

CURRICULUM VITAE

MinJun Kim, Ph.D.

Associate Professor

Department of Mechanical Engineering & Mechanics

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EDUCATION AND TRAINING

- Postdoc.** **Rowland Institute, Harvard University, MA** 2005 – 2006
Major Area: Single Molecule Biophysics, Minor Area: Nanofabrication
Advisor: **Prof. Amit Meller** (now at Boston University)
- Ph.D.** **Division of Engineering, Brown University, RI** 2005
Major Area: Cellular Engineering, Minor Area: Systems Biology
Dissertation: Bacterial Flows - Mixing and Pumping in Microfluidic Systems Using Flagellated Bacteria
Advisor: **Prof. Kenneth S. Breuer**
- M.S.** **Mechanical Engineering, Texas A&M University, TX** 2001
Major Area: Microfluidics, Minor Area: Electrochemistry
Thesis: Microfluidic Flow Control Using Electroosmosis
Advisor: **Prof. Kenneth D. Kihm** (now at the U. of Tennessee – Knoxville)
- B.S.** **Mechanical Engineering, Yonsei University, Seoul, Korea** 1997

PROFESSIONAL APPOINTMENTS

DREXEL UNIVERSITY, Department of Mechanical Engineering & Mechanics

Associate Professor, 9/2011 – present

Assistant Professor, 8/2006 – 8/2011

Director, Biological Actuation, Sensing, & Transport Laboratory, 8/2006 – present

KOREA INSTITUTE OF SCIENCE & TECHNOLOGY, Center of Bionics, Seoul, Korea

Brain Pool Fellow, 06/2013 – 09/2013

MAX PLANCK INSTITUTE, Max Planck Institute for the Science of Light, Erlangen, Germany

Alexander von Humboldt Fellow, 06/2012 – 01/2013

HARVARD UNIVERSITY, Rowland Institute, Cambridge, MA

Postdoctoral Fellow, 7/2005 – 7/2006

SAMSUNG ELECTRONICS CORP., Semiconductor Division, Suwon, Korea

R&D Engineer, 02/1997 – 06/1999

HONORS AND AWARDS

- 2013 Bionic Engineering Outstanding Contribution Award, International Society of Bionic Engineering
- 2013 Brain Pool Fellowship, Korea Ministry of Education, Science & Technology

2013	Gold Award, James F. Lincoln Arc Welding Foundation
2012 – 2015	Elected Technical Councilor Group I: Materials Science, Metallurgy, Mining Engineering in Korean-American Scientists & Engineers Association (KSEA)
2012	Alexander von Humboldt Fellowship for Experienced Researcher
2011	Early Promoted to Associate Professor with Tenure
2010	Silver Award & Merit Award, James F. Lincoln Arc Welding Foundation
2010 – 2013	Army Research Office Young Investigator Award
2009	Best Paper Award, ASME IMECE: Fluid Engineering in Micro- & Nanosystems
2009 – 2013	Human Frontier Science Program Young Investigator Award
2008	Drexel University Faculty Career Development Award
2008	NSF Fellowship, NSF Summer Institute on Nanomechanics, Nanomaterials & Micro/Nanomanufacturing
2008	Stein Fellowship, Louis & Bessie Stein Family Foundation
2008 – 2013	NSF Faculty Early Career Development (CAREER) Program Award
2007	Best of Program Award, James F. Lincoln Arc Welding Foundation
2004	Simon Ostrach Fellowship, Brown University

PUBLICATIONS

- Authored and co-authored a total of **149** archival and refereed papers, including **61** published/accepted journal papers, and 4 submitted journal papers, **74** refereed papers at various technical conferences, **6** published book chapters, **2** published books entitled “*Bacterial Microfluidics*” and “*Microbiorobotics*”, and also submitted **2** U.S. patents.

TEN REFEREED JOURNAL PAPERS RELATED TO PROPOSED RESEARCH TOPIC

10. G. Goyal, K.J. Freedman, Min Jun Kim, "Gold nanoparticle translocation dynamics and electrical detection of single particle diffusion using solid state nanopores," *Anal. Chem.*, Vol. 85, No. 17, p.8180-8187, 2013.
9. K.J. Freedman, S.R. Haq, J.B. Edel, P. Jemth, Min Jun Kim, "Controlled unfolding and stretching of a protein domain inside a solid-state nanopore," *Nat. Sci. Rep.*, Vol. 3, p.1638-1645, 2013.
8. D. Japrun, J. Dogan, K.J. Freedman, Min Jun Kim, P. Jemth, J.B. Edel, "Folding and binding of intrinsically disordered proteins studied by solid-state nanopores," *Anal. Chem.*, Vol. 85, No. 4, p.2449-2456, 2013.
7. K.J. Freedman, A. Bastian, I. Chaiken, Min Jun Kim, "Solid-state nanopore detection of antibody-antigen complexes: a HIV model study," *Small*, Vol. 9, No. 5, p.750-759, 2013. ** This paper has been selected as the cover image of this journal.
6. A.S. Prabhu, K.J. Freedman, J.W.F. Robertson, Z. Nikolov, J.J. Kasianowicz, Min Jun Kim, "SEM-induced shrinking of solid-state nanopores for single molecule detection," *Nanotechnology*, Vol. 22, 425302 2011.
5. K. Freedman, M. Jurgens, A. Prabhu, C.W. Ahn, P. Jemth, J. Edel, Min Jun Kim, "Chemical, thermal, and electric field induced unfolding of single protein molecules studied using nanopores," *Anal. Chem.*, Vol. 83, p.5137-5144, 2011.
4. M. Rafael, A. Prabhu, K. Freedman, Min Jun Kim, "Nanopore based devices for bioanalytical applications," *J. Assoc. Lab. Automat.*, Vol. 15, p.243-252, 2010.
3. G.A.T. Chasin, R. Mulero, J. Hong, Min Jun Kim, A.J. deMello, J.B. Edel, "Single Molecule Spectroscopy Using Nanoporous Membranes," *Nano Lett.*, Vol. 7, No. 9, p.2901-2906, 2007.

2. Min Jun Kim, B. McNally, K. Murata, A. Meller, "Characteristics of Solid-state Nanometer Pores Fabricated Using Transmission Electron Microscope (TEM)," *Nanotechnology*, Vol. 18, 205302, 2007.

1. Min Jun Kim, M. Wanunu, D. Bell, A. Meller, "Rapid Fabrication of Uniformly Sized Nanopore and Nanopore Array for DNA Analysis," *Adv. Mater.*, Vol.18, p.3149-3153, 2006.

SPONSORED RESEARCH & EDUCATION PROJECTS

- Awarded over **\$5.5M** since joining Drexel University on August 1, 2006 (**\$4M** as single PI and **\$1.5M** as Co-PI and Senior Personnel), submitted research and educational proposals totaling over \$45M and \$2M respectively to sponsors like NSF, ARO, AFOSR, DOD, USDA, HFSP, and USDOEd between 2006 and 2013 as lead PI or Co-PI.

03/2008 – 02/2014 Sole PI	Sponsor: National Science Foundation CAREER: Bacterial Actuation, Sensing and Transport at Micro/Nanoscale	\$598,335.00
05/2008 – 04/2009 Sole PI	Sponsor: Louis & Bessie Stein Family Foundation Single Molecule Analysis in Solid-State Membranes	\$20,000.00
06/2008 – 05/2009 Co-PI	Sponsor: U.S. Department of Agriculture Acquisition of Real Time PCR Equipment for Environmental Pathogens	\$72,500.00
06/2008 – 05/2009 Sole PI	Sponsor: Drexel Provost Office Career Development on Single Molecule Analysis for DNA Sequencing	\$10,000.00
09/2008 – 08/2012 Sole PI	Sponsor: National Science Foundation Collaborative Research: Biologically Inspired Robotic Microswimmers	\$259,800.00
08/2009 – 08/2012 Senior Personnel	Sponsor: U.S. Department of Education GAANN: Engineering for Pharmaceutical Applications	\$753,280.00
09/2009 – 08/2013 Lead PI	Sponsor: Human Frontier Science Program Office High Resolution Folding/Binding Kinetics of Single Protein Molecules	\$1,050,000.00
06/2010 – 05/2013 Sole PI	Sponsor: Army Research Office Mechanics and Engineering of Bacterial Flagellar Polymorphism	\$238,729.00
07/2010 – 06/2014 Sole PI	Sponsor: National Science Foundation Collaborative Research: Motion Control of Bacteria-Powered Microrobots	\$213,387.00
08/2010 – 07/2013 Lead PI	Sponsor: National Science Foundation Discovery-Based Experiments for Nanoscale Metrology & Manufacturing	\$200,000.00
05/2010 – 04/2011 Co-PI	Sponsor: U.S. Department of Defense Acquisition of a Fast Raman Imaging System	\$116,105.00
11/2010 – 10/2011 Sole PI	Sponsor: National Science Foundation U.S.-Korea Planning Visit: Collaboration in Insect Flight Research	\$20,000.00
09/2011 – 08/2014 Lead PI	Sponsor: Army Research Office Microbiorobots for Manipulation and Sensing	\$654,118.00
06/2012 – 01/2013 Sole PI	Sponsor: Alexander von Humboldt Foundation Hybrid Nanopore Architecture for Single Molecule Analysis	\$50,000.00
06/2013 – 09/2013 Sole PI	Sponsor: Korea Ministry of Education, Science & Tech. Implantable Neural Electrode Devices for Spinal Cord Regeneration	\$22,600.00

07/2013 – 06/2014 Sole PI	Sponsor: U.S. Department of Defense Integrated Real-Time Control & Imaging System for Nanobiostructures	\$158,998.00
08/2013 – 07/2016 Sole PI	Sponsor: National Science Foundation Collaborative Research: Bacterial Flagellar Forests	\$283,703.00
09/2013 – 08/2016 Senior Personnel	Sponsor: National Science Foundation II-NEW: Testbed for High Performance Interconnects	\$808,981.86

Educational Initiatives and Accomplishments

- Graduated **4** PhD students (3 after tenure), **5** MS students (1 after tenure), and mentored **5** postdoctoral research fellows (2 after tenure).
- Currently advising **9** PhD students, and mentored 2 students for NSF Graduate Research Fellowship (GRF), 2 students for NSF GRF Honorable Mentions, 3 students for NSF IGERT Fellowship, 3 students for DoEd GAANN Fellowship, 1 student for NSF GK12 Fellowship, 1 student for NSF Bridge to Doctorate Fellowship, 1 student for Whitaker Fellowship, and 2 students for NSF EAPSI Fellowship.
- Advised 33 undergraduate research students (independent study, research co-ops, NSF REU, etc.), 2 RET fellows, 3 REU fellows, 3 high school students, and 10 senior design project teams. Among them, 2 students received NSF GRF, 1 student for National Defense Science and Engineering Graduate Fellowship, and 4 senior design project teams that won the Best of Program, Gold, Silver, and Merit awards for the James F. Lincoln F. Arc Welding Foundation Engineering Student Design Competition.
- Developed 3 new courses for undergraduate and graduate students (MEM380/800: *Microscale Diagnostic Techniques*, MEM517: *Fundamentals of Nanomanufacturing*, and MEM518: *Introduction to Nanometrology*) and reformed 1 MEM core course (MEM310: Thermodynamic Analysis I).
- Course evaluations consistently rated as excellent with an overall instructor rating of **4.42** out of 5.0.
- Awarded 2 educational grants as PI and participating faculty (total amount: **\$0.85M** including Drexel's cost-sharing; amount allocated to M.J. Kim: **\$0.2M**) including NSF CCLI award for the development of Nanoscale Manufacturing and Metrology.
- Developed two assessment based courses – Fundamentals of Nanomanufacturing and Applications, and Fundamentals of Nano Metrology and Best Practices – now available on ASME's Online Nano Educational Series.

Professional Services and Activities

- General or Program Chair for 5 international conferences (including 2 ASME conferences).
- Editorships and Editorial Board on 3 international journals (Journal of Bionic Engineering, Recent Patents on Nanotechnology, and Journal of Visualization).
- University Centralized Research Facilities Advisory Board for Nano manufacturing and characterization facility development.
- Organized departmental seminar series and refereed senior design presentation and reports.
- Faculty mentoring in past 5-years: Henry Fu (UNR, CAREER), Jonghyun Choi (Purdue, CAREER), Hyun Joon Kong (UIUC, CAREER), Hansup Kim (U.Utah, CAREER)
- Philadelphia Chapter President for 5+ years in the Korean-American Scientists and Engineers Association (KSEA). Elected as a technical councilor in KSEA for 2012-2015.
- Served on 10+ PhD (4 after tenure) committees at Drexel.
- Regularly review proposals and publications for: NSF, ARO, European Commission, Leverhulme Trust, IEEE, ASME, APS, Elsevier, and Springer-Verlag.