HANNAH COLLINS, M.S., E.I.T.

Ph.D. Student and Graduate Research Assistant at Arizona State University
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ASU Profile | Google Scholar | ORCID | Handshake | LinkedIn | YouTube

SUMMARY

Industrious and methodical environmental engineering student and researcher whose mission is to improve environmental quality by remediating contaminated air, land, and water using microorganisms. Passed Arizona State University's Ph.D. Comprehensive/Qualifying Exam on February 24, 2025.

RESEARCH AND OCCUPATIONAL INTERESTS

- Environmental Engineering
- Environmental Biotechnology
- Bioremediation

EDUCATION

Arizona State University
8/2019 – Present
Civil, Environmental, and Sustainable Engineering, Ph.D.
Expected Graduation: 2027
GPA: 4.00
Civil, Environmental, and Sustainable Engineering, M.S. 2023
GPA: 3.93
Environmental Engineering, B.S.E. 2022
GPA: 3.58 | Cum Laude

Community Service and Extracurricular Activities:

- Active member of the Arizona State University Graduate Student Government
- Founded the Arizona State University Student and Researcher Peer Support Club on March 14, 2024 to mentor students and student-researchers
- Notetaker for classmates with disabilities
- Engineering Projects in Community Service participant from 8/2022 to 12/2022
- Active member of the Society of Water and Environmental Leaders (SWEL)
- Active member of the University Graduate Council as the Graduate Student Representative

Academic and Research Awards and Honors:

- 3/26/2025: Awarded a SUN Award by my lab group's Laboratory Coordinator, Kassandra Kellenberger, in recognition of "[doing] the work of a whole team," "[taking] the lead on helping with lab clean-up efforts," and "[contributing] to the success of everyone in the shared space."
- 12/23/2024: Nominated by Arizona State University to engage in a discussion about water management in Arizona with Estelle Brachlianoff, CEO of Veolia, a $49 billion company at the forefront of climate change and water access solutions
- 11/15/2024: Awarded a University Graduate Fellowship from Arizona State University for the Spring 2025 semester
- 8/13/2024: Awarded a Fulton Schools Graduate Scholarship from Arizona State University for the Fall 2024 semester

- 8/2/2024: Nominated by the President of Arizona State University's Graduate Student Government to be the Graduate Student Representative on Arizona State University's University Graduate Council
- 6/21/2024: Awarded the 2024-2025 Phoenix/Scottsdale Groundwater Contamination Scholarship for Environmental Science in recognition of my groundwater contamination research achievements
- 6/12/2024: One of seven students selected to represent Arizona State University at the 2024 Environmental Science & Engineering Summer School at Tongji University in Shanghai, China from 8/15/2024 to 8/21/2024
- 5/30/2024: Served on the Arizona State University Summer Research Initiative Ph.D. Panel to answer questions about my Ph.D. and research journey
- 4/5/2024: 1st Place Poster Award, 18th Biennial Symposium on Managed Aquifer Recharge
- 1/23/2024: Awarded a Fulton Schools Graduate Scholarship from Arizona State University for the Spring 2024 semester
- 1/20/2024: Awarded an FE Exam Award in recognition of passing the Fundamentals of Engineering (FE) Environmental Exam before graduating with my master's degree
- 1/4/2024: Awarded an Engineering Graduate Fellowship from Arizona State University for the Spring 2024 semester
- 12/13/2023: Received highly competitive Arizona State University School of Sustainable Engineering and the Built Environment Fulton Fellowship Award for top Ph.D. students
- 7/26/2023: 1st Place Poster Award, Arizona State University Summer Research Initiative Symposium
- 7/26/2023: Arizona State University Summer Research Initiative Ph.D. Fellowship
- 2/17/2023: 2nd Place Poster Award, Arizona State University Graduate Research Symposium
- 1/2023: Awarded funding from Arizona State University's Master's Opportunity for Research in Engineering program
- 12/12/2022: Received the Arizona State University Environmental Engineering Leadership & Service Award based on nominations by faculty members
- 11/2022: Selected to be a Student Speaker at the Arizona State University Fall 2022 Fulton Undergraduate Research Initiative/Master's Opportunity for Research in Engineering Symposium based on nominations by faculty mentors
- 1/2022 and 8/2022: Awarded funding from Arizona State University's Fulton Undergraduate Research Initiative program
- 1/2022: Accepted into Arizona State University's 4+1 Accelerated Bachelor's Plus Master's Civil, Environmental, and Sustainable Engineering program
- 7/2021, 7/2022, and 7/2023: Awarded funding from Arizona State University's Summer Research Initiative program
- Made the Dean's List for the Fall 2019, Spring 2021, Fall 2021, and Fall 2022 semesters

Chandler-Gilbert Community College
8/2018 – 5/2020
A.A. and A.S.
GPA: 3.70
Community Service and Extracurricular Activities:
- Student-athlete (head pitcher on the softball team)
- Study-abroad student (Ireland, 5/31/2019 – 7/1/2019)
- Maricopa Community Colleges Global Leadership retreat participant
- Notetaker for classmates with disabilities

Academic awards and honors:
- Phi Theta Kappa member
- Presidents' Honors Scholarship recipient
- National Junior College Athletic Association Academic All-American
- President's Honor List

Athletic awards and honors:
- Arizona Community College Athletic Conference DII Pitcher of the Week
- All-Region DII Team – Pitcher
- All Arizona Community College Athletic Conference 2nd Team – Pitcher

RESEARCH AND WORK EXPERIENCE

Rittmann Lab, Biodesign Swette Center for Environmental Biotechnology, Arizona State University
9/2021 – 12/2021 (Undergraduate Research Volunteer), 12/2023 – Present (Graduate Research Assistant)
Employer: Bruce Rittmann, Ph.D.
Projects:
Biodegradation of Per- and Polyfluoroalkyl Substances (PFAS)
Tasks:
- Conducted literature reviews to determine the knowledge gaps, challenges, and prospects of biodegradation of perfluorooctanoic acid (PFOA, $C_8HF_{15}O_2$), perfluorooctanesulfonic acid (PFOS, $C_8HF_{17}O_3S$), and perfluorohexanesulfonic acid (PFHxS, $C_6HF_{13}O_3S$)
- Currently doing experiments to see if reactive oxygen species (ROS) produced by microalgae can defluorinate perfluorooctanoic acid (PFOA, $C_8HF_{15}O_2$), perfluorobutane sulfonate (PFBS, $C_4HF_9O_3S$), and hexafluoropropylene oxide dimer acid (HFPO-DA, $C_6HF_{11}O_3$, also known as Gen-X)

Hazardous Materials Treatment in Membrane Biofilm Reactors
Tasks:
- Collected and assayed samples from membrane biofilm reactors to analyze their effectiveness in removing nitrate (NO_3^-) and perfluorooctanoic acid (PFOA, $C_8HF_{15}O_2$) from water
- Aided in writing the introduction section of paper that was accepted by *Chemical Engineering Journal* on March 4, 2025 (title: Advanced Intermittent Air Delivery in a Membrane Biofilm Reactor Achieves Full Biodegradation of a Quaternary Ammonium Compound)

United States Department of Agriculture, Muenich Lab, and Hamilton Lab, Biodesign Center for Environmental Health Engineering at Arizona State University – Physical Scientist, Research Assistant, and Mentor
5/2021 – 12/2023
Employers: Rebecca Muenich, Ph.D. and Kerry Hamilton, Ph.D.
Project: **Movement and Quantification of *Escherichia coli* in a Managed Aquifer Recharge Site**
Tasks:
- Conducted soil column experiments to analyze *Escherichia coli* transport in the environment
- Quantified *Escherichia coli* in surface water sources
- Organized and led field work events at the study site
- Applied rigorous quality assurance and control measures to uphold valid protocols, methods, and data integrity for all experiments
- Implemented aseptic techniques in all experimental procedures
- Mentored undergraduate students interested in laboratory research
- Regularly cleaned and organized laboratory benches and spaces

- Regularly presented research progress and findings at conferences, symposiums, and committee meetings to peers, colleagues, and the public, highlighting the risks of *Escherichia coli* exposure through surface and groundwater, and advocating for sustainable water management practices
- Wrote an applied project report detailing the findings and implications of my research

Arizona Department of Environmental Quality – Intern
2/14/2022 – 9/1/2023
Employer: Paula Panzino, Chief Science Officer
Projects:
Per- and polyfluoroalkyl substances (PFAS) database project
Tasks:
- Manually entered data into spreadsheets to contribute to the Arizona Department of Environmental Quality's PFAS database for PFAS present in statewide drinking water sources
- Created a data management standard work for the creation of a Geographic Information System (GIS) mapping application to depict and support evaluation of the presence of PFAS substances in Arizona's environment
- Updated a workbook with the most recent developments in PFAS regulations, media developments, and research in the areas of remediation and toxicological advancements
- Supported the Arizona Department of Environmental Quality's mission to protect and enhance public health and Arizona's unique environment

Vertical separation distance between bottom of dispersal unit and water table in onsite wastewater treatment systems to reduce or eliminate pathogens in groundwater
Tasks:
- Conducted literature review on scientific research of onsite wastewater treatment systems, fecal contamination, and water quality
- Determined knowledge gaps regarding appropriate vertical separation distances based on sound science

Removing Heavy Metals from Abandoned Mines
Tasks:
- Conducted a literature search of mitigation methods for removing metals from abandoned mine adits and stormwater runoff
- Shared relevant literature with Arizona Department of Environmental Quality colleagues to provide critical knowledge and information for environmental remediation at abandoned mine adits

Heavy Metals at a Wastewater Treatment Plant
- Conducted background research on heavy metal concentrations at a wastewater treatment plant
- Created a heavy metals mass balance spreadsheet for the plant

Contaminants of Emerging Concern
- Researched contaminants of emerging concern regulations in each of the 50 United States, tabulated them, and shared them with Arizona Department of Environmental Quality and nationwide colleagues
- Used Zotero to create citations and bibliographies for white papers about contaminants of emerging concern for the Interstate Technology and Regulatory Council (ITRC)

LICENSES AND CERTIFICATIONS

- 9/2023: Engineer-In-Training, Arizona State Board of Technical Registration
- 8/2023: Fundamentals of Engineering Environmental Exam, National Council of Examiners for Engineering and Surveying

SCHOLARSHIP, FELLOWSHIP, AND GRANT AWARDS

- 11/15/2024: University Graduate Fellowship, Arizona State University
- 8/13/2024: Fulton Schools Graduate Scholarship, Arizona State University
- 7/18/2024: Fulton Experiential Learning Grant, Arizona State University
- 6/21/2024: 2024-2025 Phoenix/Scottsdale Groundwater Contamination Scholarship for Environmental Science, Arizona State University
- 2/15/2024: Environmental Professionals of Arizona Scholarship, Environmental Professionals of Arizona
- 1/23/2024: Fulton Schools Graduate Scholarship, Arizona State University
- 1/4/2024: Engineering Graduate Fellowship, Arizona State University
- 12/13/2023: Fulton Fellowship, Arizona State University
- 7/26/2023: Summer Research Initiative Ph.D. Fellowship, Arizona State University
- 5/19/2023: Trent R. Dames and William W. Moore Fellowship, American Society of Civil Engineers
- 4/14/2023: N. G. Kaul Memorial Scholarship, New York Water Environment Association, Inc.
- 8/2020: Transfer Student Award, Arizona State University
- 7/2019: Military Order of the Purple Heart Scholarship, Military Order of the Purple Heart
- 8/2018: Presidents' Honors Scholarship, Chandler-Gilbert Community College

PUBLICATIONS

Zheng, Chen-Wei, YenJung Sean Lai, Yi-hao Luo, Everett Eustance, Maya Suzuki, Hannah Collins, Christopher Muse, and Bruce E. Rittmann. 2025. "Advanced Intermittent Air Delivery in a Membrane Biofilm Reactor Achieves Full Biodegradation of a Quaternary Ammonium Compound." *Chemical Engineering Journal* 509 (April):161301. https://doi.org/10.1016/j.cej.2025.161301.

ACADEMIC AND CONFERENCE PRESENTATIONS

Project: **Movement and Quantification of *Escherichia coli* in a Managed Aquifer Recharge Site**

- 7/25/2024: Maricopa County Waterborne Disease Task Force meeting
- 4/25/2024: AZ Water Association Conference
- 4/12/2024: Arizona State University Biodesign Fusion Scientific Retreat
- 4/4/2024: Biennial Symposium on Managed Aquifer Recharge
- 4/2023: Arizona State University Master's Opportunity for Research in Engineering Symposium
- 2/28/2023, 2/26/2024: Environmental Professionals of Arizona Student Poster Competition
- 2/17/2023, 2/16/2024: Arizona State University Graduate Research Symposium
- 11/2022: Student Speaker speech at Arizona State University Fulton Undergraduate Research Symposium
- 10/27/2022: American Society of Civil Engineers/American Society of Highway Engineers State Conference
- 4/2022, 11/2022: Arizona State University Fulton Undergraduate Research Initiative Symposium
- 7/2021, 7/2022, 7/2023: Arizona State University Summer Research Initiative Symposium

PROFESSIONAL MEMBERSHIPS

- American Association for the Advancement of Science
- American Society of Civil Engineers
- Arizona Hydrological Society
- AZ Water Association Young Professionals Committee
- Environmental Professionals of Arizona

- Environmental and Water Resources Institute
- Order of the Engineer
- Society of Water and Environmental Leaders (Arizona State University Chapter of AZ Water Association)
- Society of Women Engineers

SKILLS

- Mentoring
- Microsoft Office
- Oral and written communication
- Organization and attention to detail
- Problem solving
- R programming language
- Research (literature review, laboratory experiments, field work, and data analysis, input, and verification)
- Teamwork
- Water quality analysis