

Jiyoung Chang, Ph.D.

Assistant Professor
University of Utah, Department of Mechanical Engineering
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PROFESSIONAL POSITION

Assistant Professor (2015 July-present) Department of Mechanical Engineering, University of Utah, USA

EDUCATION AND TRAINING

- Postdoc (2013-2015)** Materials Sciences Division, Lawrence Berkeley National Laboratory, USA
Department of Physics, U.C. Berkeley, CA, USA *Advisor : Prof. Alex Zettl*
- Postdoc (2012-13)** School of Dentistry, University of California at San Francisco, San Francisco, USA
Advisor : Prof. Stefan Habelitz
- Ph.D. (2012)** Mechanical Engineering, U.C. Berkeley, CA, USA *Advisor : Prof. Liwei Lin*
- M.S. (2007)** Mechanical Engineering, Yonsei University, Seoul, Korea
- Advisor : Prof. Jongbaeg Kim & Byung-Kwon Min
- B.S. (2005)** Mechanical Engineering, Yonsei University, Seoul, Korea

EXECUTIVE SUMMARY

Expertise: Piezoelectric Energy Harvesting & Flexible electronics, Scalable Micro/nano Manufacturing, Synthesis & Characterization of 2-D materials, MEMS/NEMS, BioMEMS, Nanoscale 3D printing

AWARDS AND SCHOLARSHIP

- **Best Paper awards**, Berkeley Sensor and Actuator Center (BSAC) Research Review 2012
- **Graduate student scholarship**, IEEE-CPMT, Awards for Academic Excellence 2011
- **Yonsei scholarship for academic excellence**, Yonsei study-Abroad Foundation 2010
- **Irving and Lucile Smith Scholarship** for Academic Excellence, UC Berkeley 2009~2010

SELECTED PUBLICATIONS (*see the full publication list*)

- **Jiyoung Chang**, Qin Zhou and Alex Zettl, "Facile electron-beam lithography technique for irregular and fragile substrates", *Applied Physics Letters*, **2014** (I.F. 3.5) [link](#)
- **Jiyoung Chang**, Yumeng Liu, Han-byul Kwang, Byung-Yang Lee, Seung-Wuk Lee and Liwei Lin, "Direct-write complementary graphene field effect transistors and junctions via near-field electrospinning", *Small*, **2014** (I.F. 7.5) [Back Cover link](#)
- **Jiyoung Chang**, Michael Dommer, Cheih Chang and Liwei Lin, "Piezoelectric Nanofibers for Energy Scavenging Applications", *Nano energy*, **2012**. (I.F. 10.2) [link](#)
- Anna Harley, Thang Pham, **Jiyoung Chang**, Ernest Chen, Marcus Worsley, Alex Zettl, William Mickelson and Roya Maboudian, "Platinum Nanoparticle-loading of Boron Nitride Aerogel and Its Use as a Novel Sensing Material for a Low Power Catalytic Gas Sensor", *Advanced Functional Materials* (I.F. 11.8), **2016**, [link](#) [Inside front cover](#)
- H.B Kang, **Jiyoung Chang**, K. Koh, L. Lin and Y.S Cho, "High quality Mn-doped(Na,K)NbO₃ Nanofibers for flexible piezoelectric nanogenerators", *ACS Applied materials & Interfaces*, **2014**, (I.F. 5.9) [link](#)
- Anna Harley, **Jiyoung Chang**, Qin Zhou, Jeffrey Dong, Thang Pham, Marcus A Worsley, Rosa Maboudian, Alex Zettl and William Mickelson, "Catalytic hydrogen sensing using microheated platinum nanoparticle-loaded graphene aerogel", *Sensors and Actuators B: Chemical*, **2015** (I.F. 3.8) [link](#)
- **Jiyoung Chang**, Kisik Koh, Byung-Kwon Min, SangJo Lee, Jongbaeg Kim and Liwei Lin, "Synthesis and bi-directional frequency tuning of cantilever-shaped nano resonators using focused ion beam", *ACS Applied materials & Interfaces*, **2013** (I.F. 5.9) [link](#)

RESEARCH EXPERIENCE

Materials Sciences Division, Lawrence Berkeley National Laboratory

Department of Physics, University of California at Berkeley, CA, USA (April, 2013- present)

Postdoctoral fellow (P.I.: Prof. Alex Zettl)

- Piezoelectric 2-D materials for flexible substrate
- Super-lattice based charge transport on graphene and 2-D materials
- Contactless conductance measurement of 2-D materials
- Spin-free electron beam lithography on irregular and fragile substrate
- MEMS based micro heater toxic gas sensor arrays

University of California at San Francisco, CA, USA (June, 2012 – April, 2013)

Department of Preventive & Restorative Dental Science

Postdoctoral scholar (P.I.: Prof. Stefan Habelitz)

- Engineering dentin-pulp interface in-vitro using 3-D nanostructures
- Explore cell growth mechanism using smart nanoscale structure

University of California at Berkeley, CA, USA (Aug, 2007 – May, 2012)

Berkeley Sensor & Actuator Center, *Department of Mechanical Engineering*

Graduate student researcher (Advisor: Prof. Liwei Lin)

- Direct-write functional nanofibers via Near-field electrospinning
- PVDF- nanofibers based piezoelectric energy harvesting
- Flexible electronics using self-aligned Graphene channel MOSFET
- Direct-write microfluidic channel for ultra-fast prototyping
- MEMS based co-culture system for mammalian cells
- MEMS based cell migration/proliferation control platform
- Multi-types of cells co-culture via surface property switching
- Rapid thermal processing for low-temperature CMOS compatible hermetic sealing

Western Digital, Fremont, CA, USA (May 2010 – Aug 2010)

Engineering Intern (Supervisor: Dr. Lei Wang)

- Analysis on thermal expansion mismatch during flip-chip bonding
- Simulated temperature profile for optimized bonding condition

Yonsei University, Seoul, Korea (Sep, 2005 – Aug, 2007)

Nano manufacturing Center, School of Mechanical Engineering

Graduate student researcher (Advisor: Prof. Byung-Kwon Min & Prof. Jongbaeg Kim)

- Characterizing 1-D nanostructures using FIB-CVD
- Electrostatic nanotweezers for sub-micrometer particle manipulation
- Spiral-shaped bimorph actuators for Nanoscale substrate leveling
- In-situ monitoring and frequency tuning for frequency filtering

Yonsei University, Seoul, Korea (Mar, 2005 – Aug, 2005)

School of Mechanical Engineering

Undergraduate student researcher (Advisor: Prof. Byung-Kwon Min)

- Optimizing tool path in EDM processing for minimized tool wear (*Undergraduate graduation thesis*)

PUBLICATIONS

PEER-REVIEWED JOURNALS

1. **Jonghyun Kim**, Zhou Qin and **Jiyoung Chang**, "Suspended graphene based gas sensor with 1mW energy consumption", *Micromachines*, (IF 1.3), **2017**, [link](#)
2. Xining Zang, **Jiyoung Chang** and Liwei Lin, "Single layer graphene synthesis from nickel droplet", *Advanced Materials Interface* (I.F. 3.4), **2017**, [link](#)
3. Jongmin Yuk, Qin Zhou, **Jiyoung Chang**, Peter Ercious, Alex Zettl and Paul Alivisatos, "Real-time Observation of Water-soluble Mineral Precipitation in Aqueous Solution by *In Situ* High-resolution Electron Microscopy", *ACS Nano* (I.F. 12.8), **2016**, [link](#)
4. Anna Harley, Thang Pham, **Jiyoung Chang**, Ernest Chen, Marcus Worsley, Alex Zettl, William Mickelson and Roya Maboudian, "Platinum Nanoparticle-loading of Boron Nitride Aerogel and Its Use as a Novel Sensing Material for a Low Power Catalytic Gas Sensor", *Advanced Functional Materials* (I.F. 11.8), **2016**, [link](#) *Inside front cover*
5. Qin Zhou, Allen Sussman, **Jiyoung Chang**, Jeffrey Dong, Alex Zettl and William Mickelson, "Fast response integrated MEMS microheaters for ultra-low power gas detection", *Sensors and Actuators A:Physical*, **2015** [link](#)
6. Xining Zang, Qin Zhou, **Jiyoung Chang**, Yumeng Liu and Liwei Lin, "Graphene and carbon nanotube(CNT) in MEMS/NEMS applications", *Microelectronic Engineering*, **2015** (I.F. 1.4), [link](#)
7. **Jiyoung Chang**, Qin Zhou and Alex Zettl, "Facile electron-beam lithography technique for irregular and fragile substrates", *Applied Physics Letters*, 105(173109) **2014** (I.F. 3.5), [link](#)
8. Anna Harley, **Jiyoung Chang**, Qin Zhou, Jeffrey Dong, Thang Pham, Marcus A Worsley, Rosa Maboudian, Alex Zettl and William Mickelson, "Catalytic hydrogen sensing using microheated platinum nanoparticle-loaded graphene aerogel", *Sensors and Actuators B:Chemical*, Vol.206, pp. 399-406, **2015** (I.F. 3.8) [link](#)
9. Han Byul Kang, **Jiyoung Chang**, Kisik Koh, Liwei Lin and Yong Soo Cho, "High quality Mn-doped(Na,K)NbO₃ Nanofibers for flexible piezoelectric nanogenerators", *ACS Applied materials & Interfaces*, Vol. 6(13), pp. 10576-82, **2014**, (I.F. 5.9) [link](#)
10. **Jiyoung Chang**, Yumeng Liu, Hanbyul Kwang, Byung-Yang Lee, Seung-Wuk Lee and Liwei Lin, "Direct-write complementary graphene field effect transistors and junctions via near-field electrospinning", *Small*, Vol. 10, pp. 1920-1925, **2014** (I.F. 7.5), *Back Cover* [link](#)
11. **Jiyoung Chang**, Kisik Koh, Byung-Kwon Min, SangJo Lee, Jongbaeg Kim and Liwei Lin, "Synthesis and bi-directional frequency tuning of cantilever-shaped nano resonators using focused ion beam", *ACS Applied materials & Interfaces*, Vol. 5(19), pp. 9684-9690, **2013** (I.F. 5.9) [link](#)
12. Gökce Uğur, **Jiyoung Chang**, Shuhuai Xiang, Liwei Lin, and Jennifer Lu, "A new near infrared-mechano responsive polymer film", *Advanced Materials*, Vol. 24, pp. 2685-2690, **2012** (I.F. 15.4) [link](#)
13. **Jiyoung Chang**, Michael Dommer, Cheih Chang and Liwei Lin, "Piezoelectric Nanofibers for Energy Scavenging Applications", *Nano energy*, Vol. 1, pp. 356-371, **2012**. (I.F. 10.2) [link](#)
14. Sang-Hee Yoon, **Jiyoung Chang**, Mohammad R. K. Mofrad and Liwei Lin, "A Biological Breadboard Platform for Cell Adhesion and Detachment Studies", *Lab on a chip*, Vol. 11, pp. 3555-3562, **2011** (I.F. 5.7) [link](#)
15. **Jiyoung Chang**, Sang-Hee Yoon, Mohammad R. K. Mofrad and Liwei Lin, "MEMS Based Dynamic Cell-to-Cell Culture Platforms Using Electrochemical Surface Modifications," *Journal of Micromechanics and Microengineering*, Vol. 21, No. 5, 2011 (I.F. 1.79) [link](#)
16. B. D. Sosnowchik, **Jiyoung Chang**, and Liwei Lin, "Pick, Break, and Placement of 1D Nanostructures for Direct Assembly and Integration," *Applied Physics Letters*, Vol. 96, 153101, 2010 (I.F. 3.5) [link](#)
17. **Jiyoung Chang**, Byung-Kwon Min, Jongbaeg Kim, and Liwei Lin, "Bimorph Nano Actuators Synthesized by Focused Ion Beam Chemical Vapor Deposition," *Microelectronics Journal*, Vol. 86, pp. 2364-2368, 2009 (I.F. 1.4) [link](#)
18. **Jiyoung Chang**, Byung-Kwon Min, Jongbaeg Kim, Sang-Jo Lee and Liwei Lin, "Electrostatically Actuated Carbon Nanowire Nanotweezers," *Smart Materials and Structures*, Vol. 18, 065017, 2009 (I.F. 2.4) [link](#)

INTERNATIONAL CONFERENCES PROCEEDINGS

1. **Jonghyun Kim**, Qin Zhou and **Jiyoung Chang**, "A facile dry-pmma transfer process for electron-beam lithography on non-flat substrate", *IEEE-MEMS*, Las Vegas, Jan 2017, *Oral presentation*
2. Anna Harley, Thang Pham, **Jiyoung Chang**, Ernest Chen, Marcus Worsley, Alex Zettl, William Mickelson and Roya Maboudian, "Pt Nanoparticle-loading of Boron Nitride Aerogel and its use as a novel sensing material for a low power catalytic gas sensing", *Transducers*, June 2015
3. Yumeng Liu, **Jiyoung Chang** and Liwei Lin, "Room temperature Multi-types of gas sensor detection based on graphene based electronics", *Transducers*, June 2015
4. Yumeng Liu, **Jiyoung Chang** and Liwei Lin, "Electrospun graphene based hydrogen sensor on flexible substrate", *IEEE MEMS, San Francisco*, Jan 2014
5. Yumeng Liu, **Jiyoung Chang** and Liwei Lin, "Self-Aligned, Direct-write graphene channel FETs", *Transducers, Barcelona, Spain*, June 2013
6. **Jiyoung Chang**, Heo Kwang, Byung Yang Lee, Seung-Wuk Lee and Liwei Lin, "In-situ self-aligned doping of single layer graphene at room temperature", *IEEE-MEMS, Jan 2013*
7. **Jiyoung Chang**, Michael Dommer, Byung Yang Lee and Liwei Lin, "Direct-write Nanolithography on Flexible Substrate", *Hilton head workshop*, June 2012 (Poster)
8. **Jiyoung Chang** and Liwei Lin, "Chemical-less cell patterning via electrically altered ITO surface", *The 15th International Conference on Miniaturized Systems for Chemistry and Life Sciences (MicroTas)*, Seattle, Oct 2-5, 2011 (Poster)
9. **Jiyoung Chang** and Liwei Lin, "Large array electrospun PVDF nanogenerators on a flexible substrate", *The 16th International Conference on Solid-State Sensors, Actuators and Microsystems (Transducers)*, Beijing, China, June 5~9, 2011 (Oral)
10. **Jiyoung Chang**, Chen Yang, Bin Zhang and Liwei Lin (Invited), "MEMS Performance Challenges - Packaging and Shock Tests," *Micro- and Nanotechnology Sensors, Systems, and Applications III, SPIE Defense, Security + Sensing 2011*, Orlando, April, 2011 (Invited)
11. **Jiyoung Chang** and Liwei Lin, "MEMS packaging technologies & applications", *International symposium of VLSI design automation and test (VLSI-DAT)*, pp. 126-129, Hsin Chu, Taiwan, April 2010 (Invited)
12. **Jiyoung Chang**, Sang-Hee Yoon, Mohammad R.K. Mofrad and Liwei Lin, "MEMS-Based Biological Platform for Dynamic Cell-to-Cell Interaction Characterization," *Proceedings of 23th IEEE MEMS Conference*, pp. 92-95, Hong Kong, Jan. 2010 (Oral)
13. S.-H. Yoon, **Jiyoung Chang**, V. Reyes-Ortiz, L. Lin, and M. R. K. Mofrad, "Addressable cell patterning and release using micro cell control platform: biological breadboard", *Proceedings of 13th international conference on miniaturized systems for chemistry and life sciences*, pp. 1886-88, Jeju, Korea, Nov 1-5, 2009
14. Brian D. Sosnowchik, **Jiyoung Chang** and Liwei Lin, "Direct Pick, Break, and Placement of Nanostructures and Their Integration with MEMS," *The 15th International Conference on Solid-State Sensors, Actuators and Microsystems*, pp. 2168-2171, Denver, June 21~25, 2009 (Oral)
15. Brian D. Sosnowchik, J.P. Schuck, **Jiyoung Chang** and Liwei Lin, "Tunable Optical Enhancement from a MEMS-Integrated TiO₂ Nanosword Plasmonic Antenna," *Proceedings of 22th IEEE Micro Electro Mechanical Systems Conference*, pp. 128-131, Sorrento, Italy, Jan. 2009 (Oral)
16. **Jiyoung Chang**, Jongbaeg Kim, Byung-Kwon Min and Liwei Lin, "Thermally Driven Bimorph Nano Actuators Fabricated Using Focused Ion Beam Chemical Vapor Deposition," *The 14th International Conference on Solid-State Sensors, Actuators and Microsystems*, pp. 541-544, France, June 10-14, 2007
17. **Jiyoung Chang**, Jongbaeg Kim, Byung-Kwon Min, Sang Jo Lee, and Liwei Lin, "In-situ Frequency Tuning of Electrostatically Actuated Vibrating Nano Structures Using Focused Ion Beam," *2006 ASME IMECT, Proceedings of the MEMS Symposium*, Chicago, Nov. 2006 (Oral)
18. **Jiyoung Chang**, Jongbaeg Kim, Byung-Kwon Min, Sang-Jo Lee and Liwei Lin, "Electrostatically Actuated Nano Tweezers Fabricated on Micro-Processed Electrodes," *IEEE-NEMS, China*, Jan. 2006 (Oral)
19. **Jiyoung Chang**, Jongbaeg Kim, Byung-Kwon Min, Sang-Jo Lee, "Facile electrostatic nano-tweezers for sub-micrometer moving range", Korean precise engineering society meeting, Muju, Korea, Oct. 2006

BOOK CHAPTER

1. **Jiyoung Chang** and Liwei Lin, “Chapter 7: Piezoelectric Energy Harvesting nanofibers”, Hierarchical Nanostructures for Energy Devices”, RSC publishing (2014), ISBN: 978-1-84973-628-2

EXTERNAL FUNDING

1. **Jiyoung Chang**(PI), “Developing high-conductivity Cellulose/GNP based PCM filler”, Korean Institute of Science and Technology, \$39k(1yr), 2017
2. Michael S. Yu and **Jiyoung Chang**(co-PI), “ENERGY HARVESTING FROM ELECTROSPUN FIBERS AND PUSH-PULL LOW FREQUENCY ELECTRET TRANSDUCERS”, Office of Naval Research(ONR), \$132k(1yr), 2017
3. Liwei Lin and **Jiyoung Chang**, “Generating energy from piezoelectric nanofibers for automotive vibration”, Funding source: *TOYOTA research lab*, (\$100k/yr), 2011
4. Liwei Lin and **Jiyoung Chang**, “Anti-bacterial chewing-gum using current generation via embedded piezoelectric nanofibers”, Funding source: *Wrigley company*, (\$50k/yr), 2010

EXTERNAL SERVICE

1. Review Panel, NSF CMMI Nanomanufacturing, May 2016

TEACHING

1. **Introduction to Mechanical Design (ME1000)**, University of Utah, Spring 2017
2. **Design of Mechanical Elements (ME3000)**, University of Utah, Fall 2015, Fall 2016
3. **University of California, Berkeley, CA, USA** (Spring 2008)
4. Graduate Student Instructor, ME118 – Introduction to nano engineering (Instructor: Prof. Liwei Lin, ME)
5. **University of California, Berkeley, CA, USA** (Fall 2007)
6. Graduate Student Instructor, Physics 7A – Physics for scientists and engineers (Department of Physics)
7. **Yonsei University, Seoul, Korea** (Fall 2005)
8. Graduate Student Instructor, Creative training II (Department of Mechanical Engineering)

PATENT

1. **Jiyoung Chang**, Jongbaeg Kim, Byung-Kwon Min, “*Electrostatically Actuated Nano Tweezers and Method for fabricating the same*”, Korea patent 10-0857313
2. **Jiyoung Chang**, Jongbaeg Kim, Byung-Kwon Min, “*Fabrication of nano resonator using FIB-CVD and its precise frequency tuning method*”, Korea patent 10-0861570

INVITED TALKS

9. Department of mechanical engineering, Korea University, Seoul, Korea, May 2016 (Host: Prof. B.Y. Yang)
10. Green energy laboratory, Yonsei University, Seoul, Korea, May 2016, (Host: Prof. Byungkwon Min)
11. Korean Institute of Science and Technology, Seoul, Korea, Jan 2013 (Host: Prof. Yongbok Lee)
12. Department of mechanical engineering, Sogang University, Seoul, Korea, Jan 2013 (Host: Prof. K.C. Kong)
13. IEEE CPMT/SCV chapter, Dec 2011 (Host: Dr. Paul Wesling)

SCIENTIFIC SERVICES

1. Journal publication reviewer of *Small*
2. Journal publication reviewer of *Advanced Materials*
3. Journal publication reviewer of *Sensors and Actuators A: Physical*
4. Journal publication reviewer of *Nano energy*

5. Journal publication reviewer of *International Journal of Precision Engineering and Manufacturing*
6. Journal publication reviewer of *Micromachines*
7. Journal publication reviewer of *Journal Microfluidics and Nanofluidics*