RACHELLE ANNE REHBERG

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EDUCATION

PH.D. ANALYTICAL CHEMISTRY | **MARCH 2022** | **COLORADO STATE UNIVERSITY** **2016 – PRESENT**
Cumulative GPA: 3.65

BACHELOR OF SCIENCE, CHEMISTRY | **MAY 2016** | **WASHINGTON STATE UNIVERSITY** **2012 – 2016**
Cumulative GPA: 3.31

RESEARCH EXPERIENCE

GRADUATE RESEARCH | **COLORADO STATE UNIVERSITY** **2016 – PRESENT**
SUPERVISOR: DR. THOMAS BORCH

Citrus Greening in Florida: The main focus is to better understand the fate, transport, and application of pesticides as well as psyllid insect behavior and resistance to develop methods that reduce the risk of infection in Florida's citrus trees. Psyllids spread the Candidatus Liberibacter bacteria, infecting the citrus trees with Citrus Greening disease, or Huanglongbing (HLB). There is no cure for HLB, thus trees and whole groves are often abandoned once infected. My research focuses on developing methods to analyze pesticide application and effectiveness in order to establish a sustainable citrus production. This includes investigating pesticide application methods, pesticides present on and within leaves, ag water reuse, irrigation, contaminants in nearby water sources, as well as psyllid death. These pesticide, psyllid, and crop health results will inform the agricultural community of better management practices.

Plant Uptake in Wheat: Solid Liquid Extraction (SLE) and Liquid Chromatography Tandem Mass Spectrometry (LC-MS/MS) were used to extract, detect, and quantify organic contaminants (hydraulic fracturing additives) taken up in various components of wheat irrigated with synthetic treated produced water (STPW). Linsey Shariq provided the wheat kernels, stems, and soil samples from a greenhouse study performed at UC Davis.

Wheat Immune Response: I assisted Yuheng Qiu with his master's proof of concept project looking at the immune response of wheat plants irrigated with treated produced water (TPW). Greenhouse grown wheat crops were irrigated with various dilutions of TPW and exposed to varying pathogens. Sample results showed if wheat plants are weakened to respond to pathogens due to irrigation with TPW.

Instrument Trainings/Experience: LC-MS-QQQ, LC-MS-QTOF, GC-MS/MS, DART-MS, FTIR, ICP-MS, SEM, TGA, XPS

UNDERGRADUATE RESEARCH | **WASHINGTON STATE UNIVERSITY** **2015 – 2016**
SUPERVISOR: DR. JIM BROZIK

PROFESSIONAL EXPERIENCE

RESEARCH ASSISTANT (RA) | **COLORADO STATE UNIVERSITY CHEMISTRY DEPARTMENT, DR. THOMAS BORCH LAB** **2016 – PRESENT**

- Perform research on pesticide application methods to understand the impacts on psyllids and spreading citrus greening disease
- Investigate pesticide application methods, pesticide concentration on and within citrus leaves, and psyllid survival rates
- Develop and implement field sampling and instrumental analysis methods for environmental samples
- Analyze pesticide concentrations with LC-QQQ and statistical analysis with R to quantify pesticide application efficacy to establish a sustainable citrus production
- Research water irrigation systems and reuse to analyze contaminants in nearby water sources
- Schedule and perform field work, coordinate crop sample management with citrus farmers, and discuss changes in pesticide applications
- Communicate best management practices to industry partners and the greater agricultural community
- Develop and deliver presentations on pesticide application research to scientific community and non-technical audiences
- Write and contribute to proposals, annual reports, research updates, and manuscripts for publication
- Collaborate with research assistants and universities on a greenhouse gas emissions study of wheat kernels, stems, and soil samples
- Use Solid Liquid Extraction (SLE) and Liquid Chromatography Tandem Mass Spectrometry (LC-MS/MS) to sample organic contaminants
- Extract, detect, and quantify hydraulic fracturing additives in wheat components irrigated with synthetic treated produced water (STPW)
- Develop strong understanding and first-hand experience using various analytical instrumentation and analysis techniques
- Manage weekly hazardous waste inspections and proper disposal to comply with environmental regulations
- Implement safety talks and communicate best practices with lab personnel
- Manage and execute acquisition requests for lab supplies and equipment
- Coordinated and executed an 8-month-long facility upgrade and lab move project
  - Improved instrumentation arrangement, managed equipment inventory, coordinated with vendors for facility maintenance and repairs
  - Coordinated follow-up lab expansion project, developed project management plan including instrument and sample storage plan

TEACHING ASSISTANT (TA) | **COLORADO STATE UNIVERSITY CHEMISTRY DEPARTMENT** **2016 – 2021**

- Provide instruction for laboratory and recitation courses, facilitate support hours, and perform administrative responsibilities
- Develop course website, syllabus, lecture materials, and student assignments
- Prepare exam review materials and conduct review sessions, proctor and grade exams

PRIVATE TUTOR | **COLORADO STATE UNIVERSITY CHEMISTRY DEPARTMENT** **2016 – 2020**

- Provided tutoring services to undergraduate students in general chemistry on a weekly and bi-weekly basis

UNDERGRADUATE RESEARCH ASSISTANT | **WASHINGTON STATE UNIVERSITY CHEMISTRY DEPARTMENT** **2015 – 2016**

- Provided assistance to graduate students and principal investigator
- Developed understanding of graduate level research initiatives and luminescent spectroscopy instruments
- Presented senior undergraduate research on "Determining Parameters for a Markov Model of P2X1 That Includes Photochemical Processes"

ORGANIC STOCKROOM EMPLOYEE | **WASHINGTON STATE UNIVERSITY CHEMISTRY DEPARTMENT** **2015 – 2016**

- Provided inventory management and maintained equipment quality and location
- Developed initial inventory system for approximately 8K chemistry stockroom chemicals and equipment
- Supervised lab courses and prepared solutions and chemicals for organic chemistry lab use

VICE PRESIDENT MEMBERSHIP RECRUITMENT | **WASHINGTON STATE UNIVERSITY PANHELLENIC ASSOCIATION** **2014 – 2015**

- Developed WSU Sorority Formal Recruitment schedule, activities, and processes for 1,000 active participants
- Facilitated monthly meetings and events for recruitment planning teams and constituents
- Provided leadership and communication to stakeholders, university personnel, sorority alumnae, and recruitment chairpersons

HARVEST OPERATOR | **WATTS BROTHERS FARMS** **SUMMER 2013 | SUMMER 2014**

- Operated farm equipment and facilitated proper machinery function harvesting pea crop
- Developed hard work ethic and leadership skills while working 16-hour shifts in extensive heat

EXTRA-CURRICULAR ACTIVITIES

MEMBER | **AMERICAN CHEMICAL SOCIETY** **2020 – PRESENT**

- Participate in conferences, networking, and other professional development opportunities

MEMBERSHIP DIRECTOR | **COLORADO STATE UNIVERSITY, SOIL AND CROP SCIENCE GRADUATE STUDENT COUNCIL** **2019 – 2021**

- Engage incoming graduate students and provide campus resources, facilitate welcome events, and promote mentorship opportunities

GRADUATE WOMEN IN SCIENCE MEMBER | **NORTHERN COLORADO CHAPTER** **2017 – 2022**

- Participate in networking events with women in various science graduate programs at CSU
- Attend seminars with distinguished speakers, workshops, and routine meetings to increase science knowledge and experience
- Volunteer as a judge for community science fairs

TRI DELTA ALUMNAE MEMBER | **FORT COLLINS, CO** **2016 – PRESENT**

- Provide support to the local collegiate chapter through facilitating meetings and events with alumnae
- Coordinate fundraisers and volunteer in the community

ORDER OF OMEGA MEMBER | **PULLMAN, WA** **2015 – PRESENT**

- Participate in bi-weekly Greek honor society meetings and events

LEADERSHIP POSITIONS | **FORT COLLINS AREA TRI DELTA HOUSE CORPORATION** **2016 – 2021**

Treasurer (2018-2021), Vice President (2017-2018), HC Member (2016-2021)

- Managed $500K budget, processed timely payments, reimbursements, annual tax documentation, prepared budgets and reports
- Managed facility maintenance projects and improved Chapter property through vendor research, evaluations, and approvals
- Facilitated major property restoration through insurance claim process and crisis management
- Served as liaison and provided communication between the House Corporation and collegiate Chapter

TRI DELTA REPRESENTATIVE & EVENT MANAGER | **FORT COLLINS AREA ALUMNAE PANHELLENIC ASSOCIATION** **2018 – 2020**

- Develop and coordinate scholarship fundraiser event for collegiate and alumnae scholarship funds
- Represent Tri Delta Fraternity at monthly Panhellenic Association meetings and plan community and collegiate activities

RHO GAMMA & SELECTION COMMITTEE MEMBER | **WASHINGTON STATE UNIVERSITY PANHELLENIC ASSOCIATION** **2014 – 2015**

- Assisted with Sorority Formal Recruitment and guided a team of 25 Potential New Members through the recruitment process
- Participated in the selection process for the 2015 Rho Gammas through conducting interviews and evaluations of over 100 women

LEADERSHIP POSITIONS | **DELTA DELTA DELTA FRATERNITY** | **PULLMAN, WA** **2012 – 2015**

Nomination Committee Chairman (2015), House Manager (2014-2015), Risk Manager (2014), Chapter Correspondent Assistant (2013), active member (2012-Present)

- Coordinated and executed officer slating process and transition
- Served as the liaison and provided communication to stakeholders including chapter members, Housing Director, and Housing Corporation
- Managed property maintenance and safety protocols and provided leadership to subsequent committees
- Implemented risk management plan and coordinated fire safety plans, achieved the Health and Safety Award for Risk Management in 2014
- Supervised the well-being of Chapter members and assisted with internal and external Greek Organization correspondents

CHEMISTRY CLUB MEMBER | **WASHINGTON STATE UNIVERSITY** | **PULLMAN, WA** **2012 – 2015**

- Organized outreach and networking events, including Parent Weekends and school visits for guests and potential students

- Promoted WSU and the Chemistry Department during school visits and provided resources to interested parties and the public

RESIDENCE HALL GOVERNMENT FLOOR REPRESENTATIVE | **WASHINGTON STATE UNIVERSITY GANNON GOLDWORTHY** **2012**

- Participated in routine residence hall meetings, conducted floor inspections, and assisted with social and financial decisions
- Coordinated residence hall events and networking activities

HONORS, AWARDS, AND SCHOLARSHIPS

CSU GRAD SHOW GREAT MINDS IN RESARCH AWARD, 1ST PLACE	**2021**
BOBBIE DOUGLAS ALUMNA SCHOLARSHIP	**2019 – 2020**
3-MINUTE LIGHTNING TALK WINNER	**2019**
WSU REGENTS SCHOLARSHIP AWARD	**2012 – 2016**
WSU FUTURE COUGARS OF COLOR SCHOLARSHIP AWARD	**2012 – 2016**
WASHINGTON STATE POTATO FOUNDATION/BOISE PAPER SCHOLARSHIP AWARD	**2012 – 2016**
MIKE HARPER LEADERSHIP SCHOLARSHIP AWARD	**2012 – 2016**
WSU COLLEGE OF ENGINEERING SCHOLARSHIP AWARD	**2012 – 2013**
VALEDICTORIAN	**2012**
ENERGY SOLUTIONS SCHOLARSHIP AWARD	**2010 – 2016**

RELATED PRESENTATIONS

PHD DISSERTATION DEFFENSE | COLORADO STATE UNIVERSITY	**MARCH 10, 2022**
SEMINAR PRESENTATION, VIRTUAL | UTAH STATE UNIVERSITY	**FEBRUARY 25, 2022**
CSU GRAD SHOW POSTER AND PRESENTATIONS, VIRTUAL | COLORADO STATE UNIVERSITY	**NOVEMBER 8-10, 2021**
SEMINAR PRESENTATION, VIRTUAL | COLORADO STATE UNIVERSITY	**MAY 5, 2021**
ACS MEETING PRESENTATION, VIRTUAL | COLORADO STATE UNIVERSITY	**APRIL 7, 2021**
SEMINAR PRESENTATION, VIRTUAL | COLORADO STATE UNIVERSITY	**FEBRUARY 25, 2021**
RESEARCH SEMINAR POSTER, VIRTUAL | COLORADO STATE UNIVERSITY	**OCTOBER 28, 2020**
CSU SPEAKS PRESENTATION, VIRTUAL | COLORADO STATE UNIVERSITY	**OCTOBER 24, 2020**
3-MINUTE LIGHTNING TALK | COLORADO STATE UNIVERSITY	**NOVEMBER 7, 2019**
ORAL CANDIDACY EXAM | COLORADO STATE UNIVERSITY	**JULY 18, 2018**
LITERATURE SEMINAR PRESENTATION | COLORADO STATE UNIVERSITY	**OCTOBER 4, 2017**
WSU DEPARTMENT OF CHEMISTRY SENIOR POSTER | WASHINGTON STATE UNIVERSITY	**APRIL 29, 2016**

PUBLICATIONS

Rehberg, R., Trivedi, P., Dooley, G., Hageman, K., Stokes, S., Borch, T. “Dissipation rates and effectiveness of malathion, imidacloprid, and dimethoate at controlling Asian citrus psyllids in field conditions.” (*In progress. Plan to submit to ACS Agricultural Science and Technology)*. **2022**.

Rehberg, R., Trivedi, P., Dooley, G., Bahureksa, W., Sharp, J., Hageman, K., Borch, T. “Afidopyropen efficacy and degradation within a citrus greening disease infected grove.” *(Submitted to Pest Management Science)*. **2022**.

Menger, R.F., **Rehberg, R**., Trivedi, P., Henry, C.S., Borch, T. “High spatial resolution fluorescence imagery for optimized pest management within a Huanglongbing-infected citrus grove” *Phytopathology.* **2021**.

Rehberg, R., Trivedi, P., Bahureksa, W., Sharp, J., Stokes, S., Menger, R., Borch, T. “Quantification of insecticide spatial distribution within individual citrus trees and efficacy through Asian citrus psyllid reductions under different application methods.” *Pest Management Science*. **2021**.

Shariq, L., McLaughlin M., **Rehberg R**., Miller, H., Blotevogel J., Borch T. “Irrigation of wheat with select hydraulic fracturing chemicals: evaluating plant uptake and growth impacts.” *Environmental Pollution*. **2020.**

SKILLS

- Excellent oral and written communication
- Strong leadership and collaborative character
- Presenting scientific information to non-technical audiences
- Developing and conducting field sampling projects
- Trained instrumentation skills: LC-QQQ, LC-QTOF, GC-MS/MS, DART-MS, FTIR, ICP-MS, SEM, TEM, TGA, XPS
- Familiarity with R, Python, Mass Hunter, MassLynx
- Microsoft Office Suite (Excel, Word, PowerPoint, etc.)