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Assistant Professor

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EDUCATION AND TRAINING

University of California, San Diego	2013 - 2016
Postdoctoral research associate, Department of Chemistry and Biochemistry Advisor: Prof. Michael J. Sailor	
Pohang University of Science and Technology,	2012 – 2013
Postdoctoral fellow, Institute of Environmental and Energy Technology Advisor: Prof. Sangmin Jeon	
Pohang University of Science and Technology	2007 – 2012
Ph.D. in Chemical Engineering, Advisor: Prof. Sangmin Jeon Dissertation: Photocatalysts on Microresonators: A study on photocatalysts using microresonators	
Pohang University of Science and Technology	2003 – 2007
B.S. in Chemical Engineering	

POSITION AND RESEARCH EXPERIENCE

Ulsan National Institute of Science and Technology , Department of Biomedical Engineering	2019 -
Assistant Professor,	
Ulsan National Institute of Science and Technology , Department of Chemical Engineering	2019 -
Assistant Professor (adjunct)	
University of Ulsan College of Medicine , Department of Convergence Medicine	2016 - 2018
Assistant Professor	
Asan Medical Center , Asan Institute for Life Sciences, Biomedical Engineering Research Center	2016 - 2018
Assistant Professor (adjunct)	
Pennsylvania State University , Department of Electrical Engineering	2009.06 – 08
Visiting graduate student researcher, Advisor: Prof. Srinivas Tadigadapa	

HONORS AND AWARDS

• <u>Cheong-Am Science Fellow</u> , POSCO TJ Park Foundation	2019
• <u>Professor of the Year</u> , University of Ulsan College of Medicine	2018
• <u>Outstanding Young Scientist</u> , Korea Academy of Science and Technology	2018
• <u>Travel Grant Award</u> , 63 rd Lindau Nobel Laureate Meetings, Lindau, Germany.	2013
• <u>Outstanding Presentation Award</u> , Cross Straits Symposium on Energy and Environmental Engineering	2009
• <u>Best Poster Award</u> , International Workshop on Nanomechanical Cantilever Sensors	2009
• <u>Outstanding Presentation Award</u> , Cross Straits Symposium on Energy and Environmental Engineering	2008
• <u>Excellent Graduate Fellowship</u> , LG Yeonam Foundation, Korea	2008
• <u>Best Research Paper Award</u> , Undergraduate Research Program, POSTECH	2006

RESEARCH INTERESTS

Develop and implement novel biomaterials and translational nanomedicine to address critical biomedical challenges, with a focus on finding fundamental principles of chemistry and biology.

- *Design and engineering of biomedical nanomaterials through materials chemistry.*
 - Synthesis, characterization, and optimization: Magnetic nanoparticles, quantum dots, biodegradable fluorescent probes, photocatalytic semiconductor, and multifunctional hybrid nanoparticles.
 - Engineering functional nanomaterials & surface chemistry: Biomolecular conjugation, surface modification for biomedical and electronic devices, optoelectric property control.
- *Nano-Bio interface engineering for healthcare and emerging technology.*
 - Nano-Bio interface: Thermodynamic and kinetic basis of physicochemical phenomena in cell-to-nanomaterials interactions, molecular recognition at nanoscale, mechanotransduction and extracellular matrix homeostasis.
 - Translational nanomedicine: Targeted drug delivery systems, protective encapsulation chemistry, controlled release systems, stimuli-responsive nano-biomaterials, therapeutic chip-on-a-cancer, nanorobotics.
 - Bioimaging: Time-resolved *in vivo* imaging, fluorescent molecular imaging, cellular signaling pathways.
 - Biosensors: Early diagnostic platforms of disease biomarkers and pathogenic bacteria, low-cost point-of-care sensors, separation and concentration process using functional nanomaterials.

PUBLICATIONS

- [39] A novel blood-based colorectal cancer diagnostic technology using electrical detection of colon cancer secreted protein-2
Advanced Science, 6, 1802115 (2019). (*highlighted as a front cover*)
M. Jeun, H. J. Lee, S. Park, E. -J. Do, J. Choi, Y. -N. Sung, S. -M. Hong, S. -Y. Kim, D. -H. Kim, J. Y. Kang, H. -N. Son, J. Joo, E. Song, S. W. Hwang, S. H. Park, D. -H. Yang, B. D. Ye, J. -S. Byeon, J. Choe, S. -K. Yang, H. Moinova, S. D. Markowitz, K. H. Lee, S. -J. Myung
- [38] Optimization of ZnO nanorod-based surface enhanced Raman scattering substrated for bio-applications
Nanomaterials, 9, 447 (2019).
M. Jue, S. Lee, B. Paulson, J. -M. Namgoong, H. Y. Yu, G. Kim, S. Jeon, D. -M. Shin, M. -S. Choo, J. Joo, Y. Moon, C. -G. Pack, J. K. Kim
- [37] Diagnosis in a preclinical model of bladder pain syndrome using a Au/ZnO nanorod-based SERS substrate
Nanomaterials, 9, 224 (2019).
S. Lee, J. -M. Namgoong, H. Y. Yu, M. Jue, G. Kim, S. Jeon, D. -M. Shin, M. -S. Choo, J. Joo, C. -G. Pack, J. K. Kim
- [36] Cucurbituril-based reusable nanocomposites for efficient molecular encapsulation
ACS Sustainable Chemistry & Engineering, 7, 5440-5448 (2019).
H. Liu, Y. Luan, B. Koo, E. Y. Lee, J. Joo, T. N. T. Dao, F. Zhao, L. Zhong, K. Yun, Y. Shin
- [35] A wavelength-tunable and facilely functionable D-A type naphthalene core skeleton: Synthesis, photophysical property, and bio-imaging applications for cells and tissues
Dyes and Pigments, 162, 104-111 (2019).
Y. Jung, Y. Kim, N. H. Kim, J. Lee, K. -H. Kim, J. Jung, Y. Huh, H. -J. Jang, J. Joo, S. Park, D. Kim
- [34] Multi-spectral fluorescence imaging of colon dysplasia in vivo using a multi-spectral endoscopy system
Translational Oncology, 12, 226-235 (2019)
S. M. Bae, D. -J. Bae, E. -J. Do, G. Oh, S. W. Yoo, G. -J. Lee, J. S. FChae, Y. Yun, S. Kim, K. H. Kim, E. Chung, J. K. Kim, S. W. Hwang, S. H. Park, D. -H. Yang, B. D. Ye, J. -S. Byeon, S. -K. Yang, J. Joo, S. -Y. Kim, S. -J. Myung
- [33] Integrative micro-endoscopic system combined with conventional microscope for live animal tissue imaging
Journal of Biophotonics, 11, e201800206 (2018) (*highlighted as a front cover*)
M. Köhler, B. Paulson, S. Lee, A. Dicker, P. van Krieken, J. Y. Kim, C. -G. Pack, J. Joo, P. -O. Berggren, J. K. Kim

- [32] Tracking the fate of porous silicon nanoparticles delivering a peptide payload by intrinsic photoluminescence lifetime
Advanced Materials, 30, 1802878 (2018).
Y. Jin, D. Kim, H. Roh, S. Kim, S. Hussain, J. Kang, C. -G. Pack, J. K. Kim, S. -J. Myung, E. Ruoslahti, M. J. Sailor, S. C. Kim, J. Joo
- [31] SP1, a phosphatidylserine-recognizing peptide, is useful for visualizing radiation-induced apoptosis in colorectal cancer in vitro and in vivo
Translational Oncology, 11, 1044-1052 (2018).
M. Bae, S. J. Park, M. Choi, M. Song, Y. E. Cho, E. -J. Do, Y. -M. Ryu, S. Park, B. -H. Lee, S. -W. Lee, S. W. Hwang, S. H. Park, D. -H. Yang, B. D. Ye, J. -S. Byeon, S. -K. Yang, J. Joo, S. -Y. Kim, S. -J. Myung
- [30] Enhanced antibacterial efficacy of antibiotics-loaded nanoparticles targeted to the site of infection
Nature Biomedical Engineering, 2, 95-103 (2018).
S. Hussain,[†] J. Joo,[†] J. Kang, B. Kim, G. B. Braun, Z. -G. She, D. Kim, A. P. Mann, T. Molder, T. Teesalu, S. Camazza, S. Guglielmino, M. J. Sailor, and E. Ruoslahti ([†]equal contribution)
- [29] Molecular imaging of colorectal tumors by targeting colon cancer secreted proteins-2 (CCSP-2).
Neoplasia, 19, 805-816 (2017).
J. Kim, E. -J. Do, H. Moinova, S. M. Bae, J. Y. Kang, S. -M. Hong, S. P. Fink, J. Joo, Y. -A. Suh, S. J. Jang, S. W. Hwang, S. H. Park, D. -H. Yang, B. D. Ye, J. -S. Byeon, J. Choe, S. -K. Yang, S. D. Markowitz, S. -Y. Kim, and S. -J. Myung
- [28] Two-photon in vivo imaging with porous silicon nanoparticles.
Advanced Materials, 29, 1703309 (2017).
D. Kim, J. Kang, T. Wang, H. G. Ryu, J. M. Zuidema, J. Joo, M. Kim, J. Jung, K. H. Ahn, K. H. Kim, and M. J. Sailor
- [27] Hyperpolarized ¹²⁹Xe nuclear magnetic resonance study of mesoporous silicon sponge materials.
Journal of Materials Research, 32, 3038-3045 (2017).
Y. Mao, D. Kim, J. Joo, M. J. Sailor, R. Hopson, L. -Q. Wang
- [26] Self-sealing porous silicon-calcium silicate core-shell nanoparticles for targeted siRNA delivery to the injured brain.
Advanced Materials, 28, 7962-7969 (2016).
J. Kang, J. Joo, E. J. Kwon, M. Skalak, S. Hussain, Z.-G. She, E. Ruoslahti, S. N. Bhatia, and M. J. Sailor
- [25] Porous silicon-graphene core-shell nanoparticles for targeted delivery of siRNA to the injured brain.
Nanoscale Horizons, 1, 407-414 (2016). (*highlighted as an inside back cover*)
J. Joo, E. J. Kwon, J. Kang, M. Skalak, E. J. Anglin, A. P. Mann, E. Ruoslahti, S. N. Bhatia, and M. J. Sailor
- [24] A peptide for targeted, systemic delivery of imaging and therapeutic compounds into acute brain injuries.
Nature Communications, 7, 11980 (2016). (featured in Research Highlight, *Nature Reviews Materials* 1, 16054 (2016).)
A. P. Mann,[†] P. Scodeller,[†] S. Hussain,[†] J. Joo, E. J. Kwon, G. B. Braun, T. Molder, Z.-G. She, V. R. Kotamraju, B. Ranscht, S. Krajewski, T. Teesalu, S. N. Bhatia, M. J. Sailor, and E. Ruoslahti ([†]co-first authors)
- [23] Thermally induced silane dehydrocoupling on silicon nanostructures.
Angewandte Chemie International Edition, 55, 6423-6427 (2016).
D. Kim,[†] J. Joo,[†] Y. Pan, A. Boarino, Y. W. Jun, K. H. Ahn, B. Arkles, and M. J. Sailor ([†]equal contribution)
- [22] Enhanced quantum yield of photoluminescent porous silicon prepared by supercritical drying.
Applied Physics Letters, 108, 153111 (2016).
J. Joo,[†] T. Defforge,[†] A. Loni, D. Kim, Z. Y. Li, M. J. Sailor, G. Gautier, and L. T. Canham ([†]equal contribution)
- [21] Thermolytic grafting of polystyrene to porous silicon.
Chemistry of Materials, 28, 79-89 (2016).
J. Wang, J. Joo, R. Kennard, S.-W. Lee, and M. J. Sailor
- [20] Gated luminescence imaging of silicon nanoparticles.
ACS Nano, 9, 6233-6241 (2015).
J. Joo, X. Liu, V. R. Kotamraju, E. Ruoslahti, Y. Nam, and M. J. Sailor

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J. Joo, J. F. Cruz, S. Vijayakumar, J. Grondek, and M. J. Sailor
- [18] Precise characterization method of antibody-conjugated magnetic nanoparticles for pathogen detection using stuffer-free multiplex ligation-dependent probe amplification. ***Electrophoresis***, 35, 3283-3289 (2014).
B. Chung, G. W. Shin, W. Choi, J. Joo, S. Jeon, and G. Y. Jung
- [17] Size control of porous silicon nanoparticles by electrochemical perforation etching. ***Particle & Particle Systems Characterization***, 31, 252-256 (2014). (*highlighted as a front cover*)
Z. Qin, J. Joo, L. Gu, and M. J. Sailor
- [16] In vivo time-gated fluorescence imaging with biodegradable luminescent porous silicon nanoparticles. ***Nature Communications***, 4, 2326 (2013). (featured in Editor's Choice, ***Science*** 341, 1153 (2013).)
L. Gu, D. J. Hall, Z. Qin, E. Anglin, J. Joo, D. J. Mooney, S. B. Howell, and M. J. Sailor
- [15] A facile and sensitive method for detecting pathogenic bacteria using personal glucose meters. ***Sensors and Actuators B***, 188, 1250-1254 (2013).
J. Joo, D. Kwon, H. H. Shin, K.-H. Park, H. J. Cha, and S. Jeon
- [14] Facile and sensitive method for detecting cardiac markers using ubiquitous pH meters. ***Analytical Chemistry***, 85, 12134-12137 (2013).
D. Kwon, J. Joo, S. Lee, and S. Jeon
- [13] Magnetophoretic chromatography for the detection of pathogenic bacteria with the naked eye. ***Analytical Chemistry***, 85, 7594-7598 (2013).
D. Kwon,[†] J. Joo,[†] J. Lee, K.-H. Park, and S. Jeon ([†]equal contribution)
- [12] Magnetically recoverable hybrid TiO₂ nanocrystal clusters with enhanced photocatalytic activity. ***Materials Letters***, 93, 141-144 (2013).
J. Joo, Y. Ye, D. Kim, J. Lee, and S. Jeon
- [11] A facile and sensitive detection of pathogenic bacteria using magnetic nanoparticles and optical nanocrystal probes. ***Analyst***, 137, 3609-3612 (2012). (*featured as a front cover, Top 10 most accessed articles in 2012*)
J. Joo, C. Yim, D. Kwon, J. Lee, H. H. Shin, H. J. Cha and S. Jeon
- [10] A highly sensitive diagnostic assay for the detection of protein biomarkers using microresonators and multifunctional nanoparticles. ***ACS Nano***, 6, 4375-4381 (2012).
J. Joo, D. Kwon, C. Yim, and S. Jeon
- [9] A rapid and facile method for measuring corrosion rates using dynamic light scattering. ***Analyst***, 137, 584-587 (2012). (*highlighted as a back cover*)
J. Joo, H. Seo, C. Chun, K. Han, H. Jung, S. Kim and S. Jeon
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D. Lee, D. Kwon, W. Ko, J. Joo, H. Seo, S. S. Lee, and S. Jeon
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C. Chun,[†] J. Joo,[†] D. Kwon, C. S. Kim, H. J. Cha, M.-S. Chung and S. Jeon ([†]equal contribution)
- [6] A visible light-induced photocatalytic silver enhancement reaction for gravimetric biosensors. ***Nanotechnology***, 22, 405502 (2011).
W. Ko, C. Yim, N. Jung, J. Joo, S. Jeon, H. Seo, S. S. Lee and J. C. Park

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- [5] Photocatalytic silver-enhancement reaction for gravimetric immunosensors.
Nanotechnology, 21, 505502 (2010).
H. Seo, J. Joo, W. Ko, N. Jung and S. Jeon
- [4] Fabrication of highly uniform ZnO/CdS core/shell structures using a spin-coating-based successive ion layer adsorption and reaction method.
Nanotechnology, 21, 325604 (2010).
J. Joo, D. Kim, D.-J. Yun, H. Jun, S.-W. Rhee, J. S. Lee, K. Yong, S. Kim, S. Jeon
- [3] Enhanced photocatalytic activity of highly crystallized and ordered mesoporous titanium oxide measured by silicon resonators.
Analytical Chemistry, 82, 3032-3037 (2010). (*featured in Analytical Chemistry webpage*)
J. Joo, J. Shim, H. Seo, N. Jung, U. Wiesner, J. Lee and S. Jeon
- [2] Novel heterostructure of CdS nanoparticle/WO₃ nanowhisker: Synthesis and photocatalytic properties.
Journal of Vacuum Science and Technology B, 27, 2182-2186 (2009).
H. Kim, Y. Tak, K. Senthil, J. Joo, S. Jeon, and K. Yong
- [1] ZnO nanorod-coated quartz crystals as self-cleaning thiol sensors for natural gas fuel cells.
Sensors and Actuators B, 138, 485-490 (2009).
J. Joo, D. Lee, M. Yoo, and S. Jeon