# Kristine Q. Loh

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## EDUCATION

**University of Minnesota – Twin Cities (UMN)** Minneapolis, MN
Doctor of Philosophy, Chemical Engineering Anticipated Graduation: June 2025
*National Science Foundation Graduate Research Fellow* Cumulative GPA: 3.68
*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* Cumulative GPA: 3.96
Bachelor of Science in Chemical Engineering
*Certificate in Technical Communication and* Publishing

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

## TEACHING EXPERIENCE

*University-Level*

**Augsburg University SCI 123: The Science of Food and Cooking** September 2024 to Present
*Adjunct Faculty Instructor*
- Served as Instructor of Record for an interdisciplinary class of non-STEM majors

**UMN MATS 4400: Senior Design Project** January 2024 to May 2024
*Teaching Assistant for Lead Instructor Prof. Vivian Ferry*
- Mentored 4 materials science senior design teams through the engineering design process, including engineering and financial calculations as well as technical communication
- Provided detailed feedback for 4 major reports and presentations, as well as 3 homework assignments

**Augsburg University / UMN Preparing Future Faculty Program** September 2022 to May 2023
*Co-Instructor for Lead Instructor Prof. Moumita Dasgupta*
- Co-taught Physics for Fine Arts undergraduate class (designed and presented three lecture/lab activities and assisted with weekly labs) at Augsburg University (a local Primarily Undergraduate Institution)
- Prepared syllabus, teaching philosophy, and diversity statement documents while learning about inclusive pedagogy, universal course design, and classroom assessment techniques through GRAD 8101

**UMN CHEN 3401W: Junior Chemical Engineering Lab** January 2023 to May 2023
*Teaching Assistant for Lead Instructor Prof. Aditya Bhan*
- Assisted 3 teams of 3 students in running weekly pilot plant experiments for 2 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)

**UMN GCC 3011: Pathways to Renewable Energy** January 2023
*Guest Speaker/Technology Expert for Lead Instructor Prof. Uwe Kortshagen*
- Presented my research on solar greenhouses and served as a technology expert for a team developing a business plan and pitch presentation around solar greenhouses

**UMN CHEN 3102: Reaction Kinetics** January 2021 to May 2021
*Teaching Assistant for Lead Instructor Prof. Matthew Neurock*
- 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 2 recitation sections a week
- Received departmental Outstanding Teaching Assistant Award (faculty-nominated)

*K-12*

**Columbia University Introduction to Engineering** July 2024
*Guest Speaker for Lead Instructor Rebecca Nolan*
- Discussed chemical engineering careers with high-performing high school students

**UMN ASM Camp** July 2024
*Co-Instructor for Lead Instructor Prof. Vivian Ferry*
- Developed and co-led photoresistor activity for 30 high school juniors

**UMN Eureka! Camp** July 2023, 2024
*Co-Instructor for Lead Instructor Prof. Vivian Ferry*
- Developed and co-led polarized light art activity for 30 middle school students

**UMN SciPride** July 2023, 2024
*Solar Cell Activity Co-Lead*
- Developed and co-led polarized solar cell physics activity for over 400 community members

**UMN Science for All** May 2023, 2024
*Field Trip Liquid Nitrogen Activity Lead*
- Developed and led liquid nitrogen ice cream activity for 30 – 50 middle schoolers per day

*Murry Middle School Team Volunteer*
- Developed and led one activity per year while volunteering to support monthly demonstrations for around 35 middle school students

## MENTORSHIP EXPERIENCE

*Research Mentorship*

- Masoumeh Amirifard, *Mechanical Engineering PhD Student* August 2023 to Present
  Project: Quantum Dots for Agricultural Applications
  Current Position: Mechanical Engineering PhD Student at the University of Minnesota
- 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 $Si/SiO_2$ 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 Si 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 SWE Mentor Network, 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

## 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 agrivoltaic systems in different locations by simulating solar energy generation and lettuce growth
- Developed tunable processing technique for passivating silicon nanocrystals (Si NCs) with high photoluminescence (PL) quantum yields for solar concentrator applications
- Characterized Si NCs using steady-state and time-resolved PL spectroscopy, as well as other surface characterization techniques, including x-ray diffraction spectroscopy (XRD), Fourier transform infrared spectroscopy (FTIR), and electron paramagnetic resonance spectroscopy (EPR)
- Deposited homogenous silicon nitride thin films using rotating stage motor for radiative cooling applications

**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 $Ti_3C_2T_x$ and $Mo_2TiC_2T_x$ 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 spectroscopy, scanning electron microscopy, 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

## 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
- 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 procedures to improve process efficiency and prevent salt formation
- Contributed to 2 new products by interfacing with operators and developing technical documentation
- Updated and refined batch records for process improvement savings of up to $200,000 per campaign

## 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/$SiO_2$ 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

## PEER-REVIEWED CONFERENCE PROCEEDINGS

1. **K.Q. Loh,** K. Harbick, N.J. Eylands, U.R. Kortshagen, V.E. Ferry, "Luminescent Solar Concentrator Greenhouses for Concurrent Energy Generation and Lettuce Production in the U.S.," *AgriVoltaics World Conference 2024*, Denver, CO, 2024. (Submitted)
2. **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*, Session 4B: Chemical Engineering Education. Lincoln, NE, 2023.

## CONFERENCE AND SYMPOSIUM PRESENTATIONS

**Indicates undergraduate research mentee*

1. **K.Q. Loh,** K. Harbick, N.J. Eylands, U.R. Kortshagen, V.E. Ferry, (June 2024). *Luminescent Solar Concentrator Greenhouses for Concurrent Energy Generation and Lettuce Production in The United States*. Oral Presentation. 2024 AgriVoltaics World Conference. Denver, CO.
2. **K.Q. Loh,** N.J. Eylands, U.R. Kortshagen, V.E. Ferry, (May 2024). *Luminescent Solar Concentrators for Agrivoltaic Greenhouses in the United States.* Oral and Poster Presentations. Industrial Partnership for Research in Interfacial & Materials Engineering, Minneapolis, MN.
3. **K.Q. Loh,** H. P. Andaraarachchi, V.E. Ferry, U.R. Kortshagen, (May 2024). *Photoluminescent Si/$SiO_2$ Core/shell Quantum Dots Prepared via Plasma Synthesis and High-Pressure Water Vapor Annealing for Solar Concentrators, Luminescent Devices, and Bioimaging*. Poster Presentation. 2024 Dusty Plasma Workshop. Minneapolis, MN.
4. **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.
5. **K.Q. Loh,** K. Harbick, N.J. Eylands, U.R. Kortshagen, V.E. Ferry, (April 2024). *Solar-Powered Greenhouses for the Production of Lettuce and Clean Energy in the United States*. Lightning Talk. 2024 UMN Sustainability Symposium. St. Paul, MN. **Received Graduate Student Lightning Talk Award**.
6. **K.Q. Loh,** H.P. Andaraarachchi, U.R. Kortshagen, V.E. Ferry, (September 2023). *Photoluminescent Si/$SiO_2$ 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.
7. **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.
8. 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.
9. **K. Q. Loh,** V.E. Ferry, U.R. Kortshagen, (April 2023). *Tunable, high intensity photoluminescence from Si/$SiO_2$ core/shell quantum dots* via *high-pressure water vapor annealing.* Oral Presentation. 2023 Materials Research Society Spring Meeting & Exhibit. San Francisco, CA.
10. **K. Q. Loh,** U.R. Kortshagen, V.E. Ferry, (June 2022). *Tunable, high intensity photoluminescence from Si/$SiO_2$ core/shell nanocrystals for LSCs*. Poster Presentation. Industrial Partnership for Research in Interfacial & Materials Engineering, Minneapolis, MN.

11. **K.Q. Loh,** K. Hantanasirisakul, K. Maleski, Y. Gogotsi, J.B. Baxter, (October 2019). *Understanding Time-Dependent Light-Matter Interactions of $Mo_2TiC_2$ MXene 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.
12. **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

## HONORS AND AWARDS

*University of Minnesota*

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|---|---|
| Graduate Student Lightning Talk Award | April 2024 |
| President's Student Leadership and Service Award | March 2024 |
| 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) Outstanding Teaching Assistant (TA) Award | May 2023 |
| Council of Graduate Students (COGS) Outstanding TA Award | April 2023 |
| COGS Conference Travel Grant ($650) | April 2023 |
| CEMS Women+ Group Travel Grant ($750) | April 2023 |
| CEMS Outstanding TA Award | October 2021 |
| Society of Women Engineers Outstanding Collegiate Member | September 2021 |
| National Science Foundation Graduate Research Fellowship (3 years, $138,000 total) | March 2021 |
| College of Science and Engineering Fellowship (2 years, $50,000 total) | February 2020 |

*Drexel University*

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| Drexel University College of Engineering (CoE) Undergraduate Commencement Speaker | June 2020 |
| Dean's List (All Terms), Drexel University | September 2015 to June 2020 |
| Drexel University CoE Outstanding Undergraduate Student Award | January 2020 |
| Tau Beta Pi, Engineering Honor Society, Drexel University | December 2019 |
| Chemical and Biological Engineering (CBE) Undergraduate Student Achievement Award | November 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 (all years) | September 2015 |

## SELECTED VOLUNTEER SERVICE, LEADERSHIP POSITIONS, AND PANEL ENGAGEMENTS

**UMN Graduate Student Committee (GSC) – Departmental Advocacy and Resource-Sharing Group**
FY-2020 Cohort Representative — September 2022 to Present

**UMN CEMS Women+ Group**
Undergraduate Coordinator (organize one UG/G social event per semester) July 2022 to Present
General Coordinator (organize one event per semester) September 2020 to June 2021

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

**UMN Council of Graduate Students (COGS)**
Grant Reviewer (various Fall, Spring, and Summer Cycles) September 2020 to Present

**Letters to a Pre-Scientist**
STEM Pen Pal July 2022 to Present

**UMN President's Emerging Scholars Program Graduate Student Panel**
Panelist July 2024
Volunteer August 2023

**Drexel University Velay Fellows Mentorship Series**
Graduate Student Mentor and Panelist July/August 2021, 2022, 2023, 2024

**UMN CEMS Graduate Student Recruitment Weekends**
Graduate Life Panel Moderator and Organizer, Airport Travel Coordinator 2021, 2022, 2023, and 2024

**CEMS Department Head Search – Graduate Students and Postdoctoral Scholars**
Committee Lead November 2023

**UMN CEMS Advisor Selection Panel**
Moderator September 2021, 2023

**UMN CEMS Students Organizing Against Racism (SOAR)**
Outreach Team Volunteer and Video Script Writer (Videos 1, 2, and 3) February 2022 to July 2023

**UMN ATP-BIO High School Summer Program**
Plasma Lab Tour Guide June 2023

**UMN CEMS Graduate Fellowship Panel**
Panelist representing NSF GRFP September 2021, 2022

**Pink Space Theory**
STEM Panel Organizer and Fundraiser, Webinar Moderator, and Grant Writer June 2020 to July 2022

**ACM-W Women in Tech Symposium**
Graduate Student Panelist April 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

**SWE Early Career Professionals Affinity Group "It's OK to Fail" Workshop**
Panelist January 2022

**UMN Confronting Anti-Asian Racism in CEMS Panel**
Graduate Student Panelist April 2021

**UMN HeForSWE Webinar**
Graduate Student Panelist March 2021

**Drexel Introduce a Girl to Engineering Day (~200 community members)**
Co-organizer February 2020

**Drexel University College of Engineering**

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| 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**

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| 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)**

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| Member | April 2023 to Present |
| Symposium Assistant | April 2024 |

**Society of Women Engineers (SWE)**

*Societal*

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| 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 |

*UMN*

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| GradSWE Committee Chair | March 2021 to July 2022 |

*Drexel University*

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| Membership Director | January 2019 to December 2019 |
| President | January 2018 to December 2018 |
| Outreach Director | December 2015 to December 2017 |

**Society of Asian Scientists and Engineers (SASE)**

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| Drexel Chapter Events Coordinator | June 2018 to June 2019 |
| PR Committee Researcher | July 2016 to June 2018 |

## PROFESSIONAL DEVELOPMENT AND CERTIFICATE PROGRAMS

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| GradSWE Mentorship Program Mentee | October 2020 to Present |
| Northeastern Future Faculty Workshop | July 2024 |
| Teaching Faculty Job Preparation Program | July 2024 |
| Teaching in Globally Diverse Classes Certificate | In Progress (50%) |
| SWE Neuroinclusion Training Program | June 2024 |
| Teaching for Student Well-being Program | May 2024 |
| UMN Equity and Diversity Certificate | June 2023 |
| UMN Preparing Future Faculty Program | May 2023 |
| The Inclusive STEM Teaching Project | November 2022 |
| UMN Teaching Assistant Professional Development (TAPD) Program | August 2022 |
| Institute on Teaching and Mentoring Participant | April 2021 |

## REFERENCES

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