

# Minnesota Academy of Science Newsletter



**MINNESOTA  
ACADEMY  
OF SCIENCE**

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## Message From the Director

by Celia Waldock

As you will find in this issue, the Minnesota Academy of Science programs offer extensive rewards not only for students, but for the volunteers, mentors, judges and sponsors who work with them.

The competition season might culminate with several of our Minnesota students showcasing in the spring their STEM skills nationally (see page 3), but the work starts in fall when we support those efforts throughout the state.

How can you be part of the Minnesota Academy of Science network?

- **Contribute to the success of our ongoing programs.** Science Bowl, Minnesota State Science & Engineering Fair, Junior Science & Humanities Symposium, High School STEM Communicator Awards, and Winchell Undergraduate Research Symposium need funding support now. Find ways you can be part of the sponsoring team — as an MAS member, with planned giving, with matching funds, with sponsorships as small as \$1,000 — on page 13.
- **See our new dates for the 2018 season** on page 14. Invest in Minnesota’s STEM education by penciling in your time to serve as a volunteer or judge at any of our programs.
- **Reward yourself with our ongoing networking opportunities,** such as Science Salon (page 8) ... read the sophisticated research papers of local high school students (page 10) ... peruse the interesting STEM topics of the 1970s from our newly uploaded archives (page 11).



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## From President Dr. Stephanie Yancey

I took on the role of MAS Board President when Mike Williams had to leave prematurely in early 2016, and have enjoyed working with the Board and the MAS staff. I am delighted that we were able to expand the Board during my tenure. We have great ideas to work on for new and existing programs.

For instance, we are all looking forward to moving the State Science & Engineering Fair to the Earle Browne Center in 2018, as well as separating it from Junior Science & Humanities Symposium — something I have advocated for a number of years. I am interested in two proposals from Science & Engineering Fair Director Sara Gomez. These look at how we can increase participation at the State and Regional Fairs, as well as how we can reach out to under-represented schools and increase the diversity of our participating students.

We have had a number of interesting Science Salons, and I have always enjoyed meeting working scientists and engineers in a variety of fields. A tour of the Virtual

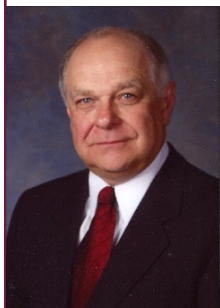
Reality labs at the University of Minnesota was a highlight this year. A favorite program for me is the High School STEM Communicator Award, reading papers written by high school scientists. Their enthusiasm and willingness to volunteer to spend the effort and time gives me hope for the future of science in general (and microbiology/molecular biology in particular).

I had the opportunity to attend the Winchell Symposium for the first time and was impressed by the posters and talks, and enjoyed speaking with many young scientists.

I know that I have not been able to devote as much time as I would have liked to MAS, and have not come close to fulfilling the goals I set for myself and the Board at the beginning of my term. It is with regret, but also hope, that I step down from the Presidency of the Board of Minnesota Academy of Science, effective September 30, 2017. I am very happy to announce that Bill Heidcamp is taking back the mantle that he held for many years. I look forward to continuing on the Board in my previous role as Vice President under his leadership, and to working with him and the Board, our Executive Director Celia Waldock, and the phenomenal MAS Staff as we move forward in our mission to “recognize, promote and influence excellence in science.”

## Board Election News

The members of Minnesota Academy of Science have unanimously voted to elect Dr. William Heidcamp, former appointed Vice President, to serve a two-year term as President of the Academy, and Dr. Stephanie Yancey, outgoing interim president, to serve a one-year term as Vice President.



### Dr. William Heidcamp

Dr. Heidcamp is Emeritus Professor of Gustavus Adolphus College, where he was department chair for more than 20 years. He earned his Ph.D. at the University of Pittsburgh in Developmental/ Cell Biology. He has numerous honors and publications to his credit. Among his many positions, he worked as a visiting scientist in the pathology division of the Centers for Disease Control in Atlanta. He retired in 2010 after working as

Dean of the College of Arts and Science at the American University of Sharjah in the United Arab Emirates, but had a brief stint in 2015 as Vice President of Academic and Student Affairs at the American University of Phnom Penh, Cambodia. As a member of the Minnesota Academy of Science Board of Directors, he served as Treasurer (2003-2004), President (2005-2006), and Acting Executive Director (2006).

### Dr. Stephanie Yancey

Dr. Yancey is a native of Chicago and received her B.A. in Biochemistry and Molecular Biology from Northwestern University. After obtaining her Ph.D. in Microbiology at Penn State, she held a Postdoctoral Fellowship at the University of Georgia in microbial genetics. She has been with Beckman Coulter since 1993 as a Development Scientist in Fullerton, CA., and has been a Staff Scientist since 1996. Since transferring to Minnesota in 2009, she has been involved in various projects, specifically related to the development of new immunoassays and clinical laboratory instrumentation.

# STUDENTS GO NATIONAL

## High School Science Bowl Champions: Edina



## Middle School Science Bowl: Minnetonka Finished Top 16 in nation at D.C. Nationals!



## Junior Science & Humanities Symposium

There were 83 Minnesota students who advanced from regional competitions to compete in the North Central Regional Junior Science & Humanities Symposium (JSHS), which supports students to contribute as future scientists and engineers.

Five JSHS finalists won an expense-paid trip to the 400-participant National JSHS in San Diego. Pictured above: Nikhil M. (third place), Harini K. (first), Manashree P. (second); Nathaniel F. (fourth), Kerui Y. (fifth). The top two advanced to present, and both won second place in their categories, winning \$8K in scholarships:

- **Manashree P., Woodbury**, “Unleading the way: Remediation of lead-contaminated water with *Coriandrum Savitvum* (cilantro) biochar.”
- **Harini K., Eden Prairie**, “A cost-effective, patient-friendly, and biocompatible treatment for chronic pain and peripheral nerve damage using genetically engineered ‘smart’ nanoparticles.”

In addition, **Kerui Y., Eden Prairie**, received honorable mention in her poster category for “Effects of pH on polyvinyl alcohol behavior in aqueous solutions.”

## THANKS TO OUR SPONSORS

3M, Seagate, Ecolab, Academy of Applied Science/U.S Army, Verizon, General Mills, St. Jude Foundation, Hardenbergh Foundation, University of St. Thomas - School of Engineering, Macalester College, Land 'O Lakes, Cray, Tennant Foundation, Sage Glass/Saint Gobain, Beckman Coulter Foundation, Barr Engineering, Great River Energy, Braun Intertec, OSilas Foundation, Diasorin

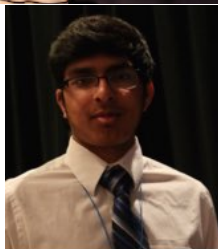
# Minnesota State Science & Engineering Fair

More than 500 students competed in the 80th annual Minnesota State Science & Engineering Fair (SSEF). The SSEF is an annual competition that has been the pinnacle of project-based education for the best and brightest Minnesota students in science, technology, engineering and math (STEM).



Five project winners won an all-expense paid trip to compete at the International Science & Engineering Fair (ISEF), featuring more than 1,700 high school students from over 70 countries

(pictured above): Hannah F. (Stillwater), Akshat S. (Oronoco), Avni J. (Eden Prairie), Manashree P. (Woodbury), and (inset) Rohan P. (Rochester).



Minnesota's regional state fair winners also competed at ISEF. The state had many strong finishers:

## Grand Awards

### BIOMEDICAL AND HEALTH SCIENCES

- "Selective Inhibition of Metastatic Cancer Cell Migration," Akshat S., Century High School, Fourth Award of \$500

### BIOMEDICAL ENGINEERING

- "Inexpensive Glucose Monitoring Device for Diabetics Using Capillary Action of Crosslinked Sensing Fluid, Year II," Serena J., St. Paul Central High School, Second Award of \$1,500
- "Bioengineering the Lung: Directed Differentiation of Human Pluripotent Stem Cells into Definitive

Endoderm on a Lung Extracellular Matrix," Meghana I., Edina High School, Fourth Award of \$500

### ENVIRONMENTAL ENGINEERING

- "Unleading the Way! Remediation of Lead Contaminated Water with Coriandrum sativum (Cilantro) Biochar," Manashree P., Woodbury High School, First Award of \$3,000

## Special Awards

American Mathematical Society — First Award of \$2,000, "Polynomials in  $Z[x]$  and Irrationality Measure," Griffin M., New Prague High School

Arizona State University scholarship — "The Effects of Bacillus Bacteria on the Invasive Species Lemna minor (Duckweed)," Claire W., Burnsville High School

Oracle Academy — Award of \$5,000 for outstanding project in the systems software category, "Detecting Abnormal Cells Using Artificial Intelligence," Gaurav B., Century High School

Patent and Trademark Office Society — Award of \$1,000, an American flag, and a framed copy of the first patent granted in the United States of America

- "Window to the Brain: Using Retinal Biomarkers to Predict Progression of Alzheimer's and Parkinson's Diseases," Archana M., Breck School
- "A Novel Approach to Minimize Road Salt Contamination in Both Terrestrial and Aquatic Ecosystems," Alyssa C., Loyola High School

U.S. Agency for International Development —

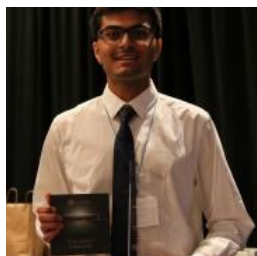
- USAID Global Development Innovation First Award of \$3,000, "Unleading the Way! Remediation of Lead Contaminated Water with Coriandrum sativum (Cilantro) Biochar," Manashree P., Woodbury High School
- USAID Global Development Innovation Second Award of \$2,000 — "3D Printable Transtibial Prosthetic," Everett K., Stillwater Area High School

University of Arizona Tuition Scholarship Award — "Mathematical Analysis of Melanocyte Patterns on Danio rerio," Frances S., Cloquet Senior High School



Seagate is a premier sponsor of the Minnesota State Science & Engineering Fair. Seagate’s Rising Star award recognizes emerging scientists whose projects exemplify high degrees of difficulty, thoroughness, complexity, creativity, innovation and effective communication.

The middle school winners were the team of Teagan F. & Erin C. (Duluth, below) for "Measuring the mortality rate of Daphnia magna exposed to tire chip leachate."



The high school winner was Pujan P. (Rochester, left) for his materials science project about preventing the spread of E. coli and other prominent bacteria in commonly touched surfaces.

Seagate also spotlights outstanding teachers from around the state who find creative ways to nurture students' interest in scientific research and discovery. Eric Seidelman of Ordean Middle School (Duluth, below center) was recognized as the winner of the teacher 1-10 years category.



Ellen Pierce of Northeast Range High School (Babbitt, right center) won in the category of teacher for more than 11 years.

*What Minnesota STEM teachers say about the value of the Science & Engineering Fair experience for their students:*

**“My students didn’t do this with friends - they did it all on their own. They learned more about themselves, gained confidence, and got outside of their bubble. The character development in itself was, and is worth it.”**

*Q: What skills do your students gain as a result of participating in the Science Fair?*

- Curiosity, problem solving, creativity, teamwork.
- Communication skills, time management skills, filling out paperwork by themselves, working through scientific struggles, data collection, programming, graphing.
- Confidence in their work as scientists and the value of sharing research.

**[Find an eight-page Highlights summary of the 2017 MSSEF experience by clicking here.](#)**





3M is a premier sponsor, offering prize money to the top three middle school and top three high school projects. The 2017 Middle School winners were (below): 3rd, Kyle L. (Remer, right); 2nd, Natalie L. (Andover, left), 1st, Hassan M. (Minneapolis, center).



The 2017 High School winners were: 3rd, Samantha D. & Abigail R. (Golden Valley, right) for a novel approach to safeguarding valuables during this age of wearable technology; 2nd, Archana M. (Golden Valley, left) for retinal biomarkers to predict progression of Alzheimer's and Parkinson's disease; 1st, Hemanth A. (Rochester, center) for developing a novel electroporating toothbrush.

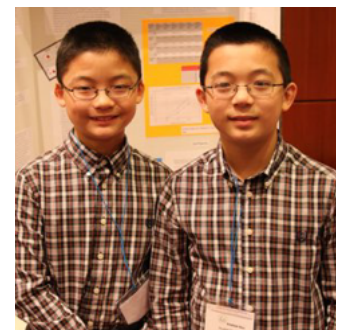
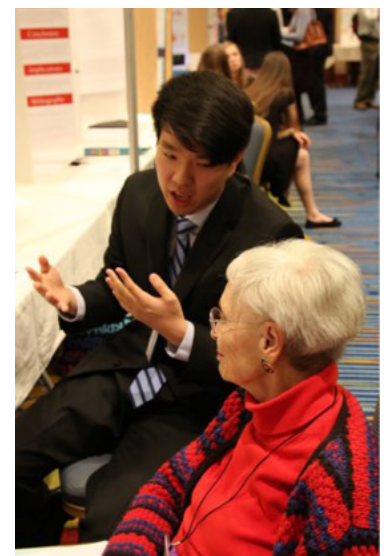


Ecolab's Green Award went to middle school winner Serena C. (Rochester, below left) for an experiment with ultrasound use in eliminating bacteria compared to traditional cleaning methods, and to high school winner Preethi K. (Rochester, below right), who determined the most effective starch-based bioplastic that can be used as an alternative to conventional petroleum-based plastics.



Its Food Safety Award went to middle school winner Elizabeth D. (Champlin, not pictured) for "What's hiding in your fast food ice?" and high school winners Morgan T. & Jillian H. (Sandstone, below) for "Does time affect bacterial growth in opened and disturbed baby food?"





Find more images in a slideshow about the Faces of Minnesota State Science & Engineering Fair at: <http://mnmas.org/state-science-engineering-fair/faces-minnesotas-state-science-engineering-fair>

# Science Salon: Virtual Reality



About 50 people gathered at the University of Minnesota Walter Library to hear about the latest virtual reality (VR) research and applications from Computer Science and Engineering professors Vickie Interrante and Dan Keefe. The event started off with demos of VR equipment by Vickie and her students. Attendees were able to put on VR goggles to see how real-life surroundings are altered using VR equipment and also how these goggles can completely change your surroundings when you put them on.

During her talk, Vickie discussed use of VR in architecture to have a first-person experience of a building design. Since it is common for people to underestimate distances with regards to experience of the design in virtual environments, Vickie conducted research on how to change visual parameters of building designs to minimize such under-estimation. She found that use of avatars and images of people and other familiar objects in the virtual environment helps reduce distance under-estimation and brings the design to life.

Dan then shared about his work on creating magical human-computer interfaces to “use computers to do things that we can not do in the real world and still have the human element in it.” Dan and his students collaborate with artists, scientists, doctors and engineers to improve designs by being able to experience a three-dimensional model of a metal sculpture, practice heart surgery virtually and simulate acoustics of talking to 600 versus 6,000 people.

Another area of his research is how to query big data sets by not just looking at graphs of data but having the ability to query part of the set and see it in ways never visualized before.

The night wrapped up with demos of VR equipment in Dan’s lab. Attendees got to make three-dimensional virtual drawings, navigate human body parts as if in surgery and gain other hands-on experiences of research happening in his lab.



*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.*

## Visit the website to read articles from past Science Salons

[Dr. Anu Ramaswami, Reinventing Cities](#)

[EcoLab, How to Attack Biofilms](#)

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

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

[Dr. Marla Spivak, Bee Lab](#)

## Next Science Salon: Fall 2017

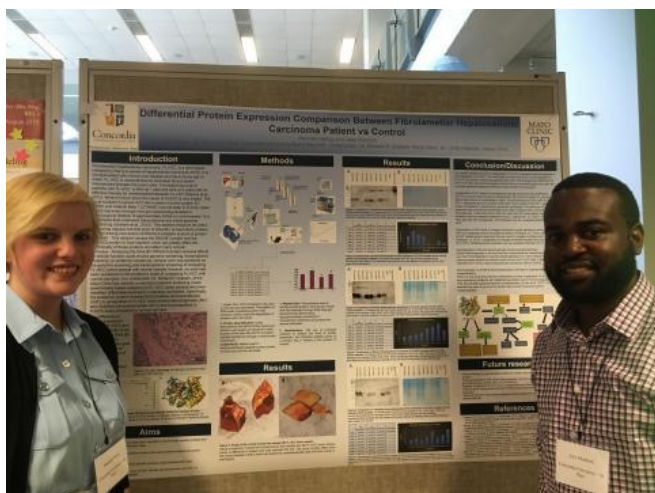
Dr. James Collins, U of M Veterinary Diagnostic Laboratory, Tuesday, October 24. Stay tuned at MNMAS.org for details and registration.



# Winchell Undergraduate Research Symposium

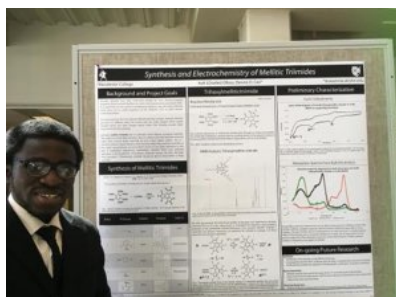
There were 127 participants in the 2017 Winchell Undergraduate Research Symposium, hosted by the Academy at Macalester College in St. Paul, including 85 student presenters. They came from 19 different schools and 30 departments scattered around Minnesota, with a few from Iowa and Wisconsin.

[Check out the projects on display here.](#)

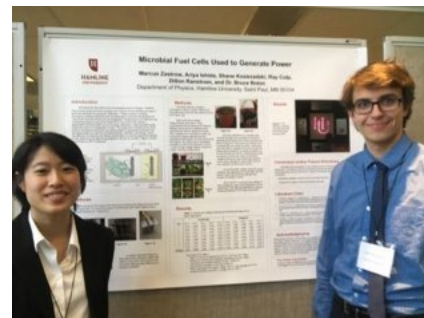


A Mayo Clinic doctor had samples but not enough time to make use of them for a theory. Students Joey Murdock and Hannah Hartog at Concordia University's Department of Biology were looking for a research project. Advisor Mary Ann Yang was the middle person and mentor who put the team together. The question explored: Can proteomic screening on FC-HCC tumor samples reliably be identified through differential expression of proteins utilizing western blot analysis?

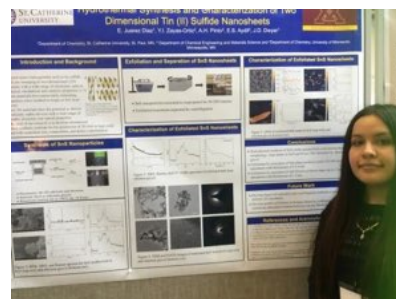
Can mellitic triimdes be stacked and assembled to form supramolecular structures? That's what Kofi Ofosu (with advisor Dennis Cao) of Macalester College's Department of Chemistry sought to find out.



Can a low-cost microbial fuel cell be constructed using a strip of copper, aluminum, a potted plant and simple electronics? The team of Ariya Ishida and Shane Kosieradzki (advisor Bruce Bolon) of Hamline University's Physics Department generated power using plant waste as nutrients for anaerobic bacterial respiration within the soil.



Elizabeth Juarez Diaz (advisor John Dwyer) of St. Catherine University's Chemistry Department reported on efforts to synthesize nanosheets of tin monosulfide via a green hydrothermal synthesis, and strategies to controllably produce single- or few-layer nanosheets with large lateral dimensions.



## Thanks to our Winchell Symposium sponsors!

Donation in memory of former MAS Executive Director M.I. (Buzz) Harrigan, American Chemical Society, Bethel University Natural and Behavioral Sciences, Carleton College Dept. of Chemistry, College of Saint Benedict and Saint John's University Dept. of Chemistry, Hamline University Chemistry Dept., Hardenbergh Foundation, Macalester College Dept. of Biology, Macalester College Chemistry Dept., Minnesota State University – Mankato Dept. of Biological Sciences, St. Catherine University School of Humanities, Arts and Sciences, St. Olaf College Dept. of Economics, St. Olaf College Natural Sciences and Math, Tribeta, University of Minnesota – Duluth College of Pharmacy, University of Minnesota – Twin Cities College of Biological Sciences Dept. of Plant and Microbial Biology, University of Minnesota – Twin Cities College of Science and Engineering Dept. of Chemistry, University of Minnesota College of Science and Engineering – Dr. Ronald Poling, Dept. of Physics and Astronomy, University of St. Thomas Biology Dept.

# Minnesota Academy of Science Journal of Student Research

In keeping with our long-standing tradition of supporting student research and STEM development, the following papers have recently been published in our online, peer-reviewed journal of pre-collegiate student research. Click on the links to read the articles.

[Gleekel, A., and Song, H. \*\*Preparing for the Future: Analyzing the Long-Term Effects of Traumatic Brain Injury.\*\* Minnesota Academy of Science Journal of Student Research, 2017; 5\(2017\): 1-11.](#)

**Abstract:** Traumatic brain injury (TBI) affects up to 1.7 million Americans annually. At least 2% of patients who suffer from a TBI will live with long-term disability. However, there is little known of the long-term effects of TBIs and their causes. It is essential that research be performed to better characterize the decades long impact of these injuries so that patients and doctors can prepare for the future. To assess the long-term effects, five tests were used: the Glasgow Coma Scale (GCS), Glasgow Recovery Scale (GRS), Telephone Interview for Cognitive Status - Modified (TICS-M), eye tracking, and blood biomarkers.

In our study, the GCS scale, eye tracking, and hyperbaric oxygen could be reestablished, while the TICS-M was found to be invalid. It is also the first long-term study of its caliber and magnitude that has been conducted in this area.

[Scott M., and Maxwell, C. \*\*Promoters of Melanoma Metastasis Cancer and Tick-borne Bacteria: Identification of Bartonella henselae and Borrelia burgdorferi as Possible.\*\* Minnesota Academy of Science Journal of Student Research, 2017; 5\(2017\): 12-18.](#)

Melanoma is one of the deadliest cancers in the world, killing over 10,000 Americans every year. However, in melanoma's earliest stages, nearly all patients can be

successfully treated. Because of this discrepancy, the purpose of this study was to look at possible environmental factors that induce melanoma metastasis in its most crucial, early stages.

This study suggests that the relationship between Bartonella henselae and vasculature in melanoma should be further investigated in determining what function tick-borne bacteria have in influencing melanoma metastasis.

[Berman, E., and Vijayakar, R. \*\*Hello Stranger: A Big Data Approach to Online Dating.\*\* Minnesota Academy of Science Journal of Student Research, 2017; 5\(2017\): 19-26.](#)

Almost half of all single adults in the United States have used online dating, a still-growing field. Anonymity on dating sites is often marketed as a premium feature, but its effectiveness in different demographic groups has not been shown by published research. Therefore, our first goal was to obtain permission for a popular online dating site to access a dataset containing demographics and interactions of 100,000 de-identified users. We then ran "Big Data" analytics on the dataset to compare the quality and quantity of online-dating matches when a user uses a dating site anonymously or non-anonymously.

[Bailey, C. \*\*Fungal Growth on Medical Devices: Is Candida Albicans Capable of Forming Biofilm on a Polystyrene Surface?\*\* Minnesota Academy of Science Journal of Student Research, 2017; 5\(2017\): 26-30.](#)

Candida albicans is a fungus that normally inhabits human microbiota without causing symptoms. When the fungus overgrows, the human host develops local yeast infections or other serious diseases like invasive candidiasis. The purpose of this study was to investigate if C. albicans could develop biofilm on the clinically used plastic, polystyrene. The data supported the hypothesis; C. albicans cells adhered and developed biofilm on the plastic surface. Biofilms only developed for 24 hours, but persisted on polystyrene until 118 hours. It may be concluded that in clinical settings, C. albicans can produce persistent biofilms on polystyrene-made clinical devices.

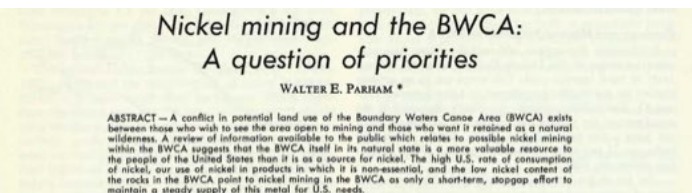
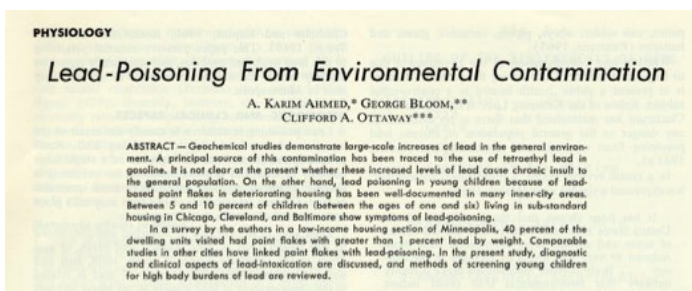
# Journal of the Minnesota Academy of Science

Digitized Minnesota Academy of Science Journal Archives, 1971-1980, are now online! Thanks to Bruce Mulder's ATAIN team at Independent School District 287 for helping to digitize many years of our historical print journal archives. [A few more years are in process!]

[Find the archives here.](#)

## Sample titles

- Looking at wolves as scientific subjects (John McClung), 1970, Volume 37, No. 1
- Toward an energy policy (Dean Abrahamson), 1972, Volume 38, No. 1
- Nickel mining and the BWCA: A question of priorities (Walter Parham), 1972, Volume 38, No. 2 & 3
- Moral and ethical dilemmas of science in the 1970s (Yvonne Condell), 1973, Volume 39, No. 1
- Observation and prediction of soil water under different types of vegetation (D.V. Wroblewski and D.F. Grigal), 1975, Vol. 41, No. 1
- Observation of physiological changes during transcendental meditation (Ron Boyer and Edwin Nordheim), 1976, Vol. 42, No. 1
- Rapeseed Cultivation and Usage (Sister M.D. Ahles), 1976, Vol. 42, No. 2
- Minneapolis/St. Paul mean temperatures and standard deviations, 1820-1974, from 1977 journal, Volume 43, No. 1
- Presettlement Vegetation of the Nemadji River Basin (R.G. Koch, L.A. Kapustka, L.M. Koch), 1977, Vol. 43, No. 2
- Possible Pictorial Messages for Communication with Extraterrestrial Intelligence (D. Vakoch), 1978, Vol. 44, No. 1
- Contemporary Peace Research: From Utopia to Feasibility (W.O. Peterfi), 1978, Vol. 44, No. 2
- Space-time in the creative process (Kathleen Cooper), 1978, Vol. 44, No. 3



## Some moral and ethical dilemmas of science in the 1970's

YVONNE C. CONDELL\*

**ABSTRACT**— Some critics of the scientific community—scientists and non-scientists—believe that scientists should become more socially responsible, that science should be tolerated only as long as its results are socially beneficial, and that science must be constitutionalized and controlled if it is not to destroy civilization.

The Scientific community has fallen upon hard times. Hard times being defined in terms of loss of funds for research, loss of prestige and influence, loss of goodwill, and loss of integrity among certain segments of the citizenry.

sin witnessed the bombing of another research laboratory. A bomb caused minor damage to an enzyme research institute. Students there complained that the institute was doing research on genetic control.

*The first journal article, available in Programs menu as The Journal of MAS, archives sidebar, was published in 1873.*

### PRESIDENT'S ADDRESS.

#### DID LIFE ORIGINATE BY LAW?

GENTLEMEN, COLLEAGUES: I thank you for conferring on me the honor of the first presiding office of the Minnesota Academy of Natural Sciences. Any one of you is better qualified for the place than myself. It is, therefore, an unaccountable enigma to me to assign a reason for your choice. But, gentlemen, I shall pass the enigma "and a' that" and proceed at once to take advantage of this time to discuss briefly the question:

#### DID LIFE ORIGINATE BY LAW?

I first contemplated a brief review of the various subjects that may come within the province of this Association. But I shall not follow this ancient precedent. I shall proceed, in a manner suited to the limitations of my knowledge, to give a sketch of what has been done and is doing in this one province of Biology—a subject with which my occupation has rendered me more familiar, perhaps, than with many other questions that may come up for our consideration.

## 2017 High School STEM Communicator Award Winners

Through the generous funding of St. Jude Medical Foundation, the Minnesota Academy of Science identifies and encourages 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. Winners of the 2017 High School STEM Communicator Awards were determined by a panel of judges.

### Top 10

- "From Takeout Box to Organic Laser: Transforming the Industry by Engineering a Transparent, Flexible Laser," Sung Wan H. and Jiaheng (Julien) H., Breck.
- "Cancer and Tick-borne Bacteria: Identification of Bartonella and Borrelia as Possible Promoters of Melanoma Metastasis," Cole M. and Maggie S., Breck.
- "Fungal growth on medical devices: is Candida albicans capable of forming biofilm on a polystyrene surface?," Cheyenne B., Park Christian, Moorhead.
- "Window to the brain: Using retinal biomarkers to predict progression of Alzheimer's and Parkinson's disease," Archana M., Breck.
- "Preparing for the Future: Analyzing the Long-Term Effects of Traumatic Brain Injury," Addison G. and Hyunsoo Brian S., Breck.
- "Quack Quack, What's in my Water? What effect does the concentration of Salicylic acid (aspirin) have on the growth of Lemna minor (duckweed) and Lumbriculus variegatus reproduction rate while under the stress of glyphosate (roundup)?," Emma W., Cloquet.
- "Inhibiting prostate cancer: The effects of the signaling receptor, RHAMM, on prostate carcinoma growth and motility," Karthik P. and Jyotirmya K., Breck.
- "Hello, Stranger: A Big Data Approach to Online Dating," Raunak V. and Elena B., Breck.
- "Classification of IMP-1  $\beta$ -Lactamase Inhibition and Inhibition Mechanisms to Combat Antibiotic Resistance," Isabella J. and Melinda S., Breck.
- "Lifting with ease: Engineering an intuitive lifting control system," Samuel A. and Siyuan M., Breck.

### Honorable Mention

- Maya C. and Samuel R. (Breck)
- Claire T. (Cloquet)
- Serena L. and Elise A. (Orono)
- Seyade T. and Cassidy Y. (Breck)
- Morgan S. and Jordin W. (Cloquet)
- Alma J. (Clinton Graceville Beardsley)
- Abigail S. (Cloquet)
- Genevieve W. (Breck)
- Harini K. (Minnetonka)
- Grant P. and James W. (Breck)

[Find details at MNMas.org.](http://MNMas.org)

### STEM Professionals: 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, including mathematics and computer science.

If you'd like to be part of this free promotional opportunity, please contact our Executive Director at [celiawaldock@gmail.com](mailto:celiawaldock@gmail.com).

Thanks to high school coach Cynthia Welsh, we've been able to feature profiles of two students: Logan Pallin, in the [Spring 2016 newsletter](#) and [on the website](#), and Bethany Rosemore in the [Winter 2017 issue](#) and [on the website](#).

# 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.

You know how important science is to our state, our country and our future. Since 1873, our donors and members have made it possible for the Minnesota Academy of Science to promote scientific education, exploration, and networking, as well as recognize the remarkable contributions of Minnesota scientists of all ages. Our programs mobilize a community of educators, science professionals and businesses to provide opportunities through which scientists can excel, gain recognition and network with other scientists.

There are many opportunities to help our small nonprofit organization.

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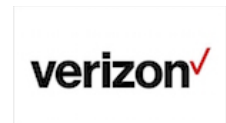
Sponsorship options for our program year range from \$1,000 to \$100,000. Sponsorship donations contribute to offsetting the costs for Minnesota State Science & Engineering Fair, Science Bowl, Winchell Undergraduate Research Symposium, and so much more — all of which are underfunded.

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

Contacts:

Celia Waldock, Executive Director,  
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Lisa Day, our Fundraising & Outreach Coordinator,  
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School of Engineering



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## OSilas Foundation



# SAVE THE DATES

The 2018 programs will need your help as volunteers, judges and sponsors. Please save these dates!

## **24<sup>th</sup> Annual Science Bowl, High School**

Saturday, January 20, 2018

Macalester College, St. Paul

*Snow date: Sun., Jan. 21, 2018*

## **11<sup>th</sup> Annual Science Bowl, Middle School**

Saturday in February TBD

University of St. Thomas, St. Paul

*Snow date: Sunday in February TBD*

## **49<sup>th</sup> Annual Junior Science & Humanities Symposium**

Saturday, March 24, 2018

University of Northwestern, St. Paul

## **81<sup>st</sup> Annual MN State Science & Engineering Fair**

Sunday - Tuesday, April 8 - 10, 2018

Earle Brown Center, Brooklyn Center

## **6<sup>th</sup> Annual High School STEM Communicator Awards**

April Submission deadlines

*Awards in June*

## **85<sup>th</sup> Annual Meeting/31<sup>st</sup> Winchell Undergraduate Research Symposium**

Saturday, April 21, 2018

University of St. Thomas, St. Paul

## **Science Salon**

Dr. James Collins, U of M Veterinary Diagnostic

Laboratory, Tuesday, October 24, plus two others TBD

## **Minnesota Technical Symposium**

Tuesday, March 6, 2018

## National Competition Dates

### **ISEF**

May 13-18, 2018, Pittsburgh, PA

### **National JSHS**

Held in April, TBD

### **National Science Bowl**

April 26 – 30, 2018, Washington, D.C.

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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- Mikki Morrissette, Communications Specialist
- Photo credits: Thanks to volunteer Dave Newell for some of the images used in this issue

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