

# Melissa A. Green

Associate Professor, Mechanical and Aerospace Engineering, Syracuse University

Date of CV: December 2020

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Syracuse, NY 13244

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## Research interests

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Biological fluid mechanics, specifically fish swimming; fluid structure interactions; vortex dynamics; unsteady aerodynamics; massively separated flows; turbulence; data visualization in extended reality

## Affiliations

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- 2019 – Associate Professor  
Syracuse University, Syracuse, NY, USA  
Mechanical and Aerospace Engineering
- 2012 – 2019 Assistant Professor  
Syracuse University, Syracuse, NY, USA  
Mechanical and Aerospace Engineering
- 2009 – 2011 NAS/NRC Postdoctoral Research Associate  
Naval Research Laboratory, Washington, DC, USA  
Laboratory for Computational Physics and Fluid Dynamics  
Advisor: Elaine Oran
- 2009 Postdoctoral Research Associate, Princeton University, Princeton, NJ, USA  
Mechanical and Aerospace Engineering  
*ONR MURI: Toward a Mission-Configurable Stealth Underwater Batoid*  
Advisor: Alexander J. Smits

## Education

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- 2009 Ph.D. Princeton University, Princeton, NJ, USA  
Mechanical and Aerospace Engineering  
*Analysis of bio-inspired propulsors*  
Advisors: Clarence W. Rowley and Alexander J. Smits
- 2003 B.S. University of Notre Dame, Notre Dame, IN, USA  
Aerospace Engineering

## Honors and Awards

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- 2020 The Filtertech, Pi Tau Sigma, and Sigma Gamma Tau Award for Excellence in Education in Mechanical and Aerospace Engineering (Syracuse University)
- 2019 Associate Fellow, American Institute of Aeronautics and Astronautics
- 2016 Dean's Award for Excellence in Engineering Education (Syracuse University)
- 2016 Senior Member, American Institute of Aeronautics and Astronautics
- 2015 The Filtertech, Pi Tau Sigma, and Sigma Gamma Tau Award for Excellence in Education in Mechanical and Aerospace Engineering (Syracuse University)
- 2014 Air Force Office of Scientific Research Young Investigator Award
- 2009 National Research Council Research Associateship
- 2007 Wu Prize for Excellence (Princeton University School of Engineering and Applied Science)
- 2004 – 2007 National Science Foundation Graduate Research Fellowship
- 2006 Larisse Rosentweig Klein Memorial Award (Princeton Mechanical and Aerospace Engineering department)

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**Awarded grants**

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- 2020 1. Syracuse University BioInspired Institute Seed Grant  
PI: Minghao Rostami, Syracuse University Mathematics Department  
**Co-PI:** Melissa A. Green  
*An Interactive Virtual Reality System for Microfluidics and Beyond*  
Dates: 1/1/2021 - 1/1/2022  
Total award: \$30,000
- 2020 2. Air Force Office of Scientific Research, Unsteady Aerodynamics and Turbulent Flows  
PI: David Rival, Queen's University  
**Co-PI:** Melissa A. Green  
*Learning to Fly: Using Distributed Pressure Sensing and Network Strategies for Control in Gusty Environments*  
Dates: 4/28/2020 - 4/27/2024  
Total award: \$635,265
- 2018 3. Syracuse University CUSE Grant  
PI: Amber Bartosh, Syracuse University School of Architecture  
**Co-PI:** Melissa A. Green  
*Multi-scale application for immersive data visualization*  
Dates: 5/1/2018 - 4/30/2020  
Total award: \$29,822
- 2017 4. Office of Naval Research, Biologically Inspired Underwater Propulsion Program  
**PI:** Melissa A. Green  
Co-PI: Dr. Rajeev Kumar, Research Assistant Professor, Syracuse University  
*Experimental analysis of the three-dimensional vortex wakes generated by bio-inspired body-caudal fin flow field interactions*  
Dates: 8/1/2017 - 7/31/2020  
Total award: \$670,949
- 2016 5. Office of Naval Research, Sea Based Aviation  
**PI:** Melissa A. Green  
CoPI: Dr. David Rival, Queen's University, Kingston, Ontario, Canada  
*The topology of force production in unsteady flow around swept wings*  
Dates: 7/1/2016 - 6/30/2019  
Total award: \$710,740
- 2015 6. National Science Foundation  
PI: Samuel Scozzafava, Vice President for Information Technology, Syracuse University  
**CoPI:** Melissa A. Green  
*Leading the Way for Research Computing at Syracuse University and Beyond: CC\*DNI Engineer*  
Dates: 9/1/2015 - 8/31/2017  
Total award: \$396,098

- 2014 7. Air Force Office of Scientific Research Young Investigator Program  
**PI:** Melissa A. Green  
*Using Lagrangian coherent structures to characterize vortex shedding on bluff bodies in cross-flow*  
 Dates: 8/15/2014 - 8/14/2017  
 Total award: \$355,160
- 2014 8. Office of Naval Research, Biologically Inspired Underwater Propulsion Program  
**PI:** Melissa A. Green  
*Lagrangian methods in unsteady propulsion: characterizing vortex wake structure and force production*  
 Dates: 5/15/2014 - 5/14/2017  
 Total award: \$671,706

### Teaching and Mentoring

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Courses taught, Assistant/Associate Professor, Syracuse University

Fluid Mechanics (MAE 341)	Fall 2020
Aircraft Performance and Dynamics (AEE 427)	Fall 2012–2015, 2017–2020
Dynamics of Mechanical Systems (MAE 321)	Fall 2015–2019
Fluid Dynamics Measurements (MAE 645)	Spring 2014

PhD student advising

- 2012 – 2017 Dr. Matthew Rockwood. PhD advisee at Syracuse University  
*Lagrangian Visualization and Real-Time Identification of the Vortex Shedding Time in the Wake of a Circular Cylinder*
- 2015 – 2017 Dr. Swathi Krishna. Served as co-director for her PhD at École Polytechnique Fédérale de Lausanne (EPFL).  
*Unsteady fluid dynamics around a hovering flat plate wing*
- 2012 – 2017 Dr. Yangzi Huang, PhD advisee at Syracuse University  
*Vortex Detection and Tracking in Massively Separated and Turbulent Flows*
- 2014 – 2020 Dr. Jack Rossetti. PhD advisee. Served as co-adviser with Prof. John Dannenhoffer.  
*A Method of Topology Optimization for Curvature Continuous Designs*
- 2016 – 2020 Dr. Han Tu. PhD advisee at Syracuse University.  
*Analysis of the flow structure and reattachment over accelerating non-slender delta-wing planforms*
- 2014 – pres Justin King: PhD advisee at Syracuse University.
- 2016 – pres Seth Brooks: PhD advisee at Syracuse University.
- 2019 – pres Youwei Liu: PhD advisee at Syracuse University.

Postdoc advising

- 2019 – pres Dr. Firas Siala (Oregon State University PhD)
- 2015 – 2018 Dr. Rajeev Kumar (University of Texas – Arlington PhD)
- 2014 – 2015 Dr. Richard Galvez (Syracuse University PhD, Physics)
- 2014 Dr. Zachary Berger (Syracuse University PhD)

## MS student research mentoring

2020 – pres	Brian Doktorczyk
2018 – 2019	Youwei Liu
2015 – 2017	Eileen Haffner
2014 – 2016	Yi Liu
2014	Matthew Kalish
2013 – 2014	Timothy Jeter
2013	Thomas Loiselle

## Undergraduate and other research advising

2018 – pres	Sareta Gladson (ECS Scholars Program, Honor's advising)
2018 – pres	Zackary Boone (Virginia Tech BS)
2018 – pres	Andrew Beck
2012	Christopher Scofield
2017 – 2018	Noah Pietraszewski
2014 – 2017	Ranbir Dhillon (Honor's advising)
2017	Tyler Impey
2015 – 2016	Eric Zacharia
2015	Ethan Palleschi
2015	Mark Gschwind
2015	Eric Zacharia
2015	Andrew LaMotte
2013 – 2014	Thomas Rice
2013 – 2014	Matthew Rosanio
2012 – 2013	Jacob Morrida
2013	Matthew Rosanio
2013	Rebecca Moore
2013	Timothy Jeter

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**Journal publications (Google Scholar)**

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- 2020 1. Boone, Z., Bartosh, A. & **Green, M. A.**, *Interactive and Immersive Visualization of Fluid Dynamics using Virtual Reality*, Journal of Visualized Experiments, e61151, *in press*. ([journal link](#))
- 2019 2. Brooks, S. A. & **Green, M. A.**, *Experimental Study of Body-Fin Interaction and Vortex Dynamics Generated by a Two Degree-of-Freedom Fish Model*, Biomimetics, **4**, 67. ([journal link](#))
- 2019 3. Krishna, S., **Green, M. A.**, & Mulleners, K. *Effect of pitch on the flow behavior around a hovering wing*, Experiments in Fluids, 60:86. ([journal link](#))
- 2019 4. Rockwood, M. P., Loiselle, T., & **Green, M. A.** *Practical concerns of implementing a finite-time Lyapunov exponent analysis with under-resolved data*, Experiments in Fluids, 60:74. ([journal link](#))
- 2019 5. Rockwood, M. & **Green, M. A.** *Real-time identification of vortex shedding in the wake of a circular cylinder*, AIAA Journal, **57**, 1, pp. 223-238. ([journal link](#))

- 2019 6. Kumar, R., King, J. T., & **Green, M. A.** *Three-dimensional pitching panel wake: Lagrangian analysis and momentum distribution from experiments*, AIAA Journal, **57**, 9. ([journal link](#))
- 2018 7. Liu, Y., Wilson, C., **Green, M. A.**, and Hughes, C. W. *Gulf Stream transport and mixing processes via coherent structure dynamics*, Journal of Geophysical Research - Oceans, **123**, 4, pp. 3014–3037. ([journal link](#))
- 2018 8. Bailey, S. C. C., Pentelow, S., Ghimire, H., Estejab, B., **Green, M. A.** & Tavoularis, S. *Experimental Investigation of the Scaling of Vortex Wandering in Turbulent Surroundings*, Journal of Fluid Mechanics, **843**, pp. 722-747. ([journal link](#))
- 2018 9. King, J. T., Kumar, R., & **Green, M. A.** *Experimental observations of the three-dimensional wake structures and dynamics generated by a rigid, bio-inspired pitching panel*, Physical Review Fluids, **3**, 3, 034701. ([journal link](#))
- 2018 10. Rockwood, M., Huang, Y., & **Green, M. A.** *Tracking coherent structures in massively-separated and turbulent flows*, Physical Review Fluids, **3**, 1, 014702. ([journal link](#))
- 2018 11. Krishna, S., **Green, M. A.**, & Mulleners, K. *Flow field and force evolution for a symmetric hovering flat plate*, AIAA Journal, **56**, 4, pp. 1360–1371. ([journal link](#))
- 2017 12. Rockwood, M.P., Taira, K., & **Green, M. A.** *Detecting vortex formation and shedding in cylinder wakes using Lagrangian coherent structures*, AIAA Journal, **55**, 1, pp. 15–23. ([journal link](#))
- 2017 13. Magstadt, A. S., Kan, P., Berger, Z. P., Ruscher, C. J., Berry, M. G., **Green, M. A.**, Lewalle, J. & Glauser, M. N. “Turbulent flow physics and control: The role of big data analyses tools,” in *Whither Turbulence in and Big Data in the 21st Century?* Ed. Pollard, A., Castillo, L., Danaila, L., & Glauser, M. N. Springer, pp. 295-322. ([journal link](#))
- 2016 14. Kumar, R., King, J. T. & **Green, M. A.** *Momentum distribution in the wake of a trapezoidal pitching panel*, Marine Technology Society Journal, **50**, 5, pp. 9-23. ([journal link](#))
- 2015 15. Huang, Y. & **Green, M. A.** *Detection and tracking of vortex phenomena using Lagrangian coherent structures*, Experiments in Fluids **56**, 7, pp. 1-12. ([journal link](#))
- 2011 16. Buchholz, J.H.J., **Green, M. A.**, & Smits, A. J. *Scaling the circulation shed by a pitching panel*, J. Fluid Mech. **688**, pp. 591–601. ([journal link](#))
- 2011 17. **Green, M. A.**, Rowley, C. W., & Smits, A. J. *The unsteady three-dimensional wake produced by a trapezoidal pitching panel*, J. Fluid Mech. **685**, pp. 117–145. ([journal link](#))
- 2010 18. **Green, M. A.**, Rowley, C. W., & Smits, A. J. *Using hyperbolic Lagrangian coherent structures to investigate vortices in bioinspired fluid flows*, Chaos **20**, 017510. ([journal link](#))
- 2008 19. **Green, M. A.** & Smits, A. J. *Effects of three-dimensionality on thrust production by a pitching panel*, J. Fluid Mech. **615**, pp. 211–220. ([journal link](#))
- 2007 20. **Green, M. A.**, Rowley, C. W., & Haller, G. *Detection of Lagrangian coherent structures in three-dimensional turbulence*, J. Fluid Mech. **572**, pp. 111–120. ([journal link](#))

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Conference extended abstracts (peer-reviewed and/or invited)

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- 2020 21. Mac Namara, S. C., & Rauh, A. E., & Blum, M. M., & Russo, N., & Green, M. A., & Nangia, S. *Peer Mentoring for Women in STEM* Paper presented at 2020 ASEE Virtual Annual Conference Content Access, Virtual Online. 10.18260/1-2–35043, June 2020.
- 2020 22. Tu, H., Marzanek, M., Green, M. A., & Rival, D. E. *Surface pressure and coherent structure evolution on an axially accelerated delta wing*, AIAA Scitech Forum 2020, Orlando, FL, USA. 6–10 January 2020.

- 2020 23. King, J. T. & Green, M. A. *Experimental Investigation into the Streamwise Circulation Generated by Bio-Inspired Pitching Panels*, AIAA Scitech Forum 2020, Orlando, FL, USA. 6–10 January 2020.
- 2019 24. Rossetti, J., Dannenhoffer, J. & Green, M. A. *A method for topology optimization for high Reynolds number flows*, AIAA AVIATION Forum 2019, Dallas, TX, USA. 17–21 June 2019.
- 2019 25. Brooks, S. A., & Green, M. A. *Effects of upstream body on pitching trapezoidal panel*, AIAA AVIATION Forum 2019, Dallas, TX, USA. 17–21 June 2019.
- 2019 26. King, J. T. & Green, M. A. *Experimental study on the appearance of Kelvin-Helmholtz-like instabilities in the wakes produced by bio-inspired pitching panels*, AIAA AVIATION Forum 2019, Dallas, TX, USA. 17–21 June 2019.
- 2019 27. Tu, H., Marzanek, M., Green, M. A., & Rival, D. E. *Experimental investigation of accelerating non-slender delta-wing planforms at high angle of attack*, AIAA Scitech Forum 2019, San Diego, CA, USA. 7–11 January 2019.
- 2019 28. King, J. T. & Green, M. A. *Experimental study of the three-dimensional wakes produced by trapezoidal panels with varying trailing edge geometry and pitching amplitude*, AIAA Scitech Forum 2019, San Diego, CA, USA. 7–11 January 2019.
- 2018 29. Rockwood, M. & Green, M. A. *Necessity of dimensional support for the reliable calculation of finite-time Lyapunov exponent fields from experimental data*, AIAA AVIATION Forum 2018, Atlanta, GA, USA. 25–29 June 2018.
- 2018 30. Tu, H. & Green, M. A. *Forces and flow structure around swept wings*, AIAA AVIATION Forum 2018, Atlanta, GA, USA. 25–29 June 2018.
- 2018 31. Ayodeji, B.-O. T., Dong, H., King, J. T., Kumar, R. & Green, M. A. *Computational study of the three-dimensional wake and performance of a trapezoidal pitching panel*, AIAA Science and Technology Forum 2018, Kissimmee, FL, USA. 8–12 January 2018.
- 2017 32. Rockwood, M.P., Brooks, S. & Green, M. A. *Relating surface pressure to Lagrangian wake topology around a circular cylinder in cross-flow*, AIAA AVIATION Forum 2017, Denver, CO, USA. 5–9 June 2017.
- 2017 33. Kumar, R., King, J. T., & Green, M. A. *Three-dimensional finite-time Lyapunov exponent field in the wake of an oscillating trapezoidal pitching panel*, AIAA AVIATION Forum 2017, Denver, CO, USA. 5–9 June 2017.
- 2017 34. King, J. T., Kumar, R. & Green, M. A. *Experimental study on the effects of trailing edge geometry on the wake structure of a trapezoidal pitching panel*, AIAA AVIATION Forum 2017, Denver, CO, USA. 5–9 June 2017.
- 2017 35. Dhillon, R. S., Pietraszewski, N. & Green, M. A. *Three dimensional flow visualization in virtual reality*, AIAA AVIATION Forum 2017, Denver, CO, USA. 5–9 June 2017.
- 2017 36. Huang, Y. & Green, M. A. *Leading edge vortex separation study by different vortex and flow separation identification methods*, AIAA AVIATION Forum 2017, Denver, CO, USA. 5–9 June 2017.
- 2017 37. Dannenhoffer, J. F. & Green, M. A. *Use of a Full-motion Flight Simulator for Teaching Aircraft Performance and Dynamics*, AIAA Science and Technology Forum 2017, Grapevine, TX, USA. 9–13 January 2017.
- 2016 38. Krishna, S., Mulleners, K. & Green, M. A. *Effect of rotational phase on the flow topology of a flapping flat-plate wing*, AIAA Science and Technology Forum 2016, San Diego, CA, USA. 4–8 January 2016.

- 2016 39. King, J. T., Kumar, R. & Green, M. A. *Experimental Study of the Three-Dimensional Wake of a Trapezoidal Pitching Panel*, AIAA Science and Technology Forum 2016, San Diego, CA, USA. 4–8 January 2016.
- 2016 40. Rockwood, M. P. & Green, M. A. *Correlation of the Surface Pressure Distribution on a Circular Cylinder with Objective Identification of Vortex Formation and Shedding*, AIAA Science and Technology Forum 2016, San Diego, CA, USA. 4–8 January 2016.
- 2016 41. Huang, Y. & Green, M. A. *Comparing leading and trailing edge vortex circulation history with vortex identification and tracking methods*, AIAA Science and Technology Forum 2016, San Diego, CA, USA. 4–8 January 2016.
- 2016 42. Rossetti, J. S., Dannenhoffer, J., & Green, M. A. *Snapshot Lagrangian Proper Orthogonal Decomposition of Cylinder Wake Flow*, AIAA Science and Technology Forum 2016, San Diego, CA, USA. 4–8 January 2016.
- 2015 43. Huang, Y., Rockwood, M.P. & Green, M. A. *Tracking coherent structures in massively-separated and turbulent flows*, Ninth International Symposium on Turbulence and Shear Flow Phenomena, The University of Melbourne, Melbourne, AUS. 30 June – 3 July 2015.
- 2015 44. Rockwood, M.P. & Green, M. A. *An Analysis of the Unsteady Wake Behind a Circular Cylinder using Lagrangian Coherent Structures*, AIAA Science and Technology Forum 2015, Kissimmee, FL, USA. 5–9 January 2015.
- 2015 45. Huang, Y. & Green, M. A. *Eulerian and Lagrangian methods for detecting vortex formation and shedding*, AIAA Science and Technology Forum 2015, Kissimmee, FL, USA. 5–9 January 2015.
- 2015 46. Rice, T. T. & Green, M. A. *Three dimensional unsteady wake of a trapezoidal pitching panel*, AIAA Science and Technology Forum 2015, Kissimmee, FL, USA. 5–9 January 2015.
- 2014 47. Rockwood, M.P. & Green, M. A. *An Analysis of the Unsteady Wake Behind a Circular Cylinder using Lagrangian Coherent Structures*, AIAA Science and Technology Forum 2014, National Harbor, MD, USA. 13–17 January 2014.
- 2013 48. Green, M. A. *Eulerian and Lagrangian methods for coherent structure analysis in both computational and experimental data*, 51st AIAA Aerospace Sciences Meeting Including the New Horizons Forum and Aerospace Exposition, Grapevine, TX, USA. 7–10 January 2013.
- 2013 49. Rockwood, M.P. & Green, M. A. *An experimental analysis of the unsteady wake behind a circular cylinder using Eulerian and Lagrangian techniques*, 51st AIAA Aerospace Sciences Meeting Including the New Horizons Forum and Aerospace Exposition, Grapevine, TX, USA. 7–10 January 2013.
- 2009 50. Green, M. A., Rowley, C. W., & Smits, A. J. *Three-dimensional wake of a biologically inspired propulsor*, 39th AIAA Fluid Dynamics Conference, San Antonio, TX, USA. 22–25 June 2009.
- 2005 51. Green, M., Parker, K., & Soria, J. *2D PIV of a Pitching Aerofoil*, Fourth Australian Conference on Laser Diagnostics in Fluid Mechanics and Combustion, The University of Adelaide, South Australia, Australia. 7–9 December 2005.

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**Invited talks**

- 2020 Oct Virtual Workshop: Complex Flows in Biological Systems, Short talk, virtual.
- 2020 Aug Rocky Mountain Fluid Mechanics Meeting, Keynote Speaker, virtual.

- 2019 Nov American Physical Society Division of Fluid Dynamics Annual Meeting, Session H29 “Focus Session: Immersive Education Platforms for Fluid Dynamics/Education and Outreach”, Seattle, WA
- 2019 Feb University at Buffalo, Department of Mechanical and Aerospace Engineering Seminar
- 2019 Jan University of Minnesota, Department of Aerospace Engineering and Mechanics Seminar
- 2018 Nov Clarkson University, Center for Complex Systems Seminar
- 2018 Oct Arizona State University, School for Engineering of Matter, Transport, and Energy, Mechanical Engineering Seminar
- 2018 June AIAA AVIATION Forum, Special Session, “Tribute to Anatol Roshko.” Atlanta, GA
- 2018 Mar Gesellschaft für Angewandte Mathematik und Mechanik e.V. 89th Annual Meeting, Session S13: Flow Control, Munich, Germany
- 2018 Mar Clarkson University, Department of Mechanical and Aeronautical Engineering Seminar
- 2017 Sep Queen’s University, Bio-propulsion workshop
- 2017 June AIAA AVIATION Forum, FD-24: Special Session: Research Frontiers in Bio-Inspired Propulsion I, Denver, CO
- 2017 Feb Stanford University, Fluid Mechanics Seminar
- 2017 Jan AIAA Science and Technology Forum, FD-34: Special Session: Low Reynolds Number Flows, Grapevine, TX
- 2016 May AmeriMech Symposium on Fluid Transport and Nonlinear Dynamics
- 2015 Mar City College of New York, Department of Mechanical Engineering Seminar
- 2015 Feb Caltech, GALCIT Colloquium
- 2015 Feb University of California, Los Angeles, Department of Mechanical and Aerospace Engineering Seminar
- 2014 Nov Lehigh University, Department of Mechanical Engineering and Mechanics Seminar
- 2014 Oct Illinois Institute of Technology, Department of Mechanical, Materials, and Aerospace Engineering Seminar
- 2014 Oct University of Illinois, Urbana-Champaign, Fluid Mechanics Seminar
- 2014 June US Congress on Theoretical and Applied Mechanics, Session: “Bioflight I: Models (experimental, numerical and theoretical),” East Lansing, MI
- 2014 May Extreme Flows Workshop, Princeton, NJ
- 2014 Mar Johns Hopkins University, Department of Mechanical Engineering Fluid Dynamics Seminar
- 2013 Nov Vanderbilt University, Department of Mechanical Engineering Seminar
- 2013 Nov Frontiers in Fluid Dynamics Research Symposium, San Juan, PR
- 2013 Sep BIRS Workshop 13w5089 Uncovering Transport Barriers in Geophysical Flows
- 2013 Apr University of Buffalo, Department of Mechanical and Aerospace Engineering Seminar
- 2013 Feb Florida State University, Department of Mechanical Engineering Seminar
- 2013 Jan Syracuse University, Department of Mechanical and Aerospace Engineering Seminar
- 2013 Jan AIAA Aerospace Sciences Meeting, Visualization, AMT-10/FD-26: Analysis and Interpretation of Very Large Sets of Fluid Dynamics Data, Grapevine, TX
- 2012 July 9th American Institute of Mathematical Sciences Conference on Dynamical Systems, Special Session 27: Transport Barriers in Dynamical Systems, Orlando, FL
- 2011 May Lorentz Center Workshop: Coherent Structures in Dynamical Systems, Leiden, The Netherlands
- 2011 May Syracuse University, Department of Mechanical and Aerospace Engineering Seminar
- 2010 May 8th American Institute of Mathematical Sciences Conference on Dynamical Systems, Special Session 30: Lagrangian Coherent Structures and Invariant Manifolds: Analysis and Applications, Dresden, Germany



- 2010 Feb Stanford University, Department of Aeronautics and Astronautics Seminar  
2009 Oct University of Iowa, Department of Mechanical Engineering Seminar  
2009 Jan California Institute of Technology, Department of Mechanical Engineering Seminar

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Non-refereed abstracts and presentations

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- 2020 52. Brooks, S. A. & Green, M. A. *Locomotive Performance of a Two Degree-of-Freedom Fish Model*, 73rd Annual Meeting of the APS Division of Fluid Dynamics, Virtual Online. 22–24 November 2020.
- 2020 53. Siala, F. & Green, M. A. *Instantaneous thrust production mechanisms and vortex shedding dynamics of oscillatory propulsors in inviscid flows*, 73rd Annual Meeting of the APS Division of Fluid Dynamics, Virtual Online. 22–24 November 2020.
- 2020 54. Liu, Y., Siala, F., Budišić, M. & Green, M. A. *Persistent Homology of FTLE Patterns Generated by Point Vortex Motion*, 73rd Annual Meeting of the APS Division of Fluid Dynamics, Virtual Online. 22–24 November 2020.
- 2020 55. Gladson, Sareta, Brooks, S. A., & Green, M. A. *Measurements of performance and kinematics for a steady sinusoidal swimming gait of a 3 degree of freedom fish model*, 73rd Annual Meeting of the APS Division of Fluid Dynamics, Virtual Online. 22–24 November 2020.
- 2019 56. Brooks, S. A. & Green, M. A. *Vorticity Generation and Arrangement Behind a Two Degree-of-Freedom Fish Model*, 72nd Annual Meeting of the APS Division of Fluid Dynamics, Seattle, WA, USA. 23–26 November 2019.
- 2019 57. Stutz, C., Bohl, D., & Green, M. A. *Wake Properties of an Oscillating Airfoil Undergoing Asymmetric Oscillation*, 72nd Annual Meeting of the APS Division of Fluid Dynamics, Seattle, WA, USA. 23–26 November 2019.
- 2019 58. Liu, Y., Bohl, D., & Green, M. A. *Application of FTLE analysis on unsteady flow around pitching airfoils of different amplitude*, 72nd Annual Meeting of the APS Division of Fluid Dynamics, Seattle, WA, USA. 23–26 November 2019.
- 2019 59. King, J. T. & Green, M. A. *Trailing edge geometry and angular pitching amplitude effects on the propulsive performance of bio-inspired pitching panels*, 72nd Annual Meeting of the APS Division of Fluid Dynamics, Seattle, WA, USA. 23–26 November 2019.
- 2019 60. Tu, H., Marzanek, M., Rival, D. E., & Green, M. A. *Unsteady flow structure response to acceleration of non-slender swept wings*, 72nd Annual Meeting of the APS Division of Fluid Dynamics, Seattle, WA, USA. 23–26 November 2019.
- 2019 61. Bohl, D. & Green, M. A. *Interaction of the Leading Edge Vortex and Shear Layer Vortices for an Airfoil Undergoing Dynamic Stall*, 72nd Annual Meeting of the APS Division of Fluid Dynamics, Seattle, WA, USA. 23–26 November 2019.
- 2019 62. Green, M. A. & Boone, Z. *3D+time flow visualization in virtual reality*, 72nd Annual Meeting of the APS Division of Fluid Dynamics, Seattle, WA, USA. 23–26 November 2019.
- 2018 63. Brooks, S. A. & Green, M. A. *Wake characteristics of a bio-inspired propulsor behind a streamlined body*, 71st Annual Meeting of the APS Division of Fluid Dynamics, Atlanta, GA, USA. 18–20 November 2018.
- 2018 64. Bohl, D. & Green, M. A. *Vortex Dynamics on an Airfoil Pitching at High Angles*, 71st Annual Meeting of the APS Division of Fluid Dynamics, Atlanta, GA, USA. 18–20 November 2018.

- 2018 65. King, J. T. & Green, M. A. *Experimental study on the effects of trailing edge geometry and pitching amplitude on the wake structure of bio-inspired pitching panels*, 71st Annual Meeting of the APS Division of Fluid Dynamics, Atlanta, GA, USA. 18–20 November 2018.
- 2018 66. Rossetti, J., Dannenhoffer III, J. F. & Green, M. A. *Topology optimization using potential flow analysis*, 71st Annual Meeting of the APS Division of Fluid Dynamics, Atlanta, GA, USA. 18–20 November 2018.
- 2018 67. Liu, Y., Bohl, D. & Green, M. A. *FTLE analysis of unsteady flow around pitching airfoils of high amplitude*, 71st Annual Meeting of the APS Division of Fluid Dynamics, Atlanta, GA, USA. 18–20 November 2018.
- 2018 68. Tu, H., Marzanek, M., Rival, D. E. & Green, M. A. *FTLE structure of the unsteady flow around accelerated non-slender swept wings*, 71st Annual Meeting of the APS Division of Fluid Dynamics, Atlanta, GA, USA. 18–20 November 2018.
- 2017 69. Tu, H. & Green, M. A. *Force production and time-averaged flow structure around thin, non-slender delta wings*, 70th Annual Meeting of the APS Division of Fluid Dynamics, Denver, CO, USA. 19–21 November 2017.
- 2017 70. Kumar, R., King, J. T., & Green, M. A. *Lagrangian coherent structure analysis in the three-dimensional wake of a bio-inspired trapezoidal pitching panel*, 70th Annual Meeting of the APS Division of Fluid Dynamics, Denver, CO, USA. 19–21 November 2017.
- 2017 71. Krishna, S., Green, M. A., & Mulleners, K. *Unsteady fluid dynamics around a hovering wing*, 70th Annual Meeting of the APS Division of Fluid Dynamics, Denver, CO, USA. 19–21 November 2017.
- 2017 72. King, J. T. & Green, M. A. *Experimental study on the effects of trailing edge geometry on the propulsive performance and wake structure of bio-inspired pitching panels*, 70th Annual Meeting of the APS Division of Fluid Dynamics, Denver, CO, USA. 19–21 November 2017.
- 2017 73. Pietraszewski, N., Dhillon, R. S. & Green, M. A. *3D flow visualization in virtual reality*, 70th Annual Meeting of the APS Division of Fluid Dynamics, Denver, CO, USA. 19–21 November 2017.
- 2017 74. Brooks, S. & Green, M. A. *Experimental study of attached splitter plate effects on the wake of a circular cylinder using finite-time Lyapunov exponents*, 70th Annual Meeting of the APS Division of Fluid Dynamics, Denver, CO, USA. 19–21 November 2017.
- 2016 75. Rockwood, M. P. & Green, M. A. *Relating surface pressure to Lagrangian wake topology around a circular cylinder in cross flow*, 69th Annual Meeting of the APS Division of Fluid Dynamics, Portland, OR, USA. 20–22 November 2016.
- 2016 76. Huang, Y. & Green, M. A. *Identification and tracking of hairpin vortex auto-generation in turbulent wall-bounded flow*, 69th Annual Meeting of the APS Division of Fluid Dynamics, Portland, OR, USA. 20–22 November 2016.
- 2016 77. Kumar, R., King, J. T., & Green, M. A. *Momentum distribution in the wake of a bio-inspired trapezoidal pitching panel*, 69th Annual Meeting of the APS Division of Fluid Dynamics, Portland, OR, USA. 20–22 November 2016.
- 2016 78. King, J. T., Kumar, R. & Green, M. A. *Experimental study of surface pattern effects on the propulsive performance and wake of a bio-inspired pitching panel*, 69th Annual Meeting of the APS Division of Fluid Dynamics, Portland, OR, USA. 20–22 November 2016.
- 2016 79. Mulleners, K., Krishna, S. & Green, M. A. *Identification of separate flow features in the shear layer*, 69th Annual Meeting of the APS Division of Fluid Dynamics, Portland, OR, USA. 20–22 November 2016.

- 2016 80. Krishna, S. Mulleners, K. & Green, M. A. *Potential flow predictions for a flapping flat plate wing*, 69th Annual Meeting of the APS Division of Fluid Dynamics, Portland, OR, USA. 20–22 November 2016.
- 2015 81. King, J. T. & Green, M. A. *Experimental study of Strouhal number effects on the wake produced by a trapezoidal pitching panel*, 68th Annual Meeting of the APS Division of Fluid Dynamics, San Francisco, CA, USA. 22–24 November 2015.
- 2015 82. Huang, Y., Hadjighasem, A., Green, M. A., & Haller, G. *Objective detection of vortices in massively-separated flow*, 68th Annual Meeting of the APS Division of Fluid Dynamics, San Francisco, CA, USA. 22–24 November 2015.
- 2015 83. Rockwood, M. P., & Green, M. A. *Correlating Velocity Information in the Vicinity of Lagrangian Saddle Points to the Spatially and Temporally Resolved Static Pressure Distribution on a Circular Cylinder*, 68th Annual Meeting of the APS Division of Fluid Dynamics, San Francisco, CA, USA. 22–24 November 2015.
- 2015 84. Bohl, D. & Green, M. A. *Experimental Investigation of Dynamic Stall on a NACA0012 Airfoil Undergoing Sinusoidal Pitching*, 68th Annual Meeting of the APS Division of Fluid Dynamics, San Francisco, CA, USA. 22–24 November 2015.
- 2015 85. Haffner, E., Green, M. A., Hamlington, P., Poludnenko, A., & Oran, E. *Coherent structure dynamics during turbulence-flame interaction*, 68th Annual Meeting of the APS Division of Fluid Dynamics, San Francisco, CA, USA. 22–24 November 2015.
- 2015 86. Krishna, S., Mulleners, K., & Green, M. A. *A Lagrangian approach to study flow topology around a flapping flat-plate wing*, 68th Annual Meeting of the APS Division of Fluid Dynamics, San Francisco, CA, USA. 22–24 November 2015.
- 2015 87. Galvez, R. & Green, M. A. *The Finite Time Lyapunov Exponent Field of  $N$  Interacting Vortices in the Zero Viscosity Limit*, 68th Annual Meeting of the APS Division of Fluid Dynamics, San Francisco, CA, USA. 22–24 November 2015.
- 2015 88. Rossetti, J., Green, M. A., & Dannenhoffer, J. *Lagrangian Proper Orthogonal Decomposition of the Wake Downstream of a Cylinder*, 68th Annual Meeting of the APS Division of Fluid Dynamics, San Francisco, CA, USA. 22–24 November 2015.
- 2015 89. Liu, Y., Wilson, C., & Green, M. A. *Lagrangian coherent structures in the Gulf Stream*, 68th Annual Meeting of the APS Division of Fluid Dynamics, San Francisco, CA, USA. 22–24 November 2015.
- 2014 90. Berger, Z. P., King, J. T., & Green, M. A. *Identification of Vortex Breakdown in Bio-Inspired Wakes Using Proper Orthogonal Decomposition*, 67th Annual Meeting of the APS Division of Fluid Dynamics, San Francisco, CA, USA. 23–25 November 2014.
- 2014 91. Huang, Y. & Green, M. A. *Eulerian and Lagrangian methods for vortex tracking in 2D and 3D flows*, 67th Annual Meeting of the APS Division of Fluid Dynamics, San Francisco, CA, USA. 23–25 November 2014.
- 2014 92. Rockwood, M.P. & Green, M. A. *The Effect of Phase Averaging Techniques on Lagrangian Coherent Structures in the Wake of a Circular Cylinder*, 67th Annual Meeting of the APS Division of Fluid Dynamics, San Francisco, CA, USA. 23–25 November 2014.
- 2013 93. Jeter, T. R. & Green, M. A. *Vortical wake evolution and its effect on performance using Lagrangian coherent structures*, 66th Annual Meeting of the APS Division of Fluid Dynamics, Pittsburgh, PA, USA. 24–26 November 2013.

- 2013 94. Rockwood, M.P. & Green, M. A. *A Lagrangian Coherent Structures Analysis of the Unsteady Wake Behind a Circular Cylinder*, 66th Annual Meeting of the APS Division of Fluid Dynamics, Pittsburgh, PA, USA. 24–26 November 2013.
- 2012 95. Green, M. A. *Using LCS to identify vortex shedding on a cylinder in cross-flow*, 65th Annual Meeting of the APS Division of Fluid Dynamics, San Diego, CA, USA. 18–20 November 2012.
- 2012 96. Rockwood, M.P. & Green, M. A. *2D FTLE in 3D flows: The accuracy of using two-dimensional data for Lagrangian analysis in a three-dimensional turbulent channel*, 65th Annual Meeting of the APS Division of Fluid Dynamics, San Diego, CA, USA. 18–20 November 2012.
- 2011 97. Green, M. A., Hamlington, P. E., Poludnenko, A. Y., & Oran, E. S. *Using LCS to study coherent structures in reacting flows*, 64rd Annual Meeting of the Division of Fluid Dynamics, Baltimore, MD, USA. 20–22 November 2011.
- 2010 98. Green, M. A., Kaplan, C. R., Oran, E. S. & Boris, J. P. *A dynamic model of human physiology*, 63rd Annual Meeting of the Division of Fluid Dynamics, Long Beach, CA, USA. 21–23 November 2010.
- 2009 99. Green, M. A., Rowley, C. W., & Smits, A. J. *Three-dimensional wake of a biologically-inspired propulsor*, 62nd Annual Meeting of the Division of Fluid Dynamics, Minneapolis, MN, USA. 22–24 November 2009.
- 2009 100. Green, M. A., Rowley, C. W., & Smits, A. J. *Vortex Wake Structure of Rigid Panels with Biologically Inspired Geometry*, 2009 SIAM Conference on Applications of Dynamical Systems, Snowbird, UT, USA. 17–21 May 2009.
- 2008 101. Green, M. A., & Smits, A. J. *LCS analysis of a biologically inspired wake*, 61st Annual Meeting of the Division of Fluid Dynamics, San Antonio, TX, USA. 23–25 November 2008.
- 2007 102. Green, M. A. & Rowley, C. W. *Detection of Lagrangian Coherent Structures in 3D Turbulence*, 2007 SIAM Conference on Applications of Dynamical Systems, Snowbird, UT, USA. 28 May – 1 June 2007.
- 2007 103. Green, M. A., & Smits, A. J. *Wake structure of rigid pitching panels with biologically inspired geometry*, 60th Annual Meeting of the Division of Fluid Dynamics, Salt Lake City, UT, USA. 18–20 November 2007.
- 2006 104. Green, M. A., Rowley, C. W., & Haller, G. *Detection of Lagrangian coherent structures in 3D Turbulence*, 59th Annual Meeting of the Division of Fluid Dynamics, Tampa Bay, FL, USA. 19–21 November 2006.
- 2006 105. Buchholz, J., Green, M. A., & Smits, A. J. *Pressure distribution, thrust performance, and wake structure of a low-aspect ratio pitching panel*, 59th Annual Meeting of the Division of Fluid Dynamics, Tampa Bay, FL, USA. 19–21 November 2006.
- 2005 106. Green, M., Parker, K., & Soria, J. *2D PIV of a pitching airfoil*, 58th Annual Meeting of the Division of Fluid Dynamics, Chicago, IL, USA. 20–22 November 2005.

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### Service to the Profession

#### Society and External service

- 2006 – pres American Physical Society, Member  
 Member (2020) of the Diversity and Inclusion Committee, Women in Fluids Network coordinator  
 Vice-chair (2017) and Chair (2018) of the External Affairs Committee

- 2011 – pres. American Institute of Aeronautics and Astronautics (AIAA), Member  
 2013 – 2018 AIAA Fluid Dynamics Technical Committee, Fundamentals of flow phenomena Subcommittee  
*Current co-chair* of Massively Separated Flows Discussion Group  
 2012 – pres. American Society of Mechanical Engineers (ASME), Member  
 2018 Invited guest speaker, Rowan College at Gloucester County STEAM Con

## Journal service

- 2015 – 2019 AIAA Journal  
*Associate Editor*  
 2011 – pres. Peer reviewer: Journal of Fluid Mechanics; Chaos, Physical Review Fluids; Physics of Fluids; Experiments in Fluids; Physical Review E; AIAA Journal; Experimental Thermal and Fluid Science; Journal of Hydro-environment; Physica D; Journal of Fluids and Structures; Geophysical Research Letters; Theoretical and Computational Fluid Dynamics; Progress in Turbulence; ASME International Gas Turbine Institute Turbo Expo

## Conference service

- 2018 AIAA Aviation Forum, 25–29 June  
*Assistant Organizer, Fluid Dynamics*  
 2013 – pres 1000 Island Fluid Dynamics Meeting  
*Technical chair, session organizer*  
 2017 Symposium on the Physics and Control of Turbulent Shear Flow, 10–11 July 2017  
*Co-organizer*  
 2017 AIAA Science and Technology Forum, 9–13 January  
*Assistant Organizer, Fluid Dynamics*  
*Session chair: FD-07. Low-Re and Bio-Inspired Flows I: Applications*  
*Session chair: FD-34. Special Session: Low Reynold's Number Flows*  
 2016 APS Division of Fluid Dynamics Annual Meeting, 23–25 November  
*Session chair: G3: Vortex Dynamics: Mechanisms and Plates*  
 2016 AIAA Science and Technology Forum, 4–8 January  
*Co-technical chair, Fluid Dynamics*  
*Session chair: FD-01: Special Session: Low Re & Bio-inspired Flows Discussion Group*  
 2015 AIAA Aviation, 22–26 June  
*Assistant Organizer, Fluid Dynamics, Fundamental Flow Phenomena Sub-topic*  
*Session chair: FD-02: Fundamental Fluid Flows*  
 2015 AIAA Science and Technology Forum, 5–9 January  
*Session chair: FD-01, Bio-inspired Flow*  
 2014 APS Division of Fluid Dynamics Annual Meeting, 23–25 November  
*Session chair: D18: Vortex Dynamics: Flow Induced Vibrations and Interactions*  
 2014 AIAA Science and Technology Forum, 13–17 January  
*Assistant Organizer, Fluid Dynamics, Fundamental Flow Phenomena Sub-topic*  
*Session chair: FD-07: Bioinspired Aerodynamics: Numerical*  
*Session chair: FD-34: Vortex Flows*  
 2013 APS Division of Fluid Dynamics Annual Meeting, 24–26 November  
*Session chair: G12, Vortex Dynamics and Vortex Flows IV*

- 2013 AIAA Fluid Dynamics Meeting, 24-27 June  
*Session chair: FD-04, Flapping-Wing Aerodynamics*
- 2012 APS Division of Fluid Dynamics Annual Meeting  
*Session chair: G28, Swimming Efficiency*
- 2012 American Physical Society Division of Fluid Dynamics Annual Meeting  
*Session chair: E13, Biofluids: Cardiovascular: FSI and CFD*

### Service to the University/Department

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#### University service

- 2020 – pres Syracuse University BioInspired Institute  
*Focus Area Leader and proposal co-author: Form & Function ([link](#))*
- 2020 – pres Syracuse University Virtual & Immersive Interactions Research Cluster  
*Proposal co-author and current primary contact. ([link](#))*
- 2018 – 2020 Syracuse University College of Engineering and Computer Science Inclusive Excellence Council
- 2018 – pres Syracuse University Women in Science and Engineering (WiSE)  
*Co-advisor for Faculty Mentoring*
- 2015 – 2017 Syracuse University Research Computer Advisory Council (RCAC)
- 2016 Research Computing Engineer search committee

#### College/Department service

- 2020
- 2020 *Chair*, Department Chair review committee
- 2019, 2017 Department faculty search committee
- 2014
- 2019 *Panelist*, Syracuse University College of Engineering and Computer Science New Faculty Event, "Recruiting and Managing Graduate Students in Research Groups."
- 2016 – 2017 *Invited guest speaker*, Syracuse University chapter of ASEE "Engineering PhD Academic Career Pathways"
- 2016 Organized Pointwise/Caelus CFD and Meshing Workshop for Syracuse University Mechanical and Aerospace Engineering juniors and seniors. Attendance ~ 20 students.
- 2016 Associate Dean of Research search committee
- 2016 Participated in "Safer Spaces" workshop offered by Syracuse University LGBT Resource Center
- 2015 Organized Syracuse CoE Research Science and Technology Forum, "Optimizing Dynamic Thrust: What Would Nature Do?"
- 2014 MAE Department Semina instructor/chair
- 2014 – 2016. Syracuse Museum of Science and Technology Summer Women's Science Camp, Organizer of "Research Day" on Syracuse University campus
- 2014 – pres. Project ENGAGE, Participating faculty