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## John P. Alper, PhD



### Education

#### University of California at Berkeley

Ph.D. in Chemical Engineering

2014

Cumulative GPA: 3.9/4.0

#### University of California at Berkeley

Masters of Science in Chemical Engineering: Summa Cum Laude

2010

Cumulative GPA: 3.8/4.0

#### University of Rhode Island

Bachelor of Science in Chemical Engineering: Summa Cum Laude

2008

Cumulative GPA: 3.8/4.0

### Academic Achievements, Awards and Honors

Eurotalents CEA Fellowship

IEEE Components, Packaging and Manufacturing Technology Society Graduate Student Grant

ARKEMA Industrial Graduate Fellowship

Second Place Finish – Science as Art Competition, MRS Spring 2013 Technical Meeting, San Francisco, Ca

Second Place Finish – Berkeley Energy and Resources Group Innovation Expo Poster Contest, 2013

University of Rhode Island President's Award for Academic Excellence

Toray Plastics America Industrial Scholarship

German Exchange Service RISE Fellow

National Society of Collegiate Scholars

Centennial Scholar

Phi Eta Sigma Honor Society for Excellence in Freshman Year

### Work and Research Experience

#### Commissariat à l'énergie atomique et aux énergies alternatives

September 2015-present

Post Doctoral Fellow – Researcher in the development and scale up of core-shell silicon-carbon nanoparticles for lithium ion battery applications. Research includes laser-pyrolysis synthesis and characterization of synthesized materials via electron microscopy, raman spectroscopy, and thermal gravimetric analysis. Fabrication of electrodes from synthesized materials, incorporation into lithium ion test batteries, and cycling analysis are also performed.

#### Contra Costa Community College District and Peralta Community College District

May 2014 – May 2015

Adjunct faculty member - Instructor of Introductory and General Chemistry lecture and lab. Developed course materials including lectures, demonstrations, homework, and examinations. Instructed students and assessed their degree of understanding basic chemical concepts including atoms and molecules, nomenclature, lewis dot structures, unit analysis, stoichiometry, reaction energetics, kinetics, acid base chemistry and nuclear chemistry.

#### University of California, Berkeley

August 2010 - Present

Researcher in nanomaterials development for electrical energy storage at the micro and macro scale. Research activities include design and synthesis of silicon and silicon carbide nanowire arrays via wet chemistry and chemical vapor deposition based methods; characterization of material structure and performance by scanning electron microscopy, Raman spectroscopy, X-ray photoelectron spectroscopy, and electrochemical methods; development of electroless deposition protocols for metal and metal oxide coating of nanowires; development of hybrid material schemes for facile integration, improved performance and simplified processing steps for on-chip energy storage functionalities.

**Los Medanos Community College**

September 2014 – December 2014

Substitute chemistry lab coordinator responsible for: management of hazardous waste in accordance with federal, state, and county regulations; preparation of materials and chemicals for teaching labs; training and management of stockroom employees; equipment and chemical stock maintenance; and assisting in the development of standard procedures for chemical use and emergency response.

**Tutor Hero**

Academic Year, 2011

Tutor for undergraduate physics, chemistry and chemical engineering.

**University of California, Berkeley**

December 2008 – August 2010

Master's degree research in antimicrobial coatings based on silanized quaternary ammonium compounds for application in novel point-of-use water purification devices for developing countries. Research activities included coating process development and optimization, characterization of coated surfaces (SEM, AFM, XPS, ellipsometry and contact angle microscopy) and antimicrobial challenge studies.

**Millennium Pharmaceuticals Inc.**

January 2008-August 2008

Process Engineer, Technical Operations. Performed technical assessments and documentation according to Good Manufacturing Practices (GMP) of manufacturing activities including deviations, corrective/preventative actions, change controls and validation activities. Responsible for tracking manufacturing trends and presentation of findings to upper management.

**University of Rhode Island**

Fall Semester 2007

Researcher in chemically modified nanoporous ceramic membranes. Research activities involved characterization of model solvents' -hexane, dioxane and water -penetration into native alumina membranes utilizing differential scanning calorimetry techniques (DSC).

**Millennium Pharmaceuticals Inc.**

June 2007 - Aug 2007

Process Engineer Intern in Technical Operations group of Pharmaceutical Operations department. Generated theoretical model of freeze drying process for pharmaceutical product and validated model with production data showing accuracy of within 10%. Utilized model to support regulatory submission of new drug process. Presented findings in a seminar to Pharmaceutical Operations department. Performed analysis of process deviations and generated GMP technical reports on deviations. Compiled metrics from batch production records and analyzed trends in data and presented results to upper management. Generated Excel worksheet to organize and streamline trending of data from manufacturing batch records.

**University of Rhode Island**

Academic year 2006

NASA sponsored researcher for development of a lab-on-a-chip to measure stress markers in saliva. Work included literature research on biomarkers and available assays, sample collection and analysis. Presented work in poster format at RI NASA Space Grant Summer Symposium, May 2007.

**Technical University of Braunschweig, Germany**

Summer 2006

Researcher on the effects of microstructures on heat transfer surfaces sponsored by DAAD fellowship. Work included conducting performing experiments on heat transfer to a viscous fluid system by way of copper plates with varying surface morphologies and analysis of relevant heat transfer coefficients from experimental data.

**University Of Rhode Island: Academic Enhancement Center**

Academic Year 2005

Tutor in college level physics, mathematics, chemistry, and philosophy for in one-on-one and small group sessions.

**University Of Rhode Island: Engineering Department**

Spring Semester 2005

Researcher in fabrication of polydimethylsiloxane (PDMS) stamps for patterning circuits on curved turbine blades. Work included fabrication of patterned PDMS stamps by photolithography, characterization resultant surfaces and development of optimal patterning process. Presented work at URI Surface and Sensors Group poster session.

**Graduate Student Teaching Experience****Graduate Student Instructor – Process Control Theory: Modeling, Design, and Simulation**

Spring Semester, 2012

Generated weekly problem sets, solutions and exam questions. Held weekly recitations and communicated directly with students to facilitate conceptual understanding and resolve content confusion.

**Graduate Student Instructor - Process Control Theory: Modeling, Design, and Simulation (Lab)** Spring Semester, 2011

Prepared and delivered weekly lectures on Matlab® Simulink® process modeling environment. Developed weekly lab projects which implemented skills and tools discussed in the lecture. Graded lab projects and exams.

**Mentorship/Outreach/Civic Engagement****Member – Teaching and Learning Committee, Los Medanos College**

Fall 2014-Spring 2015

The highest level committee at Los Medanos College engaged with developing assessment tools for student learning outcomes at the course and program level.

**Mentor: Students for Environmental Energy Development Program**

Spring 2014

Mentored Berkeley High School students in the building, testing, and analyzing an energy conversion device and its efficiency. Gained experience working with physically disabled students from diverse ethnic and socio-economic backgrounds.

**Undergraduate Research Mentor**

2009-2013

Mentored undergraduate researchers in the Maboudian lab at UC Berkeley. Developed goals of inquiry, facilitated experimental design, provided training in laboratory skills and procedures, and participated in data analysis and final report editing. M. Kim and N. Yiu's work resulted in important contributions to publications and presentations cited below.

**COINS Summer Scholar Mentor**

2012-2013

Mentored undergraduate students from under represented populations in the sciences for summer research project in nanotechnology. Developed project goals relevant to current areas of interest in the nanoscience community and set timelines for deliverables. Instructed students in lab techniques and worked with students to generate scientific report summarizing findings. Guided students through data analysis, oral presentation, and final report writing. J. Zhang's work resulted in important contributions to the publication cited below.

**UC Berkeley Botanical Gardens**

Volunteer in retail operations and community engagement.

**Skills and Interests**

Scanning electron microscopy

Grazing Angle-IR

Nuclear Magnetic Resonance

Confocal Raman microscopy/spectroscopy

X-ray photoelectron spectroscopy

Atomic force microscopy

Ellipsometry

Contact angle analysis

Nanomaterials synthesis including wet etching and chemical vapor deposition techniques

Electrochemical testing procedures  
Electrodeposition and electroless deposition chemistry  
Nanomaterials for energy storage  
Machining – mill, lathe, band Saw and drill press tools

#### Software Tools

Microsoft Office Suite – Word, Excel and Power Point  
Matlab® and Simulink®  
OriginPro 8  
Adobe Illustrator, Photoshop and Premier Pro  
Inkscape  
GIMP  
AutoCAD

#### Scientific Publications

J.P. Alper, J. Zhang, S. Wang, C. Carraro, R. Maboudian, “**Method for Growth of Silicon Carbide Nanowires on Hierarchical Porous Carbon Structures**” In Preparation

S. Wang, B. Hsia, J. P. Alper, C. Carraro, Z. Wang, R. Maboudian, “**Comparative Studies on Electrochemical Cycling Behavior of Two Different Silica-based Ionogels**”, *Journal of Power Sources*, In Press

J. P. Alper, S. Wang, F. Rossi, G. Salviati, N. Yiu, C. Carraro, R. Maboudian, “**Selective Ultrathin Carbon Sheath on Porous Silicon Nanowires: Materials for Extremely High Energy Density Planar Micro-Supercapacitors**”, *Nano Letters*, **14**,1843-1847 (2014)

J. P. Alper, A. Gutes, C. Carraro, R. Maboudian, “**Semiconductor Nanowires Directly Grown on Graphene–Towards Wafer Scale Transferable Nanowire Arrays with Improved Electrical Contact**”, *Nanoscale*, **5**, 4114-4118 (2013)

J. P. Alper, M. Kim, B. Hsia, M. Vincent, V. Radmilovic, C. Carraro, R. Maboudian, “**Silicon Carbide Nanowires as Highly Robust Electrodes for Micro-Supercapacitor Applications**”, *Journal of Power Sources*, **230**, 298-302 (2013)

A.A. Torkelson, A.K. da Silva, D.C. Love, J.Y. Kim, J.P. Alper, B. Coox, J. Dahm, P. Kozodoy, R. Maboudian, K.L. Nelson, “**Investigation of quaternary ammonium silane-coated sand filter for the removal of bacteria and viruses from drinking water**”, *Journal of Applied Microbiology*, **113**, 1196–1207 (2012)

J. P. Alper, M. Vincent, C. Carraro, and R. Maboudian, “**Silicon Carbide Coated Silicon Nanowires as Robust Electrode Material for Aqueous Supercapacitor**”, *Applied Physics Letters*, **100**, 163901 (2012).

#### Patents

J. P. Alper, C. Carraro, R. Maboudian, “**Hybrid Porous Nanowires for Electrochemical Energy Storage**”, Patent Pending.

#### Scientific Presentations

J. P. Alper, Carlo Carraro, Roya Maboudian. “**Micro-Supercapacitor Electrodes Based on Silicon and Carbon Based Nanomaterials**”, *Fall 2014 Nanowires for Energy Storage Meeting*, October 14-15, 2014, Welcome Hotel, Frankfurt Germany – Oral Presentation

J. P. Alper, Albert Gutes, Carlo Carraro, Roya Maboudian. **“Dense Semiconducting Nanowire Arrays Grown Directly on Graphene”**, *2013 AIChE Annual Meeting*, November 3-8, 2013, Hilton San Francisco Union Square, San Francisco, Ca – Oral Presentation

J.P. Alper, A. Gutes, C. Carraro and R. Maboudian, **“Semiconducting Nanowire Arrays Grown Directly on Graphene: Towards Precision Placement of Wafer Scale Nanowire Arrays with Improved Electrical Contact for Energy Storage and Harvesting”**, *IEEE CPMT Technical Meeting*, September 2013, Santa Clara, Ca. – Oral Presentation

J. P. Alper, M. Kim, B. Hsia, M. Vincent, C. Carraro, R. Maboudian. **“Silicon Carbide Nanowire Arrays: Towards Robust High Power Energy Storage for Implementation in Mobile Electronics”**, *Materials Research Society Spring Meeting*. 2013, San Francisco, Ca. – Oral Presentation

J. P. Alper, M. Vincent, C. Carraro, R. Maboudian. **“Silicon Carbide Nanostructures for Micro-Supercapacitor Applications”**, *American Vacuum Society 59<sup>th</sup> International Symposium and Exhibition*.2012, Tampa, Fla. – Oral Presentation

J. P. Alper, M. Vincent, C. Carraro, R. Maboudian. **“Development of On-Chip Silicon Nanowire Based Micro Supercapacitor Electrodes”**, *Materials Research Society Spring Meeting*. 2012, San Francisco, Ca. – Oral Presentation

J. P. Alper, M. Vincent, C. Carraro, R. Maboudian. **“Development of Silicon Based Nanomaterials for On-Chip Supercapacitor Applications”**, *Workshop for Technologies for Future Micro and Nano Manufacturing*. 2011, Napa, Ca. – Poster Presentation.

M. Cerruti, J. P. Alper, A. da Silva, D. Love, R. Lim, P. Kozodoy, C. Carraro, K. Nelson, R. Maboudian. **“Optimization of Antimicrobial Coatings for Water Treatment”**, *Materials Research Society Spring Meeting*. 2009, San Francisco, Ca. – Oral Presentation

A. da Silva, J. Dahm, M. Cerruti, J. P. Alper, D. Love, R. Lim, P. Kozodoy, G. Kang, V. Balraj, C. Carraro, K. Nelson, R. Maboudian. **“Point-Of-Use Disinfection of Drinking Water Using Cationic Antimicrobial Surface Coatings”**, *Water Environment Federation Disinfection Conference*. 2009, Atlanta, Ga. – Oral Presentation

J. P. Alper, P. Hui, D. Pratt, J. Nystrom. **“Model of Lyophilization Process for Velcade Drug Product and Comparison to Process Data”**, *Pharmaceutical Operations Technical Seminar Series*. Millennium Pharmaceuticals, August 2007. – Oral Presentation