

Gary K. Nave, Jr.

Ph.D. Candidate, Engineering Mechanics

310 Norris Hall
495 Old Turner St.
Blacksburg, VA 24061
✉ gknave@vt.edu
📧 garynave.com

Education

- July 2018 **Ph.D. Engineering Mechanics**, *Virginia Tech*, Blacksburg, VA.
Dissertation: Models of fluid-structure interaction and related phase space structures
Advisors: Shane Ross and Mark Stremler
Committee: Jake Socha, Nicole Abaid, and Craig Woolsey
Graduate Certificate: Preparing the Future Professoriate
- 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

- 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 Shane Ross. “Trajectory-free calculation of attracting and repelling manifolds”. In preparation. Pre-print on arXiv:1705.07949.
- Nave Jr., Gary K.** and Shane D. Ross. “Phase space structures for gliding and falling bodies”. In preparation.
- 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.

Conference Papers

- Nave Jr., Gary K.**, Amy L. Hermundstad, Chelsea Corkins, Emily Garner, Jeena R. Jayamon, Mohammed Seyam, Michael Stewart, Michele Waters, and Karen P. De-Pauw (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 Stremler, and Shane D. Ross (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 (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.** (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 (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.

Work Experience

- 2016-Pres **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, students conduct research projects with 3 different advisors in different fields to grow as interdisciplinary researchers, in addition to taking coursework in engineering, biology, and interdisciplinary grant writing. My research rotations were with Tess Thompson (Biological Systems Engineering), Shane Ross (Engineering Mechanics), and Jake Socha (Engineering Mechanics)
- 2012-2014 **Director of Undergraduate Recruiting**, *College of Engineering*, Virginia Tech.
Responsibilities: 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.
- 2011 **Project Manager**, *Project SPY*, Christiansburg, VA.
Responsibilities: Coordinated volunteer construction projects with middle/high school students. Inspected homes. Prepared Documentation for projects. Oversaw/trained students and adult leaders. Total of 43 projects in 7 weeks.

Teaching Experience

I have not yet had the opportunity to teach a full course. However, I have taught guest lectures in the following courses, including preparing the lecture myself.

Advanced Dynamics, ESM 6314

In this PhD-level survey of advanced research in dynamical systems, I was asked to give a series of 2 lectures as 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.

Dynamics, ESM 2304

I taught 2 substitute lectures on behalf of my advisor 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 able to guest lecture on two occasions in the freshman-level foundations of engineering course at Virginia Tech. On both occasions, the instructors asked me to come and discuss the Engineering Science and Mechanics major at Virginia Tech and highlight my current work, so students could have a better idea of what an engineer might do.

Professional Development

June 2017 **SHIFT 21st Century Faculty Institute.**

Was a member of a team that helped organize and participate 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 **VTKnowledgeWorks Tech Transfer Challenge, Finalist.**

In 2014, I led a team that was a finalist in the Tech Transfer Challenge, an entrepreneurial pitch competition for technology transfer from the research lab to the market. Our team name was “Hydrokinetic Energy Systems”

2014 **ACC Clean Energy Challenge, University of Maryland, Semi-finalist.**

The ACC Clean Energy Challenge was a competition for 12 schools in the Southeast United States. One team from each school with a technology based on clean energy was chosen as a semi-finalist. Our project was entitled “enVIV: Energy from Vortex Induced Vibration”

2013 **Ambassador Leadership Forum, Eastman Chemical Company.**

Eastman Chemical Company paid to host the Virginia Tech College of Engineering Dean’s Team, which I directed, for a two day leadership training event.

Awards & Recognition

- 2018 Dynamics Days 2018 Student Travel Award
- 2017 SIAM Student Travel Award
- 2017 Virginia Tech Outstanding Graduate Student Leader
- 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

Service

- 2016-Pres **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)
- 2015-2016 **Member**, GSA Committee on Graduate Inclusion and Diversity Policies
- 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