

## Jungkwun Kim

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## EDUCATION

### University of Florida

- Department Associate
  - Electrical and computer engineering
- Research Advisor: Dr. Yong-Kyu Yoon

Gainesville, Florida, USA

Sept. 2010 ~ Current

### State University of New York, Buffalo

- Ph.D. Candidate in Electrical Engineering
- MS in Electrical Engineering
- Research Advisor: Dr. Yong-Kyu Yoon

Buffalo, NY, USA

Sept. 2007 ~ Current

May 2007

### Saint Louis University

- BS in Electrical and Communication Engineering
- Thesis: Water marking on Audio signal

Baguio, Philippines

April 2001 ~ Oct 2005

## RESEARCH INTERESTS

- Microelectromechanical systems (MEMS) and nanofabrication technology: **3D fabrication**
- Micro/Nano-biomedical devices: Scaffold for cell culture and **microneedle**
- Micro/nano fluidic systems
- RF MEMS components and integrated RF systems: **Air-lifted 3D antenna**
- Millimeter-wave/terahertz systems: **3-D Photonic Crystal Bandgap structure**

## PROFESSIONAL EXPERIENCE

Department of Electrical Engineering  
Graduate Research Assistant

Jan. 2007~ Present

1. 3-D NEMS & MEMS fabrication
  - A. Demonstrated the **Dynamic mode multidirectional UV lithography** using SU-8 and automated UV exposure stage for bio and RF applications
  - B. Demonstrated the **Adjustable index matching medium system for dynamic mode multidirectional UV lithography** where the maximum inclined angel of the microstructure is improved from 35° to 60°.
  - C. Demonstrated the **timed development and thermal reflow scheme** for the micro hemisphere, micro pillar integrated hemisphere, and tapered rounded channel.
  - D. Designed and fabricated the **multi-height pillar array** for micro needle application using surface tension UV lithography
  - E. **3-D fabrication in submicron scale** by using the by the dynamic mode multidirectional UV lithography
2. Bio/microfluidics
  - A. Designed and fabricated a **3-D scaffold** for retina cell culture
  - B. Designed and fabricated a **multi diameters 3-D microfluidic channel** using the timed development and thermal reflow scheme
  - C. Designed and fabricated a **3-D rounded channel** using the PDMS molding and extrusion method
3. RF MEMS
  - A. Designed and fabricated the **2.4GHz air-lifted bow-tie antenna**.

## HONORS and AWARDS

### Art in Science Award



The ‘Art in Science’ award at the Micro Total Analysis System ( $\mu$ TAS) 2009 conference, sponsored by the journal, ‘Lab on a Chip’ and the National Institute of Standards & Technology (NIST). The image, titled “Micro world: united we stand,” appears on the cover of the March issue of the journal (Lab on a Chip, 2010, 10, 669). The structure in the image was fabricated by multidirectional ultraviolet lithography with negative photoresist (SU-8 2025).

*Advisor: Dr. Yong-Kyu Yoon*

### **Student Poster Competition Award**

- ✓ School of Engineering and applied Sciences, University at Buffalo, April 2009, NY, USA, “Complex 3-D Microfabrication by Dynamic Mode Multidirectional UV Lithography and Index Matching Medium,” (2<sup>nd</sup> place)
- ✓ The department of Electrical Engineering, University at Buffalo, Mar 2009, NY, USA, “Complex 3-D Microfabrication by Dynamic Mode Multidirectional UV Lithography and Index Matching Medium,” (1<sup>st</sup> place)
- ✓ The department of Electrical Engineering, University at Buffalo, Mar. 2008, NY, USA, “Automated Dynamic Mode Multidirectional UV Lithography For Complex 3-D Microstructures,” (3<sup>rd</sup> place)

### **Travel grant**

- ✓ Transducer Research Foundation for Travel Grant: student travel support for Hilton Head 2010 conference, SC, USA
- ✓ Transducer Research Foundation for Travel Grant: student travel support for MEMS 2010 conference, Hong Kong, China
- ✓ Dorothy M. and Earl S. Hoffman Travel Grant for student travel support for AVS 2009 conference, San Jose, CA, USA
- ✓ OAI, Inc. for MicroTAS conference student travel support 2009, Jeju, Korea
- ✓ Transducer Research Foundation for Travel Grant: student travel support for MEMS 2009 conference, Sorrento, Italy
- ✓ Dorothy M. and Earl S. Hoffman Travel Grant for student travel support for AVS 2008 conference, Boston, USA
- ✓ Transducer Research Foundation for Travel Grant: student travel support for MEMS 2008 conference, Tucson, USA

### **Math Olympiad Award**

- ✓ SLU-CICS Descartesian society, “Math Wizard,” Saint Louis University, Baguio, Philippines, Oct. 2004 (1<sup>st</sup> place)
- ✓ SLU-CICS Descartesian society, “Math Wizard,” Saint Louis University, Baguio, Philippines, Oct. 2002 (1<sup>st</sup> place)

### **The most outstanding international student award**

- ✓ Philippine international Friendship Organization (PIFO), “Three most outstanding international student in the Philippines, ” Nov. 2002 (Honorable Mention)
- ✓ Saint Louis University, Baguio, Philippines, “The most outstanding international student, ” Sept. 2002 (1<sup>st</sup> place)

### **Dean’s Lister**

- ✓ College of Engineering, Saint Louis University, Baguio, Philippines, 2003 spring sem. ~2006 spring sem.

## **Teaching and Mentoring**

### ✓ **Teaching Assistant**

- EE569 RF/Microwave Circuits, SUNY BUFFALO 2007 Fall semester
- EE353 Electronic Circuits SUNY BUFFALO 2008 Spring semester
- EE569 RF/Microwave Circuits SUNY BUFFALO 2007 Fall semester

### ✓ **Teacher**

- SAT Math Brent international school, Baguio, Philippines 2003~2004
- Korean Literature Brent international school, Baguio, Philippines 2003~2004

### ✓ **Supervisor**

- Boy’s dormitory, Brent international school, Baguio, Philippines 2003~2004

## **Services and Leadership**

### **Open house**

Demonstrated line follower Electrical Engineering, SUNY Buffalo Apr. 2009

### **University day open lab**

Demonstrated line follower Electrical Engineering, SUNY Buffalo Oct. 2007

### **Student Representative**

Foreign Student Association, Saint Louis University, Baguio, Philippines Oct. 2002 ~ Sept. 2003

### **Military Service, Korean Army**

1998~2000

## **Licenses**

- ✓ Fundamentals of Engineering (FE) Michigan, USA 2009
- ✓ Wireless Design engineer, National Technical Qualification Certificate, Republic of Korea, 2006 Aug

## **Patent**

1. Device, System, and Method for multidirectional ultraviolet lithography  
- Application serial number 61/147,602, filed on January 27, 2009, now pending, the disclosure of which is incorporated herein by reference.

## **Equipment and Software experience**

### **Equipment:**

E-beam lithography system, Atomic Force Microscope (AFM), DC/RF sputter, Ebeam evaporator, Thermal Evaporator, Mask Aligner (OAI, ORIEL, Karl-suss), Reactive Ion Etching (RIE) machine, Profilometer, Optical microscope, Scanning Electron Microscope (SEM)

### **Engineering software**

Comsol, Microwave Office, HFSS, PSpice, Eagle, MathCAD, AutoCAD, Origin, Matlab

## **Journal Referee**

1. Journal of Micromechanics and Microengineering (JMM):
2. IETE Technical Review

## **Publications**

### **Journal paper:**

**J. K. Kim**, S. Y. Cha, T. S. Yun, Y. K. Yoon, "2.45 GHz inter-/intra-board wireless communication using a CPW-fed vertical bow-tie antenna," Microwave and Optical Technology Letters, vol. 51, no.1, 2009, pp.266-269

### Manuscript in Preparation for journal Papers:

1. **Jungkwun ‘JK’ Kim**, Mark G. Allen and Yong-Kyu ‘YK’ Yoon, “Computer controlled dynamic mode multidirectional UV lithography for 3-D microfabrication.”
2. **Jungkwun ‘JK’ Kim**, Kangsun Lee, Kwang W. Oh and Yong-Kyu ‘YK’ Yoon, “Timed development and thermal reflow process for integrated microsystems.”

### Conference papers:

1. Kangsun Lee, Choong Kim, Youngeun Kim, Byungwook Ahn, Jaehoon Bang, ‘JK’ **Jungkwun Kim**, ‘YK’ Yong-Kyu Yoon, Ji Yoon Kang and Kwang W. Oh, “MICROFLUIDIC NETWORK-BASED COMBINATORIAL DILUTION DEVICE WITH AN INITIAL CONCENTRATION CONTROLLER,” uTAS, The 14th International Conference on Miniaturized Systems for Chemistry and Life Sciences, 3 - 7 October 2010, Groningen, Netherlands
2. Cheollbok Kim, Hyochun Ahn, **Jungkwun Kim**, Xiaoyu Cheng and Yong-Kyu Yoon, "A Compact 5GHz WLAN Notched Bluetooth/UWB Antenna," *2010 IEEE International symposium on Antennas and Propagation and CNC/USNC/URSI Radio Science Meeting*, Toronto, Ontario, Canada July 11-17
3. Xiaoyu Cheng, David E. Senior, Pitfee Jao, **Jungkwun Kim**, James J. Whalen and Yong-Kyu Yoon, "Non-Bragg Resonance in Substrate Integrated Waveguide," *2010 IEEE International symposium on Antennas and Propagation and CNC/USNC/URSI Radio Science Meeting*, Toronto, Ontario, Canada July 11-17
4. Hyochun Ahn, Cheolbok Kim, **Jungkwun (‘JK’) Kim**, David S. Elles, and Yong-Kyu (‘YK’) Yoon, “Electromechanically Steerable Directional Antenna with Floating Pillar Array,” *2010 IEEE International symposium on Antennas and Propagation and CNC/USNC/URSI Radio Science Meeting*, Toronto, Ontario, Canada July 11-17
5. **Jungkwun ‘JK’ Kim**, Hyo Chun Ahn, Xiaoyu Cheng, Kyoung Tae Kim, Gwan Ha Kim and Yong-Kyu ‘YK’ Yoon, “Fabrication of multiple height microprobes using UV lithography on timed-development-and-thermal-reflowed photoresist,” *Hilton Head Workshop 2010: A Solid-State Sensors, Actuators and Microsystems Workshop*, Hilton Head Island, June 6 - 10, 2010
6. **Jungkwun ‘JK’ Kim**, Kangsun Lee, Hongsub Jee, Kwang W. Oh, and Yong-Kyu ‘YK’ Yoon, “Fabrication of multiple height microstructures using UV lithography on timed-development-and-thermal-reflowed photoresist,” *Micro Electro Mechanical Systems, 2010. MEMS 2010. IEEE 23<sup>rd</sup> International Conference*, Hong Kong, China, Jan. 2010
7. **Jungkwun ‘JK’ Kim**, Xiaoyu Cheng, Hyochun Ahn, David Senior Elles, and Yong-Kyu ‘YK’ Yoon, “Lithographically defined integrable air-lifted BOW-TIE antennas,” *Micro Electro Mechanical Systems, 2010. MEMS 2010. IEEE 23<sup>rd</sup> International Conference*, Hong Kong, China, Jan. 2010

8. Gwan-Ha Kim, Eric Kozarsky, Hongsub Jee, Kyoung-Tae Kim, **Jungkwun Kim**, Esther Takeuchi, and Yong-Kyu Yoon, "Carbon Nanotube Embedded Three Dimensional (3-D) Carbon Microelectrodes for Rechargeable Microbatteries," *AVS 56<sup>th</sup> International Symposium and Exhibition*, San Jose, USA, Nov. 2009
9. **Jungkwun 'JK' Kim**, J. Y. Yang, M. M. Slaughter, Gloria Kim and Yong-Kyu 'YK' Yoon, "Tripod Honeycomb Shape Scaffold for Retina Cell Culture by Dynamic Mode Multidirectional UV Lithography," *AVS 56<sup>th</sup> International Symposium and Exhibition*, San Jose, USA, Nov. 2009
10. **Jungkwun 'JK' Kim**, Kangsun Lee, Kwang W. Oh and Yong-Kyu 'YK' Yoon, "Microfabrication of rounded channel and waveguide integrated microlens using timed development and thermal reflow process," *uTAS, the 13<sup>th</sup> international conference*, Jeju, Korea, Nov 2009, (accept rate: 6.5%, Oral)
11. Yong-Kyu Yoon, **Jungkwun Kim** and Gloria J. Kim, "Computer-controlled Multidirectional Ultraviolet Lithography for Integrated Microsystems," *NSF Engineering Research and Innovation Conference*, Honolulu, Hawaii, June 2009
12. **J.K. Kim**, J. Y. Yang, M. M. Slaughter, and Y. K. Yoon, "Dynamic Mode Multidirectional UV lithography for Tripod honeycomb Shape Scaffold," *2<sup>nd</sup> Integrated Nanostructured systems Workshop*, University at Buffalo, Buffalo, NY, May 2009
13. **Jungkwun 'JK' Kim**, Tae-Soon Yun, Hongsub Jee, and Yong Kyu 'YK' Yoon, "Adjustable refractive index method for complex microstructures by automated dynamic mode multidirectional UV lithography," *Micro Electro Mechanical Systems, 2009. MEMS 2009. IEEE 21st International Conference*, Sorrento, Italy, Jan. 2009
14. **Jungkwun 'JK' Kim**, and Yong-Kyu 'YK' Yoon, "Dynamic mode Multidirectional UV Lithography with Liquid state Photoresist," *AVS 55<sup>th</sup> International Symposium and Exhibition*, Boston, USA, Nov. 2008, Oral presentaion
15. Sungyoung Cha, Tae-soon Yun, **Jungkwun Kim**, and Yong-Kyu Yoon, "Pillar Array-type Parabolic Reflector Antenna Driven by Air-lifted Monopole Fed by CB-CPW for 2.4 GHz Applications," *IEEE AP-S International Symposium and USNC/URSI National Raid Science Meeting*, July, 2008
16. **Jungkwun Kim**, M.G. Allen, and Yong-Kyu 'yk' Yoon, "Automated dynamic mode multidirectional UV lithography for complex 3-D microstructures," *Micro Electro Mechanical Systems, 2008. MEMS 2008. IEEE 21st International Conference*, Tusan, USA, pp.399-402, 13-17 Jan. 2008
17. **Jungkwun Kim**, Pit Fee Jao, sung Yong cha, and Y. K. Yoon, "micro/nano fabrication and Multidisciplinary Reserch," *1<sup>st</sup> Integrated Nanostructured systems Workshop*, University at Buffalo (SUNY), Buffalo, NY, May 2007