



President's Message

Bill Hallahan has announced the 2022-2023 Student Grants program run by the RAS to all the local area colleges.

This past January, the RAS Grants Committee awarded a total of \$2390 for five research projects. The maximum amount of each grant is \$500. Last year's grants ranged from \$400 to \$500. This year we would like to increase the number of grants. We also recognize that in today's inflationary environment, \$500 does not go nearly as far and we would like to make a modest increase in the maximum award we make. We prefer to award significant grants rather than small, partial ones.

Several of these were featured in articles in the Bulletin this past year. I hope you enjoyed these. In March, we reported on **Austin Glazier's** research finding the first known occurrence of *Wolbachia sp.* endosymbiont bacteria in crayfish (Keuka College). We also summarized **Campbell Vogt's** study of the evolution of a gene (Sir3) in yeast (University at Buffalo).

In April, we examined Raunak Al-Rubayie's study to develop procedures for identifying bacterial outbreaks in local waters using Landsat remote sensing (St. John Fisher College). You also saw **Brock Johnston's** study to establish a co-culture model of both adipocytes and macrophages in seeking a means to control diabetes.

I hope you enjoyed these articles. We ran them to show you the type of cutting-edge research that is being done at our local colleges and universities by undergraduate students working with talented advisors. These grants are important not only because they support

research by developing young scientists, but also because they are given significant weight in qualifying these scholars for graduate schools and scholarships. A grant from the RAS is a prestigious award for them.

If you would like to help sponsor an additional award, please contact Dr. William Hallahan at whallah3@naz.edu to donate.

No part of our annual dues is used to make these awards. We can only make an additional award with the donations made by members by November 30. I invite you to join me in contributing, however small, to the Rochester Academy of Science Student Grants program.

* * *

Renew Your Membership

Unless you are a Life Member, note that your membership will expire on December 31, 2022. Please renew your membership at your earliest convenience.

RAS Membership Renewal

Use this link to renew.

<https://rasny.org/how-to-join>

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Meteorites, Fossils, Archeology artifacts, and Zoology and Botany

This November talk appeals to all our sections and all members of RAS are invited.

I was talking with Dr. Robert Minckley (University of Rochester) about bees—he is Dr. Bryan Danforth's co-author on *The Solitary Bees: Biology, Evolution, Conservation*, and Dr. Danforth was our keynote speaker at the RAS Paper Session last month. Dr. Danforth was our keynote speaker at

the RAS Paper Session last month. Dr. Minckley told me he also gave talks on *The Ward Project*, which he heads up. <https://wardproject.org/>

Henry Augustus Ward was a native Rochesterian who studied at Williams College, Harvard (he was assistant to Louis Agassiz), at the Sorbonne and others in Paris, and at the universities of Munich and Freiberg. After extensive traveling and collecting, of course, he returned to Rochester as Professor of Natural History at the University of Rochester in 1860.



Figure 1: Henry Augustus Ward. Credit: ResearchGate

He wrote extensively on meteorites and collected many, and on fossils and other topics. He had several papers published in *The Proceedings of the Rochester Academy of Science*. Ward soon became the leading provider of specimens to museums in the U.S. and founded Ward's Natural Science Establishment, which is still a leading purveyor to educational institutions. When P.T. Barnum wanted *Jumbo* the elephant stuffed, he sent it to Ward. This is such an interesting topic with appeal across all our sections that we booked Dr. Minckley to talk to us about it.

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The talk will be on Tuesday, November 8, at 7:30 PM at the new state-of-the-art Community Meeting Room at the NEQALS building at 1030 Jackson Rd, Webster, 14580 and it will be broadcast on Zoom. Hosted by the Fossil Section, all members of the RAS are invited. Write me at paleo@frontier.com if you have any questions.

Rochester Eclipse Task Force

Rochester, as you all know by now, is on the path of Totality for the 2024 eclipse. There will not be another one visible for substantial parts of the US after that until 2045.

So, we should take advantage of that, right? Throw a big party and make sure that everyone knows that Rochester is the place to be, right? After passing over Rochester, it can be seen from Lake Ontario, the northern Adirondacks, and northern-most Vermont, New Hampshire, and Maine, and very few people live in any of those places. So if folks in Boston, New York, and Philadelphia want to go someplace to see the eclipse, then Rochester is the closest place with the facilities they'll need, right?

RIGHT! That is why Rochester has organized the **Rochester Eclipse Task Force** to promote Rochester as an eclipse center for the Northeast US. Over 200 Rochester businesses and organizations belong to the Task Force, including the Astronomy Section of the Rochester Academy of Science. The Task Force is led by The Rochester Museum & Science Center (RMSC), Visit Rochester, the Genesee Transportation Council, and Deb Ross—editor of [Kids Out and About](#).

You can learn more at <https://rochestereclipse2024.org>.



Michael Grenier, President RAS

Review of Last Year's 2021-2022 Undergraduate Student Research Grant Awards

Last year, we had five proposals, requesting a total of \$2477. Our mission was to award only significant grants rather than small, partial awards. The maximum amount of the grant is \$500. The RAS Grants Committee awarded a total of \$2390 for five research projects.

Ryan Preble, Cornell University.
*Identification of Genomic Loci Associated with Annonaceous Acetogenin Production in *Asimina triloba*.*

Award: \$500

Sponsor: Susan Strickler, Ph.D.

Austin Glazier, Keuka College.
*Presence and identification of *Wolbachia* spp. in freshwater crayfish from the Keuka Lake watershed.*

Award: (full funding) \$500.

Sponsor: Luciana Cursino Parent, Ph.D.

Brock Johnston, SUNY Brockport.
Co-Culturing of 3T3-L1 adipocytes and J774A.1 macrophages.

Award: (full funding) \$500.

Sponsor: Laurie B. Cook, Ph.D.

Raunak Al-Rubayie, St. John Fisher College.
Remote Sensing Freshwater Bacteria in Great Lakes.

Award: \$400.

Sponsor: Fernando Ontiveros, Ph.D.

Campbell Vogt, SUNY Buffalo.
*Establishing the evolution of *Sir3* silencing function in duplicated yeast through ancestral gene reconstruction.*

Award: \$440.00.

Sponsor: Laura Rusche, Ph.D.

All of the money for the grants this year was from the Undergraduate Student Research Grants Fund, which has been established by gifts over the years, and was supplemented by some additional donations last year.

Call for Applications for the 2022-2023 Undergraduate Student Grant Awards.



Applications need to be submitted no later than December 19, 2022 (the last day of the Fall, 2022 semester) to Dr. William Hallahan. Email: whallah3@naz.edu.

Email the proposal as an attached Word document or pdf and have your faculty advisor send a separate email endorsing this proposal. A set of complete and detailed instructions can be found on the RAS website, www.rasny.org, under "[STUDENT GRANT APPLICATION DIRECTIONS](#)"

You will receive confirmation of receipt of your proposal via email. Both students and their faculty sponsors will receive letters when all award decisions have been completed, which will be on the first day of the Spring semester in January 2023.

One grant of up to \$500 to the student's college plus an unrestricted award of \$50 to the student will be awarded to the top proposal. Partial funding of at least \$200 will be provided to four or more additional proposals.

Applications for these grants will be judged on their merit as scientific research and for clear, concise description of the project. These grants are intended to help students who are working toward undergraduate degrees to purchase expendable materials for use in their projects, for travel expenses to collect data but not for laboratory equipment.

Events for November 2022

2 Wed: Astronomy Board Meeting

7:00 p.m. UR, Bausch & Lomb Hall, 4th floor Chart Room, room 408. Also Zoom meeting. ASRAS members are welcome. Contact: Mark Minarich at mminaric@rochester.rr.com.

4 Fri: Astronomy Members Meeting

7:30 p.m. – 10:00 p.m. RIT Carlson Center for Imaging Science, CAR-1125. Parking Lot F. ASRAS Board of Directors Elections. Speaker: Robert D. Fiete, Ph.D., Chief Technologist and Senior Fellow L3Harris. Topic: the history of L3Harris and Kodak in space imaging. Contact: Mark Minarich at mminaric@rochester.rr.com

6 Sun: Astronomy Open House

Open House: 12:00 p.m. - 4:00 p.m. Full Moon Sunday. Observatory tours and work parties. Members may bring guests. Farash Center for Observational Astronomy, 8355 County Road 14 Ionia, NY 14475. For weather related cancellations or changes contact Mark Minarich at mminaric@rochester.rr.com or see www.rochesterastronomy.org/calendar-of-events.

8 Tue: Fossil Section 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. Speaker: Dr. Robert Minckley, University of Rochester. Topic: *Rochester and the Birth of Natural History Museums; Ward's Natural Science Establishment before 1900.* Something for everyone-- Meteorites, Fossils, Archeology artifacts, and Zoology and Botany specimens. For meeting details and login info see the *FossilLetter* or contact Michael Grenier at paleo@frontier.com.

9 Wed: Life Sciences - Herbarium Workshop

1:00 p.m. – 4 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). At RMSC go to the front desk to meet other participants. No special experience required. If you plan to attend, please send RSVP or any inquiries to Elizabeth Pixley, herbarium curator, at evpixley@gmail.com, or call (585) 334-0977.

16 Wed: RAS Board Meeting

7:00 p.m. Library of Church of the Ascension, 2 Riverside St., corner of Lake Ave., Rochester, NY 14613. For details, contact Michael Grenier at mgrenier@frontiernet.net.

18-19 Fri- Sat and 25-26 Fri-Sat: Astronomy Member Observing

New moon deep sky member observing, starting at dusk till last person leaves. Farash Center for Observational Astronomy, 8355 County Road 14 Ionia, NY 14475. For last minute changes contact Mark Minarich at mminaric@rochester.rr.com

22: Tue Mineral Section

7:00 p.m. Planetary geologist Dr. Nick Warner of SUNY Geneseo will speak about the Mars Insight Mission as its operation winds down. The Insight lander has been gathering data about the inside of Mars. Join us online and find out what seismic activity, meteoroid impacts, and paleo-magnetic data can tell us. Contact: Jutta Dudley, juttasd@aol.com.

Other Events

Sat: Strassenburgh Telescope Observing

Saturdays, weekly from 7:00 p.m. till 9:30 p.m. through December 12th, featuring Saturn and Jupiter. Be prepared to walk up 61 steps to the roof. Free. Cancelled if cloudy. Call Jim Seidewand at (585) 703-9876.

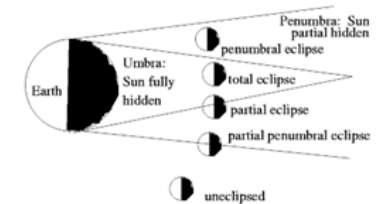
6 Sun: Daylight Savings Time Ends
Clocks "Fall Back" — Winter Time begins. Begins at 1:00a.m. local standard time.

8 Tue: Total Lunar Eclipse

Begins at 3:02 a.m. end at 7:02 a.m. Total occurs at 5:50 a.m. Enjoy the show!

*From Michael Richmond: Why don't we see a lunar eclipse every single month during a full moon? Because the moon's orbit around the Earth is tilted, which means the shadow misses the Earth most of the time due to lunar precession. This is why eclipses, whether solar or lunar, are always a special event, because when it's lined up just right you can get a really neat sky show. [From the *Rochester Democrat and Chronical* May 15, 2022]*

Lunar Eclipses



DJ Jeffery
UNLV 2003



Total Lunar Eclipse (Blood Moon) on November 8, 2022!

(Photo credit: Farmer's Almanac, almanac.com)

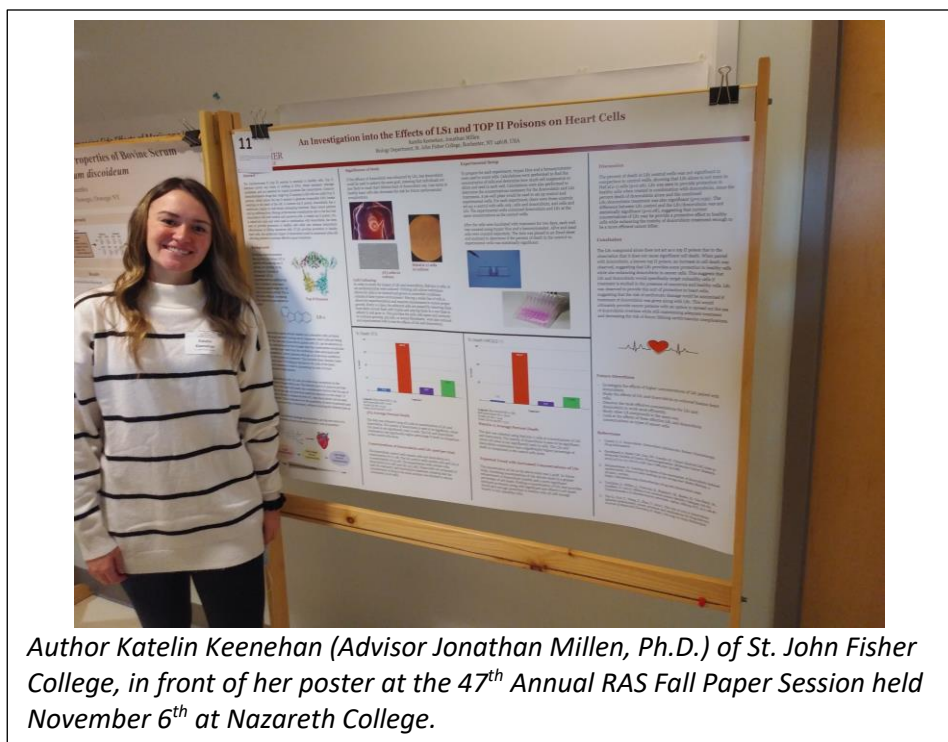
Featured 2021 RAS Paper Session Posters:

Katelin Keenehan and Jonathan Millen, Ph.D., St. John Fisher College.

AN INVESTIGATION INTO THE EFFECTS OF LS1 AND TOP II POISONS ON HEART CELLS.

Abstract

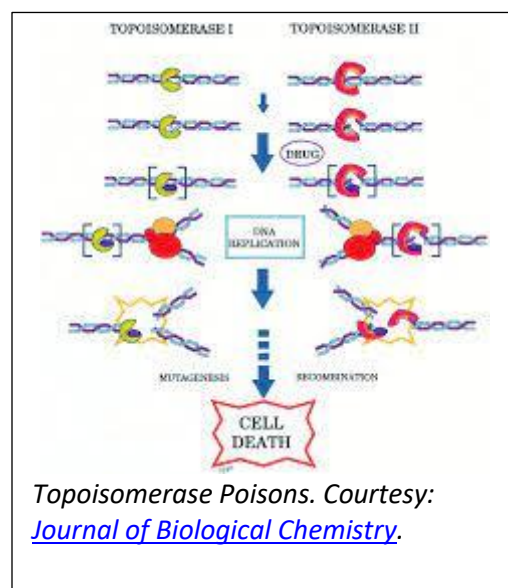
Type II topoisomerases are enzymes that are essential to cells. They correct any twists or winding in DNA and also create cleavage complexes when necessary. These enzymes are also necessary for processes like transcription, translation, and chromosome segregation. Common chemotherapeutic drugs target these top II enzymes and are known as topoisomerase II poisons. Top II poisons increase the amount of cleavage complexes, making the top II enzymes of the cell act toxic. These poisons induce the top II enzyme to generate more irreparable DNA breaks eventually resulting in death of the malignant cell⁵. Top II poisons include drugs like doxorubicin. Doxorubicin has a cardiotoxic impact on those going through treatment. Cancer patients that endure cycles of long, difficult treatment often end up suffering from lifelong cardiovascular complications due to the fact that doxorubicin targets all cells, healthy and unhealthy⁴. A known weaker top II poison is a compound called LS1. LS1 is selectively toxic to cells that have a lesser ability to repair double strand breaks. Previous experimentation shows that when LS1 is paired with strong top II poisons used to treat cancer, like doxorubicin, LS1 enhances the stronger drug's toxicity potentially by stabilizing top II covalent complexes. This creates a good target for the strong top II drug to poison and this is all done without increasing the toxic exposure in noncancerous cells. Since LS1 has been proven to enhance the toxicity of doxorubicin while not increasing toxicity in noncancerous cells³, combinations of LS1 and



Author Katelin Keenehan (Advisor Jonathan Millen, Ph.D.) of St. John Fisher College, in front of her poster at the 47th Annual RAS Fall Paper Session held November 6th at Nazareth College.

doxorubicin are hypothesized to decrease the cardiotoxic effect when compared to treating with only doxorubicin. Due to doxorubicin's known toxicity, there is a lifetime limit that is unique to each individual. This limit depends on other risks related to the heart, like the use of other heart-toxic drugs, age, and radiation exposure to the chest¹. If LS1 is found to enhance the efficacy of doxorubicin killing cancer cells, while also providing protection to healthy heart cells, then this lifetime limit of doxorubicin could ultimately be increased for individuals seen as risky candidates. This could hopefully lead to more cancer patients having successful treatments and recovery, along with a smaller chance of immediate relapse if the cancer was treated more aggressively. To study the impact of LS1 paired with doxorubicin on cardiotoxicity, cultured rat cardiomyocyte cells were used to create a population of cells used to perform experiments². The cells were treated with control conditions, doxorubicin, LS1, and a combination of dox/LS1. So far, the difference between the percentage of dead control cells and dead dox/LS1 cells was seen to be significant ($p=0.0205$). This suggests that the dox/LS1

treatment is effective in killing cells, however, much less deadly than the treatment of doxorubicin alone. On average, doxorubicin has been seen to kill 56% of cells where the dox/LS1 combined treatment has been seen to kill on average 11% of cells ($p=0.039$). These results suggest that LS1 provides a form of protection to heart cells and that there may be effective ways to treat cancer while minimizing harm to healthy cells throughout the treatment process, ultimately allowing courageous cancer survivors to live a healthier lifestyle after battling cancer.

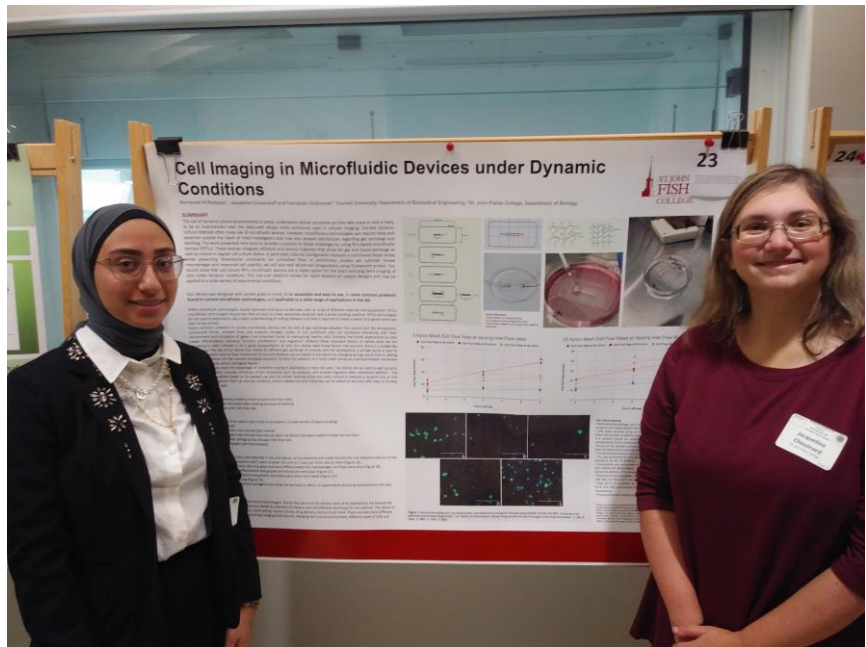


Karnavaal Al-Rubayie¹, Jaqueline Chouinard² and Fernando Ontiveros². 1. Cornell University, Department of Biomedical engineering. 2. St. John Fisher College, Biology.

CELL IMAGING IN MICROFLUIDIC DEVICES UNDER DYNAMIC CONDITIONS.

ABSTRACT

The use of dynamic culture environments to better understand cellular processes as they take place in vivo is likely an improvement over the static-well setups more commonly used in cellular imaging. Current dynamic culture methods often make use of microfluidic devices. However, microfluidics technologies can require tools and expertise outside the reach of most investigators and may also present deficiencies regarding gas exchange and leeching. The work presented here aims to provide a solution to these challenges by using film-based microfluidic devices (PETLs). These devices integrate adhesive and porous materials that allow for gas and liquid exchange as well as culture in regular cell culture



Authors Karnavaal Al-Rubayie (Cornell) and Jaqueline Chouinard (St. John Fisher College) in front their poster at the 47th Annual RAS Fall Paper Session held November 6th at Nazareth College.

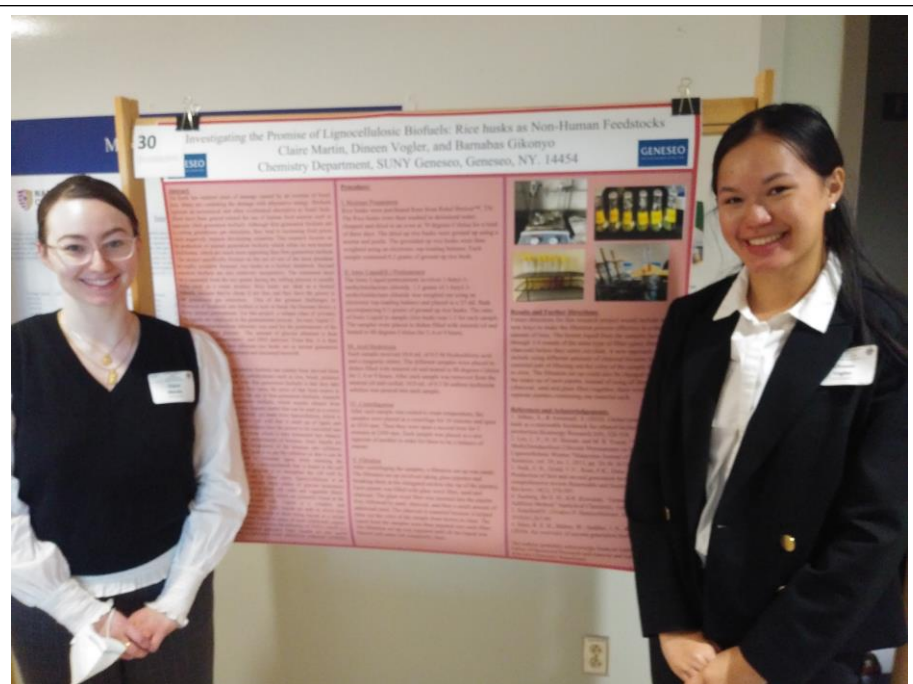
dishes. A semi-open channel configuration features a continuous liquid phase while preserving dimensional constraints for controlled flow. In preliminary studies we cultured mouse macrophages and measured cell viability as well as whole-cell phagocytosis using fluorescent probes. Our results show

that cell culture PETL microfluidic devices are a viable option for the short- and long-term imaging of cells under dynamic conditions. This low-cost platform allows for rapid iteration of custom designs and may be applied to a wide variety of experimental conditions.

Dineen Vogler, Claire Martin, and Barnabas Gikonyo, Ph.D., SUNY Geneseo.

INVESTIGATING THE PROMISE OF LIGNOCELLULOSIC BIOFUELS: RICE HUSKS AS A NON-HUMAN FEEDSTOCK.

The Earth has endured years of damage caused by an overuse of fossil fuels. Many are combating the damage with alternative energy. Biofuels represent an economical and often overlooked alternative to fossil fuels. Efforts have been geared toward the use of human food sources such as sugarcane (first generation biofuel). Although first generation biofuels aid in curbing greenhouse gas emissions, they lead to increasing food prices which negatively impacts developing



Authors Dineen Vogler and Claire Martin (SUNY Geneseo) in front their poster at the 47th Annual RAS Fall Paper Session held November 6th at Nazareth College.

Lignocellulosic Biofuels

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countries. This research focuses on the production of second-generation biofuels which relies on non-human food biomass, which are much more appealing than first generation biofuels. This project specifically focuses on the use of one of the most abundant and readily available biomasses, rice husks as a biofuel feedstock. Second generation biofuels are also relatively inexpensive. The

outermost layer that is separated from the rice grains during the milling process is usually thrown away as a waste product. Rice husks are ideal as a biofuel feedstock because they're cheap if not free, and they have the power to curb greenhouse gas emissions. One of the greatest challenges in conversion of feedstock into biofuel is how to break the biomass down, a process termed pretreatment. For this project, a unique class of solvents, ionic liquids

are employed in the pretreatment process. An ionic liquid (1-Butyl-3-methylimidazolium chloride) was used for the pretreatment of the rice husks to yield glucose. The amount of glucose obtained is then quantified using refractometry, and DNS analyses. From this, it is then possible to determine how efficient rice husks are as second-generation biofuel. The results are presented and discussed herewith.

Kevin Killigrew, Dr. Rachel Schultz, Dr. Michael Chislock, and Dr. Kathryn Amatangelo, SUNY Brockport.

USING FLOATING TREATMENT WETLANDS TO REMOVE NUTRIENTS AND RESTORE MEADOW MARSH HABITATS IN WETLAND SYSTEMS IN THE NORTHEASTERN UNITED STATES.

A significant threat that watersheds face is nutrient pollution, particularly excess phosphorus in freshwater systems. Floating treatment wetlands (FTWs) can remove excess phosphorus by plant and microbial uptake directly in the water column, and we explored both a mesocosm and pond experiment to test plant and substrate treatments. We examined phosphorus removal rates in a mesocosm setting using different combinations of four wetland plant species native to northeastern North America; *Carex stricta* (tussock sedge), *Iris versicolor* (northern blue flag), *Juncus effusus* (common rush), and *Eleocharis palustris* (common spikerush), as well as a control. Each plant plug was planted with a coconut coir substrate while the control had coconut coir substrate with no plants. The plant combinations of the FTWs included tussock species (*Carex stricta* and *Iris versicolor*), reed species (*Juncus effusus* and *Eleocharis palustris*), and a mixture. We measured the total phosphorus (TP) and orthophosphate



Kevin Killigrew and Dr. Rachel Schultz, SUNY Brockport, in front their poster at the 47th Annual RAS Fall Paper Session held November 6th at Nazareth College.

removal rates along with changes over time in chlorophyll-a, dissolved oxygen, specific conductivity, and pH. Preliminary results of this 6-week experiment showed that TP concentrations increased in each of the mesocosm treatments between the first and last week; however, there was a significantly lower increase in TP concentrations in the reed treatment compared to the control ($p = 0.002$) and tussock treatments ($p = 0.04$). The second part of this study examined total phosphorus and orthophosphate removal of FTWs in retention ponds, comparing treatment FTWs with a mixture of reed and tussock species and control mats. After the conclusion of this retention pond application, the

plants were transplanted into soil to see how effective these plants can overwinter to be reused in FTWs or planted in meadow marsh habitats.



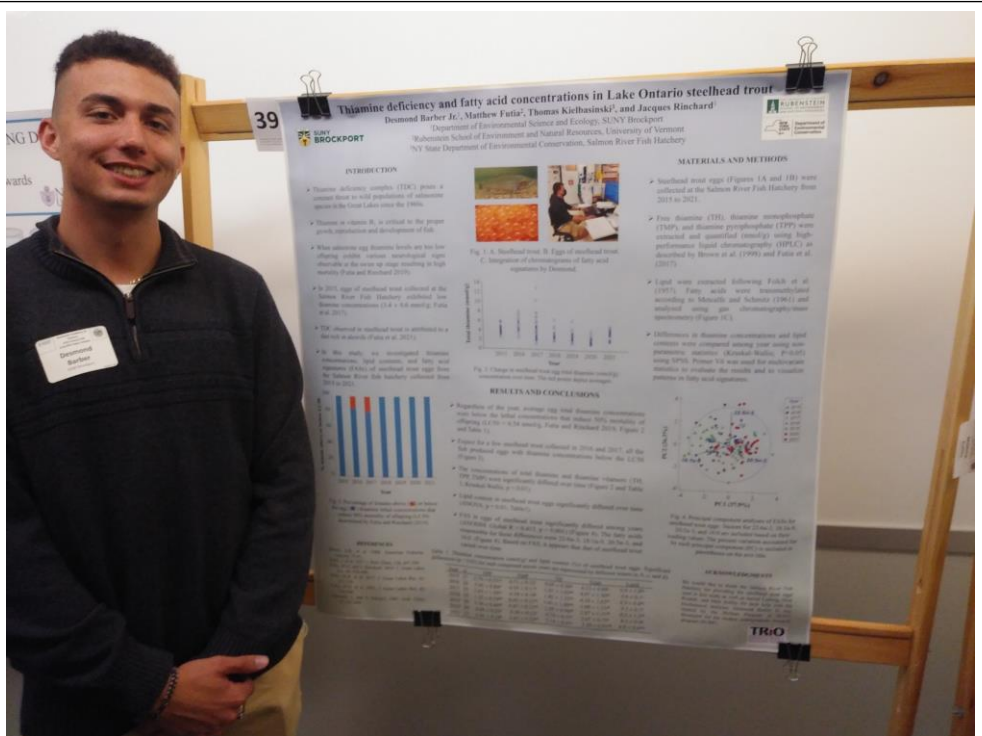
Carex stricta aka Tussock Sedge.
Courtesy Gardenia.net

Desmond Barber Jr., Matthew Futia, Thomas Kielbasinski, and Jacques Rinchar, Ph.D., SUNY Brockport, Dept of Environmental Science & Ecology.

THIAMINE DEFICIENCY AND FATTY ACID CONCENTRATIONS IN LAKE ONTARIO STEELHEAD TROUT

Abstract

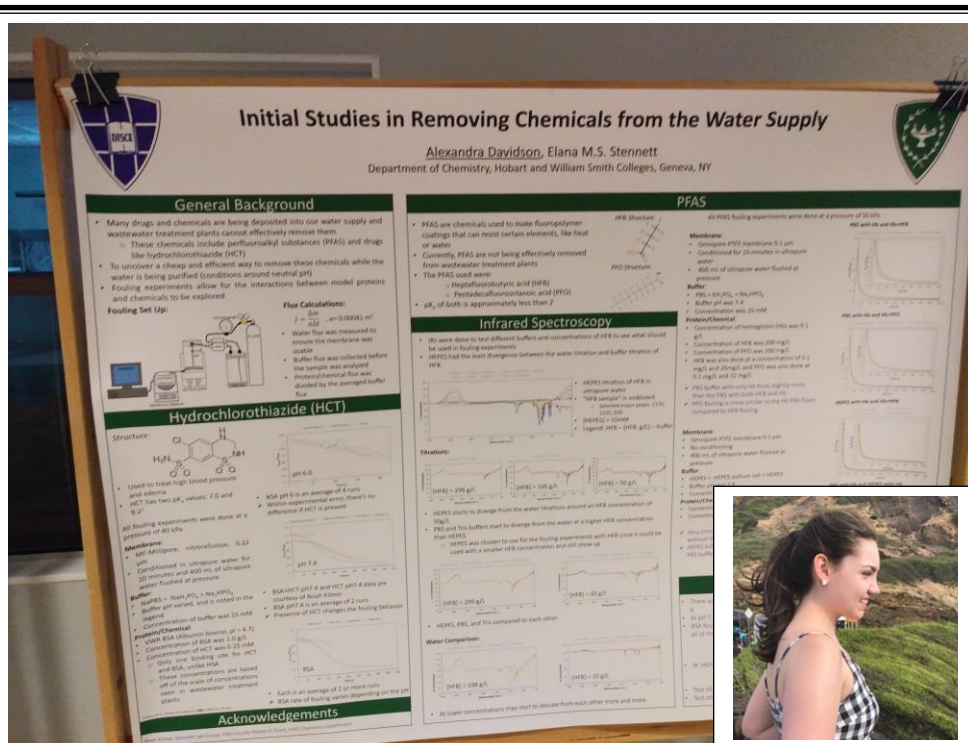
Thiamine deficiency complex (TDC) has posed a constant threat to wild salmonine species from the Great Lakes since the 1960's. Strong correlations have been made between TDC and a diet rich in alewife. The objectives of this study were to measure thiamine concentrations, lipid contents, and fatty acid signatures in steelhead trout eggs collected at the Salmon River State Fish Hatchery from 2015 to 2021. Egg total thiamine concentrations varied significantly among years (Kruskal-Wallis, $p < 0.05$), with the highest concentrations reported in 2016 (4.97 ± 1.50 nmol/g) and the lowest in 2020 (2.07 ± 0.75 nmol/g). A significant number of fish produced eggs below the lethal concentration inducing 50%



Desmond Barber Jr., SUNY Brockport, in front their poster at the 47th Annual RAS Fall Paper Session held November 6th at Nazareth College.

offspring mortality ($LC_{50} = 6.54$ nmol/g) across all years ($95.1 \pm 8.4\%$). Yearly total egg lipid content was positively correlated to yearly egg total thiamine concentrations ($r^2 = 0.64$, $P < 0.05$). Fatty acid signatures in eggs significantly differed among years (ANOSIM, Global R = 0.415, $P < 0.05$)

and the major fatty acids responsible for the differences were 22:6n-3, 18:1n-9, 20:5n-3, and 16:0. Although these results suggest a potential shift in steelhead trout diet, it did not affect egg thiamine concentrations.



Alexandra Davidson, Hobart and William Smith Colleges, with her poster at the 47th Annual RAS Fall Paper Session held November 6th at Nazareth College.

Alexandra Davidson and Elana M.S. Stennett, Ph.D., Department of Chemistry, Hobart and William Smith Colleges.

INITIAL STUDIES IN REMOVING CHEMICALS FROM THE WATER SUPPLY.

Abstract

Due to the growth of modern medicine in today's society, many drugs and chemicals are being deposited in the water supply. Wastewater treatment plants cannot effectively remove all of these chemicals like perfluoroalkyl substances (PFAS) or drugs like hydrochlorothiazide (HCT), which is particularly troublesome as they can bioaccumulate. This project seeks to begin studies to uncover a cheap and

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Water Supply

(Continued from p.7)

efficient way to remove these chemicals from wastewater. Fouling experiments were conducted of these chemicals, both with and without the presence of model proteins to explore if interactions between the model proteins and chemicals would lead to easier extraction. By utilizing a membrane similar to those employed in wastewater treatment plants, experiments were conducted to begin studying the interactions between the chemicals and model proteins. The fouling results were used to uncover a way to eliminate the chemicals from the water supply.



Frank E. Vanlare Water Treatment Plant Irondequoit, NY. Courtesy: RochesterSubway.com

ROCHESTER AREA RESEARCH IN REVIEW

[What happens if your circadian rhythms are out of whack?, October 21, 2022, University of Rochester Medical Center.](#)

[Butterfly wing patterns emerge from ancient 'junk' DNA, October 21, 2022, Cornell University.](#)

[Fatty liver linked to survival in E. coli infection, October 20, 2022, University at Buffalo.](#)

[Keeping electricity affordable on wireless charging highways, October 20, 2022, Cornell University.](#)

[Wastewater testing expected to work for most infectious diseases - Wastewater surveillance is expected work for just about every infectious disease that affects humans, including monkeypox and polio, October 18, 2022, Syracuse university.](#)

[Protein IDs, drug candidates, show promise for COVID science, October 17, 2022, Cornell University.](#)

[Future emissions from 'country of permafrost' significant, must be factored into global climate targets, October 6, 2022, Colgate University.](#)

[Europe can rapidly eliminate imports of Russian natural gas - Engineers develop a model to analyze pathways to full independence from Russian natural gas, October 6, 2022, Binghamton University.](#)

[Researchers find tumor microbiome interactions may identify new approaches for pancreatic cancer treatment, October 10, 2022, University of Rochester Medical Center.](#)

[New telescope attachment allows ground-based observations of new worlds - Observations from telescopes on Earth rival those from telescopes in space, October 6, 2017, Hobart and William Smith College, RPC Photonics in Rochester, New York.](#)

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>.

This "BULLETIN" is produced monthly, except July and September, by the Rochester Academy of Science. Submissions are due by the 10th of the month and may be emailed to the editor, Theodore W. Lechman, at Theodore.W.Lechman@gmail.com.

The Academy postal address is P.O. Box 92642, Rochester NY 14692-0642.

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