



ANNUAL REPORT

2020-2021



THE UNIVERSITY OF BRITISH COLUMBIA

Faculty of Science



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BEATY BIODIVERSITY MUSEUM 2020-2021

10
YEARS

9,968 VISITORS

49 ONLINE BEATY@HOME LIVESTREAMS

1,001 PROGRAM PARTICIPANTS

2,987 NEW SPECIMENS

Director's message

What a year! On March 17, 2020 UBC campus closed due to COVID-19, and that meant closing the Beaty Biodiversity Museum, and also halting our on-site research, curation, education, and outreach work as staff were directed to work from home. At the same time schools closed throughout BC. Our Education and Outreach team immediately swung into action to support teachers online. Our team made an amazing pivot to online outreach throwing a potential lifeline to biology teachers throughout the province. The hard work and innovation will leave a permanent legacy, extending the museum's reach into the virtual world. The Beaty@Home sessions (online discussion on biodiversity themes) have proved highly successful, attracting not only local participants but even occasionally those from far-flung places around the world. At the same time our Collections Curators found innovative ways to curate the collections from home. We needed to ensure the safety of the collections in a building now largely empty of staff and so implemented a monitoring procedure to ensure that the collections did not suffer in any way. As the "first wave" began to pass, public spaces in BC began to open once more and the museum responded immediately, re-opening on July 14, 2020. A huge amount of work by our Visitor Services team went into the reopening, to ensure that the space was absolutely safe. This meant that the museum could be a haven for BC residents and their families, in the certain knowledge that they could relax in safety. A lot has been written about the effect of the pandemic on children's mental health. I like to think that we played our part in giving families a place of wonder and normalcy in a world where walls seemed to be closing in. The COVID-19 pandemic has been described as the most globally disruptive event since the Second World War. As Director, I am immensely proud of the way in which our museum community—students, staff, and volunteers among others—responded to the crisis.

On a happier note than global pandemics, we reached an important milestone this year: our tenth anniversary. So much has happened in these ten years, with biodiversity science at UBC leaping forward, that we are already bursting at the seams. So we have been excited to begin planning this year for the expansion of the Beaty Biodiversity Centre (the building that houses both the Beaty Biodiversity Museum and the Biodiversity Research Centre). The success of both these units has led to critical space pressures. For this reason, the UBC Faculty of Science has initiated planning for an ambitious addition to the existing building. This will provide expansion space for both the museum and the centre (including space for the new cross-disciplinary Conservation Science Initiative). Although this addition won't affect the public museum space it will be vital in alleviating the space-crush in the back room areas (laboratories, curatorial rooms, and offices).

We greatly value our close links with the Biodiversity Research Centre, and I would like to thank Dr. Loren Rieseberg, Director of the centre, for his continuous goodwill towards the museum. Loren led an application to UBC's Grants for Catalyzing Research Clusters (GCRC) program as a joint proposal between the Biodiversity Research Centre and the Beaty Biodiversity Museum. Two projects from the museum were included, one from the Herbarium on Bryophyte Biodiversity Discovery and one from Exhibits & Design to fund our successful *Researchers Revealed* and Photo Competition projects. The GCRC was successful, so happily both these projects were funded.

Excellence in education is a theme running through this annual report and we were very pleased that Jackie Chambers was awarded a Faculty of Science Excellence in Service Award for her meritorious leadership of



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

the Education & Outreach team which has risen to new heights this year. The range of education work accomplished by the museum is immense. We mentor undergraduates and postgraduates who do research in the collections (in the case of undergraduates, often getting their first taste of research). Many of the Curators and members of our Education & Outreach team give guest lectures in UBC courses, as well as providing course resources and invaluable support to teaching faculty. This year we contributed to 32 UBC courses impacting over 1,900 undergraduates and postgraduates. As well as being a museum for research and outreach, we can, with some justification, consider ourselves a teaching department of the university! This is quite apart from our work with the BC school system which has a considerable impact, not least through our innovative Beaty Boxes (outreach kits with touchable specimens designed to inspire about the natural world).

On October 19, 2020 we were delighted to celebrate the conferring of the Bruce Naylor Award of the Alliance of Natural History Museums of Canada to UBC's own Dr. Geoffrey G.E. Scudder. The award is richly deserved. Dr. Scudder is one of the best-known Canadian entomologists and an influential educator and conservationist. Dr. Scudder was the Director of the Spencer Entomological Museum (now the Spencer Entomological Collection of the Beaty Biodiversity Museum) from 1958 until his retirement in 1999. The ceremony was held virtually (the new normal) but it was good to see so many of Dr. Scudder's friends, colleagues, and former students able to celebrate with him. Another UBC Professor who has had a giant impact on the Beaty Biodiversity Museum is the outgoing Director, Dr. Eric (Rick) Taylor. We all owe him a great debt of gratitude: the Beaty Biodiversity Museum has flourished mightily under his guiding hand since he took over the Directorship on September 1, 2015 (having previously served as Interim Director of the Beaty Biodiversity Museum in 2013–2014). He is, of course, one of Canada's leading fish experts and his forthcoming book, *Rivers Run Through Us: A Natural and Human History of Great Rivers of North America* (Rocky Mountain Books, October 1, 2021), will be a "must read".

Our task now is to build on Dr. Taylor's legacy and take the museum to the "next level", including deepening and extending our research impact. We can't do this on our own: we will work in partnership with our corporate and individual donors who share our vision. A good example is our partnership with Wheaton Precious Metals who have donated a magnificent educational installation, currently under development. Last summer we invited staff to bring forward major development projects and selected seven as our priorities, all of which offer potential naming opportunities (see table at right). Donors wishing to work with us on any of these are cordially invited to contact me directly.

There are many people in the UBC Faculty of Science whose goodwill is essential in helping the museum to thrive. I would particularly like to thank the outgoing Head of the Department of Botany, Dr. Sean Graham. During Dr. Graham's term as Head, the Department of Botany has continued to support positions within the Herbarium, and we are grateful to Dr. Graham for his assistance. We are equally grateful to Dr. Vanessa Auld (Head of the Department of Zoology) and to Dr. Meigan Aronson (Dean of Science) for their unstinting support. Finally, I would like to thank our donors, not just for their financial support, but also for choosing to go on this journey with us.

Dr. Quentin Cronk
quentin.cronk@ubc.ca

Beaty Biodiversity Museum Major Project Priority List for Donor Engagement

Project	Description
The Virtual Museum: digitization of the collections for science and education	Completing the digitization of our holdings and making them available online to scientists and educators. Allows the use of artificial intelligence to answer "big data" questions using our collections.
Museomics: DNA barcoding of specimens and cryptic lineage discovery	Using high-throughput DNA sequencing and genomics to reveal hidden molecular diversity in the collections and discover and describe cryptic species (especially in fungi and marine invertebrates).
Curator of Fossils	To endow a non-faculty curator position in perpetuity to conduct curation, research, and outreach on the fossils of British Columbia. To help make the BBM a renowned centre for palaeontology.
Acquisitions Fund	To establish a capital fund that can be used to purchase exceptional specimens to augment the educational and scientific value of our collections.
Canadian Arctic Climate Baseline Research Fund: to understand and quantify climate change impacts and mitigate via conservation	To fund BBM research in the Canadian arctic in collaboration with Indigenous communities to provide whole ecosystem survey and metagenomics as baselines for measuring future climate change impacts.
Beaty Museum Professorship Fund	To buy out teaching of existing faculty and provide research funding so they can work on innovative projects relevant to the museum for fixed terms as "Beaty Museum Professors".
Tropical Biodiversity Discovery Program	Funding for a 5-year collaboration with a tropical biodiversity institute to drive biodiversity discovery in critically threatened but species-rich tropical biomes, to discover and conserve species before they become extinct.

EDUCATION AND OUTREACH

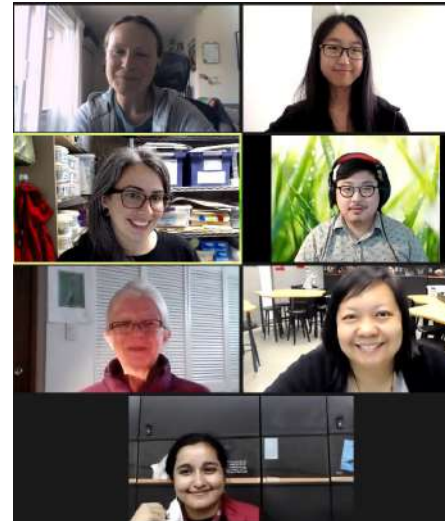
BEATY BOXES IN CIRCULATION: 10 | NUMBER OF WEEKS OF RENTALS: 64
NUMBER OF BEATY@HOME TALKS: 49 | VIEWS AND ATTENDEES: 7,280

The Education & Outreach team shares the stories of the research collections through school programs, public tours, activities, special events, and partnerships. This year due to COVID-19, we made a quick pivot to online programming and have been successful in expanding our audience and diversifying our revenue streams. We continued to make connections between biodiversity researchers and the public—allowing visitors to virtually meet the people behind the important research at the Biodiversity Research Centre and similar institutions.

We strengthened our role supporting undergraduate teaching by developing and delivering synchronous and asynchronous online content. We also continued our role in the education of educators by virtually hosting teacher candidates, and research and practicum students.

Moving online, we were able to maintain our high-quality school programming and to support teachers. Working with the PME we launched online Earth Experience, a virtual version of our joint school program and our successful virtual Educator Open House in October that had over 400 participants. We launched Beaty@Home, a weekly virtual opportunity to connect with special museum guests, talks, and tours. Many of these sessions were livestreamed to Facebook and later placed on YouTube, where we have reached thousands of people. Whether it was live from the other side of the globe, or watching after the event—our reach has expanded and we will continue to have an impact.

Despite our doors being closed for four months, and the restrictions on numbers and limits to in-person interaction; when we did open again, online programming continued to generate revenue and expand our audience. We look forward to continuing to offer virtual programs in tandem with our successful in-person programming.



Jackie Chambers
Education and Outreach Manager

Nicole Balsdon
Education and Outreach Coordinator

Nancy Lee
Kashifa Hafeez
Sheila Byers
Vincent Sayson
Angela Liu
Museum Interpreters

This was the fifth year of our successful Beaty Box specimen loan program. In light of COVID-19 restrictions we launched two online programs focused on Beaty Boxes and implemented a safe rental system as part of our reopening plan. Beaty Boxes are proving to be resilient and we have seen significant increase in rentals and revenue. We now have 10 boxes in circulation and two online programs to support them.

Jackie Chambers, Education & Outreach Manager, was awarded the Faculty of Science Excellence in Service Award for 2020.

On October 16, 2020 we celebrated ten years of being open to the public! We marked this event in person with admission by donation, as well as online with a Tenth Anniversary Livestream that included a tour of the museum, a view into collections work, Q&A time, and the premiere of our anniversary celebration video (see p. 26). Thank you to each and every member, donor, visitor, volunteer, friend, staff, and family member of the museum for supporting us these past ten years.

VOLUNTEERS

VOLUNTEER HOURS: 484.7

VOLUNTEERS STAYING IN CONTACT: 158



Volunteers, staff, and faculty participate in a virtual holiday party.

While our in-person volunteer program was put on pause this year, our volunteer corps continued their learning and connection, participating in online sessions and training as well as some at-home volunteering opportunities such as writing fact sheets. Our volunteer hours continue to climb, though more slowly than usual. We are grateful for all of their contributions and for supporting the museum through this time.

Despite museum closure and physical distancing requirements, we connected with our strong volunteer base through regular newsletters, Facebook page, and virtual parties that kept the team connected. We look forward to welcoming back our volunteers in person as soon as it is safe to do so!



Museum Interpreter Vincent Sayson leads a live tour through the dinosaur footprints.

We continued to strengthen our role supporting undergraduate teaching by collaborating with the Faculty of Science in developing and delivering synchronous and asynchronous online content. We also continued our role in the education of educators by hosting virtual teacher candidates, research and practicum students, and leading online sessions for the Faculty of Education.

Virtual collaborations, both within UBC (BRC, C+CP Kids Take Over Day, Alumni Weekend, LEEF, Physics, UBC STEM Collective, MOA, and PME) and off campus (McGill/Redpath Museum, Alliance of Natural History Museums of Canada, Queen's, NSERC Science Literacy Week & Science Odyssey, Science Rendezvous, Nature Kids BC, 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 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 online to families on both UBC campuses. Funding from a Digital Museums Canada grant and 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: 1,150,659

TWITTER FOLLOWERS: 4,143 | FACEBOOK FOLLOWERS: 4,914

INSTAGRAM FOLLOWERS: 3,174

The Marketing, Communications, and Events department aims to engage with the public by promoting the museum's initiatives and by supporting in-person and online activities to bring awareness about biodiversity to a diverse audience.

Dale Louise Gintner
Marketing, Communications,
and Events Coordinator

In the last year, our social media reach and engagement numbers have increased, and our YouTube channel alone has millions of views. Digital programs initiated during the pandemic are now part of our regular schedule. New digital projects include interactive presentations - Opening the Cabinets with the Museum Curators; new video series - Backyard Biodiversity; and a new short promotional video streaming on our social media channels. These initiatives help in achieving our strategic goal of increasing engagement with different target groups.

A screen capture of the Beaty Biodiversity Museum 360° immersive virtual tour.



The museum's website enables effective communication with our visitors, local community, and the general online audience. We added to the website a 360° immersive virtual tour, a new collection contributors webpage, and a revamped donation webpage with more information for donors. News and scientific content have been constantly published on our blog.

The department invested in new mobile and stabilizing equipment for livestreaming, and has developed, together with the Chan Centre, a new online timed-ticketing system for visitors to pre-book their tickets.

In October, we celebrated the museum's tenth anniversary with a by-donation day, a livestreamed celebration, a special anniversary video, and a memory book. In November, we hosted the virtual ceremony of the 2020 Volvo Environment Prize Award together with Universeum, the National Science Centre of Sweden, and the 2020 laureate Dr. Claire Kremen.

Dr. Claire Kremen accepts the 2020 Volvo Environment Prize from the Djavad Mowafaghian Atrium at the Beaty Biodiversity Museum.



EVALUATIONS

NUMBER OF SOCIAL MEDIA FOLLOWERS: 15,161

NUMBER OF MEMBERS: 232

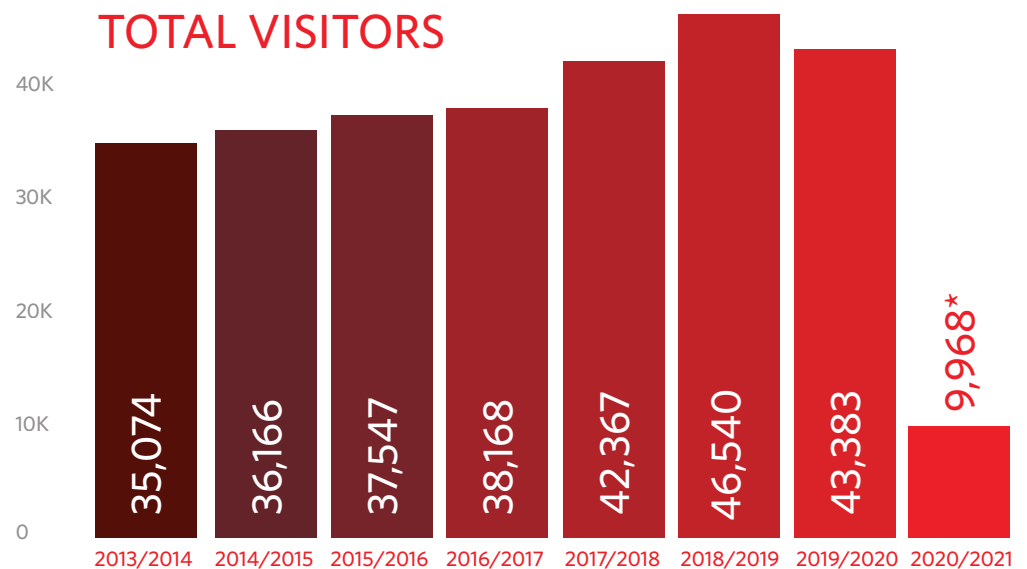
In 2020–2021 we explored online evaluation. With our pivot to online programming, it was important that we were listening and learning how to best serve our online audience. Feedback from Beaty@Home and other online events have informed our digital practice.

At our first digital Teacher Open House event in October, we implemented an online worksheet featuring various initiatives online. This served to demonstrate our range of offerings to educators, while allowing us to gather valuable information about how these materials are being used, and how they could be improved for the future. We learned that teachers want to use resources like the databases, giving a secondary audience beyond researchers for many critical features. The information has also been used to shape future online exhibits and programming projects. For example, direct educator feedback pushed us to work closely with Exhibits & Design to provide more resources to support the newest edition of *Researchers Revealed*.

We have looked closely at booking data as well as feedback from teachers, students, staff, and volunteers. This information played a key role in informing the strategic planning process and is used to continue to strengthen and enhance our exhibition design, marketing efforts, online and in-person school programs, events, and tours. In the next fiscal year, we look forward to significant enhancements to our in-person programming.

“AMAZING EXPERIENCE! EVERYTHING WAS CLEAN AND NEAT, A LOT OF FUN AND MAKES A GREAT DATE OUT OR A FAMILY EXCURSION.”

-Theresa Brown



* The museum was closed from the start of the fiscal year until July 14, 2020, losing 86 business days. On-site visitors only; does not include engagement through online paid programs.

EXHIBITS AND DESIGN

SPECIAL EXHIBITIONS: 2

ONLINE EXHIBITIONS: 8

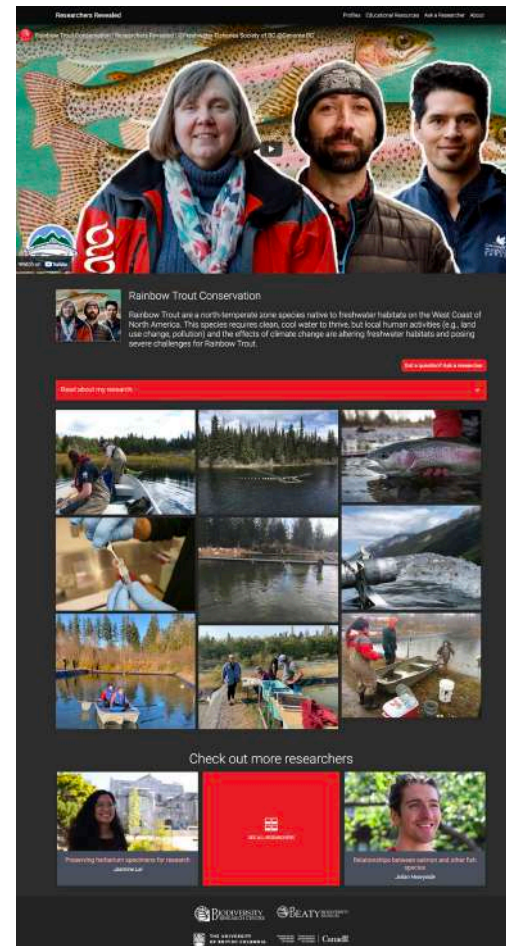
The COVID-19 pandemic has reshaped museum spaces and experiences. The museum reopened in summer 2020 with directional floor arrows and physical distancing barriers, and without the usual interactive and touchable displays we have featured in the past. Online mobile-accessible content has also played an increasingly important role in the museum visit. The Beaty Biodiversity Museum already had a mobile visitor guide, but this year it was integrated with our audio tour and brought together several existing online exhibits. Our online audience was also top of mind, with UBC classes accessing content like the Musqueam collaboration *Sturgeon Harpoon Knowledge Web* for virtual classroom learning.

The *Researchers Revealed* website is also used by UBC instructors to showcase current work in the Biodiversity Research Centre. Thanks to our education team and Jamie Clarke, a Young Canada Works Intern, we were able to develop educator resources directly linked to researcher profiles, targeting curriculum-based learning objectives from elementary through high school. With Mandy Huynh, a UBC Work Learn Student, and Media Technologist, Evan Craig, more researcher videos were added and the entire site was revised to feature this multimedia and education-centered content.

Two physical special exhibitions were installed this year. *ReCollections* celebrates the museum's tenth anniversary with over 50 artists from the museum's staff, faculty, students, and volunteers. *Fire Followers* traces the impacts of wildfires on communities in BC. Artist Megan Majewski used charcoal from burned trees to make her own paint in the works on display. Writer Sharon Roberts documented the experiences of people living in areas affected by wildfires, and those working to mitigate these risks. Both exhibits have extensive online components, enabling them to be explored remotely.

While we look forward to restoring all the components of an in-person visit, we are also aware of the reach and accessibility of online exhibits, particularly for educators of all kinds. The virtual exhibit space is one that will continue to be developed along with our walls and display cases in the post-pandemic museum.

The *Researchers Revealed* website features video profiles of Biodiversity Research Centre scientists as well as new educator resources aimed at a variety of grade levels. explore.beatymuseum.ubc.ca/researchers-revealed

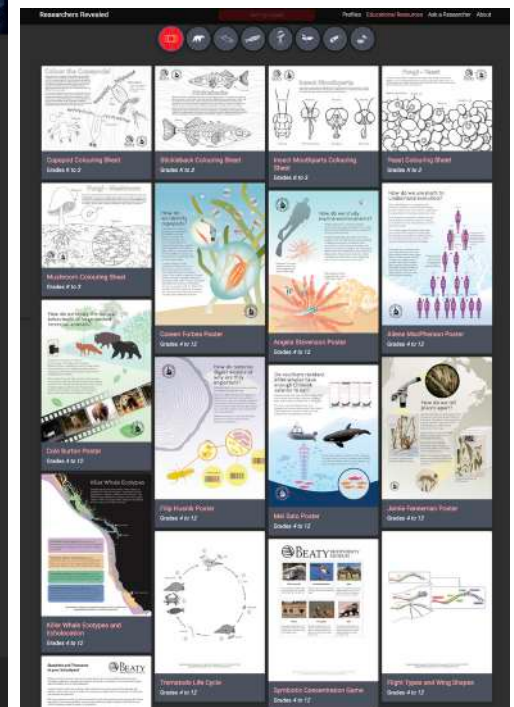


Yukiko Stranger-Galey
Exhibits and Design Manager (on leave)

Derek Tan
Digital Media Specialist
Interim Exhibits and Design Manager

Lesha Koop
Museum Artifact Technician

Evan Craig
Media Technologist





Sea Silk Waves by Sheila Byers (background)
Urn for Coral Reefs by Lesha Koop (foreground)

October 1, 2020–February 20, 2022

Creative works from past and present staff, students, researchers, and volunteers of the Beaty Biodiversity Museum and the Biodiversity Research Centre

Curators
 Yukiko Stranger-Galey and Derek Tan

Designers
 Derek Tan, Evan Craig, and Simi Wei

Fabricator
 Lesha Koop

Education Advisor
 Nancy Lee

Judging Committee
 Sylvia Heredia,
 Wayne Maddison,
 Karen Needham,
 Gregory Shapiro,
 Eric Taylor,
 Karen Yurkovich

Re



Bycatch by Zaynah Khan

Fire Followers

January 30 – October 17, 2021

Artist Megan Majewski
 and writer Sharon
 Roberts give voice to
 forests impacted by the
 BC wildfires.



Artwork by Megan Majewski
 Writing by Sharon Roberts



Megan Majewski's sketchbook

COWAN TETRAPOD COLLECTION

NUMBER OF SPECIMENS: 44,366 | ACCESSIONED THIS YEAR: 37

SPECIMENS IMAGED: 9,487 | IMAGED THIS YEAR: 292

VOLUNTEER HOURS: 116

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

Virtual labs produced by a virtual CTC:

Was all the modernization of the CTC databases initiated in 2012 and solidified by the photo digitizing initiative begun in 2013 done knowing that a global pandemic was on the way? We will never know, but for certain this year's UBC undergrads both in Biology and Forestry reaped the rewards.

Adding a searchable course number field to the CTC databases (mammals, birds, reptiles, amphibians) on the museum website database portal enables virtual specimen identification learning. UBC BIOL 427 and FRST 395 students, plus those taking BIOL 308 at the University of Northern British Columbia used this new search option to pull up specimen records for the animals they needed to learn. CTC staff and summer students did some last-minute scurrying to image and upload the three dozen species that had not previously been photographed. Everything was ready by September 1, 2020.

An added bonus for post-COVID-19 undergrads is that these virtual resources will continue to be at their disposal. They can supplement their lab-learning with museum-based virtual tetrapod identification tools.

Christopher Stinson and Ildiko Szabo were featured in the BIOL 140 video showcasing the museum's collections. Additional videos were produced for BIOL 427. All in all, the CTC is delighted that the photo imaging and digitization database initiatives created a base for making a substantial contribution to the pandemic rollout of tetrapod courses both at UBC and at other universities.

During the pandemic, CTC staff continued to provide specimens and assistance to UBC graduate and honours students.

Dr. Darren Irwin
Director and Curator

Ildiko Szabo
Collections Curator of Birds

Chris Stinson
Lead Curatorial Assistant of
Mammals, Reptiles, and Amphibians



The most notable new CTC acquisition this year is this northern black rhinoceros (*Diceros bicornis*) skull from Tanzania donated by Dr. Derek Nurse.

COWAN TETRAPOD COLLECTION

Graduate students assisted:

- Libby Natola, PhD candidate, Irwin Lab: sex determination and tissue sampling of sapsuckers
- Anthony Lapsansky, PhD candidate, joint collaboration between Atshuler Lab and Tobalske Lab (University of Montana): used previously taken wing images stored in the CTC database plus additional images taken by the researcher of newly prepared CTC specimens to investigate the evolution of wing shape in aquatic birds
- Francesca Ciocca, honours student, Altshuler Lab: wing ligaments and muscles: material properties of the deltoideus pars protogialis
- Jasmin Wong, PhD candidate, Altshuler Lab: aeroelastic flutter of flight feathers
- Dr. Vikram Baliga, post-doctoral fellow, Altshuler Lab: mass distribution in soaring birds
- Tazarve Gharajehdaghpour, PhD student, Burton Lab: prey hair samples for scat analyses of predators on mountain caribou

UBC course contributions:

- BIOL 427, Ornithology, Dr. Darren Irwin: helped the TA prepare for virtual ID labs
- BIOL 140, Laboratory Investigations in Life Science: mammal and avian collections showcased in BBM video produced by Shona Ellis
- FRST 395, Forest Wildlife Ecology and Management, Dr. Cole Burton: helped the TA prepare for virtual ID labs
- Specimens and model evaluation for 3D Education Resources Project, TLEF under Dr. Suzie Lavalley, Vantage College and Faculty of Forestry

Contributions to other universities and institutions:

- BCIT Wildlife Management Program: birds, mammal carnivores, and ungulates loan for ID labs
- UNBC BIOL308: added the course number on avian and mammal database records for use by their students in ID labs
- Environment Canada, Alaksen Office (Delta) & Surrey Ministry of Forests, Lands, Natural Resource Operations, and Rural Development (MFLNRORD): Archiving tissues and feathers from local blue-listed subspecies of great blue heron feeding studies of salvaged birds
- Environment Canada, Alaksen Office (Delta): H-isotope study of Wilson warblers salvaged from a BC Mine that neglected to turn out the lights during fall migration
- BCIT Wildlife Ecology and Management RENR 4220: mammal preparation guest lecture
- Ohio State University, Marion, Dr. Jonathan J. Cade, Assistant Professor: Request for body masses of all Geomyidae and Heteromyidae rodents
- Attended the annual (virtual) conference of the American Ornithology Society
- American Ornithological Congress Bird Data Workshop (creating queryable databases by using controlled vocabularies)
- Participated in MFLNRORD teleconference meeting on western screech owl
- Participated in Bat Matters Virtual Conference September 28–October 9, 2020



Honours undergrad student, Francesca Ciocca, conducting a wing muscle experiment on an orange-winged Amazon parrot. (*Amazona amazonica*).

COWAN TETRAPOD COLLECTION



Chris Stinson delivers a behind-the-scenes tour during a Beaty@Home livestream.

In the community

- Metro Vancouver, Sara Mimick
- Member of SNOWstorm Project
- Nature Vancouver: The Pacific and American Marten: the taxonomic relationship between these two BC-dwelling species

Beaty Biodiversity Museum event contributions:

- Beaty@Home Live: May 20, 2020 – Behind the Scenes (C. Stinson)
- Beaty@Home Live: July 29, 2020 – Albatrosses (I. Szabo)
- Tenth anniversary memory submission (C. Stinson)
- *ReCollections* art submissions (I. Szabo and Quinn McCallum)

Assistance provided to other museums:

- Kelowna Museums, specially prepared two bat specimens as spread wing mounts for bat exhibit (with eyes) and loaned ten bat specimens and transferred two.

Artist visits:

- Joel Hanna, Joyce Majiski, James MacKinnon

Notable specimens added to the CTC:

Dr. Derek Nurse donation of northern black rhinoceros skull; birds from Wild ARC (Victoria) which includes a palm warbler, an Arctic tern, and other hard-to-acquire birds; shipment of birds and mammals from Fort Nelson, BC. Since these salvaged mortalities are from the eastern side of the continental divide, most are different subspecies than those found on the west coast. Hopefully all will be prepared in 2021 and added to the collection.

MARINE INVERTEBRATE COLLECTION

SPECIMENS: OVER 500,000 | ACCESSIONED THIS YEAR: 250
NUMBER OF DATABASED RECORDS: 9,063 | NEW THIS YEAR: 500

Dr. Chris Harley
Director

Dr. Colin MacLeod
Curatorial Assistant



Three trematode parasite species: *far left* – juvenile trematode taken from purple olive snail (*Olivella biplicata*), *centre* – adult trematode taken from a glaucous-winged gull (*Larus glaucescens*), *far right* – adult trematode taken from a surf scoter (*Melanitta perspicillata*).

Our Marine Invertebrate Collection (MIC) houses many thousands of “spine-free” marine organisms that represent major animal lineages from around the globe, such as corals, snails, worms, crabs, sea stars, and sponges. Marine invertebrates possess a startling variety of forms, textures, and colors, and our collection contains some truly fantastic examples of this diversity.

This year, we have documented local marine invertebrate species in our continuing MIC “in my backyard” project. Collections from Burrard Inlet include many species of bivalves, gastropods, and crustaceans, but also invertebrate parasites that infect these taxonomic groups. To date, we have documented several trematode and cestode parasite species, and have also collaborated with the Cowan Tetrapod Collection to search for adult parasite life stages in vertebrate hosts (see images above). The MIC “in my backyard” project has been the focus of several online seminars given by Dr. Colin MacLeod, Curatorial Assistant, including the Beaty@Home series and the Biodiversity Research Centre’s seminar series, BLISS.

We also conducted a BioBlitz on the east coast of Vancouver Island in collaboration with the Hakai Institute to investigate the effects of ocean acidification on marine invertebrate biodiversity.

We have continued to work with the m̓àq̓áʔa (Makah) Fisheries Management of Washington State to investigate mass mortality events in the purple olive snail (*Olivella biplicata*) that may be caused by a combination of parasitic infection and stressors related to climate change (see image above).

Special thanks are also due to Kelly Norton for her continuing relationship with the Marine Invertebrate Collection.

HERBARIUM

SPECIMENS: OVER 714,000 | NEW THIS YEAR: 1,000
DATABASED RECORDS: 554,000 | NEW RECORDS THIS YEAR: 4,900
NUMBER OF IMAGED SPECIMENS: 38,000

Dr. Karen Golinski, Collections Curator,
Bryophytes, Lichens, and Fungi.



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

Dr. Karen Golinski joined the Herbarium as the Collections Curator for Bryophytes, Lichens, and Fungi in May 2020. Karen is well-known for her work on the bryophytes of BC, allowing her to quickly establish collaborations with government and industry, linking the wealth of UBC bryophyte collections with studies in biodiversity and conservation. These projects provide opportunities for student training, work placements, and research projects.

The pandemic brought multiple challenges and opportunities for the Herbarium this past year. Co-Curator of Lichens, Trevor Goward suggested that a top priority for the lichen collection was to incorporate Dr. Willa Noble's outstanding collection of roughly 600 species of BC lichens, collected between 1974–1985. We obtained a wage subsidy from BioTalent Canada to host Biology Co-op student Tobin Sparling, who added 4,900 specimen records to the Herbarium database.

Of course, the challenges of the past year forced us to think differently about how to support teaching, outreach, and research while physically separated from the communities that we serve. We had to get creative to continue to support many forms of teaching and learning, from one-on-one mentorship of graduate and undergraduate projects, to 'classroom' activities for large-enrollment classes.



Ochrolechia oregonensis, a lichen from the
Dr. Willa Noble collection.

Dr. Jeannette Whitton
Director

Linda Jennings
Collections Curator

Dr. Karen Golinski
Collections Curator

Dr. Sandra Lindstrom
Curator of Algae

Dr. Patrick Martone
Curator of Coralline Algae

Dr. Judith Harpel
Curator Emerita of Bryophytes

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

Linda Jennings, Collections Curator for Vascular Plants and Algae, taught a virtual module for students in ENVR 200 about biodiversity and how researchers use collections to discover new species to science. The students said that this was one of the most engaging and enjoyable modules of the term! Linda adapted this activity for students in BCIT's Forest and Natural Areas Management program, and plans to continue offering this module in the future. Linda also supported the teaching team in Seed Plant Taxonomy (BIOL 324) in adapting their labs for online delivery. Students were able to use online tools and specimen images to measure plant traits and analyze differences among notoriously challenging species of BC pussytoes. In ENVR 400, Karen mentored four talented students—Emma Menchions, Victoria Knoblauch, Isla Francis, and Caleb Weinhagen—whose capstone research project focused on determining whether species distribution modelling can be used to improve the climate threat assessment of at-risk mosses in Canada. Emma, Victoria, and Isla are continuing this work, modeling more species, and preparing to present their work at summer conferences.



A species of pussytoes, *Antennaria racemosa*, collected near Tumbler Ridge, BC, by Gerald Straley in July 1991.



Linda Jennings,
Collections Curator,
Vascular Plants and Algae.

Supporting students' discovery of biodiversity and collections is always rewarding, but especially so when we see interests turn into career paths. Barbara Neto-Bradley came into the Herbarium as a first-year undergraduate, and went on to develop and conduct an ambitious undergrad research project using our collection of grasses collected over the last several decades. Barbara explored changes in the flowering time of grasses in relation to changing climate, and found that while closely related grass species flower at similar times of the season, they are not responding similarly to changes in temperature. This means we need to be careful when extending observations about changes in one species to changes in another. Having completed her BSc and MSc at UBC, Barbara heads off to the University of Cambridge for her PhD.



Barbara Neto-Bradley.

SPENCER ENTOMOLOGICAL COLLECTION

SPECIMENS: 651,000 | ACCESSIONED THIS YEAR: 1,500
DATABASED RECORDS: 134,000 | NEW THIS YEAR: 3,000
IMAGES OF SPECIMENS: 43,100 | NEW THIS YEAR: 100
IDENTIFICATIONS FOR THE PUBLIC: 675 | VOLUNTEER HOURS: 50



Dr. Wayne Maddison
Director

Karen Needham
Collections Curator

Tiia Haapalainen
Curatorial Assistant

Christopher Stinson, Tiia Haapalainen, and Karen Needham (left to right) collecting in Brandywine Meadows in July 2020 as part of the Whistler/Pemberton/Birken Alpine Bioblitz.

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

Even in these most challenging of times, we managed to fulfill many of the core mandates of our collection: to document BC biodiversity, to grow our collection, and to assist researchers with their various projects. With most of our entomological colleagues across Canada unable to access their collections until at least September, and some not even still, we became a source of information and provided remote curation for many of them. Assistance to museum faculty and staff in Alberta, Manitoba, Ontario, and Quebec was given by providing access to our specimens (or photographs of them) in lieu of their own, and through provision of literature that hasn't yet been digitized and is therefore not available online. Yes, books, reprints, photocopyers, scanners, and even fax machines still have some utility in this digital world!

An ongoing effort since 2008, the importance of digitizing our collection was emphasized as the world moved to remote access of almost everything. Having some of our specimens databased and most of our species photographed (and on our website) allowed us and others to work safely from home or virtually visit the collection during lockdown. We have made it a priority to continue with these efforts going forward, as this resource is clearly valuable to many.

SPENCER ENTOMOLOGICAL COLLECTION



Terrestrial insects from the Whistler/
Pemberton/Birken Alpine Bioblitz, July 2020.

With more people spending time outdoors and discovering or rediscovering the natural world, our usual role of providing insect identifications and information was even more in demand. Inquiries from the public almost doubled from previous years, as everyone became amateur nature photographers and citizen scientists. The appearance of yet another two species of Asian giant hornets, one in the fall of 2019 and the other in the summer of 2020 (in addition to the original/third species found in the spring of 2019), fueled much of that interest. We are now in collaboration with colleagues at the Canadian National Collection in Ottawa to report on those findings.

The highlight of the year was, without a doubt, Dr. Geoffrey Scudder (director of our collection from 1958–1999) receiving the Naylor Award from the Alliance of Natural History Museums of Canada (ANHMC). Never has a recipient of a lifetime achievement award been more deserving! Further information about Dr. Scudder's career and accomplishments can be found on the ANHMC website.

FISH COLLECTION

SPECIMENS: 350,000 | NEW THIS YEAR: 200
NUMBER OF RECORDS WITH GEOCOORDINATES: 48,900
NUMBER OF UBC STUDENTS SUPPORTED: 27



Dr. Eric B. Taylor
Director

Dr. Nicolas Bailly
Curatorial Assistant

A 1.7-metre-long king-of-the-salmon, *Trachipterus altivelis* Kner, 1859, washed up on the shore of the territory of the Tsawwassen First Nation. Photo courtesy Kyle Flindt, hay čxʷ ǵə.

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

Very few specimens were entered in the collection and database this year; however two notable big deep-sea fishes were acquired:

- Longnose lancetfish, *Alepisaurus ferox*, from fisheries operations (more info on the species at fishbase.ca/summary/99);
- King-of-the-salmon, *Trachipterus altivelis* (1.7 metres long), gathered on the shore by the Tsawwassen First Nation on their territory (TFN) (more info on the species at fishbase.ca/summary/3264). As this species has some cultural importance in the Salish Sea area, we could confirm that the specimen was not the target of fishing activities.

Dr. Nicolas Bailly entirely cleaned and re-organized the “class collection”, 350 jars / 500 specimens used for UBC courses) to adapt recent advances in fish phylogeny / classification (e.g., Betancur-R *et*

al. 2017). This is a major leap compared from the previous classification, resolving many relationships at the ...“bush” at the top as it was called, meaning the perch-like, scorpion fishes, and related groups that altogether represent a third of the almost 36,000 known fish species. These phylogenetic changes are supported by features of fishes in our collections which will be incorporated into virtual representations.

Besides the routine work of jar curation and cross-checking the databased information with jar labels, the information provided for the online scanned collection catalogue cards (open.library.ubc.ca/search?q=*%26amp;collection=fisheries) were updated and reformatted for the new system of the Digital Centre of the UBC Library.

Much effort was dedicated to getting help to extend the virtual presence of museum specimens for all groups of fishes, which will finally happen during the summer 2021 by improving the web query interface (bridge.botany.ubc.ca/herbarium). Also, plans were made for standardizing the fish collection database with the other museum collections.

Betancur-R, R., Wiley, E.O., Arratia, G., Acero, A., Bailly, N., Miya, M., Lecointre, G., and Orti, G. 2017. Phylogenetic classification of bony fishes. *BMC Evolutionary Biology* 17(1): 1–40.

Fish Sorter!

Dr. Eric (Rick) Taylor and Derek Tan in partnership with Dr. Patrick Martone (Department of Botany) published *Fish Sorter!*, a smartphone application for the identification of BC's freshwater fishes. It is available for Android (Google Play) and Apple (App Store) devices.

Rick and Dr. Armando Geraldine continue their collaboration with BC Hydro aiming at evaluating the impacts of the Site C hydroelectric development on three species of salmonids through genomic analyses.

Several outreach and education activities took place, among others:

- Virtual visit of the Fish Collection for a UBC Biology course
- Beaty@Home session to answer the important question "How do you keep 800,000 fish specimens in order?"
- Preparation of specimens and jars for a movie
- BC Freshwater Fishes on Fishingwithrod.com (E. Taylor, youtu.be/JweMmuS2jb0)
- Beaty@Home on BC Freshwater Fishes (E. Taylor)

Nicolas 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 and Chair of the Taxonomy Group), World Register of Marine Species (WoRMS: Fish Taxonomy Editor).



Nicolas was invited to a teleconference related to a fish sounds database in preparation:

"From Practice to Pragmatism ... and back to Theory: Compromises in Collaborative Integrated Biodiversity Information Systems" based on FishBase 30 years experience. Webinar organized by Meridian, Marine Environmental Research Infrastructure for Data Integration and Application Network, led by Dalhousie University in Halifax (meridian.cs.dal.ca), January 20, 2021.

Nicolas participated in a remote workshop about the standardization of taxonomy practices for deep-sea organisms, organized by the International Seabed Authority, September 14–16, 2020:

isa.org.jm/event/workshop-deep-sea-taxonomic-standardization-strategic-approaches-collaboration

Report published at: isa.org.jm/files/files/documents/WS%20Report_Taxonomic%20Standardization.pdf

FOSSIL COLLECTION

SPECIMENS: 30,000

DATABASED RECORDS: 7,496



Dr. Kirsten Hodge
Director

Daniel Gowryluk
Curatorial Assistant

The *Elasmosaurus* is an extinct marine reptile, a replica skeleton hangs in the Earth Sciences Building, across the street from the Beaty Biodiversity Museum. Illustration courtesy Oli Beeby, Fossil Collection Work Learn student.

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.

Due to the COVID-19 pandemic and a lack of permanent curatorial staff, the fossil team's activities were temporarily put on hold starting in March 2020. Our collection is almost entirely managed by volunteers, all of whom were not allowed in the collection spaces due to building safety restrictions. This past year, in particular, has highlighted the urgent need for a dedicated fossil collection curatorial staff position who will anchor the work done in the collection, manage volunteers, as well as develop and lead research and teaching initiatives which utilize the collection. Our goal is to secure the Beaty Biodiversity Museum as an official Fossil Repository centre, further promoting the museum as a hub for the curation of research collections.

Due to our limited time on campus this year, the fossil team, all of whom are permanent staff at the neighbouring Pacific Museum of Earth, switched its efforts entirely into the virtual learning space. We developed a series of online exhibit pages and associated learning activities and guides. These virtual exhibits are located on the Pacific Museum of Earth's website. We also developed several new bookable virtual programs. Our newest and now most popular program is called Earth's Story. This program introduces participants to the concepts of deep time, the diversity of ancient life, the causes and effects of historical climate events, and examines how Earth evolved to its present-day habitable state. We are currently developing a new virtual program that focuses entirely on past life on Earth.

We are excited to welcome our fossil lab volunteer team back into the collection this coming fall and look forward to a productive year ahead.

ADMINISTRATION

*TOTAL ON-SITE VISITORS: 9,968

REVENUES FROM PAID ADMISSION: \$70,236

REVENUES FROM MUSEUM SHOP SALES: \$8,597

* The museum was closed from the start of the fiscal year until July 14th, losing 86 business days.



Strategic and operational planning

Operational planning continues to establish priorities set by the 2019-2024 Strategic Plan for its areas of focus—Collections, Curation & Research, Teaching & Learning, Exhibitory, Community Engagement, and People & Places—under the themes of collaboration, leadership, innovation, sustainability and inspiring engagement with Biodiversity. In February 2021, the Strategic Planning Committee assessed plan progress and updated priorities to include in the 2021–2022 Annual Operations Plan.

Visitor services: admission and gift store

After the closure imposed by the pandemic, the museum re-opened to the public in early July. Following a strict COVID-19 safety plan, the museum welcomed visitors in reduced and controlled numbers through a timed-entry, pre-booked ticket system. In addition, the museum offered no programs, special events, or facility rentals. Thanks to our Visitor Services team and our Interpreters—the museum’s front-line workers—the Beaty Biodiversity Museum offered a safe, educational, and entertaining option to many families during these challenging months of the past year.

Human resources

The 2019–2024 Strategic Plan lists People & Places as one of its areas of focus. 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.

Integrated Renewal Program

Through the Integrated Renewal Program, the Workday management system was implemented in November 2020. After three years of careful preparation and training, this update to UBC’s human resources and finance management systems represented an important change and required slow and patient training and orientation for all staff and faculty. As our community becomes more and more proficient in using this system, we can see the advantages of its efficient and integrated processes.

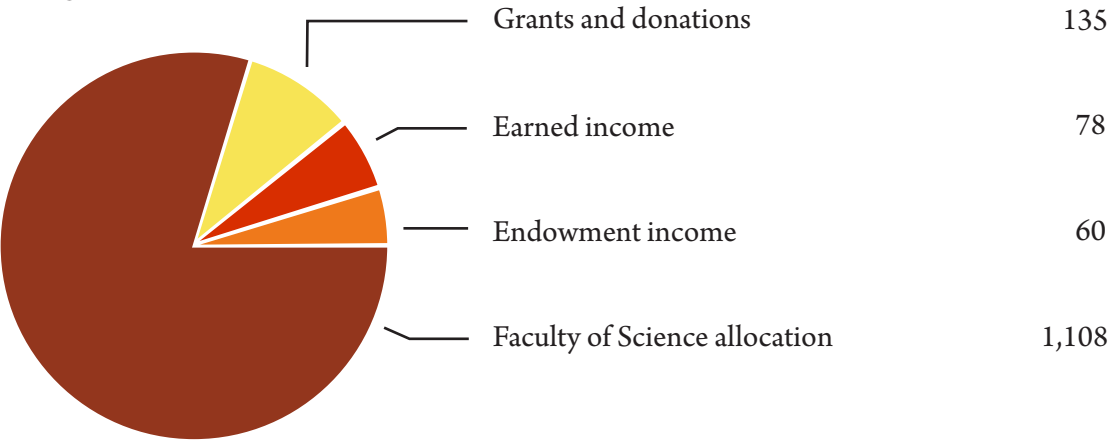
Catherine Ouellet-Martin
Senior Operations Manager

Maggie Décarie
Visitor Services Supervisor

Deepti Arya
Delia Jeong
Sandra Lo
Sebastiane Seggie
Natalie Shykoluk
Sena Youn
Visitor Services Clerks

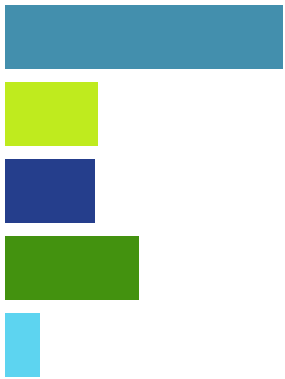
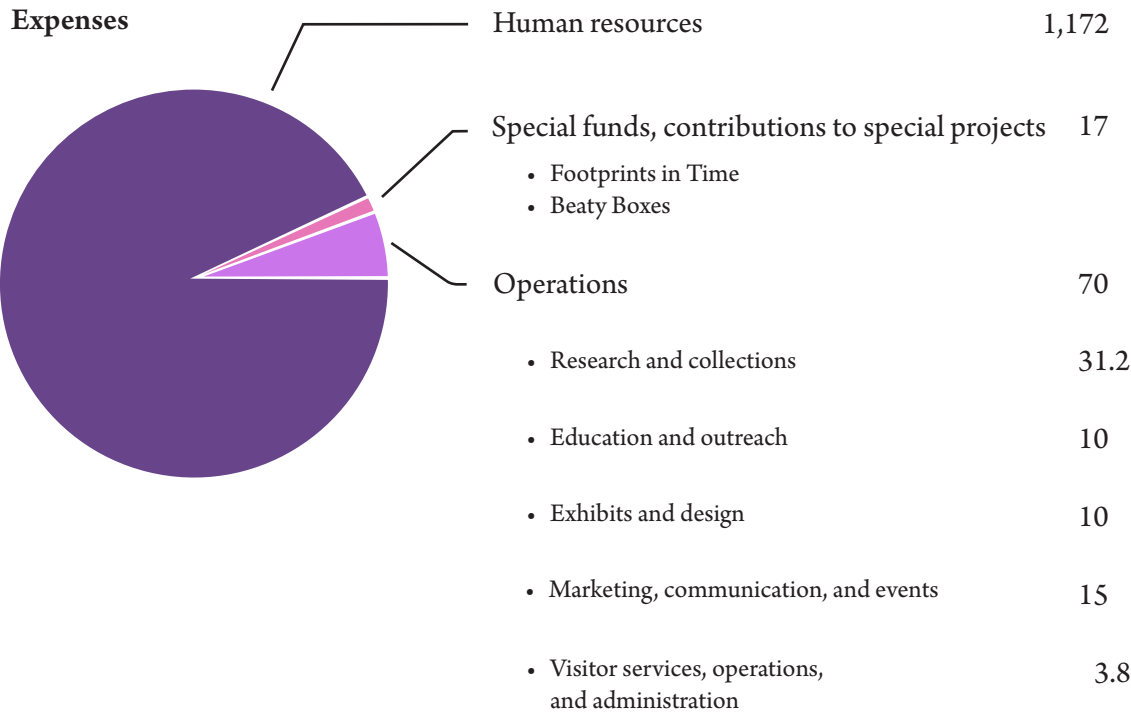
Figures in thousands
of dollars

Budget



Operational restrictions imposed by COVID-19 severely impacted self-generated revenues from admission, programs, facility rentals and Beaty Store sales. However, the museum’s financial health stayed strong this year thanks to the support of the Faculty of Science, COVID-19 relief grants and special funds, donations, membership, and some earned income. Careful management of resources resulted in a surplus at fiscal year end. The museum currently holds a \$139K structural surplus to offset against anticipated future revenue losses due to COVID-19.

Expenses





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

Kent M. Brothers
Sheila Catambing
Dr. Quentin Cronk
Nathalie Djan-Chékar
Mariya Goldis
Kirsten Johnson
Dr. Sandra Lindstrom
Frank Lomer
Neil McEachern
Dr. Barry Narod
Kelly Talayco
Ann and Mikkel Schau

Watch our tenth anniversary commemorative video at:
beatymuseum.ubc.ca/10years

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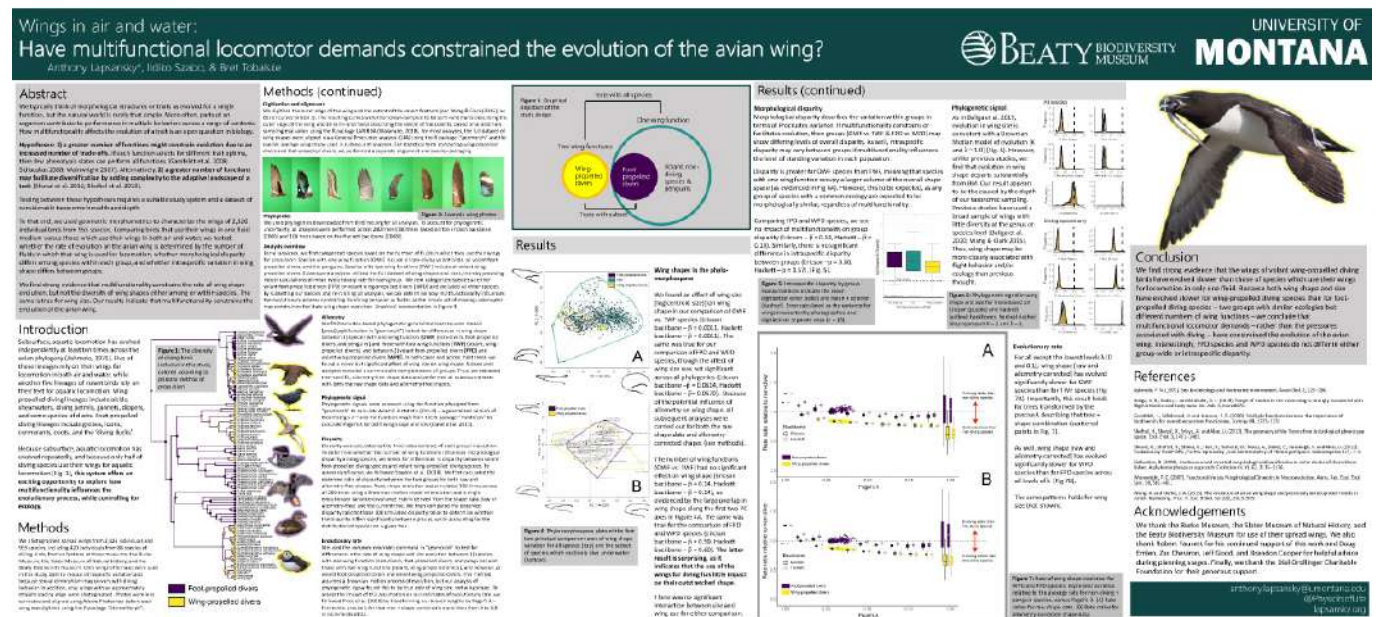
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Sarah Hoffman (Seattle NPR) filmed a documentary on the avian wing range of motion Altshuler-CTC collaboration at the BBM Vert Lab. It was released on April 20, 2020.
<https://crosscut.com/2020/04/human-elements-using-bird-wings-build-better-planes>



"WONDERFUL COLLECTION AND SETTING.
OVERALL ONE OF THE BEST MUSEUMS IN BC."

- Mauro Couto



© Beaty Biodiversity Museum

Cover: Chris Stinson, Lead Curatorial Assistant
of Mammals, Reptiles, and Amphibians, with
the skull of a Cuvier's beaked whale (*Ziphius
cavirostris*). Photograph by DerekTan.



Wash Your Hands
or use hand sanitizer



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
beatymuseum.ubc.ca