

*Photo credit: Jo Martin, Graduate Student, UVM Mathematics*

*The Winooski River flows over the Winooski One Dam  
at close to peak flood on November 1, 2019*



## **Vermont Established Program to Stimulate Competitive Research**



Winter 2020

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#### Funding:

*This material is based upon work supported by the National Science Foundation under Award No. OIA 1556770.*

*Any opinions, findings or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.*

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## From The Director



We are happy to share with you the latest news from Vermont EPSCoR in this 2020 winter magazine.

The “Halloween Storm” of October 31 – November 1, 2019 caused significant damage to Vermont due to flooding and severe weather. A Major Disaster declaration for public infrastructure was signed. In this issue, Caitlin Crossett, Graduate Research Assistant, VT EPSCoR, PhD Candidate Civil and Environmental Engineering (UVM) and Panagiotis Oikonomou, Ph.D., Postdoctoral Associate, VT EPSCoR, discuss the storm and its relevance to BREE researchers. Erin Seybold, Ph.D., Postdoctoral Associate, VT EPSCoR, also shares a recent collaborative paper that discusses landuse/landcover change amidst a varying amount of annual rainfall and storm events. We’re pleased to also share news related to our Center for Workforce Development and Diversity at Saint Michael’s College (CWDD) – especially a few recent successes from summer undergraduate and high school students. Private sector efforts continue through workshops and conferences such as the National SBIR Road Tour held at the University of Vermont with upwards of 150 entrepreneurs in attendance.

Please check in often and follow us on Twitter, Facebook, LinkedIn and our website [www.uvm.edu/EPSCoR](http://www.uvm.edu/EPSCoR)

Best regards,  
Arne Bomblies, Ph.D., P.E.  
State Director, VT EPSCoR



# Our New and Continuing Partnerships



**Middlebury College**

Offering researchers valuable insights into Lake Champlain processes enhanced by data from the research vessel, David Folger.



**VERMONT PBS**

Vermont Public Broadcast Station educates, informs, entertains and inspires Vermonters to be lifelong learners and engaged in their community.



**Lake Champlain Basin Program**

Works in partnership with government agencies from New York, Vermont, and Québec, private organizations, local communities, and individuals to coordinate and fund efforts that benefit the Lake Champlain Basin's water quality, fisheries, wetlands, wildlife, recreation, and cultural resources.



**LANDMARK COLLEGE**

A leader in creating successful learning strategies for students who learn differently and strengthening the STEM workforce.



**The University of Vermont**

Home of Vermont EPSCoR and center of RACC interdisciplinary research aligning with its mission to be among the nation's premier small research universities for faculty, post-doctoral associates, graduate students, undergraduates.

**Alan Alda Center for Communicating Science**

AT STONY BROOK UNIVERSITY

Working to enhance understanding of science by helping train the next generation of scientists

and health professionals to communicate more effectively with the public, public officials, the media, and others outside their own discipline. University of Vermont became an Alda Center Affiliate in 2015.



**Vermont Center for Emerging Technologies**

Offering select early stage firms substantive business mentoring along with traditional business incubator services and infrastructure.



**SAINT MICHAEL'S COLLEGE** FOUNDED 1904

Home to the VT EPSCoR Center for Workforce Development and Diversity (CWDD), water quality analysis laboratory for total suspended solids and summer internship opportunities for undergraduates and high school students.

**UMET** UNIVERSIDAD METROPOLITANA SISTEMA UNIVERSITARIO ANA G. MÉNDEZ

**The Ana G. Méndez University System (AGMUS) and Universidad Metropolitana**

Providing undergraduate summer research internships and an opportunity to present VT EPSCoR research at the annual "Research Symposium for Minority Students" in San Juan, Puerto Rico.



**The National Science Foundation**

Where discoveries begin

**COMMUNITY COLLEGE OF VERMONT**

Providing motivated adults the opportunity to participate in authentic research opportunities leading to continued STEM education or career opportunities.



**University of Puerto Rico at Rio Piedras and the Luquillo Long Term Ecological Research (LTER)** Integrating high school teams into Vermont EPSCoR RACC research to learn about climate change and water quality.



**Northern Vermont UNIVERSITY**



Vermont's statewide business pitch competition.



**VSSMF (Vermont State Science and Math Fair) and Norwich University** Vermont 5th-12th grade students' state-wide science fair competition inspires students and provides opportunities to further their interests in STEM.



**Castleton**



**VERMONT**

AGENCY OF NATURAL RESOURCES

Promoting the sustainable use of Vermont's natural resources, protecting and improving the health of Vermont's peoples and ecosystems, and promoting sustainable outdoor recreation.



**Vermont Technology Council**

**Vermont Technology Council**

A catalyst for the creation of science-and-technology-based business in Vermont.



**VERMONT WORKS FOR WOMEN**

# HALLOWEEN STORM

Caitlin Crossett, Graduate Research Assistant, VT EPSCoR, PhD Candidate Civil and Environmental Engineering (UVM)  
Panagiotis Oikonomou, Ph.D., Postdoctoral Associate, VT EPSCoR

If you had planned on dressing up as a wet blanket for the Halloween of 2019, you were in luck, as Mother Na-

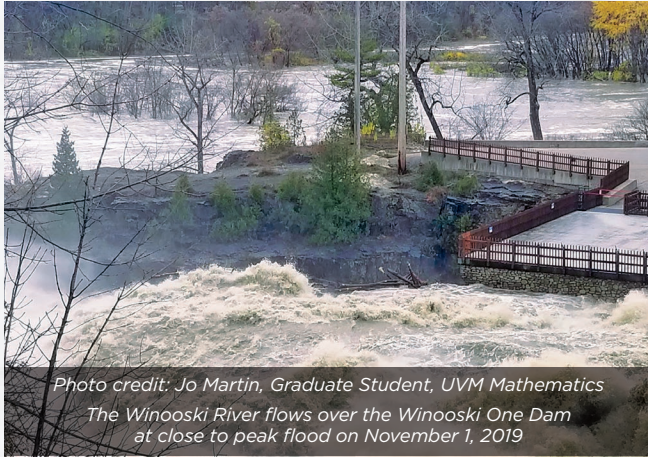


Photo credit: Jo Martin, Graduate Student, UVM Mathematics  
The Winooski River flows over the Winooski One Dam at close to peak flood on November 1, 2019

ture was prepared to maintain your look. The storm that transpired from 31 October to 1 November produced 3–5 inches of rain across New York and Vermont, flooded many rivers, and caused thousands to lose power (Hastings and Taber 2019; Figs. 1, 2). The over 6 million dollars in damages to public infrastructure in Vermont from this event led President Trump to sign a Major Disaster declaration in January 2020 (“President Signs”; Fig. 3 and sidebar).

A strong low-pressure system positioned Northwest of Vermont, its associated slow moving cold front, and a warm, moist air mass ahead of the front (within which Burlington, VT set a high temperature record for 31 October of 71°F) conditioned the region with favorable conditions for a heavy precipitation event (Hastings and Taber). Other factors such as already saturated soils and the compounding impacts of 0.5 to 1.0-inch per hour rain rates and massive amounts of leaves which clogged storm drains exacerbated impacts, especially in urban areas. Seven river gauges in Vermont exceeded flood stage and both the North Troy and Jeffersonville stream river gages set new stage records of 14.72ft and 454.5ft respectively.

While strong storms are not abnormal for our region during the fall season, this particular event broke multiple

precipitation records and set new record stage at two river gages in Vermont (Hastings and Taber 2019).

Burlington, VT set a record daily maximum rainfall on 31 October of 3.3 inches, which broke the old daily maximum record for October by 1.16 inches set in 2010. This one day precipitation extreme helped the month of October 2019 become the wettest October on record in Burlington, VT with 8.50 inches of precipitation which

beat the second wettest October in 1918 by 1.75 inches (“Burlington, VT Top 10”).

In Vermont, the annual precipitation has increased more than 10% over the 1901–2015 period, with summer and fall events contributing the most to this change (Easterling et al., 2017) At the same time, extreme precipitation events (top 1%) in the Northeast US have significantly increased (Easterling et al., 2017). Furthermore,

the majority of continental US have experienced higher annual average temperature over the 1901–2016, with Vermont being one of the states with increases greater than 1.5°F (Vose et al., 2017). The ongoing evident changes in precipitation and temperature characteristics, including extreme storms, such as the one discussed in this article and others like Tropical Storm Irene, along with the projected climate change, have peaked the interest of EPSCoR scientists on the Basin Resilience to Extreme Events (BREE) project. As total and heavy precipitation is on the rise in the Northeast, record-producing storms become more and more likely to occur over time, and the impacts from these storms may be wide-ranging. To better understand these multi-faceted impacts, several teams on the BREE project are working in tandem to identify the drivers behind the shift in precipitation as well as the effects this shift has had on the landscape.

Through an integrated modeling approach, members of the Integrated Assessment Modeling team are investigating how plausible future changes in the distribution and the persistence

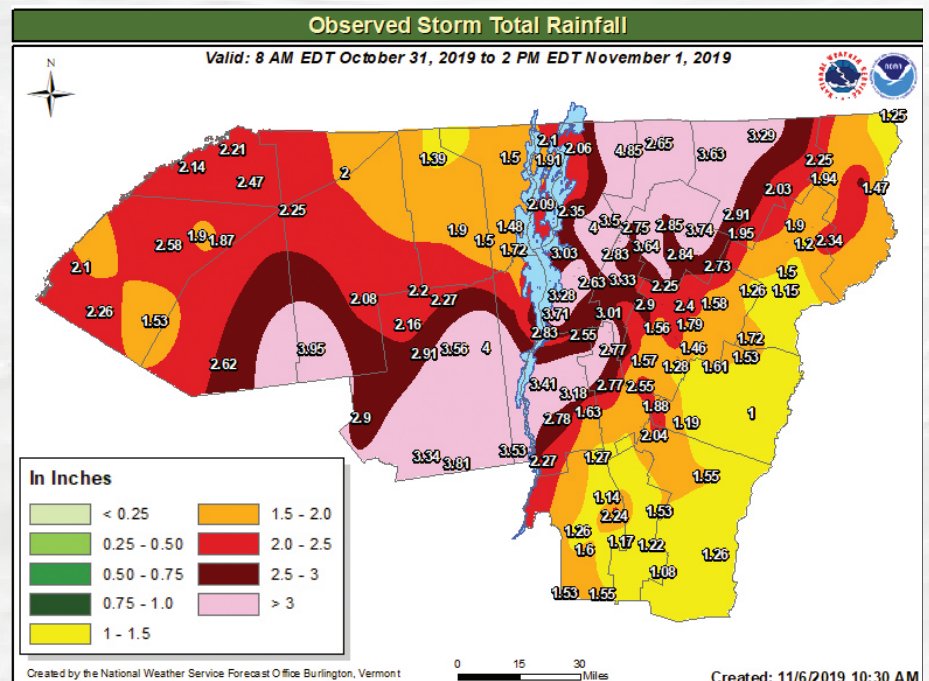
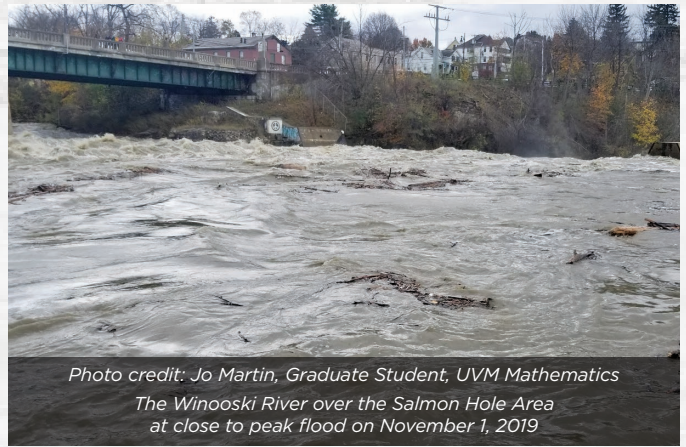
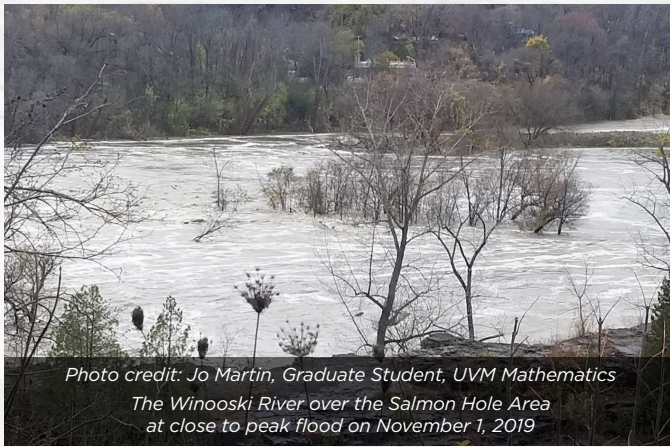


Figure 1: Observed storm total rainfall from 8AM EDT 31 October 2019 to 2PM EDT on 1 November 2019 (Hastings and Taber 2019)



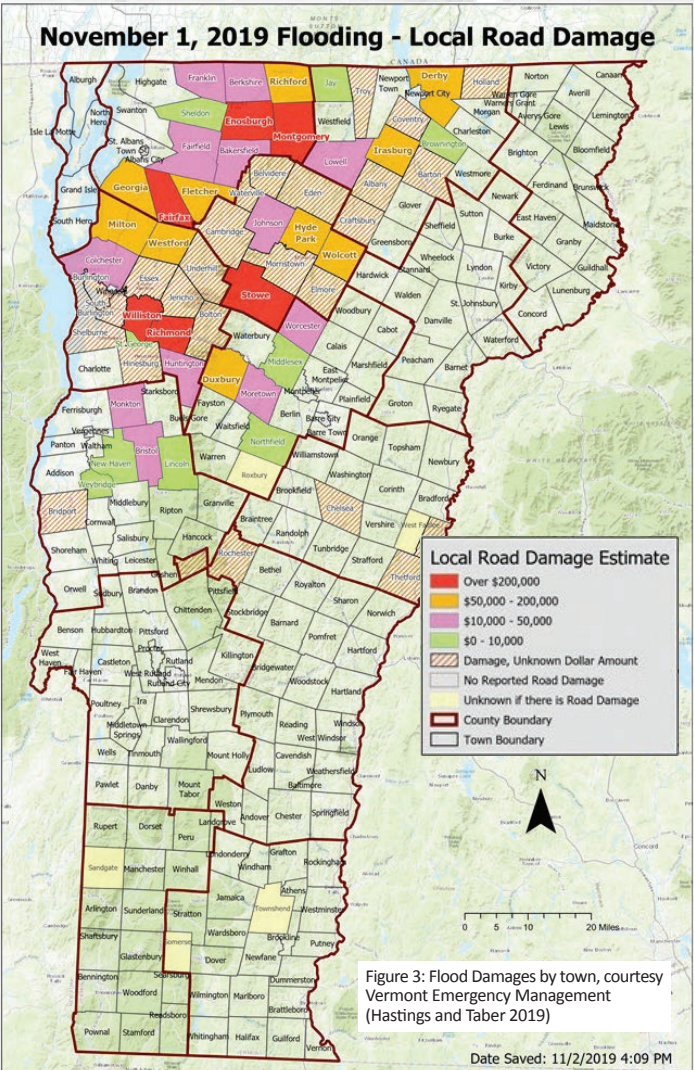
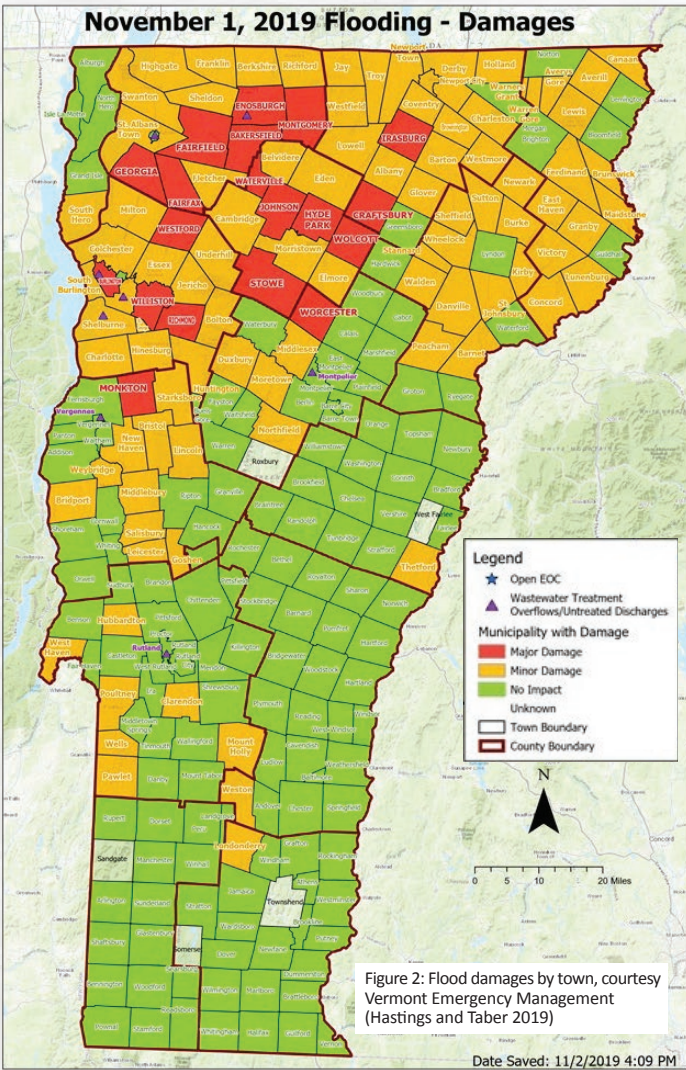


of extreme hydro-climatic events (precipitation and temperature) would affect Lake Champlain's cyanobacteria development. Members of the BREE Climate Team are working to characterize past precipitation variability in the Northeast so we may have a better understanding of WHY precipitation in our region has been changing. The changes we see in the total amount

of precipitation as well as storm-level precipitation changes (i.e. the intensity and duration of precipitation) cascade through the earth system producing a wide-range of impacts. To get at the cascading effects the change in precipitation has, members of the BREE Ecological team are studying the land-surface response to heavy precipitation events to more

fully understand how and why our soil and hydrologic systems respond to heavy precipitation events, their impact on nutrient transport, and the resulting water quality of Lake Champlain.

References found on inside back cover





# INFLUENCE OF LAND USE AND HYDROLOGIC VARIABILITY ON SEASONAL DISSOLVED ORGANIC CARBON AND NITRATE EXPORT: INSIGHTS FROM A MULTI-YEAR REGIONAL ANALYSIS FOR THE NORTHEASTERN USA

by Erin Seybold, Ph.D., VT EPSCoR Postdoctoral Associate and lead author of a recently published a journal article in Biogeochemistry with researchers from Vermont, Rhode Island and Delaware



Land use/land cover (LULC) change has significant impacts on nutrient loading to aquatic systems and has been linked to deteriorating water quality globally. Many previous studies from across the globe have established relationships between increased nutrient loading and the expansion of urban and agricultural land uses. Simultaneously, watersheds are experiencing changes to their annual hydrologic regime, with greater year to year variability in the amount of annual rainfall. We wanted to understand how these two important drivers of water quality – land use and interannual hydrologic variability – might interact to control nutrient export from water-

sheds across the northeastern USA, particularly over seasonal to annual time scales. Recent advances in high-frequency water quality sensors provide opportunities to assess these interannual relationships with sufficiently high temporal resolution to capture the unpredictable, short-term storm events that likely drive important export mechanisms for dissolved organic carbon (DOC) and nitrate (NO<sub>3</sub>--N).

This study used data from a network of on-site sensors in forested, agricultural, and urban watersheds in three states in the northeastern USA: Delaware, Rhode Island, and Vermont. Originally developed through a NSF EPSCoR RII Track II North East Water Resources Network (NEWNet) award, this network of sensors has continued to monitor streams in Vermont as part of the BREE project. Using two years of high-frequency sensor data (2015 and 2016), we quantified how hydrologic variability (e.g. the variation in the amount of

rainfall) and land use affected the timing and magnitude of dissolved organic carbon and nitrate export.

We found systematic differences in the timing DOC and NO<sub>3</sub>--N export among different LULC classes, with distinct regional similarities in the timing of DOC and NO<sub>3</sub>--N fluxes from forested and urban watersheds across the northeastern USA. Conversely, export dynamics at agricultural sites appeared to be highly site-specific, likely driven by local agricultural practices and regulations. Furthermore, the magnitude of solute fluxes across watersheds responded strongly to interannual variability in rainfall, suggesting a high degree of hydrologic control over nutrient loading across the region. Thus, there is strong potential for climate-driven changes in regional hydrologic cycles to drive variation in the magnitude of downstream nutrient fluxes, particularly in anthropogenically modified landscapes (like urban and agricultural watersheds) where excess nutrient pools are readily available.

## The full article may be found here:

Seybold, E., Gold, A.J., Inamdar, S.P. et al. Biogeochemistry (2019) <https://rdcu.be/b1BG0>

## PRESIDENT SIGNS DISASTER DECLARATION FOR HALLOWEEN STORM

VT Business Magazine

Governor Phil Scott today announced that President Donald Trump has signed a Major Disaster declaration for public infrastructure damage caused by severe storms and flooding throughout Vermont, which occurred on October 31 and November 1, 2019. The declaration will provide federal assistance for repairs to public infrastructure in Addison, Chittenden, Essex, Franklin, Lamoille, Orange, Orleans and Washington counties.

A request for Individual Assistance (IA) funding to help homeowners and renters recover from the storm is still under review by the Federal Emergency Management Agency (FEMA) and the White House.

Vermont officials identified more than \$6 million in storm damages to public infrastructure statewide. Municipalities and qualifying non-profits like public utilities in the counties above are eligible to receive 75% federal reimbursement for storm response and recovery. Those costs include debris removal and repairs to public roads, bridges and other infrastructure with storm damage.

"We're grateful for the assistance to repair public infrastructure in areas of the state hit hardest by the storm," said Governor Scott. "We are hopeful our additional request for assistance for individuals will also be approved to help families as they rebuild."

Although President Trump has not yet issued a decision on the request for IA funding, more than 370 Vermonters reported damage to their homes as a result of the storm and flooding. Vermont officials are continuing to assist individuals with unmet needs as a result of the storm.

Municipal leaders can begin the process to apply for federal funding for public infrastructure repairs by attending an upcoming applicant briefing, which will outline the requirements for receiving federal awards and maximizing eligibility of repairs. Briefing sessions will be announced shortly by Vermont Emergency Management.



## TWO NEW POSTDOCTORAL ASSOCIATES JOIN VT EPSCoR



Panagiotis (Takis) Oikonomou holds a PhD in Civil Engineering in the field of Water Resources Planning and Management from Colorado State University. He spent two postdoctoral years at Colorado Water Center, Colorado State University, before joining the Vermont EPSCoR. Prior to his graduate studies in the USA, he received an MSc in Environmental Policy and Management from the University of the Aegean and a BSc in Agricultural Engineering, majoring in

water resources, from the Agricultural University of Athens. Panagiotis joined Vermont EPSCoR in August 2019 as part of the BREE Integrated Assessment Team, focusing on computational modeling of extreme events in coupled natural and human systems.



Ravindra Dwivedi holds a PhD in the field of Hydrology and Atmospheric Sciences from the University of Arizona Tucson. His doctoral research utilized multi-year ob-

servations of hydrologic fluxes, storages, conservative tracers, chemical compositions and water residence times from a mountainous site located within the Santa Catalina Mountains Critical Zone Observatory (SCM-CZO), Tucson, Arizona, to develop and evaluate competing conceptual models of seasonal streamflow generation. Now with the BREE Ecological Systems Team, his research interests include fluid flow behavior in enclosed environments, climate change impacts on spring and stream flows, coupled flow and transport processes in geophysical environments, and contaminant flow and transport processes in subsurface environments.

## POLICY AND TECHNICAL ADVISORY COMMITTEE UPDATE



*Dr. Panagiotis (Takis) D. Oikonomou shares his findings with PTAC participants*

The VT EPSCoR Policy and Technical Advisory Committee (PTAC) Spring Meeting was held on December 19, 2019. The biannual meetings offer a space for policy makers, decision makers, researchers, federal agency representatives, town and local officials from around the state and region to convene and take an active role in interactive sessions surrounding the Lake Champlain Basin.

The day-long meeting offers stakeholders the opportunity to share knowledge, experiences and concerns with each other. The participants also hear from VT EPSCoR BREE scientists regarding progress on the Integrated Assessment Model and other important progress to date. The next meeting will be held in the Spring of 2020. For more information, please contact [epscor@uvm.edu](mailto:epscor@uvm.edu)



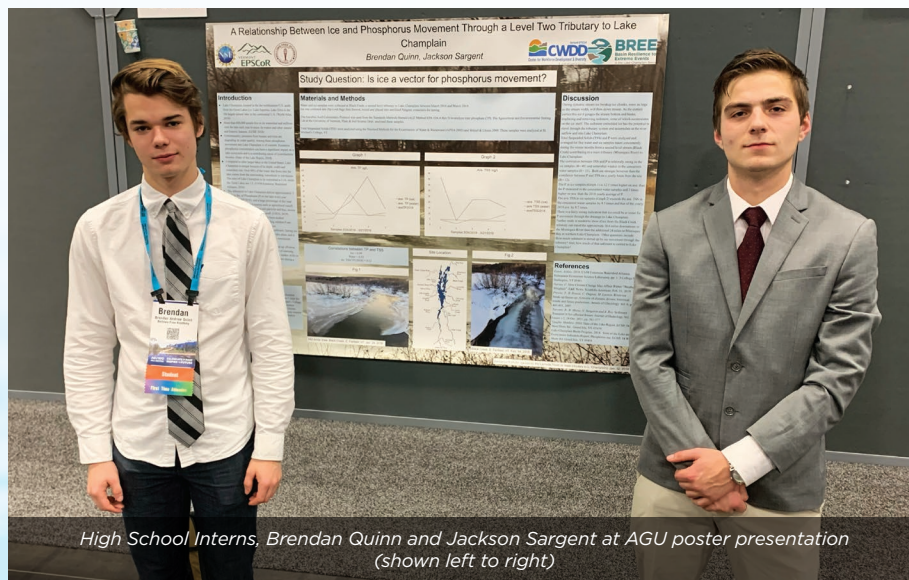
## HIGH SCHOOL STUDENT SPOTLIGHT:

Fairfax students break ice on wintertime phosphorus BFA high schoolers study pollution in frozen creek - *by Michael Frett, Messenger Staff Writer*

*Photos by Tom Lane, BFA Fairfax High School Teacher*

FAIRFAX - A new study is suggesting researchers tracking phosphorus in Vermont's watersheds should give more attention to ice - and it comes courtesy of two high school students at Bellows Free Academy - Fairfax.

"When we actually sent these samples to St. Mike's to be analyzed, the person at St. Mike's was actually very surprised," Quinn said. "There were really, really high phosphorus levels."



For about a year, BFA sophomore Brendan Quinn and senior Jackson Sargent collected samples of ice and water from a site along the Black Creek in Fairfield, looking to answer the question of whether ice provided another vector for phosphorus pollution.

Those samples were sent to Saint Michael's College in Colchester, where they were tested for phosphorus and "suspended solids" - a term referring to the scatterings of soils and sediments carried through waterways that can sometimes bring phosphorus downstream.

According to the two students, the results were clear enough for them both to, in unison, answer "yes" when asked if ice could bring phosphorus into a watershed.

Thomas Lane, the BFA high school teacher who coordinated their study with a Vermont Established Program to Stimulate Competitive Research (EPSCoR) program, suggested the students' study could provide a "preliminary study" for inciting future research.

"At our level, I would hope that somebody would say 'Oh, these guys have done this study that implicates that something's happening here,' and maybe somebody at [the University of Vermont] or St. Mike's would pick up on that," Lane said. "When it comes to phosphorus movement in Lake Champlain... wintertime has not been looked at."

"A lot of people hadn't done that research before," Sargent said.



"It's interesting because, in science, if the fieldwork is hard, I think there's a tendency not to do it," Lane said. "Most people don't like going out and getting their feet wet."

Quoting a colleague, Lane added, "A lot of the science that's easy to do has been done. It's the hard stuff... where there's still lots of room."

With Lane's support, the two students collected samples from the shores of the Black Creek between the winters of 2018 and 2019.

They selected the creek due to its role as a tributary to the larger Missisquoi River, a waterway regularly cited in state reports for the out-sized effect phosphorus pollution has had on its watershed and the resulting blooms of cyanobacteria in Missisquoi Bay.

Phosphorus is a vital nutrient needed for plants to grow. When washed into waterways, however, the nutrient can help fuel the potentially toxic bloom of cyanobacteria more commonly known as blue-green algae.





*Ice movement Black Creek*

Data collected by Quinn and Sargent found that, during the winter, the levels of phosphorus in ice easily outpaced the water still flowing below, leading the two to wonder what could happen when snow melts would wash ice further downstream into the Missisquoi River and, ultimately, into Lake Champlain.

They also wondered what that would mean as the widely reported effects of climate change leads to more frequent snow melts. "I think that, since the amount of thaws have increased, it would load more phosphorus into the lake," Sargent said. "You have more ice chunks flowing into the lake than you would if it was just once a year."

As a follow-up to that research, Sargent said he would, as a part of an independent study with Lane, actually look into that question and possibly study, through publicly available satellite imagery, the annual number of ice thaws in either Black Creek or the Missisquoi River.

"I think we're going to find more break-up events, and as you've shown, they carry a lot of phosphorus," Lane said to Sargent during their interview with the Messenger. "But you never know until you actually look at the data."

Quinn and Sargent also suggested the study showed wintertime testing could better inform state reporting on the Lake Champlain

Basin, with Quinn saying, "If they were to sample during the winter-time, [the state] could have a more accurate State of the Lake report."

According to the two students, who showed their research at the annual American Geophysical Union's Fall Meeting in San Francisco, reactions to their work were more generalized, often coming from people who appeared less familiar with the questions of phosphorus pollution dominating headlines in Vermont.

"Your audience at AGU - they're not familiar with Vermont and they're not familiar with phosphorus movement," Lane said.

"I think one thing that caught a lot of attention was animal and human harm," Quinn said.

As a classroom experience, both Quinn and Sargent said their study provided important hands-on exposure with the sciences, something they said might not come from the typical day-to-day work of traditional science classes.

Both said they hoped to pursue a future in the sciences, something Lane said he hoped experiences like their study of Black Creek could help foster.

"The whole realm of science involving field work takes capable



*Ice on bank - Black Creek*

people," Lane said. "It's practical experience and it's students being aware that science is more than what you think of happening in a lab coat in a lab."

"We got to do field research," Quinn, who has another project in the works with Lane on the effects of natural barriers like wetlands on phosphorus loading, said. "The field research we do in class - which is almost never - is very, very different from the research we do here."

"It's important that we got to try out an idea, pursuing more information about what we're trying to prove, putting that together and presenting that and proving what we found was in fact legitimate," Sargent agreed. "I think that was the important takeaway."



*Ice out event - Black Creek*



## UNDERGRADUATE INTERN SPOTLIGHT:

### BREE Intern Alumnus Now NBC5 Meteorologist



Ben Frechette, a BREE undergraduate intern in 2017 and 2018, now serves as the newest member of the NBC5 First Alert Weather team as a meteorologist.

Raised in Somerset, Massachusetts, Ben attended Northern Vermont University (NVU) as an undergraduate. During his time with the BREE program, he worked with Vermont EPSCoR member Janel Hanrahan, PhD, an Associate Professor of Atmospheric Sciences at NVU. As an intern, he aided in the development of a foundation for a model capable of forecasting the frequency of extreme precipitation events over the Lake Champlain Basin.

*"My experience with Dr. Hanrahan and the entire VT EPSCoR program gave me the confidence to pursue this opportunity at NBC 5," Frechette said. "I learned how to ask the right questions and present my findings effectively, which are skills I use in the studio every day."*

Ben joined the NBC5 news team in November 2019, marking his first time working for a television station. He joins the team with previous forecasting experience, providing weather updates to the Vermont Agency of Transportation while in college.

## VT EPSCOR LEADS SACNAS COLLABORATION



From left to right: Charles Watson (Rhode Island EPSCoR), Stephen Hale (New Hampshire EPSCoR), Megan McGinty (Alaska EPSCoR), Maria Dumanlang (Hawaii EPSCoR), Veronica Sosa-Gonzalez (Vermont EPSCoR) and Courtney Breest (Alaska EPSCoR)

CWDD Coordinator Veronica Sosa-Gonzalez, PhD, led a collaboration of EPSCoR jurisdictions during the annual meeting of the Society for the Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS) from October 31 to November 2, 2019. The collaboration led by Dr. Gonzalez included seven other EP-

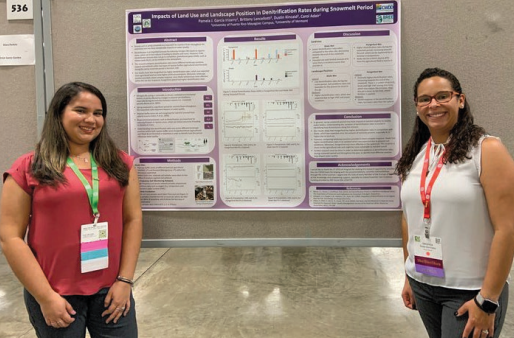
SCoR jurisdictions, with Vermont, Alaska, Hawaii, New Hampshire, and Rhode Island present at the conference and Nevada, Delaware, and Mississippi sending materials. Representatives from these jurisdictions presented current research and offered STEM students internships and graduate school opportunities.



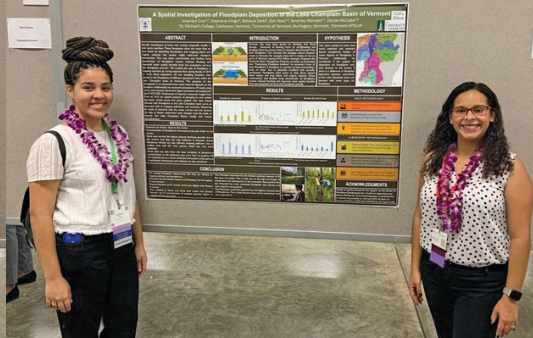
Julyanice Cruz, St. Michael's College undergraduate student and former BREE intern, talks to a SACNAS attendee about her research with BREE in the summer of 2019

The annual meeting presented the opportunity for new conversations about future collaborations. Dr. Gonzalez spoke to over 100 SACNAS attendees during the collaboration, including students, staff, and faculties from universities across the country.





Summer 2019 BREE intern Pamela Garcia and CWDD Coordinator Veronica Sosa-Gonzalez standing by Pamela's poster



Summer 2019 BREE intern Julyanice Cruz and CWDD Coordinator Veronica Sosa-Gonzalez, PhD standing by Julyanice's poster



From left to right: Julyanice Cruz, Veronica Sosa-Gonzalez, PhD, and Pamela Garcia

## SUMMER 2019 INTERNS PRESENT BREE RESEARCH AT SACNAS

BREE interns Julyanice Cruz and Pamela Garcia presented the results of their summer 2019 research during the Society for the Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS) Annual Conference that took place from October 31 to November 2, 2019 in Honolulu, Hawaii. This marked the first time that BREE research was presented at a SACNAS meeting, and both posters were highly visited by conference attendees.

When asked about their experience during the conference, the former BREE interns shared the following:

*"The SACNAS conference was the most diverse, interactive, and educational conference I have ever been to"*

*- Julyanice Cruzal*

*"SACNAS was such an amazing and life-changing experience. It was my first time presenting a poster at a conference and it was gratifying. Everything, from the different speakers to the Professional Development Sessions, inspired me to continue with my dreams pursuing a STEM career. This conference definitely made me grow not only as a professional but also as a person."*

*- Pamela Garcia*

## NATIONAL SBIR ROAD TOUR 2020 HELD AT THE UNIVERSITY OF VERMONT

The Small Business Innovation Research (SBIR) Road Tour came to Vermont on September 16, 2019 for a day-long series of panels and discussions in the University of Vermont (UVM) Davis Center. Vermont State EPSCoR Director Arne Bomblied, PhD, PE participated in a panel to discuss the variety of ways in which Vermont EPSCoR helps local small businesses, in-

cluding SBIR Phase(0) and Pilot Project awards. Approximately 150 entrepreneurs and researchers attended the event.

For more information about the SBIR Road Tour program, visit [sbirroadtour.com](http://sbirroadtour.com). To view the details and agenda of the UVM Road Tour stop, visit [uvm.edu/uvminnovations/sbir-sttr-road-tour](http://uvm.edu/uvminnovations/sbir-sttr-road-tour)



Participants of entrepreneurs and innovators listens during an SBIR Road Tour panel



Brittany Sickler (Policy Analyst, SBA Office of Investment and Innovation) moderates a panel. Photo by Danny Monahan.



# BREE RESEARCH PRESENTED AT AMERICAN METEOROLOGICAL SOCIETY (AMS) ANNUAL MEETING

## DR. DUPIGNY-GIROUX RECEIVES HONORS

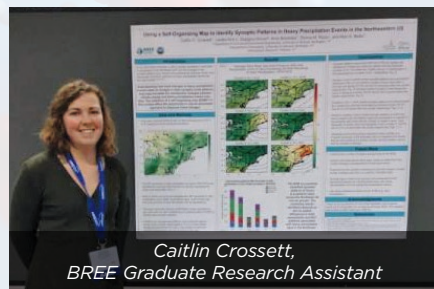
The American Meteorological Society (AMS) held its 100th annual meeting from January 12-16, 2020, with three BREE researchers on hand to present findings and receive honors.



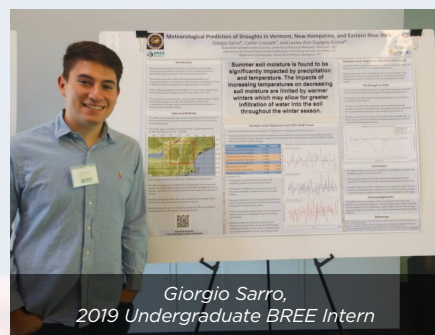
Dr. Lesley-Ann Dupigny-Giroux was inducted as a Fellow of the AMS during the annual meeting. As a Fellow, Dupigny-Giroux is among a select group of AMS members recognized for their outstanding contributions to the atmospheric, oceanic or hydrologic sciences over a substantial period of years.

An applied climatologist by training, Dupigny-Giroux's research interests in-

tersect several fields including hydro-climatic natural hazards and climate literacy, as well as the use of remote sensing and GIS (Geographic Information Systems) in the fields of spatial climate and land-surface processes. Dupigny-Giroux is the State Climatologist for Vermont.



BREE Graduate Research Assistant, Caitlin Crossett, presented her poster titled "Using a Self-Organizing Map to Identify Synoptic Patterns in Heavy Precipitation Events in the Northeastern US" at the AMS's 34th Conference on Hydrology.



Giorgio Sarro, a 2019 undergraduate BREE intern, presented his poster titled "Meteorological Predictors of Droughts in Vermont, New Hampshire, and Eastern New York." This poster featured research he completed as a part of the BREE Summer Undergraduate Research Program and was presented at the AMS's 19th Annual Student Conference.

For more information about the AMS 2020 annual meeting, visit <https://annual.ametsoc.org/index.cfm/2020>

## 2020 ALAN ALDA COMMUNICATING SCIENCE WORKSHOP

### Offering Professional Development Opportunities

Instructors Elizabeth Bojsza, James Rea, and Christian Seiter from the Alda Center at Stonybrook University facilitated the all-day workshop composed of faculty, graduate students, post-doctoral associates and administrators from multiple disciplines and programs. The workshop began with an introduction to the Alda Method's unique approach to communicating science and progressed with interactive group exercises providing hand-on training techniques for the attendees.

To learn more about the workshop series or the Alda Center, visit [www.aldacenter.org](http://www.aldacenter.org)



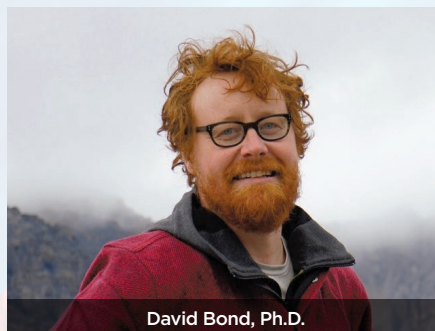
From left to right: Carolina Blake (UVM Watershed and Lake Education Program Assistant), Charlotte Cockburn (BREE Graduate Research Assistant), Dr. Don Ross (BREE Researcher), and Ellie Sovcik (UVM Undergraduate and Former BREE Intern)



From left to right: Dr. Dustin Kincaid (BREE Post Doc), Dr. Julia Perdril (BREE Researcher), Alex Medvedeff (UVM Laboratory Research Technician), and Dr. Rosalie Bruel (Rubenstein School of Environmental and Natural Resources Post Doc)



## RII TRACK-4: EPSCoR RESEARCH FELLOW: DAVID BOND, BENNINGTON COLLEGE



David Bond, Ph.D.

In 2018, Dr. Bond was invited to be a Member in the School of Social Science at the Institute for Advanced Study (IAS) in Princeton, NJ. The support of the EPSCoR Research Fellowship made it possible for him to accept this premier invitation and join 26 scholars from across the social sciences and around the world working on the theme of “Crisis and Critique.”

Collaborating with scholars and scientists from around the world, Dr. Bond explained that “My time at the Institute was a unique opportunity to deepen my current research into the emergence of the environment as a field of sci-

ence and policy while widening the significance of my findings for scholarly audiences, policy considerations, and public concerns. A number of these collaborations are transitioning into jointly authored publications and collaborative research proposals. My time at the Institute of Advanced Study was not only an extraordinary platform for my own scholarship, it also breathed new intellectual life into my long-term teaching commitments, research collaborations, and institutional responsibilities. At the Institute for Advanced Study, I also continued ongoing ethnographic and archival research on the critical relationship between fossil fuel disasters and environmental protections, synthesized my findings in direct conversation with leading scholars from across the social sciences, and finished a book length manuscript on the place of the environment in our tumultuous present.”

His book brings the historical depth and ethnographic texture of these linkages into clear focus by

following cascading stories of hydrocarbon harm and the defense of life in North America. *Environment: A Disastrous History of Our Hydrocarbon Present* describes the wider history of disasters that have long accompanied fossil fuels and the manner in which our solutions have often been less about confronting the cause than managing the effects. While many take up the environment as an autonomous field of research and regulation, this book documents how the environment gains potent definition as a laboratory for reigning in the worst of fossil fuels. Dr. Bond explained: “This history of our present is significant not only for its previous neglect in critical scholarship but also for the technical limits it places on democratic practice in this moment of rising ecological instability. I also began work on a manuscript reflecting on ongoing work responding to PFOA contamination in southern Vermont. A number of scholarly and public publications are forthcoming.”

### Where are they Now?



**Gabriela Bucini, PhD** entered into a post-doctoral program with the University of Vermont’s Department of Plant and Soil Science in 2016.

Her areas of focus include ecology, geographic information systems, and human-ecological systems. She currently develops agent-based models depicting the hoof-stock industries and is involved in a broader project that seeks to reduce the impact of potential emergent diseases on herd health.



**Sarah Coleman, PhD** completed her PhD dissertation, “Bottom-Up Adaptive Management and Stakeholder Participation for Clean

Water and Healthy Soils in a Complex Social-Ecological System” in January 2018. She used some of the research she conducted with Vermont EPSCoR in a 2018 publication in *Landscape and Urban Planning* which explored the successful adoption of stormwater practices in rural communities.



**Courtney Giles, PhD** entered into a post-doctoral program with the James Hutton Institute in the United Kingdom in 2014. She returned

to the University of Vermont in 2017 as the Lab Manager in the College of Engineering and Mathematics (CEMS). She now serves as the Director of Curricular Enrichment and Lecturer with CEMS. Her areas of expertise include phosphorus biogeochemistry, laboratory instrumentation and management, technical writing, and active and project-based learning.





## STUDENT SYMPOSIUM

The 2019 Vermont EPSCoR Annual Undergraduate Research Symposium showcased the work of undergraduate researchers in the Basin Resilience to Extreme Events (BREE) program. The event took place on Thursday August 1st, 2019 at Main Street Landing in Burlington

Vermont and was hosted by the Center for Workforce Development and Diversity. The symposium offers student researchers an opportunity to practice their science communication skills in a professional environment, and provides a critical capstone to the summer undergraduate

internships. BREE research provides valuable insights on the Lake Champlain Basin for many stakeholders throughout Vermont. The many contributions from this year's young scientists will help improve our understanding even more!



**2019 Undergraduate Interns**

**Front:** Pamela Garcia Irizarry, Sarimar Cuevas-Hernandez, Mariana Delpin Sosa, Alex Howe, Anna Singer, Grady Jakobsberg.

**Middle:** Kerien Lopez-Aquino, Connor Zwonik, Raquel Lugo-Bendezu, Ann Marie Matheny, Elinor Sovcik.

**Back:** Giorgio Sarro, Mariah Cronin, Julyanice Cruz, Luis Esbrí Ruiz, Mathew Koretsky, Diego Rodriguez-Steinhardt, Jack Goldman



**2019 Native American and First Generation Scholarship Awardees**

**L to R:** Ted Brady (Dep. Sec. VTACCD), Veronica Sosa-Gonzalez (Coordinator CWDD).

**Students:** William Li, Katie Lucier, Ryland Richardson, KC Herne, Stiles Loper, Lexus Pattershall, Tracee Turnbaugh; and Dr. Arne Bomblies, VT State EPSCoR Director

Ted Brady, Deputy Secretary of the Vermont Agency of Commerce and Community Development, keynote speaker for the Symposium awarded this year's Native American and First Generation Scholarships to seven meritorious students and remarked, "Young people in Vermont are our most valuable commodity. The Agency of Commerce is trying to create an economic development system designed to keep people in Vermont. Vermont EPSCoR and the Center for Workforce Development and Diversity at Saint Michael's College help achieve that goal by encouraging young people to stay in Vermont and work on current problems in the state."



# VT EPSCoR Native American and First Generation Scholarships

**Applications now being accepted. Deadline April 1, 2020**

*For more information please visit:*

<https://epscor.w3.uvm.edu/2/node/134> or contact

VT EPSCoR Center for Workforce Development and Diversity  
Saint Michael's College • One Winooski Park Box 137 • Colchester, VT 05439  
802.654.3270 • [cwdd@smcvt.edu](mailto:cwdd@smcvt.edu)



*2018 recipients*

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