

Win Cowger Curriculum Vitae

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Education

- 2021 PhD. Program in Environmental Science Soil and Water,
University of California at Riverside
(3.62 GPA)
- 2015 BS Environmental Science, Iowa State University
(3.93GPA) & Honors Program Graduate
- 2013 Associate of Arts in Liberal Arts, Hawkeye Community College
(4.0 GPA)
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Employment

Research Scientist, Moore Institute for Plastic Pollution Research

Oct. 2021 – Current

Leading research on plastic pollution, applying for grants, publishing peer reviewed papers, collecting field and lab based data.

Graduate Student Researcher, University of California at Riverside

Jul. 2017 – Oct. 2021

I research plastic pollution, specifically source allocation of plastic pollution with an emphasis on fluvial transport dynamics. I collect field data, conduct lab experiments, write grants, orchestrate collaborations, present at conferences, and develop process-based models. I apply my science to real-world problems by collaborating closely with nonprofit and government groups to develop my research priorities.

Contract Data Scientist, 5 Gyres

June 2017 – Sept. 2020

I analyze and compile large datasets to answer questions about mismanaged waste for 5 Gyres Institute. Some examples of questions are: What are the most common types of litter in the United States and Where are hotspot sources and sinks of plastic pollution to the marine environment in South East Asia?

Founding Member, Plant Prudent

Feb 2017 – Aug 2018

I founded a small business focused on developing web based tools to help people grow plants wisely. Our beta tool is out now which helps Iowa land owners determine the most suitable species of trees to plant on their land based on soil type. See: <http://arcgis.is/0y9nb>

Senior GIS Analyst, Prudenterra

Feb 2016 – Current

I research the feasibility of utilizing advanced GIS functions for Prudenterra, a company that specializes in sustainable agriculture and conservation consulting. Promoted to Senior GIS Analyst on July 2017 and hours cut to 5 hours or less per week during graduate school. I lead a small team of GIS analysts.

Organic Farm Environmental Specialist, Cradle to Grave Farms

Feb. 2016 – Dec. 2016

Provided technical GIS and environmental management planning assistance to an organic hop, barley, honey, chicken, and tomato farm. Directly managed hop and tomato fields and chickens.

Crew Leader, Conservation Corps of Minnesota and Iowa

Feb. 2016 – Dec. 2016

I led a team of 5 conservation workers that traveled around the Midwest. We worked with professionals in Fish and Wild Life Service, The Nature Conservancy, National Parks Service, and various state and county conservation agencies. I coordinated projects, submitted time sheets, project reports, and expense reports. My crew controlled invasive plant species with power tools and herbicide, built board walks, maintained fences, and mapped work using GPS and GIS. I volunteered for a one-month disaster relief effort where I built a phone application for FEMA to quickly find resources for survivors.

Crew Member, Conservation Corps of Minnesota and Iowa

May 2015 – Dec. 2015

Worked with the Polk County Conservation Board to upkeep parks by removing invasive species using power tools and/or herbicide, built trails and stairs, and harvested prairie seeds. I volunteered for a disaster relief effort for two weeks where I was the database manager for the volunteer reception center.

Research Assistant, Iowa State University, Supervised by Dr. Soupir & Dr. Cademartiri

Jan. 2014 – May 2015

Worked with a similar freedom to a graduate student to develop a chemical assay for quantifying bacteria in water and developed a device to concentrate bacteria from fresh water sources. Worked in a biological lab doing colony counts, growth curves, and filtration. Worked in a chemical lab creating chemical combinations, testing pH, and working with enzymes.

ASC Tutor in Algebra, Geometry, and Calculus, Iowa State University

Sept. 2013 – Dec. 2013

Tutored college and high school math courses in Algebra, Geometry, and Calculus to groups ranging from 1-5 people.

Service

University

Graduate Student Association Member, Environmental Science Department, UCR

June 2019 – Current

Graduate student association member in my department. Expanded inclusivity, diversity, and transparency within our department and advocated for the graduate students.

President of the Soil and Water Conservation Club, Iowa State University

Dec. 2013 – Dec. 2014

Led meetings, and planned activities and speakers. Presented with a groundwater flow model to children and professionals to teach the basics of groundwater flow.

Magazine Editorial Committee Member “Getting into Soil and Water”

Aug. 2013 – May 2014

Contacted authors, edited their submissions, and found sponsors.

CALS Ambassador Iowa State University

Sept. 2013 – May 2015

Led tours for the College of Agriculture and Life Sciences to prospective students. Planned training and social events for the Ambassador group.

Nonprofit Organizations

Vice President Moore Institute of Plastic Pollution Research

Sept. 2020 – Current

I am a board member for the institute serving this institute that focuses on plastic pollution research.

Data Science and IT Adviser, Let’s Do It World, Estonia

Sept. 2017 – June 2020

I guide data management, data collection, and emerging IT for Let’s Do It World. I advised creating the World Waste Platform, a data sharing and visualization platform for all waste data worldwide.

5 Gyres Research Adviser

June 2018 – Current

Assist with research priorities, writing manuscripts, and developing software tools.

The Longest Swim Methods Adviser

2018

Advised on methods for ocean litter monitoring during a swim across the pacific ocean.

National Cleanup Day Science Adviser

Dec. 2019 – Current

Advise on the availability and use of data for reporting about the problem of litter pollution and cleanup.

Government Organizations

California EPA Microplastics in Drinking Water Regulation Adviser

2019

Reviewed definition of microplastics for regulation in drinking water.

EPA Trash Methods Adviser

2018

Reviewed trash monitoring methods for an EPA workgroup.

TeamMates Mentor, Waterloo IA

Oct. 2012 – May 2013

Mentored a fifth-grader once a week to encourage him to be the best that he could be.

Professional Societies

AGU Thriving Earth Exchange, Science Partner, Pinole CA

Jan. 2021 – Current

Worked with AGU to mentor a workgroup composed of city officials and nonprofit groups, on how to collect data on trash in streams to inform management and policy making. Gave hands-on field training and data analysis services.

AGU Thriving Earth Exchange, Science Partner, Staunton VA

May 2019 – June 2020

Worked with AGU to mentor a nonprofit group, Shenandoah Green, on how to collect microplastic data. Visited them in Staunton, VA to give hands-on field training.

Reviewing Manuscripts

Environmental Science and Pollution Research: 1

Applied Spectroscopy: 2

Science of the Total Environment: 2

Environmental Science and Technology: 2

ACS Omega: 1

Nature Scientific Reports: 1

Society Memberships

American Geophysical Union, 2018-Current

SETAC North America, 2018-Current

SETAC Southern California Chapter, 2018-Current

Working Groups

Team Member, Pacific Northwest Microplastic Consortium
2020 – Current

Team Member, SCCWRP, Bight 2018 Trash Monitoring Team, Southern California
2017 – Current
Planning and implementation of the regional trash monitoring in streams around Southern California.

Microplastics Methodology Working Group, SCCWRP and Horiba, Southern California.
2019 – Current
Developing standard operating procedures and writing review manuscripts for microplastic pollution.

Trash Monitoring Work Group, Waterboards, California.
2019 – Current
Led a group of government employees, private professionals and nonprofit groups to develop tools for improving the quality and utility of trash data.

Ocean Litter Strategy, Ocean Protection Council, California.
2018 – Current
Led action items for Ocean Protection Council to improve chemical analysis of trash and develop databases.

Marine Litter Hotspot Methodology Working Group, United Nations, China.
2018
Reviewed a litter methodology on an expert panel with the United Nations in China.

Skills

Computer Software Competencies

Languages:

R

Visual Basic

HTML

CSS

Python

Java Script

Docker

Software:

Image J
QGIS
Inkscape
ArcMap
ArcGIS Online and GeoApps
Microsoft Office Suite
Google Suite
Agricultural Conservation Planning Framework (ACPF)
Stella
Amazon AWS EC2

Lab Hardware Competencies

Raman Microscope
FTIR ATR
FTIR Focal Plane Array
Fluorescence Microscope
Particle Size Analyzer
Fluorescence Spectrophotometer

Field Measurement Competencies

Discharge measurement
Grab sampling
Ocean neuston sampling
Stream particulate sampling
Land surveying
Drone flying
Infiltration measurement

Certificates

NSF ICorps Innovat'R Business Discovery 2020
Lab Safety Training UCR, Aug. 2017
Commercial Herbicide Applicator, Feb. 2016
Wildland Fire Fighter Type II, Feb. 2016
General Lab Safety ISU, Jan. 2015
Defensive Driving Course, May 2015
FEMA Trainings ICS and NIMS, May 2015
Protecting Human Research Participants NIH Training, Feb. 2014
IOWATER Training, Nov. 2013

Presentations

Commer

Platform

Maximizing the Value of Environmental Microplastics Data, U of Waterloo, 2021 **Invited**
“Reporting Guidelines to Increase the Reproducibility and Comparability of Microplastic Research”

SFEI Clean Water Group, 2021 **Invited**
“Watershed transport processes of anthropogenic litter”

Pacific Northwest Microplastic Workgroup, 2021 **Invited**
“Big Trash Data Sets and Applications”

Trash Webinar Series, 2021 **Invited**
“Big Trash Data Sets and Applications”

Civic Science Workshop, 2021 **Invited**
Panel discussion on civic science.

SETAC Europe Meeting, 2021 **Invited**
“Reporting Guidelines for Increasing the Comparability and Reproducibility of Microplastic Research”

ThermoFisher Global Microplastic Symposium, 2021 **Invited**
“Open Source Raman and IR Spectroscopy, Paving the Future for Spectral Analysis using Artificial Intelligence”

SCRIPPS-RADY OCEAN PLASTIC POLLUTION CHALLENGE, 2021 **Invited**
“Trash Data Tools”

Socal SETAC Meeting, 2020 **Invited**
“Open Specy: An open source, online, spectra classification and sharing tool for plastic pollution research”

American Geophysical Union, 2020
“Concentration-Discharge Relationships of Plastic Pollutants in Streams”

Dr. Watson's Lab Seminar, 2020 **Invited**
“Processes of Fluvial Plastic Pollution Transport and Community Science”

Staunton City Council Working Session, 2019 **Invited**
“Plastic pollution in Staunton”

Sustainable Shenandoah, James Madison University, 2019 **Invited**
“A discussion on plastic pollution.”

Grad Slam, 2019

"R Clean Community"

Undergraduate Environmental Science Club UCR, 2019 **Invited**

"Life of a graduate student"

Santa Ana River Symposium, 2019

"R Clean Community"

SciX Conference, 2019

"Open Specy: An open source, online, spectra classification and sharing tool"

Solutions Summit, 2019 **Invited**

"Global trends in plastic pollution research"

North America SETAC, 2019

"How to sample microplastics in streams"

Southern California SETAC Conference, 2019

"Are Microplastic Methods Comparable and Do They Reflect Reality?"

California Water Data Symposium, 2019

"A Call for Open Access to Trash Data"

AI For Good, 2019, Geneva Switzerland

Coauthored Kristiina Kerg, Kris Haamer, Win Cowger, "WADE an AI Trash Detection Algorithm".

Clean World Conference, 2019 **Invited**

"Policy implications of waste data".

American Geophysical Union, 2018

"Are Microplastic Methods Comparable and Do They Reflect Reality?"

North America SETAC Conference, 2018

"Are Microplastic Methods Comparable and Do They Reflect Reality?"

International Marine Debris Conference, 2018

Lead a session on big data in marine debris science that combined lectures with a panel discussion. Presented in a session about the role of open data in marine debris with Let's Do It World.

Clean World Conference, 2018

Panel discussion "Development of the World Waste Platform"

Apps for Ag Hackathon, 2017

Developed and presented a suite of spatial tools and business model for a business that utilizes urban land for agriculture, pays landowners for underutilized land, beautifies neighborhoods, and combats food deserts.

Project AWARE, 2016

Presented: “Where did the trash you’ve cleaned up come from? A more productive future for stream cleanups.”

Posters

SETAC Europe Meeting, 2021

“Open Specy : An Open Source Online Tool for Raman and FTIR Spectral Analysis of Microplastics and Beyond”

American Geophysical Union, 2019

“Estimating Riverine Microplastic Flux by Accounting for Transport Dynamics”

North America SETAC, 2019

Coauthored Hannah Hapich, Win Cowger, “Twitter Reveals Public Conversation Around Plastic Pollution”

LA Watershed Symposium, 2018

“Are Microplastic Methods Comparable and Do They Reflect Reality?”

Wildland Urban Interface Conference UCR, 2018

“Environmental Relevance in a Sea of Plastic”

GIS Day Conference UCR, 2018

“R Clean Community”

Southern California SETAC Conference, 2018

“Environmental Relevance in a Sea of Plastic”

GIS Day Conference UCR, 2017

“CleanupOurWorld: Opensource Mismanaged Waste Database with Visualization”

Iowa Water Conference, 2015

Oklahoma State Student Water Conference, 2015

Publications

Peer-reviewed articles

Win Cowger, Zacharias Steinmetz, Andrew Gray, Keenan Munno, Jennifer Lynch, Hannah Hapich, Sebastian Pimpke, Hannah De Frond, Chelsea Rochman, Orestis Herodotou. Microplastic Spectral Classification Needs an Open Source Community: Open Specy to the Rescue! 2021. *Analytical Chemistry*.

Win Cowger, Andrew Gray, James Guiling, Brandon Fong, Kryss Waldschläger. Concentration Depth Profiles of Microplastic Particles in River Flow and Implications for Surface Sampling. 2021. *Environmental Science and Technology*.

Win Cowger, Andy M. Booth, Bonnie M. Hamilton, Clara Thaysen, Sebastian Pimpke, Keenan Munno, Amy L. Lusher, et al. 2020. "Reporting Guidelines to Increase the Reproducibility and Comparability of Research on Microplastics." *Applied Spectroscopy* 74 (9): 1066–77.

Win Cowger, Andrew Gray, Silke H. Christiansen, Hannah DeFrond, Ashok D. Deshpande, Ludovic Hemabessiere, Eunah Lee, et al. 2020. "Critical Review of Processing and Classification Techniques for Images and Spectra in Microplastic Research." *Applied Spectroscopy* 74 (9): 989–1010.

Waldschläger, Kryss, Maximilian Born, **Win Cowger**, Andrew Gray, and Holger Schüttrumpf. 2020. "Settling and Rising Velocities of Environmentally Weathered Micro- and Macroplastic Particles." *Environmental Research*, September, 110192.

Pimpke, Sebastian, Silke H. Christiansen, **Win Cowger**, Hannah De Frond, Ashok Deshpande, Marten Fischer, Erika Holland, et al. 2020. "EXPRESS: Critical Assessment of Analytical Methods for the Harmonized and Cost Efficient Analysis of Microplastics." *Applied Spectroscopy*, April, 3702820921465.

Cowger, W., Gray, A. B., & Schultz, R. C. (2019). Anthropogenic litter cleanups in Iowa riparian areas reveal the importance of near-stream and watershed scale land use. *Environmental Pollution*, 250, 981-989.

Cowger, W., Gray, A. B., Eriksen, M., Moore, C., & Thiel, M. (2019). Evaluating wastewater effluent as a source of microplastics in environmental samples. *MICROPLASTICS IN WATER AND WASTEWATER*, 109.

Kang, Y., Zhao, Z., Magdy, A., **Cowger, W.**, & Gray, A. (2019, November). Scalable Multi-resolution Spatial Visualization for Anthropogenic Litter Data. In *Proceedings of the 27th ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems* (pp. 560-563).

Zhao, Z., Kang, Y., Magdy, A., **Cowger, W.**, & Gray, A. (2019, April). A Data-Driven Approach for Tracking Human Litter in Modern Cities. In *2019 IEEE 35th International Conference on Data Engineering Workshops (ICDEW)* (pp. 69-73). IEEE.

In Review

Win Cowger, Andrew Gray, Jacqueline Santiago, et al. Urban litter is a local issue and needs local solutions-using receipts as tracers of litter origin

Win Cowger, Andrew Gray, et al. What the Flux? Floating Macroplastic Concentration-Discharge Relationships Reveal Source and Transport Processes

Hannah Hapich, **Win Cowger**, Andrew Gray, et al. Trash Taxonomy: Harmonizing Classification Systems Used to Describe Trash in the Environment

Thesis

Cowger W, Schultz R. 2015. "The Bhagsu Clean Watershed Project", Iowa State University, Honors Program, Honors Project Records, RS 3/3/3, Special Collections Department, Iowa State University Library.

Other Publications

"3 Ways Littering Hurts Humans Too". Cleanup News. 2020.
<https://www.cleanupnews.org/home/litter-hurts-humans-too>

"5 Myths About Plastic Pollution Debunked". Cleanup News. 2020.
<https://www.cleanupnews.org/home/5-plastic-pollution-myths-debunked>

"World Cleanup Day 2018 Waste Report", Let's Do It World. 2018.
https://www.letsdoitworld.org/wp-content/uploads/2019/01/WCD_2018_Waste_Report_FINAL_26.01.2019.pdf

"A letter from the President" in Getting into Soil and Water Magazine, 2015

Minnesota and Iowa Conservation Corps Blogger, 2015

Acknowledgments in Publications

Kathryn Munster, An Analysis of Citizen Science and its Effects on Marine Plastic Pollution, 2019. Undergraduate Thesis, Syracuse University.

Coffin S, Dudley S, Taylor A, Wolf D, Wang J, Lee I, et al. Comparisons of analytical chemistry and biological activities of extracts from North Pacific gyre plastics with UV-treated and untreated plastics using in vitro and in vivo models. Environ Int. 2018 Dec 1;121:942–54.

BAN List 2.0, 5 Gyres et al., 2018

Brand Audit 2020. Break Free From Plastic. 2020.
<https://www.breakfreefromplastic.org/wp-content/uploads/2020/12/BFFP-2020-Brand-Audit-Report.pdf>

In the News

“Tiny Robots Could Clean Up Microplastic Pollution” Scientific American. 2021.
<https://www.scientificamerican.com/article/tiny-robots-could-clean-up-microplastic-pollution/>

“Scientist Spotlight: Disrupting the scientific “echo chamber”” AGU Thriving Earth Exchange. Summer 2021.
https://thrivingearthexchange.org/scientist-spotlight-disrupting-the-scientific-echo-chamber/?mkt_tok=OTg3LUIHVVC01NzIAAAF-ZA61CY9HcfTv6w_GRI72WV2dN-C6IIC7TulJEBqFlz5Upbly0WTCYHvEx2zWtHHyRsAki4OdiK0C1W7MI2UxZfDuk8K-JI4sU-Yvzw

“Ocean Innovators”. ECO Magazine. Spring 2021.
<http://digital.ecomagazine.com/publication/?m=9890&i=696698&p=48&ver=html5>

“Trash Data Treasure: Hunting for Solutions to Plastic Waste”. SCRIPPS-RADY OCEAN PLASTIC POLLUTION CHALLENGE. 2020. <https://cmhc.ucsd.edu/blog-trash-data-treasure/>

“Win Cowger's Research On Trash in Iowa's Waterways” KHOI Public Radio. 2019.
<https://khoifm.org/node/2119>

“The Ocean Cleanup's 'Interceptor' Aims to Clean 1,000 Rivers in 5 Years. Will It Work?” Ecowatch. 2020.
<https://www.ecowatch.com/ocean-cleanup-interceptor-2645510058.html>

“Plastic waste pollution in the ocean: technology at the tipping point” 2018. Christine Evans Pughe. Engineering and Technology Magazine.
<https://eandt.theiet.org/content/articles/2018/05/plastic-waste-pollution-in-the-ocean-technology-at-the-tipping-point/>

“A voyage to humankind’s largest creation – the North Pacific Garbage Patch” 2018. Let’s Do It World.

“Monitoring for Clean Beaches.” 2019. NOAA MDP Blog.
https://blog.marinedebris.noaa.gov/monitoring-clean-beaches?utm_medium=email&utm_source=GovDelivery

“UNESCO prizewinner uses AI tool to detect and collect trash worldwide” 10 July 2019. UNESCO Press Release. <https://en.unesco.org/news/unesco-prizewinner-uses-ai-tool-detect-and-collect-trash-worldwide>

Funding

Funding Source, amount of funding, and individual/org receiving funds.

Summer 2020 – Summer 2021

Dissertation Year Fellowship (\$14,400) (Personal)
S. Sue Johnson Endowed Graduate Award (\$2,500) (Personal)
UCR Office of Technology Partnerships (\$2,500) (Personal)

Summer 2019 – Summer 2020

Discretionary funding National Marine Sanctuaries and NOAA (\$6,000) (UCR)
Renew Oceans (\$6,000) (UCR)
UCR Office of Technology Partnerships (\$1,000) (Personal)
NOAA Marine Debris Grant (\$350,000) (UCR)
Benioff Ocean Institute (\$1,000,000) (UCR, Renew Oceans)
California Waterboards (\$100,000) (UCR)
Solutions Summit (\$1,000) (Personal)
Ocean Plastic Leadership Summit (\$3,000) (Personal)
GSA Travel Grant (\$800) (Personal)

Summer 2018 – Summer 2019

Microsoft Artificial Intelligence Development (\$40,000) (Let's Do It World)
Microsoft AI for Earth Grant (\$16,776) (Let's Do It World)
UC Riverside Undergraduate Summer Learn and Earn (\$1,960) (UCR)
Let's Do It World, Clean World Conference, Estonia (\$1,200) (Personal)
United Nations Working Group, Hotspots of Marine Litter (\$1,500) (Personal)
SETAC North America Competitive Travel Grant (\$500) (Personal)
GSA Travel Grant (\$700) (Personal)

Summer 2017- Summer 2018

National Science Foundation Graduate Research Fellowship (\$138,000) (Personal)
Chancellors Distinguished Fellowship (\$40,000) (Personal)
East China Normal University Plastic Hotspot Working Group, China (\$1,500) (Personal)
Algalita Pacific Gyre Research Voyage (\$500) (Personal)
Let's Do It World, Clean World Conference, Estonia (\$450) (Personal)
CSIRO Research Travel Grant, Australia (\$500) (Personal)
GSA Travel Grant (\$1,400) (Personal)

Fall 2014 - Spring 2015

Oklahoma Student Water Conference Travel Scholarship (\$250) (Personal)

Undergraduate Honors Program Grant (\$750) (Personal)
Iowa Soil and Water Conservation Society Scholarship (\$500) (Personal)
Phi Theta Kappa Scholarship (\$1000) (Personal)
Fred Foreman Scholarship in Leadership Participation (\$1000) (Personal)

Fall 2013 - Spring 2014

Iowa State Agronomy Travel Fellowship (\$1250) (Personal)
Phi Theta Kappa Scholarship (\$1000) (Personal)

Fall 2012 - Spring 2013

McElroy Minority Scholarship (\$2500) (Personal)

Fall 2011-Spring 2012

McElroy Minority Scholarship (\$1250) (Personal)

Awards

Outstanding Student Presentation Award, AGU 2019
3rd place in coauthored poster competition, GIS Day, University of California Riverside, 2019
2nd place in poster competition, GIS Day, University of California Riverside, 2018
2nd place in poster presentation competition, Iowa Water Conference, 2015
3rd place, NACTA Soil Judging Competition, 2015
Highest Viewed Blog Post, Conservation Corps of Minnesota and Iowa, 2015
