

EDUCATION

University of Minnesota – Twin Cities Minneapolis, MN
Doctor of Philosophy, Chemical Engineering Anticipated Graduation: June 2025
National Science Foundation Graduate Research Fellow
College of Science and Engineering Fellow
Tentative Dissertation Title: Nontoxic Nanomaterials for Photovoltaics in the Built Environment

Drexel University, Pennoni Honors Program, Summa Cum Laude Philadelphia, PA
Accelerated Master of Science in Materials Science and Engineering June 2020
Thesis Title: Optimization of Photodetection Analysis of MXene Thin Films
Bachelor of Science in Chemical Engineering Cumulative GPA: 3.96
Certificate in Technical Communication and Publishing

Ruhr-Universität Bochum Bochum, Germany
Exchange Undergraduate Student in Mechanical Engineering April to June 2018

RESEARCH EXPERIENCE

Ferry and Kortshagen Groups Minneapolis, MN
Graduate Research Fellow *January 2021 to Present*

Advisors: Drs. Vivian Ferry and Uwe Kortshagen

- Build techno-economic model in MATLAB to determine suitability of solar concentrator greenhouses as an agrivoltaic system in different locations by simulating solar energy generation and lettuce growth
- Developed tunable processing technique for passivating silicon nanocrystals (Si NCs) with high photoluminescence quantum yields for solar concentrator applications
- Characterize Si NCs using steady-state and time-resolved PL spectroscopy, FTIR, XRD, and EPR
- Deposited homogenous silicon nitride thin films using rotating stage motor for radiative cooling applications
- Simulated optical performance of luminescent solar concentrators with Monte Carlo ray-tracing MATLAB code

Nanomaterials for Energy Applications and Technology (NEAT) Lab Philadelphia, PA
Undergraduate Research Assistant *April 2017 to June 2020*
Students Tackling Advanced Research (STAR) Scholar *June to August 2016*

Advisor: Dr. Jason B. Baxter

- Investigated mechanisms of $\text{Ti}_3\text{C}_2\text{T}_x$ and $\text{Mo}_2\text{TiC}_2\text{T}_x$ film optoelectronic behavior in response to various stimuli through photoconductivity measurements
- Led research efforts on using Ti-doped hematite thin films synthesized using Successive Ionic Layer Adsorption and Reaction (SILAR) as an enhanced photoelectrochemical water splitter
- Analyzed SbSI microrods as novel pathways for electron transport using UV-Vis, SEM, EDS, and XRD
- Synthesized CuSbS_2 thin films using chemical bath deposition

Emmy Noether Research Group Bochum, Germany
Independent Research Project *April 2018 to June 2018*

Advisor: Dr.-Ing. Markus Richter

- Collaborated in two-member team to study ability of potassium phosphate to absorb carbon dioxide gas and hydrogen gas under various temperatures and pressures
- Used two-sinker magnetic suspension densimeter to collect experimental data and MATLAB to compile results

Johnson & Johnson Consumer, Inc. Fort Washington, PA
R&D Analytical Chemistry Co-op *September 2017 to March 2018*

Advisor: Dr. Michael Breslav

- Developed and executed active pharmaceutical ingredient (API) extraction tests for HPLC analysis
- Designed and conducted heat and humidity stress experiment to determine long-term stress effects on API degradation products
- Supported 5 analytical scientists through diluent, mobile phase, and sample preparation

MENTORSHIP EXPERIENCE

Research Mentorship

- Aquarina Hoanca, *CEMS Undergraduate Researcher* August 2023 to Present
Project: Optimization of LSC Greenhouse HVAC Model in MATLAB
Current Position: Undergraduate Chemical Engineering student at the University of Minnesota
- Andy Chung, *ME3 REU Student* June 2023 to August 2023
Project: From Compost to Carbon Dots: Plasma Synthesis of Carbon Nanodots from Biomass Waste
Current Position: Undergraduate Mechanical Engineering student at Lehigh University
- Adriana Chapez, *MRSEC REU Student* June 2022 to August 2022
Project: Improving the Dispersion of Si/SiO₂ Quantum Dots
Current Position: Undergraduate Mechanical Engineering student at the University of Texas Rio Grande Valley
- Noura Rayes, *ME3 REU Student* June 2021 to August 2021
Project: Increasing the Quantum Yield of Silicon Quantum Dots for Luminescent Solar Concentrators (LSCs)
Current Position: PhD Student in Materials Science and Engineering at the Penn State University

Current Professional Mentorship Program Participation

Formal mentees in Drexel SWE Professional Mentorship, UMN Women in Science and Engineering Initiative Undergrad-Grad Mentorship, UMN CEMS Graduate Student Mentorship Program, UMN Friend in STEM Research Mentorship, virtual Professional Advancement through Career Education (PACE), and GradSWE Mentorship Programs

TEACHING EXPERIENCE

Preparing Future Faculty Program

September 2022 to May 2023

- Co-taught Physics for Fine Arts undergraduate class (designed and presented three lecture/lab activities and assist with weekly labs) at Augsburg University (PUI) under the guidance of Professor Moumita Dasgupta
- Prepared syllabus, teaching philosophy, and diversity statement documents while learning about inclusive pedagogy, universal course design, and classroom assessment techniques through GRAD 8101 class

CHEN 3401W: Junior Chemical Engineering Lab

January 2023 to May 2023

- Assisted three teams of three students in running weekly pilot plant experiments for two class sections
- Utilized Socratic method of asking and answering questions to guide student troubleshooting
- Received Council of Graduate Students (COGS) Outstanding Teaching Assistant Award (student-nominated) and departmental Outstanding Teaching Assistant Award (faculty-nominated)

CHEN 3102: Reaction Kinetics

January 2021 to May 2021

- Proctored exams for students with accommodations from the Disability Resource Center (DRC)
- Graded weekly homework assignments for 99 undergraduate students
- Held weekly office hours and supported two recitation sections a week
- Received departmental Outstanding Teaching Assistant Award (faculty-nominated)

MANUFACTURING EXPERIENCE

Crazy Aaron's Enterprises

Norristown, PA

Materials & Process Engineer Co-op

April 2019 to September 2019

- Tripled production of new product line and served as subject matter expert on business merger
- Authored company-wide lean documentation to reduce defects and to highlight safety precautions
- Developed 4 new inventory items to increase process efficiency, saving over \$30,000 annually
- Researched and developed customizable room-temperature vulcanizing silicone for mass production
- Trained and supervised 6 operators on new techniques, products, and process improvements

Noramco, Inc.

Wilmington, DE

Process Engineering Co-op

September 2016 to August 2017

- Created 5 startup and preconditioning procedures to improve process efficiency and prevent salt formation
- Contributed to 2 new API product introductions by interfacing with operators and developing technical documentation

- Updated and refined batch records for process improvement savings of up to \$200,000 per campaign
- Analyzed lab testing data, equipment trends and charts, batch yield efficiency, and SAP reports for both narcotic yield investigations and process validation reports

PEER-REVIEWED JOURNAL PUBLICATIONS

1. **K.Q. Loh**, K. Harbick, N.J. Eylands, U.R. Kortshagen, V.E. Ferry “Techno-economic Analysis of Luminescent Solar Concentrator Greenhouses for Concurrent Energy Generation and Lettuce Production in the U.S.,” (in preparation).
2. **K.Q. Loh**, H. P. Andaraarachchi, V.E. Ferry, U.R. Kortshagen, “Photoluminescent Si/SiO₂ Core/shell Quantum Dots Prepared via High-Pressure Water Vapor Annealing for Solar Concentrators, Luminescent Devices, and Bioimaging.” *ACS Applied Nano Materials* 6(7) 6444-6453 (2023). DOI: [10.1021/acsanm.3c01130](https://doi.org/10.1021/acsanm.3c01130)

PEER-REVIEWED CONFERENCE PROCEEDINGS

- K.Q. Loh**, M. Dasgupta, “The Forces of Stage Design: An Interdisciplinary Approach to Teaching Normal Force, Frictional Force, and Design Ethics for non-STEM Majors” *Proceedings of the ASEE Midwest Section Conference*, Lincoln, NE, 2023.

POSTER AND ORAL PRESENTATIONS

*Indicates undergraduate research mentee

1. **K.Q. Loh**, K. Harbick, N.J. Eylands, U.R. Kortshagen, V.E. Ferry, (April 2024). *Luminescent Solar Concentrator Greenhouses for Concurrent Energy Generation and Lettuce Production in The United States*. Oral Presentation. 2024 Materials Research Society Spring Meeting & Exhibit. Seattle, WA.
2. **K.Q. Loh**, H.P. Andaraarachchi, U.R. Kortshagen, V.E. Ferry, (September 2023). *Photoluminescent Si/SiO₂ Core/shell Quantum Dots Prepared via High-Pressure Water Vapor Annealing for Solar Concentrators, Luminescent Devices, and Bioimaging*. Student Capsule Presentation. American Vacuum Society (AVS) Minnesota Chapter Symposium, Minneapolis, MN.
3. **K. Q. Loh**, U.R. Kortshagen, V.E. Ferry, (May 2023). *Luminescent Solar Concentration (LSC) Greenhouses: Optimization for Net Zero Energy and Improved Crop Growth*. Poster Presentation. Industrial Partnership for Research in Interfacial & Materials Engineering, Minneapolis, MN.
4. A. Chapa*, **K. Q. Loh**, U.R. Kortshagen, V.E. Ferry, (April 2023). *Improving the dispersion of silicon/silicon dioxide quantum dots*. Poster Presentation. 2023 Materials Research Society Spring Meeting & Exhibit. San Francisco, CA.
5. **K. Q. Loh**, V.E. Ferry, U.R. Kortshagen, (April 2023). *Tunable, high intensity photoluminescence from Si/SiO₂ core/shell quantum dots via high-pressure water vapor annealing*. Oral Presentation. 2023 Materials Research Society Spring Meeting & Exhibit. San Francisco, CA.
6. **K. Q. Loh**, U.R. Kortshagen, V.E. Ferry, (June 2022). *Tunable, high intensity photoluminescence from Si/SiO₂ core/shell nanocrystals for LSCs*. Poster Presentation. Industrial Partnership for Research in Interfacial & Materials Engineering, Minneapolis, MN.
7. **K.Q. Loh**, K. Hantanasirisakul, K. Maleski, Y. Gogotsi, J.B. Baxter, (October 2019). *Understanding Time-Dependent Light-Matter Interactions of Mo₂TiC₂MXene Films*. Poster Presentation. Future Leaders in Chemical Engineering Award Symposium, North Carolina State University, Raleigh, NC. (September 2019). Distinguished Undergraduate Research Workshop, Wayne State University, Detroit, MI.
8. **K.Q. Loh**, M.E. Edley, J.B. Baxter, (February 2018). *SbSI Microrods as a Ferroelectric Solar Cell Absorber Material*. Poster Presentation. SASE Northeast Regional Conference, Stevens Institute of Technology, Jersey City, NJ. **Received 1st Place Prize in Life Sciences Category.** (May 2017). Week of Undergraduate Excellence, Drexel University, Philadelphia, PA. (April 2017) Stanford Research Conference, Stanford University, Stanford, CA. (February 2017). SWE Region E Conference, Syracuse University, Syracuse, NY. **Received 4th Place Prize Overall.** (August 2016). STAR Scholars Summer Showcase, Drexel University, Philadelphia, PA.

SKILLS

Laboratory: Nonthermal plasma nanocrystal synthesis, FTIR, XRD, PLQY, TRPL, EPR, HPLC, SILAR, PEC Testing, UV-Vis, Glove Box

Software: MATLAB, Origin 8, AutoCAD, Fusion 360, Blender, SAP, Trackwise, Empower, Microsoft Office

Foreign language: Conversational Mandarin Chinese, Limited Working Proficiency Spanish, Basic German

SELECTED HONORS AND AWARDS

While at University of Minnesota

Community of Scholars Program (COSP) Travel Grant (\$1000)	August 2023
Letters to a Pre-Scientist (LPS) Certificate of Appreciation for Excellent Explanations	July 2023
Chemical Engineering and Materials Science (CEMS) Departmental Outstanding TA Award	May 2023
Council of Graduate Students (COGS) Outstanding Teaching Assistant Award	April 2023
Council of Graduate Students (COGS) Conference Travel Grant (\$650)	April 2023
CEMS Women+ Group Travel Grant (\$750)	April 2023
CEMS Outstanding Teaching Assistant Award	October 2021
Society of Women Engineers Outstanding Collegiate Member	September 2021
National Science Foundation Graduate Research Fellowship (3 years, \$138,000)	March 2021
College of Science and Engineering Fellowship at UMN (2 years, \$50,000)	February 2020

While at Drexel University

2020 Drexel University College of Engineering (CoE) Undergraduate Commencement Speaker	June 2020
Dean's List (All Terms), Drexel University	September 2015 to June 2020
2020 Drexel University CoE Outstanding Undergraduate Student Award	January 2020
Tau Beta Pi, Engineering Honor Society, Drexel University	December 2019
2019 CBE Undergraduate Student Achievement Award	November 2019
2019 CBE Undergraduate Student Service Award	November 2019
Society of Women Engineers Guiding Star Award (1 of 7 nationally)	February 2019
Supernova Undergraduate Research Fellow, Drexel University	September 2017
Society of Women Engineers Future Leader (SWEFL) (1 of 31 internationally)	June 2017
Kappa Theta Epsilon, Co-op Honor Society, Drexel University	June 2017
Frances Velay Fellow (1 of 8 students), Drexel University (\$3,500)	June 2016
National Achievement Full Tuition Scholarship	September 2015 to June 2020

SELECTED VOLUNTEER SERVICE AND LEADERSHIP POSITIONS

CEMS Department Head Search – Graduate Students and Postdoctoral Scholars

Committee Lead November 2023

UMN President's Emerging Scholars Program Graduate Student Panel

Volunteer August 2023

UMN Eureka! STEM Camp

Polarized Light Art Activity Developer and Volunteer July 2023

SciPride at the Bell Museum

Solar Cell Activity Volunteer June 2023

Letters to a Pre-Scientist

STEM Pen Pal July 2022 to Present

CEMS Graduate Student Recruitment Weekends at UMN

Graduate Life Panel Moderator and Organizer, Airport Travel Coordinator February 2021, 2022, and 2023

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CEMS Women+ Group at UMN

Undergraduate Coordinator (organize one undergrad/grad social event per semester) July 2022 to Present
General Coordinator (organize one social event per semester) September 2020 to June 2021

Science for All at UMN

Webmaster (sfa.cems.umn.edu) July 2022 to Present
General Volunteer (volunteer monthly at local middle schools) July 2021 to Present

Graduate Student Committee (GSC) – Departmental Advocacy and Resource-Sharing Group at UMN

FY-2020 Cohort Representative September 2022 to Present

CEMS Students Organizing Against Racism (SOAR) at UMN

Outreach Team Volunteer and Video Script Writer (Videos [1](#), [2](#), and [3](#)) February 2022 to Present

Council of Graduate Students (COGS) at UMN

Grant Reviewer (various Fall, Spring, and Summer Cycles) September 2020 to Present

Pink Space Theory

[STEM Panel Organizer](#) and Fundraiser, [Webinar Moderator](#), and Grant Writer June 2020 to July 2022

SWE Virtual Congressional Outreach Day

Minnesota Participant and Advocate for STEM Outreach March 2022

Coalition of Asian American Leaders (CAAL) Asian Minnesotans at the Capitol Day

Participant and Advocate for Ethnic Studies in Minnesota Schools March 2022

CovEducation

AP Calculus, AP English, and Middle School Reading Tutor March 2020 to June 2022

Confronting Anti-Asian Racism in CEMS Panel at UMN

Graduate Student Panelist April 2021

College of Engineering at Drexel University

Chair of Joint One-Time Undergraduate Faculty Evaluation Committee September 2019 to January 2020
Recruitment and Outreach Assistant June 2018 to June 2020

PROFESSIONAL AFFILIATIONS AND LEADERSHIP POSITIONS

American Institute of Chemical Engineers

Education Division Communications Committee Member and [Twitter/X](#) Lead December 2022 to Present
Minority Affairs Committee Communications Team Member and [Newsletter](#) Lead April 2020 to July 2021

Materials Research Society (MRS)

Member April 2023 to Present

Society of Women Engineers (SWE)

University of Minnesota
GradSWE Committee Chair March 2021 to July 2022

Societal

Awards Committee Rising Collegiate Star Award Coordinator August 2023 to Present
Awards Judge (various award cycles) March 2021 to Present
Culture & Heritage Lead for Asian Connections Affinity Group July 2022 to July 2023
Community Lead for Asian Connections Affinity Group February 2020 to July 2022
SWENext High School “Day in the Life” Reporter February 2020 to July 2022

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Drexel University
Membership Director
President
Outreach Director

January 2019 to December 2019
January 2018 to December 2018
December 2015 to December 2017

Society of Asian Scientists and Engineers (SASE)

Drexel Chapter Events Coordinator
PR Committee Researcher

June 2018 to June 2019
July 2016 to June 2018

PROFESSIONAL DEVELOPMENT AND CERTIFICATE PROGRAMS

UMN Equity and Diversity Certificate	June 2023
UMN Preparing Future Faculty Program Completion	May 2023
The Inclusive STEM Teaching Project Completion	November 2022
UMN Teaching Assistant Professional Development (TAPD) Program Completion	August 2022
Institute on Teaching and Mentoring Participant	April 2021
GradSWE Mentorship Program Mentee	October 2020 to Present

REFERENCES

Vivian E. Ferry

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