

ISSUE 21 : SPRING 2022

OPEN RIVERS :

RETHINKING WATER, PLACE & COMMUNITY

# WOMEN & WATER : CALLING



<http://openrivers.umn.edu>

An interdisciplinary online journal rethinking water, place & community  
from multiple perspectives within and beyond the academy.

ISSN 2471-190X

The cover image of Ann Raiho with a canoe, is courtesy of Natalie Warren.

Except where otherwise noted, this work is licensed under a [Creative Commons Attribution-NonCommercial 4.0 International License](https://creativecommons.org/licenses/by-nc/4.0/). This means each author holds the copyright to her or his work, and grants all users the rights to: share (copy and/or redistribute the material in any medium or format) or adapt (remix, transform, and/or build upon the material) the article, as long as the original author and source is cited, and the use is for noncommercial purposes.

*Open Rivers: Rethinking Water, Place & Community* is produced by the [University of Minnesota Libraries Publishing Services](https://www.lib.umn.edu/) and the [University of Minnesota Institute for Advanced Study](https://www.umn.edu/ia/).

## Editorial Staff

### Editor

Laurie Moberg, Institute for Advanced Study,  
University of Minnesota

### Administrative Editor

Phyllis Mauch Messenger

### Editorial Assistant

Natalie Warren  
PhD Candidate, Communication Studies,  
University of Minnesota; Institute for Advanced  
Study, University of Minnesota

### Media and Production Manager

Joanne Richardson, Institute for Advanced Study,  
University of Minnesota

## Contact Us

### *Open Rivers*

Institute for Advanced Study  
University of Minnesota  
Northrop  
84 Church Street SE  
Minneapolis, MN 55455

Telephone: (612) 626-5054

Fax: (612) 625-8583

E-mail: [openrvrs@umn.edu](mailto:openrvrs@umn.edu)

Web Site: <http://openrivers.umn.edu>

ISSN 2471-190X

## Editorial Board

### Jay Bell

Soil, Water, and Climate, University of Minnesota

### Tom Fisher

Minnesota Design Center, University of  
Minnesota

### Mark Gorman

Policy Analyst, Washington, D.C.

### Jennifer Gunn

History of Medicine, University of Minnesota

### Katherine Hayes

Anthropology, University of Minnesota

### Nenette Luarca-Shoaf

Lucas Museum of Narrative Art

### David Naguib Pellow

Environmental Studies, University of California,  
Santa Barbara

# CONTENTS

## Introductions

Introduction to Issue 21 By Laurie Moberg, Editor .....	4
--	---

## Features

Mariners, Makers, Matriarchs: Changing Relationships Between Coast Salish Women & Water By Alexandra M. Peck .....	7
Collaboration for a Common Goal By Mollie Aronowitz, Jennifer Terry, Ruth McCabe, and Mary Beth Stevenson .....	30
How the River Moves Us: Women Speak Their Story By Victoria Bradford Styrbicki .....	52

## Geographies

Floodplains and Hurricanes: Mapping Natural Disasters to Uncover Vulnerable Communities By Kristin Osiecki .....	73
---	----

## In Review

On Rivers, Women, and Canoes By Natalie Warren and Phyllis Mauch Messenger .....	82
---	----

## Perspectives (Peer Review)

The Summit of STEM: Navigating the Uneven Terrain By Ayooluwateso Coker .....	96
--	----

## Perspectives

Water as Weapon: Gender and WASH By Becky L. Jacobs .....	103
Women Landowners and the Language of Partnership Needed for Water Quality Change By Linda Shenk, Jean Eells, and Wren Almitra .....	110

## Primary Sources

Time and Trauma By Anindita Sarkar .....	118
---	-----

## Teaching and Practice (Peer Review)

Co-creating a Learning Refugia by Walking Alone and Together By Marijke Hecht, Michelle King, and Shimira Williams .....	122
---	-----

PERSPECTIVES (PEER REVIEW)

# THE SUMMIT OF STEM: NAVIGATING THE UNEVEN TERRAIN

By Ayooluwateso Coker

*Editor's note: This Perspectives article has been peer reviewed.*

I dug my ankles into the bright sand following my aunt's instructions. She laughed and said, "This is so the ocean won't snatch you!" I smiled but wondered what she meant. We were on a beach on the coast of Nigeria peering at the Atlantic Ocean. The waves drew nearer and

rushed past my buried ankles. And then I felt it: the pull of the waves as the water drew back, as if it were alive. I squealed as the force made me grab tighter to my aunt's hand. Peals of laughter reverberated through my body as I met the ocean for the first time at three years old.



*Mt. Stem by Digba Coker, 2022. Image courtesy of Digba Coker.*

## The Source

Water has always been a part of my story, but before telling my story we must look further back—to the story of my beloved parents. My father and mother are from Nigeria, but they chose to leave their network of support to provide a better opportunity for their children. I saw where my parents grew up, and I etched my initials into the clay walls of the house my father called home. I saw the land where my father and his friends used to play under the cocoa leaves. I

listened as my parents and relatives reminisced about memories from before my time. I spoke to my relatives in our beautiful mother tongue, its singsong qualities painting our conversations with decorative accents. Seeing the comfort, camaraderie, and support my parents left for me and my siblings was baffling. *You left this, all of this for me?* So, what choice do I have then, but to do better than those who came before me?

## The Inflow

My parents instilled in me a love of learning that I carry with me to this day. “Always be inquisitive,” my father would state, “and ask why.” I started to learn cursive at the age of three and was in the adult fiction section at the library by the age of seven. My father also introduced me to reading.

“This book will take you places!” The sky-blue cover of *Hawaii* by James Michener gleamed as he described the tales within.<sup>[1]</sup> He taught me to visualize as I read, diving into stories that transported me around this world and to others. My mother taught me patience and how to think



*Start Line* by Digba Coker, 2022. Image courtesy of Digba Coker.

critically. “You’ll answer these questions at the end of each chapter. You can even read the questions first, and search for those answers while you read.” I clutched *The Black Arrow* and nodded, accepting the challenge.[2] My inquisitiveness went beyond the covers of books, too. I spent my childhood outdoors exploring the natural prairies in Illinois and surveying the diversity of animals at the manmade pond by our home. I’d spend hours taking notes and sketching creatures that would approach the oasis.

As I continued through primary and secondary school, my joy for learning grew, but alongside it was the question I’d been asked since I was seven: What do I want to be? At first, I chose my mother’s profession, but she knew me too well. “Don’t choose because you think it is what I want to hear. You must choose for yourself.” So, this question brewed in my mind with a new framework. Time went by. I finally realized my passion as I was speaking with my aunt about a course I took in high school. By this point I was attending a community college, completing my general education requirements, and playing on the

## Still Waters Run Deep

Graduate school is teaching me so much about myself, and especially my name. Names are important. Just ask taxonomists who spend years—decades even—on classifying organisms correctly. Names have meaning and carry weight. When I got to graduate school, I was faced with a choice. I could either make it easier for everyone else in the room to say my name or stand proud in my culture and history; they can learn my name just like they can learn how to pronounce deoxyribonucleic acid and phenolphthalein. But I was afraid and I wanted to fit in, so I chose to make it easier for others.

When I started preparations for the next steps after graduate school, this choice appeared again.

tennis team. “Environmental science was so fun!” I told her. “We learned about different topics and aspects of the field.”

“You know,” she replied, “you can major in Environmental Science at university.” I did just that after obtaining my associate degree. I went on to receive my bachelor of science degree in conservation and environmental science. Then my father’s business led him to the University of Wisconsin School of Freshwater Sciences. “Cool research is being done with zebrafish, and I immediately thought of you. Perhaps you could study water in graduate school.” All I knew about graduate school at that point was that it was expensive. It wasn’t until I spoke with an advisor at the African American Advising Center at my undergraduate university that I learned of the different funding options and resources available. I could even be paid during graduate school! I learned this information during the second semester of my junior year of undergraduate studies. My senior year was filled with courses and applications to master’s programs. I was accepted and something new was on the horizon.

I could continue with my nickname or provide my full name. I thought of my mother’s advice: “Don’t choose because you think it is what I want to hear. You must choose for yourself.” I signed the email I sent to potential Ph.D. programs as follows:

Best,

Ayooluwateso

Names in my culture are a proclamation and mine means “I am an ornament of joy in God’s eyes.” Every time someone says my name it is a decree and a reminder of who I am. My name: a word that invokes so much meaning behind it.

During graduate school, students learn more about themselves and their research than they ever knew was possible. I spent hours in the lab to address a research question that was inspired by a section of a research paper I read. *How are sediments transported from storm runoff impacting algal blooms in Lake Superior?* I spent weeks crafting a hypothesis with my advisor's guidance. From there, I collected samples from

the field either alone or with the lab manager or an undergraduate lab assistant. Once, as we were knee deep in the rich red clay of the Nemadji River, we heard a pair of coyotes. They lost interest in us but reappeared to gaze at us for only a moment before scampering off. I sacrificed countless weekends to spend time in the lab using an in-depth protocol to uncover the story my samples were trying to tell me.

## Rough Waters

Endless hours writing and analyzing samples in the lab was not the most difficult part of graduate school, however. It was walking into a class and seeing that, yet again, no one else looks like me. It was walking into a room and knowing I must fight twice as hard to disprove any underlying biases people might have of me. It was when comments were made that weren't necessarily targeted at me, but that impacted me because I was the only black woman in the room, lecture hall, or meeting.

The scariest moment was learning about what happened to George Floyd. My hands shook as my parents and relatives called nonstop to check in because he was murdered by police and it happened right here in Minnesota. I didn't leave my apartment for a week after his murder, and when I finally did, fear clutched my heart whenever I saw a police car driving down the street. I was petrified and I was hours from my family. My parents just wanted me to come home, but I let them know that I was safe. For weeks, I was always home before sundown. Floyd's murder was a moment that reverberated around the globe. Now, more than a year later, when I reflect on those events, I wonder about where we are. What has changed? Discussions titled "Diversity, Equity, and Inclusion" and committees led by the solitary BIPOC faculty in a department? These conversations are the first step, yes, but as we move further away from the day Floyd died, we

grow further away from any meaningful action being taken.

The lack of diversity in Science, Technology, Engineering, and Math (STEM) was described as a leaky pipeline in the film *Picture a Scientist*.<sup>[3]</sup> To me, the issue is more like an open faucet that has been shut off from another valve, a seemingly free flowing environment but with obstacles that strongly hinder progress behind the scenes. The issue with the lack of diversity in STEM was shown when the black female scientist in the film told of her experiences through choked words and tears streaming down her face. I was shocked as I wiped my own tears while listening to another Black female scientist, a woman of color, articulate so eloquently what she went through and what all Black female scientists go through. Barriers are set in place for people like her—and me—not to succeed. The numbers don't lie. According to the National Science Foundation, less than 5 percent of the Ph.D.s in STEM are awarded to Black females and roughly 12 percent of the STEM workforce is Black.<sup>[4]</sup> The film was profound and thought provoking, but it left me thinking *I am a black woman and I am a scientist*.

I see a bit of a pattern when I look through history and the lack of underrepresented minorities in STEM. I see puzzles with missing pieces. I am reminded of inventions created that don't give

full credit where it is due. We all know Thomas Edison as the creator of the incandescent light-bulb, but Lewis Latimer invented and patented the filament Edison needed.[5] Ivan Getting, Roger Easton, and Bradford Parkinson are credited with inventing Global Positioning System (GPS), but Gladys West's mathematical model work was integral to its development.[6] I believe the lack of diversity in STEM is rooted in erased histories. These hidden figures are often not recognized for their contributions until after their time. When acknowledgement and credence isn't given where it is due, and young black students don't learn that there were scientists that looked like them too, it has an impact.

If I could give advice to young Black female students who are considering graduate school or

## Calmer Waters

There is hope for BIPOC students in graduate programs, however. The first time I entered my office to go to my desk, I saw Alfred (name changed for privacy). We both froze as we noticed one another: two Black students in a research setting. We both immediately smiled as he said in his Caribbean accent, "Look at this diversity!" I often think of that moment and how he was right. It was such a relief to meet him, and I'm grateful we spent that summer as officemates before he graduated. His words weren't lost on me. I am an ambitious, driven Black female in STEM, and I have pressure from all sides: pressure to make my parents proud so that leaving their motherland wasn't for nothing; pressure and doubt from a place and society that doesn't value or see my worth. These pressures don't deter me because being an underrepresented minority doesn't mean I am less than. I love my background; it is a part of who I am.

I am also very grateful to the University of Minnesota Duluth and my advisor for choosing me. The Water Resources Science program has

pursuing a career in STEM, it would be to go for it. Go for it but identify the reason why you want to pursue it so when it gets tough, you can remember that reason. Use resources that connect you with other underrepresented minorities in STEM so you don't feel so alone. Find someone in your field, tell them about your goals, and ask if they can mentor you to guide you through the steps to achieving those goals. Use resources such as #BlackinMarineScience or #BlackinChem on platforms like Twitter and Instagram. Build a support network and stay connected with those who build you up and believe in you. My advice is to believe in yourself even if others do not. You'll be amazed by what you can accomplish.

been a rewarding experience for my graduate studies. I received a Diversity of Views and Experiences Fellowship (DOVE) in my first year that provided me with funding for a full year. I have connected with the Campus Climate events and met incredible people. I travelled to Southern France to study an alpine lake through a course I took. Later, I travelled to Austria to participate in an international research experiment. These opportunities and more have been amazing additions to my professional development and granted me networking opportunities I wouldn't have had otherwise.

I have noticed impacts of efforts to increase diversity in other areas of higher education as well. During my undergraduate career, I joined the WiscAMP STEM-Inspire Program whose mission is to promote diversity in the STEM field. As a senior, I mentored underrepresented underclassmen students to guide them in coursework and on navigating university settings. The university gave tours to middle school students from around Milwaukee, and the smiles on their



faces when they saw me in the swarm of college students gave me hope. I am hopeful for the future because I know what I want to see. I desire a field where my future children feel confident in knowing they can achieve their aspirations; a field

where my future children can grow in a space where they can learn, be challenged, and succeed. I want to connect with underrepresented students and show them that they too, belong in this space. I want a field where I feel wanted.

## Epilogue

When I read the email notifying me of a call for submissions from *Open Rivers* my interest was piqued. The issue would be titled Women & Water. One potential subcategory was women in STEM. This gave me pause as I considered the unique opportunity that lay ahead. I could describe and give voice to my own experiences, giving others a lens they might not otherwise see through. I pitched an idea of discussing what it's like being a Black female in STEM because this voice seems to be missing. After a while, I went on with my day-to-day routine, certain that the article pitch was denied. I had mixed feelings when I received an email from the editor asking if I would still be interested in writing an article. On the one hand, I was thrilled that my pitch was selected, but now the hard work would begin. What do I write about, or what *should* I write about?

“Just be honest,” I told myself. Honestly, there are days when I wish that I saw more people who looked like me. Honestly, I'm tired of having to plaster a fake smile on my face when words feel as though they are piercing my skin because they are so painful. Honestly, I can forgive a thousand

times over, but know that there are days when those hurtful words replay in my head like a broken record. There are times when I feel so isolated and so alone that my breath becomes short and I shut my eyes against the feeling of encroaching darkness and a sense of dread.

Despite all that, my faith has played a major role in my success in graduate school. If there is one thing my parents value more than education, it is spirituality and having a meaningful connection with God. When I feel defeated, I'll say prayers and confessions that reinvigorate me. My faith teaches me about humility and having compassion towards others in a seemingly selfish society. Nevertheless, I am not only going to strive to achieve my goals, but flourish in a space filled with barriers.

Water has always been a part of my story, from the coast of Nigeria to Lake Superior's shore. As a student of water, I hope this glimpse into my story was as special for you as it was for me to tell. Stories connect us all and I am excited to see what else mine has in store.

## Footnotes

[1] James Michener, *Hawaii* (New York: Random House, 1959).

[2] Robert Louis Stevenson, *The Black Arrow: A Tale of Two Roses* (New York: Charles Scribner's Sons: 1888).

[3] *Picture a Scientist*, directed by Ian Cheney and Sharon Shattuck, (2020), documentary film, 97 min., <https://www.pictureascientist.com/>.

[4] Karen Hamrick, *Women, Minorities and Persons with Disabilities in Science and Engineering 2021*, Special Report NSF 21-321, (Alexandria, VA: National Science Foundation National Center for Sciences and Engineering Statistics, 2021), accessed March 22, 2022, <https://nces.nsf.gov/pubs/nsf21321/>.

[5] Peta Stamper, “Hidden Figures: 10 Black Pioneers of Science Who Changed the World,” *History-Hit*, Oct. 6, 2021, <https://www.historyhit.com/black-pioneers-of-science-who-changed-the-world/>.

[6] Aamna Mohdin, “Gladys West: The Hidden Figure who Helped Invent GPS,” *The Guardian*, Nov. 19, 2020, <https://www.theguardian.com/society/2020/nov/19/gladys-west-the-hidden-figure-who-helped-invent-gps>.

## Recommended Citation

Coker, Ayooluwateso . 2022. “The Summit of STEM: Navigating the Uneven Terrain.” *Open Rivers: Rethinking Water, Place & Community*, no. 21. <https://editions.lib.umn.edu/openrivers/article/the-summit-of-stem/>.

## About the Author

Ayooluwateso is a master’s student in the Water Resource Sciences program at the University of Minnesota Duluth. Her research interests led her to study storms and algal blooms in Lake Superior. Her research is conducted at the Large Lakes Observatory, one of the largest water-focused centers of research in the University of Minnesota system.