM Student Travel Award
2014 NSF IGERT traineeship, MultiSTEPS
2014 Virginia Tech College of Engineering Outstanding M.S. Student
2014 Manuel Stein Scholarship
2010 Ken and Loretta Reifsneider Scholarship