

2023

# ANNUAL REPORT



**UNIVERSITY OF WATERLOO**  
FACULTY OF SCIENCE  
Department of Earth &  
Environmental Sciences



**EARTH SCIENCES**  
museum  
UNIVERSITY OF WATERLOO





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# TERRITORIAL ACKNOWLEDGEMENT

As a part of the University of Waterloo, the Earth Sciences Museum acknowledges that much of our work takes place on the traditional territory of the Neutral, Anishinaabeg and Haudenosaunee peoples.

Our museum is situated on the Haldimand Tract, the land granted to the Six Nations that includes six miles on each side of the Grand River. Work toward reconciliation takes place within our spaces and through learning, teaching, and community building with help from the Office of Indigenous Relations.

## ABOUT THE HALDIMAND TRACK

On 25 October 1784, Sir Frederick Haldimand, the governor of Québec, signed a decree that granted a tract of land to the Haudenosaunee (Iroquois), also known as the Six Nations, for their alliance with British forces during the American Revolution (1775-83). The Haldimand Tract extends by 10 kilometers on both sides of the Grand River, from its source in Dundalk Township to its mouth at Lake Erie. Originally, 950,000 acres was designated for the Haldimand Tract, today approximately 48,000 acres remain. Read Six Nations Lands and Resources (reference under map) to learn more about the history and ongoing negotiations.



The Haldimand Tract and Six Nations Reserve Resource reference and map from <https://www.sixnations.ca/LandsResources/HaldProc.htm>



# MISSION

The Earth Sciences Museum aspires to foster in visitors an appreciation and understanding of the Earth's environments, materials, and processes, while facilitating awareness of the intricate human connections to them.

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## UNDERSTANDING

The first step in sharing knowledge is learning. Staff keep current by learning from our surrounding academic resources.



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## FACILITATING

Our talented staff, volunteers and faculty facilitators engage thousands of visitors each year.

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## CONNECTING

Observing our impact on visitors lets us know that we make valued connections to our community groups.



# ROLE IN SCIENCE

Science Outreach connects our faculty, staff, and students with the public by providing programs, public events and one-on-one conversation which support and nurture a persons' love for science discovery. As the longest standing outreach initiative at the University of Waterloo the Earth Sciences Museum is a pillar of Science Outreach in our community.

Over the last 56 years the museum has grown in relevance, educational importance, reputation, and its capacity to engage and educate our greater community.

The operation of the Museum is aligned with the University of Waterloo's mission and 2020 - 2025 signature commitments. The Museum also upholds the University of Waterloo's core values presented below.

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## WE ARE CURIOUS



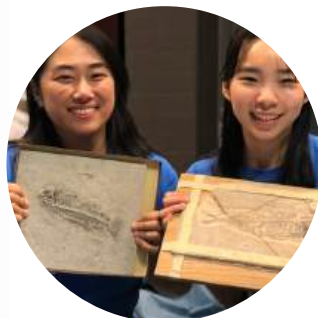
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## WE ARE COURAGEOUS



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## WE ARE ENGAGED



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## WE ALL BELONG

Fluorite  
Photo by Karen Fox



# AUTHORITY

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## UNIVERSITY

The Earth Sciences Museum is a part of the University of Waterloo's Faculty of Science and is a component of the Department of Earth and Environmental Sciences. It operates as a unit reporting directly to the Department of Earth and Environmental Sciences.



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## CHAIR & CURATOR

The Chair of the Department of Earth and Environmental Sciences attends the Museum's Advisory Board and employs a curator to manage the operation and day-to-day maintenance of the Museum. Both the department Chair and the Museum Curator are responsible for communications between the Museum's Advisory Board and the Department of Earth and Environmental Sciences. The Curator organizes and maintains relations with subcommittees, volunteers, and paid staff of the Earth Sciences Museum.

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## BOARD

The primary role of the Museum's Advisory Board is to oversee the Museum's functions and provide expertise and insight towards the Museum's development.





# BOARD MEMBERS

The Earth Sciences Museum Advisory Board is composed of persons who have expertise in various disciplines of earth and environmental sciences or museology.



**CORINA MCDONALD**

Science Museum Curator  
Earth Sciences Museum and  
Science Museum & Galleries



**DAVID CHIN-CHEONG**

Geoscientist  
Canadian Standards  
Association



**HEATHER NEUFELD**

Outreach Manager  
Faculty of Science



**JEAN RICHARDSON**

Director of Volunteers  
Earth Sciences Museum



**JEFF SAGE**

Retired WRDSB Teacher  
Earth Sciences Museum



**JOHN JOHNSTON**

Continuing Lecturer  
Sedimentology/Stratigraphy  
Earth & Environmental Sciences



**JOHN MOTZ**

Earth & Environmental  
Sciences Alumni  
Earth Sciences Museum



**LAURA SCAIFE**

Geologic Consultant and  
Educator



**MARIO CONIGLIO**

Department Chair  
Earth & Environmental  
Sciences Department



**PETER GRAY**

Senior Hydrogeologist and  
Vice President  
MTE Consultants



**PETER RUSSELL**

Curator Emeritus  
Earth Sciences Museum



**SANA AHMED**

MSc. Candidate  
Earth & Environmental  
Sciences Department



**TIFFANY SVENSSON**

Senior Hydrogeologist  
BluMetric Environmental Inc.



# IN THE SWING OF THINGS

The Museum uses outreach, events, and programming to inspire our visitors to understand and connect with our Earth. Programs are defined as any Museum engagement hosted by Museum staff offered to the public through programs offered via our website. Outreach is defined as Museum engagement off-campus and beyond regular Museum programs. Events are defined as in-house engagement by either Museum or UWaterloo staff.

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## MUSEUM PROGRAMS

Schools and community groups have trended back towards in-person programming with only a handful of virtual programs run for schools that are at a considerable distance from the Museum. The most popular program is 'Rocks & Minerals' for grade 4 classes. In November staff rolled out a new program for grade 6/7 called 'Graph-light!' The program focuses on graphite, one of Canada's critical minerals. Students learn about where graphite comes from, what we use it for and then creates and compares raw graphite and graphite in pencils by making electrical circuits with LED lights.



**5,667**  
Persons engaged



**11,688**  
Persons engaged

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## MUSEUM OUTREACH

Museum staff and volunteers participated in seven outreach events this year. The highlight was the Waterloo Wellington Children's Groundwater Festival. The festival, which ran out of Guelph Lake Conservation Area for four days straight, reached 6,489 students between Grades 2 and 5. The festival was in-person for the first time since 2019.



**23,301**  
Persons engaged

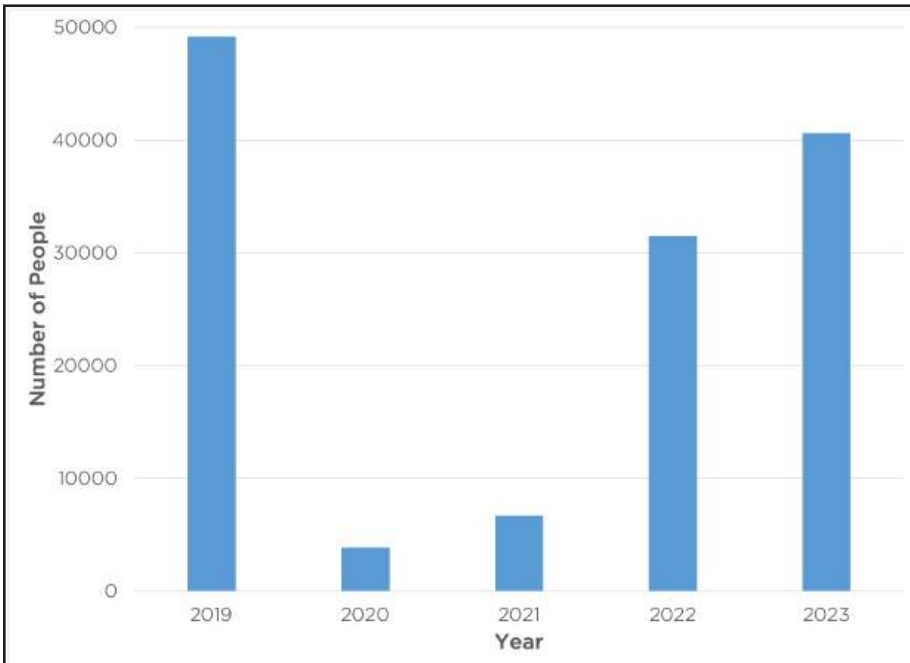
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## IN HOUSE EVENTS

The Museum is a hot spot for on-campus events, campus tours, department events and open houses. Events brought in over 23,000 visitors to the Museum space. Hosting the Waterloo Gem & Mineral Show and Kid's Science Open House again this year was a real delight for the public. Around 4000 persons were in attendance.

# OUTREACH, EVENT & PROGRAM DATA

## TOTAL ANNUAL ENGAGEMENT



The trend in overall engagement is rebounding quickly from the dip caused by the 2020 pandemic.

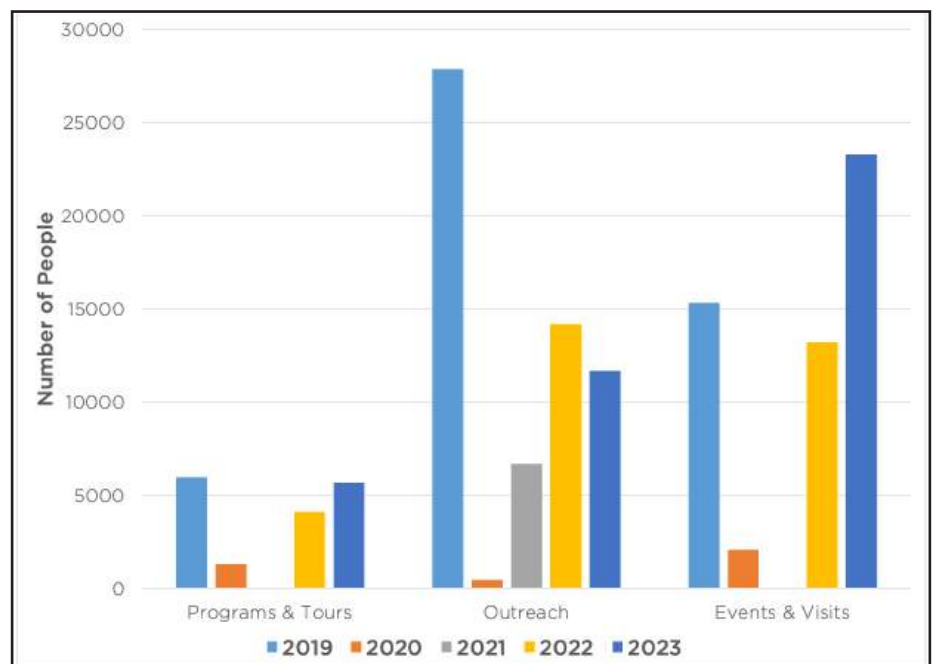
This year total annual engagement is 40,656. This number represents all individual's accounted for in outreach, event, and program visits. This number does not account for groups, families or individuals that visit beyond museum run activities or scheduled events.

Total annual engagement is broken down into three engagement types: Outreach, Events & Visits and Programs & Tours.

Outreach is rebounding from pandemic levels but we do not anticipate being able to reach pre-pandemic levels in the near future due to staff time limitations and volunteer risk restrictions which has resulted in a reduction of attended outreach occasions.

Events & Visits have increased by 43% since 2022. This rise is due to an upsurge in campus visits and science tours through UWaterloo's Visitor Centre and Marketing Undergraduate and Recruitment office and due to hosting the Gem & Mineral show for the first time since 2019.

## ENGAGEMENT TYPE



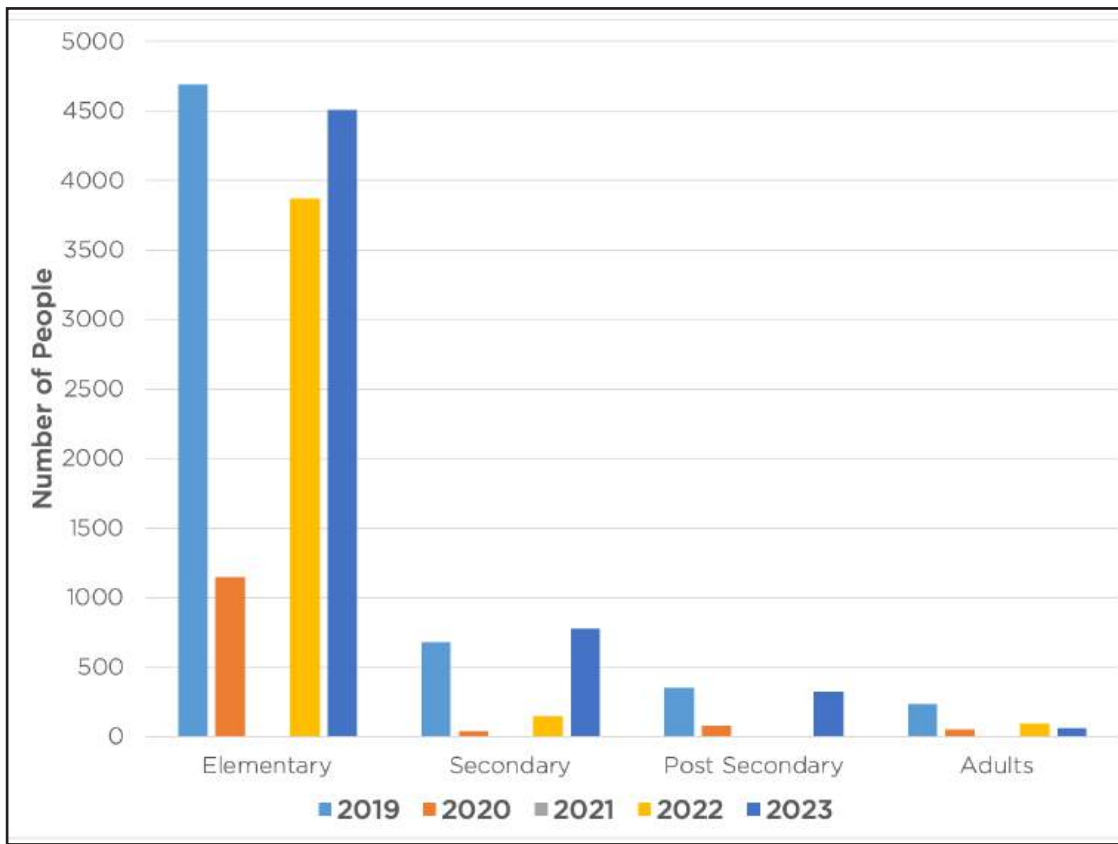
# PROGRAMS

Elementary programs dominate total programming at 71% in comparison to secondary programs at 19%, post-secondary visits at 7% and adult programs at 3%. Although secondary attendance was relatively low, a dramatic increase in secondary programs of 81% was observed between 2022 and 2023.

This increase can be attributed to advocacy by two main groups on campus: The Office of the Registrar’s Marketing and Undergraduate Recruitment-Outreach (MUR-O) and Science Outreach.

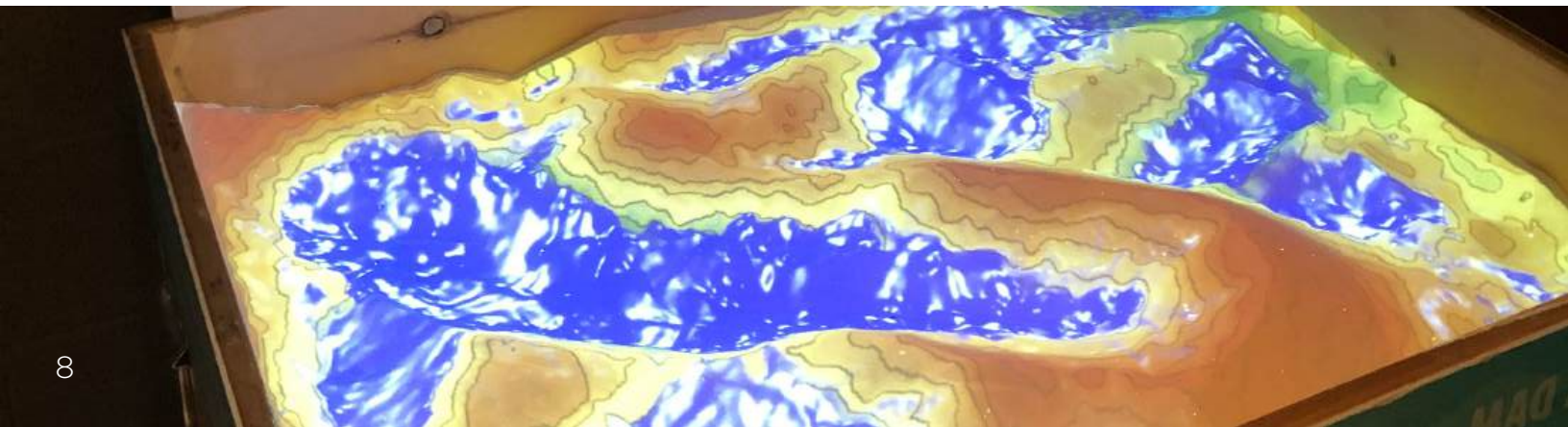


## VISITOR DEMOGRAPHICS



Rebecca Tanouye is the Enrichment Officer working for MUR. She works with the Ontario Postsecondary Access and Inclusion Program (OPAIP) grant, which focuses on addressing needs of communities who historically have not accessed postsecondary education due to systemic barriers, and then creates opportunities for them to see themselves in these spaces.

Communities that Rebecca serves include students who identify as Black, Indigenous, marginalized, or racialized, first-generation, newcomers, low-income, 2SLGBTQIA+, and students with disabilities.





Rebecca directly connected with secondary school teachers at Secondary School Head meetings and advocated for all public programming offered on campus, including the Museum. Through Rebecca, the University communicated its support for equal opportunities to Waterloo Region District School Board (WRDSB) and Waterloo Catholic District School Board (WCDSB) schools in all neighborhoods in the form of free bussing and free programming.

This advocacy highlighted the Museum in the eyes of secondary school teachers and broke down financial barriers. Museum programs are free however, secondary schools that could not previously afford to bus to the Museum were able to attend this year for the first time.

Science Outreach Manager, Heather Neufeld, included the Museums Geochemistry program as an option in Sciences Lab Days. Lab Days are opportunities for secondary school classes to attend programs and workshops hosted by all Science departments at the end of the Fall and Winter terms during a two or three week period when Science labs are unoccupied by UWaterloo students.

This opportunity significantly increased attendance to the Museums Geochemistry program which introduces Grade 11 and 12 chemistry students to the application of chemistry in Earth Sciences.





## PROGRAM POPULARITY

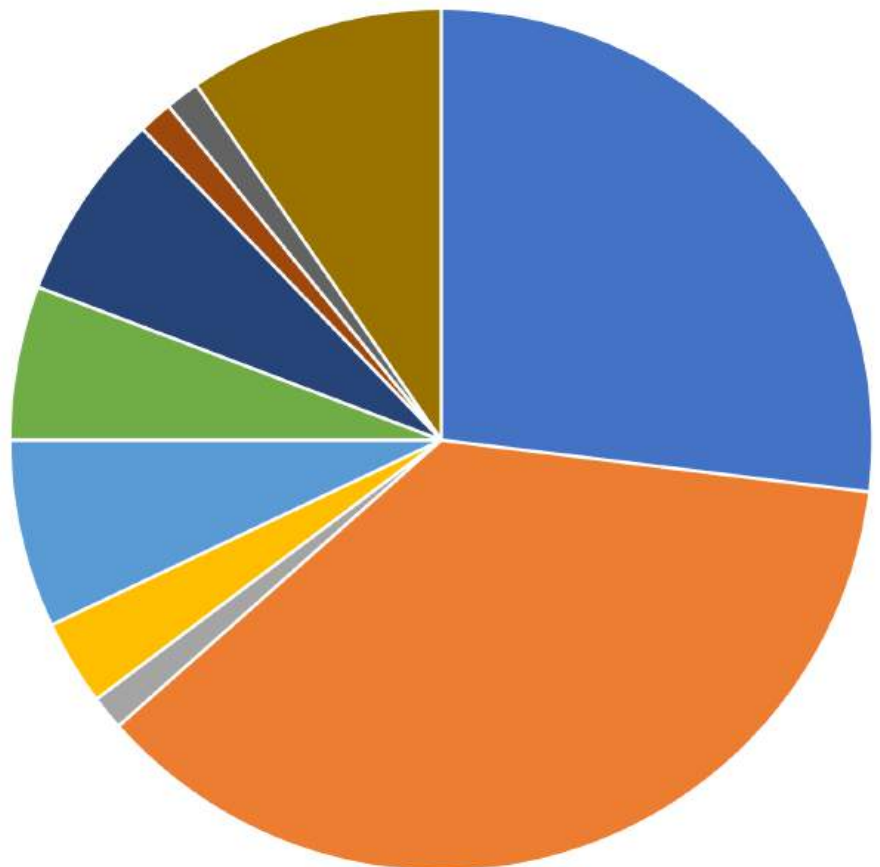
The number of total students engaged in all Museum programs increased by 1,500 from last year to over 5,500. This change was simply because the Museum was open all year round in 2023. In 2022, the museum missed two months of potential programming by re-opening with online programming in March, instead of January.

The most popular programs were 'Rocks and Minerals' and 'Dinosaurs and Fossils'. 'General Museum Tours' were closely followed by 'Natural Disasters'. Then 'Geochemistry' and 'Rocks, Minerals and Microscopes'. Virtual programming has had very little uptake this year with 'Rocks ROCK!' being the only virtual program requested.

Both 'Geophysics' and 'Graph-Light!' were introduced this Fall. More time is needed to determine the popularity of these two new programs.

## PROGRAM TYPE

- Dinosaurs and Fossils
- Rocks and Minerals
- Rocks ROCK! (Virtual)
- Water Cycle Adventures
- Natural Disasters
- Geochemistry
- Rocks Minerals and Microscopes
- Geophysics
- Graph-Light!
- General Museum Tour







# DIGITAL OUTREACH

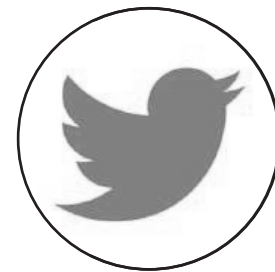
## SOCIAL MEDIA

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### TWITTER

**@UWEarthMuseum**

The museum currently has 645 followers and focuses its content primarily towards a scientific audience.



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### INSTAGRAM

**@uearthmuseum**

The museum has 902 followers and focuses instagram content towards high school and university students.

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### YOU TUBE

**@uwscience**

**Earth Sciences Museum Playlist**

The museum has a playlist on the Waterloo Science You Tube page. The playlist content is focused towards families and includes activities, story books and exhibit builds.



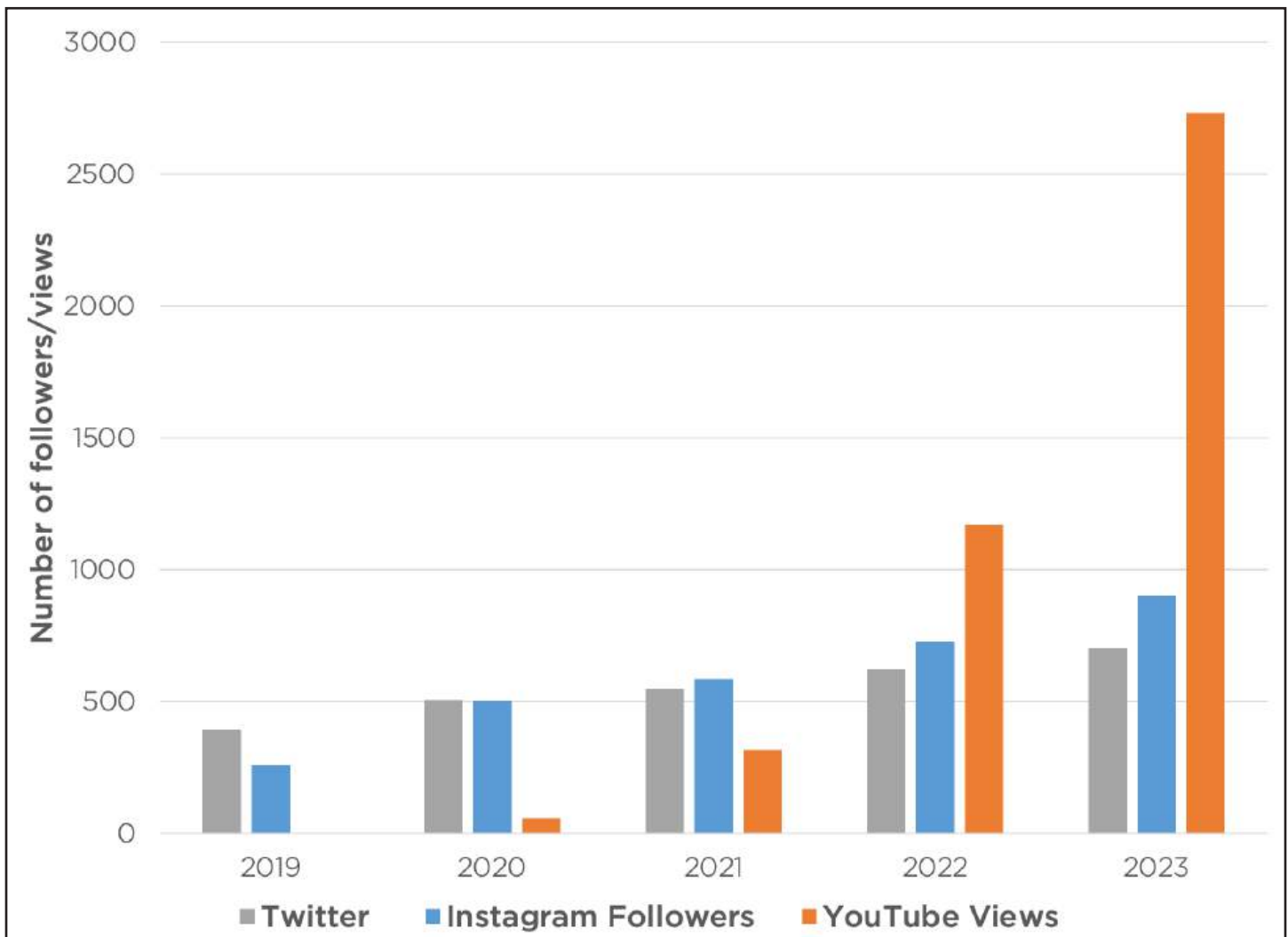


The Museum's social media presence runs through three main platforms. Social media content shares information about museum events, programs, objects, news and Earth Science-related stories. Content is created by a part-time employee hired through the UWaterloo Work Study program which supports students on OSAP. The student and social media content is guided by an experienced volunteer or the curator.



## SOCIAL MEDIA FOLLOWERS

Social media trends indicate that platforms heavy in photo and video content are most popular. Twitter has been consistently popular but has not had the same spike in followers or views as the other two platforms.





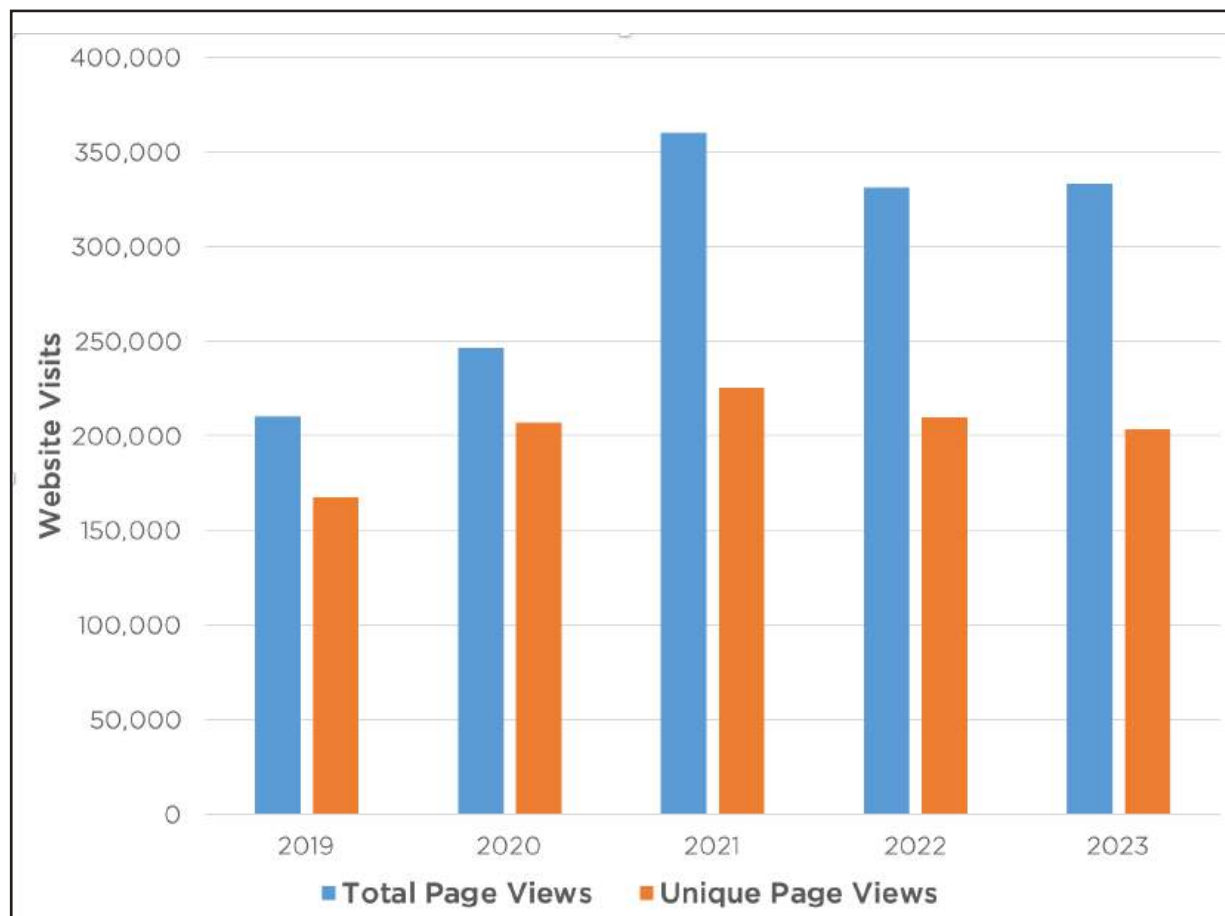
# WEBSITE DATA

The museum has two main websites, the Earth Sciences Museum and Peter Russell Rock Garden. Following 2021's spike in website traffic due to the pandemic, this year's main website traffic is close to last year, while traffic on the Rock Garden website has increased. Both remain higher than pre-pandemic use.

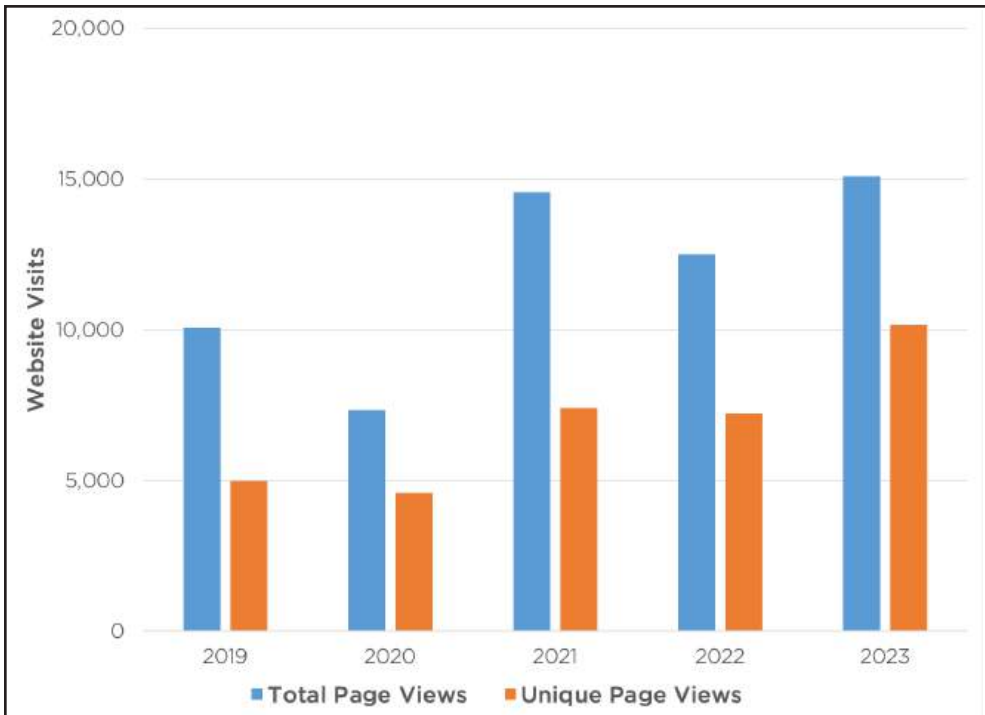
A Museum virtual-tour website was added back in 2021. Traffic on the virtual site is increasing even without significant advertising.

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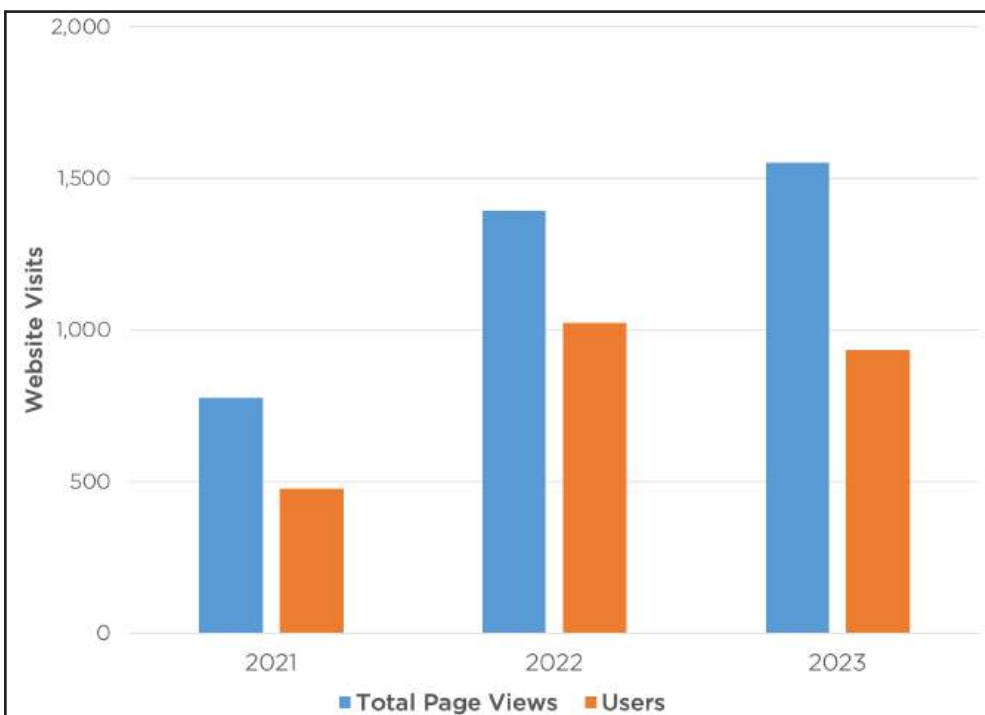
## EARTH SCIENCES MUSEUM WEBSITE



# PETER RUSSELL ROCK GARDEN WEBSITE



# VIRTUAL TOUR WEBSITE





Dendritic Goethite  
Photo by Karen Fox

# ACQUISITIONS

The Earth Sciences Museum holds over 15,000 objects in its collection. The objects are used to further the Museum's mission statement by highlighting Earth's environments, materials and/or processes through exhibits, displays, programs, events and public lectures. This year's donations and purchases are listed below.

## PURCHASES

Occasionally the Museum purchases specimens to enhance an exhibit or fill a gap that exists in the overall collection. This year a trilobite and three dolomite specimens were purchased.



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### ONTARIO FOSSIL TRILOBITE

This addition will fill a gap in the Museum's collection of Ontario fossils and help spotlight life's diversity in the Devonian time period.

# DONATIONS



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## DR. ALAN MORGAN

Dr. Alan Morgan is a retired faculty member of the Earth & Environmental Sciences department and life-long educator of the Earth Sciences, as well as an avid mineral and fossil collector. He has donated over three-hundred minerals and fossils which he collected throughout his lifetime.

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## LARRY LAMB

Twelve new specimens were added to the Larry Lamb collection this year. The Lamb collection is one of the founding collections already housed and on display in the Museum. Of the twelve specimens most of them are meteorites or meteorite related.



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## IRWIN KENNEDY

In addition to his 2022 mineral donation, the remaining one-thousand, two-hundred mineral specimens from Irwin Kennedy have arrived at the museum. They are a representation of Mr. Kennedy's life-long career as a professional geologist and mineral enthusiast.



LITHIUM ORE - GARTH DREVER, FRONTIER LITHIUM  
METEORITE - GENE GRAVEL

# STRATEGIC GOALS

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## DIGITIZE THE COLLECTION

A digital collection database is a foundational component to provide management, accessibility, visibility and public engagement for over 15,000 objects in the Museum collections. Staff and volunteers are working diligently to photograph, update and reference object data, create software and standard operating procedures for cataloguing objects. Software used by Museum staff to manage the collection is now in use. Next steps involve linking the software to a designed public-facing website and continue to photograph and input object data into the database.

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## DEVELOP EXHIBITS

Much housekeeping took place to illuminate and protect our exhibits. Electrical lines and lighting were brought to six display cabinets and UV film was applied to the windows looking into the building. The film will help protect fossils from deterioration and wood from fading. The Reimer Family Gallery installation and resulting renovations were stalled due to the pandemic and the absence of staff in 2021. This year elements for the petrified plants wall were put in place, including the 2008 lb. piece of petrified wood from Arizona. Work continues to progress on content for the remaining Gallery spaces.

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## QUALITY PROGRAMS

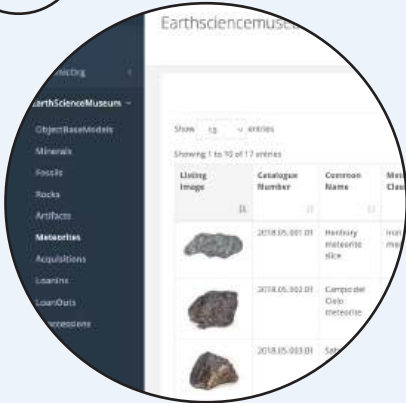
The Museum's primary goal is to share appreciation and understanding of Earth processes and human connections with visitors. This year a new program, Graph-light!, was rolled out late in November to highlight critical minerals in Canada which are a hot topic across our Nation. Staff are also communicating with Secondary school Geography teachers to optimize our secondary school programs. Permanent staff are looking ahead into 2024 to assess current programs and implement changes where necessary.



# ACTIONS AND TASKS

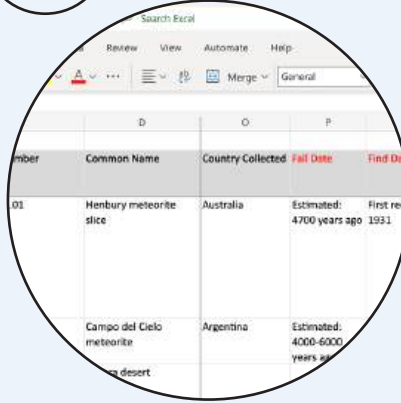
1

**COMPLETE SOFTWARE**



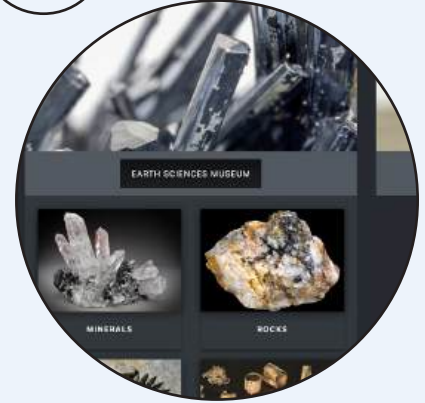
2

**IMPORT PREVIOUS DATA**



3

**COMPLETE PUBLIC WEBSITE**



✓

**PETRIFIED PLANTS RENOVATION**



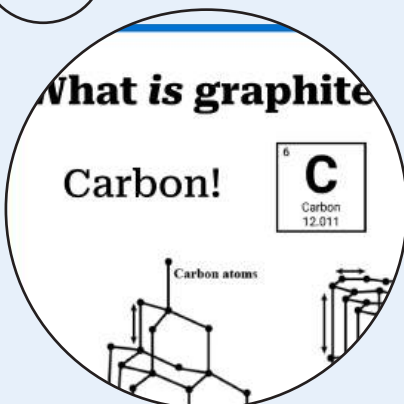
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**ELECTRICAL RENOVATION**



1

**REVISE PROGRAMMING**



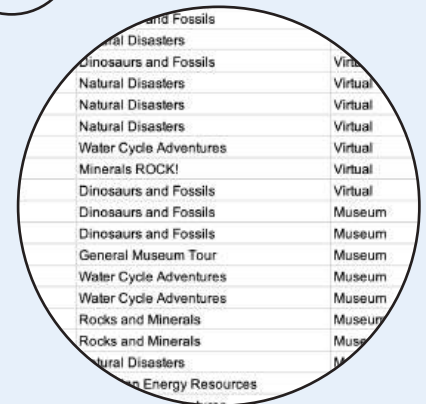
2

**APPLY REVISED/NEW PROGRAMMING**



3

**ASSESS PROGRAM ATTENDANCE**





# COMMUNITY SUPPORT

Our staff and volunteers provide energy and maintain the scaffolding of this Museum. Thank-you to those who have supported and helped us this year!

## COOPERATIVE STUDENTS

Every four months, one or three coop students are hired to teach museum programs and assist with the collection database. Funding for students is partly supported by the Museums Conestoga Rover's Endowment as well as the Faculty of Science.



**PLUTO JIANG**

2B Physics & Astronomy  
8 Month Term

"I love when things fall onto this planet."



**ADELAIDE TIMMERMAN**

2B Biology, Psychology Minor

"Hello! I am in my second year of Honours Biology with a minor in Psychology. Biology and its various disciplines have always been near and dear to my heart, making me eager to learn as much as I can about the field. With this in mind, I am very excited to be working for the Earth Science Museum and Science Museum and Galleries collection!"



**ASIA MAHEU**

2B Earth & Environmental Sciences Geology

"Hello! I'm currently in my third year of geology, and I am so excited to be working at the museum this fall! I've loved rocks, fossils and dinosaurs since I was little and it's so rewarding to be able to share my love for Earth Sciences through museum tours and field trips. It would be so gneiss if you came to visit the museum!"



**CRYSTAL CZARNIECKI**

3B Earth & Environmental Sciences Geology  
8 Month Tem

"I am so excited to be working with the Earth Sciences Museum again! I am a fourth year geology student here at UW, and I love running the kids' fieldtrips to our museum. It is very rewarding to be teaching a subject that I am so passionate about. Last time I worked for the museum, I focused more on research and database management. I am so happy that this time around, I get to focus on community outreach. I couldn't imagine a more fun job!"



**MAIJA DEVI SCHADE**

3A Biology

"Hi! My name is Maija, and I am in my third year of biology at the University of Waterloo. I am super happy to be working for the Earth Sciences Museum! There is so much to learn about in science, and I am excited to be able to help organize the museum's collection so everyone can learn about all the amazing things it has to offer."



**JAY MILLER**

4B Knowledge integration, Earth & Environmental Science Minor, 8 Month Term

"Hi! I am Jay, a 4th year Knowledge Integration and Earth Sciences Student. I love geology and museums, so working at the Earth Sciences Museums is a no brainer. Currently, I work behind the scenes to help design a travelling exhibit for the museum that focuses on current Earth Science research."



# WORK STUDY STUDENTS & PART-TIME STAFF

Work study students are part-time employees that create and post the museum's social media communications. All work study students have OSAP and 75% of their salary are funded by the University's Student Awards & Financial Aid Office.



**ALIVIA MADDEN**

1B Earth & Environmental Sciences Ecology

"I am a first year student studying Environmental Science. I love learning about ecology and geology and hope to study volcanology one day. I'm excited to share my passion with you by building the Earth Sciences Museum's social media this term!"



**LUCA GALLER**

4A, Biological & Medical Physics

"I'm super excited to be doing my third term as the ESM Communications Assistant! I'm now in my fourth year of Biological and Medical Physics with a double minor in Biology and Astrophysics. Growing up in Alberta, my favourite summer activity was visiting the Royal Tyrell Museum in Drumheller which has a world class collection of fossils and other cool specimens!"



**MELISSA GIBBON**

4A Science & Business

"I'm a fourth-year science and business student and I will be optimizing volunteer onboarding processes for the ESM. Museums have always been my happy place and we are very lucky to have a gneiss one right here on campus, don't take it for granite!"

## AWESOME VOLUNTEERS

There were over 100 volunteers working with museum staff this year! We can't list them all but everyone of the students come with a variety of backgrounds and talents to help organize events, run programs, build exhibits, clean and update information, just to name a few. THANK YOU ALL!

SANA AHMAD

KIKI KIMBER

ERNIE BURNS

MASHAEL KHAN

TERESA DANG

COPPER PICKERING

IVAN EDGEWORTH

JEFF SAGE

SOPHIE GAGNON

FATIMA SIDDIQUI

JESSA GAREAU

REMY SREMCEVIC

MELISSA GIBBON

SHAMREZ SYED

CARALINE GIROUARD

STEPHEN TAN

KATRINA HYNEK

JACQUELINE VOISIN

ADAM JOHNSON

EMILY ZELENYT



# EXCEPTIONAL VOLUNTEERS

The Museum can not function without volunteers, especially the volunteers below. Their expertise, knowledge, time and dedication to critical areas such as collection management, public content, programs and volunteer management, enable the Museum to maintain high standards and attain its mission.



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## PETER RUSSELL - CURATOR EMERITUS

Peter can and does indeed help with everything. Recently he has been giving public lectures, helping add information to the collection database and reviewing posters and signage.

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## KAREN FOX - COLLECTION MANAGER

Karen has been instrumental in moving the online collection database forward. She is continuing to photograph museum objects and work on the organization and structure of the online collection database, which is no small feat.



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## JEAN RICHARDSON - VOLUNTEER DIRECTOR

As Volunteer Director Jean assists in volunteer operations including recruitment and the creation of onboarding, and off boarding processes for future and current volunteers. She has also done a tremendous job keeping our museum spaces clean and sparkly.





DINOSAURS



Follow us  
@DINO





Iridescent Hematite  
Photo by Karen Fox