Research in the South Slave

Summer Update

HELLO SUMMER!

Sarah Rosolen, Manager, South Slave Research Centre

As it always seems to happen, one week it's snowing and the next is summer. We have definitely kicked into summer mode here at Aurora Research Institute with lots of STEM outreach and research on the go. This is in part thanks to **two** summer students working in our office this year! Josh Kearley, a Fort Smither studying Physics at the University of British Columbia, is helping with STEM Outreach and Greg Look, an Aurora College Environment and Natural Resources Technology student from Hay River, is working with the Chair of Indigenous Approaches to Environmental Management. It's great to have so much young energy on the team! You can learn more about them and what they are doing on page 5.

We are also energized to learn about the numerous science and research programs being led by Indigenous Government Organizations this summer: on-the-land camps, fish surveys, community monitoring programs, and a STEM camp. Southern researchers are also coming back to the NWT after a few years' hiatus due to you-know-what! So far we have heard from Wilfred Laurier, Waterloo, Carleton, University of Calgary, University of Wisconsin (USA), and Kyoto University (Japan). We have contributions from some of these programs in the section called "Research Summaries and Researcher Profiles". A preliminary list of summer science events is on the last page. It's looking like a great start to the summer!

Finally, we have a new Facebook page! Please follow us @SouthSlaveResearch to stay up to date on the research and science scene in the region. We are happy to share your science and research happenings, too. And, if you are into Instagram, we do that too! We are @nwtresearch - and be sure to check out the South Slave highlights reel.

@SouthSlaveResearch

IN THIS ISSUE

RESEARCH SUMMARIES AND RESEARCHER PROFILES

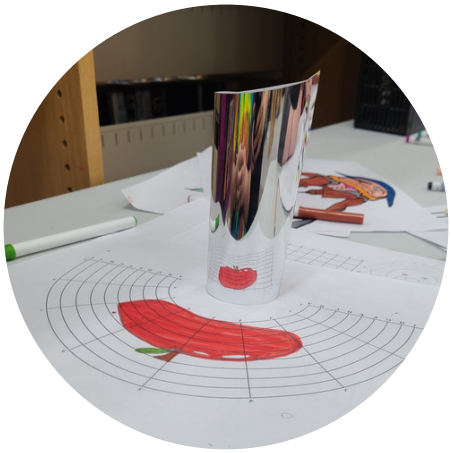
SCIENCE ODYSSEY

Hilary Turko, Outreach Coodinator - South Slave

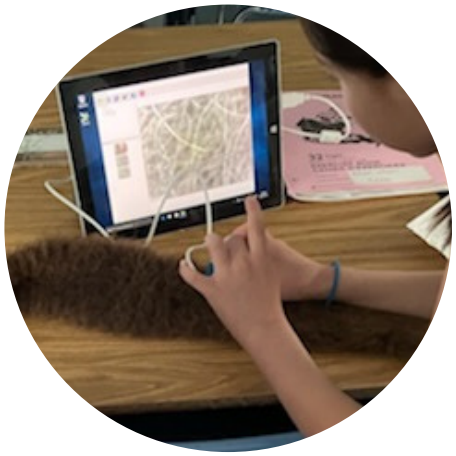
Science Odyssey was celebrated across the South Slave from May 7-22 this year. Over 600 Seeds and Science Kits were distributed to classrooms across our region! Teachers and students conducted experiments on the germination and growth of their plants by changing the light source and the amount of water given to their seedlings. Participating classes were entered in a draw to win an AeroGarden for their classroom.

Other STEM programming highlights this spring included playing with optical illusions and building protective cases for eggs that were dropped out of the Fort Smith Fire Hall.

We were honoured to participate in Salt River First Nations treaty day and National Indigenous Peoples day celebrations by offering STEM activities in Fort Smith on June 21.



Optical illusion morphed drawings



Gr 1/2 students at JBT explore the similarities and differences in Northern animals by looking at furs with digital microscopes

PLANT SURVEY WITH PWK

Kavita Sewruttun, a French Immersion teacher at PWK High School in Fort Smith, attended our bird watching session (see page 4) and asked if we could do something similar for her classes. Peter Lin, an instructor with the Environment and Natural Resources Technology Program at Aurora College offered to help out and led the grades 7, 8, and 9 classes on a vegetation survey near the landslide in Fort Smith. We talked about adaptations of northern plants, designing monitoring programs, and what types of information you can get from vegetation surveys. These budding environmental science students did really well with the plant ID and data collection.

COMMUNITY STEM CAMP

Maximum 12 participants per day

August 8th: Age 6

August 9th: Ages 7 & 8

August 10th: Ages 9 & 10

August 11th: Ages 11 & 12

August 12th: Ages 13 & 14

9:00 am to 3:30 pm

SRFN Culture Room

FUN, FREE ACTIVITES FOR ALL!

Call or Email SRFN to register

872-2986

reception.srfn@northwestel.net

Hosted by Salt River First Nation

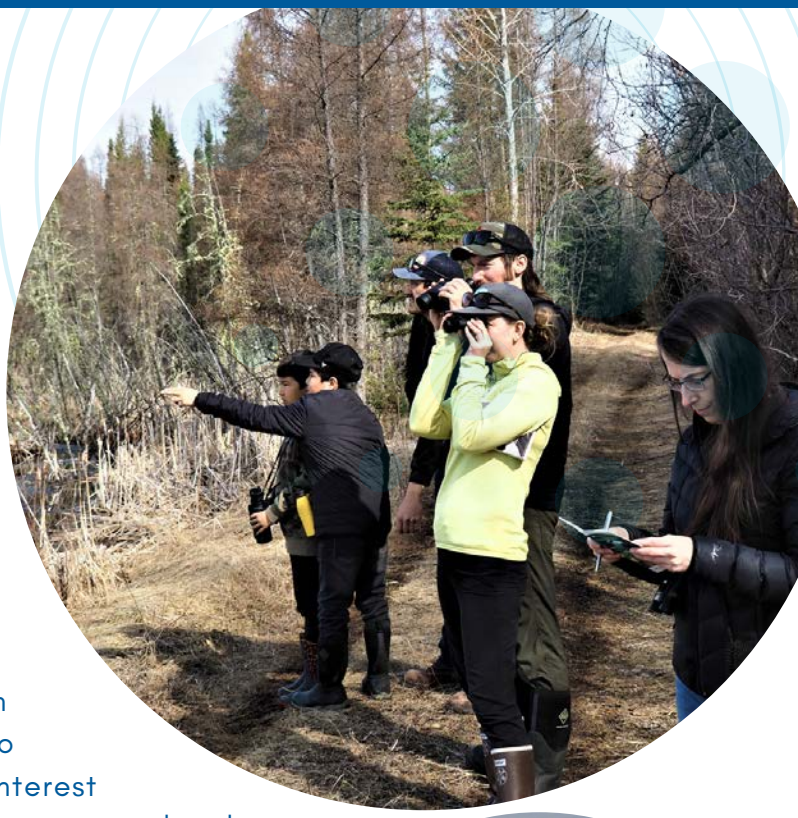
Sponsored in part by

MACA and Aurora College Research Centre

COLLÈGE AURORA COLLEGE | Research Institute Institut de recherche

BEGINNER BIRD WATCHING 101

Sharon Irwin, Research Coordinator



Sharon Irwin, Research Coordinator at ARI this spring, delivered a beginner bird watching workshop to the public in Fort Smith in May. The first part of the workshop was an "in-class" session that covered tips on how to identify local birds by appearance, behaviour, habitat and sound and what is needed to watch and identify birds, including some cool apps for your phone.

The second part was a field trip that took place on Saturday May 14, which coincidentally happened to be World Migratory Bird Day. There was so much interest that we had to hold two field trips that day. Both trips started with a stop along Calder Avenue, where several migrating sparrow species had been flocking, waiting for some signal unknown to humans that it was time to continue north. We felt lucky to spot two of these species before they continued on their journey: the white-crowned sparrow and Harris's sparrow.

The rest of the trip took place at a slough off Highway 5 on Smith's Landing First Nation land. There was ice on the majority of the open water due to a late spring. Fortunately, an ice-free area close to shore gave us a close up view of a pair of green-winged teals in the morning and a horned grebe and a pair of solitary sandpipers in the afternoon. The groups spotted or heard 28 different species between the morning and afternoons trips.

It looks like this program stirred up interest in more citizen science talks. We hope we can deliver - stay tuned!

HELLO FROM OUR SUMMER STUDENTS!

This summer I am working with the South Slave Outreach Team to promote and deliver STEM-related activities to youth in Fort Smith. I held a coding and robotics club at PWK High School in June and will be supporting and offering STEM camps, festivals, and activities around town for the rest of the summer!!

Josh Kearley is a third year Physics student at UBC Okanagan. Watch for some fun events this summer, hosted by Josh!

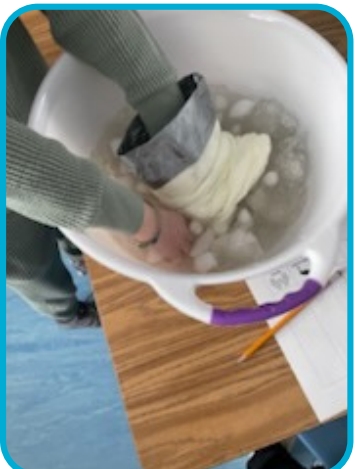
My name is Gregory Look and I am working with Julian on designing a Great Slave Lake fishery by Northerners for resilient futures in the NWT. My tasks include trawling social media to discover the diverse values of fisheries on Great Slave Lake.

This data will lead into my technical project for the Environment and Natural Resources Technology Program (ENRTP) at Aurora College.

Add STEM to your event!

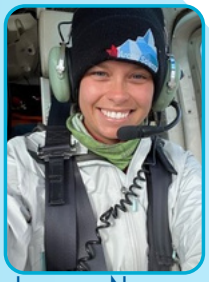
We love to share our STEM! Let us know what you have going on and we will try to be there in person. If we aren't able to be there, we can set you up with lots of cool activities and equipment!

Contact Hilary:
hturko@auroracollege.nt.ca



RESEARCH PROJECT HIGHLIGHTS & RESEARCHER PROFILES

Water in the whooping crane nesting area



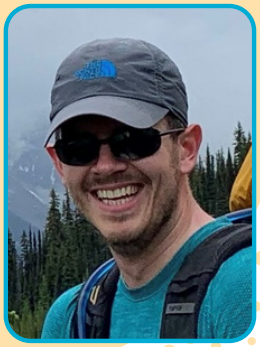
Laura Neary

Roland Hall

Brent Wolfe

Community perspective on wood bison health

David Hall



Kyle Plotsky

Fungi and bacteria after a wildfire

Thea Whitman

Microplastics in Great Slave Lake

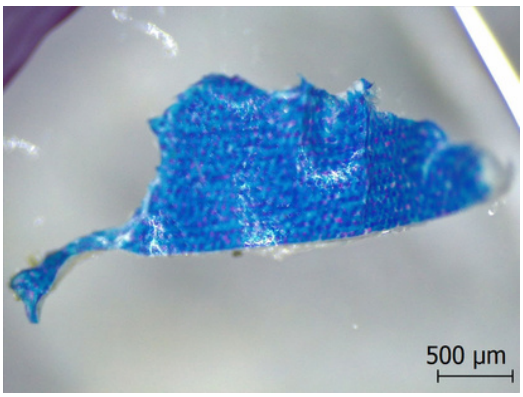
Madelaine Bourdages

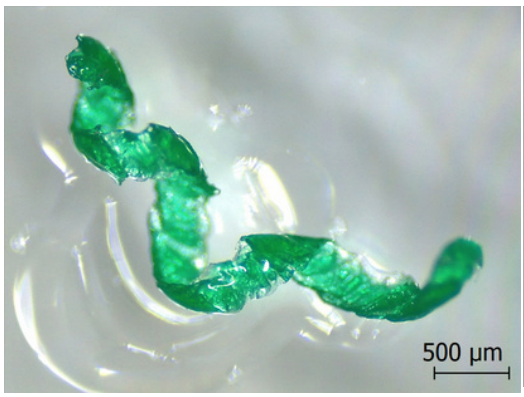
Community governance in small scale fisheries

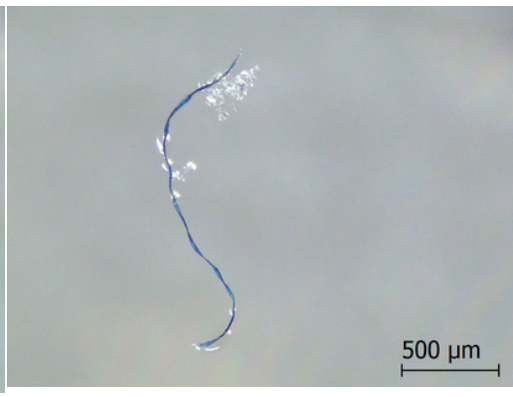
Julián Idrobo

ASSESSING MICROPLASTICS IN GREAT SLAVE LAKE

Madelaine Bourdages, Carleton University





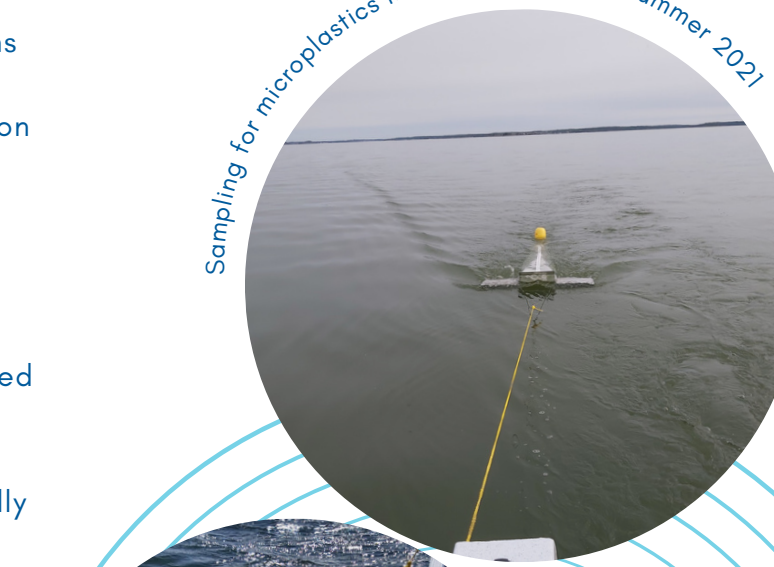


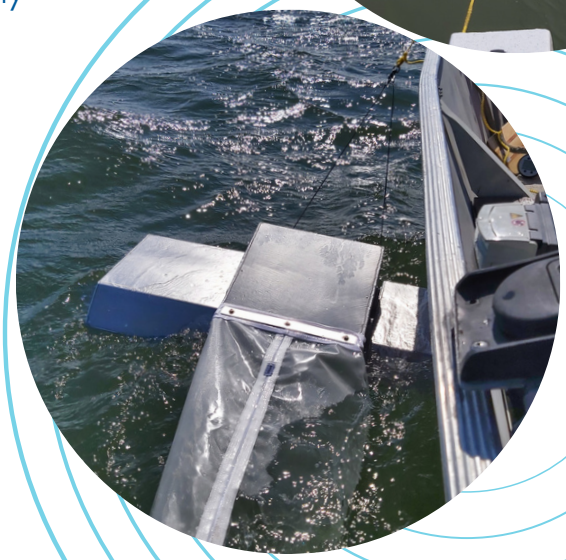
Magnified images of microplastics found in Yellowknife Bay in 2021!

Microplastics (plastics smaller than 5 mm) are a major environmental concern. Much remains unknown about the transport and fate of microplastics in Arctic freshwater environments and how freshwater systems may play a role in the transport and distribution of microplastics in the Arctic. Researchers from Carleton University are aiming to quantify and determine the types of microplastics in Arctic freshwater environments and better understand the sources, transport pathways, and fate of microplastics.

Surface water and sediment samples will be collected around Great Slave Lake in July 2022. Sampling locations this year will include Yellowknife, Fort Providence, Hay River, Fort Resolution, and potentially Fort Smith.

Please contact Madelaine Bourdages (madelainebourdages@cmail.carleton.ca) with any questions.





NEW CHAPTER ON TRANSDISCIPLINARY ACTION-RESEARCH AND BLUE JUSTICE

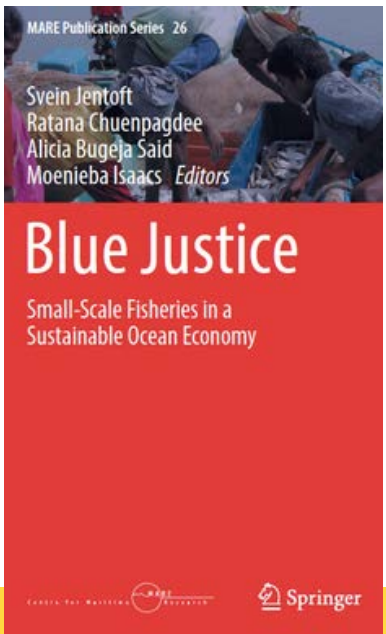
Dr. Julián Idrobo, Chair of Indigenous Approaches to Environmental Management, Aurora College

In April, ARI's Julián Idrobo published a chapter in the book Blue Justice: Small-Scale Fisheries in a Sustainable Ocean Economy from the Too Big to Ignore global small-scale fisheries collective. This chapter is inspired by Julián's community-based, action-research work with Afro-descendent communities and their traditional authorities (Los Riscales Community Council) in the Colombian Pacific. It tells the story of the community of practice that he, his colleagues and graduate students convened and how it resisted the construction of a deep-water port in the Tribugá Gulf. This community of practice became known as the Alianza Nuquí.

Youth foreseeing cargo vessels in the Tribugá Gulf, (Más Arte Más Acción)

The chapter examines the tensions co-existing between the Colombian national development model and the community's effort to achieve their wellbeing and self-determination through territorial planning initiatives. While the national development model promotes the extractivist economy, the community seek their permanence, wellbeing and cultural continuity in their ancestral marine and coastal territory through environmental stewardship and local economic development.

The Alianza Nuquí emerged in response to the community's appeal. It became a transdisciplinary knowledge platform that galvanizes knowledge from academia, practitioners and traditional knowledge systems to support local governance processes. Together, Los Riscales Community Council and the Alianza Nuquí contribute to the consolidation of a Blue Justice agenda in Colombia that counters neoliberal policies and practices that exclude and marginalize Indigenous and traditional coastal communities from marine and coastal spaces.



Even though Julián's chapter tells a story from thousand kilometres away, it resonates with the reality of Indigenous and Metis peoples in the Northwest Territories. Their struggle to counter development and colonialism while finding pathways for self-determination and resurgence is very similar to the one from Indigenous peoples and local communities in the global south.

Through cases from around the globe, the Blue Justice book examines different dimensions of justice and governance, as they relate to coastal and marine environments and the people who call those places home.

The chapter can be found at:
https://link.springer.com/chapter/10.1007/978-3-030-89624-9_31

If you would like a copy of the paper, please contact Julián:
JIdrobo@auroracollege.nt.ca

NEW RESEARCH PROJECT ON THE SOCIOECONOMICS OF WOOD BISON MANAGEMENT

Dr. Kyle Plotsky, University of Calgary: kyle.plotsky@ucalgary.ca

Dr. David Hall and I (Dr. Kyle Plotsky) are researchers with the Faculty of Veterinary Medicine at the University of Calgary investigating potential ways to manage wood bison health in Wood Buffalo National Park. Our research focuses on how people think about the bison, the management of the zoonotic diseases that infect the park bison, and the broader landscape.

Currently, we are conducting online questionnaires about the bison health issue with respondents from across the prairies and Northwest Territories. In the coming months, we also will be hosting workshops and conducting questionnaires in the communities around Wood Buffalo National Park.

If you have any comments or would like to discuss our project, I can be reached at kyle.plotsky@ucalgary.ca

You can find out more about our project and how to participate at

ucvm-bison-project.com.

FIRE ECOLOGY AT A TINY SCALE

Dr. Thea Whitman, University of Wisconsin

Residents of regions where wildfires are common are often familiar with many of the ways that the natural world is adapted to wildfire. For plants, examples of these adaptations include rapidly resprouting after a burn (as seen with aspen) or having "serotinous" cones that require heat to open and release their seeds (as seen with jack pine). But what happens to the tiny organisms that we can't see with the naked eye after a wildfire? Dr. Thea Whitman and her lab have been investigating the effects of wildfire on soil bacteria and fungi in Wood Buffalo National Park since 2015.

Bacteria and fungi perform many key functions in the soil, such as breaking down dead organic matter, cycling nutrients, or forming close symbioses with plants. Understanding how wildfires affect these soil microbes can help us understand whether or how wildfires will affect these important functions. Questions the research team have been asking include: (1) How does wildfire change the community – and how quickly does it recover? (2) What are the traits of microbes that are well-adapted to wildfires – are there "aspens and jack pines of the microbial world"? (3) How do different fire regimes – different severities or frequencies – affect the microbial response to wildfire? They use a combination of field research, laboratory studies, and genetic sequencing of the microbial communities to answer their questions.

So far, the research team has found that – while microbial communities are dramatically altered one year post-fire, community composition appears to be quite resilient – they start looking more like the communities of unburned soils just five years later. They have also found that fast-growing species make up a large portion of the community one year post-fire, but that this effect is relatively short-lasting. This summer, they will be returning to WBNP to collect samples for a study where they are investigating whether including information about soil microbial communities in models helps improve predictions of carbon cycling post-fire. They will be presenting an overview of their research and findings June 27, 7pm at the Parks Theatre.

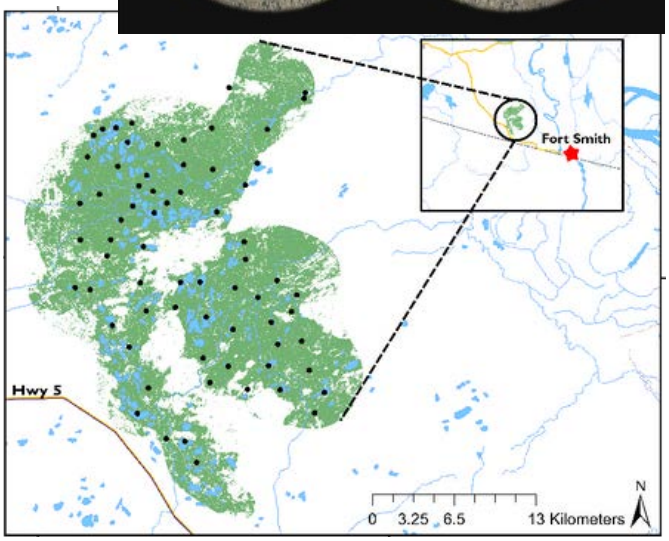
PHOTOS (top to bottom)
1) Many soil fungi, such as this Geopyxis, are already known to be common post-fire, thanks to their easily-visible and characteristic fruiting bodies. 2) Dana Johnson, a Ph.D. student in the lab, samples a soil core. 3) Soils in Wood Buffalo National Park can be very heterogeneous! 4) A soil sample that will be analyzed back at the lab for bacterial and fungal community composition using high-throughput sequencing.

RESEARCH GROUP LAUNCHES NEW PROJECT STUDYING WATER IN THE WHOOPING CRANE NESTING REGION

Laura Neary, University of Waterloo

Brent Wolfe (Professor at Wilfrid Laurier University) and Roland Hall (Professor at University of Waterloo) have worked extensively across Canada's North studying environmental changes within lake-rich lands. Their research looks at current conditions as well as long-term (centuries to millennia) records preserved in lake sediment cores. Together, these approaches can give a perspective of environmental change over space and time to help understand the impact of climate change and industrial developments on northern freshwater landscapes. Much of their work has been conducted in partnership with stakeholder organizations, including northern Indigenous communities, national parks, educational institutions, government agencies, and industries. These collaborations and a strong commitment towards relationship-building have laid a critical foundation to help ensure successful long-term research and monitoring programs.

GOALS FOR OUR NEW RESEARCH PROGRAM



The new research program aims to understand the role of climate change on freshwater availability across the Whooping Crane Nesting Region within Wood Buffalo National Park. A focus will be on understanding the importance of different hydrological processes on pond water balance and water quality. We will be collecting water samples in the spring, summer and fall and using water-level loggers to measure hourly variations in water depth at 63 ponds in the Sass-Klewi region over the next 5 years. We will also collect lake sediment cores from 5 of these ponds in September 2022 to learn how hydrological and ecological conditions have varied during the past several centuries and how deposition of contaminants of concern (including microplastics) has changed in this remote region. Laura Neary (PhD student at University of Waterloo) will play a lead role in the execution of this project. This research program will contribute new knowledge concerning the vulnerability of the whooping crane nesting ponds to climate change and will form a framework for ongoing monitoring.


Laura Neary

We are very approachable people who love a friendly game of cards, camping, hiking and more! You can reach us at: rihall@uwaterloo.ca, bwolfe@wlu.ca, and lkneary@uwaterloo.ca.

UPCOMING SCIENCE EVENTS

June 27 - ARI Presents:
"What happens to fungi and bacteria after a wildfire?" Dr. Thea Whitman
7pm, Parks Theatre (see story on page 11)

July 26 - August 4:
Tundra Science and Culture Camp
www.enr.gov.nt.ca/en/services/tundra-science-and-culture-camp

August 8-12 - SRFN Community STEM CAMP
See poster on page 3 for details.

August 18-21 - Dark Sky Festival
Visit: www.tawbas.ca/dark-sky-festival.html

Also in the works: 3D Printing Workshop (Date TBD)