



THE UNIVERSITY OF BRITISH COLUMBIA

Faculty of Science



BRITE Internship Program:

Confronting biodiversity challenges
by placing emerging scientists
in real-world settings

FORWARD 

BIODIVERSITY LOSS IS ACCELERATING, WITH CASCADING CONSEQUENCES.

BRITE IS ABOUT SOLUTIONS.

The Biodiversity Research: Integrative Training and Education (BRITE) Internship Program was established at UBC in 2010.

“Humans have altered the environment for every species on the planet,” says Evolutionary Biology Professor and MacArthur Fellow Dr. Sally Otto. “From habitat fragmentation to invasive species to climate change, the pervasiveness of ecological and evolutionary impacts on species throughout the globe should make us take pause.”

In this new era scientists are calling *the Anthropocene* the rate of extinctions is escalating and human activities are reshaping evolutionary selection pressures and affecting the health of many ecosystems.

Recognizing the urgent need to turn the tide, Professor Otto and a colleague, Social-ecological Systems Professor Kai Chan, designed BRITE as a solutions-oriented program that would place the brightest young scientific minds in collaborative, applied settings to focus on tangible achievements.

BRITE's benefits flow both ways between master's and doctoral students at UBC's Biodiversity Research Centre (BRC) and

conservation organizations and government agencies in Canada and internationally.

By providing paid internships, the BRITE program serves as a wonderful matchmaker, helping to build strong relationships between organizations seeking to expand their capabilities and graduate students with cutting edge skills and new perspectives.

These internships provide the students with valuable real-world experience, which gives them traction towards their career goals.

BRITE thanks the generous donors who are growing its endowment, and welcomes new ones. Their philanthropic support is vital to this remarkable program's success.

To date, BRITE has funded more than 75 internships with over 50 organizations worldwide. The following are just a few of those stories.

Photo courtesy: Ignasi Rodriguez © - Wide Open Projects - coral restoration



Sarah Amundrud

Quantifying the population dynamics of the invasive Brown Marmorated Stink Bug in the Okanagan

BRITE placement: BC Ministry of Agriculture - 2018

Global trade has enabled the spread of invasive pests and non-native diseases which threaten food security and drive biodiversity loss. Exacerbating the problem, climate change is increasing the already staggering economic and environmental costs by accelerating their dispersal.

The brown marmorated stink bug (BMSB) was discovered in the eastern US in 2001, having likely stowed away on cargo ships that docked in its native southeast Asia. Unhindered by natural predators, it has established itself rapidly and extensively across North America, reaching BC's agriculturally lush Okanagan region in 2016.

At that time, Sarah Amundrud was working towards a PhD in Quantitative Ecology and looking for an opportunity to apply the academic skills she had acquired in entomology and ecology to a real world problem.

For her BRITE internship, Sarah connected with the BC Ministry of Agriculture about a project in the Okanagan. "BMSB's decimate crops," says Sarah. "They have a huge economic impact."

Sarah set up the entire project—encompassing research, establishing sites for sampling, and developing a sampling protocol. She was particularly interested in the BMSB's phenology and reproductive development.

"These insects are most invasive in the world right now where they can have multiple generations in a year, and that's typically in warmer places," says Sarah. "If there is a single generation per year, most will die off in the winter. But if there's a second generation in the same year and not enough die off, that's when their population really explodes."

Climate change is a growing worry for the Okanagan's winegrowers and farmers: BMSB's like warmth.

Dr Amundrud now works as a data scientist and climate risk specialist. She credits BRITE with helping her transition into industry. "The work I did with the government opened doors," she says. "I'm in industry now, and they care a LOT about experience outside of academia."

Photo courtesy: Sarah Amundrud



Francisco Henao Diaz

Modelling the movement of elephants in the Kavango-Zambezi Transfrontier Conservation Area

BRITE placement: World Wildlife Federation – 2021

In early 2021, Francisco Henao Diaz was nearing completion of a PhD in Evolutionary Biology and looking for an opportunity to apply his computational skills.

“I had become highly specialized in statistical modelling,” he says, “but I felt detachment between what I was doing and real life. I wanted to find something where I could feel a sense of contribution.”

The Kavango-Zambezi Transfrontier Conservation Area (KAZA) in Africa is the biggest of its kind. Its borders encompass portions of Angola, Botswana, Namibia, Zambia and Zimbabwe, although the diverse species and ecosystems within ignore such human inventions. The goal of this ambitious undertaking is to sustainably manage ecosystems, heritage and cultural resources and to collaboratively protect and promote environmental and socio-economic wellbeing.

The natural wonders of Victoria Falls and the Okavango Delta are situated within KAZA's biologically rich mosaic of wetlands, sandy woodlands and vast grasslands, which has been coined a “Noah's Ark” for the diversity of its wildlife—including the largest population of African elephants.

World Wildlife Federation's KAZA team has employed GPS trackers on elephants in Namibia since 2010, to better understand their movement patterns and behaviour.

Working with their large dataset, Francisco created models that animate the elephants' responses to a long fence that is intended to separate wildlife and cattle, as well as reduce human-elephant conflicts.

Francisco's models allow other data that might influence elephants' activity in and around protected areas and migration corridors to be overlaid—such as weather, watercourses, human infrastructure—so as to predict future elephant behaviour in similar circumstances and inform future efforts to protect both elephants and people.

“BRITE gave me an enriched and applied experience outside academia,” says Francisco, “and the chance to learn how conservation organizations work.”

Photo courtesy: Patrick Bentley



Micah Scholer

Nesting biology and spatial analysis of Karearea (New Zealand Falcons) in pine plantations

BRITE placement: Wingspan National Bird of Prey Centre, Rotorua, New Zealand – 2016

Although the most direct remedy for biodiversity damage driven by habitat loss would be a reversal of that loss, a complementary approach supports the restoration of native species within areas that have been significantly altered by human activity.

Micah Scholer chose a BRITE placement that took him to New Zealand's Wingspan National Bird of Prey Centre where industry and conservation groups are collaborating to safeguard the endemic Karearea (New Zealand Falcon), which is increasingly threatened by the lethal combination of habitat loss and invasive predators such as cats, hedgehogs and mustelids.

He enumerates three key aspects that attracted him:

1. Island wildlife often face a unique suite of challenges;
2. New Zealand hits above its weight in terms of the uniqueness of its biodiversity;
3. This project is outside protected areas.

On New Zealand's North Island, vast tracts of land have been converted to pine plantations. The Karearea have adapted

by building their ground-level nests in clear-cut blocks, close to uncut stands where they can hunt for small prey. Micah's work with Wingspan included creating a spatial model of likely nesting sites to assist conservationists' efforts and, importantly, show forestry companies which areas would be sensitive to field operations during the falcons' breeding season.

"Conserving biodiversity cannot be accomplished solely by relying on areas that have been designated as protected," Micah observes. "Partnerships such as these will become increasingly important."

Micah's positive experience with BRITE literally changed his life. Upon attaining his PhD in Zoology he moved to New Zealand, where he is now Biodiversity Monitoring Supervisor for the Department of Conservation, a role that includes coordinating the collection of biodiversity data on the North Island—including keeping track of the Karearea.

*Background photo courtesy: Micah Scholer
Inset photo courtesy: Nature In Stock*



Philippe Fernandez-Fournier

Teaching tropical ecology at research stations in Indonesia

BRITE placement: Operation Wallacea – 2016

“I knew that I didn’t want to spend the rest of my life in academia, but was instead interested in someday starting my own research station where I could combine research and teaching,” says Philippe Fernandez-Fournier. A BRITE internship while he was a Master’s Zoology student gave him a real world preview of his dream.

Operation Wallacea, an organization that runs biological and conservation management research programs around the world, offered Philippe a placement in a tropical rainforest on Buton Island in Sulawesi, Indonesia. There, at a remote research station, he taught tropical ecology, ecological survey methods, and jungle competence to visiting students, and developed his own teaching skills in a unique environment.

Philippe worked alongside conservation scientists, gaining valuable experience by leading research projects and managing groups of volunteers and staff. He learned about ecological census techniques used to monitor herpetofauna, birds, bats, arthropods and mammals, and saw first-hand how organizations can employ researchers from other countries and involve local communities.

While living and teaching at the biological outpost, Philippe worked hard to learn the local language—Indonesian—a skill that he found invaluable for engaging with locals.

Philippe appreciates the BRITE program’s flexibility and believes it’s important for graduate students to create their own opportunities and shape their own projects. “I was given new responsibilities because of my enthusiasm and I encourage future interns to do the same,” he says.

Now working towards a PhD in Biological Sciences, Philippe has co-founded Wide Open Projects (WOP), a non-profit that assists local partners in Raja Ampat, West Papua, Indonesia. WOP collaborates with local communities to develop education, social, and conservation projects, such as coral reef restoration and tourism industry education.

Photo courtesy: Philippe Fernandez-Fournier



Zana Mody

Developing a Mi'qmaq Strategic Plan for Nature-based Climate Solutions in Cape Breton, Nova Scotia

BRITE placement: ESSA - 2022-23

When BRITE offered PhD student Zana Mody the chance to work with Indigenous communities, scientists and stakeholders to develop a strategy drawing on nature-based climate solutions to restore and conserve vital ecosystems in the Maritimes, she didn't hesitate.

Vancouver-based ESSA is an adaptive management consultancy that develops holistic solutions to social and environmental challenges. At ESSA, Zana worked with Patrick Burke—a BRITE alumnus who is now Sr. Climate Adaptation and Environmental Specialist—and others on a collaborative project for client Unama'ki* Institute for Natural Resources (UINR) in Cape Breton, Nova Scotia, to develop a Mi'qmaq Strategic Plan for Nature-based Climate Solutions. The Plan, which will support Indigenous Protected and Conserved Areas (IPCA) development, will be the first of its kind in Canada and may serve as a model for other Nations initiating similar programs on their territories.

"Applying what I've learned as an academic in a community-based setting is really important," says Zana. Working within a framework of two-eyed seeing, which blends Indigenous perspective with western science, her engagement has

included extensive consultations with Indigenous elders, learning about Mi'qmaq traditional ecological knowledge and how that can be integrated into nature-based climate solutions projects.

"Canada has made sweeping commitments to Indigenous peoples for reconciliation, as well as significant commitments on lowering greenhouse gases and conserving oceans and lands," says Zana. "We will have to work closely with Indigenous communities and scientists to come up with plans and ways to meet them. I want to be part of that process that helps conserve and restore vital habitats across Canada and potentially across the world."

**Unama'ki is the Mi'qmaq word for Cape Breton Island, and loosely translates to "Land of Fog." It has been home to the Mi'qmaq people for many centuries.*

Photo courtesy: Zana Mody



““ **The world's biodiversity is in crisis.**

Scientists play a key role in identifying the crisis points and evaluating potential solutions. Biodiversity internships allow budding scientists to help organizations solve key problems facing Earth's biological diversity.”

*Dr. Sally Otto
UBC Professor, MacArthur Fellow and BRITE co-founder*

CONTACT

Fiona Beaty
Associate Director, Development
Faculty of Science
The University of British Columbia
604 827 4406
fiona.beaty@ubc.ca

Sally Otto
Professor, Department of Zoology
Faculty of Science
The University of British Columbia
604 822 2778
otto@zoology.ubc.ca

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<https://science.ubc.ca/giving/projects/brite-biodiversity-internships>

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