Rochester Academy of Science™

BULLETIN

"An organization of people interested in the Natural Sciences"

September 2024; Vol. 78, #7

President's Message

Fall Paper Session

This Fall, on Saturday, November 16th, we will host the **50th Annual RAS Fall Scientific Paper Session** at SUNY Brockport.

This event provides an opportunity for local college and university science students and faculty to gather and share their research interests and results. For more information and to register go to rasny.org/paper-session. We do need members as volunteers to help organize the Paper Session and to help run it on the day.

Save the Date!
Saturday, November 16th, 2024
RAS Scientific Paper Session
SUNY Brockport

Student Grants program

We have announced the 2024-2025 Student Grants program run by the RAS to all the local area colleges.

This past January, the RAS Grants Committee awarded a total of $4762 for nine research projects. The maximum amount of each grant is $700 for research, plus a $50 unrestricted grant to the author of our top submission. Currently, there is enough for five grants in our Under-Graduate Student Research Grants Fund. We hope that fund endowment earnings this year will add enough for another three or four grants. However, to give ten or more awards will require the generosity of our members, who can make donations restricted for use in grants. We use no membership dues for grants, only endowment earnings and member donations. We featured seven grant projects in articles in the Bulletin this past year. We received 2023 recipient Adam Graziano's report on "Quantifying the effects of Japanese knotweed (*Fallopia japonica*) allelopathy on native plant growth." We summarize his report in this Bulletin.

Tracking down the asteroid that caused the end-Cretaceous mass extinction

Luis Alvarez and Walter Alvarez in 1980 first hypothesized the end-Cretaceous extinction-causing impact based on a huge iridium anomaly in Cretaceous-Paleogene boundary clays[1]. When you read about the impact in papers since then, you usually see the cause as a "bolide" (5,460 references in Google Scholar) or "impactor" (3,110 references). It has been an open question as to what type of extraterrestrial object it was.

The lead candidates are an asteroid or a comet. In 2021, Amir Siraj and Abraham Loeb postulated that it was a comet based on statistical liklihood. Chemical analysis of impact detritus demonstrates that the impactor was composed largely of carbonaceous chondritic material which make up 10% of asteroids, but carbonaceous chondrites are in the mix of materials in most comets.A rejoinder from Steve Detsch et al. (2022) demonstrates that a comet is unlikely due to the far too low iridium content in comets. They also note that there are several types of carbonaceous chondrite asteroids, and that the impactor was a particular type (CM or CR) not matched by comets at all.

Now, a study by University of Cologne researchers led by Mario Fischer-Gödde published in *Science* on 15 Aug

Kuiper Belt Object 2004 EW95, the first carbonaceous asteroid confirmed in the outer Solar System, as reported in Seccull, Tom, et al. "2004 EW95: A Phyllosilicate-bearing Carbonaceous Asteroid in the Kuiper Belt." The Astrophysical Journal Letters *855.2 (2018): L26.*

2024 has determined that the ruthenium isotopic composition in the K-P boundary is only matched by carbonaceous asteroids, specifically those from the outer solar system formed beyond Jupiter's orbit during the formation of the solar system[4]. For more, see https://www.sciencedaily.com/releases/2024/08/240816123943.htm

These four original papers are all available from mgrenier@frontiernet.net.

1. Alvarez, Luis W., et al. "Extraterrestrial cause for the Cretaceous-Tertiary extinction." *Science* 208.4448 (1980): 1095-1108.

2. Siraj, Amir, and Abraham Loeb. "Breakup of a long-period comet as the origin of the dinosaur extinction." Scientific Reports 11.1 (2021): 3803.

3. Desch, Steven J., et al. "The breakup of a long-period comet is not a likely match to the Chicxulub impactor." *Scientific reports* 12.1 (2022): 10415.

4. Fischer-Gödde, Mario, et al. "Ruthenium isotopes show the Chicxulub impactor was a carbonaceous-type asteroid." *Science* 385.6710 (2024): 752-756.

* * *

Michael Grenier, RAS President

Events for September, 2024

NO SEPT. SECTION MEETINGS FOR:
Fossil
Anthropology

Sept 4 Wed: Astronomy Board Meeting
7:00 p.m. – 9:00 p.m. Farash Center. ASRAS Members are welcome to attend. Contact: Anthony Golumbeck at semp@use.startmail.com.

Sept 6 Fri: Astronomy Members Meeting
7:30 p.m. – 9:30 p.m. Farash Center. Nitya Ravi from UR will speak about Dark Matter. Contact: Anthony Golumbeck at semp@use.startmail.com.

Sept 15 Sun: Astronomy 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.

Sept 18 Wed: RAS Board Meeting
7:00 p.m. -9 p.m. Pittsford Community Center, room 207, 35 Lincoln Ave, Pittsford. Zoom option available. For details, contact Michael Grenier at mgrenier@frontiernet.net.

Sept 24 Tues: Mineral Members Meeting
7:00 p.m. Meeting information TBA. Meet in the Pittsford Community Center, 35 Lincoln Ave, Pittsford, Room 19. Come in person to socialize and see our new venue! Zoom optional. Contact: Jutta Dudley at juttasd@aol.com.

Sept. 25 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. 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.

Sept 25 Wed: Astronomy Members Forum
7:30 p.m. Farash Center and Zoom. Contact: Anthony Golumbeck at semp@use.startmail.com.

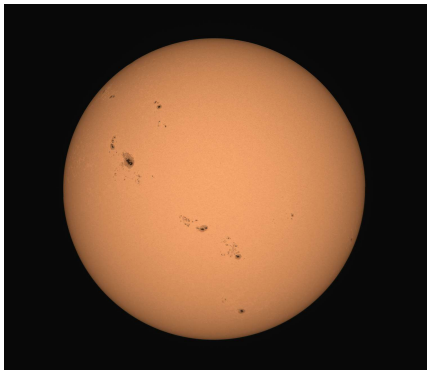
Sept. 26 Thurs: Life Sciences Lecture
7:00 p.m. The meeting will be held remotely via ZOOM and is open to all RAS Members and guests. Guest speaker is Anthea Lavallee, Executive Director of the Hubbard Brook Research Foundation. She will speak on, "The Little Brook that Changed the World: How NH's Hubbard Brook Ecosystem Study Shapes Environmental Policy and Practice, From Acid Rain to Climate Change." You may not have heard of it, but government policy decisions affecting your life have been made based on research there. The RAS is involved—five Student Research Grants have been made in the past few years for studies being done at Hubbard Brook. For meeting details and Zoom login info, see the **Life Sciences News** (page 3) inside this issue of RAS Bulletin. Contact Michael Grenier at mgrenier@frontiernet.net for more information.

Sept 27 Fri: Astronomy Public Observing
7:30 p.m. – 11:00 p.m. Farash Center, public welcome. Contact: Anthony Golumbeck at semp@use.startmail.com.

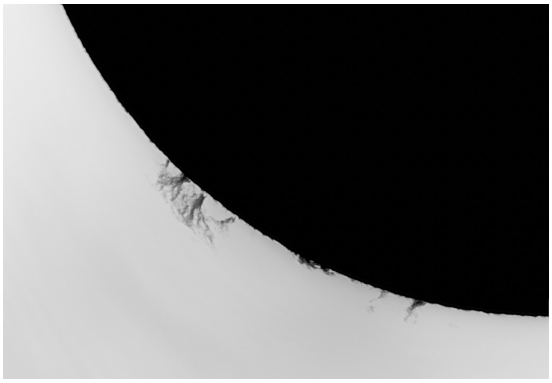
STRASENBURG OBSERVATORY:
ASRAS will operate the telescope at the Strasenburg Planetarium on mostly clear Saturday nights, dusk until 10:30. For more information, contact: Jim Seidewand at (585) 703-9876.

OUTSIDE RAS EVENTS:

Sept. 21 Sat: ANNUAL IONIA FALL FESTIVAL
ASRAS will do outreach at this event. For details see https://www.ioniaumc.org/events.html. Contact: Anthony Golumbeck at semp@use.startmail.com.



Solar Disk; Kevin Lyons, Aug 7, 2024



Solar prominences, Eric Day, Aug 7, 2024

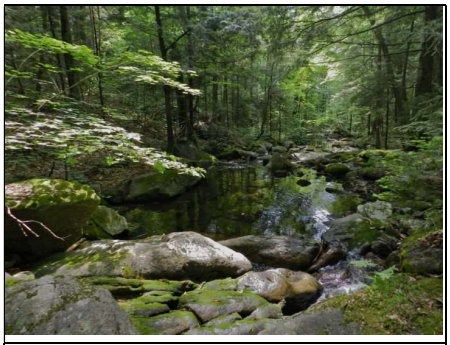
Life Sciences News

September Life Sciences lecture

The Life Sciences Section has a lecture meeting on Thursday, September 26, at 7:00 p.m. with guest speaker Anthea Lavallee, Executive Director of the Hubbard Brook Research Foundation. She has a front row seat for one of the most dynamic and influential ecosystem studies in the world. All RAS members are welcome to attend.

She will speak on, "The Little Brook that Changed the World: How New Hampshire's Hubbard Brook Ecosystem Study Shapes Environmental Policy and Practice, From Acid Rain to Climate Change."

The Foundation operates a field station adjacent to the Hubbard Brook Experimental Forest (HBEF), sponsors programs on ecosystem processes, and develops educational programs.



Hubbard Brook flows through the Experimental Forest. *Photo by Alisa Muniz, www.birds.cornell.edu*

The HBEF is a 7,800-acre research field site in the White Mountains of New Hampshire, operated by the United States Forest Service. Established in 1955, it brings together scientific teams from more than 25 universities and research institutions which explore the relationships among Hubbard Brook's plants, animals, air, water, and soils.[1]

Anthea will share key Hubbard Brook discoveries including acid rain, the impacts of forest cutting on water quality and quantity, and climate change consequences.

Long-term ecosystem studies have the power to reveal otherwise imperceptible patterns, trends, irregularities, and environmental solutions. Anthea will make connections between Hubbard Brook research and our economy, ecology, culture, and quality of life as citizens of the Northern Forest.

The Hubbard Brook Ecosystem Study is a long-term, collaborative research program focused on improving our understanding of the response of northern forest ecosystems to natural and anthropogenic disturbances. The study is supported by the National Science Foundation's Long Term Ecological Research program. [1]

Areas of research[2] include:

1. Hydrology, including ecosystem water flow, snowfall analysis, and long-term ice-in/ice-out;
2. Environmental factors encouraging or restricting tree growth, and effects of deforestation on mineral flux;
3. Effects of environmental changes on bird behavior and insect population, especially regarding reproductive capacity;
4. Effects of acid rain and resultant soil mineral changes on plant root micro-environments;
5. Cycling of Nitrogen, Sulfur, Phosphorus, Mercury, Calcium, and Carbon, and effects of pollution on minerals flux.

View of Mirror Lake from the Hubbard Brook Experimental Forest. Photo by Alisa Muniz, www.birds.cornell.edu

For more information, see the HBEF website, hubbardbrook.org/.

There is also an article on HBEF in Yankee Magazine, September 2023, on-line at newengland.com/travel/new-england/these-trees-say-so-much

Sources
1. hubbardbrook.org
2. Wikipedia

Here's the Zoom Meeting link:
https://us02web.zoom.us/j/84077589472?pwd=S1l5ZkZ4ZDFULzg3czNaVUFCRjBlUT09
Meeting ID: 840 7758 9472
Passcode: 413593

One tap mobile
+19292056099,,84077589472#,,,,*413593# US (New York)
(If difficulty, try
+13017158592,,84077589472#,,,,*413593# US (Washington DC)

Dial-up if you are on telephone only, or if you want to use your phone for the audio.
+1 929 205 6099 (New York) (If difficulty, try +1 312 626 6799 (Chicago) or +1 301 715 8592 (Germantown)

Classified Advertisement
⬇ Employment Opportunity ⬇

RAS Scientific Paper Session Coordinators

Rochester Academy of Science, Rochester, NY.

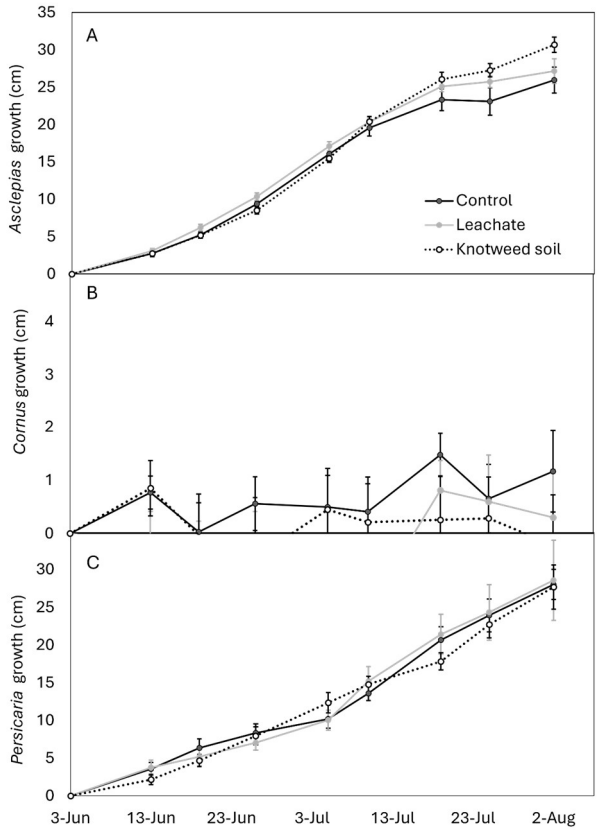
Part-time volunteer **Registrar** to receive registration emails from attendees from mid-September through mid-November and transfer data to registration spread sheet. Expected number of registrants is 300. Registrar sends spreadsheet to committee weekly. This job can be shared.

MAPPING THE PRESENCE OF INVASIVE PLANTS IN THE BROCKPORT NATURAL AREA. By Adam Graziano and Kathryn Amatangelo. SUNY Brockport.

Adam is an RAS Student Grant Recipient; this is an abstract of his final report.

Abstract

Biological invasions are one of the leading causes of decreasing biodiversity around the world. Japanese knotweed (*Fallopia japonica*) is an invasive perennial herb native to east Asia that has become increasingly abundant in New York state. One way that invasive plants such as Japanese knotweed interfere with native communities is through the release of allelochemicals, which are secondary compounds that inhibit the growth of competitors. While knotweed is known to produce several potentially allelopathic compounds, their isolated effects on native plant growth are understudied. I performed a manipulative growth experiment treating three native species with knotweed leachate or tap water and potting them in control soil or knotweed soil collected from beneath a local knotweed population. Native species were grown for eight weeks, and their growth among treatments compared. I hypothesized that the growth of natives receiving knotweed leachate and natives potted in knotweed soil would be limited by allelochemicals. Contrary to my hypothesis, there were no significant differences between leachate and control plants. When significant results were found, plants potted in knotweed soil grew better than control plants. This may be due to increased nutrient availability or changes in soil biota caused by knotweed. My results suggest that Japanese knotweed allelopathy plays a minimal role in the species' success and its allelochemicals are not a major concern for restoring native communities.

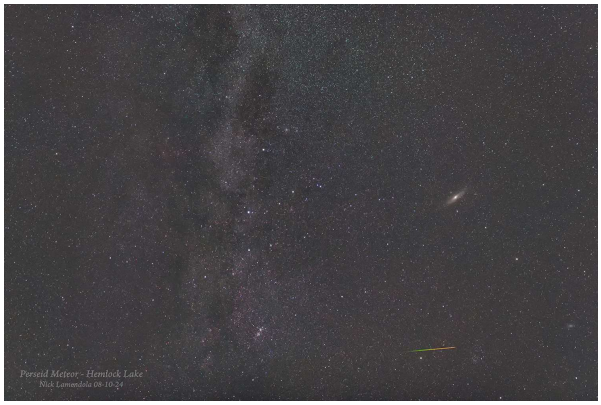


Graziano (2024) Figure 7. Mean growth of *A. incarnata* (A), *C. racemosa* (B), and *P. virginiana* (C) plants based on sequential measures of plant height (cm). Error bars indicate standard error.

Graziano (2024) Figure 4. Persicaria virginiana *test plants on day 177.*

Adam Graziano grew up in western New York and attended SUNY Brockport, where he received a BS in Environmental Science and Ecology with honors in 2024. He is currently working for the Smithsonian as a biological sciences laboratory technician performing the fourth census of the Smithsonian Environmental Research Center's ForestGEO plot.

Adam Graziano with Asclepias incarnata *test plants.*



Perseids, Nick Lamendola, Aug 10, 2024

Recent RAS Member Photos

M81 & 82, Burney Baron, Aug, 2024

Rochester Research in Review.

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

New study confirms mammal-to-mammal avian flu spread. Cornell University, July 24.

Babbling babies need timely responses to learn language, social norms. Cornell University, August 12, 2024.

Babbling babies need timely responses to learn language, social norms. Cornell University, August 12, 2024.

Lake Erie walleye growth is driven by parents' size, experience. Cornell University, August 14, 2024.

Sleep resets neurons for new memories the next day. Cornell University, August 14, 2024.

Cleaning up the aging brain: Scientists restore brain's trash disposal system. University of Rochester, August 15, 2024.

Liver transplant outperforms other therapies for colorectal cancer that has spread to the liver. University of Rochester Medical Center, July 30, 2024.

New technique pinpoints nanoscale 'hot spots' in electronics to improve their longevity. University of Rochester, July 17, 2024.

Right on schedule: Physicists use modeling to forecast a black hole's feeding patterns with precision. Syracuse University, August 16, 2024.

Scientists untangle interactions between the Earth's early life forms and the environment over 500 million years. Syracuse University, July 29, 2024.

Groundbreaking research in

*Dawn Redwood (*Metasequoia glyptostroboides*), Durand-Eastman Park arboretum, April 28, 2024, Michael Grenier. A deciduous conifer, common to Cretaceous and Tertiary periods, long thought to be extinct, identified in China in 1944, now planted worldwide.*

ABOUT THE ACADEMY

The Rochester Academy of Science™, 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. 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 (585) 671-8738 or by email paleo@frontier.com.
The Academy Internet website is http://www.rasny.org or see us on Facebook at https://www.facebook.com/Rochester-Academy-of-Science-792700687474549**.**

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