

**BIOGRAPHICAL DATA**

**CONTACT INFORMATION:**

**MAILING ADDRESS:**

Department of Mechanical and Aerospace Engineering  
P.O.Box 162450  
University of Central Florida, Orlando, FL 32816-2450

**ON-CAMPUS OFFICE:**

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Engineering Building I  
Orlando, FL 32816-2450

**LABORATORY:**

NanoFab and BioMEMS Lab  
Room 334  
Engineering Building I  
Orlando, FL 32826

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**EDUCATION:**

**Ph. D. in Electrical Engineering, 2002**

University of Cincinnati, Cincinnati, Ohio

Concentrations: MEMS and BioMEMS

Dissertation: "Micromachined Permanent Magnets and Their MEMS Applications"

Advisor: Dr. Chong H. Ahn

**M.S. in Materials Engineering, 1991**

Seoul National University, Seoul, Korea

**B. S. in Materials Engineering, 1989**

Seoul National University, Seoul, Korea

## **RESEARCH AND TEACHING EXPERIENCE:**

### **Professor, August 2013 - Present**

Mechanical, Materials and Aerospace Engineering,  
University of Central Florida, Orlando, Florida

### **Associate Professor, August 2007 – August 2013**

Mechanical, Materials and Aerospace Engineering,  
University of Central Florida, Orlando, Florida

### **Assistant Professor, July 2002 – August 2007**

Mechanical, Materials and Aerospace Engineering,  
University of Central Florida, Orlando, Florida

### **Senior Research Associate, April 2002 - June 2002**

Microsystems and BioMEMS Lab, Electrical Engineering Dept.,  
University of Cincinnati, Ohio

Participated in DARPA Project: Plastic-based Structurally Programmable Microfluidic Bio-Chips for Clinical Diagnostics.

### **Graduate Research Assistant, August 1998 - March 2002**

Microsystems and BioMEMS Lab, Electrical Engineering Dept., University of Cincinnati, Ohio  
Engaged in various research projects including DARPA-MTO and NASA-Glenn.  
Developed micromagnets and magnetic microactuators.

### **Teaching Assistant, Microfabrication Lab for MEMS, Spring Quarter, 2001**

Electrical Engineering Dept., University of Cincinnati, Ohio

### **Research Engineer, Korea Electronics Technology Institute, March 1993 - August 1997**

Korea Electronics Technology Institute, Pyeongtaek, Korea

Developed a multilayered chip inductor and a piezoelectric ceramic filter. The projects were supported by the Ministry of Information and Communication and the Ministry of Commerce and Trade.

Filed 6 Korean patents related to chip inductor and piezoelectric filter fabrication: Patents 10-1996-025192, 10-1996-025193, 10-1996-009565, 10-1996-009566, 20-1995-055222, 10-1993-020429

## TEACHING

### COURSES TAUGHT OVER THE PAST 5 YEARS:

Past 5  
years

<i>Course Number</i>	<i>Course Title</i>	<i>Credits</i>	<i>Class</i>	<i>Semester</i>	<i># Students</i>	<i>Excellent /Very Good/Good</i>	<i>Overall Assessment</i>
<i>EML6085</i>	<i>Research Methods</i>	<i>3</i>	<i>Grad</i>	<i>Spring 14</i>	<i>31</i>		<i>4.47</i>
<i>EMA3124</i>	<i>Design and Selection of Materials</i>	<i>3</i>	<i>Senior</i>	<i>Fall 13</i>	<i>75</i>		<i>2.66</i>
<i>EML6085</i>	<i>Research Methods</i>	<i>3</i>	<i>Grad</i>	<i>Spring 13</i>	<i>32</i>		<i>4.31</i>
<i>EML6229</i>	<i>Adv. Topics in Miniaturization</i>	<i>3</i>	<i>Grad</i>	<i>Spring 13</i>	<i>7</i>		<i>4.60</i>
<i>EMA31224</i>	<i>Design and Selection of Materials</i>	<i>3</i>	<i>Senior</i>	<i>Fall 12</i>	<i>67</i>		<i>3.5</i>
<i>EML5291</i>	<i>MEMS Materials</i>	<i>3</i>	<i>Grad</i>	<i>Spring 12</i>	<i>5</i>	<i>SPI not avail.</i>	
<i>EMA3124</i>	<i>Design and Selection of Materials</i>	<i>3</i>	<i>Senior</i>	<i>Fall 11</i>	<i>74</i>	<i>14.3/35.7/32.1</i>	<i>3.3929</i>
<i>EML6299</i>	<i>Adv. Topics in Miniaturization</i>	<i>3</i>	<i>Senior</i>	<i>Spring 11</i>	<i>9</i>	<i>66.7/33.3/0</i>	<i>4.6667</i>
<i>EMA3124</i>	<i>Design and Selection of Materials</i>	<i>3</i>	<i>Senior</i>	<i>Fall 10</i>	<i>68</i>	<i>3.3/13.3/30</i>	<i>2.4333</i>
<i>Note: Sabbatical Leave - Fall 2009 and Spring 2010</i>							
<i>EEE6326C*</i>	<i>MEMS Fabrication Lab</i>	<i>3</i>	<i>Grad</i>	<i>Spring 09</i>	<i>14</i>	<i>60/20/20</i>	
<i>EMA3124</i>	<i>Design and Selection of Materials</i>	<i>3</i>	<i>Senior</i>	<i>Fall 08</i>	<i>55</i>	<i>4.2/8.3/50</i>	
<i>EGN4413C</i>	<i>Interdisciplinary Design II</i>	<i>3</i>	<i>Senior</i>	<i>Spring 08</i>	<i>8</i>	<i>50 /50/0</i>	
<i>EAS4710C</i>	<i>Aerospace Design II</i>	<i>3</i>	<i>Senior</i>	<i>Spring 08</i>	<i>37</i>	<i>26.3/26.3/39.5</i>	
<i>EGN4412C</i>	<i>Interdisciplinary Design I</i>	<i>3</i>	<i>Senior</i>	<i>Fall 07</i>	<i>9</i>	<i>100/0/0</i>	
<i>EAS4700C</i>	<i>Aerospace Design I</i>	<i>3</i>	<i>Senior</i>	<i>Fall 07</i>	<i>36</i>	<i>8.3/33.3/50</i>	
<i>EML6299</i>	<i>Adv. Topics in Miniaturization</i>	<i>3</i>	<i>Grad</i>	<i>Spring 07</i>	<i>9</i>	<i>50/50/0</i>	
<i>EML5291*</i>	<i>MEMS Materials</i>	<i>3</i>	<i>Grad</i>	<i>Spring 06</i>	<i>7</i>	<i>75/25/0</i>	

<i>EML4005</i>	<i>Design in Nature and Eng.</i>	3	<i>Senior</i>	<i>Spring 06</i>	35	33.3/38.0/19.1	
<i>EMA3124*</i>	<i>Design and Selection of Materials</i>	3	<i>Senior</i>	<i>Fall 05</i>	74	7.0/14.0/51.2	
<i>EML6299*</i>	<i>Adv. Topics in Miniaturization</i>	3	<i>Grad</i>	<i>Spring 05</i>	10	87.5/0/12.5	

\*New Courses

\*\* Independent Studies and research courses were taught but not listed in this table

## THESIS ADVISING:

*(Note: These students have been supported by the research grants from NSF and other funding agencies)*

### *M. S. Students Graduated*

1. Xiaochen Wang, Materials Science and Engineering  
Topic: Electroplated Micro- and Nanoscale Structures for Emitters and Sensors  
Publication: in progress  
Graduated in Spring, 2014
2. Ehsan Yakhshi Tafti, Mechanical Engineering  
Topic: Flow Visualization in Microfluidic Expansion & Mixing Behaviors  
Publication: 1 journal and 3 conference papers  
Graduated in Summer, 2009
3. Matthew R. Montgomery, Electrical Engineering  
Topic: Magnetically Deflectable MEMS Actuators for Optical Sensing Applications,  
Graduated in Summer, 2009
4. Andrea S. Wesser, Mechanical Engineering  
Topic: User-defined Patterning of Neural Progenitor Cells on 3D Micropillar Arrays Using Round Cross-Sectional Geometry, Specific Dimensions and Thiol-Based Chemical Adhesion  
Publication: 1 journal paper  
Graduated in Spring 2008
5. Michael R. Pepper, Mechanical Engineering  
Topic: Rapid Prototyping of Microfluidic Packages  
Publication: 1 journal paper, 1 conference paper  
Graduated in Fall 2006
6. Anjum Mehta, Mechanical Engineering

Topic: Micromachined Electrochemical Sensors for Hydrogen Peroxide and Chlorine Detection

Publication: 2 journal paper, 4 conference papers

Graduated in Fall 2005

7. Naveenkumar Palsandram\*, Electrical Engineering  
Topic: Interconnection, Interface and Instrumentation for Micromachined Chemical Sensors,  
Publication: 1 journal paper, 1 conference paper  
Graduated in Summer 2005
8. Vivek Sundaram\*, Electrical Engineering  
Topic: Basic Study of a Micro Machined DEP (Dielectrophoretic) Manipulator  
Publication: 1 conference paper  
Graduated in Summer 2004
9. Shekhar Halakatti, Electrical Engineering  
Topic: Development of a Flow Through Microsensor for Continuous Monitoring of Free Chlorine in Water  
Publication: 1 journal paper, 4 conference papers  
Graduated in Fall 2003

*\*Partially supported as GTA*

#### ***Ph. D. Student Graduated***

1. Roxana Shabani, Mechanical Engineering  
Topic: Three-phase Contact Line Phenomena in Droplets on Solid and Liquid Surfaces: Electrocapillary, Pinning, Wetting Line Velocity Effect, and Free Liquid Surface Deformation  
Publication: 7 journal papers and 2 conference papers  
Graduated in Summer, 2013
2. Ehsan Yakhshi Tafti, Mechanical Engineering  
Topic: Thermally-induced Motion of Droplets on a Thin Liquid Layer and Its Application to Droplet Manipulation Platforms  
Publication: 7 journal papers and 3 conference papers  
Graduated in Fall, 2010
3. Ghanashyam Londe, Electrical Engineering  
Topic: Integration of a Nanostructure Embedded Thermoresponsive Polymer for Microfluidic Applications  
Graduated in Fall 2008  
4 journal papers, 3 conference papers

4. Peng Zhang, Mechanical Engineering  
Topic: Design and Fabrication of Chemiresistor Type Micro/Nano Hydrogen Gas Sensor Using Interdigitated Electrodes  
Graduated in Fall 2008  
6 journal papers, 5 conference papers
5. Hyungseok Bang, Optics  
Topic: Integrated Optical SPR (Surface Plasmon Resonance) Sensor Based on Optoelectronic Platform (Co-advised with Dr. Parick Likamwa at CREOL)  
Graduated in Summer 2008  
3 journal papers, 3 conference papers

#### ***Ph. D. Students in Progress***

1. Xioachen Wang  
Topic: Environmental sensors using nanoflakes and nanofibers
2. Christopher Hughes  
Topic: Energy generation using nanofluidic channels and membranes
3. Alireza Karbalaee Baba  
Topic: Droplet based chemical synthesis on a thermocapillary manipulation platform

#### **NON-THESIS MS STUDENT ADVISING:**

##### ***M. S. Students Graduated***

1. Jaim M. Iftekhar, Spring, 2013
2. David Summerlot, Spring, 2011
3. Joseph Mahaney, Fall, 2006

#### **EDUCATIONAL CONTRIBUTIONS:**

##### **ADVISEMENT ACTIVITIES**

##### ***Educational Programs***

NSF Nanotechnology Undergraduate Education Program, Program Director (2008-2011)

NSF Research Experience for Undergraduate, Program Co-Director (2007-2010)

*Undergraduate Students*

1. Roman Williams\*, MAE, University of Central Florida  
Joined as UCF STATESS Program student  
Period: Spring 2014- current  
Topic: TBD
2. Mark Schumacher, MAE, University of Central Florida  
UCF EXCEL Program student. Currently supported by a research grant.  
Period: Spring 2012 - current  
Topic: Design of a blood separation channels
3. Michael Alva, MAE, University of Central Florida  
Joined as UCF EXCEL Program student. Currently supported by a research grant.  
Period: Spring 2012 - current  
Topic: Instrumentation for microfluidic droplet generation
4. Alexis Trimms\*\*\*, EE, University of Central Florida  
Joined as UCF STATESS Program student  
Period: Spring 2013 – Fall 2013
5. Megan Pence\*\*, MAE, University of Central Florida  
Joined as UCF EXCEL Program student.  
Period: Fall 2012 – Fall 2013  
Topic: Surface tension driven microfluidic devices
6. Alicia Mak\*\*, MAE, University of Central Florida  
Currently supported by a research grant.  
Period: Summer 2012 - current  
Topic: Design of a blood separation channel
7. Benedict Vani\*, EE, University of Central Florida  
UCF RAMP (Research and Mentoring Program) student  
Period: 2007 – 2008  
Topic: Optimization of Nanoimprint Lithography (NIL) Technology
8. Kevin Law, Physics, New College of Florida  
REU Student  
Period: 10 weeks, Summer 2008  
Topic: Effect of Surfactants on Droplet Formation in Microchannels
9. Robin Jacobs-Gedrim, Physics, New College of Florida  
REU student

Period: 10 weeks, Summer 2007

Topic: Electrode Geometry and Platinum Sputtering Time Effects on MEMS Tin Oxide Hydrogen Sensor

10. Samuel Subbarao, Engineering, Columbia University

REU student

Period: 8 weeks, Summer 2006

Topic: Design and Fabrication of a Passive Fluid Switch Using Hydrophobic/Hydrophilic Nanostructures

11. John Norwood\*, Engineering, Princeton University

REU student

Period: 8 weeks, Summer 2005

Topic: The Use of Nanoparticles in a Microsensor for Free Radical Detection

12. Andrea Wesser\*\*, MAE Honor, University of Central Florida

UCF Honor student

Period: Spring – Fall 2004

Topic: Design, Fabrication and Testing of a Two-Dimensional, Passive Micromixer  
Guided Andrea Wesser to win the 3<sup>rd</sup> Place in the 2004 International Fluids Engineering Division Senior Design Competition, 2004 ASME International Mechanical Engineering Congress & Exposition (IMECE 2004) in Anaheim, California, November 13-19, 2004

13. Gustavo Alverio\*, EE, University of Central Florida

REU student

Period: 8 weeks, Summer 2004

Topic: Nanomaterial-based Hydrogen Sensor

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\*Minority student

\*\* Female student

### ***Post-doctoral Advisement***

Dr. Roxana Shabani, Fall 2013- current

Dr. Sanghoon Park, Fall 2013 – current

Dr. In Sung Hwang, 2012- 2013, currently employed by LG Electronics, Korea

Dr. Peng Zhang, 2009-2010, currently employed by A.O. Smith Corp. R&D Center in Najing, China



### ***K-12 Teachers***

1. Robert Hillenbrand, Science Teacher, Mainland High\*\*, Volusia County, FL  
Period: 8 weeks, Summer 2004  
Topic: Passive Microfluidic Mixer

\*\*Mainland High School is located in an economically underprivileged area. The school has a large population of minorities ( 41% Black, 4% Hispanic, 2% Asian). The teacher developed a module and a demo tool for presenting ideas of micro engineering in the classroom.

2. Terry Barchfeld of Timbercreek High, Science Teacher, Timbercreek High, Orange Country, FL  
Period: 8 weeks each in Summer 2005 and 2006  
Topic: Microfluidic Channel Fabrication and Characterization

### ***K-12 Students***

- Matt and Tim Joubert (Satellite High, Satellite Beach, FL), Junior, Satellite High, Brevard County, FL  
Period: Summer 2008  
Topic: Patterned Cell Growth  
Competed at the Brevard Intracoastal Science and Engineering Fair.  
They placed first in the Team's competition.
- Noel Turner, Junior, Satellite High, Brevard County, FL  
Period: Summer 2007-2008  
Topic: Stem Cell Patterning
- Tiffany Liu, Junior, Satellite High, Brevard County, FL  
Period: Summer 2004-Fall 2005  
Topic: Free Chlorine Microsensor  
Guided this female student to earn the 2nd place, State of Florida Stockholm Junior Water Quality Award. The regional fair was at the Merritt Island Mall and had 263 participants. The Stockholm Water Quality award was a contest between winners from each of 37 regional fairs. This research experience helped her decide her future major in science. She was admitted to Princeton University in Fall 2006.

## **STUDENT ACHIEVEMENT:**

Roxana Shabani

- David T. & Jane M. Donaldson Memorial Scholarship, College of Engineering and Computer Science, UCF, 2012
- NSF Summer Institute Fellowship on Short Course for Energy Manufacturing, 2011
- Grand Prize in "Computational and Experimental Materials Science" Florida Chapter of the American Vacuum Society, and Florida Society for Microscopy, Orlando, Florida, March 7-8, 2011

David Summerlot

- 2nd Prize in in " Materials Characterization", Florida Chapter of the American Vacuum Society, and Florida Society for Microscopy, Orlando, Florida, March 7-8, 2011

Ehsan Yakhshi Tafti, PhD student

- 2010-2011 Award for Outstanding Dissertation, "Thermally-induced Motion of Droplets in a Thin Liquid Layer and Its Application to Droplet Manipulation Platforms", College of Engineering and Computer Sciences, University of Central Florida
- DEED Research Grant, American Public Power Association (APPA), 2009
- Raymond Davis Scholarship, Society for Imaging Science and Technology, 2008

Ghanashyam Londe, PhD student

- AVS (American Vacuum Society) Graduate Research Award, 2008
- Transducer Research Foundation Travel Award, 2007

Andrea Wesser, PhD student

- 3<sup>rd</sup> Place in the 2004 International Fluids Engineering Division Senior Design Competition, 2004 ASME International Mechanical Engineering Congress & Exposition (IMECE 2004) in Anaheim, California, November 13-19, 2004  
[<http://divisions.asme.org/fed/news/enews.htm>]
- USA Today All-Academic 2<sup>nd</sup> team for promoting engineering to girls.  
[[http://www.usatoday.com/news/education/2005-02-15-college-2005-second-team\\_x.htm](http://www.usatoday.com/news/education/2005-02-15-college-2005-second-team_x.htm)]
- Featured in the April, 2005 issue of ASME News.  
[<http://www.asmenews.org/archives/backissues/apr05/features/405girls.html>]
- NSF IGERT fellowship, 2005-2007

## **STUDENT PLACEMENT AFTER GRADUATION:**

1. David Summerlot, MS, Graduated in Spring 2011  
Lockheed-Martin Corporation, Orlando, FL 32819
2. Ehsan Yakhshi Tafti, PhD, Graduate in Fall 2010  
R&D Engineer  
Advanced Cooling Technologies, Inc.

Lancaster, PA 17601

3. Ghanashyam Londe, PhD, Graduated in Fall 2008  
Process Engineer  
Intel Corporation  
Hillsboro, OR 97124
4. Peng Zhang, PhD, Graduated in Fall 2008  
Senior Engineer  
A. O. Smith Corp.  
Nanjing, China
5. Andrea Wesser, MS, Graduated in Spring 2008  
Product Line Manager  
Planar Energy Devices  
Orlando, FL 32805
6. Michael Pepper, MS, Graduated in Fall 2006  
Mechanical Engineer II  
Harris Corporation  
Melbourne, FL 32919
7. Anjum Mehta, MS, Graduated in Fall 2005  
Diffusion Engineer  
Micron Technology  
Boise, ID 83716
8. Naveenkumar Palsandram, MS, Graduated in Summer 2005  
SAP System Analyst  
Intel Corporation  
Hillsboro, OR 97124
9. Vivek Sundaram, MS, Graduated in Summer 2004  
Test Lead  
Capital One  
Framingham, MA 01581
10. Shekhar Halakatti, MS, Graduated in Fall 2003  
Senior Software Engineer  
Sony Electronics  
San Diego, CA 92127

## RESEARCH

### RESEARCH INTERESTS (KEYWORDS):

- Chemical/Bio sensors – gas sensors, electrochemical sensors, integrated-optic based sensors
- Microactuators – magnetic microactuators, grapheme-based actuators, thermocapillary-driven droplet actuators
- Microfluidic components and systems – passive micromixers, bio-inspired surface tension-based valves, EWOD micropumps
- Nanomaterials/Microdevices integration using non-conventional fabrication methods
- Polymer micromachining – UV-LIGA, hot embossing, microinjection molding, nanoimprint
- Micro/Nanofabrication techniques for MEMS and BioMEMS
- MEMS packaging – interconnecting microfluidic packages

### LIST OF PUBLICATIONS:

#### *Book Chapters*

1. H. J. Cho and C. H. Ahn, Magnetic Microactuators: Techniques and Applications, pp. 305-328, MEMS/NEMS Handbook, Vol. 5, Ed. by C. T. Leondes, Springer, 2006
2. G. Londe, A. Han and H. J. Cho., MEMS for Nanotechnology – Top-down perspective, pp. 107-167, Functional Nanostructures, Ed. by. S. Seal, Springer, 2008

#### *Refereed Journal Papers*

1. A. Davanlou, H. J. Cho, and R. Kumar, “Motion of Spherical Droplets Against Marangoni Flow in a Thin Liquid Film,” *Journal of Heat Transfer*, available online, May 2014. <http://dx.doi.org/10.1115/1.4027533>
2. R. Shabani and H. J. Cho, “Flow rate analysis of an EWOD-based device: how important are wetting-line pinning and velocity effects?,” *Microfluidics and Nanofluidics*, vol. 15, issue 5, pp. 587-597, 2013. <http://dx.doi.org/10.1007/s10404-013-1184-y>
3. R. Shabani, R. Kumar, and H. J. Cho, “Droplets on liquid surfaces: Dual equilibrium states and their energy barrier,” *Applied Physics Letters*, vol. 102, no. 18, p. 184101, 2013. <http://dx.doi.org/10.1063/1.4804242>
4. R. Shabani and H. J. Cho, “Active surface tension driven micropump using droplet/meniscus pressure gradient,” *Sensors and Actuators B: Chemical*, vol. 180, pp. 114–121, 2013. <http://dx.doi.org/10.1016/j.snb.2012.05.058>
5. S.-H. Bae, O. Kahya, B. K. Sharma, J. Kwon, H. J. Cho, B. Özyilmaz, and J.-H. Ahn, “Graphene-P(VDF-TrFE) Multilayer Film for Flexible Applications,” *ACS Nano*, vol. 7, no. 4, pp. 3130–3138, 2013. <http://dx.doi.org/10.1021/nn400848j>
6. J. Lee, J. Kim, H. Kim, Y. M. Bae, K.-H. Lee, and H. J. Cho, “Effect of thermal treatment on the chemical resistance of polydimethylsiloxane for microfluidic devices,” *Journal of*

- Micromechanics and Microengineering*, vol. 23, no. 3, p. 035007, 2013.  
<http://dx.doi.org/10.1088/0960-1317/23/3/035007>
7. R. McCormack, N. Shirato, U. Singh, S. Das, A. Kumar, H. J. Cho, R. Kalyanaraman, and S. Seal, "Laser irradiated nano-architected undoped tin oxide arrays: mechanism of ultrasensitive room temperature hydrogen sensing," *Nanoscale*, vol. 4, no. 22, p. 7256-7265, 2012. <http://dx.doi.org/10.1039/c2nr32217j>
  8. R. Shabani and H. J. Cho, "Nanomaterials in Actuators—A Review," *Reviews in Nanoscience and Nanotechnology*, vol. 1, no. 2, pp. 85–102, Jun. 2012.  
<http://dx.doi.org/10.1166/rnn.2012.1006>
  9. E. Yakhshi-Tafti, R. Kumar, and H. J. Cho, "Measurement of Surface Interfacial Tension as a Function of Temperature Using Pendant Drop Images," *International Journal of Optomechatronics*, vol. 5, no. 4, pp. 393-403, 2011.  
<http://dx.doi.org/10.1080/15599612.2011.633206>
  10. R. Shabani and H. J. Cho, "A micropump controlled by EWOD: wetting line energy and velocity effects," *Lab on a Chip*, pp. 3401-3403, vol. 11, 2011.  
<http://dx.doi.org/10.1039/c1lc20440h>
  11. S.-E. Zhu, R. Shabani, J. Rho, Y. Kim, B. Hong, J.-H. Ahn and H. J. Cho, "Graphene-based Bimorph Microactuators," *Nano Letters*, pp. 977-981, Vol. 11, No. 3, 2011.  
<http://dx.doi.org/10.1021/nl103618e>
  12. H. A. Lee, Y.-C. Byun, U. Singh, H. J. Cho, and H. Kim, "Surface Modification of Carbon Post Arrays by Atomic Layer Deposition of ZnO Film," *Journal of Nanoscience and Nanotechnology*, pp. 7322-7326, vol. 11, 2011.  
<http://dx.doi.org/10.1166/jnn.2011.4827>
  13. R. Shabani, L. Massi, L. Zhai, S. Seal, and H. J. Cho, "Classroom modules for nanotechnology undergraduate education: development, implementation and evaluation", *European Journal of Engineering Education*, pp. 192-210, Vol. 36, Issue 2, 2011.  
<http://dx.doi.org/10.1080/03043797.2011.573536>
  14. A. Kumar, P. Zhang, A. Vincent, R. McCormack, R. Kalyanaraman, H. J. Cho and S. Seal, "Hydrogen selective gas sensor in humid environment based on polymer coated nanostructured-doped tin oxide," *Sensors and Actuators B: Chemical*, pp. 884-892, Vol. 155, Issue 2, 2011. <http://dx.doi.org/10.1016/j.snb.2011.01.065>
  15. N. Shirato, J. Strader, A. Kumar, A. Vincent, P. Zhang, A. Karaoki, P. Nacchimuthu, H. J. Cho, S. Seal and R. Kalyanaraman, "Thickness dependent self limiting 1-D tin oxide nanowire arrays by nanosecond pulsed laser irradiation," *Nanoscale*, pp.1090-1101, 3, 2011. <http://dx.doi.org/10.1039/c0nr00689k>
  16. E. Yakhshi-Tafti, G. Londe, A. Chunder, L. Zhai, R. Kumar, and H. J. Cho, "Wettability Control and Flow Regulation Using a Nanostructure-Embedded Surface," *Journal of Nanoscience and Nanotechnology*, pp. 1417-1420, Vol. 11, No. 2, 2011.  
<http://dx.doi.org/10.1166/jnn.2011.3400>
  17. E. Yakhshi-Tafti, H. J. Cho, and R. Kumar, "Diffusive mixing through velocity profile variation in microchannels", *Experiments in Fluids*, pp. 535-545, Vol. 50, No. 3, 2010.  
<http://dx.doi.org/10.1007/s00348-010-0954-5>
  18. E. Yakhshi-Tafti, H. J. Cho, and R. Kumar, "Impact of drops on the surface of immiscible liquids," *Journal of Colloid and Interface Science*, pp. 373-376, Vol. 350, Issue 1, 2010.  
<http://dx.doi.org/10.1016/j.jcis.2010.06.029>

19. E.Yakhshi-Tafti, H. J. Cho and R. Kumar, “Droplet actuation on a liquid layer due to thermocapillary motion: Shape effect”, *Applied Physics Letters*, 264101 (3 pages), Vol.96, 2010. <http://dx.doi.org/10.1063/1.3456391>
20. P. Zhang, A. Vincent, A. Kumar, S. Seal and H. J. Cho, “A Low-Energy Room-Temperature Hydrogen Nanosensor: Utilizing the Schottky Barriers at the Electrode/Sensing-Material Interfaces”, *IEEE Electron Device Letters*, pp. 770-772, Vol. 31, Issue 7, 2010. <http://dx.doi.org/10.1109/LED.2010.2049473>
21. D.-J. Kim, N.-E. Lee, J.-S. Park, I.-J. Park, J.-G. Kim, and H. J. Cho, “Organic electrochemical transistor based immunosensor for prostate specific antigen (PSA) detection using gold nanoparticles for signal amplification,” *Biosensors and Bioelectronics*, Vol. 25, No. 11, pp. 2477-2482, 2010. <http://dx.doi.org/10.1016/j.bios.2010.04.013>
22. G. Londe, A. Chunder, L. Zhai and H. J. Cho, “An Analytical Model for Wettability Switching Characteristic of a Nanostructured Thermoresponsive Surface”, *Applied Physics Letters*, 164104, Vol. 94, 2009. <http://dx.doi.org/10.1063/1.3103270>
23. A. Chunder, K. Etcheverry, G. Londe, H. J. Cho and L. Zhai, “Conformal switchable superhydrophobic/hydrophilic surfaces for microscale flow control”, *Colloids and Surfaces A: Physicochem. Eng. Aspects*, pp. 187-193, Vol. 333, 2009. <http://dx.doi.org/10.1016/j.colsurfa.2008.09.044>
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### ***Refereed Conference Proceedings***

1. A. Davanlou, R. Shabani, H. J. Cho, R. Kumar, "Is thermocapillary enough for droplet actuation?", *Proceedings of 17<sup>th</sup> International Conference on Miniaturized Systems for Chemistry and Life Sciences (MicroTAS 2013)*, Freiburg, Germany, October 27-31, 2013, pp. 59-61 [Acceptance rate of this conference is 59%].
2. U. Singh, H. A. Lee, Y. Byun, A. Kumar, S. Seal, H. Kim and H. J. Cho, "ZnO Modified High Aspect Ratio Carbon Electrodes for Hydrogen Sensing Applications," *Procedia Engineering (Proceedings of Eurosensors XXV)*, vol. 25, pp. 1669-1672, 2011.
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## *Presentations*

1. X. Wang, J. Gu. W. Deng, and H. J. Cho, "Electroplated In-Plane MEMS Electrospray Emitter", 225<sup>th</sup> ECS (Electrochemical Society) Meeting, Orlando, FL, May 11-15, 2014
2. S. Saraf, C. J. Neal, A. Kumar, S. Das, S. Park, S. Seal, and H. J. Cho, "Anti-biofouling Nanoporous Gold Electrodes for Biochemical Sensor Applications", 225<sup>th</sup> ECS (Electrochemical Society) Meeting, Orlando, FL, May 11-15, 2014
3. C. J. Neal, S. Saraf, S. Park, S. Das, H. J. Cho, and S. Seal, "Cerium Oxide Nanoparticles Decorated SAM Modified Gold Electrode for ROS Biosensing", 225<sup>th</sup> ECS (Electrochemical Society) Meeting, Orlando, FL, May 11-15, 2014
4. A. Davanlou, R. Shabani, H. J. Cho, and R. Kumar, "Is thermocapillary enough for droplet actuation?", 17<sup>th</sup> International Conference on Miniaturized Systems for Chemistry and Life Sciences (MicroTAS 2013), Freiburg, Germany, October 27-31, 2013
5. R. Shabani, R. Kumar and H. J. Cho, "Modeling Stable Configurations of Aqueous Droplets Floating on Air-oil Interface", 8th International Conference on Multiphase Flow (ICMF 2013), Jeju, Korea, May 26-31, 2013
6. J. Lee, H. A. Lee, U. Singh, C. Yang, H. J. Cho and H. Kim, "Organic to Inorganic Conversion Process of PDMS", TMS 2012, Orlando. Florida, March 11-15, 2012
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13. H. Cho, S. Seal and R. Kalyanaraman, "Development of a Hydrogen Discriminating Low Temperature 1-D Nanocomposite Micro-Sensor", 2010 NSF ECCS Grantees' Conference, Honolulu, Hawaii, November 30-December 3, 2010 (*Invited*)
14. A. Kumar, P. Zhang, H. J. Cho, and S. Seal, "Highly Robust Hydrogen Selective MEMS Nanogap Sensor Utilizing the Schottky Barrier at Electrode/Sensing Material", AVS 57th Intl. Symp. & Exhibition, Albuquerque, NM, October 17-23, 2010

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24. P. Zhang, A. Vincent, S. Seal and H. J. Cho, "Nano Sensor Design for Hydrogen Detection", SPIE Conference on Defense, Security and Sensing, Orlando, Florida, USA, April 15-17, 2009
25. H. J. Cho, L. Zhai and S. Seal, "Preparing Undergraduates for Careers in Nanotechnology", NSF EEC Awardee Conference, Reston, VA, USA, February 1-2, 2009 (*Invited*)
26. E. Yakhshi-Tafti, H. J. Cho and R. Kumar, "Study of the backward facing step flow problem in microchannels using micro particle image velocimetry", 47th AIAA Aerospace Sciences Meeting, Orlando, Florida, USA, January 5-8, 2009
27. G. Londe, A. Chunder, L. Zhai and H. J. Cho, "A Nanostructured Thermosensitive Surface with Integrated Microheater for Wettability Control", 2008 International Mechanical Engineering Congress and Exposition, Boston, MA, October 31-November 6, 2008

28. E. Yakhshi Tafti, K. Law, R. Kumar and H. J. Cho, "Effect of Surfactants on Droplet Formation in Microchannels," ASME Early Career Technical Conference (ASME ECTC 2008), Miami, FL, October 3-4, 2008
29. E. Yakhshi Tafti, O. Ardila, H. J. Cho and R. Kumar, "Experimental Analysis of Backward Facing Step Flow in Microchannels Using Micro Particle Image Velocimetry", 2008 ASME Heat Transfer/Fluids/Energy/Solar/Nano Conferences (ASME HT), Jacksonville, FL, August 10-14, 2008
30. H. Pang, P. L. Likamwa, H. J. Cho, "Development of SPR Sensor Array Based on Optoelectronic Platform for High Throughput System", 2008 Conference on Lasers and Electro-Optics and 2008 Conference on Quantum Electronics and Laser Science (CLEO/QELS 2008), San Jose, CA, May 4-9, 2008
31. G. Londe, A. Wesser, H. J. Cho, L. Zhai, A. Chunder, S. Subbarao, "A Thermosensitive Valve Using Switchable Hydrophilic/Hydrophobic Nanostructures for Lab-on-a-chip (LOC) Systems", The 14<sup>th</sup> International Conference on Solid-State Sensors, Actuators and Microsystems (Transducers 2007), Lyon, France, June 10-14, 2007 [Acceptance rate: 41%].
32. H. J. Cho, "CAREER: A Micro SPR Sensor with Integrated Microfluidic Components", 2007 NSF ECCS Grantees' Workshop to Broaden Participation, Reno, Nevada, April 30-May 2, 2007 (*Invited*)
33. H. Pang, P. Likamwa and H. J. Cho, "A Micro SPR (Surface Plasmon Resonance) Sensor with an Integrated Photodetector", International Conference on Micro Total Analysis Systems (micro-TAS 2006), Tokyo, Japan, November 5-9, 2006.
34. P. Zhang, S. Desphande, S. Seal, H. J. Cho and P. J. Medelius "Fast Detection of Hydrogen at Room Temperature Using a Nanoparticle-integrated Microsensor", The 5th International Conference on Sensors (IEEE SENSORS 2006), Daegu, Korea, October 22-25 [Acceptance rate: 60%]
35. H. Pang, P. Likamwa and H. J. Cho, "Integrated Optical Sensor Platform based on Evanescent Field Coupling for Biochemical Sensor Applications", The 5th International Conference on Sensors (IEEE SENSORS 2006), Daegu, Korea, October 22-25 [Acceptance rate: 60%]
36. S. Shukla, E. Brinley, H. J. Cho, and S. Seal, "Polymer Fiber Assisted Processing of Ceramic Oxide Nano and Submicron Fibers", The 30th Annual Cocoa Beach Conference and Exposition on Advanced Ceramics and Composites, Cocoa Beach, FL, January 22-27, 2006.
37. N. S. Palsandram, P. Zhang, M. Pepper, M. Lee and H. J. Cho, "Interconnecting Microfluidic Package and Hybrid Interface for Chip-based Sensor", 2005 ASME International Mechanical Engineering Congress and Exposition (IMECE 2005), Orlando, FL, November 5-11, 2005.
38. P. Zhang, S. Shukla, L. Ludwig, H. J. Cho and S. Seal, "A Room Temperature Hydrogen Sensor with High Sensitivity and Selectivity Using Nanocrystalline Semiconductor Particles", 2005 ASME International Mechanical Engineering Congress and Exposition (IMECE 2005), Orlando, FL, November 5-11, 2005.
39. S. Patil, A. Mehta, H. Bang, H. J. Cho and S. Seal, "A Novel Nanomaterial Based Electrochemical Sensor for Free Radical Detection", 2005 ASME International

- Mechanical Engineering Congress and Exposition (IMECE 2005), Orlando, FL, November 5-11, 2005.
40. S. Shukla, C. Drake, L. Ludwig, H. J. Cho, and S. Seal, "Air-Pressure Effect on Room Temperature Hydrogen Sensitivity of Semiconductor Tin Oxide Based Thin Film Micro-Sensor", ASM International Surface Engineering Congress and Exhibition, St. Paul, MN, August 1-3, 2005.
  41. A. Mehta, H. Shekhar, S. H. Hyun, S. Hong and H. J. Cho, "A Disposable Microsensor for Continuous Monitoring of Free Chlorine in Water", The 2nd IWA Conference on Instrumentation, Control and Automation (ICA2005), Busan, Korea, May 29 – June 2, 2005.
  42. P. Zhang, G. Londe, J. Sung, E. Johnson and H. J. Cho, "Microlens Fabrication Using an Etched Glass Mater", The 6th International Workshop on High Aspect Ratio Micro Structure Technology (HARMST 2005), Gyeongju, Korea, June 10-13, 2005.
  43. S. Shukla, R. Agrawal, L. Ludwig, H.J. Cho, and S. Seal, "Nano-Micro Integrated Highly Sensitive Room Temperature Hydrogen Detector" the Annual Joint Symposium of Florida Chapter of the AVS and Florida Society for Microscopy, Orlando, FL, March 13-17, 2005.
  44. S. Shukla, L. Ludwig, R. Agrawal, J. Duarte, H. J. Cho, and S. Seal, "Room Temperature Hydrogen Sensitivity of Nanocrystalline Doped-Tin Oxide Sensor under UV-Light", Presented at TMS 134<sup>th</sup> Annual Meeting and Exhibition, San Francisco, CA, February 13-17, 2005.
  45. S. Shukla, R. Agrawal, J. Duarte, H. J. Cho, and S. Seal, "Photo-Deactivated Room Temperature Hydrogen Gas Sensitivity of Nanocrystalline Doped-Tin Oxide Sensor", The 29th Annual Cocoa Beach Conference and Exposition on Advanced Ceramics and Composites, Cocoa Beach, FL, January 24-27, 2005.
  46. S. Shukla, R. Agarwal, L. Ludwig, H. Cho and S. Seal, "Room temperature hydrogen gas sensitivity of Nanocrystalline Doped-Tin Oxide Sensor Incorporated into MEMS Device", MRS 04 Fall Meeting, Boston, MA, November 29-December 3., 2004.
  47. A. Rajnikant, S. Shukla, L. Ludwig, M. Anjum, H. J. Cho and S. Seal, "A Nanoparticle-based Microsensor for Room Temperature Hydrogen Detection", The 3rd International Conference on Sensors (IEEE SENSORS 2004), Vienna, Austria, October 24-27, 2004 [Acceptance rate of this conference is 55%].
  48. M. Anjum, H. Shekhar, S. Hyun, and H. J. Cho, "A Disposable BOD Microsensor Using a Polymer Substrate", The 3rd International Conference on Sensors (IEEE SENSORS 2004), Vienna, Austria, October 24-27, 2004 [Acceptance rate of this conference is 55%].
  49. V. Sundaram, H. Bang, and H. J. Cho, "A DEP(dielectrophoresis) Manipulator for Bead-based Assay Using Transparent ITO Electrodes", The 3rd International Conference on Sensors (IEEE SENSORS 2004), Vienna, Austria, October 24-27, 2004 [Acceptance rate of this conference is 55%].
  50. A. Mehta, H. Shekhar, S. H. Hyun and H. J. Cho, "A Disposable Microbial Sensor for Rapid BOD Measurement", International Conference on Micro Total Analysis Systems (micro-TAS 2004), Mälmo, Sweden, September 26-30, 2004 [Acceptance rate of this conference is 64%]
  51. H. Shekhar, V.Chathapuram, S. H. Hyun, S. Hong and H. J. Cho, "A Disposable Microsensor for Continuous Monitoring of Free Chlorine in Water", The 2nd IEEE

- International Conference on Sensors (IEEE SENSORS), Toronto, Canada, October 22-24, 2003
52. J. Yan, S. T. Kowel, H. J. Cho, and C. H. Ahn, "Micromirror-based 3D Display System and Its Defense Applications", The 17th Annual International Symposium on Aerospace/Defense Sensing, Simulation, and Controls (AeroSense), Orlando, FL, April 21-25, 2003.
  53. H. J. Cho and C. H. Ahn, "Microscale Resin-bonded Permanent Magnets for Magnetic MEMS Applications", The 47th Annual Conference on Magnetism and Magnetic Materials, Tampa, FL, November 11-15, 2002.
  54. A. Puntambekar, S. Murugesan, R. Trichur, H. J. Cho, S. Kim, J.-W. Choi, G. Beaucage, and C. H. Ahn, "Effect of Surface Modification on Thermo-Plastic Fusion Bonding for 3-D Microfluidics," The 6th International Conference on Micro Total Analysis Systems (micro-TAS 2002), Nara, Japan, November 3-7, 2002.
  55. C. H. Ahn, S. Kim, H. J. Cho, S. Murugesan and G. Beaucage, "Surface Modification of Cyclic Olefin Copolymers for Bio-MEMS Microfluidic Devices", The MRS Spring Meeting, San Francisco, CA, April 1-5, 2002.
  56. H. J. Cho and C. H. Ahn, "Micromachined Resin Bonded Permanent Magnet Arrays Using a Bumper Filling Technique", The 46th Annual Conference on Magnetism and Magnetic Materials, Seattle, WA, November 12-16, 2001.
  57. J.-W. Choi, S. Kim, R. Trichur, H. J. Cho, A. Puntambekar, R. L. Cole, J. R. Simkins, S. Murugesan, K. S. Kim, J. B. Lee, G. Beaucage, J. H. Nevin, and C. H. Ahn, "A Plastic Micro Injection Molding Technique Using Replaceable Mold-Disks for Disposable Microfluidic Systems and Biochips", The 5th International Conference on Micro Total Analysis Systems (micro-TAS 2001), Monterey, CA, October 21-25, 2001.
  58. T. R. Butt, H. Tran, J.-W. Choi, H. J. Cho and C. H. Ahn, "A Disposable Cell-Based Biochip for Detection of Hormones and Drugs", The 5th International Conference on Micro Total Analysis Systems (micro-TAS 2001), Monterey, CA, 2001, October 21-25, 2001.
  59. A. Puntambekar, H. J. Cho, C.-C. Hong, J.-W. Choi, C. H. Ahn, S. Kim, and V.B. Makhijani, "A New Fixed-Volume Metering Microdispenser Module Based on sPROMs technology", The 11th International Conference in Solid-State Sensors and Actuators (Transducers '01), Munich, Germany, June 10-14, 2001.
  60. J. Yan, S. T. Kowel, H. J. Cho, and C. H. Ahn, "Micromirror Arrays for Stereoscopic 3D displays", The Society of Information Display Symposium '01, San Jose, CA, June 3-8, 2001.
  61. H. J. Cho and C. H. Ahn, "Patterning of Magnetic Beads with Electroplated Thick Magnet Arrays for BioMEMS Applications", The 8th Joint MMM-Intermag Conference, San Antonio, TX, January 7-11, 2001.
  62. C. H. Ahn, A. Puntambekar, S. M. Lee, H. J. Cho and C.-C. Hong, "Structurally Programmable Microfluidic Systems", The 4th International Conference on Micro-Total Analysis Systems (micro-TAS 2000), Enschede, The Netherlands, May 14-18, 2000.
  63. A. Puntambekar, S. Lee, H. J. Cho, and C. H. Ahn, "On-Chip Microfluidic Multiplexers for Biochemical Reactor and Mixers", IEEE World Congress on Biomedical Physics, Chicago, IL, July 23-28, 2000.



64. H. J. Cho, J. Yan, S. T. Kowel, F. R. Beyette, Jr., and C. H. Ahn, "A Scanning Micromirror Using a Bi-directionally Movable Magnetic Microactuator", SPIE Conference on MOEMS and Miniaturized Systems, Santa Clara, CA, September 18-20, 2000.
65. H. J. Cho and Chong H. Ahn, "A Novel Bi-Directional Magnetic Microactuator Using Electroplated Permanent Magnet Arrays with Vertical Anisotropy", The 13th Annual International Conference on Micro Electro Mechanical Systems (IEEE MEMS 2000), Miyazaki, Japan, January 23-27, 2000

### *Invited Seminars and Lectures*

1. Thermally Actuated Droplet Manipulation Platform, LG Electronics R&D Campus, Seoul, Korea, July 3, 2013
2. A Tale of Two Droplets - Development of a Thermotaxis Platform Technology for Droplet Manipulation, Hanyang University, Ansan, Korea, June 25, 2013
3. Development of a Room Temperature Hydrogen Sensor, Andong National University, Andong, Korea, May 20, 2013
4. From Materials to Devices - Development of a Room Temperature Hydrogen Sensor, Korea Research Institute of Standards and Science, Daejeon, Korea, June 14, 2012
5. Thermotaxis Droplet Manipulation Platform and Other Modular Microfluidic Components, Korea Electrotechnology Research Institute (KERI), Ansan, Korea, March 8, 2012
6. Thermocapillary Droplet Manipulation – A New Platform Technology for Droplet Manipulation, Korea Institute of Industrial Technology (KITECH), Ansan, Korea, July 25, 2011
7. High-speed Thermocapillary Manipulation of Droplets, Gyeongsang National University, Jinju, Korea, July 1, 2011
8. Thermocapillary Motion of Droplets on a Thin Liquid Film, Sungkyunkwan University (SKKU), Suwon, Korea, May 16, 2011
9. A Passive Micromixer and a Smart Wettability Control Surface for Microflow Regulation, Andong National University (ANU), Andong, Korea, June 24, 2010
10. MEMS Technology and Device Applications of Novel Functional Materials, Chonnam National University (CNU), Gwangju, Korea, June 3-4, 2010
11. Room Temperature Hydrogen Sensor Using Nano-Micro Interface, College of Nanoscience and Nanotechnology, Pusan National University (PNU), Miryang, Korea, March 26, 2010
12. Hydrogen Sensing at Room Temperature - Materials to Device, Pukyong National University, Busan, Korea, March 19, 2010
13. Micro-Nano Sensors, Sensor Technical Workshop at Sungkyunkwan University (SKKU), Suwon, Korea, February 24, 2010
14. Novel applications at the interface of nano and micro – Hydrogen Sensor and Wettability Control Surface, School of Materials Science and Engineering, Seoul National University (SNU), Seoul, Korea, November 11, 2009

15. A Novel Diffusion-based Passive Micromixer Using Velocity Profile Variation, Faculty of Applied Chemical Engineering, Chonnam National University (CNU), Gwangju, Korea, November 6, 2009
16. Flow Control at the Interface of Nano-Micro, School of Advanced Materials Science and Engineering, Sungkyunkwan University (SKKU), Suwon, Korea, October 21, 2009
17. In-plane Micromixer and Switch for Flow Regulation at the Reduced Scale, Institute for Eco-energy, Korea Advanced Institute of Science and Technology (KAIST), Daejeon, Korea, September 14, 2009
18. Novel Applications at the Interface – Energy, Nanomaterials and MEMS, School of Advanced Materials Science and Engineering, Sungkyunkwan University (SKKU), Suwon, Korea, July 6, 2009
19. Invited Lecture Series – 1. MEMS and BioMEMS, 2. Functional Nanostructure Integration, School of Advanced Materials Science and Engineering, Sungkyunkwan University (SKKU), Suwon, Korea, March 11-12, 2008
20. Micromachined sensors and components for bio/chemical applications, Department of Mechanical Engineering, Stevens Institute of Technology, Hoboken, NJ, February 8, 2007
21. Invited Lecture on MEMS/BioMEMS, Faculty of Applied Chemical Engineering, Chonnam National University, Gwangju, Korea, November 2, 2006
22. Microsensors for Bio/Chemical Applications, Department of Mechatronics, GIST (Gwangju Institute of Science and Technology), Gwangju, Korea, November 2, 2006
23. Invited Seminar, Department of Materials Science & Engineering, Korea University, Seoul, Korea, October 31, 2006
24. Invited Seminar, School of Advanced Materials Engineering, Andong National University, Andong, Korea, October 26, 2006
25. Invited Seminar, School of Materials Science and Engineering, SKKU (SungKyunKwan University), Suwon, Korea, June 9, 2005
26. Invited Seminar, KETI (Korea Electronics Technology Institute), Sunnam, Korea, June 7, 2005
27. Invited Seminar, Department of Mechanical Engineering, KAIST (Korea Advanced Institute of Science and Technology), Daejeon, Korea, June 3, 2005
28. Invited Seminar, Faculty of Applied Chemical Engineering, Chonnam National University, Gwangju, Korea, June 2, 2005

## **PATENTS AND DISCLOSURES:**

### *At University of Central Florida*

- E. Yakhshi Tafti, **H. J. Cho**, R. Kumar, “Microfluidic mixer having channel width variation for enhanced fluid mixing”, US PATENT 8,430,558, April 30, 2013
- S. Seal, **H. J. Cho**, S. Patil, A. Mehta, “Cerium oxide nanoparticle regenerative free radical sensor”, US PATENT 8,172,997, May 8, 2012
- **H. J. Cho**, S. Halakatti, A. Mehta, “Portable Water Quality Sensor Fabrication Method”, US PATENT 8,057,724, November 15, 2011

- S. Seal, S. V. Shukla, L. Ludwig and **H. Cho**, “Fabrication Method for a Room Temperature Hydrogen Sensor”, US PATENT 8,034,650, Oct. 11, 2011
- **H. J. Cho**, "Interconnecting Microfluidic Package and Fabrication Method", US PATENT 7,988,902, Aug. 2, 2011
- **H. J. Cho**, H. Bang, P. Likamwa, “Micro integrated planar optical waveguide type SPR sensor”, US PATENT 7,920,267, April 5, 2011
- S. Seal, S. V. Shukla, L. Ludwig and **H. Cho**, “Room Temperature Hydrogen Sensor”, US PATENT 7,791,150, Sep. 7, 2010
- **H. J. Cho**, S. Halakatti, A. Mehta, “Portable Water Quality Monitoring System”, US PATENT 7,666,285, Feb. 23, 2010
- **H. J. Cho**, "Interconnecting Microfluidic Package and Fabrication Method", US PATENT 7,569,127, Aug. 4, 2009
- **H. J. Cho**, H. Bang, P. Likamwa, “Micro integrated planar optical waveguide type SPR sensor”, US PATENT 7,483,140, January 27, 2009
- S. Bhansali, B. A. Rzigalinski, **H. Cho**, “System and Method for Immunosensor Regeneration”, US PATENT 7,118,922, October 10, 2006.

*At University of Cincinnati*

- C. H. Ahn, **H. J. Cho**, J.-W. Choi, “Magnetic Bead-based Arrays, ” U. S. Patent Appl. 20040009614
- S. T. Kowel, J. Yan, **H. J. Cho**, C. H. Ahn, “3D Display using Micromirror Array,” U. S. Patent Appl. 20040218037

*At Korea Electronics Institute of Technology*

- Patents 10-1996-025192, 10-1996-025193, 10-1996-009565, 10-1996-009566, 20-1995-055222, 10-1993-020429

## GRANTS AND CONTRACTS:

*Principal Investigator*

- *External*

**Droplet Thermotaxis: A New Platform Technology for Droplet-based Microfluidic Systems**

Duration: 2011-2015

Amount: \$358,875

Funding Source: National Science Foundation, ECCS-1102280

Investigators: H. J. Cho, R. Kumar

**STTR: Compact Debridement and Treatment Delivery Device for Dermal Wound Care**

Duration: 2011-2012

Amount: \$50,000

Funding Source: National Institute of Health (subcontracted through PharmAcute LLC),  
1R41MD00693301

Investigator: H. J. Cho

**Modular MEMS Components for Diagnostic Biochips**

Duration: 2012-2013

Amount: \$86,500

Funding Source: Korea Electrotechnology Research Institute (KERI)

Investigators: H. J. Cho

**Collaborative: Regenerative Nanosensors for Quantitative Assessment of Oxidative Stress in Neurodegeneration**

Duration: 2009-2015

Amount: \$346,455

Funding Source: National Science Foundation, ECCS-0901503

Investigators: H. J. Cho, S. Seal (UCF) Lee Goldstein (Boston University)

**NUE: Preparing Undergraduates for Careers in Nanotechnology**

Duration: 2008-2011

Amount: \$199,980

Funding Source: National Science Foundation, EEC 0741508

Investigators: H. J. Cho, L. Zhai, S. Seal, E. Vittes

**CAREER: A Micro SPR (Surface Plasmon Resonance) Sensor with Integrated Microfluidic Components for In-Situ Monitoring of Biomolecular Activities**

Duration: 2004-2009

Amount: \$ 399,808

Funding Source: National Science Foundation, ECS-0348603

Investigator: H. J. Cho

**MRI: Acquisition of NIL (Nanoimprint Lithography) System**

Duration: 2005-2007

Amount: \$ 200,000

Funding Source: National Science Foundation, ECS-0521497

Investigators: H. J. Cho, E. G. Johnson, S. Seal, J. Fang

**Fabrication of a rotating out-of-plane micromirror**

Duration: 2007-2008

Amount: \$10,000

Funding Source: Agiltron Inc.

Investigator: H. J. Cho

**Interdisciplinary Research and Education: Skinmimicked Micro Biosystem**

Duration: 2005-2007

Amount: \$ 60,000  
Funding Source: University of South Florida (NSF-IGERT)  
Investigator: H. J. Cho

**Development of a disposable microbial sensor for water quality monitoring based on a generic biosensor platform**

Duration: 2003-2004  
Amount: \$ 94, 195  
Funding Source: NASA-University of Florida Space Biotechnology  
Investigators: H. J. Cho, S. K. Hong

- *Internal*

**FHTC: Compact Debridement and Treatment Delivery Device for Dermal Wound Care**

Duration: 2012-2013  
Amount: \$16,667  
Funding Source: Florida High Tech Corridor  
Investigator: H. J. Cho

**NIL (Nanoimprint Lithography) System**

Duration: 2006  
Amount: \$200,000  
Funding Source: Presidential Initiative to Fund Major Research Equipment (UCF)  
Investigators: H. J. Cho, E. G. Johnson, S. Seal, J. Fang

**A Needle-type Nanomaterial-integrated Biochemical Sensor for In-situ Plant Physiology Monitoring**

Duration: 2005  
Amount: \$ 130,000  
Funding Source: Space Research Initiative-University of Central Florida  
Status: Funded and Completed  
Investigators: H. J. Cho, S. Seal (UCF), Melanie Correll, Ray Bucklin (UF)

**SPR (Surface Plasmon Resonance) Sensor Instrument**

Duration: 2005  
Amount: \$27,500  
Funding Source: Presidential Initiative to Fund Major Research Equipment (UCF)  
Investigator: H. J. Cho

**Micro Injection Molding Machine**

Duration: 2003  
Amount: \$38,295  
Funding Source: Presidential Initiative to Fund Major Research Equipment (UCF)

Investigator: H. J. Cho

**Development of a DEP (dielectrophoretic) Biochip for Water-borne Bioparticle Manipulation**

Duration: 2003

Amount: \$7,500

Funding Source: In-House Research Grant (UCF)

Investigator: H. J. Cho

*Co-Principal Investigator*

**NUE: A nanotechnology undergraduate module with embodied virtual lab (PI: J. Thomas)**

Duration: 2014-2015

Amount: \$200,000

Funding Source: National Science Foundation, EEC 1343749

Investigators: H. J. Cho, S. Kim, L. Zhai, J. Thomas

**Multiplexed MEMS Emitters with Augmented Electrospray Thrust (PI: W. Deng)**

**Duration: 2013**

Duration: 2013

Amount: \$39,846

Funding Source: University of Central Florida (Space Research Initiative Program)

Investigators: W. Deng and H. J. Cho

**Collaborative: Development of a Hydrogen Discriminating Low Temperature 1-D Nanocomposite Micro-Sensor (PI: S. Seal)**

Duration: 2008-2012

Amount: \$300,000

Funding Source: National Science Foundation, ECCS- 0801774

Investigators: S. Seal, H. J. Cho (UCF) Ramki Kalyanaraman (University of Tennessee)

**REU Site: Extension of Knowledge to Small-Scale-Engineering (PI: R. Kumar)**

Duration: 2007-2010

Amount: \$294,056

Funding Source: National Science Foundation, EEC-0649076

Investigators: H. J. Cho, R. Kumar

**Tunable Optical Sensors for Microarray Technology (PI: P. Kik)**

Duration: 2006-2007

Amount: \$ 175,167

Funding Source: Center for Biological Defense (USF)

Investigators: P. Kik, A. Dogariu

**Nano-particles/tubes Integrated MEMS device for Point Contact Highly Sensitive Hydrogen Sensor (PI: S. Seal)**

Duration: 2005-2006

Amount: \$ 174,535

Funding Source: ASRC Aerospace Corporation

Investigators: S. Seal. H. J. Cho

**Highly Selective Nano-MEMS Low Temperature Hydrogen Sensor (PI: S. Seal)**

Duration: 2004-2006

Amount: \$ 75,429 (w. split)

Funding Source: Florida Solar Energy Center

Investigators: S. Seal. H. J. Cho

**FHTC: Nano-particles/tubes Integrated MEMS device for Point Contact Highly sensitive Hydrogen Sensor (PI: S. Seal)**

Duration: 2005-2006

Amount; \$86,480

Funding Source: Florida High Tech Corridor

Investigators: S. Seal. H. J. Cho

## **PROFESSIONAL ACTIVITIES**

### **SERVICE TO THE DEPARTMENT, COLLEGE AND UNIVERSITY:**

- Associate Chair, Spring 2014-
- Faculty Senate (Alternate), Fall 2013- Spring 2014
- Member, University Undergraduate Course Review Committee (UCRC), Fall 2013-Spring 2014
- Chair, Advisory Committee, Department of Mechanical and Aerospace Engineering, University of Central Florida, 2013-2014
- Chair, Honors and Awards Committee, Department of Mechanical and Aerospace Engineering, University of Central Florida, 2012-2013
- Member, Honors and Awards Committee, Department of Mechanical, Materials and Aerospace Engineering, University of Central Florida, 2011-2012
- Member, Faculty Search Committee, Energy Systems, Department of Mechanical, Materials and Aerospace Engineering, University of Central Florida, 2011-2012
- Member, Graduate Committee, Mechanical Systems, Department of Mechanical, Materials and Aerospace Engineering, University of Central Florida, 2011
- Chair, Awards Committee, Department of Mechanical, Materials and Aerospace Engineering, University of Central Florida, 2006-2008
- Member, Graduate Committee, Department of Mechanical, Materials and Aerospace Engineering, University of Central Florida, 2005, 2008, 2010
- Member, Evaluation Committee, Department of Mechanical, Materials and Aerospace Engineering, University of Central Florida, 2005
- Member, Faculty Search Committee, Department of Mechanical, Materials and Aerospace Engineering, University of Central Florida, 2003
- Member, Department of Mechanical, Materials and Aerospace Engineering, University of Central Florida, 2003

### **SERVICE TO THE PROFESSION:**

Institute of Electrical and Electronics Engineer (IEEE), Member  
American Society of Mechanical Engineers (ASME), Member  
American Society of Engineering Education (ASEE), Member  
Korean-American Scientists and Engineers Association (KSEA), Central FL Chapter  
President, 2011

### **SERVICE AS EDITORIAL BOARD:**

- International Journal of Optomechatronics, Taylor and Francis, 2010-Current

### **OTHER EXTERNAL PROFESSIONAL SERVICE ACTIVITIES:**



### ***Reviewer for Funding Agencies***

- National Science Foundation, Review Panel, 2003-6, 2008, 2011
- Canada Foundation for Innovation, Reviewer, 2004-2008, 2010-11
- Natural Sciences and Engineering Research Council of Canada, 2008
- Technology Foundation, STW (Dutch funding agency) , 2005

### ***Reviewer for Journals (in alphabetical order)***

- European Journal of Engineering Education
- IEEE-AME Journal of Microelectromechanical Systems
- IEEE-ASME Transactions on Mechatronics
- IEEE Transactions on Biomedical Engineering
- IEEE Sensors
- International Journal of Optomechatronics
- Journal of Applied Physics
- Journal of Micromechanics and Microengineering
- Journal of Micro/Nanolithography, MEMS, and MOEMS
- Journal of Optics A
- Lab on a Chip
- Langmuir
- Macromolecules
- Microfluidics and Nanofluidics
- Nanoscale Research Letters
- Sensors
- Sensors and Actuators A and B
- Smart Materials and Structures
- Thin Solid Films

### ***Award Judge***

- IEEE Sensors GE Award (2005)
- Showcase for Undergraduate Research Excellence, UCF (2012-3)
- Graduate Research Forum, UCF (2013)

### ***Conference Program Committee and Chair***

- Bio-Nanotechnology Theme Session Moderator, UKC (US-Korea Conference on Science, Technology and Entrepreneurship) 2012, August 8-11, Los Angeles, CA, 2012
- Program Committee, ISOT (International Symposium on Optomechatronic Technologies) Co-sponsored by IEEE, OSA and IES, Istanbul, Turkey, September 21-23, 2009
- Session Chair, 2008 ASME IMECE (International Mechanical Engineering Congress and Exposition), Boston, MA, October 31-November 6, 2008
- Session Co-chair, 2007 ASME International Mechanical Engineering Congress and Exposition (IMECE 2007), Seattle, WA, November 11-15, 2007
- Session Chair, 2007 International Conference on Nano Science and Technology, Gwangju, Korea, Nov. 8-9, 2007
- Session Chair, The 6<sup>th</sup> International Workshop on High Aspect Ratio Micro Structure Technology (HARMST 2005), Gyeongju, Korea, June 10-13, 2005.

#### ***Conference Program Reviewer***

- 2008 ASME International Mechanical Engineering Congress and Exposition (IMECE 2008)
- 2007 ASME International Mechanical Engineering Congress and Exposition (IMECE 2007)
- 2006 ASME International Mechanical Engineering Congress and Exposition (IMECE 2006)
- 11th IEEE International Conference on Electronics, Circuits and Systems (ICECS 2004), Tel-Aviv, Israel, December 13-15, 2004

## **OTHER ACTIVITIES**

#### ***Outreach Activities***

- NSF Summer REU (Research Experience for Undergraduates) and RET (Research Experience for Teachers) advisor, 2004-2009  
Advised talented undergraduate students from UCF, Princeton and Columbia. Among them, two are minority students.  
Advised two high school teachers in the Central Florida school districts.
- K-12 research project faculty advisor in collaboration with Satellite High, 2004-current
- Technical assistance as Alliance Partner of SATOP\* (Space Alliance Technology Outreach Program) for RTA# 1396: Reduction of the size of a electromechanical actuator/voice coil, 2004  
\*SATOP is a NASA funded program to provide free engineering assistance to small and medium size businesses. UCF has a corporate agreement to participate in SATOP.

#### ***Promotional Activities***

- The Orlando Business Journal featured the seven inventors at UCF who have been awarded the most patents in 2013 and H. J. Cho was selected as one of the patentees - “The 7 most prolific inventors at UCF last year” on Dec. 20, 2013. (<http://www.bizjournals.com/orlando/blog/2013/12/the-7-most-prolific-inventors-at-ucf.html?page=all>)
- The research work on graphene microactuators that was originally published in Nano Letters was selected as Research Highlights in April, 2011 by Nature Publishing Group (<http://www.nature.com/am/journal/2011/201104/full/am201181a.html>).  
“Inorganic materials such as shape memory alloys and piezoelectric ceramics generally provide good mechanical performance, but can be employed only over a very limited range of temperature and driving voltage. Organic materials like polymers, on the other hand, have wider operating range but suffer from slow response, short life cycles and low efficiency of energy conversion. A research team led by Hyoung Jin Cho from the University of Central Florida in the USA and Jong-Hyun Ahn from Sungkyunkwan University in Korea<sup>1</sup> has now demonstrated a possible solution — integrating graphene into an organic film.”
- Organized Nanotechnology Entrepreneurship Workshop, NanoScience Technology Center, UCF, May 28, 2009. Offered invited lectures to UCF undergraduates and REU students for promoting nanotechnology education at UCF and careers in nanotechnology.
- Conducted promotion and recruitment activities through the faculty’s international student recruitment travel program, for the period, October 26 - November 2, 2006, which was supported by International Services Center (ISC) under the division of Graduate Studies. Presented seminars at five different academic institutions in Korea. Introduced UCF school information, graduate studies, and current research topics. Discussed the recent progress and outcomes of UCF research and education with 14 professors and about 90 students at different locations. Collected student information forms and submitted those with the recruitment travel report to Graduate Studies for continuing communication.
- Bioarray News (<http://www.bioarraynews.com>), the weekly magazine which covers Biochips and Microarrays Research featured the *SPR-based biosensor research at UCF BioMEMS Lab* in its April 7 issue, 2004.
- The UCF Alumni Newsletter, Pegasus featured the BioMEMS research at UCF in its July/August issue, 2004.
- The success story of a PhD student in BioMEMS Lab was covered in UCF news (<http://news.ucf.edu>), Central Florida Future (April 11 issue, 2005), USA Today ([http://www.usatoday.com/news/education/2005-02-15-college-2005-second-team\\_x.htm](http://www.usatoday.com/news/education/2005-02-15-college-2005-second-team_x.htm)), and ASME News (<http://www.asmenews.org/archives/backissues/apr05/features/405girls.html>)

## **RECOGNITION AND AWARDS**

- **WCU (World Class University) Visiting Professorship**, Ministry of Education, Science and Technology, Korea (2009-2010)
- **Distinguished Researcher Award** (2007) – College of Engineering and Computer Science, University of Central Florida
- **NSF CAREER Award** - A Micro SPR (Surface Plasmon Resonance) Sensor with Integrated Microfluidic Components for In-Situ Monitoring of Biomolecular Activities, 2004-2009, Electrical and Communications Systems Division, National Science Foundation.
- **IOP Select\*** by Institute of Physics (2003)  
H. J. Cho and C. H. Ahn, "Magnetically-driven bidirectional optical microscanner ", *Journal of Micromechanics and Microengineering*, pp. 383-389, Vol. 13, No.3, 2003.  
\*IOP Select reflects both the breadth and international significance of papers published in the peer reviewed journals by Institute of Physics.
- Conference Travel Award, MEMS 2000, Miyazaki, Japan, 2000.
- Outstanding Research Award, Korea Electronics Technology Institute, Korea, 1994.