Martin Siron

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EDUCATION

Ph.D., Materials Science and Engineering, UC Berkeley, Berkeley, CA — *Expected: 2022*
PI: Kristin Persson | Focus: Photocatalysts, CO_2RR

M.Sc., Materials Science and Engineering, UC Berkeley, Berkeley, CA — *Awarded: May 2019*
PI: Peidong Yang | Focus: Phase Transitions, Photonics, Fundamental Material Properties

B.S. Chemical Engineering (Nanotechnology), University of Southern California, Los Angeles, CA — *Awarded: May 2017*
PI: Andrea Armani | Focus: Optically cleavable polymers
GPA: 3.6

RESEARCH EXPERIENCE

Kristin Persson Research Group, Lawrence Berkeley National Lab, Berkeley, CA

Project: High-throughput adsorption workflow — *Spring 2019 – Fall 2020*

- Built high-throughput workflow using Atomate for finding adsorption energies of complex semiconductor materials
- Benchmarked workflow on published literature
- Incorporated descriptors important to photocatalysis process: charge partitioning analysis, geometric analysis, bonding analysis and electronic structure analysis
- Mentored undergraduate student: *Ricardo Buarque*

Project: In-depth study of potential Telluride materials for CO2RR — *Fall 2020 – Present*

- Running adsorption workflow for adsorbates of interest to CO2 reduction on potential new Telluride materials
- Understanding trends between materials.

Peidong Yang Research Group, UC Berkeley, Berkeley, CA

Project: 2D Perovskite Nanoplates Self Assembly — *Fall 2017 – Spring 2019*

- Synthesized perovskite and Ruddlesen-Popper 2D nanoplates using hot injection colloidal method
- Structural characterization using XRD, TEM, AFM, SAXS, 2D NMR
- Optical characterization using UV-Vis, PL and time-resolved picosecond lifetime PL
- Measured integrated quantum yield of nanoplates
- Studied self-assembly of the plates by tuning solvent, ligand, and composition

Project: Langmuir Blodgett Assembly of Perovskite Nanowires — *Spring 2018 – Spring 2019*

- Synthesized inorganic perovskite nanowires of various length
- Performed structural and optical characterization
- Protected and patterned nanowires using modified Langmuir Blodgett technique
- Studied polarization dependent PL of patterned nanowire

Project: Perovskite@CNT: Phase Transition — *Fall 2018 – Spring 2019*

- Incorporated perovskite inside a carbon nanotube
- Initial HR-TEM, STEM studies on structure of Perovskite@CNT
- Initial study on affect of confinement of phase transition of a crystal inside a CNT.

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Project: Lead free perovskite: $CsEuCl_3$ *Fall 2018 – Spring 2019*

- Performed HR-TEM and EELS studies to resolve the structure of air-sensitive lead-free, CsEuCl3 quantum dots
- Peformed X-Ray studies to figure out structure of $CsEuCl_3$ quantum dots.
- Performed 2D NMR studies to solve ligand shell on $CsEuCl_3$ quantum dots

National Center for Electron Microscopy (NCEM), Lawrence Berkeley National Lab, Berkeley, CA

Project: Tecnai TEM Microscope *Spring 2018 – Present*

- Characterized 0-3D perovskite colloidal nanostructures using various TEM methods:
  - High Resolution TEM (HR-TEM)
  - Selected Area Electron Diffraction (SAED)
  - Electron Energy Loss Spectroscopy (EELS)
  - Low-dose TEM
  - Scanning Transmission Electron Microscopy (STEM)
  - Tilting, and focus-series exit wave reconsutruction

Advanced Light Source (ALS), Lawrence Berkeley National Lab, Berkeley, CA

Project: Beamline 7.3.3: SAXS, WAXS, GI-SAXS, GI-WAXS. Dynamic and static. *Spring 2018 – Spring 2019*

- Characterized synthesis and assembly of 2D perovskite
- Characterized various perovskite-matrix materials
- 2D diffraction of various Pb-free perovskite materials

Andrea Armani Research Group, University of Southern California, Los Angeles, CA

Project: Characterize a polymerization reaction with various variables and solvents with a UV cleavable base. *Fall 2014 – Spring 2017*

- Synthesized via atom transfer radical polymerization (ATRP) poly(styrene) and poly(methyl acrylate) with photo-labile o-Nitrobenzyl derivative moiety and narrow polydispersity (>1.10 PDI) low, medium and high molecular weight polymers.
- Created protocol to synthesized poly(ethyl glycol)mono-methyl acrylate via ATRP with current chemical inventory. Synthesized MPEGMA with low polydispersity (1.14) and ONB-moiety.
- Irradiating with sun simulator different photo-cleavable polymers to quantitate the effect monomers have on the cleaving kinetics of the polymer on a thin film and in a solvent environment

Project: Synthesis of beta-Heamatin particles *Spring 2017*

- Synthesized using high concentrate buffer solution beta-Heamatin crystals from Hemin.
- Characterized to confirm structure using XRD and FTIR

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Institute of Microelectronics, Tsinghua University, Beijing, China

Project: To figure out application for a novel molybdenum sulfide (MoS_2) nano structure — *Summer 2015*

- Participated in 6 week Viterbi-Tsinghua summer fellowship where I was matched with an engineering research lab at Tsinghua University in Beijing.
- Research group already had a process to create a novel, 'hair-like' MoS_2 structure. The task was now to find application for this structure which had much more surface area than previously built MoS_2 structures by other labs.
- Created a protocol to test this if MoS_2 structure would be a better Lithium Ion Battery (LiB) anode

GRANTS/AWARDS

National Science Foundation, Graduate Research Fellowship Program (NSF GRFP) — *Spring 2017*

- 3 year PhD fellowship
- 2000 selected out of ~13000 application pool.

National Academy of Engineering Grand Challenge Scholar — *Spring 2017*

- 25 USC students selected, for $1,000 scholarship
- Demonstrated leadership in: research, entrepreneurship, multiple disciplines, cultural competence and social consciousness.

Charles J. Rebert Chemical Engineering Outstanding Service Award — *Spring 2017*

- 2 graduating seniors from Chemical Engineering department awarded
- For students who have shown strong service to the department

Presidential Scholar — *Fall 2013 – Spring 2017*

- Only about 200 students are selected out of a 48,000 application pool for this award.
- Covers half of the tuition for attending USC

Rose Hills Fellowship — *Summer 2016*

- Only about 40 applicants out of 90 were chosen for this award
- Applicants demonstrate strong research skills and interesting projects

O4U Engineering Fellow — *Fall 2015-Present*

- Only about 100 students were selected out of a 500+ application pool.
- This is awarded to only top Engineer LGBTQ students in the nation
- Applicants are sent to the O4U Engineering conference in Palo Alto with all expenses paid

Seely Mudd Scholarship — *Fall 2016*

- Merit based scholarship awarded to top engineering students.

Undergraduate Research Assistant Fellowship — *Spring 2016*

- Top researchers are awarded this university wide award for a semester
- This provides a stipend for research performed during the school year

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INVOLVEMENT

Graduate Assembly, UC Berkeley — *Fall 2018 – Present*
2020-2021 Vice President of Finance

- Served on *Chancellor's Advisory Committee on Student Service Fees*, *Student Union Board*, *Student Fee Referenda Committee*, *Interorganizational Committee on Student Fee Governance*, *Lower Sproul Fee Committee*, *Course Materials Service Fee*, *University Business & Partnership Advisory Committee*, *Beverage Working Group*, *Student Tech Fee Referenda Committee*
- Chaired *Student Union Board's Finance Committee*, Internal Finance Committee within Graduate Assembly
- Helped draft language for future Student Tech Fee referenda
- Advocated against Pepsi pouring rights with University
- Created a $100,000 job bank for graduate student affected by COVID-19, co-launched program to pay students serving on critical campus committees, & raised equity standards within the GA.
- Met with key campus partners (Chancellor, VC Student Affairs, VC Equity & Inclusion, VC Finance) to advocate on behalf of graduate students amid budget cuts
- Served on independent 501(c)3 Graduate Student Assembly board amid working on GA's independence from the ASUC.
- Managed $1M budget, $1.4M reserved, and $1.5M endowment fund

MSE Grad Student Council, UC Berkeley — *Fall 2018 – Spring 2019*
President

- Launched climate survey for department in effort to revamp curriculum and improve experience of graduate students

Bay Area Scientists in Schools — *Fall 2018 - Present*
Member

- Participated in various outreach activities to increase the pipeline to STEM of underrepresented communities.

AIChE, Young Professionals Committee (National) — *Summer 2016*
2017 Annual Meeting Professional Development Workshop Chair

- Develop, organize, and chair the in-person Young Professionals Committee's (YPC) Professional Development Workshop for the 2017 AIChE Annual Meeting in Minneapolis, MN.
- Create an interactive workshop that focuses on topics relevant to young professionals looking to advance their careers from entry-level or mid-level positions during the Annual Meeting.

AIChE, Chapter at USC — *Fall 2015 – Spring 2016*
President

- Implemented Chem-E only Career Fair initiative which helped to grow organization by over 150% and secured new sponsors for more programing.
- Managed $22,000 budget.

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ChemE Car *Spring 2015*
Co-Captain

- Implemented the Chem-E car competition at USC.
- Extensively planned to create a car by 2016 for regional competition.
- Performed research on various fuel types and proposed a budget to Viterbi to get funding for Chem-E Car Team.
- Inspired 20 active members to join and build a car on weekly rotations and grew club to 70 members within one year
- Competed at Regional Competition in Riverside, CA
- Created research poster for poster competition

CONFERENCES AND PRESENTATIONS

- Ricardo Buarque, Oxana Andriuc, Martin Siron. "Adsorption Workflow for Photocatalysts for CO_2 Reduction." Joint Center for Artificial Photosynthesis Research Conference, Berkeley, CA. 2020, Virtual Poster. *Spring 2020*
- Oxana Andriuc, Martin Siron, Ricardo Buarque. "Adsorption Workflow for Semiconductors." Kavli Institute for Nanoscience Conference, Berkeley, CA. 2020, Poster. *Spring 2020*
- Martin Siron, Michele Lee, Eda Gungor, Andrea M. Armani. "Tuning Cleaving Kinetics of Photo-Responsive Polymers via Solvent-Polymer Interactions." American Institute of Chemical Engineers National Conference, San Francisco, 2016, Poster *Fall 2016*

PUBLICATIONS

- "*Self-Assembly of Two-Dimensional Perovskite Nanosheet Building Blocks into Ordered Ruddlesden–Popper Perovskite Phase"*
  Yong Liu, **Martin Siron**, …, Peidong Yang. Journal of the American Chemical Society, 2019
- *"Lead halide perovskite nanowires stabilized by block copolymers for Langmuir-Blodgett assembly"*
  Hao Liu, **Martin Siron**, …, Peidong Yang. Nano Research, 2020
- *"Lead-free Cesium Europium Halide Perovskite Nanocrystal"*
  Jianmei Huang*, Teng Lei*, **Martin Siron**, Peidong Yang et al. ACS Nano Letters, 2020
- *"An Automated Adsorption Workflow for Semiconductors"*
  Oxana Andriuc, **Martin Sion**, …, Kristin Persson
  *** In preparation*

SKILLS

Programming Languages: Python**,** Java, MATLAB
Computational Materials: VASP, Pymatgen, Atomate, Fireworks
Machine Learning: TensorFlow
Data Analysis: Python with MatPlotLib & Seaborn; R, Origin Pro
Spoken Languages: French (Native), English (Native)