



# ANNUAL REPORT

## 2021-2022



THE UNIVERSITY OF BRITISH COLUMBIA

**Faculty of Science**



# CONTENTS

3	Director's Report
5	Teaching and Learning
6	Volunteers
7	Partnerships
9	Marketing, Communications, and Events
10	Evaluations
11	Exhibits and Design
13	Collections and Research
13	Cowan Tetrapod Collection
16	Marine Invertebrate Collection
17	Herbarium
19	Spencer Entomological Collection
21	Fish Collection
22	Fossil Collection
23	Administration
24	Operations
25	Donors
26	Publications and Presentations



Mother Midnight  
Sarah Ronald  
from *Disrupting Wild Echoes*

# BEATY BIODIVERSITY MUSEUM 2021-2022

**26,898 VISITORS**

**3,274 VOLUNTEER HOURS**

**3,056 PROGRAM PARTICIPANTS**

**156,052 NEW SPECIMENS**



## Director's message

This has been a year of emergence from the pandemic and of a return to normal. Fortunately, due to government assistance that mitigated our financial losses, and responsible fiscal management by our staff, we emerge from the worst of the pandemic in reassuringly good shape, and ready to forge ahead with exciting initiatives and collaborations. I mention collaborations specifically, as “collaboration” is the theme of this annual report. One of our most valued collaborations is with our partner first nations, especially the Musqueam on whose traditional, ancestral and unceded territory our museum is located. Our collaboration with the Musqueam is a long-standing one, as exemplified by the successful *Sturgeon Harpoon Knowledge Web* project, for which the Musqueam First Nation and Beaty Biodiversity Museum worked closely together. This was recipient of the Governor General's History Award for Excellence in Museums in 2019, and the legacy continues to this day. It was conceived as a living exhibition, with the ability to continuously add sharings from Musqueam knowledge holders to the site. The museum recently secured two grants to support this important work and are looking forward to enriching and deepening this collaboration in the coming year.

More recently, UBC has launched a framework for indigenous collaboration with its “Indigenous Strategic Plan” (ISP). This past year we have started a long-term process to implement the ISP and build on our existing collaborations within its framework. Many elements of the ISP are already incorporated in the current strategic plan for the Beaty Biodiversity Museum. I think this will provide a really solid foundation for future collaboration with First Nations on all biodiversity issues.

At the start of FY 2021/22 many of us were connecting virtually through online meetings, classes, and programming such as Beaty@Home and virtual tours. Later in the year, with the return to onsite learning on campus, our focus turned to reactivating in-person teaching, learning, and collaboration. We are currently balancing both in-person and online connections; this hybrid of formats has strengthened existing partnerships and opened up new opportunities for collaboration allowing us to reach beyond the physical walls of the museum.

Other collaborations I would like to mention are our collaborations with the Departments of Botany and Zoology. Our collections originated in university departments before being transferred to the Beaty Biodiversity Museum. They originated because they were vital to those departments for research and teaching, and our aim is not only to continue to provide this service to the departments, but to enhance and deepen it. Recognizing this, the departments continue to assist us in helping with staff costs, and by giving support in many ways. This is more than a collaboration, in fact it is more of an intimate symbiosis, as the Beaty Biodiversity Museum aims to create an intellectual ecosystem of organismal and collections-based research and teaching that helps to strengthen the disciplines of botany, zoology, and geology at UBC to the benefit of all. For their valued partnership I would like to thank Dr. Lacey Samuels (Interim Head of Botany) and Dr. Vanessa Auld (Head of Zoology). Lacey steps down this year and she will be missed, but happily we welcome incoming Head of Botany, Dr. Shawn Mansfield, to continue the partnership.



**Dr. Quentin Cronk**  
Director, Beaty Biodiversity Museum  
Professor, Department of Botany



Chris Mortenson

Most exciting of all this year has seen the development of a new collaboration: with the department of Earth Ocean and Atmospheric Sciences (EOAS) in order to strengthen the Fossil Collection. First, we were able to welcome Dr. Kendra Chritz, a noted palaeoecologist and isotope geochemist, as Director of the Fossil Collection. Secondly, thanks to support from Dr. Philippe Tortell (Head of EOAS), and the assistance of Dr. Kirsten Hodge (Director of our sister museum—the Pacific Museum of Earth) we have been able for the first time to hire a Curator of Palaeontology in the Beaty Biodiversity Museum. In this position we welcome Dr. Bruce Archibald who has made a tremendous start in bringing our fossil holdings up to international standards. I would like to thank Kendra, Philippe, and Kirsten for banding together with us to make this possible. As American author and campaigner Helen Keller famously said: “Alone we can do so little; together we can do so much.” And that is well exemplified by our community at UBC, and by our success as a museum.

## **Undergraduate education report:**

During the period April 1, 2021 to March 31, 2022 Beaty Biodiversity Museum curators, educators and other staff contributed to the teaching or organization of 56 UBC courses, work experiences, and student groups, from several faculties, affecting approximately 1,650 students. Much of this includes important experiential learning in the museum itself. In addition, undergraduate teaching for external institutions was conducted, including for BCIT and McGill University.

Dr. Quentin Cronk  
quentin.cronk@ubc.ca

# TEACHING AND LEARNING

BEATY BOXES IN CIRCULATION: 10 | NUMBER OF WEEKS OF RENTALS: 64

PARTICIPANTS IN PROGRAMS: 3056 | TOTAL GROUPS: 131

The Teaching & Learning team shares the stories of the research collections through school programs, public tours, activities, special events, and partnerships. The first part of FY 2021/22 was focused on Beaty@Home and virtual tours. Later in the year, with the return to in-person learning on campus, our focus was on reactivating hands-on programming.

We marked this return by launching a series of new curriculum-based tours and programs. Virtual tours continue to be offered. What began as a quick pivot to online programming at the start of the pandemic has continued to be successful in expanding our audience and diversifying our revenue streams. Feedback indicates that the online format meets access needs for a number of schools and groups. By continuing to offer a selection of online and in-person programming and resources, we were able to maintain our high-quality school programming and support teachers. We are also exploring hybrid events. Hosting our first hybrid Educator Open House we welcomed teachers from across the province to join in person and online.

The return of in-person programming has been successful as demonstrated by growing school booking numbers and high attendance for Nature Club and Spring Break. This was the sixth year of our successful Beaty Box specimen loan program. Our programming and outreach kits continue to be key revenue generators for the museum.



Daniel Gowryluk presents an activity at the Educators Open House.



Museum Interpreter Vincent Sayson shows off the tetrapods.

We welcomed UBC courses back to the museum and supported BIOL 490, a student-led seminar in developing outreach material for secondary teachers, a unique opportunity to connect undergrad students with outreach work at the museum. We also continued our role in the education of educators by delivering sessions for the Faculty of Education and hosting teacher candidate practicums.

Jackie Chambers  
Teaching and Learning Manager

Nicole Balsdon  
Teaching and Learning Coordinator

Nancy Lee  
Kashifa Hafeez  
Sunny (Yingxin) Zhang  
Sheila Byers  
Vincent Sayson  
Angela Liu  
Cassidy Mark  
Spencer Goyette  
Jerlyn Brutas  
Museum Interpreters



# VOLUNTEERS

VOLUNTEER HOURS: 3,274

ACTIVE VOLUNTEERS: 87



Volunteer Sasha shows visitors teaching specimens as part of the Educator's Open House.



Volunteer Maia presents an activity on seeds.



Volunteer Justin presents some krill.

We were thrilled to see the return to in-person volunteering at the museum this year and we have begun to rebuild our volunteer corps by interviewing and training new recruits. Education volunteers support us in sharing the stories of the research collections.

Along with other members of the museum team, education volunteers are identifiable in their red vests and are ready to answer questions and share stories with visitors. Volunteers also assist with events and special programming such as twice daily hands-on activities, Spring Break drop-in activities, public lectures, exhibit openings, and membership events. Volunteers are supported with learning opportunities on a weekly basis, and given in-depth workshops regularly.

Beaty Museum volunteers come from all walks of life, many different countries, and range from high school and post-secondary students to working and retired professionals. Our dedicated volunteers have an understanding and an enthusiasm for the museum, which they readily share with visitors. This team of knowledgeable and friendly people adds a personal touch to the visitor experience and strengthens the connections between the museum, the collections, and the community.

Over 1,341 undergraduate and graduate students from UBC and other post-secondary institutions visited the museum as part of a course. We continue to strengthen our role supporting undergraduate teaching by collaborating with the Faculty of Science in developing and delivering both online and in-person sessions. We also continued our role in the education of educators by hosting virtual and in-person teacher candidates, research and practicum students, and leading online and in-person sessions for Faculty of Education.

Virtual and in-person collaborations, both within UBC (BRC Biodiversity Lecture Series, Mushroom Walk with Dr. Mary Berbee, NITEP, the Indigenous Teacher Education Program in the Faculty of Education, Vancouver Summer Program, C+CP Kids Take Over Day, Alumni Weekend, Lessons in Evolution and Ecology FUNDamentals - LEEF, Let's Talk Science, Physics, Zoology Graduate Students Association, UBC STEM Collective, MOA, and PME) and off campus (Vancouver School Board Scientist in Residence Program, NSERC Science Literacy Week & Science Odyssey, Science Rendezvous, Surrey Teachers Association, BC Science Teachers Association) continue to strengthen our reputation as a teaching and learning space.

These opportunities help to move the museum beyond its four walls and allow us to make new connections and broaden the recognition of our skills and expertise. Through support and funding from UBC Campus + Community Planning and work with the PME and LEEF graduate student group, we continued to offer our monthly Nature Club both online and in person to families on both UBC campuses. Funding from a Wheaton Precious Metals donation allowed us to begin planning to enhance our virtual and onsite learning opportunities at the museum.





# THIS YEAR THE BEATY MUSEUM PARTNERED WITH...



# MARKETING, COMMUNICATIONS, AND EVENTS

SOCIAL MEDIA REACH: 504,062

TWITTER FOLLOWERS: 4,621 | FACEBOOK FOLLOWERS: 5,371

INSTAGRAM FOLLOWERS: 4,276

YOUTUBE VIEWS: 21,882,777

In the last year, we focused our marketing efforts on digital projects and social media to reach a bigger audience and increase the general public's awareness of the Beaty Biodiversity Museum. Our virtual programs, online exhibitions, and video series have been well received both internally and by the general public. The museum's website is also an important information channel, and this year, several new webpages were created for our Collections, Exhibitions, and Teaching & Learning departments. For our online programs, bookings, and rentals, a new e-payment form was created to facilitate online payments.

The museum's social media platforms have seen an increase in the number of followers and engagement, and also in the number of visitors attending the in-person events at the museum, as a result of the boosted social media posts. The museum was also featured in TV news and art magazines, as well as on national and international marketing campaigns promoted by Destination BC, Destination Vancouver, and Vancouver Attractions.

Despite the COVID-19 restrictions, we had many events taking place at the museum in the last year, such as the monthly Nature Club and Nocturnal editions, Spring Break, Educators Open House, UBC Homecoming, book launches, the Biodiversity Lecture Series, and the special Mushroom Walk for members. Other important activities that affect the museum's daily operations were a priority, such as the maintenance of the online ticketing system, monthly newsletters, new design for printed material, and support for the admissions team and collection curators' activities.

Dale Louise Gintner  
Marketing, Communications,  
and Events Coordinator

Specimens exhibited as part of  
the Educators Open House.



Derek Tan

The Mushroom Walk hosted by fungi curator Mary Berbee.



Derek Tan



# EVALUATIONS

NUMBER OF SOCIAL MEDIA FOLLOWERS: 51,958

NUMBER OF MEMBERS: 323

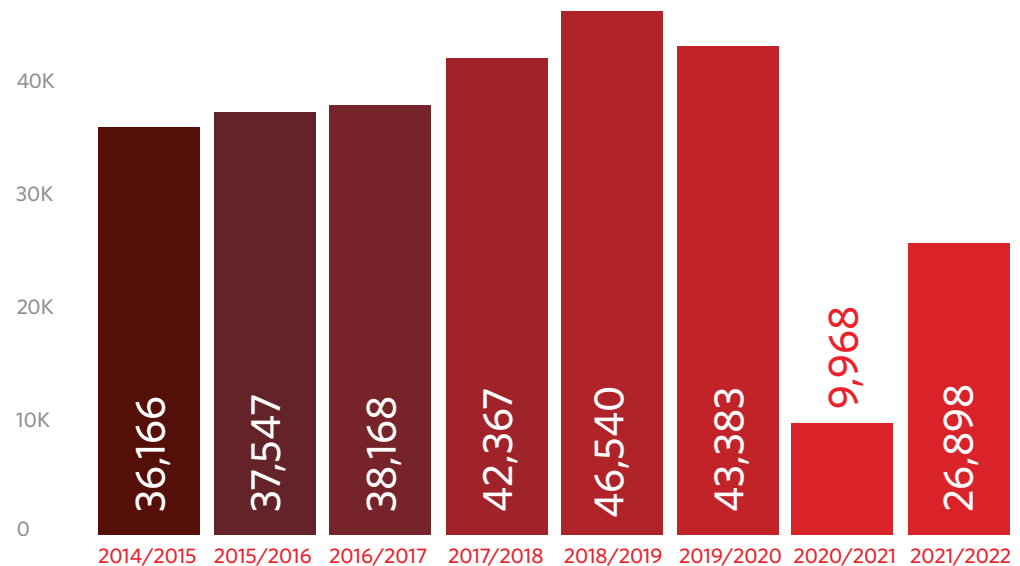
The extensive booking data and feedback from students and teachers collected by the museum over the past years played a key role in informing our new suite of in-person programming and tours. We were able to make the most of the pause in in-person programming imposed by COVID-19 restrictions and use this time to develop a suite of inquiry-based, hands-on school programs that engage students in activities that reflect on contemporary research as well as methods of scientific investigation.

In addition to this, booking data and audience feedback from our year of online programming showed us that, even after the return to in person teaching and learning on campus, there were groups asking us to retain the online format for some tours and programs.

As we see the return to in-person school and public programming we are committed to collaboration with our audiences, to continue listening and learning how to best serve both our online and in-person guests.



## TOTAL MUSEUM VISITORS



## EXHIBITS AND DESIGN

HIGHLIGHT UBC RESEARCH: 10 VIDEOS

NEW PERMANENT EXHIBITS: 10

Engaging visitors with diverse perspectives on biodiversity has remained a priority. Our continued partnership with the Musqueam First Nation has blossomed this year with the awarding of two grants. These funds will enable the further development of the award-winning *Sturgeon Harpoon Knowledge Web* and support the growth and deepening of our collaboration.

We have delighted in showcasing the beauty and diversity of the natural world through exhibition, and have featured five new exhibitions this year. These include *The Curious World of Seaweed* by Josie Iselin, which has even drawn international visitors to our space, and *Disrupting Wild Echoes* by Sarah Ronald, whose visitor dialogue space garnered over 160 visitor letters in its first two weeks after its opening. These have each been supported by an online version that increases accessibility of this content and widens the museum's reach.

A focus this year has also been the preparation for the refreshing of several permanent exhibits: the large tree cookie (affectionately known as Stumpy), a cast of a whale fossil found by UBC researchers on Vancouver Island, and some of our large fish displays. These plans are being thoughtfully laid with the generous collaboration of several UBC departments and donors, and will add greatly to the engagement of our museum visitors in the coming years.

*Sturgeon Harpoon Knowledge Web* project, with Morgan Guerin and Jason Woolman from the Musqueam First Nation

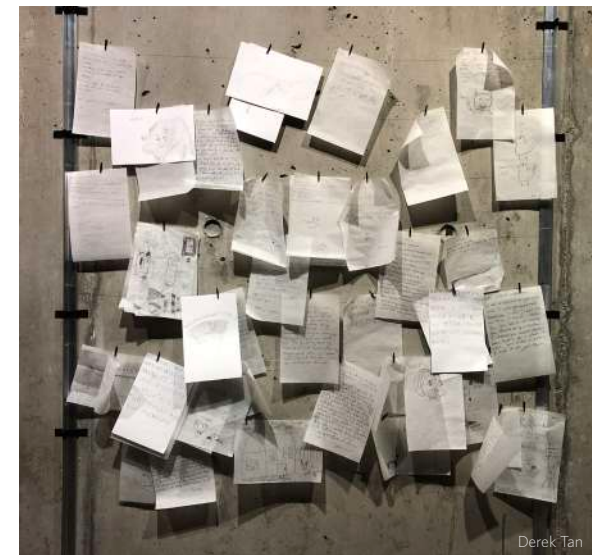
- Awarded University of British Columbia Community-University Engagement Support grant
- Awarded University of British Columbia Partnership Recognition Fund grant

*Researchers Revealed* exhibit and Biodiversity Research Photo Competition

- Awarded University of British Columbia Grant for Catalyzing Research Clusters



Lesha Koop prepares the displays for *The Curious World of Seaweed* exhibition.



Visitor letters to wildlife in *Disrupting Wild Echoes*.



November 18, 2021 – April 24, 2022

# The Curious World of Seaweed

Josie Iselin

 **BEATY** BIODIVERSITY  
MUSEUM  
beatymuseum.ubc.ca



MARCH 17 – AUGUST 21, 2022

# DISRUPTING WILD ECHOES SARAH RONALD

 **BEATY** BIODIVERSITY  
MUSEUM



Artwork by Josie Iselin



Artwork by Sarah Ronald

# COWAN TETRAPOD COLLECTION

NUMBER OF SPECIMENS: 44,366 | ACCESSIONED THIS YEAR: 352

SPECIMENS IMAGED: 11,405 | IMAGED THIS YEAR: 1,775

NUMBER OF UBC STUDENTS SUPPORTED: 55

VOLUNTEER HOURS: 1,176

The Cowan Tetrapod Collection (CTC) is the second-largest scientific collection of birds, mammals, reptiles, and amphibians in British Columbia.

Undergraduate involvement tops our collaborations list. Ildiko Szabo and Christopher Stinson are heavily involved in tetrapod identification labs, host weekly volunteer specimen preparation days, and host the UBC Anatomy and Dissection Club. These collaborations with students offer an opportunity to interact with a diversity of undergrads, support their interest and help them find their passion.

Collaborations are the ‘raison d’être’ for museum collections. During the pandemic, we began recording how many CTC specimens have citations. Nearly all are the product of a collaboration. We uncovered thesis projects and papers for 10% of our bird, mammal, reptile, and amphibian specimens . . . and we have barely scratched the surface.

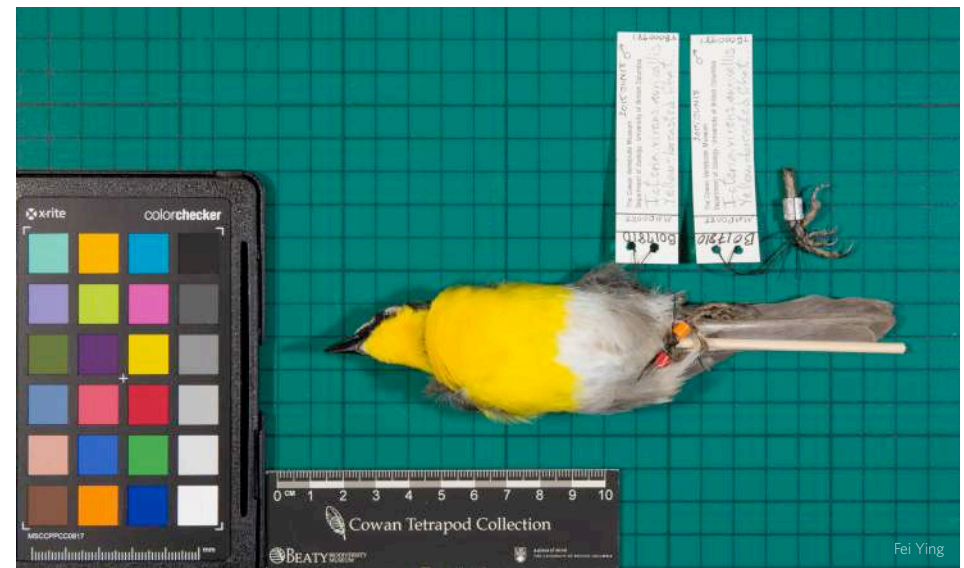
This year we were on deck for UBC Forestry camera trap investigations, UBC flight lab physiology experiments, sub-sampling of large shorebirds, rabbits, and deer for the SFU ancient DNA lab, plus research projects from five other universities. In the cultural sector, we helped out at the Museum of Anthropology, Wilson School of Design, Emily Carr University, plus our home team here at the museum.

As curators, we are uniquely placed to archive data-rich specimens sets collected by federal and provincial government scientists. Via our public databases, we can make the existence of these specimens and this government research known to the global research community. The CTC participated in five government tetrapod biodiversity and anthropogenic studies including a study on the prevalence of toxoplasmosis in urban songbirds. These same birds will be analysed for mercury and the presence of micro-plastics in their guts.

Dr. Darren Irwin  
Director and Curator

Ildiko Szabo  
Collections Curator of Birds

Chris Stinson  
Curatorial Assistant of Mammals,  
Reptiles, and Amphibians



ECCC and the Genomic Science Centre used tissue from this yellow-breasted chat (*Icteria virens*) to build the first whole-genome sequence of this BC blue-listed species. This elevates CTC specimen B017810 to the “Type” for this genomic sequence.



# COWAN TETRAPOD COLLECTION



Kaitlin Chamberlain

Ildiko Szabo (left) discusses with Susan Rowley, MOA Director and Arctic Curator the fabrication of the Siberian Yupik bird parka (MOA A2.486) donated by Francis (Bud) Fay. Observing are Work Learn students Finola Fogarty and Quinn McCallum. This meeting established that this parka is composed of double-crested cormorant pelts.

## Graduate students assisted:

- Altshuler Lab: Mass distribution in soaring flight of birds project.
- Altshuler Lab: Francesca Ciocca, Extensor Metacarpi Radialis project (Part II – non-passerines).
- WildCo (Burton) Lab: Camera trap photo species identifications for: Jacqueline Sunderland-Groves, Research Scientist; Katie Tjaden-McClement, MSc Student; Dr. Catherine Sun, Postdoctoral Fellow; Tazarve Gharajehdaghipour, PhD Student; Mitch Fennell, MSc Student; Laura Stewart, MSc Student; Jamie Clarke, Undergraduate Student; Michael Procko, MSc Student; Alexia Constantinou, MSc Student.

## Assistance provided to other museums and institutions:

- MOA: Avian forensic identification of bird skins used to create Siberian Yupik parka donated by Dr. Francis Fay.
- FLNRO + South Okanagan Bat Association: Prepared eight bats for public outreach.
- ECCC and the Genomic Science Centre: Tissue from B017810 yellow-breasted chat (*Icteria virens*). Whole-genome sequence was successful, a global first for this species which is blue-listed in BC. This elevates the CTC specimen to the “Type Specimen” for this genomic sequence.
- UBC Library Special Collections: Approached regarding a possible loan of a penguin mount and penguin eggs for a Shakespeare exhibit. The museum’s involvement with this Vancouver Art Gallery exhibit was canceled due to lack of funds.

## Help with Courses, etc.:

- BIOL 427 Ornithology and Herpetology, Darren Irwin: helped with ID labs (48 students).
- FRST 395 Forest Wildlife Ecology and Management, Cole Burton: helped with ID labs (165 students).
- BIOL 448J Directed Studies in Biology: Museum and backrooms tour (13 students).
- ENVR 400 Community Project in Environmental Science: Help with Bat Project at UBC Farm.

### Assistance provided to other Universities and Institutions:

- Environment and Climate Change Canada (ECCC) + BC Ministry of Forests, Lands and Natural Resource Operations and Rural Development (MFLNRORD: Surrey): Archived tissues and feathers from local blue-listed subspecies of great blue heron feeding studies of salvaged birds.
- ECCC: Kemess Mine (BC) Wilson's warbler hydrogen isotope project.
- ECCC & UBC Genetic Data Centre: Prevalence of *Toxoplasma gondii* in BC urban songbirds.
- ECCC: Mercury levels in BC urban songbirds.
- ECCC: Hydrogen isotope studies to determine approximate breeding ground locations of BC urban songbirds.
- MFLNRORD (Nanaimo): Provided 387 new frozen specimens of wolves, coyotes, ermine, martens, mink, and weasels from Vancouver Island, Haida Gwaii, and southwestern BC.
- MFLNRORD (Smithers): Provided new frozen specimens, including a spring cold snap one-day mortality event near Telkwa High Road (Bulkley Valley). This region is underrepresented in the collection.
- Acadia University (Nova Scotia) Mallory Lab: Prevalence of microfibers in BC urban songbirds.
- SFU Ancient DNA Lab: Luke Jackman, study of Canada's presumed extinct northern curlew (*Numenius borealis*).
- SFU Ancient DNA Lab: Tom Royle and Lauren Clark, white-tailed jackrabbits and mule deer.
- McGill University (Quebec) + SFU, Elliot Lab: Subsampled 32 gulls for historic mercury levels comparison in the Salish Sea.
- Wilson School of Design: DEPD 4720 Transformative Thinking, Project Transformed by Nature, guest lecturer.
- University of Alaska Fairbanks: Isotope analysis of northern red-backed voles' teeth.
- Seattle Pacific University (Washington), Claire Geiman: Cranial morphometrics standardized with body mass of island deer.
- American Ornithological Society (AOS): Attended annual (virtual) conference.
- AOS Bird Data Workshop: "Creating queryable databases by using controlled vocabularies."

## COWAN TETRAPOD COLLECTION



Christopher Stinson demonstrating how to measure a Cougar prior to dissection for UBC Anatomy and Dissecting Club members.

### In the community:

- PME podcast On Earth: Christopher Stinson interviewed.
- Bat Education and Ecological Protection Society, Peachland: Mounted eight bats with spread wings for their education kits.

### Artist visits:

- Jaiden George (Ahousaht Nation), Emily Carr University of Art + Design thesis project. Accompanied by Vanessa Denham.
- Bruce Speidel: Virtual consultation on 2023 Conservation Stamp Art Competition, Wyoming, Pacific marten painting *Pacific Creek Pioneer* won honourable mention.



# MARINE INVERTEBRATE COLLECTION

SPECIMENS: OVER 600,000 | NEW THIS YEAR: 150,000

NUMBER OF DATABASED RECORDS: 9,063

VOLUNTEER HOURS: 375

Dr. Chris Harley  
Director

Dr. Colin MacLeod  
Curatorial Assistant

Sheila Byers  
Curatorial Assistant



Bill Merilees' mollusc collection.

This has been an exciting year for the Marine Invertebrate Collection (MIC) with the addition of some 150,000 mollusc (shell) specimens added to the thousands of “spine-free” marine organisms currently archived in the museum. The diversity of marine invertebrates, whether considering the corals, snails, worms, crabs, sea stars, or sponges, possess a startling variety of forms, textures, and colors. Our collection is growing in its local and global diversity representation.

Thanks to a donation from William (Bill) Merilees, we have expanded our collection by approximately 126,000 specimens from British Columbia, including close to 800 species of micromolluscs, and an important cultural collection from Haida Gwaii. Bill's collection represents over five decades of fieldwork and research focused on the small snails and clams that live in the nearshore and intertidal habitats. A diversity of large international specimens from Antarctica, Africa, Australia, New Zealand, Galapagos, and many other locations complete the Merilees Collection. The scientific value of Bill's collection is immense and will provide many opportunities for studies on BC molluscs.

Bill Merilees working at a microscope.



We have continued to work with the Cowan Tetrapod Collection to document the adult life stages of trematode, nematode, and cestode parasites found in BC birds. To date, we have collected over 200 samples from 42 BC bird species, including ospreys, surf scoters, pelagic cormorants, and belted kingfishers.

Special thanks are due to Kelly Norton for her continuing relationship with the Marine Invertebrate Collection. We look forward to furthering our relationship with Bill Merilees over the coming years.

# HERBARIUM

SPECIMENS: OVER 758,000 | NEW THIS YEAR: 4,085  
DATABASED RECORDS: 573,350 | NEW RECORDS THIS YEAR: 4,085  
NUMBER OF IMAGED SPECIMENS: 40,000



The Herbarium comprises several collections including the algae, bryophytes (mosses and relatives), vascular plants, fungi, and lichens.

*Townsendia lemhiensis* sp. nov. (*species nova* - newly described species and introduced to the public for the first time in a publication) was described by Chris Lee (UBC PhD 2015), Curtis Björk, and Jeannette Whitton. This charming plant is known from just three sites in Idaho, where it occurs on ashy white soil patches where few other plants grow. One reason that it was probably overlooked is that it flowers soon after the snows melt on these slopes. Like many other townsendias, these populations are apomictic, producing seeds that are clones of the mother plants. This, along with the small number of known populations and small geographical range may make *T. lemhiensis* more vulnerable to changing environmental conditions, and highlights the need to protect this unique species. The holotype specimen is held in the Herbarium's collection.



The newly described *Townsendia lemhiensis* in Idaho.

The Herbarium partnered with the BC Conservation Data Centre (BC CDC) to support a set of initiatives in the bryophyte collection. We produced an updated checklist of BC mosses, searched for rare mosses in southwestern BC parks, and supported two undergraduate research projects. In one of these, UBC student Emma Menchions modeled potential habitat under a set of climate change scenarios for two rare BC mosses. Emma and her collaborators are now preparing a manuscript based on her findings.

Dr. Jeannette Whitton  
Director

Linda Jennings  
Collections Curator

Dr. Karen Golinski  
Collections Curator

Spencer Goyette  
Curatorial Assistant

Dr. Sandra Lindstrom  
Curator of Algae

Dr. Patrick Martone  
Curator of Coralline Algae

Dr. Quentin Cronk  
Curator of Eudicots

Dr. Sean Graham  
Curator of Monocots and  
Basal Angiosperms

Dr. Mary Berbee  
Curator of Fungi

Trevor Goward  
Co-Curator of Lichens

Curtis Björk  
Co-Curator of Lichens



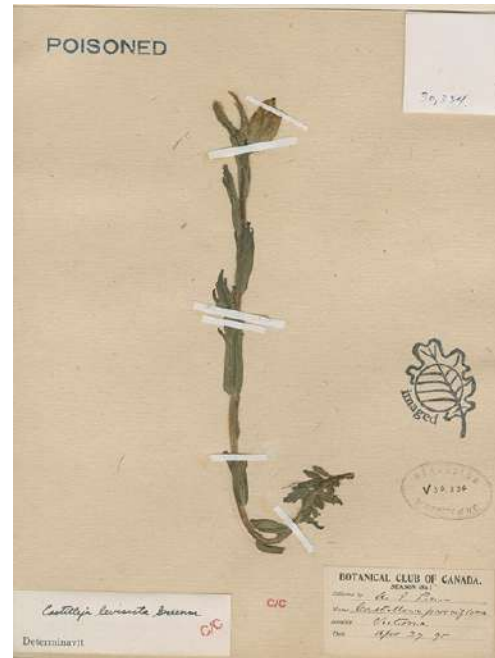
In another collaboration the BC CDC, we completed an inventory of BC's red-listed vascular plant species held in our collections, with the support of UBC Co-Op student Christina Gentle. A previous inventory had found just 120 red-listed specimen sheets, but Christina's work uncovered an additional 600 specimens of these species of conservation concern, representing 131 of BC's 172 red-listed vascular plant species. All of these important specimens have now been databased, imaged, and placed into new protective folders, ensuring they can be easily located and used to support future conservation efforts.

In October, Parks Canada funded field searches for bryophytes-at-risk and herbarium training on Haida Gwaii for Gwaii Haanas staff, Council of Haida Nations staff, and BC government staff. Afterwards, Herbarium staff engaged with the local community through a public lecture in the Gwaii Haanas Speakers Series.

A UBC 'Grant for Catalyzing Research Clusters' funded a working group meeting focused on the future of bryophyte biodiversity and conservation in BC. The meeting led to collaborations among researchers and stakeholders including the Herbarium, UBC Botany, the Canadian Centre for DNA Barcoding at the University of Guelph, the Canadian Museum of Nature, the BC Conservation Data Centre, the Royal Alberta Museum, the University of Alberta, Parks Canada, and expert bryologists.



Label data transcribed into our online database, like specimen images and maps for our BC red-listed vascular specimens.



One of the earliest BC red-listed vascular specimens in our collection, collected by A.J. Pereio and the Botanical Club of Canada in Victoria, BC, 1895.

Spencer Goyette presenting a Spring Break activity about lichens.



Herbarium training with Gwaii Haanas / Parks Canada partners.

# SPENCER ENTOMOLOGICAL COLLECTION

SPECIMENS: 653,000 | ACCESSIONED THIS YEAR: 1,500  
DATABASED RECORDS: 136,000 | NEW THIS YEAR: 2,000  
IMAGES OF SPECIMENS: 43,350 | NEW THIS YEAR: 250  
IDENTIFICATIONS FOR THE PUBLIC: 500



Top of the World  
Highway, Yukon,  
August 2021.

Dr. Wayne Maddison  
Director

Karen Needham  
Collections Curator

The Spencer Entomological Collection (SEC) is the second-largest collection of insects and other arthropods in western Canada.

Another atypical year. We hosted in-person visits from several researchers unable to access other collections in BC and Canada. We are grateful to the Entomological Society of Canada and NatureServe Canada for funding these visits. With many still not able to travel, we also sent out thousands of specimens on loan. Of particular note, four wasp families and one beetle family were examined in their entirety, something seldom done anymore. Dozens of new species were added to our collection from the efforts of these taxonomic experts.

We also continued our Yukon databasing project with support from the Yukon Conservation Data Centre. This year we focussed on digitizing specimen information from our last five Yukon Bioblitzes (Carmacks, Kluane, Tombstone, Watson Lake, and Top of the World).

Field work included our tenth year at the Whistler/Pemberton Bioblitz in July and our fifth year attending a Yukon Bioblitz in August. We also made a brief trip to Clearwater as soon as provincial travel restrictions were lifted in June. Field work planned by Collection Director Dr. Wayne Maddison was postponed because of the pandemic: to the western U.S. for *Pellenattus*, to Mexico for *Habronattus*, and to Colombia for studies on the evolution of colour vision in salticids.



## SPENCER ENTOMOLOGICAL COLLECTION

With no student assistance or volunteers in the collection from April 2020 to August 2021, we gratefully welcomed our first undergraduate assistant in September 2021. Her focus in the fall and winter has been on processing and identifying terrestrial specimens from summer field work, as well as photography of species new to our collection for addition to our website. Spring sees us preparing for the 2022 field season, which she will stay on to assist us with.

Sadly, our director emeritus, Dr. Geoffrey G.E. Scudder, who has worked in the collection since 1958 is no longer able to carry on with his research, so a specimen and data recovery project began in July to secure his legacy. I am grateful for the support of the Department of Zoology and the BC Ministry of Environment for providing space and assistance with this overwhelming task.



A firefly, *Photinus obscurellus* (Coleoptera: Lampyridae) new to our collection and from a new location in BC (Clearwater, June 2021).



# FISH COLLECTION

SPECIMENS: 350,000

NUMBER OF RECORDS WITH GEOCOORDINATES: 49,000

NUMBER OF UBC STUDENTS SUPPORTED: 56

Dr. Eric B. Taylor  
Director

Dr. Nicolas Bailly  
Curatorial Assistant



The Yokozuna slickhead (*Narcetes shonanmaruae*) is a newly described deep-sea fish that is found at depths greater than 2,000m around Japan.

The Fish Collection is the third-largest ichthyological collection in Canada and a major provincial, national, and international resource.

Few specimens were acquired or entered in the collection or databased, this year. A recent donation, however, will increase the collection and data in the coming year by an estimated 250 lots and 300 specimens.

It was rewarding to lend specimens to two BC museums for their temporary or long-term exhibits to integrate marine biodiversity within the domain they cover. The Britannia Mine Museum, in Squamish, documented the impact of the mining industry on fish diversity in Howe Sound (18 specimens representing 10 species). The North Vancouver Museum borrowed more than 100 specimens representing seven species from the shores of Burrard and Indian Arm inlets.

Much effort was dedicated to enhancing the virtual presence of the Fish Collection in FishBase ([www.fishbase.org](http://www.fishbase.org)) and in the museum's new web query interface (<https://bridge.botany.ubc.ca/herbarium/search.php?Database=fish>). Under the direction of Nicolas Bailly and with feedback from other curators, three Work Learn students (J.P. Garcia in the summer term, and Yuxin Zhang and Sassan Shokoohi in the winter term) corrected, developed further, and documented the interface created by David Rowsell in 2019.

Dr. Eric Taylor and Dr. Armando Geraldine continue their multi-year collaboration with BC Hydro that is developing and applying genomic methods to assist in mitigating impacts of the Site C hydroelectric development on salmonid populations.

Nicolas Bailly participated in various international biodiversity informatics initiatives' regular and annual meetings as a member of their steering committees: FishBase/SeaLifeBase (Taxonomy Coordinator), Catalogue of Life (CoL: Vice-Chair), World Register of Marine Species (WoRMS: member of the Steering Committee and Fish Taxonomy Editor).



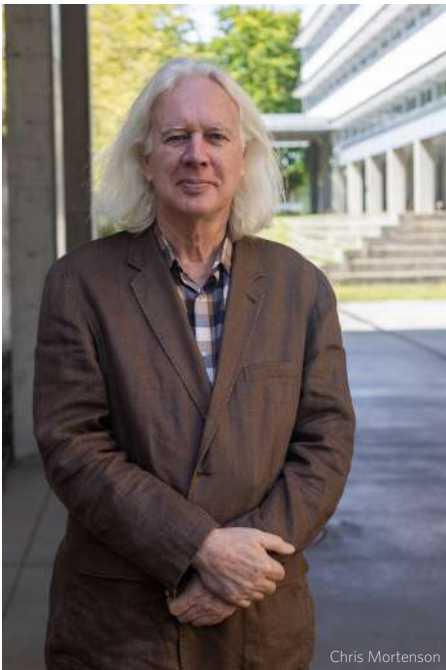
# FOSSIL COLLECTION

SPECIMENS: 30,000

DATABASED RECORDS: 7,496

Dr. Kendra Chritz  
Director

Dr. Bruce Archibald  
Collections Curator - Paleontology



Bruce Archibald, new Collections Curator.



Large ammonite fossil held by Bruce Archibald.

The Fossil Collection has over 30,000 specimens that range from recent shells to early traces of cyanobacteria, called stromatolites that represent some of the oldest evidence of life on Earth. The collection includes several of British Columbia's earliest natural history records and represents a comprehensive survey of BC's paleontological heritage.

Dr. Bruce Archibald was hired as Collections Curator - Paleontology and started April 1, 2022. This new position is possible thanks to a partnership of the Department of Earth, Ocean and Atmospheric Sciences and the Pacific Museum of Earth. Priorities for the coming year include:

- Separating high-quality specimens of the collection with detailed locality information to constitute the core of the significant research collection that will emerge.
- The revised collection will be databased.

- Low-quality specimens or those with insufficient locality data will be organised as teaching collections according to the needs of various classes. The remainder will become part of outreach education collections for schools and programs for museum visitors.
- Bruce is organising meetings with officers of the Princeton Museum and council members of the Upper Similkameen Indian Band (Hedley, BC) to discuss ways in which the Beaty might create close bonds to the benefit of all through the various programs and opportunities that the Beaty has to offer. Initial discussions have been received very positively.

# ADMINISTRATION

TOTAL ON-SITE VISITORS: 26,898

REVENUES FROM PAID ADMISSION: \$171,000

REVENUES FROM MUSEUM SHOP SALES: \$18,000



Sebastiane Seggie and Deepti Arya with Visitor Services.

Catherine Ouellet-Martin  
Senior Operations Manager

Maggie Décarie  
Visitor Services Supervisor (to  
December 2021)

Deepti Arya  
Visitor Services Supervisor (from  
January 2022)

Christine Kerr

Deepti Arya  
Sandra Lo  
Sebastiane Seggie  
Sena Youn  
Visitor Services Clerks

## Strategic & Operational Planning

In January 2022, the Strategic Planning Committee assessed progress against priorities set by the 2019–2024 Strategic Plan and updated priorities to include in the 2021–2022 Annual Operations Plan for Collections, Curation & Research, Teaching & Learning, Exhibitory, Community Engagement, and People & Places.

### Visitor Services: Admission and Gift Store

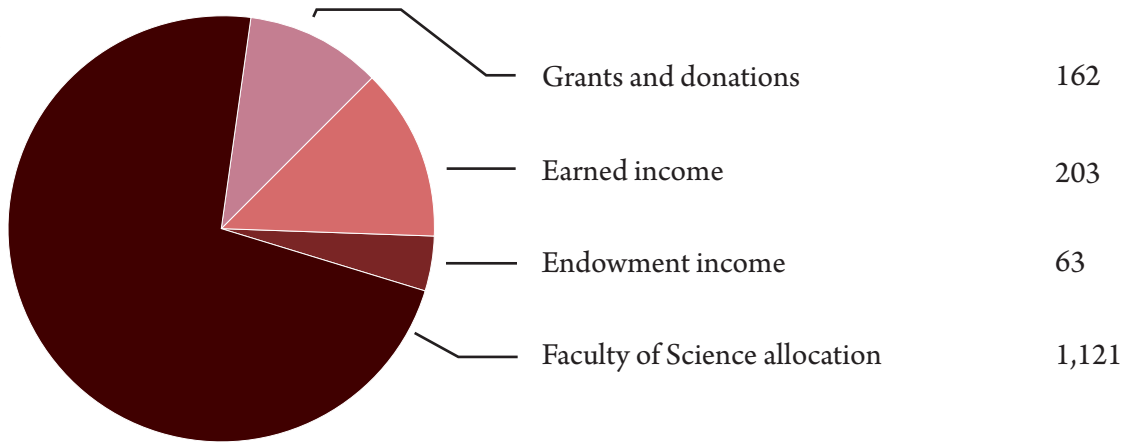
Following a strict COVID-19 safety plan, the museum continued to welcome visitors in reduced and controlled numbers through a timed-entry, pre-booked ticket system until Fall 2021 when restrictions progressively lifted to allow a return to programs, special events, facility rentals, and full-capacity visitation. Thanks to our Visitor Services team, our Interpreters and a respectful and considerate public, the Beaty offered a safe, educational, and entertaining option to many families during the challenging months of the past year.

## Human Resources

Success in this area is achieved by providing a respectful and collaborative environment in which to work and learn. A positive working environment is supported through inspiring facilities, recognition and growth for individuals, and sustainable operations. This year, we added the new position of Collections Curator - Paleontology. With this addition to our human resources capital, we now have dedicated curatorial expertise in all six of our collections.

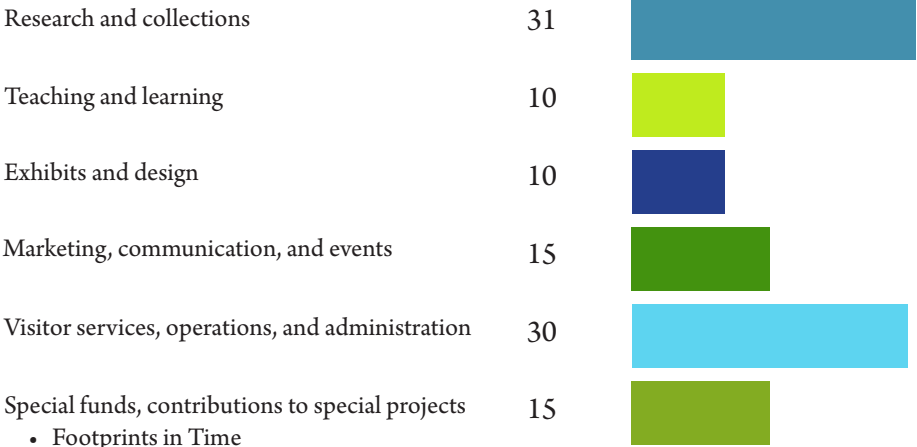
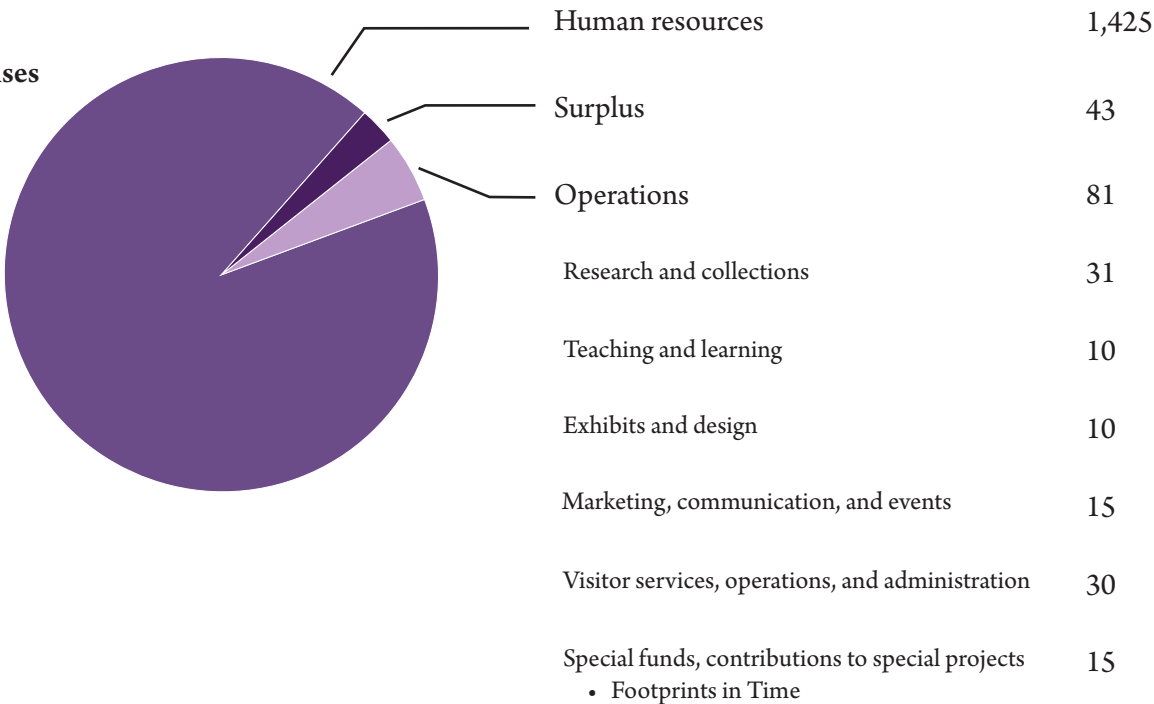


Budget



Figures in thousands of dollars.

Expenses



- Footprints in Time

We are grateful to our founding donors who made essential contributions to the creation of this world-class facility for biodiversity research and community learning:

Drs. Ross and Trisha Beaty  
The Djavad Mowafaghian Foundation  
Dr. Allan Yap

And a heartfelt thank you to everyone who has supported us since.

## Donations

Ann and Mikkel Schau	Lai Tsz Wah
Anonymous	Nathalie Djan-Chékar
Barry Narod	Quentin Cronk
Bob and Rene MacDonald	Richard Hayden
Bruce Bennett	Sally Aitken
Christine Allen	Sandra Lindstrom
David and Jennifer Wood	Shirley Mackie
and Family	Steven Dang
Deng Lang Zhang	Terry McIntosh
Eun Jin Yoon	Theresa Isomura
Frank Lomer	Virginia Skilton
Kelly Talayco	William Merilees
Kent M. Brothers	



Chris Mortenson



## Publications

Bass, A., **Needham, K.**, and Bennett, A.M.R. 2022. First record of *Vespa crabro* (Hymenoptera: Vespidae) in western North America with a review of recorded species of *Vespa* in Canada. *Zootaxa* (in press).

**Björk, C.R.** 2021. Notes on the *Artemisia campestris* complex in northwestern North America. *Phytoneuron* 2021-73:1–33.

Bourgoin, T., **Bailly, N.**, Zaragueta, R., and Vignes-Lebbe, R. 2021. Complete formalization of taxa with their names, contents and descriptions improves taxonomic databases and access to the taxonomic knowledge they support. *Systematics and Biodiversity* 19(7):738–746.

Bouزيد, N.M., Archie, J.W., Anderson, R.A., **Grummer, J.A.**, Leache, A.D. 2022. Evidence for ephemeral ring species formation during the diversification history of western fence lizards (*Sceloporus occidentalis*). *Molecular Ecology* 31(2):620–631.

Calderon, M.S., Bustamante, D.E., Gabrielson, P.W., **Martone, P.T.**, Hind, K.R., **Schipper, S.R.**, Mansilla, A. 2021. Type specimen sequencing, multilocus analyses, and species delimitation methods recognize the cosmopolitan *Corallina berteroi* and establish the northern Japanese *C. yendoi* sp. nov. (Rhodophyta: Corallinaceae). *Journal of Phycology*, 57(5):1659–1672.

**Cronk, Q.** 2022. The distribution of sexual function in the flowering plant: from monoecy to dioecy. *Philosophical Transactions of the Royal Society B-Biological Sciences* 377(1850).

**Cronk, Q.** 2022. Some sexual consequences of being a plant. *Philosophical Transactions of the Royal Society B-Biological Sciences* 377(1850).

**Golinski, G. K.** 2021. *Recovery Plan for Seligeria acutifolia, acuteleaf small limestone moss*. BC Ministry of Environment and Climate Change Strategy, Victoria, BC.

Graham, B.A., Cicero, C., Strickland, D., Woods, J.G., Coneybeare, H., Dohms, K.M., et al. 2021. Cryptic genetic diversity and cytonuclear discordance characterize contact among Canada jay (*Perisoreus canadensis*) morphotypes in western North America. *Biological Journal of the Linnean Society* 132(4):725–740.

**Grummer, J.A.**, **Whitlock, M.C.**, **Schulte, P.M.**, and **Taylor, E.B.** 2021. Growth genes are implicated in the evolutionary divergence of sympatric piscivorous and insectivorous rainbow trout (*Oncorhynchus mykiss*). *BMC Ecol. Evol.* 21:63. doi: 10.1186/s12862-021-01795-9

**Jennings, L.** 2021. “Featured Herbarium: The UBC Herbarium, Beaty Biodiversity Museum”. *The Vasculum (Society of Herbarium Curators)*, 16.2.

Konoreva, L.A., Chesnokov, S.V., Stepanchikova, I.S., Spribille, T., **Björk, C.**, and Williston, P. 2021. Nine *Micarea* species new to Canada including five species new to North America. – *Herzogia* 34: 18–37.

Lai, J., **Maddison, W.P.**, Ma, H., and Zhang, J. 2021. Intra-specific variation of non-genitalic and genitalic traits in two euophryine jumping spider species. *Journal of Zoology* 313(4):263–275.

**Le Renard, L.**, Stockey, R.A., Upchurch, G., and **Berbee, M.L.** 2021. Extending the fossil record for foliicolous Dothideomycetes; *Bleximothyrium ostiolatum* gen. et sp. nov. a unique fly-speck fungus from the Lower Cretaceous of Virginia, USA. *American Journal of Botany* 108(1):129–144. doi: 10.1002/ajb2.1602

**Le Renard, L.**, Stockey, R.A., Upchurch, G., and **Berbee, M.L.** 2021. Cretaceous fungal scutella from the Lower Potomac Group Zone 1: *Stomatothyrium placocentrum* gen. et sp. nov., a Dothideomycete colonizer of conifer stomata. *International Journal of Plant Sciences* 182(8):712–729.

Lee, C., **Björk, C.R.**, and Whitton, J. 2022. *Townsendia lemhiensis* (Asteraceae, Astereae): A narrowly endemic new species from Idaho, USA. *PhytoKeys*, 193, 67–75.

Lin, Q., Ané, C., Givnish, T.J., and **Graham, S.W.** 2021. A new carnivorous plant lineage (*Triantha*) with a unique sticky-inflorescence trap. *Proceedings of the National Academy of Sciences*, 118(33).

**Lindstrom, S.C.**, Lemay, M.A., Starko, S., Hind, K.R., and **Martone, P.T.** 2021. New and interesting seaweed records from the Hakai area of the central coast of British Columbia, Canada: Chlorophyta. *Botanica Marina*, 64(5):341–361.

**MacLeod, C.D.**, Armstrong, C., and Wang, T.X. 2021. A riddle, wrapped in a mystery, inside a barnacle. *Frontiers in Ecology and the Environment* 19(2):107.

**Maddison, W.P.** 2021. New cocalodine jumping spiders from Papua New Guinea (Araneae: Salticidae: Cocalodinae). *Zootaxa*. 2009:1–22.

**Martone, P.T.**, **Schipper, S.R.**, Froese, T., Bretner, J., DeMong, A., and Eastham, T.M. 2021. Calcification does not necessarily protect articulated coralline algae from urchin grazing. *Journal of Experimental Marine Biology and Ecology*, 537:151513.

Names or organizations in **bold** are associated with the Beaty Biodiversity Museum or the Biodiversity Research Centre.

# PUBLICATIONS AND PRESENTATIONS

**Neto-Bradley, B.M., Whitton, J., Lipsen, L.P.J., Pennell, M.W.** 2021. Macroevolutionary history predicts flowering time but not phenological sensitivity to temperature in grasses. *American Journal of Botany*, 108(5):893–902.

**Pauly, D., Piroddi, C., Hood, L., Bailly, N., Chu, E., Lam, V., Pakhomov, E.A., Pshenichnov, L.K., Radchenko, V.I. and Palomares, M.L.D.** 2021. The biology of mesopelagic fishes and their catches (1950–2018) by commercial and experimental fisheries. *Journal of Marine Science and Engineering* 9(10)[1057]:1–11. doi: 10.3390/jmse9101057

**Pauly, D., Liang, C., Xian, W., Chu, E. and Bailly, N.** 2021. The sizes, growth and reproduction of arrow worms (Chaetognatha) in light of the gill-oxygen limitation theory (GOLT). *Journal of Marine Science and Engineering* 9(12)[1397]: 1–21. doi: 10.3390/jmse9121397

Peña, V., Belanger, D., Gagnon, P., Richards, J.L., Le Gall, L., Hughey, J.R., et al. 2021. *Lithothamnion* (Rhodophyta: Hapalidiales) in the changing Arctic and Subarctic: DNA sequencing of type and recent specimens provides a systematics foundation. *European Journal of Phycology*. 2021;56(4):468–493.

Peña, V., Bélanger, D., Gagnon, P., Richards, J.L., Le Gall, L., Hughey, J.R., Saunders, G.W., **Lindstrom, S.C.**, Rinde, E., Husa, V., and Christie, H. 2021. *Lithothamnion* (Rhodophyta, Hapalidiales) in the changing Arctic and Subarctic: DNA sequencing of type and recent specimens provides a systematics foundation. *European Journal of Phycology*, (4):468–493.

Post, J.R., Ward, H.G.M., Wilson, K., Sterling, G.L., Cantin, A., and **Taylor, E.B.** 2021. Assessing conservation status with extensive but low-resolution data: application of Bayesian hierarchical modelling to Endangered Athabasca River rainbow trout (*Oncorhynchus mykiss*). *Conservation Biology*, 36(3): e13783.

Sabadel, A.J.M., and **MacLeod, C.D.** 2022. Stable isotopes unravel the feeding mode-trophic position relationship in trematode parasites. *Journal of Animal Ecology* 91(2):484–495.

Satjarak, A., **Golinski, G.K.**, Trest, M.T., and Graham, L.E. 2022. Microbiome and related structural features of Earth's most archaic plant indicate early plant symbiosis attributes. *Scientific Reports* 12(1). doi: 10.1038/s41598-022-10186-z

Schneider, A.C., and Benton, B.E. 2021. Morphometrics and redescription of *Aphyllon fasciculatum* and *Aphyllon franciscanum*, two widespread but previously conflated species in western North America. *Systematic Botany*, 46(2): 446–455.

Siegle, M.R., **Taylor, E.B.**, and **O'Connor, M.I.** 2022. Heat wave intensity drives sublethal reproductive costs in a tidepool copepod. *Integrative Organismal Biology* 4(1).

Simon, A., Goffinet, B., Wang, L.-S., Spribille, T., **Goward, T.** et al. 2022. Global phylogeny and taxonomic reassessment of the lichen genus *Dendrocosticta* (Ascomycota Peltigerales). *Taxon* 71(2):256–287.

Strother, I.E., Coxson, D., and **Goward, T.** 2022. Why is the rainforest lichen Methuselah's beard (*Usnea longissima*) so rare in British Columbia's inland temperate rainforest? *Botany* 100:283–299.

Szuts, T. and **Maddison, W.P.** 2021. New species of the monotypic thiratoscirtine genera *Ajaraneola* and *Nimbarus* (Araneae: Salticidae: Aelurillini: Thiratoscirtina). *Zootaxa* 4915 (1):119–126.

**Taylor, E.B.**, Chudnow, R., Spendlow, I., Pillapow, R., and van Poorten, B., 2021. Microsatellite DNA analysis of overwintering bull trout (*Salvelinus confluentus*) and its implications for harvest regulation and habitat management. *Fisheries Management and Ecology* 28: 219–229. doi: 10.1111/fme.12473

Weiss, S.J., Goncalves, D.V., Secci-Petretto, G., Englmaier, G.K., Gomes-Dos-Santos, A., Denys, G.P.J., et al. Global systematic diversity, range distributions, conservation and taxonomic assessments of graylings (Teleostei: Salmonidae; *Thymallus* spp.). *Organisms Diversity & Evolution*. 2021;21(1):25–42.

Wolski, G.J., Nowicka-Krawczyk, P. and Buck, W.R. 2021. *Plagiothecium schofieldii*, a new species from the Aleutian Islands (Alaska, USA). *PhytoKeys* 184:127–138.

Wolski, G.J., Nowicka-Krawczyk, P. and Buck, W.R. 2022. *Plagiothecium talbotii*, a new species from the Aleutian Islands (Alaska, USA). *PhytoKeys* 194: 63–73.

Wu, E.T.Y., Liu, Y., **Jennings, L.**, Dong, S. and Davies, J. 2021. Detecting the phylogenetic signal of glacial refugia in a bryodiversity hotspot outside the tropics. *Diversity and Distributions* 2021;00:1–15. doi: 10.1111/ddi.13449

Yu, K., Wang, W.H., **Maddison, W.P.** and Zhang, J.X. 2022. Revision of the genus *Charippus* Thorell, 1895, with descriptions of eight new species (Araneae, Salticidae, Euophryini). *Zootaxa* 5192(2):151–198.

Zinn, K.R., Rosenfeld, J.S., and **Taylor, E.B.** 2021. Effects of experimental flow manipulations on water quality, hypoxia, and growth of Threatened Salish sucker (*Catostomus* sp. cf. *catostomus*) and juvenile coho salmon (*Oncorhynchus kisutch*).



## Presentations

8ème Rencontres de l'Ichthyologie en France. 2022 (Paris, France): poster.

**Bailly, N.:** Challenges et choix pour les bases de données ichthyologiques. Comment servir tout le monde ?

England, K., Moreau, T., and **Tan, D.K.** 2021. "Birds and Biodiversity" *Grow Green Live Series*. Metro Vancouver Regional Parks. <https://www.facebook.com/metrovancouver>

FishBase Symposium. 2021 (Paris, France): oral presentations

- **Bailly, N.**, Ellenbroek, A., Fricke, R., Bart, H., Friedman, K. et al., Counting fish species: importance, methods, improvements.
- **Fricke, R.**, van der Laan, R., Fong, J., **Bailly, N.** et al., Eschmeyer's Catalog of Fishes and FishBase: the future path for a unique global list of recent fishes
- **Pruvost, P.**, Causse, R., and **Bailly, N.**, History of the computerization of the MNHN fish collection and its collaboration with FishBase.

A special issue of *Cybium* will publish many of the contributions.

**Golinski, G.K.** and Doubt, J. 2021. Co-conveners of the symposium *Impacts of Climate Change on Bryophyte Biodiversity*. BL2021 (International Association of Bryologists, American Bryological and Lichenological Society, Canadian Botanical Association, & Société québécoise de bryologie): *Bryophytes, lichens, and northern ecosystems in a changing world* (online).

**Golinski, G.K.** 2021. Public lecture, Gwaii Haanas Speaker Series, "Mosses & Liverworts, Oh my!" (Bryophytes-at-risk in Gwaii Haanas and nearby areas).

International Congress on Aquatic Sciences (October 2021, Saint-Pierre & Miquelon, France): oral presentations

- **Bailly, N.**, **Pruvost, P.**, Saint-Pierre and Miquelon marine biodiversity data available in international databases.
- Palomares, M.L., **Bailly, N.**, David, E., Parducho, V.A., Schijns, R., Froese, R., and **Pauly, D.** From abundance to scarcity: biomass trends of fish populations in the Northwest Atlantic.
- **Gaël, D.** (with Béarez, P., Urtizberea, F., Simian, G., and **Bailly, N.**), Assessment of the taxonomical knowledge of fish of Saint-Pierre and Miquelon.

A special issue of *Cybium* will publish many of the contributions.

**Jennings, L.** 2021. Advanced on-line vascular pressing workshop "Pressing Plants: Part 2" in collaboration with Julia Alards-Tomalin (BCIT) for Beaty@home [https://www.youtube.com/watch?v=mUrJSZmz\\_ss](https://www.youtube.com/watch?v=mUrJSZmz_ss)

**Jennings, L.** 2021. VanDusen Botanical Garden presentation "David Douglas, he changed the face of gardens and forestry all over the world!"

**Jennings, L.** 2021. On Earth podcast - <https://podcasts.apple.com/ca/podcast/on-earth-with-linda-jennings-botanist/id1562034229?i=1000534808299>

**Jennings, L.** 2021. Teaching Spotlight – Using the Beaty Biodiversity Museum collections to engage undergraduate students in science. *Bio News* <https://blogs.ubc.ca/bionews/2021/04/27/teaching-spotlight-using-the-beaty-biodiversity-museum-collections-to-engage-undergraduate-students-in-science/>

**Menchions, E.**, Francis, I., **Knoblauch, V.**, Weinhausen, C., Caners, R., and **Golinski, G.K.** 2021. Incorporating microclimatic considerations into rare species SDMs for climate assessments. Annual meeting of the Canadian Society for Ecology and Evolution (online).

**Menchions, E.**, Francis, I., **Knoblauch, V.**, Weinhausen, C., and **Golinski, G.K.** 2021. "Can species distribution modelling improve the climate threat assessment of at-risk mosses in Canada?" BL2021 (International Association of Bryologists, American Bryological and Lichenological Society, Canadian Botanical Association, & Société québécoise de bryologie): *Bryophytes, lichens, and northern ecosystems in a changing world* (online).

**Menchions, E.**, Francis, I., **Knoblauch, V.**, Weinhausen, C., and **Golinski, G.K.** 2021. "Can species distribution modelling improve the climate threat assessment of at-risk mosses in Canada?" UBC Earth, Ocean and Atmospheric Sciences Annual Poster Corral (online).

Moreno-Garcia, S. (with **Tan, D.K.**). 2022. "Bird's-eye view: How UBC community members are flocking together to bird-proof campus buildings" *Focus* (UBC Faculty of Science). <https://focus.science.ubc.ca/birds-c2be73bc2f4f>

**Tan, D.K.**, et al. 2021. Researchers Revealed in collaboration with **Amy Liu** for Beaty@home <https://youtu.be/8ZrdXo9rIB8>

**Stinson, C.** 2021. On Earth podcast - <https://podcasts.apple.com/us/podcast/on-earth-with-chris-stinson-collections-manager-beaty/id1562034229?i=1000540002800>

"SO MANY DISPLAYS. SO MUCH GREAT INFORMATION."

- Sheldon Nider



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Beaty Biodiversity Museum  
2212 Main Mall  
University of British Columbia  
Vancouver, BC V6T 1Z4  
phone: 604.827.4955  
fax: 604.822.0686  
email: [info@beatymuseum.ubc.ca](mailto:info@beatymuseum.ubc.ca)  
[beatymuseum.ubc.ca](http://beatymuseum.ubc.ca)