

Kueyoung Kim

The Pennsylvania State University
kuk197@psu.edu
Phone: 814-232-0306

LinkedIn: [Kueyoung Kim](#)
Twitter: [kueyoung_k](#)
ORCID: [0009-0001-7058-705X](#)

Education

B.S. in Chemistry (Minor Mathematics), Penn State (University Park, PA) Cumulative GPA: 4.0/4.0
Schreyer Honors College, Millennium Scholars Program
Expected Graduation: May 2025

Publications

Kim, K. E.*; Xue, W.*; Zarzar, L. D. Liquid-Liquid Surfactant Partitioning Drives Dewetting of Oil from Hydrophobic Surfaces. *Journal of Colloid and Interface Science* **2023**. <https://doi.org/10.1016/j.jcis.2023.12.054>.

- Contribution: identified research question, developed hypotheses, designed and conducted experiments, drew figures, wrote manuscript, communicated with reviewers

Kim, K. E.; Balaj, R. V.; Zarzar, L. D. Chemical Programming of Solubilizing, Non-Equilibrium Active Droplets. *Accounts of Chemical Research* **2024**. <https://doi.org/10.1021/acs.accounts.4c00299>.

- Contribution: directed paper narrative, drew figures, wrote manuscript, communicated with reviewers.

Le, Q. N.*; **Kim, K. E.***; Kaehr, B; Zarzar, L. D. History-Dependent Motility of Self-Propelled Droplets in Ionic Surfactant Solutions (in preparation)

- Contribution: direct paper narrative, design and conduct experiments, image analysis and quantification in Python, draw figures, write manuscript.

* indicates co-first authorship

Awards and Fellowships

National Awards and Fellowships

Rhodes Scholarship Finalist..... **2024**
Undergraduate Award in Analytical Chemistry, ACS Division of Analytical Chemistry
College Chemistry Award, Society for Analytical Chemists of Pittsburgh
MIT Summer Research Program (MSRP)
First Place Poster Award, ACS Fall 2023 Meeting, ACS Division of Colloid and Surface Chemistry..... **2023**
[Goldwater Scholarship, Barry M. Goldwater Foundation](#)
[Max Planck School Matter-to-Life Undergraduate Research Opportunity](#)
UC Berkeley Amgen Scholars Program
NSF Center for the Mechanical Control of Chemistry REU..... **2022**
National Merit Scholarship, The National Merit Scholarship Corporation **2021**

University Awards (Penn State)

["Undergrads in the Lab" Spotlight](#)..... **2024**
Astronaut Scholarship Nomination
Evan Pugh Scholar Award - Senior..... **2023**
Ira M. Lubert Millennium Scholarship
President Walker Award
Dean's List..... **2022**
Schreyer Honors College
Millennium Scholars Program

Eberly College of Science Awards (Penn State)

Joseph A. Dixon Memorial Scholarship in Chemistry **2024**
Aldine Lucille Cech Honors Scholarship
Harry A. Bright Memorial Scholarship in Chemistry

Ethel Senkovits Watts Memorial Scholarship in the Physical Sciences	
Norman Freed Undergraduate Research in the Eberly College of Science Scholarship	2023
Strickler Honors Scholarship	2022
Benkovic Summer Research Award	
First Place Poster (Physical Sciences), Undergraduate Research Symposium	
Doug and Jean LaBoda Scholarship in Science	
Homer Braddock Scholarship	2021

External/Other Awards

Honorable Mention Poster, UPenn Engineering and Applied Sciences Summer Poster Session	2022
Valedictorian, State College Area High School	2021

Research Experience

The Pennsylvania State University **2021–Present**

Advisor: Prof. Lauren Zarzar, Dept. of Chemistry

Undergraduate Research

- Publish a first-author paper on the dynamic wetting properties of surfactant-stabilized oil-in-water emulsions
- Publish a first-author article on the Zarzar Lab's work in active droplets for *Accounts of Chemical Research*
- Investigate history-dependent motility of self-propelled droplets in collaboration with a graduate student. (co-first author; in preparation)
- Skills: microscopy (optical, fluorescence, DIC), fluorescence spectroscopy, surface functionalization, interfacial tension measurement (pendent drop/spinning drop tensiometry, contact angle), OWRK wtheory, CD spectroscopy, Python (image analysis, data visualization)

Massachusetts Institute of Technology **Summer 2024**

Advisor: Prof. Mark Bathe, Dept. of Biological Engineering

MIT Summer Research Program

- Developed a nanoscale DNA origami model to study exciton transport across photosynthetic membranes
- Investigated use of dyes templated in a chiral helix using DNA origami for excitonic charge separation
- Employed prior knowledge of protein purification to successfully purify for DNA origami structures
- Skills: DNA origami fabrication, solid-phase oligonucleotide synthesis, origami purification (agarose gel electrophoresis, size-exclusion chromatography, PEG precipitation), steady-state spectroscopy (UV-vis, excitation, emission, FRET analysis)

Max Planck Institute for Dynamics and Self-Organization **Fall 2023**

Advisor: Prof. David Zwicker, Max Planck Research Group Theory of Biological Fluids

Max Planck School Matter-to-Life Undergraduate Research Opportunities

- Analyzed the use of phase separation (Cahn-Hilliard dynamics) as a thermodynamically consistent model for cell polarization by applying numerical analysis/computational simulations
- Developed 40+ simulation scripts comprising of ~7000 lines of code committed on Github over 10 weeks
- Skills: Python, Jupyter Notebook, Github, complex systems analysis (linear stability, identifying equilibria), numerical simulations (high performance computing cluster), thermodynamics of complex fluids

University of California, Berkeley

Advisor: Prof. Matthew Francis, Dept. of Chemistry

Summer 2023

Amgen Scholars Program

- Explored the use of a biosurfactant derived from an intrinsically disordered protein for micelle-mediated drug delivery to glioblastoma multiforme (brain cancer)
- Optimized protein purification based on technical knowledge from coursework and literature on protein-protein interactions
- Skills: recombinant expression in *E. coli*, protein bioconjugation, tissue culture (human glioblastoma, U251MG), dynamic light scattering (DLS), electrospray ionization quadrupole time-of-flight mass spectrometry (ESI Q-TOF MS), high pressure liquid chromatography (HPLC), ion exchange chromatography (IEX), nickel affinity chromatography (Ni-NTA), fluorescence spectroscopy, dose-response assay

University of Pennsylvania

Summer 2022

Advisor: Prof. Robert Carpick, Dept. of Mechanical Engineering and Applied Mechanics

Center for the Mechanical Control of Chemistry REU

- Spearheaded an independent project on using shear-stress to drive mechanochemical Diels-Alder cycloaddition
- Developed a project proposal including experimental design by referencing literature in tribology, solid mechanics, organic chemistry, and analytical chemistry.
- Skills: atomic force microscopy (contact and tapping modes), surface-enhanced Raman spectroscopy (SERS), time-of-flight secondary ion mass spectrometry (TOF-SIMS), microtribometer, ball-in-disc tribometer (mini traction machine)

Leadership

Science LionPride

2021–Present

President (2024–present)

- As President: lead with executive board to manage all aspects of the organization, overhaul recruitment process incorporating diverse hiring practices, implement organizational restructuring (new communication channels, leadership positions, documentation procedures)
- As Vice President (2023–2024): orchestrate diversity, equity, & inclusion (DEI) efforts for 40+ club members, oversee implementation of club code-of-conduct, mediate interpersonal conflicts within the organization, promote inter-club teamwork and community
- As Alumni and Outreach Director (2022–2023): direct science outreach events at Penn State and in the local community, recruit members to serve and network at Eberly College of Science alumni events, develop and lead professionalism and resume workshops for 20+ club members, organize the annual retreat, present annual report of club activities to Eberly College of Science Alumni Board
- Give tours to prospective students, speak at accepted student programming, provide logistical support at Eberly College of Science alumni events, raise money for pediatric cancer

Science Olympiad at Penn State

2021–24

Event Supervisor

- Spearhead development of chemistry exams and hands-on lab activities for ~1500 high school and 500 middle school students competing at the Science Olympiad at Penn State invitational tournament
- Coordinate logistics for lab activities including creating lab tasks, organizing lab materials and waste, and ensuring proper lab safety

Pennsylvania State Science Olympiad

2022–23

State Supervisor

- Oversaw a hands-on chemistry event for over 4,500 middle school competitors across the state of Pennsylvania
- Created exams and labs for both regional and state level tournaments emphasizing chemical observation and characterization skills
- Designed education modules for coaches across the state to prepare competitors

Teaching

Process Fluid Mechanics (CHE 330) Instructional Assistant

Fall 2022, Spring 2023

Penn State Dept. of Chemical Engineering

- Served as a teaching assistant for ~150 third-year undergraduate chemical engineering students taking junior-level fluid mechanics
- Lectured on microscopic balances (continuity, Navier Stokes Eqn.), held office hours, developed homework and answer keys, organized and hosted exam reviews, graded, and provided feedback on quizzes and exams

Science Outreach and Service

Penn State Chemistry Undergraduate Research Ambassador **2022–Present**

- Speak to ~75 first-year chemistry majors at Penn State on getting involved in undergraduate research
- Advise 6 students interested in undergraduate research on identifying suitable research mentors

STEM Undergraduate Research Symposium **2023, 2024**

State College Area High School

- Proposed, coordinated, and hosted an undergraduate research symposium composed of a poster session and a Q&A for high school students in collaboration with Penn State and State College Area School District administration
- Focused on recruiting diverse presenters from a wide range of disciplines to encourage current high schoolers to pursue STEM careers regardless of their background

Invited Speaker, Penn State Millennium Scholars Program **2024**

- Individually led a workshop on applying for awards and fellowships to 120+ underrepresented STEM undergraduates in the Millennium Scholars Program

Invited Panelist, Penn State Spark Program **2024**

- Spoke to ~30 first and second-year students about my experience in undergraduate research and applying for fellowships

Invited Guest Research Lecture **2024**

State College Area High School, Chemistry and Physics Club

- Communicated work from the Zarzar Group to use emulsions as soft active materials to high school students interested in pursuing STEM careers

Photochemistry and Fluorescence Outreach **2023**

Park Forest Elementary School

- Led 3rd and 4th grade students through a hands-on art activity involving fluorescent inks created from turmeric

Microfluidics Outreach **2023**

State College Area High School, AP Physics C Classes

- Designed and led a short-term outreach program in collaboration with Prof. Gina Noh introducing high school students to microfluidics and basic concepts in fluid mechanics
- Fabricated microfluidic chips with shrinky-dink thermoplastics and developed a hands-on lab to visualize laminar flow, stagnation points, and Fickian diffusion of dyes

Penn State HauntedU **2022**

Penn State Eberly College of Science

- Planned and directed a short Halloween themed outreach experiment exploring the dissolution and diffusion of dyes in M&Ms targeting both children and adults

Eberly College of Science Parents Weekend Research Tours **2022**

Penn State Eberly College of Science

- Proposed, organized, and led research tours informing parents of various undergraduate research opportunities available at Penn State

Catalysis Outreach **2022**

State College Area High School

- Crafted a hands-on multi-day outreach program for ~30 middle school students with Prof. Gina Noh exploring how chemical reactions are currently being used to improve sustainability

Presentations

- “Constructing a DNA origami model for energy transport across photosynthetic membranes”** 2024
Poster, MIT Summer Research Program Symposium
- “Modeling cell polarization as membrane-bound phase separation”** 2023
Oral Talk, Max Planck Matter-to-Life Undergraduate Research Opportunities Fall Meetup
- “Multi-timescale contact line dynamics of sessile oil droplets arising from aqueous surfactant partitioning”**
Poster, ACS Fall 2023 Conference (First Place, COLL Division)
- “Modification of an intrinsically disordered protein sequence for micelle-mediated drug delivery to glioblastoma multiforme”**
Poster, UC Berkeley Amgen Scholars Poster Session
Oral Talk, UC Berkeley Amgen Scholars Research Symposium
- “Using shear stress to drive Diels-Alder cycloaddition”** 2022
Poster, ACS Spring 2023 Conference
Poster, Eberly College of Science Undergraduate Research Poster Exhibition (First Place, Physical Science)
Poster, ACS Central PA Local Section Poster Symposium
Poster, Center for the Mechanical Control of Chemistry REU Poster Session
Poster, UPenn School of Engineering and Applied Science REU Symposium (Honorable Mention)
- “Control of dewetting sessile droplets via surfactant partitioning”**
Poster, livMatS meets LiMC² 2.0, Penn State & University of Freiburg

Workshops and Professional Development

- ACS Catalysis Summer School 2022
Penn State Chemistry Summer Professional Development Program
Penn State Diversity in STEM Conference

Languages

English (Native), Korean (Native), Spanish (B1)