John Farnsworth | Assistant Professor

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http://www.colorado.edu/lab/experimentalaerodynamics

Research Interests

Experimental Fluid Mechanics and Aerodynamics · Flow Control · Unsteady Aerodynamics · Fluid-Structure Interaction · Experimental Techniques and Flow Visualization (e.g. Particle Image Velocimetry)· Renewable Energy Applications (e.g. Wind Turbines, Wave Energy Converters, etc.) · Nature Inspired Fluid Flow (e.g. Biological Flight, Geophysical Flows, etc.) · Collaborative Experiments and Computational Simulations

Education

Rensselaer Polytechnic Institute **Troy, NY**
Ph.D. Aeronautical Engineering *2008–2011*

Rensselaer Polytechnic Institute **Troy, NY**
M.S. Aeronautical Engineering *2006–2007*

Rensselaer Polytechnic Institute **Troy, NY**
B.S. Aeronautical and Mechanical Engineering, Magna Cum Laude *2002–2006*

Professional Experience

University of Colorado at Boulder **Boulder,CO**
Assistant Professor *2014–Present*
Aerospace Engineering Sciences Department

United States Air Force Academy **USAF Academy, CO**
Visiting Post-Doctoral Researcher *2011–2014*
Department of Aeronautics, Aeronautics Research Center

Rensselaer Polytechnic Institute **Troy, NY**
Department of Mechanical, Aerospace, and Nuclear Engineering *2002–2011*
- Research Assistant, Flow Control Research Laboratory, 2008 – 2011
- Teaching Assistant, 2006 – 2007
- Undergraduate Research Assistant, Flow Control Research Laboratory, 2004 – 2006

Naval Undersea Warfare Center **Newport, RI**
Summer Graduate NREIP Intern *2008,2009,2010*
Vehicle Dynamics and Signature Control Branch

NASA Langley Research Center **Hampton, VA**
Summer Research Scholar *2006*
Aerodynamic Configurations Branch

Teaching Experience

University of Colorado at Boulder

Intro. Thermo. and Aero. (ASEN 2002): U-Grad Course, Instructor	*F2015, F2016, F2017*
Senior Projects I (ASEN 4018): U-Grad Course, Project Adviser	*F2014,S2015*
Senior Projects II (ASEN 4028): U-Grad Course, Project Adviser	*F2014,S2015*
Fluid Mechanics (ASEN 5051): Grad Course, Instructor	*F2014*
Exp. Fluid Mechanics (ASEN 6519): Grad Course, Instructor	*S2016*
Flow Control (ASEN 6519): Grad Course, Instructor	*S2018*

United States Air Force Academy

Aeronautical Laboratory (AE 471): Research Project Lead	*F2011-S2014*

Rensselaer Polytechnic Institute

Fluid Dynamics Laboratory: Undergraduate Course,Teaching Assistant	*F2006, S2007, F2007*
Engineering Graphics and CAD: Undergraduate Course,Teaching Assistant	*S2006*

Sponsored Research Activities

1. **"Unsteady Wind Tunnel Modifications for the Study of Convective Longitudinal Gusts,"** Innovative Seed Grant Program, Research & Innovations Office, University of Colorado Boulder, $49,976; 07/01/2017 – 06/30/2018, PI: John Farnsworth.
2. **"Flow Control for Flexible Structures,"**, United States Air Force Academy, $86,045; 9/26/2014-5/31/2017, Cooperative Agreement FA7000-14-2-0018; PI: John Farnsworth.
3. **"Numerical Simulations of Unsteady Aerodynamics Using High Performance Computing Resources,"** United States Air Force Academy, $48,332; 07/23/2015 – 06/30/2016, Cooperative Agreement FA7000-15-2-0009, PI: Peter Hamlington, Co-PIs: Kenneth Jansen and John Farnsworth.
4. **"Wind Tunnel Instrumentation Support,"** Engineering Excellence Fund, College of Engineering and Applied Science, University of Colorado Boulder, $38,287.50; 05/01/2015 – 05/01/2016, PI: John Farnsworth, Co-PI: Trudy Schwartz.
5. **"Collaborative Investigations in Fluid Dynamics,"** United States Air Force Academy, $277,803.60; 07/29/2011 – 07/28/2014, Cooperative Agreement FA7000-11-2-0005, PI: John Farnsworth.
6. **"Propulsor Thrust Vectoring through Stator-Induced Circumferentially-Varying Preswirl,"** University Laboratory Initiative (ULI) Program, Office of Naval Research, 2008 – 2011, PI: Michael Amitay, Student Investigator: John Farnsworth.

Honors and Awards

Most Comprehensive Flow Visualization Award Flow Visualization Showcase at the 23rd AIAA Computational Fluid Dynamics Conference, AIAA Aviation Forum, Denver, CO; Jun. 2017.

Senior Member American Institute for Aeronautics and Astronautics, 2015.

Michael A. Sadowsky Prize Graduate Research Award, Mechanical Aerospace and Nuclear Engineering Department, Rensselaer Polytechnic Institute, May 2007.

Honorable Mention National Science Foundation Graduate Research Fellowship Program, 2007.

Honorable Mention National Science Foundation Graduate Research Fellowship Program, 2006.

Magna Cum Laude B.S. Aeronautical and Mechanical Engineering, Rensselaer Polytechnic Institute, 2006.

Professional Affiliations

American Institute of Aeronautics and Astronautics (AIAA): Senior Member *2005–Present*

American Physical Society (APS): Member *2007–Present*

Professional Leadership

Member: AIAA Applied Aerodyanmics Technical Commitee, 2012–2018.

Subcommittee Chair: Publicity and Publications Subcommittee, AIAA Applied Aerodynamics Technical Committee, 2016 – 2018

Student Volunteer Coordinator: 70th APS Division of Fluid Dynamics Meeting, Denver, CO; November 19-21, 2017.

Technical Chair: 35th AIAA Applied Aerodynamics Conference, AIAA Aviation Forum, Denver, CO; June 5-9, 2017.

Co-Technical Chair: 34th AIAA Applied Aerodynamics Conference, AIAA Aviation Forum, Washington, D.C.; June 13-17, 2016.

Co-Organizer: Rocky Mountain Fluid Mechanics Symposium (Annual Student Conference), Summer 2015 to present.

Conference Session Chair:

56th AIAA Aerospace Sciences Meeting, SciTech Forum, Kissimmee, FL; January 8-12, 2018.
35th AIAA Applied Aerodynamics Conference, Aviation Forum, Denver, CO; June 5-9, 2017.
55th AIAA Aerospace Sciences Meeting, SciTech Forum, Grapevine, TX; January 9-13, 2017.
69th APS Division of Fluid Dynamics Meeting, Portland, OR; November 20-22, 2016.
34th AIAA Applied Aerodynamics Conference, Aviation Forum, Washington, D.C.; June 13-17, 2016.
54th AIAA Aerospace Sciences Meeting, SciTech Forum, San Diego, CA; January 4-8, 2016.
33rd AIAA Applied Aerodynamics Conference, Aviation Forum, Dallas, TX; June 22-26, 2015.
53rd AIAA Aerospace Sciences Meeting, SciTech Forum, Kissimmee, FL; January 5-9, 2015.
52nd AIAA Aerospace Sciences Meeting, SciTech Forum, National Harbor, MD; January 13-17, 2014.
31st AIAA Applied Aerodynamics Conference, San Diego, CA; June 24-27, 2013.
51st AIAA Aerospace Sciences Meeting, New Horizons Forum, Grapevine, TX; January 7-10, 2013.
30th AIAA Applied Aerodynamics Conference, New Orleans, LA; June 25-28, 2012.

Professional Journal Referee

Journal of Fluid Mechanics · Journal of Fluids and Structures · Experiments in Fluids · AIAA Journal · Journal of Renewable and Sustainable Energy · Journal of Aerospace Information Systems · Proceedings of the Institution of Mechanical Engineers, Part G: Journal of Aerospace Engineering · AIAA Applied Aerodynamics Technical Conference Meeting Papers · AIAA Fluid Dynamics Technical Conference Meeting Papers

University Service

University of Colorado Boulder

Reviewer, Astronaut Scholarship, CU Top Scholarships Office, Spring 2015, 2016, & 2017.
Reviewer, UK Graduate Fellowships (Rhodes, Marshall, Gates, and Churchill), Spring 2016.
Reviewer, Innovative Seed Grant Program, CU Research & Innovation Office, Spring 2015, & 2018.

Ann and H.J. Smead Department of Aerospace Engineering Sciences (AES)

Member, AES Bylaws Subcommittee, Fall 2017 to Present.
Member, AES Instructor Search Committee, Fall 2017 to Present.
Member, AES Outreach Committee, Fall 2015 to Present.
Member, AES Undergraduate Committee, Fall 2015 to Present.

College of Engineering and Applied Science (CEAS)

Faculty Adviser, Gold Shirt Program, CU Bold Center, Fall 2016 to Present.
Co-Organizer, Boulder Fluid and Thermal Sciences Seminar Series Spring 2016 to Present.

Students and Researchers Advised

(University of Colorado Boulder - UCB)

Graduate Students

Ethan Culler: Ph.D. Aerospace Engineering Sciences, UCB — *Expected Graduation Date: 08/2018*
Joseph Straccia: Ph.D. Aerospace Engineering Sciences, UCB — *Expected Graduation Date: 08/2019*
Daniel Sinner: M.S. Aerospace Engineering Sciences, UCB — *Expected Graduation Date: 12/2018*
Daniel Bateman: M.S. Aerospace Engineering Sciences, UCB — *Graduation Date: 12/2017*
Nishant Agarwal: M.S. Aerospace Engineering Sciences, UCB — *Graduation Date: 05/2017*
Naveen Penmetsa: M.S. Aerospace Engineering Sciences, UCB — *Graduation Date: 08/2016*

Undergraduate Students

Lucas Droste: Aerospace Engineering Sciences, UCB — *May 2016 - Present*
Grant Dunbar: Aerospace Engineering Sciences, UCB — *May 2016 - Present*
Ashley Montalvo: Aerospace Engineering Sciences, UCB — *May 2017 - December 2017*
Yuma Yagi: Aerospace Engineering Sciences, UCB — *May 2017 - August 2017*
Severyn Polakiewicz: Aerospace Engineering Sciences, UCB — *Aug. 2016 - May 2017*
Ryan Aronson: Aerospace Engineering Sciences, UCB — *May 2016 - May 2017*
Kevin Paynter: Mechanical Engineering, UCB — *Aug. 2015 - May 2016*

Student Awards and Prizes

Ethan Culler: National Defense Science & Engineering Graduate Fellowship — *Sep. 2015–Aug. 2018*
Joseph Straccia: National Science Foundation Graduate Research Fellowship — *Sep. 2016–Aug. 2019*

References

(Advised students and postdoctoral researchers underlined)

In Progress

[4]K. Jansen, M. Rasquin, **J. Farnsworth**, N. Rathay, M. Monastero, and M. Amitay, "Interaction of a synthetic jet actuator on separated flow over a vertical tail", AIAA J. (Invited to Revise), Jan. 2018.

[3]M. Rasquin, **J. Farnsworth**, R. Balin, and K. Jansen, "Modeling strategies of active flow control applied to a vertical tail assembly", AIAA J. (Invited to Revise), Jan. 2018.

[2]E. Culler, C. Fagley, J. Seidel, T. McLaughlin, and **J. Farnsworth**, "Aerodynamic response of a flexible finite span wing excited in stall flutter", J. Fluids Struct. (Revised and Resubmitted), Jan. 2018.

[1] N. Penmetsa, R. Starkey, and **J. Farnsworth**, "Experimental and computational investigation of a dual-throat thurst-vectoring nozzle", AIAA J. (Submitted for Initial Review), Sept. 2017.

Book Chapters

[1] M. Amitay and **J. Farnsworth**, "Separation control", in *Synthetic jets*, edited by K. Mohseni and R. Mittal (CRC Press, Sept. 2014), pp. 193–233.

Journal Articles

[9] E. Culler, C. Fagley, J. Seidel, T. McLaughlin, and **J. Farnsworth**, "Developing a reduced order model from structural kinematic measurements of a flexible finite span wing in stall flutter", J. Fluids Struct. **71**, 56–69 (2017).

[8] C. Porter, C. Fagley, **J. Farnsworth**, J. Seidel, and T. McLaughlin, "Closed-Loop Flow Control of a Forebody at a High Incidence Angle", AIAA J. **52**, 1430–1440 (2014).

[7] C. Fagley, **J. Farnsworth**, C. Porter, J. Seidel, T. McLaughlin, J. Lee, and E. Lee, "Open-Loop Dynamics of the Asymmetric Vortex Wake behind a von Kármán Ogive at High Incidence", Int. J. Flow Control **5**, 59–78 (2013).

[6] S. Huyer, A. Dropkin, D. Beal, **J. Farnsworth**, and M. Amitay, "Preswirl Maneuvering Propulsor", IEEE J. Oceanic Eng. **37**, 122–138 (2012).

[5] **J. Farnsworth**, M. Amitay, D. Beal, and S. Huyer, "Interactions of a propeller with a stator-induced circumferentially varying flow", Exp. Fluids **52**, 495–510 (2012).

[4] **J. Farnsworth**, M. Amitay, D. Beal, and S. Huyer, "Measurements of a stator-induced circumferentially varying flow", Exp. Fluids **51**, 423–442 (2011).

[3] V. Maldonado, **J. Farnsworth**, W. Gressick, and M. Amitay, "Active control of flow separation and structural vibrations of wind turbine blades", Wind Energy **13**, 221–237 (2010).

[2] **J. Farnsworth**, J. Vaccaro, and M. Amitay, "Active Flow Control at Low Angles of Attack: Stingray Unmanned Aerial Vehicle", AIAA J. **46**, 2530–2544 (2008).

[1] M. Ciuryla, Y. Liu, **J. Farnsworth**, C. Kwan, and M. Amitay, "Flight Control Using Synthetic Jets on a Cessna 182 Model", J. Aircraft **44**, 642–653 (2007).

Theses

[2] **J. Farnsworth**, "Fundamental Investigation of Circumferentially Varying Stator Cascades", PhD thesis (Rensselaer Polytechnic Institute, Troy, New York, May 2011).

[1] **J. Farnsworth**, "Aerodynamic Performance Modification of the Stingray UAV at Low Angles of Attack", MA thesis (Rensselaer Polytechnic Institute, Troy, New York, Dec. 2007).

Conference Papers

[23] R. Laurence, G. Dunbar, **J. Farnsworth**, and B. Argrow, "Aircraft geometry effects on a distributed flush airdata system", in AIAA paper 2018-1519 (2018 AIAA Aerospace Sciences Meeting, AIAA SciTech Forum, Jan. 2018).

[22] K. Jansen, M. Rasquin, **J. Farnsworth**, N. Rathay, M. Monastero, and M. Amitay, "Interaction of a synthetic jet actuator on separated flow over a vertical tail", in AIAA paper 2017-3243 (35th AIAA Applied Aerodynamics Conference, AIAA Aviation Forum, June 2017).

[21] E. Culler, **J. Farnsworth**, C. Fagley, J. Seidel, and T. McLaughlin, "Driven versus "Free flutter" motion of a NACA 0018 finite span rigid wing", in AIAA paper 2017-4359 (35th AIAA Applied Aerodynamics Conference, AIAA Aviation Forum, June 2017).

[20] J. Straccia and **J. Farnsworth**, "Application of a biot-savart solver to predict axis switching phenomenon in finite-span vortices expelled from a synthetic jet", in AIAA paper 2017-3311 (47th AIAA Fluid Dynamics Conference, AIAA Aviation Forum, June 2017).

[19] C. Fagley, J. Seidel, T. McLaughlin, and **J. Farnsworth**, "Aero-Servo-Elastic Control of a Cyber-Physical Flexible Wing", in AIAA paper 2016-0320 (54th AIAA Aerospace Sciences Meeting, Jan. 2016).

[18] E. Culler, **J. Farnsworth**, C. Fagley, and T. McLaughlin, "Spanwise Variation of Stall Flutter on a Flexible NACA 0018 Finite Spanwing", in AIAA paper 2016-1554 (54th AIAA Aerospace Sciences Meeting, Jan. 2016).

[17] **J. Farnsworth**, S. Corbett, J. Seidel, and T. McLaughlin, "Aeroelastic Response of a Finite Span NACA 0018 Wing Part 1: Experimental Measurements", in AIAA paper 2015-0249 (53rd AIAA Aerospace Sciences Meeting, Jan. 2015).

[16] **J. Farnsworth**, C. Fagley, C. Porter, and T. McLaughlin, "Asymmetric Vortex State Response to Open-Loop Actuation for Variations in Angle of Attack and Reynolds Number", in AIAA paper 2014-0931 (52nd AIAA Aerospace Sciences Meeting, Jan. 2014).

[15] C. Fagley, C. Porter, J. Seidel, **J. Farnsworth**, and T. McLaughlin, "Experimental Closed-Loop Flow Control of a von Kármán Ogive at a High Angle of Attack", in AIAA paper 2013-2924 (31st AIAA Applied Aerodynamics Conference, June 2013).

[14] C. Porter, C. Fagley, **J. Farnsworth**, J. Seidel, and T. McLaughlin, "Closed Loop Flow Control of a Tangent Ogive at a High Angle of Attack", in AIAA paper 2013-0395 (51st AIAA Aerospace Sciences Meeting, Jan. 2013).

[13] C. Porter, C. Fagley, **J. Farnsworth**, J. Seidel, and T. McLaughlin, "Numerical Simulations of Closed-Loop Flow Control of a Tangent Ogive at a High Angle of Attack", in AIAA paper 2013-2923 (31st AIAA Applied Aerodynamics Conference, June 2013).

[12] E. Stephen, **J. Farnsworth**, C. Porter, R. Decker, T. McLaughlin, and J. Dudley, "Impinging Shock Wave - Boundary Layer Interactions on a Three-Dimensional Body", in AIAA paper 2013-2733 (43rd AIAA Fluid Dynamics Conference, June 2013).

[11] C. Fagley, C. Porter, J. Seidel, **J. Farnsworth**, and T. McLaughlin, "Optimal Sensor Arrangement for Asymmetric Vortex State Estimation on a Slender Body at High Incidence", in AIAA paper 2012-3046 (6th AIAA Flow Control Conference, June 2012).

[10] C. Fagley, **J. Farnsworth**, J. Seidel, and T. McLaughlin, "Experimental Study of Open Loop Plasma Actuation on a von Kármán Ogive", in AIAA paper 2012-0905 (50th AIAA Aerospace Sciences Meeting, Jan. 2012).

[9] C. Porter, J. Seidel, C. Fagley, **J. Farnsworth**, and T. McLaughlin, "Vortex Dynamics of a Tangent Ogive at High Angle of Attack", in AIAA paper 2012-2953 (6th AIAA Flow Control Conference, June 2012).

[8] **J. Farnsworth**, C. Fagley, C. Porter, J. Seidel, and T. McLaughlin, "The Transient Response of a von Kármán Ogive to Open Loop Plasma Actuation", in AIAA paper 2012-2955 (6th AIAA Flow Control Conference, June 2012).

[7] S. Huyer, A. Dropkin, D. Beal, **J. Farnsworth**, and M. Amitay, "Pre-swirl Maneuvering Propulsor: Part 1 Computations", in AIAA paper 2010-4958 (28th AIAA Applied Aerodynamics Conference, June 2010).

[6] J. Vasile, Y. Elimelech, **J. Farnsworth**, M. Amitay, and K. Jansen, "Interaction of a Finite-span Synthetic-jet and Cross-flow over a Swept Wing", in AIAA paper 2010-4584 (5th AIAA Flow Control Conference, June 2010).

[5] **J. Farnsworth**, M. Amitay, D. Beal, and S. Huyer, "Pre-swirl Maneuvering Propulsor: Part 2 Experiments", in AIAA paper 2010-4959 (28th AIAA Applied Aerodynamics Conference, June 2010).

[4] **J. Farnsworth**, M. Amitay, S. Huyer, and D. Beal, "Stator-Induced Circumferentially Varying Preswirl Propulsor", in AIAA paper 2009-3620 (27th AIAA Applied Aerodynamics Conference, June 2009).

[3] V. Maldonado, **J. Farnsworth**, W. Gressick, and M. Amitay, "Active Enhancement of Wind Turbine Blades Performance", in AIAA paper 2008-1311 (46th AIAA Aerospace Sciences Meeting, Jan. 2008).

[2] **J. Farnsworth**, F. Cannelle, M. Ciuryla, and M. Amitay, "Control of the Stingray UAV at Low Angles of Attack", in AIAA paper 2007-0321 (45th AIAA Aerospace Sciences Meeting, Jan. 2007).

[1] **J. Farnsworth**, J. Vaccaro, and M. Amitay, "Aerodynamic Performance Modification of the Stingray UAV at Low Angles of Attack", in AIAA paper 2007-4426 (25th AIAA Applied Aerodynamics Conference, June 2007).

Presentations and Posters

[19] K. Jansen, **J. Farnsworth**, M. Rasquin, N. Rathay, M. Monastero, and M. Amitay, *Interaction of a synthetic jet actuator with a severely separated crossflow*, 70th Annual Meeting of the APS Division of Fluid Dynamics, Volume 62, Number 14, Nov. 2017.

[18] P. Weidman and **J. Farnsworth**, *Periodic bubble formation and ejection for flow over paper*, 70th Annual Meeting of the APS Division of Fluid Dynamics, Volume 62, Number 14, Nov. 2017.

[17] A. Montalvo, E. Culler, and **J. Farnsworth**, *Uncertainty quantification from measures of divergence in 2d piv data*, 70th Annual Meeting of the APS Division of Fluid Dynamics, Volume 62, Number 14, Nov. 2017.

[16] E. Culler and **J. Farnsworth**, *The influence of second harmonic phase and amplitude variation in cyclically pitching wings*, 70th Annual Meeting of the APS Division of Fluid Dynamics, Volume 62, Number 14, Nov. 2017.

[15] J. Straccia and **J. Farnsworth**, *Vortex dynamics of very low aspect ratio rectangular orifice synthetic jets*, 70th Annual Meeting of the APS Division of Fluid Dynamics, Volume 62, Number 14, Nov. 2017.

[14] L. Droste, R. Aronson, and **J. Farnsworth**, *Design and qualification of an axisymmetric jet for performing probe calibrations*, AIAA Region V Student Conference, Denver, CO, Apr. 2017.

[13] N. Agarwal and **J. Farnsworth**, *Unsteady aerodynamics of a single cycloidally rotating naca 0012 blade*, AIAA Region V Student Conference, Denver, CO, Apr. 2017.

[12] **J. Farnsworth**, N. Penmetsa, and R. Starkey, *Experimental and computational investigation of a dual-throat thrust vectoring nozzle*, 69th Annual Meeting of the APS Division of Fluid Dynamics, Volume 61, Number 20, Nov. 2016.

[11] E. Culler, **J. Farnsworth**, C. Fagley, and J. Seidel, *Comparison of driven and simulated "free" stall flutter in a wind tunnel*, 69th Annual Meeting of the APS Division of Fluid Dynamics, Volume 61, Number 20, Nov. 2016.

[10] J. Straccia and **J. Farnsworth**, *Application of biot-savart solver to predict axis switching phenomena in finite-span vortices expelled from a synthetic jet*, 69th Annual Meeting of the APS Division of Fluid Dynamics, Volume 61, Number 20, Nov. 2016.

[9] E. Culler, **J. Farnsworth**, C. Fagley, and J. Seidel, *Spanwise variation of stall flutter on a flexible naca 0018 finite span wing*, 2015 AIAA Rocky Mountain Section Technical Symposium, Golder, CO, Nov. 2015.

[8] J. Akkala, J. Buchholz, **J. Farnsworth**, and T. McLaughlin, *Vorticity Transport on a Flexible Wing in Stall Flutter*, 67th Annual Meeting of the APS Division of Fluid Dynamics, Bulletin of the American Physical Society, Vol. 59, No. 20, San Fransisco, CA, Nov. 2014.

[7] **J. Farnsworth**, J. Akkala, J. Buchholz, and T. McLaughlin, *Kinematics and Flow Evolution of a Flexible Wing in Stall Flutter*, 67th Annual Meeting of the APS Division of Fluid Dynamics, Bulletin of the American Physical Society, Vol. 59, No. 20, San Fransisco, CA, Nov. 2014.

[6] **J. Farnsworth**, Z. Francis, R. Witt, C. Porter, and T. McLaughlin, *Flow Visualization of a von Kármán Ogive Forebody with Plasma Actuation*, 65th Annual Meeting of the APS Division of Fluid Dynamics, Bulletin of the American Physical Society, Vol. 57, No. 17, San Diego, CA, Nov. 2012.

[5] **J. Farnsworth**, M. Amitay, D. Beal, and S. Huyer, *Interactions of a Propeller with a Circumferentially Varying Flow*, 64th Annual Meeting of the APS Division of Fluid Dynamics, Bulletin of the American Physical Society, Vol. 56, No. 18, Baltimore, MD, Nov. 2011.

[4] **J. Farnsworth**, M. Amitay, D. Beal, and S. Huyer, *Interaction of a circumferentially varying stator row upstream of a propeller in a uniform flow*, 63rd Annual Meeting of the APS Division of Fluid Dynamics, Bulletin of the American Physical Society, Vol. 55, No. 16, Long Beach, CA, Nov. 2010.

[3] **J. Farnsworth** and M. Amitay, *The interaction of an array of circumferentially varying stators with a uniform crossflow*, 62nd Annual Meeting of the APS Division of Fluid Dynamics, Bulletin of the American Physical Society, Vol. 54, No. 19, Minneapolis, MN, Nov. 2009.

[2] **J. Farnsworth**, M. Amitay, D. Beal, and S. Huyer, *Stator-Induced Circumferentially Varying Preswirl Propulsor*, 61st Annual Meeting of the APS Division of Fluid Dynamics, Bulletin of the American Physical Society, Vol. 53, No. 15, San Antonio, TX, Nov. 2008.

[1] **J. Farnsworth**, J. Vaccaro, and M. Amitay, *Flow Control of the Stingray UAV at Low Angles of Attack*, 60th Annual Meeting of the Divison of Fluid Dynamics, Bulletin of the American Physical Society, Vol. 52, No. 12, Salt Lake City, UT, Nov. 2007.