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CURRICULUM VITAE

HAIJUN LIU

Assistant Professor

Department of Mechanical Engineering
Temple University
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RESEARCH INTERESTS

- Bio-inspired sensing and bio-mechanics
- Acoustic metamaterials
- Sound source localization and robotic navigation
- Sensors for civil, mechanical, biochemical, biomedical, and environmental applications
- Theoretical and experimental mechanics

EDUCATION

- **Ph.D. in Mechanical Engineering**, University of Maryland, College Park, 2012
  Dissertation: Understanding and Mimicking the Fly's Directional Hearing: Modeling, Sensor Development, and Experimental Studies (Advisor: Dr. Miao Yu)
- **M.S. in Material Science**, Tsinghua University (Beijing), 2005
  Thesis: Finite element simulation based on crystal plasticity theory (Advisor: Dr. Pan Zeng)
- **B.S. in Mechanical Engineering**, Tsinghua University (Beijing), 2002

PRIOR EMPLOYMENT

- **Research Associate, 2013-2015**
  Department of Mechanical Engineering, University of Maryland, College Park
  Sensor Science Division, National Institute of Standards and Technology, Gaithersburg, MD
  (Advisor: Dr. Douglas A. Olson and Dr. Miao Yu)
- **Research Assistant, 2007-2012**
  Department of Mechanical Engineering, University of Maryland, College Park
- **Teaching Assistant, 2007, 2009, 2011**
  Department of Mechanical Engineering, University of Maryland, College Park
  Courses: ENES220: Mechanics II (Mechanics of Materials), ENME351: Electronics and Instrumentation II
- **Mechanical Engineer, 2005-2007**
  Asia Pacific Technical Center (Shanghai), FESTO
- **Research Assistant, 2002-2005**
  Department of Mechanical Engineering, Tsinghua University, Beijing

HONORS AND AWARDS

- **Travel Grant to Micro & Nano Poster Forum at ASME IMECE**
  National Science Foundation, 2012
- **Invention of the Year Finalist** (Fly Ear-Inspired Miniature Acoustic Sensor System)
  University of Maryland, 2011
- **Future Faculty Fellow**
  A. James Clark College of Engineering, University of Maryland, 2009
- **Travel Grant to NSF CMMI Research and Innovation Conference**
  National Science Foundation, 2009
- **First Place Poster Award** (Division of Mechanics and Materials)
  Department of Mechanical Engineering Research Review Day, University of Maryland, 2009
- **First Place Poster Award** (Division of Mechanics and Materials)
  Department of Mechanical Engineering Research Review Day, University of Maryland, 2008
- **Outstanding College Graduate of Beijing (北京市优秀大学毕业生)**
  Beijing Bureau of Education, 2002
- **Student Award for Outstanding Academic Performance**
  Tsinghua University, 1999, 2000, 2001, 2003
- **Student Award for Outstanding Charity Work**
  Tsinghua University, 2001

JOURNAL PUBLICATIONS

1. Z. Zhang, Y. Chen, **H. Liu**, H. Bae, D.A. Olson, A.K. Gupta, and M. Yu. On-fiber plasmonic interferometer for multi-parameter sensing, *Optics Express*, **23**(8), 10732-10740 (2015). DOI: 10.1364/OE.23.010732
2. Y. Chen*, **H. Liu***, M. Reilly, H. Bae, and M. Yu. Enhanced acoustic sensing through wave compression and pressure amplification in metamaterials, *Nature Communications*, **5**, 5247 (2014). DOI: 10.1038/ncomms6247. (*: equal contribution)
3. **H. Liu**, D.A. Olson, and M. Yu, Modeling of an air-backed diaphragm in dynamic pressure sensors: effects of the air cavity. *Journal of Sound and Vibration*, **33** (25), 7051-7075 (2014). DOI: 10.1016/j.jsv.2014.07.004
4. H. Bae, D. Yun, **H. Liu**, D.A. Olson, and M. Yu. Hybrid miniature Fabry-Perot sensor with dual optical cavities for simultaneous pressure and temperature measurements, *Journal of Lightwave Technology*, **32** (8), 1585-1593 (2014). DOI: 10.1109/JLT.2014.2308060. (Featured cover art)
5. **H. Liu**, L. Currano, D. Gee, T. Helms, and M. Yu. Understanding and mimicking the dual optimality of the fly ear. *Scientific Reports*, **3**, 2489 (2013). DOI: 10.1038/srep02489.
6. A.P. Lisiewski, **H. Liu**, M. Yu, L. Currano, and D. Gee. Fly-ear inspired micro-sensor for sound source localization in two dimensions, *Journal of the Acoustical Society of America Express Letters*, 129(5): EL166-EL171 (2011). DOI: 10.1121/1.3565473
7. H. Bae, X.M. Zhang, **H. Liu**, and M. Yu. Miniature surface-mountable Fabry-Perot pressure sensor construction with a 45-degree angled fiber, *Optics Letters*, 35 (10), 1701-1703 (2010). DOI: 10.1364/OL.35.001701
8. **H.J. Liu**, M. Yu, and X.M. Zhang. Biomimetic optical directional microphone with structurally coupled diaphragms, *Applied Physics Letters* 93(24), 243902 (2008). DOI: 10.10631/1.3043724. (Selected for the January 1, 2009 issue of Virtual Journal of Biological Physics Research)

9. **H. Liu**, G. Fang, and P. Zeng. Numerical simulation techniques based on crystal plasticity theory, *Journal of Plasticity Engineering*, 13(2), 1-7 (2006). DOI: 10.3969/j.issn.1007-2012.2006.02.001. (Chinese)
刘海军, 方刚, 曾攀. (**2006**). 基于晶体塑性理论的大变形数值模拟技术, 塑性工程学报, 13(2), 1-7.
10. **H. Liu**, H. Bae, Z. Zhang, Y. Chen, Z. Wen, D.A. Olson, and M. Yu. High sensitivity, ultra-miniature fiber optic acoustic sensor based on graphene-silver composite diaphragm. *Applied Physics Letter*, submitted.
11. S.J. Sterbing-D'Angelo, **H. Liu**, M. Yu, and C.F. Moss. Morphology and deflection properties of tactile hairs on the wing membrane of bats: scanning electron microscopy and laser scanning vibrometry, submitted.
12. **H. Liu**, H. Bae, D.A. Olson, and M. Yu. A fiber optic sensor with solid polymer cavity for dynamic pressure measurement in shock tube. In preparation.
13. D.A. Olson, K. Douglass, **H. Liu**, M. Yu, and G. Strousse. Toward the establishment of traceable dynamic pressure standard using laser absorption spectroscopy. In preparation.

CONFERENCE PROCEEDINGS

1. **H. Liu**, D.A. Olson, K.O. Douglass, and M. Yu, Fiber Optic Graphene Sensors for Dynamic Pressure Measurements, Optical Sensors 2015, Boston, MA, June 27-July1, 2015. DOI: 10.1364/SENSORS.2015.SeS4C.3
2. L. Sawaqed, **H. Liu**, and M. Yu. Robotic Sound Source Localization Using Bio-inspired Acoustic Sensors, *ASME 2012 International Mechanical Engineering Congress and Exposition*, Houston, TX, November 9-15, IMECE2012-89561, 57-65, (2012). DOI: 10.1115/IMECE2012-89561.
3. **H. Liu** and M. Yu. Effects of air cavity on fly-ear inspired directional microphones: a numerical study, *SPIE Smart Structures and Materials/NDE*, San Diego, California, March 6-10, *Proc. SPIE 7981*, 79811V, (2011). DOI: 10.1117/12.880619.
4. A.P. Lisiewski, **H. Liu**, and M. Yu. Fly ear inspired miniature sound source localization sensor: localization in two dimensions, *ASME 2010 International Mechanical Engineering Congress and Exposition*, Vancouver, British Columbia, November 12-18, IMECE2010-40741, 339-344, (2010). DOI: 10.1115/IMECE2010-40741.
5. D. Gee, **H. Liu**, L. Currano, and M. Yu. Enhanced directional sensitivity of a biomimetic MEMS acoustic localization sensor, *SPIE Defense, Security, and Sensing*, Orlando, Florida, April 5-9, *Proc. SPIE 7682*, 76820N, (2010). DOI: 10.1117/12.850418.
6. **H. Liu** and M. Yu. A new approach to tackle noise issue in miniature directional microphones: bio-inspired mechanical coupling, *SPIE Smart Structures and Materials/NDE*, San Diego, California, March 7-11, *Proc. SPIE 7647*, 76470P, (2010). DOI: 10.1117/12.847820.
7. **H. Liu**, M. Yu, L. Currano, and D. Gee. Fly-ear inspired miniature directional microphones: modeling and experimental study, *ASME 2009 International Mechanical Engineering Congress and Exposition*, Lake Buena, Florida, November 13-19, IMECE2009-11772, 271-277, (2009). DOI: 10.1115/IMECE2009-11772.
8. **H. Liu**, L. Currano, D. Gee, B. Yang, and M. Yu. Fly-ear inspired acoustic sensors for gunshot localization, *SPIE Defense, Security, and Sensing*, Orlando, Florida, April 13-17, *Proc. SPIE7321*, 73210A, (2009). DOI: 10.1117/12.821212.
9. L.J. Currano, **H. Liu**, D. Gee, B. Yang, and M. Yu. Microscale implementation of a bio-inspired acoustic localization device, *SPIE Defense, Security, and Sensing*, Orlando, Florida, April 13-17, *Proc. SPIE7321*, 73210B, (2009). DOI: 10.1117/12.821675.
10. **H. Liu**, M. Yu, and X.M. Zhang. Understanding fly-ear inspired directional microphones, *SPIE Smart Structures and Materials/NDE*, San Diego, California, March 8-12, *Proc. SPIE 7292*, 72922M, (2009). DOI: 10.1117/12.817703.

11. **H. Liu**, Z. Chen, and M. Yu. Biology-inspired acoustic sensors for sound source localization, *SPIE Smart Structures and Materials/NDE*, San Diego, California, March 9-13, *Proc. SPIE 6932*, 69322Y, (2008). DOI: 10.1117/12.776519.

PRESENTATION

1. **H. Liu**, Y. Chen, H. Bae, and M. Yu, Optimization of graded-index anisotropic acoustic metamaterial for enhanced sensing, ASME IMECE, November 13-19, Houston, TX, 2015.

POSTERS

1. **H. Liu**, D.A. Olson, and M. Yu. Graphene based optical sensors for dynamic pressure measurements. *The 10th International Nanotechnology Conference on Communication and Cooperation* (Gaithersburg, Maryland), May 13-15, 2014.
2. **H. Liu** and M. Yu. Mimicking how the fly hears: fly-ear inspired MEMS acoustic sensors, *Micro & Nano Technology Forum, ASME 2012 International Mechanical Engineering Congress and Exposition (Houston, TX)*, November 9-15, 2012.
3. **H. Liu**, H. Bae, and M. Yu. Biology-inspired miniature optical directional microphones: bridging biological systems and sensor technology. *2009 NSF Engineering Research and Innovation Conference* (Honolulu, Hawaii), June 22-25, 2009.
4. **H. Liu**, H. Bae, and M. Yu. Fly ear inspired miniature directional microphones. *Research Review Day*, Department of Mechanical Engineering, University of Maryland, College Park, March 2, 2009.
5. **H. Liu**, Z. Chen, X.M. Zhang, and M. Yu. Bio-inspired optical directional microphone. *Research Review Day*, Department of Mechanical Engineering, University of Maryland, College Park, March 14, 2008.

PATENTS

1. Miao Yu and **Haijun Liu**, Biology-inspired miniature system and method for sensing and localizing acoustic signals, *US Patent* 8,503,693, 2013

PROFESSIONAL AFFILIATION

- Member of American Society of Mechanical Engineers (ASME)
- Member of Acoustical Society of America (ASA)
- Member of Optical Society of America (OSA)
- Member of International Society for Optical Engineering (SPIE)