

Advancing research and education in Optofluidics, Microfluidics, Bioengineering, and MEMS.

Contact

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Education

Doctor of Philosophy in Engineering Science

Expected Graduation in May 2013

The Pennsylvania State University, University Park, PA

Concentrations: Microfluidics, Optofluidics, MEMS

GPA: 3.9/4.00

Bachelor of Science in Biomedical Engineering

Graduated cum laude in March 2007

Rose-Hulman Institute of Technology, Terre Haute, IN

Minor: Electrical Engineering

Concentration: Bioinstrumentation

GPA: 3.57/4.00



Technical Skills

Electrical

1. Analog electronic design. I have built several amplifier and driving systems for piezoelectric devices. Piezoelectric devices are tricky since they are large capacitive loads and special concerns must be taken to protect amplifiers and drivers from these reactive loads. I self-learned about impedance matching and modeling, and amplifier protection circuitry.
2. Test Equipment. I have become familiar with common and uncommon equipment for electrical analysis. I am comfortable working with high voltage amplifiers and drivers, low frequency and high frequency function generators, Impedance/Gain-Phase analyzers, several models of oscilloscopes, electrometers for high voltage current flow and insulation resistance

Extreme (High/low) Temperature

1. I have worked with both high temperature (1000 deg C) ovens for testing and fabrication
2. I have worked with liquid Nitrogen (-190 deg C) and cryogenic vacuum chambers.
3. I have analyzed thermal expansion of devices and materials at both low and high temperatures.
4. I have designed and fabricated accelerometers for 1000 deg C operation.

MEMS Skills:

1. I have been trained on micro/nanofabrication equipment and practices such as: contact lithography, Spin coaters, wet chemical etching, and deep reactive ion etching (DRIE).
2. I have designed and fabricated countless microfluidic devices.

Laboratory Skills:

1. I have worked with many high end microscopes to acquire images and data for microfluidics experiments.
2. I have worked on basic chemistry for creating solutions of microparticles, and salt solutions. I am very familiar with the relationship of optical properties of salt solution and how they vary with concentration.

Optics Skills:

1. I have worked with a high powered Argon Ion laser for countless hours. I am particularly familiar with setting up optical systems and safety.
2. I have worked with custom optical fiber systems and configurations to couple light into optical fibers.
3. I have researched many available high powered/miniature laser systems for optofluidic integration.
4. I have designed and worked with integrated optical fiber and microfluidic systems.
5. I have worked with optical analysis equipment such as optical power meters, and photodiodes.

Work Experience

Graduate Research Assistant at Penn State**09/27/2007 – Present**

1. Assisted in the writing of several proposals for research funding from NIH and NSF
2. Acquired skills in chemistry, photonics, microfabrication, electronics, fluids and biology.
3. Proficient with MATLAB, Image J, AutoCAD, and other design and data analysis tools and techniques.
4. Acquired skills in document preparation, presenting, organization,

Research Engineer at TRS Technologies, State Collage, PA**05/07/2009 – 08/01/2011**

1. Developed technical reports, proposals and presentations for NASA and DoD SBIR programs.
2. Conducted electrical design of logic and high-voltage circuits for driving piezoelectric actuators and motors.
3. Designed devices and testing systems for high temperature and cryogenic piezoelectric devices.
4. Worked on mechanical designs for High temperature interferometers
5. Worked with both high temperature and low temperature system.
6. Investigated materials, designs, thermal expansion, and corrosion in high temperature and low temperature system.

Graduate Teaching Assistant at Penn State**08/27/2007 – 05/07/2009**

1. ENG 201 – Statics (2 semester)
2. ENG202 – Dynamics (1 Semester)
3. ENG203 – Strength and Materials (1 semester)
4. Held recitations to teach students subject material and answer questions
5. Held study sessions to help students with difficult homework problems and prepare for exams
6. Extensive experience with grading homework assignments and exams

MEMS Lab. TA/Technician at Rose-Hulman IT, Terre Haute, IN**03/05/2007 – 08/10/2007**

1. Acquired full training in the use and maintenance of microfabrication equipment and processes such as: photolithography contact aligner, electron beam evaporator, magnetron sputtering system, M4L plasma cleaner, and wet chemical etching.
2. Training on handling hazardous materials such as: hydrochloric acid, hydrofluoric acid, sulfuric acid, concentrated ammonia, concentrated hydrogen per oxide, and several metal etchants.
3. Held laboratory sessions for the MEMS course.
4. Instructed students on clean room etiquette, safety and equipment function

Systems Engineer at ICTT, Terre Haute, IN**06/01/2006 – 08/20/2006**

1. Developed a theoretical model of a system using the system engineering process.
2. Assigned and connected attributes of the engineering system with consumer requirements.

Peer-reviewed Journal Publications

Michael Ian Lapsley, Anaram Shahravan, Qingzhen Hao, Bala Krishna Juluri, Stephen Giardinelli, Mengqian Lu, Themis Matsoukas, and Tony Jun Huang, *Shifts in plasmon resonance due to charging of a nanodisk array in argon plasma*, Applied Physics Letters, (Submitted)

Michael Ian Lapsley, I.-Kao Chiang, Yue Bing Zheng, Xiaoyun Ding, Xiaole Mao and Tony Jun Huang. *A single-layer, planar, optofluidic Mach-Zehnder interferometer for label-free detection*, Lab on a Chip, **2011**, DOI: 10.1039/c0lc00707b.

Michael Ian Lapsley, Xiaole Mao, Sz-Chin Lin and Tony Jun Huang. *In plane, variable optical fiber attenuator using a tunable reflective interface*, Applied Physics Letters, **2009**, 95, 083507.

Xiaole Mao, Sz-Chin Lin, Jinjie Shi, **Michael Ian Lapsley**, Bala Juluri, and Tony Jun Huang. *Tunable Liquid Gradient Refractive Index (L-GRIN) lens with two degrees of freedom*, Lab on a Chip, **2009**, 9, 2050 - 2058, DOI: 10.1039/b822982a.

Xiaole Mao, Bala Juluri, **Michael Ian Lapsley**, and Tony Jun Huang. *Microseconds microfluidic chaotic bubble mixer*, Microfluidics and Nanofluidics, **2010**, 8, 139-144, DOI: 10.1007/s10404-009-0496-4.

S. Zhang; Xiaoning Jiang, **Michael Lapsley**, Paul Moses and Thomas ShROUT, *Piezoelectric accelerometers for ultrahigh temperature application*, Applied Physics Letters, **2010**, 96, 013506

To be Submitted

Michael Ian Lapsley, et al., *Fluorescent activate cell sorting using drift based hydrodynamic focusing and acoustic sorting*.

Michael Ian Lapsley, et al., *Acoustic bubble resonance characterization using an optofluidic interferometer*.

Michael Ian Lapsley, et al, *Measuring diffusivity and refractive index of concentrated solutions of calcium chloride with and in-plane, steady state, optofluidic device*.

Conferences

Xiaole Mao, Bala Krishna Juluri, **Michael Lapsley**, and Tony Jun Huang, **A Fast Micromixer and Microreactor Based on Dynamic Self-Assembly of Monodisperse Microbubbles**, the 2008 ASME International Mechanical Engineering Congress & Exposition, Boston, MA, November 2-6, 2008.

Xiaole Mao, **Michael Lapsley**, John Waldeisen, and Tony Jun Huang, *An Opto-Fluidic Hybrid System for Miniaturized Flow Cytometry: Focusing of Cells and Light on Microscale*, the 2008 ASME International Mechanical Engineering Congress & Exposition, Boston, MA, November 2-6, 2008.

Fellowships

2010-2012	NASA PSGC Fellowship
2008	Harry G. Miller Fellowship
2007	Paul H. Schweitzer Memorial Graduate Fellowship

Honors/Certificates

2011	ESM Today Symposium – 3rd Place in poster competition
2010	ESM Today Symposium - 2nd Place in poster competition
2009	ESM Today Symposium – 3rd Place in paper competition
2007	Passed the Fundamentals of Engineering Exam

Leadership

2009-2011	Lab manager of BioNEMS laboratory
2006	President of Delta Sigma Phi Fraternity (Zeta Lambda Chapter)
2005	Vice-President of Delta Sigma Phi Fraternity (Zeta Lambda Chapter)
2004	Alumni Director of Delta Sigma Phi Fraternity (Zeta Lambda Chapter)

Outreach

2010-2011	Graduate Student life presentation – Encouraging undergraduates to consider attending graduate school
2011	Church class teaching high school students religion and ethics