**Rochester Academy of ScienceTM  
BULLETIN**

*“An organization of people interested in the Natural Sciences” May 2024; Vol. 78, #4*



**President’s Message**

**President's 2023 Annual Report**

I was excited and pleased with our full slate of programming in 2023 across all sections with active participation from so many members.

The Academy held our 49th RAS Annual Scientific Paper Session at R.I.T. in November. We had nearly 300 attendees from 23 different colleges and other organizations including many from the RAS. There were 112 research projects presented, a 24% increase over 2022. This year’s session will be at SUNY Brockport on November 16th, and I hope many of you will attend this excellent event.

Our Student Grants Committee reviewed numerous applications at the end of 2022 and made ten research grants to undergraduates in January totaling $5750, the most we have ever given thanks to generous donations by members and by the Life Sciences Section in addition to the endowment earnings. The largest grant was full funding plus $50 non-restricted for the first-place award. Many of these research projects were featured in the *RAS Bulletin*. I hope you enjoy these, as fostering future scientists in their early career is an important part of our mission.

The RAS Bulletin published 12 issues covering Academy business and section events and providing interesting scientific articles and photographs from our members. Please take the time to look at it when it arrives to you to keep up with all that we do. We provided two well-attended public lectures last year—one on “Black Bears in New York” by Dr. Paul Curtis of Cornell University at our 2023 Annual Meeting and a second by Drs. Roger Easton, Jr. and Jeyhan Kartaltepe of R.I.T. on “Astronomical Images – the Oldest and the Newest” for our keynote Larry King Memorial Lecture at the Annual Scientific Paper Session.

The Academy also provides important services to our sections, including insurance coverage, funding, non-profit organization status, and affiliation with the American Association for the Advancement of Science.

While the eclipse itself is 2024 news, there was much work done to prepare for it in 2023, led by our Astronomy Section. They were actively involved in the Rochester Eclipse Task Force since its launch in 2018. Besides advising, ASRAS members led the training of Eclipse Ambassadors throughout the community, provided speakers on the eclipse for many organizations, and secured 16,000 eclipse glasses for distribution to members and for outreach in the community, many paid for with donations.

Our “promote scientific study and research mission” is largely met through our sections’ “citizen science” programs. Members had a wealth of opportunities available in 2023. All sections had regularly scheduled meetings, usually with engaging lectures. In addition, ASRAS offered both scheduled and open observing of the universe at the Marian & Max Farash Center for Observational Astronomy, the RocheStar Fest, several educational Astronomy Forums, and special events such as Partial Solar Eclipse and meteor shower viewing. They also established partnership with the Astronomical League. Fossil conducted several collecting field trips to various sites encompassing both stratigraphy and fossils. They participated in the International Meeting of the Subcommission on Devonian Stratigraphy by invitation at SUNY Geneseo and at the Paleontological Research Institution annual symposium. Mineral sponsored the 50th (and last) Annual Rochester Mineral Symposium, which they founded in 1973. Life Sciences manages the internationally known RAS Herbarium with 30,000 preserved specimens from New York State at the Rochester Museum & Science Center. They partnered with the Mid-Atlantic Herbarium Consortium in 2023 resulting in the loan of expertise, equipment, and training to photograph and digitize the entire collection, to make it available for research in an on-line data base. This project will take several years of volunteer effort at regular Herbarium workshops.

We also have a “disseminate scientific knowledge” mission and we meet that through outreach and public science programming. In 2023, ASRAS hosted many public open house events and Scout astronomy camp-outs at the Farash Center, operated the RMSC telescope on Saturday nights with 60 to 200 visitors coming, and set up at the Ionia Fall Festival. Their support for the RMSC Fringe Festival telescope event–“AstroFringe”–in September landed ASRAS members on local TV news. Several sections participated in educational outreach programs at the ADK Expo and Burroughs (*Cont. p.3*) (*from p.1*) Audubon Nature Club in June, at the Paper Session in November, and at the RMSC in December. Anthropology co-sponsored a lecture with the Rochester Chapter of the Archaeological Institute of America, participated in the Frost Town Symposium on Western New York Archaeology, and set up a hands-on display at the RMSC in October for Archeology Day.

Our success is due to the work of scores of leaders and volunteers within the Academy and its sections. I am grateful to all those who have had a hand in our 2023 success. This also includes all our members who take such an active interest in our events and programs.

I generally do not mention in our annual report any names of those who contributed to the success of the Academy because there are so many. I make an exception in calling out Dr. William Hallahan, Professor Emeritus of Biology at Nazareth College, member for the past 46 years, Fellow of the Academy in 1987, Treasurer and chair of the Student Grants committee for decades. Poor health has forced him to resign this year. We are diminished by his absence. My thanks and deep gratitude to Bill for his years of service and friendship to the Academy.

A person wearing sunglasses and a hat pointing at something

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***Michael Grenier, RAS President***

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**May 1 Wed: Astronomy Board Meeting**

7:00 p.m. – 9:00 p.m. ASRAS Members are welcome to attend. Contact: Anthony Golumbeck at [semp@use.startmail.com](mailto:semp@use.startmail.com).

**May 3 Fri: Astronomy Members Meeting**

7:30 p.m. – 9:30 p.m. Farash Center, 8355 County Road 14, Ionia. Speaker: Dave Bishop – “Astronomy Year in Review.” Contact: Anthony Golumbeck at [semp@use.startmail.com](mailto:semp@use.startmail.com).

**May 4 Sat: Fossil Section Field Trip**

Split Rock Quarry near Syracuse:  This family-friendly site is a large quarry located southwest of Syracuse exposing Upper Silurian and Lower Devonian strata especially the Onondaga Limestone.  Collecting is limited to picking up loose material scattered near the quarry walls.  For additional information contact Dan Krisher at [DLKFossil@gmail.com](mailto:DLKFossil@gmail.com).

**May 7 Tues: Fossil Members Meeting**

7:30 p.m. Meeting will be held in the community meeting room at the NEQALS building, 1030 Jackson Rd., Webster 14580.  It will also be broadcast on Zoom and is open to all RAS members and guests.  Our guest speaker is Dr. James Boyle on Devonian placoderm fishes of New York, Ohio, and Pennsylvania, including *Dunkleosteus* and *Titanichthys.* James is a professor inn SUNY Buffalo's Department of Geology and their Director of Undergraduate Studies.  One of his areas of research focus is the paleobiology of arthrodire placoderms, a diverse group of armored fishes which abruptly went extinct at the end of Devonian Period.  For meeting details and Zoom login info, see the RAS May *FossiLetter*or contact Michael Grenier at [paleo@frontier.com](mailto:paleo@frontier.com).

**May 8 Wed: Herbarium**

12:00 p.m.-3:00 p.m. The Life Sciences section will hold a workshop at the RAS Herbarium, located in the basement of the Rochester Museum and Science Center (RMSC). We will be continuing to organize plant specimens in preparation for digitizing the collection. If you plan to attend, please send an RSVP to [rasherbarium@gmail.com](mailto:rasherbarium@gmail.com). At RMSC go to the front desk to meet other participants. For more information, contact herbarium curators, Tim Tatakis and Steven Daniel, by emailing [rasherbarium@gmail.com](mailto:rasherbarium@gmail.com).

**May 8 Wed: Life Sciences Lecture**

7:00 p.m.  The meeting will be held remotely via ZOOM and is open to all RAS Members and guests.  What animal can survive in space, can live decades without food or water, and lives near your home? The tardigrade! Our guest speaker is RAS member Judy Dobles speaking on "The Cumming Nature Tardigrade Project."  Judy is a researcher at Cumming Nature Center who specializes in these delightful little creatures.  For meeting details and Zoom login info, see the **Life Sciences News** on page 3 of this issue of *RAS Bulletin*. Contact Michael Grenier at [paleo@frontier.com](mailto:paleo@frontier.com) for more information.

**May 10 Fri: Astronomy Public Observing**

7:30 p.m. – 11:00 p.m. Farash Center, public welcome. Contact: Anthony Golumbeck at [semp@use.startmail.com](mailto:semp@use.startmail.com).

**May 18 Sat: Fossil Section Field Trip**

Road Cuts Near Cherry Valley: Road cuts near Cherry Valley expose Middle Devonian Onondaga and Oatka Creek Formations with a fauna of brachiopods, corals, and other organisms.  For additional information contact Dan Krisher at [DLKFossil@gmail.com](mailto:DLKFossil@gmail.com).

**May 19 Sun: Astronomy Members Open House**

12:00 p.m. – 3:00 p.m. Farash Center, 8355 County Road 14, Ionia. Contact: Anthony Golumbeck at [semp@use.startmail.com](mailto:semp@use.startmail.com).

**May 22 Wed: RAS Board Meeting**

7:00 p.m. – 9:00 p.m. Church of the Ascension, 2 Riverside Street. Zoom option available. For details, contact: Michael Grenier, [mgrenier@frontiernet.net](mailto:mgrenier@frontiernet.net)

**May 22 Wed: Astronomy Members Forum**

7:30 p.m. Farash Center and Zoom. This is a reschedule that had tentatively been planned for 4/24. Speaker: Craig Kaplan “The Life of Stars, including Novae and Supernovae.” Contact: Anthony Golumbeck at [semp@use.startmail.com](mailto:semp@use.startmail.com).

**May 28 Tues: Mineral Section Virtual Meeting**

7:30 p.m. Meeting information TBA. Zoom and/or in person at NEQALS. This is likely the last time we will be allowed to meet there. Members will receive details. Contact: Jutta Dudley, [juttasd@aol.com](mailto:juttasd@aol.com).

**STRASENBURG OBSERVATORY**:

ASRAS will operate the telescope at the Strasenburg Planetarium on mostly clear Saturday nights, dusk until 10:30. For more information, contact: Jim Seidewand at (585) 703-9876.

*Events for May 2024*

**2**

**Life Sciences News**

As you saw in the calendar, we have a lecture meeting on Wednesday, May 8, at 7:00 p.m. with Judy Dobles on tardigrades. Tardigrades are eight-legged segmented micro-animals and are their own phylum. They are most closely related to velvet worms and arthropods. Join us on Zoom to learn all about this hardy and adorable microscopic species. Judy has been working to expand knowledge of tardigrade biodiversity in New York State by collecting small samples of lichen, moss, and leaf-litter at the Cumming Nature Center. She has been collecting, identifying, and photographing tardigrades and will share some insights and findings during this presentation.

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| A close-up of a tardigrade  Description automatically generated |
| *Figure 2B, Scanning Electron Microscope photo of the eutardigrade* Macrobiotus tonollii*, frontal view. From Nelson, Diane R. "“Smoky Bears”—Tardigrades of Great Smoky Mountains National Park."* Southeastern Naturalist 6*, no. sp2 (2007): 229-238.* |

German zoologist Johann August Ephraim Goeze first described them in 1773 and called them Kleiner Wasserbär (translation, “little water bear.” They are also known as moss piglets.) In 1776, Italian biologist Lazzaro Spallanzani named the group "Tardigrada," or "slow stepper." They are near-microscopic aquatic animals about the size of this period. They have plump, segmented bodies, flattened heads, and eight legs ending in four to eight claws. Tardigrades are particularly of interest to science because they survive at amazingly low and high temperatures, and can even survive the vacuum and radiation of outer space. There are 1,464 known tardigrade species. See more at <https://www.livescience.com/57985-tardigrade-facts.html>.

Here’s the Zoom Meeting link: <https://us02web.zoom.us/j/84077589472?pwd=S1l5ZkZ4ZDFULzg3czNaVUFCRjBlUT09>

**Meeting ID:** 840 7758 9472

**Passcode:** 413593

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One tap mobile

+19292056099,,84077589472#,,,,\*413593# US (New York)

(If difficulty, try +13017158592,,84077589472#,,,,\*413593# US (Washington DC)

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**Dial-up if you are on telephone only**, or if you want to use your phone for the audio.

**3**

**RAS Herbarium Update**

by Tim Tatakis

You’ll remember from our February 2024 article in the Bulletin by Elizabeth Pixley, Timothy Tatakis and Steven Daniel that we are digitizing the approximately 30,000 specimens in the RAS Herbarium kept at the Rochester Museum & Science Center.

Volunteers have been meeting several times a month since January.  During these meetings, they sort and barcode specimens in preparation for imaging, while others work on scanning and transferring images.  These meetings include the monthly workshop and several additional meetings, usually about once a week.  If you are interested in learning more about the project and perhaps participating, contact the RAS Herbarium Curators (see back page of *RAS Bulletin* for contact information).  To date, 4,538 RAS Herbarium specimens have been sorted, barcoded, imaged, and uploaded to the Mid-Atlantic Herbarium Consortium website where they are available for all to view.  The project is ongoing and expected to last for at least the next few years; updates will be provided periodically in the *RAS Bulletin*.

**4**

**THEORY OF MIND AND SCHIZOTYPY: THE**

**INDEPENDENT CONTRIBUTION OF CHILD**

**MALTREATMENT**

by Morgan R. Johnson, Victoria Popov, and Lindsay S.

Schenkel. Rochester Institute of Technology.

**Abstract:**

Previous studies have reported impairments in theory of mind (ToM), or the ability to understand others’ mental states, among individuals with schizotypal traits (Jahshan & Sergi, 2007; Gooding & Pflum, 2011). Impairments in ToM have also been documented among individuals with histories of child maltreatment (CM) (Germine et al., 2015; Nazarov et al., 2014). Studies have identified significant associations between CM and schizotypal symptoms (Berenbaum et al., 2003, 2008). Additionally, research has shown that individuals with schizotypy experience considerable social and interpersonal difficulties (Aghvinian and Sergi, 2018). However, there is insufficient evidence regarding the relationships between CM, ToM, social functioning, and schizotypy, and in particular, the degree to which CM may significantly predict poor ToM ability above and beyond that of schizotypy. This is surprising given the high rates of CM found among individuals with schizophrenia spectrum disorders. The aim of the present study was to examine associations between these variables, as well as the independent contribution of CM on ToM ability after accounting for the variance explained by schizotypy symptoms.

A person presenting a poster

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Owen Vincent at the RIT Fall Paper Session, Nov, 2023. Photo by R. Crumrine

A young person standing next to a poster

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Morgan R. Johnson at the RIT Fall Paper Session, Nov, 2023. Photo by R. Crumrine

**BONE FRACTURE REPAIR: A COMPARISON OF**

**POROUS AND MECHANICAL PROPERTIES OF**

**COLLAGEN AND CHITOSAN BIOACTIVE**

**CEMENTS AND PIG BONE.**

by Owen Vincent, Nobah Islam, Walker Pedinotti, Dr.

Barnabas Gikonyo. SUNY Geneseo.

**Abstract:**

Calcium phosphate cements (CPCs) have been under study as a method of replacing autografting as a method of setting and repairing fractured, loadbearing bones. Hydroxyapatite (HA) is a calcium phosphate mineral and the primary mineral component of bone, and can help to facilitate osteoconduction in vivo. HA cements alone however lack the mechanical strength and porosity required for optimal cell attachment and durability. The addition of a commercially available dental cement has shown promise in improving mechanical strength, and naturally occurring polymers have shown promise in helping to improve porosity and the degradation of the cement as new bone is formed. In this project we examine the effects of the polysaccharide polymer chitosan and the protein polymer collagen on the strength and porosity of a hydroxyapatite and dental cement CPC using mechanical strength testing and imaging methods. The resulting tests show promise for chitosan and collagen infused HA/dental cements as bone cements, however concerns remain about the mechanical strength and future trials will focus on increasing the mechanical strength of the cement.

**Undergraduate Student Research**

The following are a few abstracts from students presenting at the 2023 Fall Paper Session.

**Rochester Academy of Science Annual Financial Report for 2023**

The Rochester Academy of Science has three categories of funds: the General Fund, the Expendable Funds, and the Endowment Funds. The General Fund receives RAS membership dues and monthly interest from the Life Fund (endowment) and the Memorial Fund (endowment). Most of the Expendable Funds also receive monthly interest generated from the Endowment Funds. Expenses from the General and Expendable Funds are outlined in the budget below. This financial report does not include the income and expenses of the individual RAS sections. A total of 343 members paid dues for 2023 membership in RAS (includes Life members).

**Revenue collected in 2023 (combined for General, Expendable and Endowment funds)**:

RAS Member dues = $2,945.00, Gifts $26,517.00, Interest and dividends = $6,520.31, Fall Paper Session Abstract Fees = $1,053.50. Total revenue collected in 2023 = $37,035.81.

**Expenses Summary - General Fund:**

Section & Board Meetings: Room rental $650.00

Bulletin: printing, mailing, labor $1,522.50

General Office Expenses (PO Box, mail permit) $176.00

Liability Insurance $661.00

Website $503.64

**Expenses Summary - Expendable Funds:** (reported to the IRS as unrestricted assets; they do not receive funds from membership dues or from the General Fund.)

Publications Fund: used to publish the Proceedings and Academy booklets. 2023 expenditure was $0.00.

Grants Fund: used to award annual research grants to undergraduate college students. 2023 expenditure was $5750.00.

Lecture Fund: used to pay the expenses and honoraria for invited speakers who give lectures at Academy events (the Fall Scientific Paper Session and the Spring Lecture). 2023 expenditure was $0.00.

Paper Session Fund: used to pay Fall Scientific Paper Session expenses. 2023 expenditure was $677.86.

Herbarium Fund: used to purchase RAS Herbarium supplies. 2023 expenditure was $600.00.

**Total Expenses in 2023 (General + Expendable Funds)**: $10,541.00.

**Endowment Funds**: The endowment funds are not spent but generate interest, which is used as income for the General Fund and four of the Expendable Funds. They are reported to the IRS as restricted assets.

Fund Balance (12/31/2023) Interest Supports

Fairchild Fund $10,741.00 Publications

Life Fund (Life Membership dues) $13,500.00 General Fund

Jensen Fund $8,275.00 Student Grants

Speakers Fund $6,550.00 Lectures

Grace Murray Fund $8,250.00 Student Grants

Grants Program Endowment $35,000.00 Student Grants

Herbarium Endowment $ 2,000.00 Herbarium

Memorial Fund (named memorial gifts) $1,650.00 General Fund

Babette Coleman Bequest $ 4,958.86 Herbarium

Balance of the Endowment Funds $90,924.86

**Assets and Liabilities**: The assets of the Rochester Academy include money held by each of the five sections, as well as the RAS funds in the Pittsford Federal Credit Union (checking, savings) plus investments held by Morgan Stanley/Smith Barney (this monthly interest is deposited into the Expendable Funds accounts). The RAS also owns stock in ConocoPhillips and Phillips 66; the dividends received are deposited into the Grants Fund. Finally, RAS has investment money in the UBS Putnam Diversified Income Trust which was a bequest from the Babette Coleman estate. The RAS also owns the Astronomy Section observatory in Ionia, NY. The RAS has no liabilities.

**5**

[Researchers identify path to prevent cognitive decline after radiation. University of Rochester](https://www.sciencedaily.com/releases/2024/01/240103130843.htm)

[Is oxygen the cosmic key to alien technology? University of Rochester](https://www.sciencedaily.com/releases/2024/01/240102174047.htm)

[Scientists uncover link between the ocean's weather and global climate. University of Rochester](https://www.sciencedaily.com/releases/2023/12/231221012646.htm)

[Researchers find neurons work as a team to process social interactions. University of Rochester.](https://www.sciencedaily.com/releases/2023/11/231127180652.htm)

[Pancreatic cancer discovery opens the door for new clinical trial. University of Rochester.](https://www.sciencedaily.com/releases/2023/11/231116140835.htm)

[Parkinson's Disease: New theory on the disease's origins and spread; University of Rochester, April, 2024](https://www.sciencedaily.com/releases/2024/04/240411130149.htm#google_vignette)

[New imaging method illuminates oxygen's journey in the brain, University of Rochester, April, 2024](https://www.sciencedaily.com/releases/2024/03/240328162557.htm)

[Newly sequenced genome reveals coffee's prehistoric origin story -- and its future under climate change. University at Buffalo. April, 2024](https://www.sciencedaily.com/releases/2024/04/240415110542.htm)

[Are these newly found rare cells a missing link in color perception? University of Rochester. April, 2024](https://www.sciencedaily.com/releases/2024/04/240415163725.htm)

[Plasma oscillations propel breakthroughs in fusion energy. University of Rochester. March, 2024.](https://www.sciencedaily.com/releases/2024/03/240315160903.htm)

[New roadmap to prevent pandemics centers on protecting biodiversity. Cornell University. March, 2024](https://www.sciencedaily.com/releases/2024/03/240326103855.htm)

[Pairing crypto mining with green hydrogen offers clean energy boost. Cornell University. March, 2024](https://www.sciencedaily.com/releases/2024/03/240325172414.htm)

[Higher bacterial counts detected in single-serving milks, researchers report. Cornell University. March, 2024.](https://www.sciencedaily.com/releases/2024/03/240311145736.htm)

['Study drugs' set the stage for other drug use and mental health decline. Binghamton University. March, 2024.](https://www.sciencedaily.com/releases/2024/03/240311145741.htm)

[Scientists ID burned bodies using technique used for extracting DNA from woolly mammoths, Neanderthals. Binghamton University. February, 2024.](https://www.sciencedaily.com/releases/2024/02/240229182926.htm)

[Generating 'buzz' about new products can influence their success. Binghamton University. February, 2024.](https://www.sciencedaily.com/releases/2024/02/240220144500.htm)

A spiral galaxy in space

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*M51 by John Larysz, 4/15/2024*

A solar eclipse in the sky

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*Solar Eclipse by Michael Naven from Saranac NY, 4/8/2024*

**Rochester Research in Review**.

(These are Hot Links which when clicked lead to the press release on the Science Daily website.)

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**ABOUT THE ACADEMY**

The Rochester Academy of ScienceTM, Inc. is an organization that has been promoting interest in the natural sciences since 1881, with special focus on the western New York state region. Membership is open to anyone with an interest in science. Dues are minimal for the Academy and are listed in the [membership application online](https://rasny.org/how-to-join). Each Section also sets dues to cover Section-related publications and mailings. We are recognized as a 501(c)3 organization.

For information, contact President Michael Grenier at

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The Academy Internet website is [http://www.rasny.org](http://www.rasny.org/) or see us on Facebook at <https://www.facebook.com/Rochester-Academy-of-Science-792700687474549>**.**

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