

# Jessica K. Shang

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## Education

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**Stanford University** Stanford, CA  
*Postdoctoral Fellow, School of Medicine* July 2015 – June 2016

– Department of Pediatrics; Stanford Cardiovascular Institute. Advisor: Alison L. Marsden

**Princeton University** Princeton, NJ  
*PhD, Mechanical & Aerospace Engineering* 2015

– Thesis: Flexibility and curvature effects on vortex dynamics and fluid-structure interactions.  
Advisors: Profs. Howard A. Stone & Alexander J. Smits

**University of Cambridge** Cambridge, United Kingdom  
*MPhil, Engineering* 2011

– Thesis: Effects of low-amplitude vibrations on impulsively-started wings at incidence. Supervisor:  
Prof. Holger Babinsky

**Harvard University** Cambridge, MA  
*AB, Engineering Sciences, cum laude with highest honors* 2008

– Thesis: Design and fabrication of a four-winged micro air vehicle. Advisor: Robert J. Wood.

## Honors and Awards

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Office of Naval Research Summer Faculty Research Fellow, 2017  
Stanford Cardiovascular Institute Fellow, NIH T32 training grant, 2015  
Larisse Rosentweig Klein Memorial Award (Princeton), 2013  
Princeton University Francis Upton Graduate Fellow (Princeton), 2009  
National Science Foundation Graduate Research Fellow, 2008  
Gates Cambridge Scholar (Gates Foundation), 2008

## Service

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Member: American Physical Society, SWE  
Review committee: National Sciences and Engineering Research Council of Canada (NSERC)  
Referee for *AIAA Journal*, *J. of Fluids and Structures*, *J. of Visualized Experiments*, *Ocean Engineering*,  
*Physics of Fluids*  
Faculty advisor for University of Rochester Society of Women Engineers chapter  
Session chair: SB3C 2016, *Aneurysm biomechanics*

## Teaching Experience

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**University of Rochester** Rochester, NY  
– ME 241: Fluids Lab Spring 2017 –  
– ME 444: Continuum Mechanics Fall 2017

## Princeton University

Princeton, NJ

- MAE 433: Automatic control systems, Assistant-in-instruction. Spring 2013
- MAE 335: Fluid dynamics, Assistant-in-instruction. Fall 2012
- MAE 222: Mechanics of fluids, Assistant-in-instruction. Spring 2012

## Harvard University

Cambridge, MA

- ES 123: Introduction to fluid mechanics and transport processes, Teaching fellow. Spring 2008
- ES 51: Computer-aided machine design, Teaching fellow. Fall 2006

## Publications

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### Peer-Reviewed Articles

10. J. K. Shang, M. Esmaily, R. Figliola, O. Reinhartz, T. Y. Hsia, and A. L. Marsden, 2018. Patient-specific modeling of the assisted bidirectional Glenn, *J. Thoracic and Cardiovascular Surgery*, in preparation.
9. J. K. Shang, H. A. Stone, and A. J. Smits, 2018. Flow past a concave cylinder of constant curvature, *J. Fluid Mech.*, accepted.
8. A. Verma, M. Esmaily, J. K. Shang, R. Figliola, J. A. Feinstein, T. Y. Hsia, and A. L. Marsden, 2018. Optimization of the Assisted Bidirectional Glenn Procedure for First Stage Single Ventricle Repair, *World J. for Pediatric & Congenital Heart Surgery*, accepted.
7. I. Jacobi, J. S. Wexler, M. A. Samaha, J. K. Shang, B. J. Rosenberg, M. Hultmark, and H. A. Stone, 2015. Stratified thin-film flow in a rheometer, *Phys. Fluids*, **27** 052102.
6. J. K. Shang, H. A. Stone, and A. J. Smits, 2014. Vortex and structural dynamics of a flexible cylinder in cross-flow, *Phys. Fluids*, **26** 053605.
5. J. H. Tu, C. W. Rowley, J. N. Kutz, and J. K. Shang, 2014. Spectral analysis of fluid flows using sub-Nyquist-rate PIV data, *Exp. Fluids*, **55** 1805.
4. J. K. Shang, A. J. Smits, and H. A. Stone, 2013. The appearance of P+S modes in the wake of a freely vibrating, highly flexible cylinder, *J. Fluids Structures*, **43** 481–486.
3. J. K. Shang, B. M. Finio, S. A. Combes, and R. J. Wood, 2009. Artificial insect wings of arbitrary morphology for flapping wing MAVs, *J. Bioinspir. Biomim.*, **4** 036002.
2. B. O. Mysen and J. Shang, 2005. Evidence from olivine/melt element partitioning that nonbridging oxygen in silicate melts are not equivalent, *Geochim. Cosmochim. Acta*, **69** 2861-2875.
1. B. O. Mysen and J. Shang, 2003. Fractionation of major element between co-existing  $H_2O$  silicate melt and silicate-saturated aqueous fluid in aluminosilicate systems at 1-2 GPa, *Geochim. Cosmochim. Acta*, **67** 3925-3936.

### Refereed Abstracts/Proceedings

3. A. Verma, M. Esmaily, J. K. Shang, R. Figliola, T. Y. Hsia, and A. L. Marsden, 2017. Optimization of Systemic-to-Pulmonary Shunt Design in the Assisted Bi-directional Glenn, *Summer Biomechanics, Bioengineering, and Biotransport Conference*, Tuscon, AZ.
2. J. Shang, M. Esmaily-Moghadam, T. Khalapyan, R. Figliola, O. Reinhartz, T.-Y. Hsia, A. Marsden, 2016. Implementation of the Assisted Bidirectional Glenn in an Idealized Single Ventricle Model, *Summer Biomechanics, Bioengineering, and Biotransport Conference*, National Harbor, MD.
1. B. M. Finio, J. K. Shang, and R. J. Wood, May 2009. Body torque modulation of a microrobotic fly, *IEEE International Conference on Robotics and Automation*, Kobe, Japan.

## Presentations

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### *Invited Seminars*

9. George Washington University, Dept of Mechanical Engineering (Oct 2016)
8. Rochester Institute of Technology, Center for Applied and Computational Mathematics (Oct 2016)
7. University of Rochester, Physical Models of Biological Systems (Aug 2016)
6. University of Rochester, Dept of Mechanical Engineering (Feb 2015)
5. Georgia Tech, Woodruff School of Mechanical Engineering (Feb 2015)
4. UC Davis, Dept of Mechanical and Aerospace Engineering (Feb 2015)
3. UC Santa Barbara, Dept of Mechanical Engineering (May 2014)
2. University of Notre Dame, Dept of Aerospace and Mechanical Engineering (Apr 2014)
1. MIT, Women in Aerospace Symposium (Apr 2013)

### *Oral Presentations*

15. J. H. Kim, W. Gorman, J. Shang, 2017. Droplet impact dynamics on flexible superhydrophobic surfaces, *70th Annual Meeting, APS DFD*, Boulder, CO.
14. A. Verma, J. Shang, M. Esmaily, K. Wong, A. Marsden, 2016. Shape Optimization of the Assisted Bi-directional Glenn surgery for stage-1 single ventricle palliation, *69th Annual Meeting, APS DFD*, Portland, OR.
13. J. Shang, M. Esmaily, R. Figliola, T.-Y. Hsia, A. Marsden, 2016. Patient-specific modeling of the Assisted Bidirectional Glenn (ABG), *69th Annual Meeting, APS DFD*, Portland, OR.
12. J. Shang, A. J. Smits, H. A. Stone, 2015. Flow past a finite cylinder of constant curvature, *68th Annual Meeting, APS DFD*, Boston, MA.
11. A. Marsden, J. Shang, M. Esmaily-Moghadam, R. Figliola, O. Reinhartz, T.-Y. Hsia, 2015. Optimization of the assisted bidirectional Glenn for single ventricle palliation, *68th Annual Meeting, APS DFD*, Boston, MA.
10. J. Shang, A. J. Smits, H. A. Stone, 2014. Drag on a liquid-infused superhydrophobic cylinder, *67th Annual Meeting, APS DFD*, San Francisco, CA.
9. M. Fu, H. A. Stone, A. J. Smits, I. Jacobi, M. Samaha, J. Wexler, J. Shang, B. Rosenberg, L. Hellström, Y. Fan, K. Wang, K. Lee, M. Hultmark, 2014. Liquid-infused surfaces in turbulent channel flow, *67th Annual Meeting, APS DFD*, San Francisco, CA.
8. M. Samaha, J. Shang, M. Fu, K. Wang, H. A. Stone, A. J. Smits, M. Hultmark, 2014. Measurements of drag reduction by SLIPS, *67th Annual Meeting, APS DFD*, San Francisco, CA.
7. J. K. Shang, B. Rosenberg, P. Dewey, H. A. Stone, and A. J. Smits, 2013. Flow around a superhydrophobic cylinder, *66th Annual Meeting, APS DFD*, Pittsburgh, PA.
6. M. Hultmark, H. A. Stone, A. J. Smits, I. Jacobi, M. Samaha, J. Wexler, J. K. Shang, B. Rosenberg, L. Hellstroem, Y. Fan, 2013. Drag reduction using slippery liquid infused surfaces, *66th Annual Meeting – APS DFD*, Pittsburgh, PA.
5. B. Rosenberg, M. A. Samaha, I. Jacobi, J. K. Shang, M. Hultmark, A. J. Smits, 2013. Longevity and drag reduction of omniphobic surfaces, *66th Annual Meeting, APS DFD*, Pittsburgh, PA.
4. J. K. Shang, H. A. Stone, and A. J. Smits, 2012. Characterization of vortex-induced vibration of a flexible cylinder, *65th Annual Meeting, APS DFD*, San Diego, CA.
3. B. Rosenberg, G. Arwatz, J. K. Shang, and A. J. Smits, 2012. Flow over slippery liquid-infused porous surfaces, *65th Annual Meeting, APS DFD*, San Diego, CA.

2. J. K. Shang, A. J. Smits, and H. A. Stone, 2011. A cantilevered flexible cylinder in cross-flow, *64th Annual Meeting, APS DFD*, Baltimore, MD.
1. J. K. Shang and H. Babinsky, 2010. Effect of low-amplitude vibrations on impulsively-started wings, *63rd Annual Meeting, APS DFD*, Long Beach, CA.

#### *Video/Poster Presentations*

3. J. K. Shang, H. A. Stone, and A. J. Smits, 2014. Flow around a superhydrophobic cylinder, *Purdue Prospective Faculty Workshop*, Lafayette, IN.
2. J. K. Shang, A. J. Smits, and H. A. Stone, 2012. Wakes and trajectories of a flexible cantilevered cylinder, *Fluid and Elasticity Conference*, La Jolla, CA.
1. J. Shang, M. Sullivan, and H. A. Stone, 2007. Hydrodynamic Cavitation: A Demonstration Suitable for the Classroom, *60th Annual Meeting, APS DFD*, Salt Lake City, UT.

#### *Exhibits*

2. Robotic fly prototype displayed at “Ecological Urbanism: Alternative and Sustainable Cities of the Future” symposium and exhibition. Harvard University Graduate School of Design, 3/30/09-5/17/09.
1. Flybot robotic fly, in “Design and the elastic mind,” New York Museum of Modern Art, 2/24/08-5/12/08.