

## Research experience

[4/2014 - Present] **Graduate Research Assistant**, Pattern Formation and Control Lab, Georgia Institute of Technology (Georgia Tech).

Duties: Designed and built fluid experiment that incorporated a home built time resolved volumetric velocimetry. The data was analyzed using Shake-The-Box and compared to numerically computed invariant solutions to the Navier-Stokes equations via custom MATLAB and Python codes.

[3/2007 - 7/2013] **Researcher**, Fluid Metrology Group, National Institute of Standards and Technology (NIST).

Duties: Develop physical models and uncertainty analysis for primary flow standards, design and perform experiments in the wind tunnel facility, maintained both liquid and air flow primary standard, and perform calibrations of customer transfer standards

## Education

[2020](expected) **Ph.D. in physics**, Georgia Institute of Technology

Thesis topic: *The role of coherent structures in fluid turbulence*  
Minor in Mechanical Engineering

[2015] **M.S in physics**, Georgia Institute of Technology

[2013] **B.S. in physics**, University of Maryland

Minor in Philosophy (1 class short of a double major)

## Service

### Professional

[2014 - 2017] **Founding President**, Graduate Association of Physicists at Georgia Tech (held 12 events)

An organization that provides career development opportunities to physics PhD students, particularly those who do not intend on staying in academia after completing their PhD.

### Community

[2015 and 2016] **Lead organizer**, Science of Beer

A community science outreach event hosted with more than 350 participants at SweetWater Brewing Company in conjunction with the Atlanta Science Festival.

[2008 - 2011] **Lead organizer**, A free indoor soccer league

This indoor league held on Friday nights provided an alternative to the partying lifestyle for high school and college age kids

## Additional skills

Instrumentation	Tomographic PIV	3D particle tracking	Nonlinear Dynamics	Fluid Turbulence	Calibration
Public speaking	Experimental design	Machine shop	Python	LabVIEW	MATLAB

# Publications

## Peer Reviewed Publications

1. *A novel subcritical transition to turbulence in Taylor-Couette flow with counter-rotating cylinders* Christopher J. Crowley, Michael C Krygier, Daniel Borrero-Echeverry, Roman O Grigoriev, Michael F Schatz. *Journal of Fluid Mechanics* (accepted)
2. *The effect of turbulence on a multi-hole Pitot calibration.* Christopher J. Crowley, Iosif I. Shinder, Michael R. Moldover. *Flow Measurement and Instrumentation* 33, October 2013, Pages 106-109, ISSN 0955-5986.
3. *Improvements to NISTs air speed calibration service.* Iosif I. Shinder, Christopher J. Crowley, B. James Filla, Michael R. Moldover. *Flow Measurement and Instrumentation* 44, August 2015, Pages 1926.
4. *Uncertainty Analysis of NISTs 20 L Hydrocarbon Liquid Flow Standard.* Johnson AN, Crowley CJ, Yeh TT. *Journal of the Metrology Society of India*, 2011 Pages 187202.
5. *Rheoscopic fluids in a post-Kalliroscope world.* Daniel Borrero-Echeverry, Christopher J. Crowley, and Tyler P. Riddick. *Physics of Fluids* 30, 087103 (2018)
6. *Isosbestic point in optical mapping; theoretical and experimental determination with Di-4-ANBDQPQ transmembrane voltage sensitive dye.* Ilija Uzelac, Christopher J. Crowley, Flavio H. Fenton. *Computing in Cardiology*, 2019, Singapore.

## Conference Papers

1. *Calibrations of Multi-holed Pitot Tubes Depend on Turbulence.* I. I. Shinder, C. J. Crowley, M. R. Moldover. Proceeding of the Measurement Science Conference 2012, Pasadena, California.
2. *Improvements To NISTs Air Speed Calibration Service.* Iosif I. Shinder, Christopher J. Crowley, B. James Filla, Michael R. Moldover. Proceeding of the Flomeko 2013, Paris, France.
3. *Design and Capabilities of NISTs Scale-Model Smokestack Simulator (SMSS).* Aaron N. Johnson, Joey T. Boyd, Eric Harman, Mohammad M. Khalil, Jacob E. Ricker, Christopher J. Crowley, Rodney A. Bryant, Iosif I. Shinder. Proceeding of the 9th International Symposium on Fluid Flow Measurement, Arlington, VA, 2015.
4. *NISTs Fully Dynamic Gravimetric Liquid Flowmeter Standard.* Jodie G. Pope, Aaron N. Johnson, James B. Filla, Joey T. Boyd, Christopher J. Crowley, and Vernon E. Bean. Proceeding of the International Symposium on Fluid Flow Measurement, Arlington, VA, 2015.
5. *Computer Simulation for Flow Hysteresis during Multi-hole Pitot Tube Calibration.* Hsin-Hung Lee, Iosif I. Shinder, Christopher J. Crowley, John D. Wright, Michael R. Moldover. Proceeding of the 20th National Computational Fluid Dynamics Conference 2013, Nantou, Taiwan.
6. *Removing the Hydrocarbon Liquid from Hydrocarbon liquid Flow Standards.* Jodie G. Pope, Christopher Crowley. Proceedings of the 16th International Flow Measurement Conference FLOMEKO, 2013.
7. *Improved Nozzle Manifold for Gas Flow Calibrations.* Aaron N. Johnson, Chunhui Li, John D. Wright, Gina M. Kline, and Chris J. Crowley. Proceeding of the International Symposium on Fluid Flow Measurement, Colorado Springs, CO, 2012.

## Other Types of Publications

1. *Liquid Flow Meter Calibrations with the 0.1 L/s and 2.5 L/s Piston Provers.* Jodie G. Pope, John D. Wright, Aaron N. Johnson, Christopher J. Crowley. NIST Special Publication 250-1039r1.
2. *A Comparison of 12 US Liquid Hydrocarbon Flow Standards and the Transition to Safer Calibration Liquids.* John Wright, Aaron Johnson, Gina Kline, Chris Crowley, *et al.* Cal Lab 2012; 19-2:30-38.

## Talks

- *Experimental evidence of exact coherent structures in small-aspect-ratio Taylor-Couette flow*, APS - Division of Fluid Dynamics 2019, Seattle, Washington.
- *Experimental search for exact coherent structures in turbulent small-aspect-ratio Taylor-Couette flow*, APS - Division of Fluid Dynamics 2018, Atlanta, Georgia.
- *Understanding transitional turbulence with the aid of Exact Coherent Structures*, Invited talk at NIST, Gaithersburg, MD on May 15 2017.
- *The transition into turbulence in a rotating flow*, Georgia Tech Physics Forum on April 14 2017.
- *Rheoscopic fluids in a post-Kalliroscope world*, APS - Division of Fluid Dynamics 2016, Portland, Oregon.
- *Experimental and numerical study of direct laminar-turbulent transition in Taylor-Couette flow*, APS - Division of Fluid Dynamics 2016, Portland, Oregon.
- *Direct laminar-turbulent transition in counter-rotating Taylor-Couette flow: experiments and simulations*, Bifurcations and Instabilities in Fluid Dynamics 2015, Paris, France.
- *Experimental observations of direct laminar-turbulent transition in counter-rotating Taylor-Couette flow*, International Couette-Taylor Workshop 2015, Cottbus, Germany
- *A dynamical systems approach to understanding fluid turbulence*, Invited talk at NIST, Gaithersburg, MD on May 1 2015.
- *Experimental observations of direct laminar-turbulent transition in counter-rotating Taylor-Couette flow*, APS - Division of Fluid Dynamics 2015, Boston, Massachusetts.
- *Direct laminar-turbulent transition in Taylor-Couette flow: Experiments and simulations*, APS - Division of Fluid Dynamics 2014, San Francisco, California.
- *From SI to Customer Instrument. Practical Aspects of NIST Airspeed Calibration Traceability*, Measurement Science Conference 2013, Pasadena, California.

## Teaching Experience

**2015** Workshop Instructor, United Nations Abdus Salam International Center for Theoretical Physics (ICTP), Trieste, Italy.

Hands-On Research in Complex Systems School

Duties: Design lesson plan, generate instructional materials, lead a hands on lab session.

**2013-2014** Teaching Assistant, Georgia Tech

Phys 2211 Intro Physics I

Duties: lead a weekly recitation, held office hours, graded assignments

Phys 2212 Intro Physics II

Duties: lead a weekly lab class, held office hours, graded assignments

**2012** Workshop Instructor, National Institute of Standards and Technology (NIST) Summer Institute for high school teachers, Gaithersburg MD

Duties: Designed lesson plan, generated instructional materials, lead a hands on lab session.

## Memberships and Committees

- Graduate Association of Physicists, Founding President
- American Physical Society
- American Association for the Advancement of Science