

Minnesota Academy of Science Newsletter



**MINNESOTA
ACADEMY
OF SCIENCE**

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Message From the Director

by Celia Waldock

As we close out 2016, and usher in 2017, I want to thank those of you who donated to our Give to the Max campaign. As a small non-profit with a tight operating budget for all the STEM programs we offer Minnesota students, we rely very heavily on donations.

As you consider your charitable end-of-year giving, please donate to the cost-effective college and career preparation opportunities of Minnesota Academy of Science. MAS offers students — who will lead our innovations in environmental protection, cognitive science, engineering, and more — programs beyond the classroom to develop critical thinking, collaboration building, evidence-based research, written and oral communication and presentation skills.

Here are two ways you can effortlessly contribute:

- 1) Our Give to the Max campaign is still open: <https://www.givemn.org/organization/Minnesota-Academy-Of-Science>
- 2) Login to our AmazonSmile link. Then, make any purchases as usual, and Amazon will match a .5% donation of your purchase price to our account. Bookmark the Smile account page to continue making an easy donation to MN MAS with any Amazon purchase. <https://smile.amazon.com/ch/41-0789356>

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Message from the President

Dr. Stephanie D. Yancey

You'll start to see many new faces at the Minnesota Academy of Science events and programs this year. The new program director for the State Science & Engineering Fair and Junior Science & Humanities Symposium, Sara Gomez, is profiled on page 9.



We have **Marcella McClain**, currently pursuing a doctorate in Information Technology with a specialization in education, as our new database manager. One of her interests is mentoring young girls in the field of computer science and information technology —

something she's been involved with since the days of punch cards.



Jennifer Schuetz is our new coordinator for the Winchell Undergraduate Research Symposium and Science Salon. She worked 16 years as an aquatic ecologist and environmental educator for a small nonprofit organization at the University of New Mexico Department of Biology. She

is enjoying the rain, lakes and other water bodies after living in the desert. Jennifer is passionate about helping students get excited about science and math. She is new to Minnesota, but did spend two years in Maine as a graduate student in Ecology and Environmental Science, giving her a taste of winter. She already loves cross country skiing and snowshoeing.



Minnesota Academy of Science Board President Stephanie Yancey

Can We Feature Your Work?

We want to include more personal stories of our MN MAS community: program alumni, current students, volunteers and supporters. What are you working on in a STEM field? We're looking for all disciplines, and would especially like to spotlight work in computer science soon, since we haven't featured any of those stories lately.

Thanks to high school coach Cynthia Welsh, we've been able to feature profiles of two northern Minnesota students this year: Logan Pallin, in the spring newsletter and [on the website](#), and Bethany Rosemore in this issue and [on the website](#).



Lisa Day, our new Fundraising and Outreach Coordinator, has been a Grant Writer for Neighborhood House and Goodwill/Easter Seals. She's spent the last five years coordinating the sales team and doing

outreach for the Hub Bike Co-op. Lisa is an avid cyclist and ultra-marathon runner. Lisa is also a playwright.

2017 VOLUNTEERS NEEDED

Science Bowl

Approximately 150
volunteers are needed for:



High School Science Bowl (January 21)

Middle School Science Bowl (February 11)

The majority of volunteers are working in academia or in one of the many STEM companies in the area. Chemists, physicians, researchers, engineers, professors, biologists and many others help to continue the Minnesota Academy of Science's long tradition of programs of excellence. Volunteers staff the roles of question proofreader, moderator, scientific judge, scorekeeper, rules judge, and timekeeper. Training is provided on-site the day of each event. Volunteers may work either or both of the competitions. [Learn more here.](#)

Science & Engineering Fair

We will need 250 project judges, 50 High School paper judges, 50 Middle School paper judges.

Junior Science & Humanities Symposium: paper judges with expertise, and general volunteers (March 25)

State Science & Engineering Fair (March 25-27)

Judges typically represent university faculty and researchers, industrial engineers and scientists, representatives of private and federal research

centers, and medical practitioners or researchers. To judge high school projects, judges must have a minimum of 6+ years of experience or a doctoral degree (this includes graduate students in their final year of their program). To judge middle school projects, judges must have 2+ years of experience or a Bachelor's degree (this includes upper division undergraduate students). Learn more about [general volunteer opportunities here](#). Learn about [being a judge here](#).

High School STEM Communicator

The High School STEM Communicator Awards program needs three types of volunteer judges — professional mathematicians, scientists, engineers; citizen-scientists who are interested and trained in math/science fields; technical writers. Volunteers are asked to read two or three papers and respond electronically to student work. Papers will be sent out about one month in advance of the due date. [Learn more here.](#)

Kelly Coleman, a toxicologist in the medical device industry, volunteers because "Seeing all those smart kids restores my faith in the future."

Be a Volunteer or Judge



*Images from
2016 State
Science &
Engineering
Fair*

Looking to Feature Students From Our Programs

Funders of our education programs like to hear from students about what the experience of participating means to you.

- What did you learn as you journeyed through STEM research, team-building, or presentation preparation enroute to Science Bowl, Science & Engineering Fair, JSHS, Winchell?
- What were highlights of the experience?

You might be featured on the MAS website or in this newsletter.

See several students featured in the Summer newsletter here.

We are doing our year-end wrap-up now. Please take advantage of winter break time to send us a quick note that explains what this kind of experience offers you personally, whether you were involved in 2016, or are preparing to compete in 2017 for the first time.

Please write a few paragraphs addressed to "Minnesota Academy of Science" that indicates how the programs have been an important experience for you. Then send it to mikkimorrisette@mnmas.org.

Thank you for your participation! And welcome to a new year!

Networking: Minnesota Technical Symposium

The annual symposium — coordinated by Minnesota Academy of Science board vice president Bill Heidcamp — will be held March 16, 2017, at the Innovation Center, Schuman Research Facility, Ecolab in Eagan.

Topic: Virtual Reality/Augmented Reality

All interested persons are welcome to attend. Registration should open around February 20 at the [MinnTS website](#). Find updated [details at MAS](#).

Science Salon

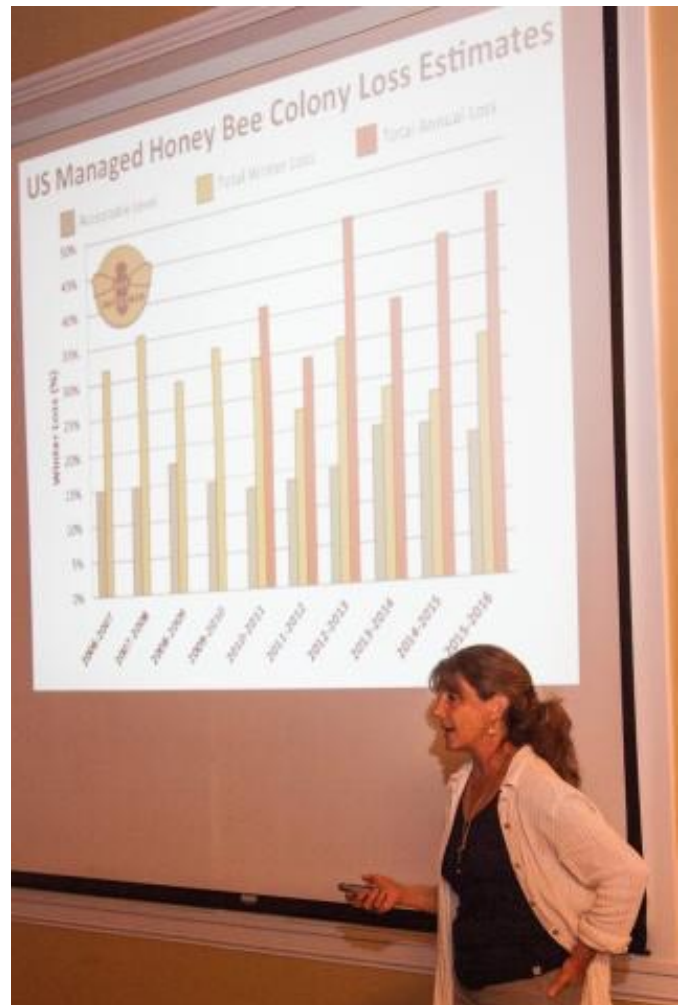
“Protecting Our Pollinators” with Dr. Marla Spivak

On September 22, 2016, we had the honor of listening to Dr. Marla Spivak from the University of Minnesota’s Bee Lab speak at Science Salon held at the Dodge Nature Center in West St. Paul. Her presentation comes at a time in which news about the poor state of our pollinator populations continues to grow. Dr. Spivak, her colleagues and her students, are investigating the issues that have been plaguing our honey and native bees, as well as potential solutions. She shared this work with us at Science Salon.

THE PROBLEM

Our bees are dying, at double the acceptable levels. Acceptable levels are losses that bee populations can rebound from to maintain a healthy number. These losses are attributed to multiple problems: viruses, parasites, pathogens, insecticides, herbicides, fungicides, lack of food.

Dr. Spivak said the research indicates lack of food seems to be the biggest concern, with the rest of the issues compounding that problem. She recommends that improving food access for bees should be a primary focus. Bees aren’t particularly picky — if there is nectar and pollen available, they are happy. The problem is, she said, humans have created an environment full of monocultures. Our suburbs are full of Kentucky Blue Grass lawns, which provide no food. We treat our lawns for “weeds,” which eliminate small food sources. Our agricultural system is the same; we have fields upon fields of one crop, which provides



food when it is flowering, but then it becomes a food desert.

SOLUTIONS

Having a landscape that is continually in bloom with a diversity of flowering sources for bees has proven to greatly improve the health and survival of bee colonies. Both the pollen and nectar have proteins and lipids that increase immunity to disease and viruses, as well as help bees detox from pesticides. In other words, having a good diet allows bees to combat more effectively the other problems we are seeing in our bee populations.

What can we do? How can we help? Dr. Spivak says the solution is pretty easy: plant more



flowers and avoid pesticides/ herbicides/ fungicides. And when you do plant flowers, watch what the pollinators are visiting. If you notice that they visit some plants more than others, plant more of those plants next year.

Need helpful hints on what to start with? Bees love mints and clovers. And Dr. Spivak reminds us to not forget the trees. Cottonwoods can be especially important for the production of propolis — a resin that has antimicrobial, antifungal, antiviral, and waterproofing properties.

RESEARCH

What is Dr. Spivak's team working on? They are studying what plants bees seem to really like — by translating the communication among sister bees that share information on where good food can be found. They have also been doing research on seed mixtures; what types of plants are the best and what kinds of mixtures we could be using in our lawns.

The Minnesota Academy of Science works to bring scientists from different disciplines together. Science Salon is a forum for professional scientists and engineers to stay current on groundbreaking research and emerging technologies, engage in cross-disciplinary networking, and participate in philanthropic activities.

Contact: Jennifer Schuetz, new program coordinator, jenniferschuetz@mnmas.org

Visit the website to read articles from past Science Salons:

[Dr. Michael Osterholm, Infectious Diseases](#)

[Dr. Fotis Sotiropoulos, St. Anthony Falls Lab](#)

NEXT ISSUE: Our story on the EcoLab Science Salon presentation about biofilm

[Bee-friendly planting tips](#)

There is much more work they are doing in their new center at the University of Minnesota, and at the visitor-friendly Pollinator Discovery Center at the University of Minnesota Landscape Arboretum. Learn more at: <http://www.beelab.umn.edu/>

— Ashley Smith

Where Is She Now?

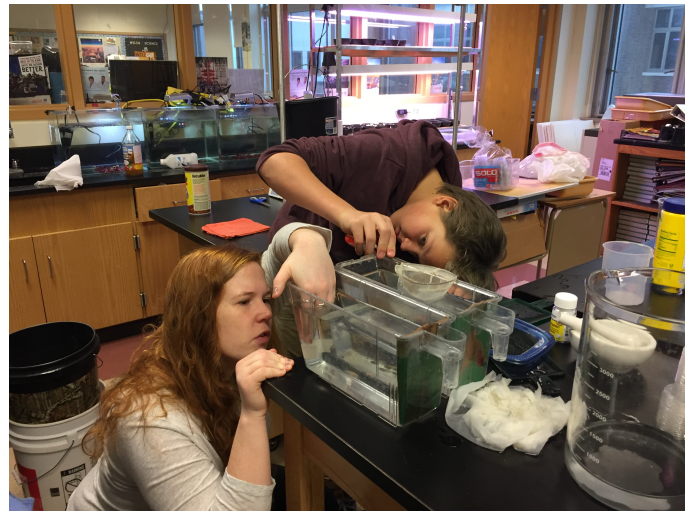
Bethany Rosemore, Minnesota Science Fair Alum

In addition to studying sharks in a shark tank off the coast of Africa, working to save penguins, and learning to scuba dive the Galapagos Island, Bethany Rosemore returned to her Cloquet Middle School alma mater in 2016 to mentor two middle school students (Henry Slater and Lleyton Sinkkonen), who were studying Japanese Medaka, the fish she studied in middle school.

Slater and Sinkkonen's research advanced to the State Science & Engineering Fair in April. Bethany Rosemore was a six-time entrant into the MAS fair, a three-time entrant into the Stockholm Junior Waterprize, and was a finalist at the Intel International Science and Engineering Fair, winning a fourth-place Grand Award and a Special Award.

Rosemore went on to graduate in environmental studies in May 2016 from the University of Rochester in New York. She was awarded a Research and Innovation Grant from the University. The grant allowed her to volunteer for two weeks in Gansbaai, South Africa, with Great White Shark conservation and research, and with African Penguin rehabilitation. She worked on a cage-diving boat and an eco-tourism boat, where data was recorded on shark sightings and characteristics.

Rosemore has worked with her advisor, associate professor Dr. John D. Kessler, to do research in Chemical Oceanography. She was onboard a



research cruise off the coast of Rhode Island to look at the fate of methane in the water column. While studying abroad in Quito and the Galapagos Islands in Ecuador, she was able to be a part of the launch of the Project Abby 2100 with Rochester professor Dr. Tom Mullikin and a few other students. This project aims to humanize the effects of climate change by using the peer-reviewed science and interviews to predict the future life of Baby Abby, a theoretical child born in 2015. [[See the project website here.](#)]

"It was participating in science fair from 8th grade up that truly sparked my interest in research in the scientific field," Rosemore says.

"It was science fair that allowed me to learn how to and fall in love with travel while in high school. And without the support and inspiration Dr. Cynthia Welsh provided to me throughout middle and high school, many of these once-in-a-lifetime research experiences wouldn't be possible. Since my science fair days, I have independently traveled to over 10 different countries and have no plans of slowing down."

Journal of the Minnesota Academy of Science

Because of the wealth of early scientific discoveries, knowledge, and history contained in the *Journal of the Minnesota Academy of Science*, which has been published since 1873, we have an abundance of early Minnesota scientific papers about geology, botany, zoology, astronomy, and archaeology. Although many of these articles may no longer be relevant to current scientific discussion, they provide a foundation to understand how far our scientific knowledge and understanding of the natural world has progressed since 1873. A team is

gradually generating digital PDF scans of our earliest journals. From Volume 5, No. 1, in 1911:

- "Ancient Glass and Pottery," by Walker, T.B.
- "The Wild Botanic Garden in Glenwood Park," Minneapolis, Butler, E.
- "Notes on the Eleventh International Geological Congress Held in Stockholm, August 18-25, 1910," Winchell, H.V.
- "The Iron Ore Ranges of Minnesota, and Their Differences," Winchell, N.H.

High School Students: Apply for STEM Communicator Awards

In 2013, MAS created a new program focused on written communication skills among young scientists, technologists, engineers, and mathematicians, through the generous funding of St. Jude Medical Foundation.

The goal of the High School STEM Communicator Awards program is to identify and encourage high school students who show exceptional potential in performing scientific and mathematical research, in communicating their research through writing, and in understanding the societal context of their research and results.

The top 10 papers will be recognized with a cash prize, medallion, and publication in the

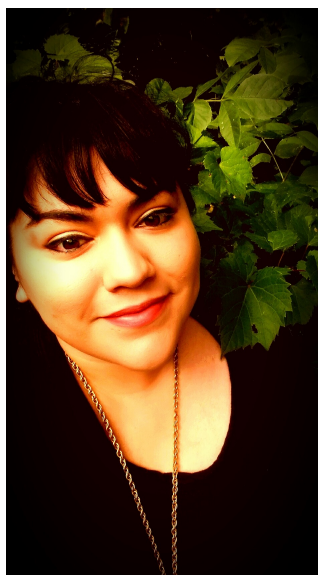
Minnesota Academy of Science Journal of Student Research.

To declare your intent to apply for the 2017 High School STEM Communicator Awards, **email Karen Newell** (karennewell@mnmas.org) with the following information:

- Name
- School
- Grade
- Probable Project Name
- Individual or team entry (choose one)
- ISEF Category and Subcategory ([see list](#))
- Two email addresses where you may be reached

PROGRAM NEWS

New Program Coordinator for Science & Engineering Fair and Junior Science & Humanities Symposium



The new program director for the State Science & Engineering Fair and Junior Science & Humanities Symposium is Sara Gomez.

"I recently moved to Minnesota from Austin, Texas, where I studied Environmental Biochemistry and Policy.

I decided to share my passion for science with others by teaching high school. I chose to work with high schools in underserved communities because, coming from one myself, I know how important it is to have dedicated STEM teachers to ignite the kind of curiosity in their students that gives way to opportunity. During my time teaching, I also began to work with local advocacy groups, then transitioned to program director with Digital Media Academy, a national technology camp for kids where I set up workshops nationally in topics such as robotics, 3D printing, and programming. I am glad to have found a home for my skills and passion at the Minnesota Academy of Science."

Seven Local Broadcom MASTERS Semifinalists

The 2016 Broadcom MASTERS selected 300 middle school students from a pool of 2,343 entrants and more than 6,000 nominees from fairs across the U.S. Seven Minnesota students were named semifinalists.

Maasia Apet, Grade 8

St. Paul, MN

"Biomass to Biofuel!"

Julia Brouwer, Grade 7

Edina, MN

"Leafy Green Astronauts: How Space Radiation Affects Seed Germination and Plant Growth"

Noah Eggebraaten, Grade 6

Rochester, MN

"A Study of the Use of Aeroponics to Produce Food in a Space Environment"

Emmarah Qureshi, Grade 8

Fridley, MN

"Building and Testing on an Artificial Stomach"

Anindita Rajamani, Grade 7

St. Paul, MN

"Fast Food Assistant: A Smartphone App for Healthy Fast Food Choices"

Supriya Roy, Grade 6

Rochester, MN

"Just the Right Combination"

Max Vogel, Grade 8

Lake Elmo, MN

"Got Gas V2: A Follow-up Investigation into the Efficiency of Ethanol"

Thank You to Our Sponsors

Raise the visibility of your company and sponsor the Minnesota Academy of Science. Join us to recognize, promote and influence excellence in science.

Help support science by supporting the Minnesota Academy of Science. There are many opportunities to help our small nonprofit organization. Sponsorship options range from \$1,000 to \$100,000.

Sponsorship donations contribute to offsetting the costs for Minnesota State Science & Engineering Fair, Science Bowl, Winchell Undergraduate Research Symposium, and so much more — all of which are underfunded.

Co-sponsors also are needed for Science Salon by providing a meeting venue, tour, speaker, and refreshments for participants.

Contacts:

Celia Waldock, Executive Director, celiawaldock@mnmas.org with questions or to sponsor a program.

Lisa Day, our new Fundraising & Outreach Coordinator, lisaday@mnmas.org.



Department of Chemistry



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Because we are a small organization, the MAS office is only staffed part-time. Below is the best way to contact our contractors and staff:

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Minnesota Science Networking

We'd like to start promoting our Minnesota science community with Linked In profiles of research being done in the field. If you'd like to contribute to this, please contact our Communications Specialist at mikkimorrissette@mnmas.org.

One interesting recent nugget on [our Facebook page](#): An invitation to contribute suggestions for overlooked women in the science industry [as this writer did](#).



Newsletter Production Team

Celia Waldock, Editor-in-Chief

Mikki Morrissette, Communications Specialist

Photo credits: Thanks to Dave Newell and Craig Turner for some of the images used in this issue

We are extending our communications coverage to strengthen our networking, mentoring and funding capabilities as a statewide scientific community. Stay connected with this newsletter and the bi-weekly news, as well as the MNMAS Facebook and Twitter accounts.

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