

Alaska NSF EPSCoR is a partnership dedicated to growing Alaska's scientific research capacity, funded by the National Science Foundation and the State of Alaska.

A More Fiery Future?

2019 Southcentral fires spur EPSCoR effort to forecast conditions

Some of the weather conditions that led to the destructive McKinley and Swan Lake fires in 2019 could be a mainstay of Southcentral Alaskan summers in the future, according to a new article by a team of Alaska NSF EPSCoR Boreal Fires scientists.



Photo by Katy O'Hara/USFS

A member of a hotshot fire crew monitors the Swan Lake Fire, August 26, 2019.

Twenty-three researchers – 13 of them core members of the Boreal Fires team – collaborated on “Emerging Anthropogenic Influences on the Southcentral Alaska Temperature and Precipitation Extremes and Related Fires in 2019,” an article recently published online in the journal *Land*. The researchers studied Southcentral Alaska's unusual 2019 fire year for signs of human influence on the climatological factors that precipitated the fires, and extrapolated their results out through the coming decades. They found that Southcentral summers are expected to get both hotter and wetter, but that temperature growth will be more pronounced than higher moisture, increasing fire risk.

“The heat is overtaking the moisture,” explained lead author Uma Bhatt, UAF Professor of Atmospheric Science and co-lead of the Boreal Fires component. “Precipitation is going up, but temperature is really going up. The warming is winning out.”

2019 was an unusual summer in Southcentral Alaska: whereas seasonal rains generally quash the fire season by late July, persistent hot and dry weather and high wind events led to a spate of late-season conflagrations, such as the McKinley Fire north of Willow and a resurgent Swan Lake Fire on the Kenai Peninsula. The ongoing fires led to prolonged periods of poor air quality and cost \$70 million to suppress.



From the PI

Brenda Konar,
Principal Investigator

It's an honor and a privilege to introduce myself as the new Principal Investigator and Project Director of Alaska NSF EPSCoR Fire & Ice.

Many of you know me already, but for those who don't, here's a little background: I'm currently a Professor of Marine Biology at the UAF College of Fisheries and Ocean Sciences, and recently stepped down as CFOS' Associate Dean of Research and as Director of the Institute of Marine Science and the Coastal Marine Institute. I have a Ph.D in Biology from the University of California-Santa Cruz, and I've worked at UAF in various faculty capacities since 1999. My research interests include intertidal and nearshore ecology, in particular processes that regulate seaweed and invertebrate communities. I also teach various courses, including scientific diving, which is a personal passion of mine.

I've been involved with the Fire & Ice project since the beginning, as a co-PI and as co-lead of the Coastal Margins component. My principal role has been coordinating and leading intertidal research in Kachemak

Southcentral Fire Predictions

Continued from Page 1

“Some of the fires, in Swan Lake, for example, they had started in June and had been smoldering,” said Bhatt. “Typically those go out once it starts raining, but it was dry and a few things happened and they just erupted.”

The main purpose of the article was to study whether impacts of human-driven climate change – “the anthropogenic signal” – can be detected in these fires, as it already has been in Interior Alaska. To accomplish this, the researchers studied temperature and precipitation data from both the Susitna Valley and the Kenai Peninsula, and climate model simulations from the National Center for Atmospheric Research Community Earth System Model Large Ensemble (LENS). The scientists quantified fire risk by using the model output to calculate monthly values for the Standardized Precipitation Evapotranspiration Index (SPEI), a measure of surface wetness/dryness and thus flammability.

The team found that 2019 was indeed an extraordinary fire year: it had both the hottest and driest June–August period in Southcentral Alaska in the last 40 years. However, the researchers determined that despite that year’s extreme conditions, the anthropogenic signal has thus far been minimal in Southcentral Alaska: the likelihood of any month’s average SPEI in 1979–2019 being higher than that month’s extreme SPEI in the preindustrial era is still quite small –



Major burn areas of 2019 in southern Alaska. The inset shows PSA (Predictive Service Area) boundaries for Alaska and the analysis domain used for the research. (Bhatt et al. 2021)

only around 2 percent depending on the month. This led them to conclude that the anthropogenic signal was not solidly in evidence in 2019.

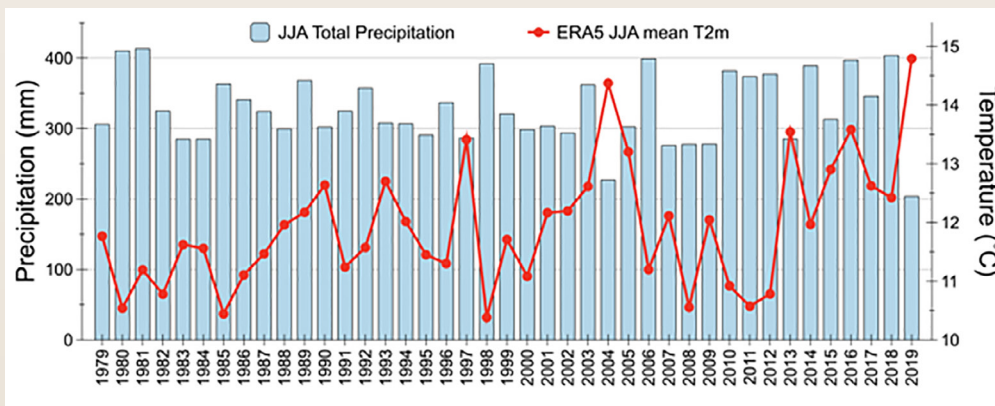
However, they also calculated values for the years 2040 to 2080, and found a much more pronounced likelihood that average SPEI in any month will rise beyond preindustrial extremes: about 13 percent in June, 9 percent in July and 7 percent in August. These numbers are considerably smaller

than those researchers have estimated for the hotter and drier Interior Alaska: an earlier study estimated that the anthropogenic signal has increased the risk of an event like the 2015 Interior Alaska fire season by 34–64 percent. But Bhatt said the Southcentral numbers still indicate a southward progression of human impacts on Alaska’s fire season.

“On the North Slope, we’ve been saying for a long time how human impact, anthropogenic climate change has been visible, and then the 2015 paper

showed it was in the Interior,” Bhatt noted. “And now we’re finally getting hints of it farther south.”

Of the researchers involved in the article, 14 are UAF affiliates and 2 are UAA affiliates. The article is part of a special edition of *Land* entitled “Fire in the Earth System: Humans and Nature.”



June–August total precipitation (blue bars) and air temperature at 2 meters in altitude for each year, 1979–2019, based on European Center Reanalysis version 5 (ERA5) over a domain including the Kenai Peninsula and the Mat-Su Valley. The image demonstrates 2019’s precipitation and temperature extremes. (Bhatt et al. 2021)

Lena's Labors Logged

Story and photos by Naomi Hutchquist and Cassidy Phillips, Alaska NSF EPSCoR

Fire & Ice Coastal Margins researchers have been collecting and sorting samples of marine life from Juneau and Kachemak Bay since 2019. But what happens to the samples once they make it into the lab? On a rainy day in June, members of the Fire & Ice communications team paid a visit to the Lena Point Fisheries facility in Juneau, where University of Alaska Southeast undergraduates Preslee Chase, Grace Ham, and Mali Tamone were hard at work turning samples into science.

Chase, a fourth-year undergraduate, is studying the diets of snails and limpets. Her experiment consists of six tackle-box-sized containers in a running current of seawater. Each container is broken into thirty cells, with each cell alternately housing a snail or a limpet collected from each of the EPSCoR research sites in Juneau and Kachemak Bay. The snails and limpets are being fed *Fucus* (rockweed), a seaweed that is abundant in both regions. By examining their diets, Chase

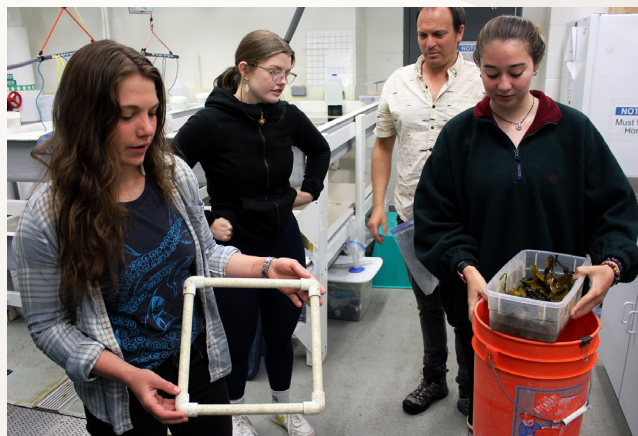


Snails and limpets from Preslee Chase's experiment.

rely on the chemistry of the ocean to build their shells and adhere to rocks.

Fourth-year UAS undergrad Mali Tamone is studying a very different aspect of nearshore food webs: contamination by microplastics. Tamone collected samples of *fucus* from sites chosen for their proximity to human activities. Each sample was stored in a glass or aluminum container to minimize interaction with plastics, then run through a 1 micron filter and examined under a microscope to look for microplastics. The objects she's looking for are less than five millimeters long, and can include fragments that have sloughed off of larger plastic objects, fibers from synthetic clothing, and exfoliant beads used in cosmetics. The goal of this project is to examine whether microplastics adhere to *Fucus* in the wild in order to better understand to what degree microplastics might be found in the food web.

The three projects are funded by both Alaska NSF EPSCoR and the UA Biomedical Learning and Student Training (BLaST) program. The data collected from the projects will continue to fill in gaps in understanding about how the dynamic coastal margins along the Gulf of Alaska play into the larger ecosystem and the food web that supports life in this region.



UAS undergraduate researchers (l to r) Mali Tamone, Gracelyn Ham and Preslee Chase. UAF postdoctoral researcher Scott Gabara is in the background.

hopes to determine why snails and limpets collected from Kachemak Bay appear to be larger than those from Juneau.

Ham's project also takes advantage of samples collected from Fire & Ice research sites in Juneau and Kachemak Bay. The UAS sophomore-to-be is examining the shell strength and attachment strength of Pacific blue mussels from each area. When the mussel samples were collected, a force gauge was used to measure the amount of upward force required to remove them. In the lab, Ham is using the same tool to apply downward pressure against the mussel and measure the force required to break through the shell. She's tracking how these numbers differ across research sites with different levels of glacial coverage, to test the hypothesis that the amount of freshwater input will affect shell strength and adhesion for creatures that



Grace Ham sorts and weighs *fucus*, mussels, hermit crabs, and other creatures.

An Intoxicating Side Gig

“Data manager by day, sommelier wrangler by night” is an unorthodox career trajectory. But it suits Vanesa Raymond just fine.

“I’m a multipassionate person, is really what it comes down to,” said Raymond, who works as the Data Manager for Fire & Ice and also founded Telesomm, an app that links up wine enthusiasts with sommeliers.

Raymond’s resume is, shall we say, picaresque. She holds a Master’s in Arctic Governance from UAF and a Bachelor’s in Cultural Studies from Hampshire College, for which she wrote a thesis on the history of jazz. She’s worked as a cook on a windjammer in Maine, a Peace Corps Volunteer in Bulgaria, a market researcher for a national wine event franchise, and in a variety of project and data management positions across Massachusetts, New York, California and Alaska.



Vanessa Raymond

Photo courtesy Vanessa Raymond

the process of learning to taste wine, and they’ll also tell you information about those wines, the wineries, the winemaking process, the grapes, maybe the winemaking culture that wine comes out of.”

Raymond said that online wine tastings are growing in popularity, but that what makes the app unique is its personal sommelier service. “Lots of people were starting to do online wine tastings, but I saw that they were kind of missing some personalization,” she explained. “It was like buying a ticket to an event, as opposed to a private experience with just you and your friends on your birthday with your favorite wines.”

Raymond spent months building and testing the app, gathering market data from segments of the wine industry, gauging interest from sommeliers, and running a series of test events. She benefited a great deal during the process from Alaskan services for business startups, including Alaska Startup Week and the Alaska Developers Alliance HAKathon, both of which enjoy support from EPSCoR. She also took part in Upstart Alpha, a business accelerator run by the University of Alaska Center for Economic Development, and has employed an intern (senior undergraduate Iman Allen) provided to her through a UAA entrepreneurship class.

“I definitely consider myself an output of the Alaska startup ecosystem,” she said. “As nascent as it is, I’ve been absorbing anything that comes out of it.”

Raymond said that the app has been used by thousands of people so far, including a number who discovered it through a collaborative event with a Balkan pastry company that garnered a mention in *Forbes* magazine. She hopes to expand and diversify Telesomm’s offerings to include beer and coffee as well, while also being careful to not let maintaining the app overwhelm her free time. “I’m trying to grow it slowly, because I do have a day job that’s really intensive, so I can’t dedicate a lot of time to it.”

But the endeavor has been entirely worth it, she added. “I’ve had so many incredible experiences and met so many cool people through this process that I never could have expected.”



Photo courtesy Vanessa Raymond

Raymond at a grape harvest in Varshets, Bulgaria in 2009, during her time serving as a Peace Corps Volunteer.

She first collaborated with Alaska NSF EPSCoR when she took a job in 2014 with the UAF Geographic Information Network of Alaska, an EPSCoR project partner with whom she helped to develop the Vis Space visualization facility as well as elements of EPSCoR’s data management and online presence. She left GINA and eventually ended up working for Axiom Data Science, then returned to the fold when EPSCoR contracted

with Axiom to manage Fire & Ice research data.

“I review data and help scientists write scientific metadata so that it can be properly archived and re-used by other researchers,” she explained. “I also help set some of the best practices and guidelines around how we should be sharing data, how we should be documenting science data.”

Never one to be complacent in her career, Raymond also recently embarked on a side gig based on one of her many interests: wine. In April 2020 she founded the Telesomm app, through which wine devotees can schedule virtual wine tastings with any of 11 sommeliers from around the globe. The sommeliers recommend wines (and sometimes food pairings), then meet via Zoom with the clients for a tasting and info session. “They will talk you through



Photo courtesy Vanessa Raymond

Raymond and her cousins in New Jersey, Washington, and Ohio take a world tour of Chardonnay on Telesomm with sommelier Nicole Castro Garro.

Laboring through AGU

Cecilia Borries-Strigle already knew she was in for a long night.

The UAF Atmospheric Sciences Ph.D student was scheduled to present her research at the American Geophysical Union Fall Meeting on December 15. In a normal year, this would have meant standing in front of a poster or a roomful of researchers; in 2020, it meant a 3 A.M. Zoom call.

“I didn’t really sleep” beforehand, Borries-Strigle said. “My alarm went off at 2:30 and I popped out of bed.”

The awkward hour was the result of last year’s all-virtual AGU format, which was scheduled to accommodate simultaneous participants from time zones around the world. Borries duly gave a brief presentation on her research at her scheduled time of 3:04 AM, then settled back for the rest of the session, which included talks by about eight other researchers followed by half an hour of questions and answers.

But she was having trouble concentrating, and it wasn’t just the hour: Borries-Strigle also happened to be nine months pregnant with her first child, and a day past her due date. And right when the session began, so did her contractions.

“They started pretty much right away, but I wasn’t really paying attention. Until maybe half way through the Q and A session, I was thinking that there was a pattern,” Borries-Strigle recalled. “So I started recording the time. And yep, there was a pattern!”

Photo courtesy Cecilia Borries-Strigle



Cecilia Borries-Strigle and Aurelia

She timed the minute-long contractions at seven minutes apart, and guesses she had three or four before the session mercifully came to an end. During that time she managed to answer the couple of questions that were tossed her way, and says she doesn’t think anyone on the call picked up on her condition. “I was trying to breathe through it, it was difficult,” she said.

Borries-Strigle said her focus was starting to flag by the time call ended at 4 AM. She tried to go back to sleep, but she and her husband ultimately packed up and headed to the hospital a couple of hours later. It turned out there was no rush; her condition was progressing slowly and the hospital declined to admit her. She returned that evening, spent the night at the hospital and gave birth to 6-pound 9-ounce Aurelia Beatrice Strigle at 3:05 PM on Dec. 16, 36 hours after the girl’s first hint that she wanted out.

“They have a mind of their own,” Borries-Strigle marveled.

Borries-Strigle is in her second year of her Ph.D under Professor of Atmospheric Sciences Uma Bhatt. Her AGU presentation – which was actually prerecorded; all she had to do at 3:04 AM was deliver a quick summary – was entitled “Applying seasonal forecasts for summer fire weather outlooks in Alaska at a 3-month lead,” and described her research into the relative ability of different weather forecast models to accurately predict subseasonal fire conditions in Alaska.

Letter from the PI

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Bay.

I’m stepping into the position at an important time, at the midway point of our 5-year project. A lot of the work we’ve done in the last couple of years is paying off in the form of individual discoveries, datasets, and publications. The challenge now is to expand on our progress to reach larger conclusions that utilize and synthesize the many different kinds of data we’re generating. I’m also excited to work on our sustainability plan, so the progress we make in Fire & Ice will continue to benefit Alaska into the future.

Fortunately, we’re well-suited to accomplish all of our goals. That is in no small part a reflection of the strong leadership of Pips Veazey, who resigned as PI/PD earlier this year to take a position out-of-state. Pips had a long and successful run at Alaska EPSCoR, and we’re all deeply indebted to her for the current solid state of the program. But she didn’t do it alone: part of the secret to her success was building talented and capable Management and Leadership

teams. With these folks to help shoulder the load, I have no worries about us continuing our success.

As for me, I look forward to the job. While I’m intricately acquainted with Coastal Margins research, I have lots to learn about the rest of the project. So I’m very excited to find out more about our Boreal Fires research, the Diversity, Education and Workforce Development component and other aspects of our operation.

EPSCoR is a big and complicated project, but we’ve got the experience and skills on board to keep it going strong. I look forward to helping it succeed, and I also look forward to working with all of you along the way.

Sincerely,

Brenda Konar

EPSCoR welcomes Student Ambassadors

The EPSCoR program couldn't function without the hard work, resourcefulness and creativity of its many grad students, and it's important that students get at least as much out of the program as they pour into it.

That's why EPSCoR started a "Student Ambassador" program, through which a pair of EPSCoR graduate students work with program leads to brainstorm content for student meetings and events. UAF graduate students Anushree Badola and Lindsey Stadler have volunteered to serve initial one-year terms as ambassadors.

"We want to make sure that our graduate student events are valuable and relevant to the students," said EPSCoR Program Administrator Tara Borland. "We're pleased and grateful that Anushree and Lindsey are on board to help us shape the program."

Badola is a second-year PhD student in Geoscience, studying under Boreal Fires co-lead Uma Bhatt. She's originally from Kotdwara, India, and holds both a B.S. in Forestry from the G.B. Pant University of Agriculture and Technology in India and a Master's in Geo-Information Science and Earth Observation from the University of Twente in the Netherlands. Her research focuses on hyperspectral remote sensing of wildfires, specifically on creating detailed fuel maps for the whole boreal domain in Alaska and on assessing burn severity.

Stadler is a second-year M.S. student in Marine Biology, studying under Coastal Margins faculty Katrin Iken. She's originally from Long Island and received her bachelor's degree in Marine Biology from Roger Williams University in Rhode Island. She also has a 25-ton master captain's license and used to lead whale watching tours in the Salish Sea off of Washington and B.C. She's researching how increasing temperatures and concurrent increasing glacial melt will affect near-shore resource availability and energy flow.

Future EPSCoR graduate student offerings might include social events, writing groups, seminars on a variety of subjects, and other activities. The first development under the new program is an [EPSCoR Discord channel](#) aimed at students.



Badola (t) & Stadler (b)

A New Asset for ASET



Photo courtesy Patrick Tomco

Postdoc Zachary Redman helps a Thermo Fisher Scientific representative transport the mass spectrometer for installation.

UA researchers will be better equipped to study everything from oil spills to ground squirrels thanks to funding from the national NSF EPSCoR program.

NSF EPSCoR kicked in \$180,000 of the \$450,000 needed to purchase an Orbitrap mass spectrometer, which was installed in February at the UAA Applied Science Engineering and Technology (ASET) laboratory and which is the first high-resolution spectrometer in the state. The funding was part of an NSF Major Research Instrumentation award to UAA Assistant Professor of Chemistry Patrick Tomco, who has also enjoyed national EPSCoR support in the form of a 2019 Track-4 award to conduct oil spill research in Louisiana and Florida.

Mass spectrometry is a key analytical method used to identify and characterize small quantities of chemical species in complex samples. Tomco and his Co-PI's have lined up a broad array of planned uses for the device, including studying insecticides, oil spill damage mitigation, plant-herbivore dynamics, medicinal properties of Alaskan botanicals, and the microbiomes of hibernating Arctic ground squirrels. A dozen researchers across the UA system have current plans to use the device; also, the Alaska Department of Fish and Game Division of Sport Fish will use it to study a fish pesticide used on invasive Pike, and the Alaska state crime lab plans student internships aimed at developing new forensic toxicology screening methods.

The EPSCoR support came about through a mechanism known as "co-funding," through which the national NSF EPSCoR organization provides funds to other NSF departments so they can help support worthy research projects located in EPSCoR jurisdictions. As of spring 2021 EPSCoR was co-funding six awards in Alaska for a total of about \$700,000.

EPSCoR in Brief

The Next EPSCoR: “Glaciers to Gulf”

The Alaska NSF EPSCoR leadership team is starting work on the next EPSCoR Track-1 proposal, which would run from 2023–28. They’ve adopted a general framework focused on coastal margins research and are [looking for pre-proposals](#) from researchers interested in participating. There will be a webinar in early September to answer more questions about the project.

Rolling Travel Awards

EPSCoR is offering [rolling travel funding](#) for UA affiliates to present research, to interact with colleagues and mentors, and/or to obtain training in STEAM fields. These awards can be used to participate in conferences, workshops, trainings, or other appropriate academic activities, in person or remotely.

Awards of up to \$3,500 are available on a rolling basis through August 31, pending continued availability of funds. Travel and/or participation must be completed by September 30. The awards are for domestic travel only.

Monthly Newsletter

“[Fire & Ice Essentials](#)” is a new monthly newsletter aimed at participants in Alaska NSF EPSCoR. It’s focused on funding opportunities and events designed to supplement newsletters like this one, which are aimed at a wider audience. To subscribe, email [Tom Moran](#).



Sitka Fellowships

EPSCoR affiliates are invited to apply for a pair of exciting free fellowship opportunities with the Sitka Sound Science Center.

[Scientists in Residency](#) spend a month in Sitka furthering their research and taking part in local outreach. [Scientists in the Schools](#) spend a week in Sitka collaborating with K-12 researchers and educators to design and implement engaging classroom and field experiences.

Scientist in Residency fellowships require [an application](#); at present people interested in [Scientists in the Schools](#) simply need to email [Tara Borland](#) expressing interest. The deadline for applying for either is August 27.

Fire & Ice Faculty Hires



We’re pleased to report that the Alaska NSF EPSCoR Fire & Ice project has completed all five of its University of Alaska faculty hires:



Gwenn Hennon was hired by the UAF College of Fisheries and Ocean Sciences. She’s focusing on plankton with the Coastal Margins component.



Jessica Glass was hired by the UAF College of Fisheries and Ocean Sciences. She’s focusing on fisheries genomics with the Coastal Margins component.



Julie Schram was hired by the University of Alaska Southeast Department of Natural Sciences. She’s focusing on animal physiology with the Coastal Margins component, and also serving as Co-PI and UAS lead for the Fire & Ice project.



Simon Zwieback was hired by the UAF Geophysical Institute. He’s focusing on remote sensing with the Boreal Fires component

Kynan Hughson was hired by the UAA College of Arts and Sciences. He’ll focus on Earth surface processes with both the Boreal Fires and Coastal Margins components.



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If you wish to be added to (or removed from) the EPSCoR newsletter mailing list or listserv, please contact Tom Moran at tmoran3@alaska.edu or (907) 474-5581.