Spring 2020
CPRC Newsletter

Photo Curtsey of: www.dreamstime.com

Table of Contents

MISSION STATEMENT

Serving the Chesapeake-Potomac Region (Maryland, DC, Virginia, and West Virginia), our chapter of SETAC North America (SNA) provides a professional forum for individuals from private industry, academia, and government agencies who are engaged in the study and analysis and solutions for environmental problems, management and regulation of natural resources, and/or research and development. We facilitate networking and educational opportunities for scientific professionals, mentoring and career guidance for students, and environmental education and outreach for the public.

Get in Touch!

Like us on Facebook

FOLLOW US ON twitter

LinkedIn

LinkedIn Groups

Chapter Leadership

Officers		
President	Jennifer Flippin, Tetra Tech	president.cprc.setac@gmail.com
Vice President	Nathalie Lombard, University of Maryland Baltimore County	vice.president.cprc.setac@gmail.com
Past President	Ben Burruss, Toxicology Regulatory Services	BBurruss@toxregserv.com
Treasurer	Meredith Bohannon, U.S. Army Public Health Center's Health Effects Division (HEF)	treasurer.cprc.setac@gmail.com
Secretary	James Sanders, US Environmental Protection Agency	cprc.setac@gmail.com
Board Members 2018 – 2020	Scott Lynn, US Environmental Protection Agency	scottglynn@scottglynn.com
2018 – 2020	Jamie Suski, EA Engineering, Science, and Technology, Inc.	jsuski@eaest.com
2019 – 2021	Sarah Lanasa, Student Representative, Towson University	slanas1@students.towson.edu
2019 – 2021	Michael Quinn , U.S. Army Public Health Center's Health Effects Division (HEF).	michael.j.quinn104.civ@mail.mil
2020 – 2022	Tyler Frankel, University of Mary Washington	tfrankel@umw.edu
2020 – 2022	Upal Ghosh, University of Maryland Baltimore County	ughosh@umbc.edu
Web Presence	cprcsetac.wordpress.com	
Website Manager	Scott Lynn, U.S. Environmental Protection Agency	website.cprc.setac@gmail.com
Social Media	Sarah Lanasa, Towson University	cprc.social.media@gmail.com
Newsletter Editor	C. Daniel Furst, Towson University	newsletter.cprc.setac@gmail.com
Assistant Editors	Scott Lynn, U.S. Environmental Protection Agency/ James Sanders U.S. Environmental Protection Agency	

President's Podium

Happy Spring CPRC SETAC Members!

Spring in our region is a time of notable change. The trees wake up, birds return, and the spring peepers begin singing (however I also heard a few peeps back in January during an unusually warm streak in the mountains of West Virginia). One big change of which we are all aware is the shifting of commitments as we try to minimize the spread of COVID-19. As you know, CPRC along with the other regional SETAC chapters chose to cancel or postpone spring meetings this year. We were looking forward to our joint meeting with the Hudson Delaware Chapter but are confident that we will have another opportunity to host the meeting sometime in the future. Our board members and Events Planning committee are looking into options for rescheduling the meeting but everything will be on hold until we have more clarity about the current situation. In the meantime, we are exploring ideas to offer virtual presentations, posters, or seminars, and we welcome your ideas!

The chapter recently elected two new Board Members, Upal Ghosh (UMBC) and Tyler Frankel (University of Mary Washington), and Secretary James Sanders (EPA). The Executive Committee unanimously approved Nathalie Lombard (UMBC) as the chapter Vice President 2020-2021. Welcome aboard! We look forward to their leadership and ideas for moving the chapter into the next year. We also thank outgoing board members, Mark LaGuardia (VIMS) and Lance Yonkos (UMD) for their contributions over the last few years!

Many people have noted that as we settle into working from home, it feels like the movie *Groundhog Day* and days start to feel similar. You may notice something else is the same this year. I'm writing this article as both the outgoing and incoming President. Unfortunately, our Vice President for 2019-20 had to step down last fall to tend to other priorities, leaving a vacancy in the President's position for 2020-21. For the interim year, I will remain in the role of CPRC President with significant assistance from Past President Ben Burruss and Vice President Nathalie Lombard.

Hope you are all able to get outside as the weather improves and find a good way to celebrate Earth Day on April 22. Since we cannot gather for our Spring Meeting to celebrate, please consider sending us a note or photo to show us how you are celebrating Earth Day close to home, socialmedia.cprc.setac@gmail.com As always, reach out if you have ideas or suggestions, president.cprc.setac@gmail.com

Stay well and stay in touch,

Jennifer Flippin

About our New V.P

Nathalie is a post-doctoral Research Associate at the University of Maryland Baltimore County in the department of Chemical, Biochemical and Environmental Engineering and works on the fate and transport of persistent organic pollutants with Prof. Upal Ghosh. She obtained a Master of Science in Plant Biology and Plant Chemistry and a Ph.D. in Environmental Microbiology at University Claude Bernard Lyon I (France), then moved to Baltimore to apply her multidisciplinary skills towards healthier and cleaner environments. She worked for three years at the Institute of Marine and Environmental Technology with Prof. Kevin Sowers on the bioremediation of polychlorinated biphenyls (PCB). Her work determined the key kinetic parameters that allow prediction of the rates of PCB microbial dechlorination in sediments and has enabled translation of the bioremediation technology to full-scale field applications.

Nathalie Lombard

Her current work is focused on the Chesapeake Bay waterbodies impaired by PCBs and tracking down the sources of contamination in order to help decision-making on remedial actions. She has taken a leading role in these projects working with teams of graduate and undergraduate students, training them on laboratory techniques and implementing field monitoring campaigns.

Nathalie enjoys volunteering in her spare time and for several years she has participated in cleaning rivers and streams in the Baltimore area. She has been part of the CPRC chapter for three years and joined the CPRC Events planning committee in 2019. She organized social gatherings and hikes for members to connect and discover the beautiful Chesapeake Bay region. She is now looking forward to serving the chapter as Vice President.

Secretary

James Sanders

James is a Fate Assessor in EPA's Office of Pollution Prevention and Toxics, Risk Assessment Division. He applies principles of environmental chemistry, engineering, and toxicology to predict the disposition of new and existing chemicals regulated under the Toxic Substances Control Act. He also has experience as an environmental consultant in the private sector. James grew up in Colorado and earned a B.S. in chemistry from Metropolitan State University in Denver and an M.S. in toxicology from Colorado State University. He relocated to the East Coast and earned a Ph.D. in environmental engineering from the University of Maryland, Baltimore County. He has been a member of CPRC SETAC since joining as a grad student in 2013. James has been closely involved in the chapter's leadership, having participated in the Communications Committee since 2016 and served two stints as Editor in Chief of the chapter's newsletter (2017 and 2019). He has a wife and two-year-old son and enjoys spending time with his family outdoors.

Newsletter Editor

C. Daniel Furst

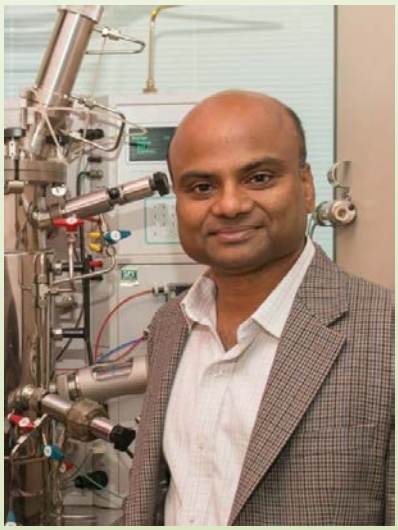
Charles "Daniel" Furst has been studying Environmental science at Towson University over the past three years and has recently started research towards a Master's Degree in Environmental Science at under the mentorship of Dr. Christopher J. Salice. His research focuses on the effects of Per- and Polyfluoroalkyl Substances (PFASs) on reptiles, specifically the brown anole (*Anolis sagrei*). This research is important to him because there are no data currently on the effects of PFASs on reptiles despite widespread confirmation of exposure. Dan is intent on generating high-quality ecotoxicological data that could be used in a regulatory context. He has also conducted ecotoxicological research on house crickets (*Acheta domesticus*) to help inform this research. Dan seeks a career conducting both field and lab research on organisms to help understand the anthropogenic impact we have on wildlife. He is excited for the opportunity to be the CPRC Newsletter Editor for 2020.

Board Members

Tyler Frankel, University of Mary Washington

Tyler Frankel is an Assistant Professor in the Department of Earth and Environmental Sciences at the University of Mary Washington. He first joined the CPRC and SETAC as a Ph.D. student in 2015 and has been a continuous member of both societies since then. As a faculty member at a public liberal arts university, one of his main goals is to provide opportunities for students to pursue novel and impactful independent research endeavors while interacting with a wide range of professionals from academia, government organizations, and private industry. Tyler's research interests involve the investigation of anthropogenic pollutants on aquatic wildlife, with a focus on the viability, reproduction, and behavior of both vertebrate and invertebrate species. Recently, he and his students have performed several studies examining the presence, concentrations, and physiological effects of trace metals, sulfoximine insecticides, and microplastics on fish and invertebrates in the Rappahannock River Basin. To combine his passions for teaching and ecotoxicology, he developed a new course offering at UMW that 1) introduces students to basic toxicological concepts such as the common sources of contaminants, transport within the environment, AOPs, and MOAs on biota and 2) challenges them to conduct an independent study examining the exposure effects of a contaminant of their interest on the viability and physiology of Daphnia magna. Based on his firsthand knowledge of the benefits CPRC provides, he continues to encourage both his own research students and colleagues to become members and attend both local and national annual meetings.

Upal Ghosh, University of Maryland Baltimore County



Dr. Upal Ghosh is a professor in the department of Chemical, Biochemical, and Environmental Engineering at the University of Maryland Baltimore County. He and his students have been active in the CPRC chapter. Dr. Ghosh is also an active member of SETAC at the national and international levels serving as a session chair at conferences, leading in a SETAC Pellston workshop, and serving as an Associate Editor of the journal Environmental Toxicology and Chemistry. He has an undergraduate degree in Chemical Engineering and MS and Ph.D. degrees in Environmental Engineering. His group performs research in environmental engineering and science with a focus on the fate, effects, and remediation of toxic pollutants in the environment. They use multidisciplinary tools to investigate exposure and bioavailability of organic and metal pollutants to organisms and apply the new understanding to develop novel approaches for risk assessment and remediation. His research has contributed to the development and transition of novel sediment remediation technologies based on altering sediment geochemistry and enhancing biological degradation. Dr. Ghosh has also led the development of monitoring tools for pollutant bioavailability, especially work on passive sampling techniques for measuring freely dissolved concentrations in sediment porewater. His current research includes several projects in the Chesapeake Bay region including source tracking and pollutant mass balance in the Anacostia River, DC, and Back River, MD. His research contributions have been recognized through multiple awards including the University System of Maryland Regents award for Excellence in Scholarship, Research, and Creative Activity in 2016. His work has been published in the leading journals in the field and the technology development has led to several US patents. Dr. Ghosh also is the co-founder of two startup companies that are transitioning emerging sediment remediation technologies to the field.

My Time in Toronto
By: Amanda Isabella

Toronto is a beautiful city.

That was my first thought as I watched the skyline come into view, hints of sun on a cloudy day flashing off the skyscrapers. It was my first time out of the United States, and I was like a wide-eyed child. Everything was beautiful and new.

The convention center for the Society of Environmental Chemistry and Toxicology National Conference was larger than I would have thought. Even better, I was able to walk there every morning, a welcome change from my normal commute.

It was my first National SETAC conference and much like that wide-eyed child, I was determined to do everything. I sat down during breaks to circle all of the talks I wanted to go to. I didn't want to miss a single session. This occasionally had me darting into three or four different rooms throughout the course of a single session.

And there was so much more to do than just the platform presentations! There were posters to see (and present), networking sessions to attend, old acquaintances to catch up with, mentoring opportunities, and dinners.

I wore myself out by the second day.

Because I attended so many platform presentations, it was difficult to choose which ones I wanted to highlight here. A few that stand out in my mind even now include a graduate student working on identifying microplastics in dolphins; talks on ecological risk assessment and what the field needed moving forward; and a very interesting talk about science communication, which occurred during a student lunch.

One keynote address that truly stood out in my mind was presented by Henry Lickers, a member of the Mohawk Council of Akwesasne. He spoke of melding science of indigenous knowledge and how Western science has done a great deal to exclude Indigenous Peoples and the knowledge they hold. I was moved by his speech and I had the opportunity to listen to a member of an indigenous people, which was a new experience for me. It also really cemented for me how much SETAC was working to bring diversity to their meetings, which means a great deal to me.

The student mixer at the National Hockey Hall of Fame was the highlight of the social gatherings. It was a great opportunity for graduate and undergraduate students of diverse backgrounds to have a stress-free environment to relax in.

National SETAC brought about a cascade of new knowledge, new opportunities, and a new perspective on the world for this under-traveled student. Even though I was exhausted, I was sad to say goodbye when it was time to leave. I hope SETAC continues on the path forward it has created, including diversity into science and bringing together the brightest minds in chemistry, toxicology, and many other disciplines to solve the pressing problems the world faces.

SETAC North America 41st Annual Meeting

SETAC NORTH AMERICA

41st ANNUAL MEETING

15 – 19 November 2020 | FORT WORTH, TX

The meeting will emphasize the need for environmental scientists and managers from all sectors to work together at a global scale to address shared environmental challenges.

Still undecided? Learn more about Fort Worth via the links below!

Fort Worth is Where Cowboys and Contemporary Culture Meet

8 Reasons to Make Fort Worth, Texas Your Next Weekend Getaway

48 Hours in Fort Worth: The Must-Stop Spots for a Weekend trip in Cowtown

Microplastics: A Widespread Pollutant with Lethal and Sub-lethal Effects

Meredith E. Seeley
PhD Candidate in Marine Science
The Virginia Institute of Marine Science (VIMS), William & Mary (W&M)

Meredith E. Seeley is a third year PhD candidate at the Virginia Institute of Marine Science, William & Mary, advised by Dr. Robert C. Hale. Meredith is interested in the abundance and distribution of microplastics in marine environments, as well as understanding their capacity as a marine toxicant. Meredith plans to continue in research and teaching following her PhD.

In an economy where the increase in the rate of plastic production exceeds that of global carbon emissions, plastics and their degradation products, microplastics, have become pervasive environmental contaminants (Borrelle et al. 2017). Although often treated as one contaminant type, microplastics are diverse in polymer structure, chemistry, size, shape and weathering extent – to name a few. Truly, the most unifying aspect of this contaminant is its ubiquity and persistence in the environment. Yet, microplastics can be difficult to identify; visually, even the most colorful microplastics lose this characteristic as they break down into smaller particles (Fig. 1). Even so, advanced instrumentation has revealed that microplastics are present across aquatic and terrestrial environments. As such, an abundance of recent research has addressed the toxicity of microplastics, focusing particularly on marine organisms (Hale et al. 2020). In a meta-analysis of such research, it was found that nearly two-thirds of studies detected an effect of microplastics to the study organism, most measuring mortality and, to a lesser extent, reproductive output (Bucci et al. 2019). However, ecosystem-level effects are poorly elucidated by existing research, likely because a number of sub-lethal effects are not well documented.

In a recent study, I investigated the response of salt marsh sediment microbial ecosystems to microplastic pollution. These sediment microbiomes are critical in driving carbon utilization and nutrient turnover in coastal zones, where microplastic pollution can be introduced from coastal runoff, storm drains and wastewater effluent. Working with microbial ecologist Bongkeun Song and my advisor, environmental chemist Robert C. Hale (VIMS), microbial community structure and functional implications for nitrogen cycling were monitored in a microcosm incubation, with different microplastic amendments (Fig. 2). These treatments included a diversity of polymers, including polyethylene, polyurethane foam, polyvinyl chloride and polylactic acid, a biopolymer..

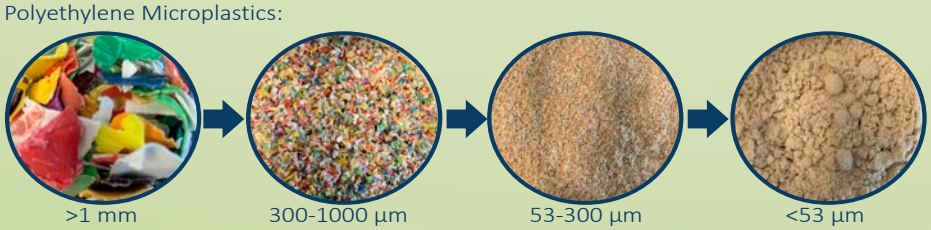
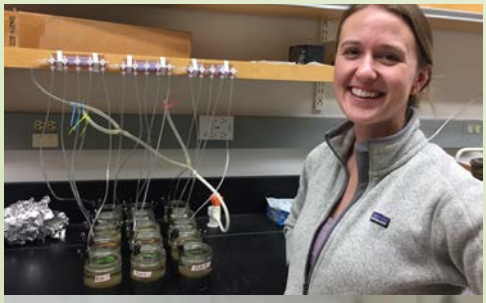


Fig. 1 Example of microplastics of different size ranges, generated in the laboratory from a commercially recycled mix of polyethylene products.

The research uncovered significant changes in microbiome structure between microplastic treatments, significantly altering potential denitrification. This may be particularly important in highly polluted areas. For example, Elizabeth Lake (a coastal estuary on Elizabeth Island, AK) is absent of local habitation, but receives large inputs of marine debris from the greater Pacific (Martins et al. 2016). This ultimately causes extensive microplastic pollution (Fig. 3). I am working with the Gulf of Alaska Keepers (GoAK.org) to characterize the microplastic burden at this site, which can be used to inform risk to, for example, the sediment microbial communities

In other research, I aspire to further capture the sub-lethal burden that microplastics may present. Funded by the National Oceanic and Atmospheric Administration Marine Debris Program, and along with my advisor (Robert C. Hale) and researchers at the VIMS and W&M, I am investigating how microplastics may modulate response to a virus that plagues North Pacific salmonid species. Key to this research is immunologist Patty Zwollo (W&M), who will help us understand immune response though all phases of chronic microplastic exposure and acute disease onset. This is assisted by paraffin histology (with Wolfgang K. Vogelbein, VIMS) which creates cross-sections of tissues, such as juvenile fish, to be captured and read for cellular-level response (Fig. 4). The viral progression will be monitored with infectious disease expert, Andrew Wargo (VIMS). Although an ultimate metric may include mortality, this research is focused on the sub-lethal effects that microplastics may have, and the role this ultimately plays in effective disease virulence. Such research endeavors are important in the global context of environmental toxicology. Although microplastics do not always cause mortality at environmental concentrations, their chemistry and structure may cause other adverse effects, potentially modifying our existing understanding of how organisms respond to environmental perturbations, including pollutants and disease. This could be considered in many environmental toxicology models, as no locale is truly microplastic-free in the Anthropocene.

Fig. 2 Setting up a sediment microcosm incubation with different microplastics



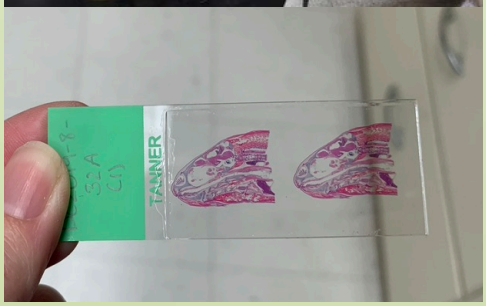


Fig. 4 Paraffin histology cross-sections of the anterior portion of juvenile fish (*O. mykiss*).

Fig. 3 Plastic pollution mixed with natural debris; Elizabeth Lake, AK.

REFERENCES
Borrelle SB, Rochman CM, Liboiron M, Bond AL, Lusher A, Bradshaw H, Provencher JF. 2017. Why we need an international agreement on marine plastic pollution. Proc Natl Acad Sci U S A. 114(38):9994–9997. doi:10.1073/pnas.1714450114.
Bucci K, Tulio M, Rochman CM. 2019. What is known and unknown about the effects of plastic pollution: A meta-analysis and systematic review. Ecol Appl. 30(2):1–16. doi:10.1002/eap.2044.
Hale RC, Seeley ME, Guardia MJ La, Mai L, Zeng EY. 2020. A Global Perspective on Microplastics Journal of Geophysical Research : Oceans. :1–40. doi:10.1029/2018JC014719.
Martins K, Hagedorn B, Ali S, Kennish J, Applegate B, Leu M, Epp L, Pallister C, Zwollo P. 2016. Tissue Phthalate Levels Correlate With Changes in Immune Gene Expression in a Population of Juvenile Wild Salmon. Arch Environ Contam Toxicol. 71(1):35–47. doi:10.1007/s00244-016-0283-7.

Alaskan Adventures of a Post-Graduate

By

Rachel Harrison

When I finished my master's thesis at University of Maryland, I decided to start sending my resume all over the country. Taking advantage of this new freedom was my top priority, and I intended to do it far out of my comfort zone. I got the call from a remote salmon hatchery in March. I was given my start date at the end of a phone interview. By that evening, I had booked a one-way trip to Alaska. I was headed to the airport six days later with my Osprey backpack, my warmest clothes, and only a faint idea of what the next few months would have in store.

Getting to the hatchery was quite an ordeal. My first flight was delayed by two days due to weather. When my second flight landed in Anchorage at 3 am, I learned that some airports close at night. There were travelers sleeping on the chairs and floor. I found a corner and took a nap until Starbucks opened. At 5:30 am, twenty minutes before my flight boarded, the desk and the gate to my terminal finally opened. I rushed to the gate, only to find about 12 other people sitting there. I was confused until I saw the 29-passenger twin propeller plane outside. Oh, okay.

I felt like a celebrity walking across the tarmac to board the tiny aircraft. After 18 hours of travel, I arrived in Homer at 7 am. It was the smallest airport I had ever seen. One desk. One waiting area. One baggage claim. The last leg of the trip was a boat leaving town at 10 am. It was cold and raining, so I decided to wait in the airport. The desk attendant and I were the only people in the building.

At 9 am, I called the number for one of two taxi services. An hour seemed like more than enough time, but my taxi never arrived. I called for a new one at 9:45. I called the boat captain to tell him I may be a few minutes late, but to my surprise, he had left early. He said he would come back for me in an hour or two.

My taxi driver left me at the end of the spit with my luggage. The only dry place to wait was under the awning of a public restroom. There were no shops open, not even the boat office. While I waited, sitting on my luggage, I looked up to see a white wolf standing in the rain a few feet in front of me. I froze as he stared at me curiously. I noticed that he was wearing a chain. The wolf stepped forward, so I reached out to pet him. Was I dreaming? Just then, a man approached me with another wolf on a leash! He apologized for his "dog" bothering me. After a short conversation, I learned that his dogs were 80% wolf. He said he lived in his pickup with these massive animals temporarily until his house was finished on his new 2-acre plot of land. Where the hell was I?

Just when I thought I was catching on to how "Alaska time" operates, I received a call from my new boss at the hatchery. She informed me that the boat wouldn't be picking me up today because the cost of gas wasn't worth the trip for one passenger. I would have to book a hotel and take the boat in the morning. I had very little cell service and no idea where the nearest hotel was. She agreed to book one for me. Another taxi ride later, I was at the Beluga Lake Lodge. After a nap, I went to the hotel bar for dinner where I met some interesting people. Many of them had moved to Alaska "for a year or two" but fell in love with it and never left.

I was nervous to tell anyone why I was here. The subject of Tutka Bay Lagoon Hatchery is a controversial one for Homer residents and fishermen. There are strong feelings regarding hatchery fish breeding with wild salmon, causing a decline in native fish populations. Some people also believe that producing this many salmon (100 million per year) is having negative environmental impacts on Kachemak Bay. There are many articles, opinions, and ongoing discussions in the region about the company as a whole.

The next morning, I made it onto the boat. I was well-rested and ready to meet the other 7 people on the peninsula I would call home for 3 months. The water taxi service was the only way in and out of the lagoon. Our groceries and mail arrived by boat every 2 weeks. We took weekend trips to Homer about once a month. Living in a state park as beautiful as Kachemak Bay left little room for boredom. There was always hiking and adventuring to be done, as long as we didn't forget our bear spray. Black bears, otters, and bald eagles became everyday interactions, and I never stopped being in awe.

During my stay at the hatchery, it was time to pond the fish. We sent newly hatched salmon into concrete raceways and through almost a half mile of 6-inch Spiroflex tubing to nets in the lagoon. We carried the empty incubators outside, cleaned them thoroughly, and made any repairs necessary before storing them for the next batch of eggs in August. The incubation room was cold and dark, so I was glad for the days when I got to take a boat (or walk, depending on the huge tidal ranges) to the lagoon to feed fish. This was quite a task once we filled all 17 nets. Every hour, we walked around each net as fast as possible with full 5-gallon buckets to toss scoops of feed evenly onto the surface. At the peak of feeding, we were using over 100 bags of feed per day. We loaded a small barge with feed at least once a week and kept it tied to the floating net pens. Otters were always swimming around the nets and happily eating cod, making even the hardest days more pleasant. In the first week of June, we released all the fish and pulled up the nets to clean and store. My time at Tutka Bay was quickly coming to an end.

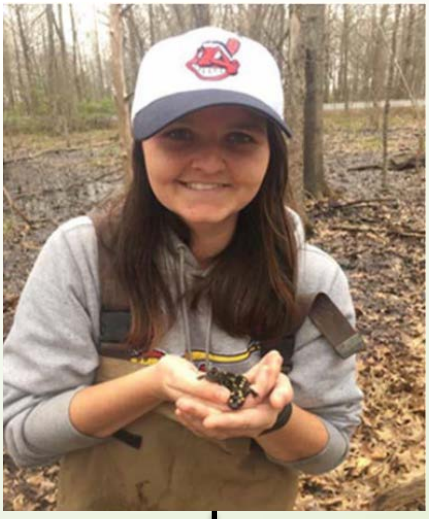
By this time of year, the sun never went down. When I left the hatchery, I had even more adventures. I walked on a glacier and had dinners at midnight under the sun. Some of my coworkers and I decided to spend a few days camping in Denali National Park. One morning, I left my tent to see a moose cow and her calf standing across the trail from each other – the only trail to the restroom. I think I could have walked right under the mother's long legs. I could never appreciate their sheer size until I saw them so close. I waited until they moved far enough from the trail together, then made a run for the bathhouse. Just the next day walking over a bridge on a hike, I spotted a caribou grazing below and watched him for about an hour, almost in disbelief of the raw majesty around every corner in the park.

Living remotely at the hatchery was such a unique experience. I once saw a woman bring her friends into town to help her put an entire bathtub on the boat. These women proceeded to unload it onto her truck for self-installation. Her cabin was somewhere between the lagoon and the next small village over, called Seldovia. These people amazed me. The mountains, the crystal-clear water, the wilderness, it all amazed me. I fell in love with Alaska, and I barely scratched the surface of all the adventures it has to offer. I can't wait to go back.

Women in STEM: Life as a Master of Science

Caitlin Weible

Towson University: Environmental Science Masters Degree 2019



I am currently an air quality technician who is also providing support for the hazardous materials program at the Wright Patterson Air Force Base in Dayton, Ohio. The Wright Patterson Air Force Base is home to the National Museum of the US Air Force and is the located on the site where the Wright brothers took their first flight over 115 years ago. I found this position through an online employment search engine, which is the primary method I used for seeking employment after graduation. I am not exaggerating when I say I probably applied for over 90 different positions and heard back from less than 10, so don't feel discouraged if you run into an after graduation rut when you are applying for jobs.

As far the role I serve in my current position, it is my job to maintain records associated with a comprehensive air emissions inventory of stationary sources. Projects that I partake in include review of documentation, field surveys, and record updating in data sheets along with maintaining the Air Program Information Management System (APIMS). It is of upmost importance that all of our emissions units on base remain within compliance of the Clean Air Act, otherwise the Air Force could face hefty fines. An emissions unit can range anywhere from a boiler used in heat plant to a paint booth used for coating airplanes. I also assist with the preparation of permitting applications whenever the base is need of a new emissions unit, and I conduct site visits to verify sources at least one time each quarter to ensure that our inventory is accurate.

Moving forward, I hope to move on from a contracting position to a government position either on this base or at another military base in the near future. There are a ton of research labs on base, and although I am happy in my current position, I would love to be able to move back into a research position. Ultimately, I would like to study the chemicals that I studied for my thesis research, PFAS (Per-and polyfluoroalkyl substances), which also happen to be a hot topic on military installations right now).

TOWSON UNIVERSITY™

Photo from: daytondailynews.com

2019-Travel Award Winners

Name: **Annaleise Conway**
University: **University of Maryland Center for Environmental Science (UMCES)**
Department: Marine Estuarine Environmental Science
Type of Degree: M. S.
Award: $500

Presentation: **Platform**
Session: Concentrations and Impacts of UV Filters in Aquatic Environments
Title: **6 – Investigating the Toxicity of the UV filter Benzophenone-3 (BP-3 or oxybenzone) on the coral *Galaxea fascicularis***

Annaleise is currently a second-year graduate student completing her Master's Degree in Marine-Estuarine Environmental Science at the Chesapeake Biological Laboratory in Solomons, Maryland. Her research focuses primarily on the ecotoxicology of UV filters, specifically oxybenzone, and its potential impact to hard corals. Annaleise plans to pursue employment in environmental science with governmental or non-profit organizations after graduation.

Abstract:
The active ingredients in sunscreens, UV filters, have gained increasing notoriety due to concern that these compounds may have negative impacts on sensitive coral species. Legislative activity in Hawaii and Key West, among others, has led to bans on the sale of sunscreens containing the specific active ingredient benzophenone-3 (BP-3 or oxybenzone) after a single published study demonstrated the potential for coral mortality, deformity, and bleaching when larvae were exposed to BP-3 at parts per billion to parts per million concentrations. However, a recent study using two species of adult coral fragments and larvae found little impact at parts per billion concentrations of BP-3. Given and the small amount of variable data on the toxicity of BP-3 to coral, additional toxicological assessments are necessary to determine the true risk of this UV filter. Therefore, we conducted a number of acute (i.e. 96-hour) and chronic (i.e. 21+ days) toxicity tests using nubbins from a common shallow-water hard coral species, *Galaxea fascicularis*. These experiments were coupled with chemical analysis to determine the actual aqueous concentrations at several time points during the exposure. Multiple endpoints pertinent to risk assessments (i.e. mortality and growth) were examined along with other biological endpoints such as bleaching and algal cell loss. With the results from these experiments, toxicological measures such as NOECs, LC_{50}s, and EC_{50}s were calculated in order to compare the results of this test to previous assessments of BP-3 toxicity. A risk assessment of BP-3 on *Galaxea fascicularis* was conducted using these results coupled with global analytical values of BP-3 in seawater from a variety of coral reef locations.

2019-Travel Award Winners

Name: **Catherine Crowell**
University: **University of Mary Washington**
Department: Earth and Environmental Sciences
Type of Degree: B.S
Award: **$500**

Presentation: **Poster**
Session: Aquatic Toxicology, Ecology, and Stress Response
Title: **RP050 – The impacts of pH on trace contaminant leaching and toxicity of coal ash in *Planorbella duryi***

Catherine is currently a second-year undergraduate student completing her bachelor's degree in Environmental Science at the University of Mary Washington. Her research focuses primarily on trace metal analysis found within coal ash and their effects on snails. Catherine plans to pursue her M.S upon graduation.

Abstract: Coal fly ash is a major industrial waste that is primarily produced by coal-burning power plants. Ash contains multiple trace contaminants that have the potential to leach from the coal ash into waterways after rain events, causing undesirable effects on aquatic species in these ecosystems. Few laboratory studies have examined the relationship between acidified rainfall and the release of trace metals from coal ash and the impacts of such rainfall on the toxicity of coal ash leachates on aquatic invertebrates. Thus, the goals of this study were to 1) evaluate the effect of varying pHs on the leaching of trace contaminants from coal ash and 2) examine the impacts of these leachates on the viability, development, and hatch rate of embryonic *Planorbella duryi*, a freshwater snail species commonly found in intermittent streams or shallow waters throughout North America. Briefly, 100g of coal fly ash obtained from a local coal ash repository was added to individual glass vessels containing 1L of synthetic water adjusted to pHs of 4.5, 5.0, 5.5, 6.0, 6.5, 7.0, or 7.5. After 48 hours, all leachates were vacuum filtered and an aliquot analyzed for aluminum, arsenic, calcium, cadmium, chromium, cobalt, iron, mercury, magnesium, manganese, lead, selenium, and zinc using ICP-OES. Embryonic *P. duryi* clusters (<2hrs old) were then exposed to each leachate or pH-adjusted synthetic water for 10 days using a 48hr static-replacement assay, and the number of viable individuals and hatchlings in each cluster assessed daily. To examine the impacts on growth, photographs of each embryo were obtained on days 5, 7, and 10 and differences in shell diameter and pigmentation assessed using ImageJ. While this project is currently ongoing, we expect to find increases in aqueous trace contaminant concentrations as a result of decreased pH in leachates as well as decreased viability, growth, and hatching success. This study will provide important information regarding the potential impacts of acidified rainfall on the mobilization of trace contaminants and toxicity of coal ash leachates on aquatic invertebrates.

2019-Travel Award Winners

Name: **Joy Huber**
University: **Towson University**
Department: Environmental Science
Type of Degree: Masters of Science
Award: **$500**

Presentation: **Poster**
Session: Behavioural Ecotoxicology in the Lab and Beyond: Incorporating Environmental Complexity and Relevance
Title: **WP027 – Considering behavioral endpoints to gain an improved understanding of neonicotinoid effects in aquatic systems.**

Joy is a first-year graduate student attending Towson University to obtain a master's degree in environmental science. Her research focuses in aquatic ecotoxicology with a primary focus on predator- prey interactions and behavioral changes due to exposure to environmental contaminants. Following the completion of her program, Joy would like to pursue a career in academia as a professor or find employment in risk assessment.

Abstract:
Neonicotinoids are a widely used class of pesticides with the ability to persist in the environment. This class of pesticide has been shown to be highly toxic to insects and has the potential to be toxic to non-target aquatic invertebrates and vertebrates. Neonicotinoids act upon the animal by activating the nicotinergic acetylcholine receptors of the insect central nervous system. This over-stimulates the nervous system, impacting nervous system function and potentially resulting in the death of the individual. The majority of ecotoxicity studies on neonicotinoids have focused on mortality as an endpoint. Non-lethal effects, however, have the potential to cause ecologically significant impacts in aquatic systems. Behavioral effects, for example, can occur at much lower concentrations than mortality but also have the potential to influence the health of individuals and to impact inter-species interactions. The goal of this research was to better understand the role that neonicotinoids have on predator-prey interactions and how these might compare to results from published toxicity studies. For this research, we used the neonicotinoid pesticide, imidacloprid, as it was the first compound in the class to be developed and is still widely used. We have found that endpoints such as immobilization occur at concentrations that are not environmentally relevant, as a 48-hour acute *D. magna* acute immobilization test yielded an LC_{50} of 70.8 mg/L. Clearly, the use of *D. magna* may not be sufficient to inform toxicity values because of their relative tolerance. D. magna, however, may be an ideal candidate for a prey species in an assay to evaluate impacts of imidacloprid on predatory behavior. As an example, Odenate larvae will be used to develop an assay to determine the effects of environmentally relevant imidacloprid concentrations on predator efficiency. The LC_{50} from *D. magna* will be used to inform further experimentation with Odenate larva, a potentially more sensitive species. The ultimate goal of this research is to better understand the potential ecological effects of noenicitinoid pollution as a result of behavior alteration in sensitive predators.

2019-Travel Award Winners

Name: **Amanda Isabella**
University: **Towson University**
Department: Environmental Science
Type of Degree: M.S. Environmental Science
Award: **$500**

Presentation: **Poster**
Session:
Title: **MP003 – Building a bigger picture: Exploring effects of realistic resource and chemical environments on population-level ecotoxicology of *D. magna***

Amanda Isabella is a graduate student at Towson University, working towards a M.S. in Environmental Science in the Salice Applied Ecology and Ecotoxicology laboratory. As a research assistant, Amanda explores the response of daphnia populations in multiple stressor scenarios to understand environmentally relevant toxicological situations. Prior to joining the Salice laboratory, Amanda worked at Eurofins QC as an aquatic toxicologist. Amanda has a B.S. in Biology from Millersville University. She calls Philadelphia home and plans to remain on the east coast after graduating in order to tackle some of the most pressing issues urbanization has placed on the region's water sources. Amanda is also an advocate for minorities in the STEM field and is passionate about involving children with hands-on STEM-related projects. When not working, Amanda can be found on the hiking trail with her two dogs or home with her family in Bucks County.

Abstract: Traditional toxicity testing is used to assess adverse effects of chemicals on environments using tests of individual organisms. However, traditional toxicity tests largely fail to account for ecological factors such as predation and resource environment, as well as the effects of multiple chemical stressors. In this study, a binary mixture of two environmentally relevant chemicals were used to create a complex but realistic stressor environment. A pulse of pyraclostrobin, a fungicide, was applied to aquatic laboratory systems chronically stressed with high conductivity due to sodium chloride, which is common in aquatic systems from road de-icing activities. These compounds were selected due to their contrasting physiochemical attributes but also their likelihood to co-occur in many rural waterways. To first assess these stressors, we conducted a series of 48-hour acute studies with *Daphnia magna* exposed to various concentrations of sodium chloride and pyraclostrobin. The first study used the algae *Raphidocelis subcapitata* as a food source and the second study used homogenized waste from *Lymnaea stagnalis*, as a lower quality, but environmentally relevant, carbon source. Both food sources decreased toxicity of both chemicals and the mixture, but high-carbon quality *R. subcapitata* increased the LC_{50} significantly more, suggesting an important effect of resource quality. We then initiated a series of laboratory-population experiments with full factorial designs to evaluate the effects of both chemicals and food sources under more ecologically realistic conditions. Results for the laboratory-population experiment in which daphnia were fed algae showed that chloride delayed time to first reproduction and the addition of pyraclostrobin increased acute mortality in individuals that manifested at the population level. Average length of individuals increased after pyraclostrobin application due to size-specific toxicity but then plummeted as the population recovered. Interestingly, the acute data allowed for the estimation of outcomes from the population experiment with regard to the toxicity of the mixture. A similar population-level experiment is planned in which snail waste will be used as a carbon source. In conclusion, these increasingly complex ecological scenarios will provide ecologically relevant data, and can also be used to help inform and evaluate standard toxicity test designs.

2019-Travel Award Winners

Name: **Sarah Lanasa**
University: **Towson University**
Department:
Type of Degree:
Award: **$500**

Presentation: **Poster**
Session: Aquatic Toxicology
Title: **RP043 – Are "safeners" safe? Effects of unregulated inert safeners on population growth and size of non-target algae.**

Sarah is a first-year graduate student expecting to complete her master's degree in environmental science December 2020 at Towson University in Maryland. Her research primarily focuses on the toxicity of herbicides and other formulation components on green algae, as well as incorporating analytical techniques into traditional ecotoxicology testing. Sarah aims to pursue a Ph.D after graduation and, eventually, a career in academia where she will teach and continue ecotoxicology research

Abstract: Chloroacetanilide is a group of herbicides with increasing use worldwide. They are used to control grass weeds that affect important crops such as corn, soybean and cotton. Acetochlor and S-metolachlor are the most common chloroacetanilide herbicides used. When applied, acetochlor and S-metolachlor are frequently paired with a "safener" which prevents the crop from being affected by the herbicide. Safeners are considered inert and, therefore, are not regulated or tested for toxicity. While the ecological toxicity of acetochlor and S-metolachlor have been well-studied safeners, however, have not. Runoff from agriculture fields has led to measurable concentrations of safeners in nearby freshwater systems. There is a lack of information needed to assess the potential risk safeners may pose to organisms in freshwater systems. The safeners we focused on where benoxacor (commonly paired with S-metolachlor), dichlormid and AD-67 (commonly paired with acetochlor). We conducted a series of 72-hour algae toxicity tests separately with the three safeners to find the EC_{50} (the effective concentration causing 50% growth inhibition) on a non-target algae, *Raphidocelis subcapitata*. AD-67 was the most toxic followed by benoxacor, and dichlormid showed toxicity only at high concentrations. ED_{50} values for all safeners tested were far above environmentally relevant levels. However, a difference in size of algae cells was observed during the toxicity tests. Images of algae were captured at the 72-hour timepoint and analyzed using ImageJ software to measure the total area of each cell. We found a size increase from the controls for each safener at concentrations lower than the EC_{50} value in all safeners tested, with the exception of benoxacor. Algal cell size was increased in all concentrations of AD-67, some of which are approaching environmental relevance. The changes seen in cell area suggest a potentially more sensitive endpoint than what is seen in standard toxicity tests. We are exploring the commonness and significance of the observed increases in algal cell size. Also, we are designing studies to determine if increases in algae cell size impacts *Daphnia magna* and algae dynamics. Results of these studies may lead to and improved understanding of the potential ecological effects of safeners.

2019-Travel Award Winners

Name: **Meredith Seeley**
University: **Virginia Institute of Marine Sciences**
Department: Aquatic Health Sciences
Type of Degree: PhD
Award: **$500**

Presentation: **Poster**
Session:
Title: **TP101 – Different microplastics can influence structure and function of sediment microbial communities**

Meredith is a Ph.D. candidate at the Virginia Institute of Marine Science. Meredith has a Bachelor of Science degree in Biology from the University of Oklahoma and a Master of Science degree from the University of Texas Marine Science Institute. Meredith is passionate about addressing marine plastic pollution through research and outreach. She is particularly interested in research that helps expand our understanding of the toxicological impacts of microplastics to a variety of marine biota.

Abstract:
Plastics are now ubiquitous in freshwater, coastal and open ocean environments. Sediments therein have been discovered to be major sink for microplastic. While plastic polymer type has been reported to influence the composition of floating plastic biofilm communities, studies to date have not investigated the effects of different microplastics on sediment microbial communities or sediment biochemical activities. Here, we present the results of a sediment microcosm experiment established with microplastics (53-300 μm) of different petroleum-based polymers (polyethylene [PE], polyvinyl chloride [PVC] and polyurethane foam [PUF]) and one bio-polymer (polylactic acid [PLA]). We characterized the sediment bacterial compositions and functional gene abundances after 7 and 16 days incubation using 16S MiSeq and quantitative polymerase chain reaction (qPCR) analyses, respectively. Nitrogen cycling was also evaluated by measuring dissolved inorganic N fluxes and denitrification rates (calculated via sediment slurry incubation experiments using a ^{15}N isotope pairing technique). We observed that bacterial community compositions differed significantly between the biopolymer, petroleum-based polymers and non-amended sediment, with PVC being the most distinctly unique community. Nitrification gene abundances and inorganic N fluxes revealed that nitrification was highest in the biopolymer (PLA) and PUF, and lowest in PVC treatments. Correspondingly, denitrification rates were inhibited in PVC, but highest in PLA and PUF. Both denitrification and nitrification activities were higher in PE, PUF and PLA treatments than the non-amended control. This suggests that: (1) microplastics may enhance sedimentary nitrogen cycling processes and (2) sediment microbial communities may have the capacity to use plastics as carbon substrate. Overall, our study shows that the environmental presence of different microplastics may alter the structure and function of sediment microbial communities. This underlines the need for greater evaluation of the consequences of plastic contamination to sediment microbial ecosystems and biogeochemical cycling.

2019-Travel Award Winners

These travel awards were sponsored by:

$2,000

$500

TETRA TECH

Thank you Sponsors!!!

CPRC Membership

SETAC: **The Society of Environmental Toxicology and Chemistry** is an independent, nonprofit professional society that provides a forum for individuals and institutions engaged in the study of environmental issues, management and conservation of natural resources, environmental education, and environmental research and development.

CPRC: **The Chesapeake and Potomac Regional Chapter** of SETAC is a non-profit organization started in the year
1983. CPRC's mission is to promote the exchange of information among environmental scientists in the Mid-Atlantic
States.

Note: you do not have to be a SETAC member to be a member of CPRC.

There are three ways to join/renew:

Preferred Method: SETAC North America (SNA) (link). SNA will send us your contact information so we can add you to our chapter mailing list. You do not have to be an SNA member to use this option.

PayPal CPRC (link): Credit cards accepted, no PayPal account needed. Enter appropriate fee amount ($5 student, $15 professional). Please note that it is easier for us to track your membership when you join via the SNA site (option1 above).

Snail Mail: Check and money orders accepted. Please include your name, affiliation and address with your payment.

SETAC-CPRC P.O. Box 2728
Brooklyn, MD 21225
Attn: Meredith Bohannon, Treasurer

Membership renewals occur every December. If you have any difficulty with your membership application or payment, please contact Matthew Behum (treasurer.cprc.setac@gmail.com).

CPRC Sponsorship Form

CPRC SETAC Sponsorship Form

An electronic version of this form can be completed at:

https://goo.gl/forms/La1Lwvb21Gv58wus1

STEP ONE: CONTACT INFORMATION

Organization Mailing Address

City/State/Postal Code/Country

Sponsor Contact Phone Fax

Email

STEP TWO: SELECT SPONSORSHIP ACTIVITIES

Please select below the CPRC activities you would like to support as a sponsor. You are encouraged to select more than one CPRC activity to sponsor. The following CPRC activities available for sponsorship will be granted on a "first come, first served" basis and can be reserved in advance of the event. The additional sponsorship benefits are granted to sponsors according to the 3-tier sponsorship scheme (shown at the end) which is determined by the total of the sponsorship activity.

SPONSORSHIP ACTIVITY / TYPE	AMT	QTY AVAILABLE	QTY SELECTED	SUBTOTAL
STUDENT AWARDS and TRAVEL SUPPORT				
Annual Spring Meeting Student Awards (1st, 2nd, & 3rd place) for best poster or platform presentation	$250	2		
Student Travel Award to SETAC NA	$500	Unlimited		
Virtual Poster Contest Student Awards	$250	1		
Annual Spring Meeting Travel Support for one student (includes short course, meeting registration, overnight	$250	Unlimited		
Autumn / Winter Dinner Travel Support for four students	$250	1		
CPRC EVENTS				
Poster Social / Coffee Break at the Annual Spring Meeting	$250	2		
Student-Mentor Luncheon during the Annual Spring Meeting	$500	1		
CPRC Pub Night / Evening Social at SETAC NA meeting	$1,000	1		
Annual Autumn / Winter Dinner Event with Guest Speaker	$500	1		
			TOTAL DUE $	

Sponsorship Opportunities

STEP THREE: PAYMENT INFORMATION

Please submit a completed copy of this form and a check (payable to "CPRC SETAC") to the following address:

CPRC SETAC Treasurer
PO Box 2728
Brooklyn, MD 21225
Attn: Meredith Bohannon

If you have any difficulty with your sponsorship payment, or have any questions, please contact CPRC Treasurer Meredith Bohannon (treasurer.cprc.setac@gmail.com) or (cprc.setac@gmail.com).

CPRC SETAC Sponsorship Form

ADDITIONAL SPONSORSHIP BENEFITS BY TIER[A]

Benefit	Primary Producer ($250/year)[A]	Secondary Producer ($500/year)[A]	Keystone Sponsor ($1000+/year)[A]
Complimentary Spring Meeting Registration(s)[B]		1	2
Table and poster display space at a CPRC annual meeting (if requested)			✓
Logo appears in CPRC newsletter and meeting documents. Logo and link posted on CPRC website[C]	2 years[C]	3 years[C]	5 years[C]
Advertising in newsletter	Half Page	Full Page	Full Page
Advertising in Spring Meeting Program		Half Page	Full Page

[A] Sponsorship Tier is determined by the total amount given on an annual basis from **STEP TWO**.

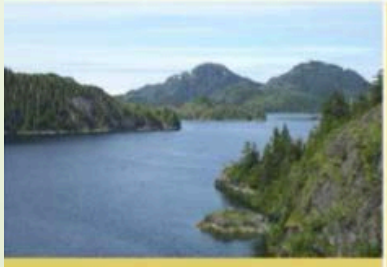
[B] Complimentary Spring Meeting Registrations are granted on an annual basis according to the sponsorship tier with the recommendation that they are to be used within a year.

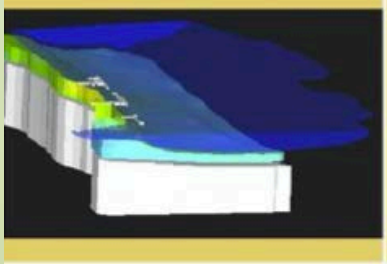
[C] Length of time during which the logo appears in the newsletter, meeting documents, and website is a benefit only and does NOT represent a commitment to provide sponsorship money on an annual basis.

CPRC Sponsors (Keystone)

integral consulting inc.

Integral Consulting Inc. is a national science and engineering firm providing multidisciplinary services in the fields of health, environment, technology, and sustainability.





We are currently seeking highly motivated individuals for the following positions to support our growing environmental practice on the East Coast:

- Senior-level Toxicologist
- Junior- and Mid-level Toxicologists/Human Health Risk Assessors
- Senior-level Ecological Risk Assessor
- Junior- and Mid-level Ecological Risk Assessors
- Mid-, Senior-, and Principal-level Engineers
- Mid- and Senior-level Geologists
- Mid-, Senior-, and Principal-level Hydrogeologists

Why work for Integral?

Technically Stimulating

Every day, our staff is involved in a diverse range of projects for a variety of clients—applying skills and making recommendations th lead to positive change.

Unique Collaboration

The Integral name reflects our very purpose: To gather teams of professionals with distinctly different yet complementary skills, an to apply their integrated knowledge and perspective in ways that surpass our clients' expectations.

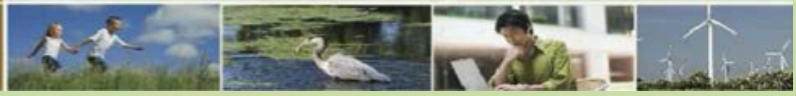
Supportive Environment

Outstanding benefits include company-subsidized medical, dental, and vision plans, company-paid life and short- and long-term disability insurance, a 401(k) plan and company match, flexible spending accounts (cafeteria plan), health club reimbursement of $20 per month, and vacation/sick leave.

For more information, please visit our web site at www.integral-corp.com/careers

Health ■ Environment ■ Technology ■ Sustainability

www.integral-corp.com



CPRC Sponsors (Keystone)

CPRC Sponsors (Secondary Producers)

ENVIRONMENTAL & TURF SERVICES, INC.
Stuart Z. Cohen, Ph.D., CGWP

eurofins | agroscience services

Exponent®

TETRA TECH

CPRC Sponsors (Primary Producers)