

# Jeong-Yeol Yoon

## Assistant Professor, The University of Arizona

### Contact Information

---

Address Department of Agricultural & Biosystems Engineering, The University of Arizona  
1177 E 4<sup>th</sup> St, Rm 403, Tucson, Arizona 85721-0038  
Citizenship U.S. Citizen  
Phone Office: (520) 621-3587; FAX: (520) 621-3963  
Web/E-mail <http://biosensors.abe.arizona.edu>; [jyoon@email.arizona.edu](mailto:jyoon@email.arizona.edu)

### Academic Education

---

Ph.D., 2004, University of California, Los Angeles, Biomedical Engineering (Advisor: Robin L. Garrell)  
Ph.D., 1999, Yonsei Univ., Seoul, Korea, Chemical Engineering (Advisor: Woo-Sik Kim; Co-Advisor: Jung-Hyun Kim)

### Academic Positions

---

Assistant Professor (Tenure-Track) Aug 2004-present	Department of Agricultural & Biosystems Engineering Biomedical Engineering GIDP BIO5 Institute	} University of Arizona
---	--	-------------------------

### Scholarly Activities

---

Program Chair/Co-Chair, *IBE 2010 Conference*, Boston, MA; *IBE 2009 Conference*, Santa Clara, CA  
Program Committee Member, DS202, *2009 SPIE Defense, Security + Sensing*, Orlando, FL  
Program Committee Member, BE-23, *2007 ASABE Annual International Meeting*, Minneapolis, MN

Associate Editor, *Transactions of the ASABE* (ASABE) 2009-present  
Associate Editor, *Biological Engineering* (ASABE) 2008-present  
Editorial Board Member, *Resource* (ASABE) 2008-present  
Editorial Board Member, *Journal of Biological Engineering* (IBE/BioMed Central) 2007-present  
Editorial Board Member, *The Open Biotechnology Journal* (Bentham) 2007-present

Member, *The American Society for Engineering Education* (ASEE) 2007-present  
Member, *The International Society for Optical Engineering* (SPIE) 2007-present  
Member, *American Society of Agricultural and Biological Engineers* (ASABE) 2006-present  
Member, *Institute of Biological Engineering* (IBE) 2005-present

Reviewer for *ACS Nano* (ACS), *Analytica Chimica Acta* (Elsevier), *Biological Engineering* (ASABE), *Biosensors and Bioelectronics* (Elsevier), *Biosystems Engineering* (IAgrE/Elsevier), *Biotechnology Progress* (ACS/AIChE), *Industrial & Engineering Chemistry Research* (ACS), *Journal of Biological Engineering* (IBE/BioMed Central), *Journal of Colloid and Interface Science* (Elsevier), *Journal of Microelectromechanical Systems* (IEEE/ASME), *Journal of Physical Chemistry* (ACS), *Langmuir* (ACS), *Micro & Nano Letters* (IET), *The Open Biotechnology Journal* (Bentham), *Sensing and Instrumentation for Food Quality and Safety* (Springer), *Sensors* (MDPI), *Sensors and Actuators* (Elsevier), *Talanta* (Elsevier)

### Current Extramural Grants

---

**Desert Tech / OTT-UA:** Real-Time, Portable Biosensor for *E. coli* (PI, 2009-2011)  
**NIH:** Nanoarray-Type Detection of Oct3/4 and Cdx2 Using AuNPs and E-Beam Patterns (PI, 2007-2009)  
**NVRQS:** Development of Lab-on-a-Chip to Detect Infectious Agents within Livestock Barns (PI, 2007-2011)

### Past Extramural Grants

---

**NSF:** Development of Simulation Models and Biosensors to Detect Biological Agents in Water Distribution Systems (Co-PI, 2006-2008)  
**UA Foundation:** Protein Nanoarray Using Gold Nanoparticles and E-Beam Lithography (PI, 2005-2006)  
**Arizona Dept. of Commerce:** Lab-on-a-Chip for Real-Time Monitoring of Water Safety (Subcontractor, 2005)  
**BMD, S.A.:** Improving Beads Saturation and Eliminating Non-Specific Adsorption in FIDIS™ (PI, 2005)

### Past Funded Summer Research

---

**National Veterinary Research & Quarantine Service** (Summer 2008); **Yonsei University** (Summer 2006);  
**Pacific Northwest National Laboratory** (Summer 2005)

### Courses Taught at the University of Arizona

---

**ABE/AME 489B/589B** Bio Micro/Nanotechnology Applications; **BME 416/516** Principles of Biomedical Engineering; **ABE 486/586** Biomaterial-Tissue Interactions; **ABE 447/547** Sensors and Controls

### Peer-Reviewed Journal Articles

---

\* = corresponding author

1. Tremaine B. Powell, Phat L. Tran, Keesung Kim and Jeong-Yeol Yoon\*, "Size-Dependent Self-Assembly of Submicron/Nano Beads-Protein Conjugates for Construction of a Protein Nanoarray," *Materials Science and Engineering C*, **2009**, doi: 10.1016/j.msec.2009.07.010.
2. Jin-Hee Han, Hyuck-Jin Kwon, Jeong-Yeol Yoon\*, Keesung Kim, Sang-Woon Nam and Jung Eek Son, "Analysis of the Thermal Environment in a Mushroom House Using Sensible Heat Balance and 3-D Computational Fluid Dynamics," *Biosystems Engineering*, **2009**, doi: 10.1016/j.biosystemseng.2009.07.007.
3. Jeong-Yeol Yoon\*, Mark R. Riley, "Grand Challenges for Biological Engineering," *Journal of Biological Engineering*, **2009**, 3: 16.
4. Jeong-Yeol Yoon\*, Jin-Hee Han, Christopher Y. Choi, Melissa Bui, Ryan G. Sinclair, "Real-Time Detection of *Escherichia coli* in Water Pipe Using a Microfluidic Device with One-Step Latex Immunoagglutination Assay," *Transactions of the ASABE*, **2009**, 52(3): 1031-1039.
5. Jin-Hee Han and Jeong-Yeol Yoon\*, "Reusable, Polyethylene Glycol-Structured Microfluidic Channel for Particle Immunoassays," *Journal of Biological Engineering*, **2009**, 3: 6.
6. Brian C. Heinze, Jae-Young Song, Chang-Hee Lee, Anbar Najam and Jeong-Yeol Yoon\*, "Microfluidic Immunosensor for Rapid and Sensitive Detection of Bovine Viral Diarrhea Virus," *Sensors and Actuators B: Chemical*, **2009**, 138(2): 491-496.
7. Jeong-Yeol Yoon\*, "Detection of Avian Influenza Type A H3N2 Virus Antigens in Microchannel and Droplet Microfluidics," *Biological Engineering*, **2008**, 1(4): 323-333.
8. Jeong-Yeol Yoon\*, David J. You, "Backscattering Particle Immunoassays in Wire-Guide Droplet Manipulations," *Journal of Biological Engineering*, **2008**, 2: 15.
9. Brian C. Heinze, Jeong-Yeol Yoon\*, "Real-Time Monitoring of Fibrinogen Cross-Linking on Model Biomaterial Surfaces with Quartz Crystal Microbalance," *The Open Biotechnology Journal*, **2008**, 2: 247-251.
10. Keesung Kim, Jeong-Yeol Yoon\*, Hyuck-Jin Kwon, Jin-Hee Han, Jung Eek Son, Sang-Woon Nam, Gene A. Giacomelli and In-Bok Lee, "3-D CFD Analysis of Relative Humidity Distribution in Greenhouse with Fog Cooling System and Refrigerative Dehumidifiers," *Biosystems Engineering*, **2008**, 100(2): 245-255.
11. Jeong-Yeol Yoon\*, "Open-Surface Digital Microfluidics," *The Open Biotechnology Journal*, **2008**, 2: 94-100.
12. Jin-Hee Han, Brian C. Heinze, Jeong-Yeol Yoon\*, "Single Cell Level Detection of *Escherichia coli* in Microfluidic Device," *Biosensors and Bioelectronics*, **2008**, 23(8): 1303-1306.
13. Jeong-Yeol Yoon\*, "Latex Immunoagglutination Assay in Lab-on-a-Chip," *Biological Engineering*, **2008**, 1(1): 79-94.
14. Lonnie J. Lucas, Jennine N. Chesler, Jeong-Yeol Yoon\*, "Lab-on-a-Chip Immunoassay for Multiple Antibodies Using Microsphere Light Scattering and Quantum Dot Emission," *Biosensors and Bioelectronics*, **2007**, 23(5): 675-681.
15. Keesung Kim, Gene A. Giacomelli, Jeong-Yeol Yoon, Sadanori Sase\*, Jung-Eek Son, Sang-Woon Nam, In-Bok Lee, "CFD Modeling to Improve the Design of a Fog System for Cooling Greenhouses," *Japan Agricultural Research Quarterly*, **2007**, 41(4): 283-290.
16. Lonnie J. Lucas, Jin-Hee Han, Jennine Chesler, Jeong-Yeol Yoon\*, "Latex Immunoagglutination for a Vasculitis Marker in a Microfluidic Device Using Static Light Scattering Detection," *Biosensors and Bioelectronics*, **2007**, 22(9-10): 2216-2222.
17. Jin-Hee Han, Kye-Seong Kim, Jeong-Yeol Yoon\*, "The Enhanced Diffusional Mixing for Latex Immunoagglutination Assay in a Microfluidic Device," *Analytica Chimica Acta*, **2007**, 584(2): 252-259.

18. Lonnie J. Lucas, Jin-Hee Han, Jeong-Yeol Yoon\*, "Using Highly Carboxylated Microspheres to Simplify Immunoassays and Enhance Diffusional Mixing in Microfluidic Devices," *Colloids and Surfaces B: Biointerfaces*, **2006**, 49(2): 106-111.
19. Tremaine Powell, Jeong-Yeol Yoon\*, "Fluorescent Biorecognition of Gold Nanoparticle – IgG Conjugates Self-Assembled on E-Beam Patterns," *Biotechnology Progress*, **2006**, 22(1): 106-110. *Most accessed article in 2006.*
20. Jeong-Yeol Yoon, Robin L. Garrell\*, Sung-Wook Choi, Jung-Hyun Kim, Woo-Sik Kim, "Using a Stirred Cell to Evaluate Structural Changes in Proteins Adsorbed on Particles," *AIChE Journal*, **2005**, 51(3): 1048-1052.
21. Jeong-Yeol Yoon, Robin L. Garrell\*, "Preventing Biomolecular Adsorption in Electrowetting-Based Biofluidic Chips," *Analytical Chemistry*, **2003**, 75(19): 5097-5102.
22. Jiaying Huang, Veronica M. Egan, Hailan Guo, Jeong-Yeol Yoon, Alejandro L. Briseno, Robin L. Garrell, Charles M. Knobler, Feimeng Zhou, Richard B. Kaner\*, "Enantioselective Discrimination of D- and L-Phenylalanine by Chiral Polyamine Thin Films," *Advanced Materials*, **2003**, 15(14): 1158-1161.
23. Sung-Wook Choi, Jung-Min Park, Yongsu Chang, Jeong-Yeol Yoon, Seungjoo Haam, Jung-Hyun Kim\*, Woo-Sik Kim, "Effect of Electrostatic Repulsive Force on the Permeate Flux and Flux Modeling in the Microfiltration of Negatively Charged Microspheres," *Separation and Purification Technology*, **2003**, 30(1): 69-77.
24. Jeong-Yeol Yoon, Kyung-Hee Kim, Sung-Wook Choi, Jung-Hyun Kim\*, and Woo-Sik Kim, "Effects of Surface Characteristics on Non-Specific Adsorption in Latex Immunoagglutination Antibody Assay," *Colloids and Surfaces B: Biointerfaces*, **2003**, 27(1): 3-9.
25. Sung-Wook Choi, Jeong-Yeol Yoon, Seung-Joo Haam, Joon-Ki Jung, Jung-Hyun Kim\*, Woo-Sik Kim, "Modeling of the Permeate Flux during Microfiltration of BSA-Adsorbed Microsphere in Stirred Cell," *Journal of Colloid and Interface Science*, **2000**, 228(2): 270-278.
26. Sung-Wook Choi, Jeong-Yeol Yoon, Seung-Joo Haam, Joon-Ki Jung, Woo-Sik Kim\*, "Study on the Permeate Flux in the Filtration of BSA-Adsorbed Microsphere Using Stirred Cell," *Journal of the Korean Institute of Chemical Engineers*, **2000**, 38(1): 26-31. (in Korean)
27. Jeong-Yeol Yoon, Jung-Hyun Kim\*, Woo-Sik Kim, "The Relationship of Interaction Forces in the Protein Adsorption onto Polymeric Microspheres," *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, **1999**, 153(1-3): 413-419.
28. Jung Hun Lee, Jeong-Yeol Yoon, Woo-Sik Kim\*, "Continuous Separation of Serum Proteins Using a Stirred Cell Charged with Carboxylated and Sulfonated Microspheres," *Biomedical Chromatography*, **1998**, 12(6): 330-334.
29. Jeong-Yeol Yoon, Jung-Hyun Kim\*, Woo-Sik Kim, "Interpretation of Protein Adsorption Phenomena onto Functional Microspheres," *Colloids and Surfaces B: Biointerfaces*, **1998**, 12(1): 15-22.
30. Jeong-Kwi Seo, Jeong-Yeol Yoon, Joon Taek Oh, Woo-Sik Kim\*, "Optimum Growth Conditions and pH Control Solution for PHB Biosynthesis in *A. eutrophus*," *Journal of Industrial and Engineering Chemistry*, **1998**, 4(3): 215-220.
31. Jeong-Yeol Yoon, Jung Hun Lee, Jung-Hyun Kim\*, Woo-Sik Kim, "Separation of Serum Proteins with Uncoupled Microsphere Particles in a Stirred Cell," *Colloids and Surfaces B: Biointerfaces*, **1998**, 10(6): 365-377.
32. Geun-Do Cho, Jeong-Yeol Yoon, Joon Taek Oh, Woo-Sik Kim\*, "Study on the Biosynthesis of PHB with *Alcaligenes latus*," *Journal of the Korean Institute of Chemical Engineers*, **1997**, 35(3): 412-418. (in Korean)
33. Jeong-Yeol Yoon, Ham-Yong Park, Jung-Hyun Kim\*, Woo-Sik Kim, "Adsorption of BSA on Highly Carboxylated Microspheres - Quantitative Effects of Surface Functional Groups and Interaction Forces," *Journal of Colloid and Interface Science*, **1996**, 177(2): 613-620.
34. Young-Jun Park, Jeong-Yeol Yoon, Ham-Yong Park, Jung-Hyun Kim\*, Woo-Sik Kim, "Synthesis of Model Microspheres and Adsorption Study of Bovine Albumin," *Journal of Biomedical Engineering Research*, **1993**, 14, 209-219. (in Korean)

### **Book Chapters**

---

1. Lonnie J. Lucas, Jeong-Yeol Yoon\*, "On-Chip Detection Using Optical Fibers," in *Encyclopedia of Microfluidics and Nanofluidics*, Dongqing Li, ed., Springer: Heidelberg, **2008**, pp.1515-1530.

2. Jeong-Yeol Yoon\*, Robin L. Garrell, "Biomolecular Adsorption in Microfluidics," in *Encyclopedia of Microfluidics and Nanofluidics*, Dongqing Li, ed., Springer: Heidelberg, **2008**, pp.68-76.
3. Jung-Hyun Kim\*, Jeong-Yeol Yoon, "Protein Adsorption on Polymer Particles: Some Applications," in *Encyclopedia of Surface and Colloid Science - Online Update*, Ponisseril Somasundaran, ed., Marcel Dekker: New York, **2003**, pp.1-5.
4. Jung-Hyun Kim\*, Jeong-Yeol Yoon, "Protein Adsorption on Polymer Particles," in *Encyclopedia of Surface and Colloid Science*, Arthur Hubbard, ed., Marcel Dekker: New York, **2002**, pp.4373-4381.

### **Refereed Conference Proceedings**

---

1. Vasco Polyzojev, Eniko Enikov, Brian C. Heinze and Jeong-Yeol Yoon, "Magnetic Particle Enhanced Microcantilever Biosensor for Rapid and Sensitive *E. coli* detection," *IEEE/ISOT International Symposium on Optomechatronic Technologies*, Istanbul, Turkey, 21-23 September **2009**.
2. Phat L. Tran, Yee Tchao and Jeong-Yeol Yoon, "Fluorescence Resonance Energy Transfer Detection of Mouse Immunoglobulin G and Octamer-4 on Protein Nanoarray," *IEEE/ICME International Conference on Complex Medical Engineering 2009*, Tempe, AZ, USA, 9-11 April **2009**.
3. Jeong-Yeol Yoon, Brian C. Heinze, Jessica Gamboa, David J. You, "Detection of Avian Influenza Antigens in Proximity Fiber, Droplet and Optical Waveguide Microfluidics," *Proceedings of SPIE*, **2009**, 7313: 73130J.
4. Phat L. Tran, Yee Tchao, David J. You and Jeong-Yeol Yoon, "Protein Nanoarray Made by Size-Dependent Self-Assembly for Detection of Mouse Immunoglobulin G and Octamer-4," *Proceedings of SPIE*, **2009**, 7313: 731306.
5. Brian C. Heinze, Jae-Young Song, Jin-Hee Han, Jeong-Yeol Yoon, "Latex Immunoagglutination Assay for Bovine Viral Diarrhea Utilizing Forward Light Scattering in Microfluidic Device," *Proceedings of SPIE*, **2008**, 6886: 688605.
6. Jeong-Yeol Yoon, Jin-Hee Han, Brian Heinze, Lonnie J. Lucas, "Microfluidic Device Detection of Waterborne Pathogens through Static Light Scattering of Latex Immunoagglutination Using Proximity Optical Fibers," *Proceedings of SPIE*, **2007**, 6556: 65560M.
7. Lonnie J. Lucas, Jin-Hee Han, Jeong-Yeol Yoon, "Latex Immunoagglutination Antibody Assay in a Microfluidic Device Using Static Light Scattering Detection," *Biosensors 2006*, Toronto, Canada, 10-12 May **2006**, O29-O30.
8. Tremaine Powell, Jeong-Yeol Yoon, "Self-Assembly of Gold Nanoparticles on E-Beam Nano-Patterns towards Protein Nanoarray," *NSTI Nanotech 2005*, Anaheim, CA, USA, 8-12 May **2005**, 1: 351-354.
9. Brian R. Baker, Azim N. Laiwalla, Jeong-Yeol Yoon, Javier Canavate, Robin L. Garrell, "Adhesion and Cohesion of Mussel Adhesive Protein on Glass and Gold through Protein Removal Studies," *Polymeric Materials: Science and Engineering*, **2001**, 85: 115-116.
10. Fusayo Saeki, Jean Baum, Hyejin Moon, Jeong-Yeol Yoon, Chang-Jin Kim, Robin L. Garrell, "Electrowetting on Dielectrics (EWOD): Reducing Voltage Requirements for Microfluidics," *Polymeric Materials: Science and Engineering*, **2001**, 85: 12-13.

### **Current Students**

---

Graduate Students: Brian C. Heinze, Phat L. Tran, David J. You, Hyuck-Jin Kwon, Zachary Dean, Deepa Patel  
 Undergraduate Students: Jessica Gamboa, Kenneth Geshell, Scott Angus, Teresa Lam

### **Past Graduate Students and Post-Docs**

---

Jae-Young Song, D.V.M., Ph.D., Currently Division Director at National Veterinary Research & Quarantine Service  
 Lonnie J. Lucas, Ph.D., Currently Program Manager at Areté Associates  
 Keesung Kim, Ph.D., Currently Research Associate Professor at Seoul National University  
 Tremaine B. Powell, Ph.D., Currently Environmental Engineer at U.S. EPA  
 Jin-Hee Han, Ph.D., Currently Post-Doctoral Fellow at University of California, Davis

### **References**

---

Robin L. Garrell, Professor, Department of Chemistry & Biochemistry, University of California, Los Angeles, Box 951569, Los Angeles, California 90095-1569 ([garrell@chem.ucla.edu](mailto:garrell@chem.ucla.edu), 310-825-2496).

Woo-Sik Kim, Professor Emeritus, Department of Chemical Engineering, Yonsei University, Seoul, Korea  
([wskim@yonsei.ac.kr](mailto:wskim@yonsei.ac.kr), +82-2-2123-2750).

Jung-Hyun “Jay” Kim, Professor, Department of Chemical Engineering, Yonsei University, Seoul, Korea  
([jayhkim@yonsei.ac.kr](mailto:jayhkim@yonsei.ac.kr), +82-2-2123-4163).

Donald C. Slack, Professor and Head, Department of Agricultural & Biosystems Engineering, The University of  
Arizona, Tucson, Arizona 85721-0038 ([slackd@email.arizona.edu](mailto:slackd@email.arizona.edu), 520-621-7230).