

DANIEL B. QUINN

703 · 489 · 9016 ◊ danquinn@virginia.edu
122 Engineer's Way ◊ Charlottesville, VA 22903
danbquinn.com ◊ [Link to Google Scholar](#)

Research interests: fluid-structure interactions, biomechanics, autonomous vehicles, energy harvesting, aeroacoustics, interfacial flows, cyber-physical systems, motor-learning, propulsor wakes.

APPOINTMENTS

Assistant Professor 2016 - Present

University of Virginia, Charlottesville, VA

Departments of Mechanical and Aerospace Engineering, Electrical and Computer Engineering

- Leading an experimental fluid dynamics lab that studies smart fluidic systems such as autonomous vehicles and adaptive energy harvesters. The lab is part of the Link Lab, a multi-departmental initiative to study the applications of Cyber-Physical Systems.

Postdoctoral Researcher 2015 - 2016

Stanford University, Stanford, CA

Department of Mechanical Engineering

- Worked with Professor David Lentink in the [Fluids & Robotics Lab](#), using a closed-loop turbulence generation system to study the maneuvers of birds and UAVs in the presence of gusts.

Research Assistant 2012 - 2015

Princeton University, Princeton, NJ

Department of Mechanical and Aerospace Engineering

- Worked with Professor Lex Smits to study flexible propulsor design, including the creation of scaling laws and closed-loop search algorithms to optimize swimming efficiency.

Visiting Fellow 2012 - 2014

Harvard University, Cambridge, MA

Department of Organismal and Evolutionary Biology

- Worked with Professor George Lauder in the [Lauder Lab](#), studying the roles of flexibility and ground effect in the swimming efficiency of rays and skates.

EDUCATION

Princeton University

Ph.D. in Mechanical and Aerospace Engineering 2015

[Teaching Transcript](#) 2014

M.A. in Mechanical and Aerospace Engineering 2012

University of Virginia, Charlottesville

B.S. in Aerospace Engineering 2010

Thomas Jefferson High School for Science and Technology 2006

AWARDS

- Andreas Acrivos Dissertation Award in Fluid Dynamics; 2016
- Khan Academy Talent Search Winner; 2015
- Emerging Alumni Scholar (Princeton); 2014
- 1st Place at Princeton MAE Research Day; 2013
- NSF GFRP Honorable Mention; 2011
- Francis Upton Fellow (Princeton); 2010
- SEAS Outstanding Student Award (UVA); 2010
- Rodman Scholar (UVA); 2009

PUBLICATIONS

- Van Buren, T., Floryan, D., Quinn, D.B., & Smits, A.J. 2017. Nonsinusoidal gaits for unsteady propulsion. *Physical Review Fluids*. **2**, 053101.
- Quinn, D.B., Watts, A., Nagle, T., & Lentink, D. 2017. A new low-turbulence wind tunnel for animal and small vehicle flight experiments. *Royal Society Open Science*. **4.3**, 160960.
- Gutierrez, E., Quinn, D.B., Chin, D.D., & Lentink, D. 2016. Lift calculations based on accepted wake models for animal flight are inconsistent and sensitive to vortex dynamics. *Bioinspiration and Biomimetics*. **12** (1), 016004.
- Quinn, D.B., & Rosenberg, B.J. 2015. Inverted glass harp. *Physical Review E*. **92** (2), 021003.
- Quinn, D.B., Lauder, G.V., & Smits, A.J. 2015. Maximizing the efficiency of a flexible propulsor using experimental optimization. *Journal of Fluid Mechanics*. **767**, 430-448.
- Quinn, D.B. 2015. Optimizing the efficiency of batoid-inspired swimming (Doctoral dissertation). Department of Mechanical & Aerospace Engineering, Princeton University. T-3295.
- Quinn, D.B., Lauder, G.V., & Smits, A.J. 2014. Scaling the propulsive performance of heaving flexible panels. *Journal of Fluid Mechanics*. **738**, 250-267.
- Quinn, D.B., Moored, K.W., Dewey, P.A., & Smits, A.J. 2014. Unsteady propulsion near a solid boundary. *Journal of Fluid Mechanics*. **742**, 152-170.
- Quinn, D.B., Lauder, G.V., & Smits, A.J. 2014. Flexible propulsors in ground effect. *Bioinspiration and Biomimetics*. **9** (036008).
- Dewey, P.A., Quinn, D.B., Boschitsch, B.M., & Smits, A.J. 2014. Propulsive performance of unsteady tandem hydrofoils in a side-by-side configuration. *Physics of Fluids*. **26** (041903).
- Quinn, D.B., Feng, J., & Stone, H.A. 2013. Analytical model for the deformation of a fluid-fluid interface beneath an AFM probe. *Langmuir*. **29** (5), 1427-1434.

TEACHING AND ADVISING

Classes

- Fluid Mechanics I (MAE6310, Graduate Level)
University of Virginia; 2017
- *Guest Lecturer* (3 lectures) for Intro to Fluid Mechanics (ME70, Undergraduate Level)
Stanford University; 2015
- *Guest Lecturer* (2 lectures) for Biomechanics of Flight (ME303, Graduate Level)
Stanford University; 2015, 2016
- *Assistant Instructor* for Ordinary Differential Equations (MAE305, Undergraduate Level)
Princeton University; 2014
- *Assistant Instructor* for Viscous Flows and Boundary Layers (MAE552, Graduate Level)
Princeton University; 2013
- *Assistant Instructor* for Intro to Fluid Mechanics (MAE335, Undergraduate Level)
Princeton University; 2012

Student Advising/Mentoring

- *Master's Thesis Committee Chair* for [Vishaal Saraiya](#), Graduate Student, University of Virginia; 2017
- *PhD Thesis Committee Member* for [David Barnes](#), Graduate Student, University of Virginia; 2017
- *Master's Thesis Committee Chair* for [Gregory Lewis](#), Graduate Student, University of Virginia; 2017
- *Advisor* for [Arman Mottaghi](#), Undergraduate Researcher, University of Virginia; 2017-present
- *Postdoctorate Mentor & Master's Thesis Committee Member* for [Sofia Minano](#), Visiting Student Researcher, Stanford University; 2016
- *Postdoctorate Mentor* for [Eric Gutierrez](#), Graduate Student, Stanford University; 2015-2016
- *Postdoctorate Mentor* for [Yous van Halder](#), Visiting Researcher, Eindhoven University of Technology; 2015
- *Graduate Mentor* for [Oliver Badaoui](#), Visiting Researcher, University of Glasgow; 2013-2014
- *Graduate Mentor* for [Stefano Chiazza](#), Visiting Researcher, Institut Suprieur de l'Aronautique et de l'Espace; 2013
- *Graduate Mentor* for [Florian Bremer](#), Visiting Researcher, Technische Universität; 2013
- *Graduate Mentor* for [Caden Ohlwiler](#), Undergraduate Student, Princeton University; 2012
- *Graduate Mentor* for [Katherine Bedkowski](#), Undergraduate Student, Princeton University; 2012

ACADEMIC SERVICE

Professional Societies

- Society for Integrative and Comparative Biology; 2015-2016
- American Physical Society; 2012-present
- Raven Society (UVA High Honor Society); 2010-present
- Tau Beta Pi (Engineering Honor Society); 2008-2010
- Sigma Gamma Tau (Aerospace Honor Society); 2008-2010

Peer review

- *Referee* for Journal of Fluid Mechanics; 2014, 2015, 2016, 2017
- *Referee* for The American Institute of Aeronautics and Astronautics (AIAA) Journal; 2016, 2017
- *Referee* for Bio-inspiration for Marine Technologies; 2016
- *Referee* for The Journal of Fluids Engineering; 2016
- *Referee* for Aerospace; 2016
- *Referee* for Bioinspiration and Biomimetics; 2014, 2016, 2017
- *Referee* for Journal of Fluids and Structures; 2015
- *Referee* for Ships and Offshore Structures; 2014

COMMUNITY OUTREACH

Educational Video Producer

2006-present

YouTube

Web-based

- Writing, directing, and editing short videos that explain fluid dynamics to a general audience; videos have received over 300,000 views and have been featured on [National Public Radio](#), [TedEd](#), and [Khan Academy](#).

Co-Founder

2013, 2014, 2015

Harlem Prep to Princeton

Princeton, NJ

- Organized a now annual field trip for Harlem Prep 4th graders in which students participate in lab demos in the Princeton MAE department.

Selection Committee Member

2015

Breakthrough Junior Challenge

Web-based

- Scored and commented on dozens of educational videos written and produced by students, ages 13-18, as part of an international contest promoting science and math education.

Co-Founder

2013

Art of Science Video

Princeton, NJ

- Organized a contest where Princeton students and local high-schoolers submitted artistic videos stumbled upon during the course of scientific research.

- Reviewed interactive modules that became part of an undergraduate online physics textbook.

SELECTED PRESENTATIONS

Invited Seminars

- Quinn, D.B. Hints from nature: four ways animals could guide the design of advanced vehicles. Virginia Technical Institute, Blacksburg, VA. March, 2017.
- Quinn, D.B. How flexibility and dynamic ground effect could improve bio-inspired propulsion. Am. Phys. Soc. Div. of Fluid Dyn., Portland, OR. November 2016.
- Quinn, D.B. Flexibility, dynamic ground effect, & head stabilization: three tips for bio-inspired vehicles. Institute of Mechanics, Chinese Academy of Sciences, Beijing, China. November 2016.
- Quinn, D.B. Flexibility, dynamic ground effect, & head stabilization: three tips for bio-inspired vehicles. Hong Kong University of Science and Technology, Hong Kong. November 2016.
- Quinn, D.B. The future of smart fluidic systems. University of Virginia, Charlottesville, VA. March 2016.
- Quinn, D.B., Kress, D., & Lentink, D. How body size affects head stabilization in flying birds. Soc. for Exp. Bio., Brighton, UK. July 2016.
- Quinn, D.B., Smits, A.J., & Lauder, G.V. Effects of flexibility in swimming. Winter Workshop on Locomotion. New Orleans, LA. January 2013.

Conference Talks

- Lentink, D. & Quinn, D.B. From quiet laminar flow to turbulent gusts: A new wind tunnel for studying animal flight performance and control. Soc. for Int. & Comp. Bio., New Orleans, LA. January 2017. Abstract: 97-5.
- Quinn, D.B., Lauder, G.V. & Smits, A.J. Maximizing the efficiency of a flexible propulsor using experimental optimization. Am. Phys. Soc. Div. of Fluid Dyn., San Francisco, CA. November 2014. Abstract: R6.00009.
- Quinn, D.B., Lauder, G.V. & Smits, A.J. Scaling the hydrodynamic performance of heaving flexible panels. Am. Phys. Soc. Div. of Fluid Dyn., Pittsburgh, PA. November 2013. Abstract: G17.00004.
- Badaoui, O.J., Quinn, D.B., Dewey, P.A., & Smits, A.J. Investigating the relationship between planform and performance in bio-inspired aquatic propulsion. Am. Phys. Soc. Div. of Fluid Dyn., Pittsburgh, PA. November 2013. Abstract: G18.009.
- Moored, K.W., Quinn, D.B., Dewey, P.A., & Smits, A.J. Unsteady propulsors in ground effect. Am. Phys. Soc. Div. of Fluid Dyn., Pittsburgh, PA. November 2013. Abstract: R26.007.

- Dewey, P.A., Moored, K.W., Quinn, D.B., & Smits, A.J. Hydrodynamics of foils swimming in a side-by-side configuration. Am. Phys. Soc. Div. of Fluid Dyn., Pittsburgh, PA. November 2013. Abstract: G17.006.
- Quinn, D.B., Moored, K.M., Dewey, P.A., Lauder, G.V. & Smits, A.J. Swimming near the wall. Am. Phys. Soc. Div. of Fluid Dyn., San Diego, CA. November 2012. Abstract: G15.00004.
- Dewey, P.A., Moored, K.W., Quinn, D.B., & Smits, A.J. Identifying optimal vortex spacing for swimming and flying animals. Am. Phys. Soc. Div. of Fluid Dyn., Baltimore, MD. November 2011. Abstract: G28.004.
- Quinn, D.B., Dewey, P.A., Moored, K.M., & Smits, A.J. Benefits of unsteady swimming near a wall. Am. Phys. Soc. Div. of Fluid Dyn., Baltimore, MD. November 2011. Abstract: H28.00002.
- Quinn, D.B., Rein-Weston, D., Dewey, P.A., Green, M., & Smits, A.J. Propulsive performance of oscillating batoid-inspired fins. Am. Phys. Soc. Div. of Fluid Dyn., Minneapolis, MN. November 2009. Abstract: BV.00007.

Conference Posters

- Quinn, D.B., Watts, A., Nagle, T., & Lentink, D. A new wind tunnel for studying animal flight performance and control (Poster) Gordon Research Conference: The Development of an Animal Movement Paradigm. Ventura, CA. March 2017.
- Quinn, D.B. & Lentink, D. Inferring forces from kinematics in animal locomotion (Poster). Soc. for Int. & Comp. Bio., Portland, OR. January 2016. Abstract: 1356-641107.

Competitive Talks

- Quinn, D.B. & Smits, A.J. Swimming near the bottom of the pool. Princeton MAE Research Day. Princeton, NJ. September 2013.

Review Meetings

- Quinn, D.B., Dewey, P.A., Moored, K.W., Lauder, G.V., & Smits, A.J. Thrust and efficiency for flexible propulsors: ground effect and fin interactions. ONR MURI. Program Manager: Bob Brizzolara. Arlington, VA. October 2013.
- Quinn, D.B., Lauder, G.V., Moored, K.W., Dewey, P.A., & Smits, A.J. Scaling the performance of flexible heaving panels. 1000 Islands Fluid Dyn. Meeting. Gananoque, Ontario. April 2013.
- Quinn, D.B., Lauder, G.V., Moored, K.W., Dewey, P.A., & Smits, A.J. Scaling the performance of flexible heaving panels. ONR MURI. Program Manager: Bob Brizzolara. Arlington, VA. April 2013.
- Quinn, D.B., Dewey, P.A., Moored, K.W., & Smits, A.J. Unsteady propulsors near walls and with passive flexibility. ONR MURI. Program Manager: Bob Brizzolara. Blacksburg, VA. April 2012.
- Quinn, D.B., Moored, K.W., Dewey, P.A. & Smits, A.J. Unsteady propulsors in ground effect. 1000 Islands Fluid Dyn. Meeting. Gananoque, Ontario. April 2012.

- Quinn, D.B., Dewey, P.A., Moored, K.W., & Smits, A.J. Swimming near boundaries. ONR MURI. Program Manager: Bob Brizzolara. Carderock, MD. October 2011.
- Quinn, D.B. & Smits, A.J. Near-wall effects on oscillating fins. 1000 Islands Fluid Dyn. Meeting. Gananoque, Ontario. April 2011.

MEDIA COVERAGE

- “Flying in Place”; May 4, 2016; Slate Magazine
<http://www.slate.com/articles/video/video/2016/05/...>
- “Stanford scientists are using a bird treadmill to improve drones”; Apr 26, 2016; Observer
<http://observer.com/2016/04/stanford-scientists-are-using-a-bird-treadmill-to-improve-drones/>
- “The Inverted Glass Harp”; Oct 15, 2015; The Kid Should See This
<http://thekidshouldseethis.com/post/the-inverted-glass-harp>
- “The Inverted Glass Harp”; Sep 16, 2015; Fuck Yeah Fluid Dynamics
<http://fuckyeahfluidynamics.tumblr.com/post/129216945630/...>
- “Make Your Own ‘Inverted’ Glass Harp with Just One Glass”; Sep 1, 2015; Gizmodo
<http://gizmodo.com/make-your-own-inverted-glass-harp...>
- “Physicist discovers wine glass in water is an even better instrument than water in wine glass”; Aug 27, 2015; The Independent
<http://www.independent.co.uk/arts-entertainment/music/news/...>
- “Submerge a wine glass in water to make ‘inverted harp of glass’”; Aug 26, 2015; New Scientist Magazine
<https://www.newscientist.com/article/dn28089-submerge-a-wine-glass...>
- “Why Is My Wine Crying?”; Apr 29, 2015; Drink Wine with Dinner
<http://rosinawilson.com/wine-tears-apr-2015/>
- “Podcast: Wine Physics”; Apr 22, 2015; Physics Buzz
<http://physicsbuzz.physicscentral.com/2015/04/podcast-wine-physics.html>
- “Life with Wine: ”Why Does Wine Cry?”; Sep. 8, 2014; Bottlenotes
<http://www.bottlenotes.com/the-daily-sip/wine-tips/science-of-wine-legs-september-2014>
- “The wonder of fungus, dirt and parasites: Exhibition showcases stunning scientific photographs and animations”; Jul 30, 2014; Daily Mail
<http://www.dailymail.co.uk/sciencetech/article-2709388/...>
- “Princeton launches Art of Science 2014 online galleries”; Jul 29, 2014; Princeton Art of Science
<http://artofsci.princeton.edu/princeton-launches-art-of-science-2014-online-galleries/>
- “Crying In Your Glass”; May 12, 2014; Winemaker Magazine
- “Watch: Why Does Wine Cry?”; Nov 15, 2013; Vinepair
<http://vinepair.com/wine-blog/wine-cry/>
- “Wine Crying Shouldnt Make You Cry”; Nov 15, 2013; Nontrivial Problems
<https://nontrivialproblems.wordpress.com/2013/11/15/wine-crying...>

- “My Wine Won’t Stop Crying – A Mystery In A Wineglass”; Nov. 14, 2013; Radio Lab on National Public Radio
<http://www.npr.org/sections/krulwich/2013/11/12/244796108/my-wine...>
- “Wine Snobs: Justified by Science, Sort Of”; Nov. 14, 2013; The Atlantic
<http://www.theatlantic.com/technology/archive/2013/11/wine-snobs...>
- “Why does wine cry?”; Nov. 7, 2013; Princeton Engineering Facebook Page
<https://www.facebook.com/princetonengineering/posts/10152066713269954>
- “Art Competition Shows Off the Unexpected Beauty of Science”; Jun 8, 2013; Wired
<http://www.wired.com/2013/06/art-of-science/>
- “Princeton University Celebrates the Art of Science”; May 21, 2013; The Smithsonian
<http://www.smithsonianmag.com/science-nature/princeton...>
- “Time-Lapse Legs of Wine”; Apr 24, 2013; Fuck Yeah Fluid Dynamics
<http://fuckyeahfluidynamics.tumblr.com/post/48776241662/...>