

# ROBERT WELLS WHITTLESEY

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## 1 Education

- Pursuing Doctor of Philosophy in Aeronautics, California Institute of Technology
  - July 2008 - *Present*
- Master of Science in Aeronautics, California Institute of Technology
  - September 2008 - June 2009
- Bachelor of Science in Aerospace Engineering, Bachelor of Science in Mechanical Engineering, Illinois Institute of Technology
  - August 2004 - May 2008
  - Graduated Summa Cum Laude

## 2 Research Experience

- Graduate Student - California Institute of Technology, Pasadena, CA - 2008-*present*
  - Investigating enhanced propulsion mechanisms using inspiration from jellyfish.
  - Also investigated novel idea for yielding more power output from vertical axis wind turbines using a wind-farm arrangement modeled after vortices shed by schooling fish.
  - Advisor: Prof. John O. Dabiri
- Research Assistant - Illinois Institute of Technology, Chicago, IL - 2006-2008
  - Investigated a three-dimensional analysis of separation control in an axial flow compressor with aim to delay rotating stall.
  - Worked independently to bring compressor back into full-working order and carried out experimental techniques

## 3 Publications

3. **R W Whittlesey** “Wake-based unsteady modeling of the aquatic beetle *Dytiscus marginalis*,” *Journal of Theoretical Biology*, 2011, Vol. 291, pp 14-21.  
doi: 10.1016/j.jtbi.2011.08.005
2. L A Ruiz, **R W Whittlesey**, J O Dabiri “Vortex-enhanced propulsion,” *Journal of Fluid Mechanics*, 2011, Vol. 668, pp 5-32.  
doi: 10.1017/S0022112010004908

1. **R W Whittlesey**, S Liska, J O Dabiri “Fish schooling as the basis for vertical axis wind turbine farm design,” *Biospiration and Biomimetics*, 2010, Vol. 5, 035005.  
doi: 10.1088/1748-3182/5/3/035005

## 4 Patents and Patent Applications

- “Passive Mechanism for Pulsatile Jet Propulsion,” CIT-5672-P
- “A Two-Dimensional Array of Turbines,” U.S. 12/644,667; PCT/US2009/069205

## 5 Invited Presentations

1. “Innovative concepts: Fish Schooling as a Basis for Vertical Axis Wind Turbine Farm Design.” 1st World Summit on Small Wind Turbines, a part of the New Energy Husum show, Husum, Germany, March 2010.

## 6 Conference Presentations

10. “Bio-inspired Propulsion: Efficiency Improvements in UUVs using a Starling Vortex Generator” 29th Symposium on Naval Hydrodynamics, Gothenburg, Sweden, August 2012
9. “Improving propulsive efficiency through passive mechanisms using a Starling vortex generator” 64th Annual Meeting of the APS Division of Fluid Dynamics, Baltimore, MD, November 2011
8. “Passively pulsed propulsion of aquatic vehicles” 63rd Annual Meeting of the APS Division of Fluid Dynamics, Long Beach, CA, November 2010
7. “Fish Schooling as the Basis for Vertical Axis Wind Turbine Farm Design” 4th Southern California Symposium on Flow Physics, UC:Irvine, Irvine, CA, April 2010
6. “Fish schooling as a basis for wind farm design” 62nd Annual Meeting of the APS Division of Fluid Dynamics, Minneapolis, MN, November 2009
5. “Corner Separation and the onset of stall in an axial compressor” AIAA 38th Fluid Dynamics Conference and Exhibit, Seattle, WA, June 2008, AIAA 2008-4299
4. “Corner Separation and the onset of stall in an axial compressor” Chicago Area Undergraduate Research Symposium (CAURS), Oral and Poster presentation, Illinois Institute of Technology, April 2008
3. “Corner Separation and the onset of stall in an axial compressor” IIT Research Day Research Poster Competition, Illinois Institute of Technology, April 2008
2. “Corner Separation and the onset of stall in an axial compressor” IIT MMAE Department 2008 Research Poster Competition, Illinois Institute of Technology, March 2008
1. “Corner Separation and the onset of stall in an axial compressor” Great Midwestern Regional Space Grant Meeting Poster Competition, Purdue University, September 2007

## 7 Awards

- Chicago Area Undergraduate Research Symposium (CAURS), Joe Cribari President's Award (Top Oral and Poster), Illinois Institute of Technology, April 2008
- IIT Research Day Research Poster Competition, First Place, Undergraduate Category, Illinois Institute of Technology, April 2008
- Russell R. Vought Graduate Fellowship, California Institute of Technology, March 2008
- IIT MMAE Department 2008 Research Poster Competition, First Place, Undergraduate Category, Illinois Institute of Technology, March 2008
- IIT MMAE Department 2008 Outstanding Senior Award, Illinois Institute of Technology, March, 2008
- NASA Illinois Space Grant Consortium Undergraduate Scholarship, April 2007
- LaVerne Noyes Scholarship, Illinois Institute of Technology, May 2004

## 8 Teaching and Mentoring

- *ME19 Fluid Mechanics* Teaching Assistant, Fall 2011 and Winter 2012
  - Compiled, produced, and graded biweekly homework assignments for junior-level undergraduate students.
  - Hold weekly office hours to assist students in understanding material covered in class and homework assigned.
- *Ae104b Experimental Methods* Teaching Assistant, Winter 2011
  - Developed and managed a Particle Image Velocimetry Laboratory for first-year graduate students.
  - Each group of two students had three weeks to complete the laboratory and write up the lab report.
- *Ae/Be242 Biological Flows: Propulsion* Tutor, Winter 2011
- PUSD Robotics Teacher, McKinley Middle School, Pasadena, CA, 2010-2011 Academic Year
  - Taught robotics to eighth-grade students using Lego NXT as our robotics platform and "RobotC" as the programming language (a variant of 'C').
  - Extensively supplemented provided curriculum with new challenges (akin to short labs) and tests for the students.
  - Students were able to complete various challenges with their robotics including cooperative (multiple-robot) challenges and multi-sensory challenges.
- Caltech Classroom Connection Volunteer, Wilson Middle School, Pasadena, CA, Spring 2010

- Assisted Mr. Darius Hines, a science teacher, develop and execute a robotics class.
  - Curriculum focused on teaching students programming as well as creating a better understanding of technology.
  - Students were able to leverage their programming skills to compete in a robotic obstacle course that required the robots to track lines and detect obstacles without human intervention.
- Co-mentored Joseph Laurienti, a Caltech Summer Undergraduate Research Fellow from the University of Southern California, Summer 2010

## 9 Memberships in Professional Societies

- 2009 - *present*: American Physical Society
- 2005 - 2009: American Society of Mechanical Engineers
- 2005 - 2009: American Institute of Aeronautics and Astronautics

## 10 Other Skills

- Computer and Programming
  - MATLAB, L<sup>A</sup>T<sub>E</sub>X, Perl, Python, some C++ and C
  - Well-versed in Windows 7, Mac OS X, and Linux (RHEL, Ubuntu)
- SCUBA
  - Open Water Certified, NAUI, February 2010
  - American Academy of Underwater Sciences Certified, April 2010

## 11 Employment

- Research Assistant - Mechanical, Materials, & Aerospace Engineering Department at the Illinois Institute of Technology, Chicago, IL - 2006-2008
- Learning Assistant - Illinois Institute of Technology, Chicago, IL - 2007-2008
  - Lived on a freshman floor and was responsible for encouraging academic success.
  - Worked with individual students to discuss academic goals and resources available to help them meet those goals.
  - Provided tutoring during finals and throughout the semester to individual students.
- Summer Internship - The Boeing Company, Everett, WA - 2006
- Summer Internship - Wireless Applications Corporation, Bellevue, WA - 2005, 2006, and 2008