

**BIOGRAPHICAL SKETCH**

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NAME: Sumin Lee

eRA COMMONS USER NAME (credential, e.g., agency login): SUMIN.LEE

POSITION TITLE: Post doctoral

EDUCATION/TRAINING (*Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.*)

INSTITUTION AND LOCATION	DEGREE (if applicable)	Start Date MM/YYYY	Completion Date MM/YYYY	FIELD OF STUDY
Ewha Womans University	B.S.	03/2007	08./2010	Chemistry and Life
Ewha Womans University	M.S.	08/2013	07/2018	Chemistry
University of California, Berkeley	Ph.D.	08/2013	08/2013	Chemistry
Stanford University	Post doctoral	09/2019		Chembiology

**A. Personal Statement**

The project goal is building the imaging tools of *S. aureus* in vivo based on the activity-based probes (ABPs). ABPs have been developed to characterize protein activity and monitor the functional regulation of enzymes in complex proteomes by forming covalent bond with the active site of the enzyme to enable detection and affinity purification of a target enzyme population. Recently, the alkyne-isocoumarin, called as JCP251 identified one of serine hydrolases on bacterial cell surface, named as FphB and through ex vivo study, this FphB involves in the heart and liver infection. Here, we envisioned to image this surface exposed serine by conjugating JCP251 and fluorescent probe or contrast agents as non-invasive imaging tools to visualize sites of infection *in vivo*. I have successfully synthesized the red-shifted fluorescent probe linked with JCP251 and it revealed the high fluorescent in WT cells but significantly low in FphB transposon mutant cells. For ultrasound contrast agent, I prepared microbubbles which is embedded with JCP251 and will attempt to measure ultrasound imaging in biofilm grown slides or tube through collaboration with ultrasound imaging experts. This fluorescent work was facilitated by my scientific background and training, which have been focused on synthetic chemistry and biological applications built upon during my undergraduate and master's degree with Prof. Wonwoo Nam at Ewha Womans University in South Korea and Ph. D. studies with Prof. Chris Chang at UC Berkeley. With the Nam lab, I had focused on building up series of photochromic molecules and luminescent sensors for zinc detections. My graduate work with Prof. Chris Chang at UC Berkeley has focused on functionalized polymers and fluorescent probes for copper and sodium ions. Also, I have had numerous chances to collaborate with a lot of labs, learning to communicate clearly and cooperate to pursue the common research goals. As a result of these previous experiences, I am aware of the importance of frequent communication among project members and of constructing a realistic research plan, timeline, and budget plan. Through this collaboration and works, I have produced several peer-reviewed publications from each project.

In summary, I have a demonstrated record of accomplished projects along with cooperative researches, and my expertise and experience have prepared me to lead the proposed project.

**B. Positions and Honors**

2006-Present : Postdoctoral Researcher, Stanford University

- Mar and Sep 2011 **Research Assistant Scholarship** for employed student to assist academic research
- Aug 2010 Graduate as **MAGNA CUM LAUDE**
- From 2007 to 2009 **Honor Scholarship** for superior academic student
- Mar 2008 **Academic Incentive Scholarship** for an honors program at Ewha Womans University
- Mar 2008 **Hong Seung Dae Scholarship** for superior academic student

## C. Contributions to Science

### Patents

C. J. Chang, J. R. Long, S. Lee, G. Barin, 2016, SYSTEMS AND METHODS FOR DETECTING METAL ION CONCENTRATIONS IN SUBJECTS. U.C. Case No. B16-159; Reference: 116550-5001-US

### Presentations

- Sumin Lee. (2017, Apr) Oral presentation “Frameworks for Capturing Copper and Iron Ions in Biological and Environmental Samples” at the 2017 ACS Inorganic chemistry, San Francisco, USA
- Sumin Lee. (2012, Jun) Oral presentation “Metal-Ion Responsive Photofunctional Organic Molecules” at the 2012 KCS Inorganic chemistry department summer symposium, Yongin-si, Korea
- Sumin Lee, Youngmin You, and Wonwoo Nam (2012, Apr) Poster presented at the 109<sup>th</sup> General Meeting of the Korean Chemical Society, Ilsan, Korea
- Sumin Lee, Youngmin You, Soo Young Park, Shunichi Fukuzumi, Injae Shin, and Wonwoo Nam (2011, Oct) Poster presented at the 108<sup>th</sup> Autumn Meeting of the Korean Chemical Society, Daejeon, Korea
- Youngmin You, Sumin Lee, Wonwoo Nam, and Stephen J. Lippard (2010, Nov) Poster presented at the 5<sup>th</sup> Asian Biological Inorganic Chemistry Conference, Kaohsiung, Taiwan

### Publications

- S. Lee, P. Liu, N. Yuki, I. Hamachi, E. Miller, C. J. Chang “Ligand-Directed Acyl Imidazole Chemistry for Labeling Proteins in Copper-Rich Compartments in Cells and Neurons”, *Manuscript in preparation*
- S. Lee, A. Uliana, M. K. Taylor K. Chakarawet, S. R. S. Bandaru, S. Gul, R. Chatterjee, C. M. Ackerman, J. Xu, J. A. Reimer, J. Yano, A. Gadgil, J. R. Long and C. J. Chang “Iron Capture in a Functionalized Porous Polymer Applied to Remediation and Detection in Environmental Water Samples”, *Paper submitted*
- C. Y.-S. Chung, J. M. Davis, S. Lee, D. C. Brady, C. J. Chang “Activity-Based Ratiometric FRET Probe Reveals Oncogene-Driven Changes in Labile Copper Pools Induced by Altered Glutathione Metabolism”, *Paper submitted*
- S. N.W. Toussaint, R. T. Calkins, S. Lee, B. W. Michel. “An Olefin Metathesis-Based Fluorescent Probe for the Selective Detection of Ethylene in Live Cells”, *J. Am. Chem. Soc.* **2018**, 140, 41, 13151-1315
- C. M. Ackerman, S. Lee, C. J. Chang. “Analytical Methods for Imaging Metals in Biology: From Transition Metal Metabolism to Transition Metal Signaling”, *Anal. Chem.* **2017**, 89, 22-41
- S. Lee, G. Barin, C. M. Ackerman, A. Muchenditsi, J. Xu, J. A. Reimer, S. Lutsenko, J. R. Long and C. J. Chang “Copper Capture in a Thioether-Functionalized Porous Polymer Applied to the Detection of Wilson’s Disease”, *J. Am. Chem. Soc.* **2016**, 138, 7603-7609
- S. Lee, Y. You, K. Ohkubo, S. Fukuzumi, and W. Nam “Highly Efficient Cycloreversion of Photochromic Dithienylethene Compounds Using Visible Light-Driven Photoredox Catalysis”, *Chem. Sci.*, **2014**, 5, 1463-14
- S. Lee, Y. You, K. Ohkubo, S. Fukuzumi, and W. Nam “Photoelectrocatalysis to Improve Cycloreversion Quantum Yields of Photochromic Dithienylethene Compounds”, *Angew. Chem., Int. Ed.*, **2012**, 51, 13154-13158
- S. Lee, Y. You, K. Ohkubo, S. Fukuzumi, and W. Nam “Mechanism and Fluorescence Application of Electrochromism in Photochromic Dithienylcyclopentene”, *Org. Lett.*, **2012**, 14, 2238-2241
- J. E. Kwon, S. Lee, Y. You, K.-H. Baek, K. Ohkubo, J. Cho, S. Fukuzumi, I. Shin, S. Y. Park, and W. Nam, “Fluorescent Zinc Sensor with Minimized Proton-Induced Interferences: Photophysical Mechanism for Fluorescence Turn-On Response and Detection of Endogenous Free Zinc Ions”, *Inorg. Chem.* **2012**, 51, 8760–8774
- Y. You, S. Lee, T. Kim, K. Ohkubo, W.-S. Chae, S. Fukuzumi, G.-J. Jhon, W. Nam, and S. J. Lippard, “Phosphorescent Sensor for Biological Mobile Zinc”, *J. Am. Chem. Soc.* **2011**, 133, 18328–18342

**D. Additional Information: Research Support and/or Scholastic Performance**

YEAR	COURSE TITLE	GRADE
	Ewha Womans University	
2008	Analytical Chemistry	A-
2008-2009	Organic Chemistry	A+
2008	Synthetic experiment	A
2008	Physical Chemistry	A-
2008	Immunology	B+
2009	Biochemistry	A
2009	Inorganic chemistry	A
2009	Polymer Chemistry	B+
2009	Organic reaction mechanism	A
2010	Molecular Biology	A-
2010	Spectroscopy for organic structural analysis	A
2010	Advanced chemical experiment	S
2010	Redox Chemistry and biology	A
2010	Advanced inorganic chemistry	A
2011	Bioinorganic chemistry	A
	University of California, Berkeley	
2013	Chemistry Fundamentals	B
2013	Coordination Chemistry	B-
2014	Inorganic Spectroscopy	A
2014	Bioinorganic Chemistry	A