



Julius A. Edson

Education

University of California, Irvine | Chemical & Biochemical Engineering, Ph.D, In Progress
University of California, Irvine | Chemical & Biochemical Engineering, M.S., 2014
City College of New York | Chemical Engineering, BE, 2012

Research Experiences

Graduate Research Assistant | 2012 - Present | University of California, Irvine | Irvine, CA

- Nano-Antibiotics Synthesis and characterization
- Synthesis of multifunctional drug molecule

PI: Young Jik Kwon

Undergraduate Research Assistant | 2007 - 2012 | City College of New York | New York, NY

- Infrared Spectroscopy: Analysis of Potential Linker Molecules
- Stabilization of AC Assisted Janus Particle Assembly

PI: Ilona Kretzschmar

Visiting Researcher | 2010 | Universidad de San Buenaventura | Cartagena, Colombia

- Led and managed group members for the duration of the project. On-site sample collection and testing, interaction with community leaders about project goals.
- Interacted with the people and experienced the culture, while using the language previously learnt.

PI: Julie Vernon and Diomaris Padilla

Visiting Researcher | 2009 | TU Graz | Graz, Austria

- Learned and practiced new techniques (electroceramic synthesis, material milling and sintering, electrochemistry application)
- Experienced the culture, and learned some German.

PI: Werner Krauss and Klaus Reichmann

Visiting Researcher | 2008 | Royal Institute of Technology | Stockholm, Sweden

- Learned new research techniques in biomaterials and corrosion science (cyclic voltammetry, impedance).

PI: Jinshan Pan

Laboratory Intern | 2004 - 2005 | USDA | Beltsville, MD

- Characterized *Stemphylium* Using AFLP DNA Fingerprinting.
- Spent one academic year working independently in a government lab. Growing fungal cultures, characterizing the cultures, then incubating various plants to determine fungi pathology, as well as studying the individual strain morphologies.

PI: Nichole O'Neill and Julie Wolfe

Publications

- 1) Edson, J., Kretzschmar, I. Infrared Spectroscopic Characterization of Potential Linker Molecules. *The Grove School of Engineering Journal of Student Research*, 3 (2010), 43-47.
- 2) Edson, J., Kretzschmar, I. "Transmission Mode Infrared Spectroscopic Analysis of C8 Alkanethiols on Gold-Coated Silver Chloride Substrate" (In preparation)
- 3) Kemp, J; Edson, J.; Kwon, YJ, "Nano-antibiotics: Nanotechnology in fighting against infectious diseases" *Handbook of Nanobiomedical Research*: (2014) 373-405 (Invited book chapter)
- 4) Edson, JA, Kwon, YJ. "RNAi for Silencing Drug Resistance in Microbes toward Development of Nanoantibiotics." *Journal of Controlled Release* 189 (2014): 150-157.



Presentations

Posters

- 1) Edson, J., Moses A., Pan, J., "Electrochemical Measurements of Metallic Biomaterials" Royal Institute of Technology Summer Research Symposium, Stockholm, Sweden, August 2008
- 2) Edson, J., Kretzschmar, I., "Infrared Spectroscopic Characterization of Bifunctional Organic Linker Molecules" AIChE National Conference, Nashville, TN, November 2009.
- 3) Edson, J., Moses A., Pan, J., "Electrochemical Measurements of Metallic Biomaterials" NSF Engineering Education Awardees Conference, Reston, VA, January 2010
- 4) Edson, J., Krauss, W., Reichmann, K., "Modification of the ceramic system: $[\text{Bi}_{0.49}\text{Nd}_{0.01}\text{Na}_{0.335}\text{K}_{0.125}\text{Li}_{0.04}]\text{TiO}_3$ " 2nd Annual Creativity in the Arts and Sciences Event, Gainesville, FL, January 2010
- 5) Edson, J., Ortega, B., Richardson, R., "Quality of the Potable Water and River Water used in the Zapatero Community" Universidad de San Buenaventura summer research symposium, Cartagena, Colombia, August 2010
- 6) Edson, J., "Analysis of Amine Monolayer Formation on Gold Surfaces Using FTIR" Grove School of Engineer Symposium, New York, NY, October 2010
- 7) Edson, J., Kretzschmar, I., "Analysis of Organic Linker Molecules Using Gaussian 03w" AIChE National Conference, Salt Lake City, UT, November 2010. **Selected for 3rd Place Award.**
- 8) Edson, J., Kretzschmar, I., "Exploring Self Assembled Monolayer Formation of Linkers on Gold-Coated Polystyrene Particles" Einstein in the City Conference, New York, NY, April 2010.
- 9) Edson, J., "Modeling Infrared Spectra of Linkers" New York City Alliance Summer Symposium, Brooklyn, NY, August 2011
- 10) Edson, J., Kretzschmar, I., "Analysis of Molecular SAM Formation on Thin Gold Films Using Infrared Spectroscopy" AIChE National Conference, Minneapolis, MN, October 2011
- 11) Edson, J., Kretzschmar, I., "Analysis of Molecular SAM Formation on Thin Gold Films Using Infrared Spectroscopy" NY Academy of Sciences, New York, NY, March 2012
- 12) Edson, J., Kretzschmar, I., "1-Octanethiol and 1,8-Octanedithiol SAM Formations on Gold-coated Silver Chloride Films" UU Series (Nano), Bronx Community College, Bronx, NY, April 2012
- 13) Wu, S. Edson, J.A., Kwon, Y.J. "Determining the Optimal Conditions for Chitosan Polyplex Formation", Orange County Graduate Women in Sciences (OCGWIS) 25th Student Research Conference, Irvine, CA, April 2014. **Selected for 2nd Place Award.**
- 14) Edson, J.A., Wu, S., Lee, B., Ingato, D., Kwon, Y.J., "Acid-Responsive Chitosan as Efficient Gene Delivery Carriers and Nanoantibiotics Materials" American Chemical Society (ACS) Fall Annual Meeting, San Francisco, CA, August 2014. **Selected as an ACS PMSE Finalist.**
- 15) Edson, J.A., Wu, S., Lee, B., Ingato, D., Kwon, Y.J., "Acid-Responsive Chitosan as Efficient Gene Delivery Carriers and Nanoantibiotics Materials" Chao Family Comprehensive Cancer Center Scientific Retreat Poster Session, Palm Springs, September 2014

Talks

- 1) Edson, J., Krauss, W., Reichmann, K., "Modification of the ceramic system: $[\text{Bi}_{0.49}\text{Nd}_{0.01}\text{Na}_{0.335}\text{K}_{0.125}\text{Li}_{0.04}]\text{TiO}_3$ " Syracuse University Chemistry Symposium, Syracuse, NY, November 2009
- 2) Edson, J., Kretzschmar, I., "Infrared Spectroscopic Characterization of Potential Linker Molecules" NYACS URS Conference, Garden City, NY, May 2010
- 3) Edson, J., Lam, L., Liu, D., Ma, S., "Research Experience for Undergraduates (Domestic and International)" AIChE National Conference Student Chapter Workshops, Salt Lake City, UT, November 2010.



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- 4) Edson, J., Kretzschmar, I., "Exploring Self Assembled Monolayer formation of Linkers on gold coated polystyrene particles" AICHe Mid-Atlantic Regional Conference, State College, PA, April 2011
- 5) Edson, J., Kretzschmar, I., "Exploring Self Assembled Monolayer formation of Linkers on gold coated polystyrene particles" NYACS URS Conference, Riverdale, NY, May 2011
- 6) Edson, J., "Modeling Infrared Spectra of Linkers" New York City Alliance Summer Symposium, New York, NY, August 2011
- 7) Edson, J., Kretzschmar, I., "1-Octanethiol and 1,8-Octanedithiol SAM Formations on Gold-coated Silver Chloride Films" NYACS URS Conference, Old Westbury, NY, May 2012
- 8) Edson, J., Kwon, Y.J., "Chitosan nanoparticle mediated Gene Delivery", Competitive Edge Research Symposium, Irvine, CA, August 2012
- 9) Fu, I.W., Wong, S., Edson, J.A., Markegard, C.B., Kwon, Y.J., Nguyen, H.D., "Molecular Dynamics Simulations of Self-Assembly of Nonviral Gene Delivery Complexes By Pegylated Peptides and siRNA Molecules", AICHe Annual Meeting, San Francisco, CA, November 2013
- 10) Edson, J.A, Kemp, J., Kim, J., Cho, S.K., Pedram, A., Levin, E.R., Kwon, Y.J., "Acid-Degradable Polyketal Nanoparticles Carrying MnSOD siRNA to Restore Intrinsic Apoptosis in Tamoxifen-Resistant Breast Cancer Cells", AICHe Annual Meeting, San Francisco, CA, November 2013
- 11) Edson, J.A., Pal, S., Wu, S., Lee, B., de la Maza, L., Kwon, Y.J., "pH-Responsive Chitosan Nanoparticles As a Gene Therapy-Based Nanoantibiotic", AICHe Annual Meeting, Atlanta, GA, November 2014

Patents

- 1) Kwon, YJ & Edson JA. "Metamorphic natural material for applications in nanoantibiotics, gene therapy, and regenerative medicine" U.S. Provisional Application No. 62/036,005

Awards

- 2014 UCI DECADE Travel Grant
- 2013 - 2018: National Science Foundation Graduate Research Fellowship (NSFGRF)
- 2013 - 2015: California Institute for Regenerative Medicine (CIRM) Training Grant
- 2012 - 2017: University of California, Irvine Graduate Opportunities Fellowship (GOF)
- 2012 - 2013: Graduate Assistance in Areas of National Need (GAANN) Fellowship
- 2012 University of California, Irvine Competitive Edge Program
- 2011 - 2012: CCNY Partnership for Research and Education in Materials (PREM) Fellowship
- 2011 CCNY ChE Car Team (Captain) - **Awarded 3rd Place in Regionals for Design**
- 2009 - 2010: CCNY STEP Research Fellowship
- 2008 - 2009: CCNY Chemical Engineering A.X. Schmidt Scholarship

Skills

Organized leader with an energetic personality and excellent interpersonal communication skills.

Technical Skills: Nanomaterial synthesis (Janus, Gold, Polymer), Chemical synthesis and modification, Electrochemistry, Electroceramics fabrication, Microscopy Techniques (AFM, TEM, SEM, Confocal), Analytical Techniques (FTIR, NMR, MALDI-TOF, GPC, DLS, ZETA, Gel Electrophoresis, FACS), Cell Culture Techniques, Assays (MTT, Apoptotic), Animal model techniques (Injections (IV, IP, Subcutaneous), Blood collection, Euthanasion)

Software: MS Office (Word, Excel, PowerPoint, Access, Expressions, Outlook, Publisher, Visio), Origin Pro, Mathworks Suite, Adobe Creative Suite (Illustrator, Photoshop, InDesign, Premiere, Dreamweaver, Encore, Flash), Visual Basic, Aspen Engineering Suite, Super Pro, Mathematica, Molecular Dynamics Modeling (VMD, NAMD, CHARMM, AMBER, Gaussian 03w)

Language Skills: Elementary - Japanese (1 year); Moderate - Spanish (4 years with international immersion)
Fluent - English, Yoruba



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Organizations

- American Institute of Chemical Engineers (AIChE)
Positions Held: Executive Student Committee (Local Sections Chair, Regional Liaison), President, Secretary
- Omega Chi Epsilon (OXE)
- National Society of Black Engineers
- National Action Council for Minorities in Engineering (NACME)
- Black Male Leadership and Mentoring Program (BMLMP)
- Louis Stokes Alliance for Minority Participation (LSAMP)
- Graduate InterConnect (GIC) - Peer Mentor
- Competitive Edge - Peer Mentor
- CBEMS Graduate Student Council - Vice President
- DECADE Student Council - Recruitment Chair
- DECADE Plus - Graduate Student Mentor
- Discovery Cube Initiative - Founding Member
- Engineering/ICS DECADE Student Council - Chair
- UC Irvine Graduate Professional Success (GPS) BioMed

Teaching Experiences

2007-2008 | High School Tutor | Harlem Children Zone | Harlem, NY

- Tutored High School students 9-12 in Math and Science
- Led after school programs and weekend field trips

2015 - Present | Pharm Sci 174L - TA | University of California, Irvine | Irvine, NY

- Prepared Lab Manual & accompanying video series
- Provided solutions and cell cultures for each experiment
- Led in vivo experiments, and taught basic mice handling
- Led multiple sessions weekly
- Led lecture style discussion session

Mentoring

Undergraduate:

- 2013 - 2015: Bianca Lee: Pharmaceutical Science, BS
2014 Lee Miyauchi: Junior in Pharmaceutical Science
2013 - 2014: Shirley Wu: Pharmaceutical Science, BS
2012 Chris Dang: Biological Science, BS

High School:

- 2014 Jasmine Kaura (Now at Massachusetts College of Pharmacy and Health Sciences - Medicine)
2012-2013: Erik Cerros (Now at UC San Diego - Electrical Engineering)
2012-2013: Alejandro Aguilar (Now at CSU-Chico - Nursing)

Outreach Activities

- 2015: Led various workshops at the Discovery Science Center in Santa Ana, CA.
- 2012-2013: One week laboratory experience for high school students from Orange County region. Majority females and underrepresented minorities. Introduce the students to a simple project in gene therapy and have them spend a week creating nanoparticles then characterizing them with dynamic light scattering, zeta potential, and gel electrophoresis. Then show them some common in



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vitro studies. Two students are then chosen for a one year internship in the lab.

- 2012: Laboratory workshops for six high school students from various high schools in the NYC area. Majority females and underrepresented minorities. A tour of the CCNY labs followed by 6 small demonstrations including how to design a Ni-NiOOH battery from scratch.
- 2012: Two part workshop series for middle school students from Hostos Lincoln Academy in Bronx, NY. The benefits of paying attention in school, as well as the many things one can do with engineering. The presentation was followed by a small lab tour of some of the labs at CCNY and a demonstration using liquid nitrogen. The students then performed some experiments on their own such as making an electromagnet.
- 2011: Pre-College Engineering/Science Day at CCNY
High school students (majority female) from NYC area visit City College for an entire day to learn about the different science and engineering programs available.
- 2010: A. Philip Randolph High School Visit
Visit to a local high school boarding the City College Campus to inspire the students to consider STEM fields.
- 2009: High Performance Learning (HPL) program at AIChE National Conference in Tennessee.
Workshops on how to run experiments for primary and secondary school students
- 2008: Thomas Mifflin Elementary School workshop in Philadelphia
Following the AIChE conference, a visit was made to a local elementary school to perform some workshops with them i.e.: making ice-cream.