



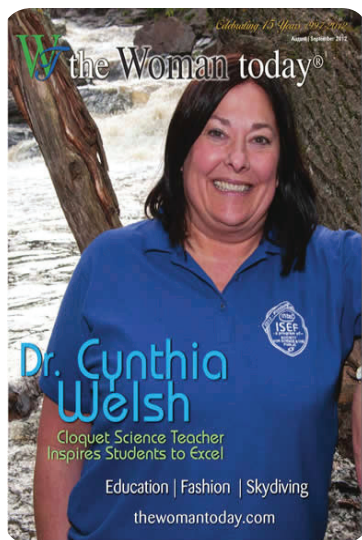
# Minnesota Academy of Science

Promoting Excellence in Science Since 1873

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**Minnesota's Cover Girl: Dr. Cynthia Welsh**, was featured in the September issue of *The Woman Today*, an online magazine from Duluth-Superior. The article highlights Dr. Welsh's work with her biology students, especially Native Americans. See the article on page 8.

## New HS Science Communicator Award Announced for Spring 2013

In recent years, the gap in understanding between scientists and the public has become evident in highly polarized controversies such as climate change, stem cell research, and animal experimentation. There is a sense in our society that increasing the quality of discourse on these issues requires more than just increasing science skills among the general public; we also need to improve communication skills within the scientific community. Several organizations have started to address this need, including the American Association for the Advancement of Science with their Center for Public Engagement with Science and Technology.

For 75 years, the Minnesota Academy of Science (the Academy) has managed the State Science & Engineering Fair, providing opportunities that enable middle and high school students to develop their understanding of science. As part of the Fair, these students have the chance to prepare and give oral presentations through the Junior Science and Humanities Symposium. We did not have a comparable program focused on the development of written communication skills among young scientists and mathematicians.

Through the generous funding of **St. Jude Medical Foundation**, the Minnesota Academy of Science announces the **Minnesota High School Scientist Communicator Awards**. The goal of these awards is to identify and encourage high school students showing 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.

This new initiative will operate as a statewide competition, managed by the Minnesota Academy of Science. The selection process will identify students having a substantive base of scientific knowledge exceeding usual high school science requirements, a record of effective use of scientific methods to advance research in a chosen area of science, demonstrated skills of clear and concise data analysis,

and critical thinking to synthesize information and argue the merits of conclusions, and a record of personal growth as well as recognition of how their research impacts others.

A complete listing of Communicator Award criteria will be available on the Academy's website shortly. Applicants should have a substantive knowledge of science, which includes class work in biology or environmental science, chemistry, and at least concurrent enrollment in physics. Each applicant is expected to effectively use scientific methods to advance research in a chosen area of science. They should also be able to show a context for their research and identify potential outcomes of that research. Additionally, applicants should have presented their research at their school or in another forum.

Candidates will need to submit a paper that explores a current issue relating to science, technology and society, a transcript, and an assessment by the student's educational advisor(s). The Academy will recruit scientists and educators of appropriate expertise and stature to evaluate the applicants in a manner consistent with the other competitions we currently coordinate. The top 10% of applicants will be recognized with a cash award and a medallion. The original research papers submitted by the winners will be published in the **Student Journal of the Minnesota Academy of Science**. Winners will be announced at the State Science and Engineering Fair in April, 2013.

An Intent to Apply deadline is December 1, 2012. Details will be available shortly at the MAS website. Stay tuned!



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## A Message From The President

This year we celebrated the 75th Science and Engineering Fair and the Academy's 139th year. The mission statement of the Minnesota Academy of Science is to "Recognize, promote and influence excellence in science." It is what the Academy has always been about: serving science and those pursuing knowledge through science. We have a broad strategic plan full of great new and old ideas designed to serve our scientific community, of which you are an important part. You are our future.

The Academy has revitalized the publication *The Journal of the Minnesota Academy of Science*, and you are challenged to be a part of it. Through generous underwriting by St. Jude Medical Foundation, the Minnesota Academy of Science announces the **Minnesota High School Scientist Communicator Awards**. The goal of these awards is to identify and encourage high school students showing 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 first HS Science Communicator Awards will be presented at the 2013 MSSEF in April, and top papers will be published in the Journal.

Read the announcement on page one, and watch the Academy's website to see the details and deadlines for the HS Scientist Communicator Awards. They will be posted very soon.

I wish you a terrific start to the year, and hope to meet you at one of the Academy's activities and/or competitions during the Academic Year 2012-13.

Jim Fairman, President  
Minnesota Academy of Science



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## A Message From the Executive Director



Welcome to our new website! We are so excited to bring you this new look. We have worked diligently to transfer all the information, simplify it and make our site more user-friendly. We hope you will find the site easy to use and pleasant to view.

In addition, we have purchased a new data management system that we are diligently working with to get it up and running. We believe our new data management system will streamline our systems for registration, competition scoring and communications. The capacity of our new MemberSuite system will allow us to grow and add functions as the Academy grows. The features include an application programming interface (API) that lets us add new features and functionality as we need it; customize via integration links that give us the ability to add new functionalities as we grow which will display within the system, customization, dues billing, and a customizable, open-source self-service portal for our members/participants to update a profile, purchase memberships, make donations or various other tasks. We hope to take advantage of many of these applications in future years.

Get in, use our new website and give us some feedback! We want to hear from you.

A handwritten signature in dark ink, appearing to read 'Celia Waldock'.

Celia Waldock

### MAS: Supporting Minnesota Scientists at Every Stage



*Through educational programs  
and professional development opportunities  
-from middle school through professional life-  
Minnesota Academy of Science supports Minnesota's scientists  
at every stage of their development, providing  
a vital forum for scientific inquiry and discussion that  
reaches thousands of Minnesota scientists annually.*

## Rena Weis: I-SWEEP

### International Sustainable World Energy Engineering and Environment Project Olympiad



Best friends Katie Morris, left, and Rena Weis show their awards earned at the International Sustainable World Energy, Engineering, and Environment Project Olympiad (ISWEEEP) in Houston Texas this spring. Congratulations!



I-SWEEPers visit NASA. Left to right: Ellen Roufs (Minnesota), Nina Difrancio (New York), Katie Morris (Minnesota), Rena Weis (Minnesota), Julia Abelsky (Georgia), Barry McNeely (Louisiana)

I was awarded the trip to the International Sustainable World Energy, Engineering, and Environment Project Olympiad (I-SWEEEP) 2012 from the Minnesota State Science fair, after being rejected by the online application. Hearing this announcement was one of the happiest moments of my life, because I would be able to travel to my second international science competition with my best friend, Katie Morris.

We were both excited to go to Houston, Texas and present our research. I began making friends as soon as I arrived at the Minneapolis St Paul Airport. I-SWEEEP overall was an amazing experience and highlights included field trips to NASA Space Center and the Houston Museum of Natural Sciences. We stayed in the beautiful Hilton Americas hotel with our projects in the George R. Brown Convention Center just across the street.

My favorite part of the experience was by far having the opportunity to make friends from across the United States and the world. I am still in contact with fellow scientists from multiple states and countries such as Slovakia, Turkey, and Albania. I was honored to receive a silver medal at the Olympiad for my project titled Impacts of Various Biochar and Fertilizer Rates on Zea Mays, and will never forget the life changing experience of I-SWEEEP 2012.

- Rena Weis

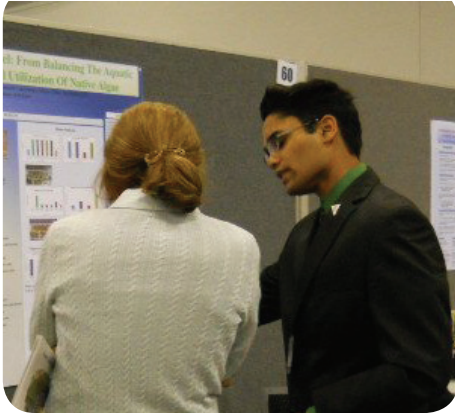


### Goodbye to Joe

Joe Duca has left the building! Our wonderful Database Manager and Webmaster who has been with the Academy for close to 12 years has moved to Indianapolis and accepted a position with an on-line event management firm. Many of you who know Joe are aware of the terrific support he gave to make our events a great success. From up-front communications and emails to behind-the-scenes scoring management, Joe did it all. No matter how pressed or stressed Joe was, he never lost his kindness or humor. He added creativity and fun to all of our activities and events. Working with him was a pure pleasure. Joe, we will miss you!

# 2011 and 2012: AJAS, I-SWEEEP, and SJWP

## Rahul Mukherjee's Timeless Scientific Expedition: Coast to Coast



“I have always been interested in the environment ever since my family and I have been on trips to various national parks during summer vacations since I was a young boy. However, at the time, I never realized the importance of protecting the world's most treasured natural jewels, like our Great Lakes. This is the time in which I started science fairs since the 4th grade and I have always been involved in Environmental Science Projects, trying to understand the environment and its mysterious ways.”

I truly began to understand the essence of the environment when I developed my first research project on this journey in 2011: **Macroalgae As An Alternative Source of Biodiesel: From Balancing the Aquatic Ecosystem of The Great Lakes To The Industrial Utilization of Native Algae**. During the summer of 2010, my family and I went on an expedition to all of the Great Lakes and while I collected water and algae samples, I was confronted with the Great Lakes' most serious and daunting problem: the excessive blooming of native *Cladophora* algae and the existence of the highly invasive *Dreissena* species.

My research project in 2011 was based on timely removal of accumulated algae to produce Biodiesel. However, I soon realized that this was a temporary solution and decided to expand the topic to the invasive Zebra and Quagga mussels in 2012 in the project titled: **Restoration of The Great Lakes: A Genetic Study On Zebra and Quagga Mussels and The Mystery Behind Its Calcium (2+) Based Invasion**.

To share my findings and to articulate my journey, I entered the Rochester Regional Fair and State Science Fairs. At the 74th Annual Minnesota State Fair, my project and paper presentations were greatly enhanced as I was able to present to a new panel of judges with new improvements and also as during the final round at JSHS, I had to bring the presentation time down from 12 to 8 minutes, a feat that surprised me.

During March of 2011, my most notable accomplishment was receiving the **AJAS American Junior Academy of Science Award** for the research paper to go on an all expense paid trip to the National Conference in Vancouver, BC, Canada, during February 15-19th, 2012 and also qualifying as an individual applicant Finalist in the Houston **2011 I-SWEEEP Convention** in which I won a Gold Medal in the Energy category and received \$1000. During May 4-9th I-SWEEEP, I had the opportunity to share my research with presenters from all over the world, and actively participate in their numerous field activities.

In 2012, I became an **I-SWEEEP** Finalist directly from the Region and won another Gold Medal in the Environment category and received another \$1000 in Houston during May 2-7th convention.

During my time at AJAS, I had an amazing experience, sharing my research with many professors, teachers, delegates. I was chaperoned by Lise Weegman, who made the trip vivid and lively. However, before I went, I was faced with a time conflict as attending the conference in Vancouver was during the same week of our regional fair. However, thanks to the State Fair, Roger Larsen (Region), and the AJAS committee, I was able to Skype the 2012 project to a panel of 40 judges in Rochester while presenting the 2011 project in Vancouver. That's two time zones and two projects! Now you can understand the “timeless” essence to this journey... after this experience, I felt I had plunged into the ultimate reaches that science fair can bring!

After AJAS and I-SWEEEP, I was graced with the opportunity to go to the **National Stockholm Junior Water Prize**, an all expense paid trip to Boston, MA during June 14-16th, 2012 as the Minnesota delegate after winning at both region and state. It was a most delightful experience with East Coast traditions. The competition, although small (48 delegates), was intense as each state sent the best water-related research.

I am proud to have been selected as a **Minnesota Scholar of Distinction in Science in 2012** and to be able to represent Minnesota at these science competitions. I will always apprise the opportunities that the Minnesota Academy of Science has provided as I continue research at The Johns Hopkins University.

## Duligur Ibeling Reflects on Science Bowl



I started participating in Science Bowl because I've always been interested in scientific subjects. I also enjoy contests, and I had heard from friends that the Bowl's format makes it unique among academic competitions. After our school's first meeting, I discovered I liked the game and I began to practice more with our team. Then, as I heard more and more questions and developed more of a "feel" for when to buzz, I got better at the contest and began to enjoy it more.

Science Bowl supplemented my school's science curriculum. Often, what's learned in classroom science classes is not sufficient for the harder Bowl questions, so I had to devote extra time to study scientific subjects independently to a greater depth. Through studying for Science Bowl, I learned many new terms that would appear arcane to my classmates, who'd not yet been introduced to them: I knew what an alkene was far before formally studying any organic chemistry, for example. Thus, Science Bowl stimulated my academic interest in science.

Besides encouraging me to study science subjects in more depth, Science Bowl helped develop my teamwork skills. It was essential for our team to know each player's strengths and weaknesses. We determined these both by self-assessment and a long, empirical method involving playing through many questions on different topics. If a given player heard a question whose topic he knew he was historically weak at, he would wait and let a team member better at that topic buzz in, rather than rashly buzzing early with a meager chance at personal glory but an ultimate statistical loss for the team. Since some of these team strategies turned out to be counterintuitive and it's often difficult to assess one's own abilities accurately, our weekly practices helped us learn and develop these habits. Science Bowl thus helped us know and respect each other more as teammates, and I think these teamwork skills are well applicable to other situations, and probably any that involve working in groups.

At the 2011 National Science Bowl tournament (where we placed 9th), I noticed that a middle school tournament was held in parallel with the high school tournament. My brother Daniel was in middle school, so I thought the Bowl would be a fun opportunity for him, given how much I had enjoyed Science Bowl. I told him about the competition and that he should get some of his classmates together for a middle school team. I then downloaded some sample questions from online, and read these to the middle school students to pique their interest. The middle schoolers seemed to enjoy it, so we began to meet weekly for practice.

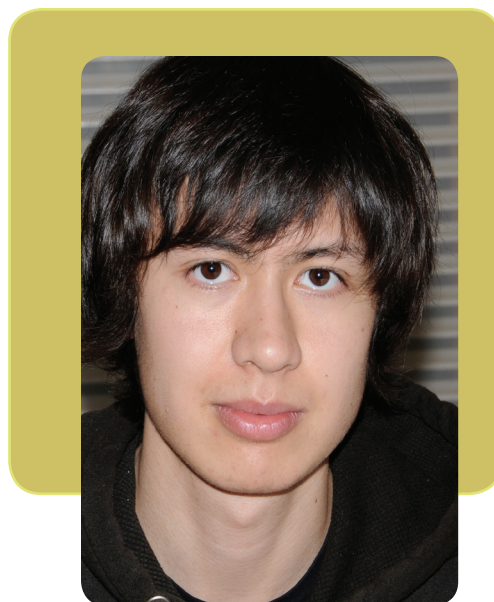
Being a Science Bowl coach was a totally different experience from just being a Science Bowl player. I had to manage five middle schoolers through two-hour practices (this was quite a feat), and I had to teach them what I had learned over almost three years of practice within a few months. I definitely enjoyed the experience, however, and it shows that Science Bowl has also improved my leadership skills. I was captain of my high school team this last year, but this experience wasn't really comparable since I had been playing with many of the same people for a long time and we were all very practiced. As I coached the middle schoolers, I had to think always of the team, and how to accommodate different players and buzzing styles, how to present the academic material in an interesting and understandable way, and, perhaps most of all, how to teach the team to think as a team and respect each other as teammates. The best teams will have both "breadth" and "depth": they will know about many fields and subjects, but

they will also need to know substantial and sophisticated content for these fields. Therefore, a team's optimal strategy is to allocate the necessary topics across teammates, thus taking care of "breadth," then to have each individual player manage the "depth" by reading on the topics involved. If a team wants to implement this strategy, it's essential that they cooperate carefully. They need to think of each other as teammates in order to solve the problem of "breadth" and "depth." As a coach, I facilitated this. I coached the team mostly independently, with some additional support from parents of the students involved. Thus, I believe Science Bowl is an excellent experience not only for the players, but also for the coaches, who hone their leadership skills through the effort they put in to develop their teams to full potential.

If Science Bowl loses funding, its participants will have lost a tremendous educational experience. For high schoolers and perhaps even more so for middle schoolers, Science Bowl encourages studying subjects to a depth and sophistication that they wouldn't otherwise get through their regular school courses. It furthermore forces students to think and get along cooperatively, an essential skill in any environment. The fact that it combines these with the advantage of practical scientific education is great. Science Bowl also helps coaches develop their leadership skills through strategizing with and teaching their teams. This double benefit (for students and coaches alike) makes it unique among academic competitions, and I really believe it's a great program that should continue under the auspices of friendly sponsors. Science Bowl is additionally clearly helping to train our nation's future scientists, and for this cause alone it should continue to be supported.

I'm a senior at Wayzata High School, and I will be attending Harvard University this fall, where I will most likely concentrate in some combination of computer science and molecular biology. This plan is tentative, however, and I'm also interested in other science subjects, given what I have studied for my classes and Science Bowl preparation. I hope to become a scientific researcher someday.

- Duligur Ibeling, Wayzata High School Class of 2012



# Science Bowl for High School and Middle School Students



Lisa Warbritton, Science Bowl Manager

A total of **267 students** in grades 6-12 participated in the **2012 MN State Regional Science Bowls**. Teams from schools state-wide participated in the competition to crown the Minnesota winners who qualified to participate in the U.S. Department of Energy's National Science Bowl. The science bowls test teams of students utilizing a fast-paced question and answer format similar to the TV game show, *Jeopardy*. The students were quizzed on science disciplines including biology, chemistry, earth science, physics and astronomy, as well as math.

Teamwork, camaraderie and educational excellence in the sciences are only some of the by-products of the Science Bowl program of the Minnesota Academy of Science. Other goals include enhancing the students' interest in science, developing leadership skills, providing opportunities for interaction between students and scientists, promoting ethical standards of conduct and influencing students' decisions to pursue a career in science.

The Minnesota State Regional Science Bowls were sponsored by contributions from Ecolab, General Mills, Great River Energy, Macalester College, Pentair, and the University of St. Thomas School of Engineering.

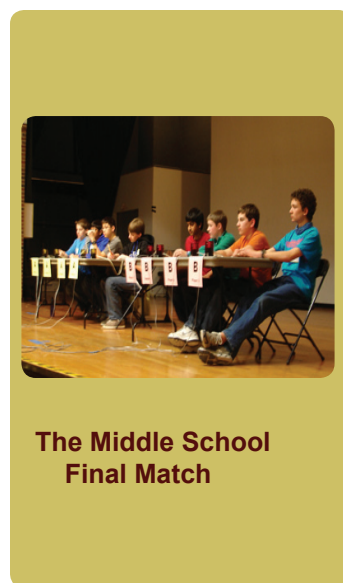
## Award Recipients:

### High School

Award Presented	Recipient
First Place	St. Paul Central High School
Second Place	Stillwater Area High School
Third Place	Roseville Area High School
Civility Award	Woodbury High School

### Middle School

Award Presented	Recipient
First Place	Minnetonka Middle School West
Second Place	Math & Science Academy, Woodbury
Third Place	Oak Land Junior High, Stillwater
Civility Award	Minnetonka Middle School West



The Middle School Final Match

### 2012 Combined Statistics Summary

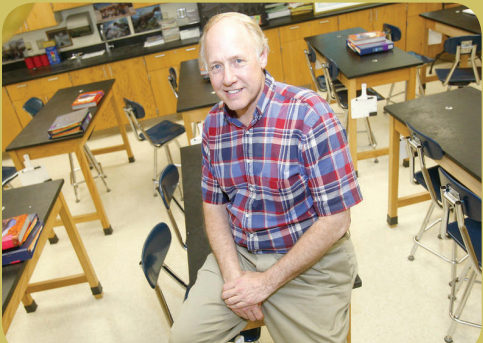
	Teams	Students	Coaches	Volunteers	Volunteer Hours
High School	32	155	23	60	378
Middle School	24	112	19	58	366
Total	56	267	42	118	744

# After 20 Years, Roger Larsen Retiring as Rochester Science Fair Director

**“No matter what happens to science fair, my students will be doing science fair,” Larsen said.**

When Roger Larsen took over as Rochester’s science fair director two decades ago, the event was smaller and produced, at best, a handful of ribbon-winners at state each year.

Eighteen years later, Rochester students now compete on a global stage against the world’s best science students. Community sponsorships for the science fair have soared. Science projects grew in complexity and sophistication, occasionally bordering on the science fictional. And cash awards for winners are such that some students now pay income taxes on their winnings. A driving force behind those changes has been Larsen, a Kellogg Middle School teacher who championed a philosophy that the best ideas are born in the crucible of competition.



“The competition is so much better,” Larsen said. “When you create competition, you create quality. If you want to win and beat somebody else, you’re going to come up with a better idea.” Now, 18 years later, both Larsen and his assistant director, Karen Sabatke, are stepping down, creating a void that some fear will be difficult, if not impossible, to fill. Some worry that the event, now considered one [of the state’s larger] science fairs, is heading toward a future of diminishment and downsizing. “I can’t even imagine the science fair next year without them,” said Janet Topazian, a parent who serves on the committee that helps organize the event.

The school district’s director of curriculum, Jean Lubke, said through a spokesperson that the district is working on a plan to hire a new director, but no details were offered. Larsen, 60, said it was time to step down. He had been weighing the decision for several years, but what tipped the scales was the need to put his own family first. A father of six children and grandfather of seven, Larsen said a turning point came when his oldest son was diagnosed with a brain tumor last summer. “It made me stop and think about life. Do I want to spend my last hours with all these kids and not my own? Because when I’m gone, they’re the ones who are going to miss me,” Larsen said.

Science fair was a more localized, in-school event before Larsen took over. Back then, the fair migrated from middle school to middle school every two years like a hot potato. Larsen had been at Kellogg only a short while when he agreed to become its director when it was Kellogg’s turn. Two years later, Larsen decided he couldn’t let go. “I think we can do this better,” he recalled saying.

His enthusiasm for science fair grew as he watched students grapple and develop solutions to real-world problems. Not only that, but it forced students to articulate and defend ideas. Larsen made the fair a more enticing event for the community by booking renowned speakers like Temple Grandin, Nobel Laureate winners, even one of the Rocket Boys depicted in the movie, “October Sky.”

Larsen also believed that to get the best out of students, you need to give big prizes for big ideas. Back before Larsen became director, prizes were more like consolation prizes: a \$25 bond, a duffel bag, even a flashlight. He made sure that the prizes would excite a student’s competitive juices. This year, cash prizes topped out at \$500. But the richer the prize, the greater the need for financial backing. So he expanded the number of sponsorships from businesses and other organizations. Last year, the Rochester Regional Science Fair had 125 sponsorships, a more than tenfold jump from the 15 in the mid-1990s. Larsen said it wasn’t difficult because businesses and people, like Gene and Nancy Glorvigen, owners of Recreation Bowling Lanes, were only too eager to support the fair.

“It’s a science community,” Larsen said. “That’s why it’s important that we have the best science fair. We should have the most winners. We’re one of the top research centers in the world.” Larsen said he remains emotionally torn by his decision. You don’t understand what it is like to put on a fair of this magnitude until you actually do it. Usually, at this time, with this year’s science fair concluded, Larsen would be busy making preparations for next year’s event. “They haven’t started. The fair should already be starting for next year. I would already have a theme. There’s no theme,” he said. Larsen said there is one way in which he will continue to contribute to science fair. “No matter what happens to science fair, my students will be doing science fair,” Larsen said.

- Used by permission of Rochester Post Bulletin



# Cloquet Science Teacher Inspires to Excel: Dr. Cynthia Welsh

by Nancy Hoene, *The Woman Today* Duluth-Superior

Dr. Cynthia Welsh's classroom is a research incubator, a hot-bed of young scientists conducting studies with real-world significance and PhD-level interest. The end result is students well-versed in scientific methodology, articulate in presenting their findings, and ready to pursue their passion in college and beyond.

A science teacher in the Cloquet School District, Cynthia's own passion is aquatic science and microbiology – and, of course, her students. The 2011 Bill Boyle Educator of the Year was awarded to her for that reason, assisting students in the study of the water environment.

Formerly given only to college professors, this is the first time it was awarded to a middle/high school teacher, which is not surprising since her students regularly reap such prizes as research grants, internships, published papers, and poster presentations – achievements usually reserved for the masters and doctoral levels.

## The Competitive Drive

Setting the course for her work today was Cynthia's own doctoral thesis, "Making Science Education Meaningful for American Indian Students: The Effect of Science Fair Participation." She has a PhD in educational policy and administration from the University of Minnesota.

Though not Native American herself, Cynthia says the Cloquet District has a high percentage of American Indian students. She explains, "I look for the best way to educate all of my students; conducting individualized research projects is one tool that has met with success." She works hard to transform cookie-cutter activities into inquiry-based discovery learning opportunities.

Early in seventh grade, her students are required to complete a science project, though science fair participation is optional. She wants them to discover their passion for a particular area of research early on, so they don't waste time in college. Rather, they leave high school with clear direction, knowing what they want to pursue.

Cynthia's own late start in college may account for the way she instills strength of purpose in her students. Graduating with a teaching degree at age 35, she was a mother of three children and moved a lot due to her husband's job. Taking one class at a time, she completed her bachelors in 12 years. Then, she quickly went ahead with her masters, followed by her doctorate shortly thereafter.

## A Shared Agenda

Today, she spends more than 900 hours annually beyond her teaching job, planning the NE Minnesota Regional Science Fair and helping students with projects and competitions. Her husband Scott co-directs the fair and travels with her to state and international science fairs.

"He makes large wooden science boards for my students' displays, and the night before a competition he listens to projects

Madison and Dr. Welsh

as students prep for the big day," she notes. A Solway Township Supervisor who owns his

own business, Scott has his company sponsor a seventh grade award at the state science fair. The award honors the process that led their daughter Elizabeth along a path to her current graduate studies in Water Resources. She works under the supervision of Dr. Elizabeth Minor, a chemical limnologist at UMD's Large Lakes Observatory.

Cynthia and Scott's other two children, Mark and Katherine, also UMD graduates (Mark in criminology, and Katherine in speech pathology), are working in their respective fields. Mark is a case worker for Scott County Jail, and Katherine is a speech pathologist at Cloquet Community Hospital. Both have children whom Cynthia loves to spoil.

She insists on taking summers off to fish the Boundary Waters (a 33-inch walleye is her record), spend time with her siblings at Bass Lake in Grand Rapids, and garden. Canning pickles and salsa, Cynthia prepares gifts for those who help her out during the school year.

With a nod to the professors and research scientists at area colleges who mentor her students on science projects, Cynthia also acknowledges financial backing from the Rotary, businesses in the community, and her school. "We are fortunate to have strong support from the community," she says.

## Awards, Accolades, and Accomplishments

To her, it is worth seeing students undertake research with relevance to the scientific community, such as Courtney Jackson mapping areas of Venus's surface that have not previously been mapped (using Magellan radar data), or Bethany Rosemore deploying two different dyes in equal concentrations into area streams to examine photo-degradation rates.

Cynthia's students go guns blazing into competitions, racking up awards and achievements, like Angela Moynan receiving the 2012 Minnesota Stockholm Junior Waterprize. They also get accepted at top colleges like Stanford, Duke and Penn State.

"Cindy takes students around the country to present their work and build connections with scientists and engineers; she's a fantastic colleague and does incredible work with kids," says Matt Winbigler, a fellow science teacher and colleague.

After 17 years of teaching, perhaps Cynthia Welsh's opus will be the compendium of stories her students write, leaving their mark (and hers indirectly) on the world.

The Woman Today is the premier regional bimonthly women's publication in the Twin Ports area. With over 15 years in this marketplace, the magazine continues to have a broad-based appeal to women and their families year after year. Additional pictures may be seen at <http://thewomantoday.net/womantoday/august2012/index.html>



# Carolyn Jons Observes Broadcom Masters Program

**Carolyn Jons**, Central Middle School, Eden Prairie was an eighth grader last academic year. Her project was *The Effect of Oxygen Removal Treatments on the Mold Growth of Blueberries*.

"Last year at the regional and state science fairs I was invited to apply for **Broadcom Masters**. As I looked over the application, I thought it would be an awesome opportunity, but I doubted I would ever become a finalist. Still, I decided to complete the registration process because there was no chance I might win unless I applied. When I received a call and was told I was a finalist, I was shocked and delighted.



The Broadcom Masters competition was an amazing once in a lifetime experience. From the time I stepped off the airplane in Washington D.C until the time I said my last goodbyes, I was solidly booked with exciting things to do.

The competition itself consisted of a project presentation as well as a variety of thought provoking group challenges. During the project presentation I was judged by a variety of top level scientists. Many of their questions demanded that I think about my project in a new way. The team challenges were both exciting and difficult. A few of these challenges were purifying water, circuiting a house, creating a suspension bridge, and developing a presentation to address an important issue in a short amount of time. My personal favorite was a group challenge where we were challenged to create a Rube Goldberg machine that poured dog food.

Beyond this, we had many fun social activities as well. During these times we were able to better bond with the other Broadcom Masters. A few of the activities we did were a moonlight monument tour, visiting the science museum, visiting the aquarium, and at the end, a dance and ice cream party. At the end of the week we had an award ceremony. Here I won the Broadcom Masters Rising Star Award. The coolest part of this award was I got to go to the Intel Science Fair as an observer even though I was only in 8th grade.

I traveled to Intel with the Minnesota brigade. The Minnesota brigade was awesome about welcoming me. The high school kids were super kind about including me in everything they did. The coolest thing I got to do with the Minnesota Brigade was create the United States poster that was carried at the opening event. For most of the time at Intel I was with the group, Broadcom Masters International. This was made up of 14 middle school students from around the world. Beyond myself and my fellow United States representative, Chad, there were kids from Canada, China, India, Israel, Japan, Korea, Mexico, Singapore, Taiwan and the United Kingdom. While with this group of middle school students we did all sorts of activities.

We visited Carnegie Mellon University and Kenny Wood amusement park. We also participated in the student observer activities and we got to view all the spectacular Intel science fair projects. After visiting the International Science and Engineering Fair as an observer, I have a new goal. Someday I want to be there presenting my science study or innovation. As I look back on my experiences

this past year, I will never forget the people I met, the friends I made, and the experiences I had at the Broadcom Masters competition, Broadcom Masters International, and the International Science and Engineering Fair."

The **Broadcom Foundation** was founded to inspire and enable young people throughout the world to enter careers in science, technology, engineering and mathematics (STEM) through partnerships with local schools, colleges, universities and non-profit organizations. Broadcom Foundation is the proud sponsor of the Broadcom MASTERS®, a program of Society for Science & the Public – a premier science and engineering competition for middle school children. The Foundation's mission is to advance education in STEM by funding research, recognizing scholarship and increasing opportunity.

Learn more at [www.broadcomfoundation.org](http://www.broadcomfoundation.org).

A note from **Annie Jiao**, Breck, to Celia Waldoock:

Thank you for making the State Science and Engineering Fair a possibility. It was a wonderful experience for me to be able to present to so many scientists that were interested in the research that I performed. The science fair was undoubtedly one of the best learning experiences that I have had as a student so far. I learned so much about my work and its implications by talking to the judges. They offered wonderful suggestions for future work, potential applications, and even how should I go about presenting my work. For example, one judge, who was an expert in the field I studied, offered a possible explanation as to why the conjugation efficiencies of *e.coli* bacteria were higher in solid than in liquid environments, which I incorporated into my future presentations.

At the State Science and Engineering Fair, I received first place awards from both General Mills and the Institute of Food Technologies. Without your efforts, neither of these could have been possible.

Thank you again for all of your efforts.

Best,  
Yan (Annie) Jiao

An e-note to Lise Weegman, MSSEF Director, from  
**Anushua Bhattacharya, East Ridge High School, Woodbury**

Attending the Intel ISEF competition was a remarkable experience that I would never trade in. Not only did I meet a number of wonderful students from around the country and around the world, but I shared my exciting results of my science research with experts in the field as well as other elite members of the scientific community. By being sent to ISEF from the Minnesota State Fair, I felt more prepared for judges at the State level [who] were familiar with my project and hence, asked me specific questions that were later asked again by ISEF judges. Overall, I would encourage any high school student to attend ISEF simply because when you place over 1600 students in a convention who are all excited about science, the energy is beyond words!

# 79th Annual Meeting and 24th Winchell Undergraduate Symposium



Megan Buchanan, Annual Meeting Coordinator

The Minnesota Academy of Science was thrilled to offer the 79th Annual Meeting/ 24th Winchell Undergraduate Symposium on April 21, 2012. The meeting was hosted by St. Olaf College, in Northfield, Minnesota.

The 2012 Annual Meeting/Winchell Undergraduate Symposium had the most successful turnout it has had in over five years. This year's meeting had over 200 participants, with 90 presentations in poster format and 45 oral presentations. In addition 25 colleges and institutions from around Minnesota, Wisconsin, and Iowa were represented.

The 2012 event included a few new offerings, among which was St. Olaf College offering tours of some of their campus highlights. Registrants were given the opportunity to tour the college's natural lands or to tour their LEED Platinum certified Regents Hall. Another exciting opportunity for participants was the discussions offered during lunch. Guests from Graduate Programs from around the state as well as industry professionals were invited to host lunch discussions. Meeting participants were given the opportunity to sign up based on discipline or interest and spend the lunch hour having informal discussions. We were excited to invite two professional scientists to the event this year to present during one of the afternoon oral sessions. The scientists were from the University of Minnesota Biochemistry and BioTechnology Departments.

Our keynote speaker was Dr. Jon Foley. Dr. Foley is the Director of the Institute on the Environment at the University of Minnesota, where he is also McKnight Presidential Chair of Global Ecology. Dr. Foley presented from his article *Can we Feed the World and Sustain the Planet?* and spoke in depth on how a five-step global plan could double food production by 2050, while greatly reducing environmental damage.

The 2012 Annual Meeting/Winchell Undergraduate Symposium was sponsored by:

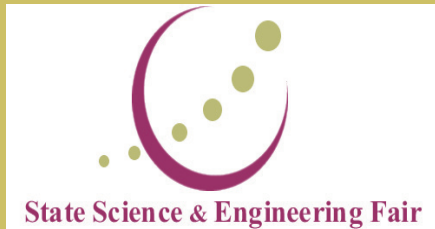
- St. Olaf College
- American Chemical Society
- Augsburg College
- Bethel University
- Hamline University
- Macalester College
- North Hennipin Community College
- St. Catherine University
- Tri-Beta



Dr. Jon Foley

A very special thanks....

Thank you to our incredible 2012 Planning Committee! Each year, the volunteer planning committee is responsible for the organization, planning and execution of the Annual Meeting/Winchell Undergraduate Symposium. The planning committee is comprised of several science professors from colleges throughout the state, and is chaired by a professor of the hosting college. The 2012 planning committee worked tirelessly, and went above and beyond to ensure the success of this year's Annual Meeting/Winchell Undergraduate Symposium.



# MN State Science & Engineering Fair

## 75 years of Science: Encouraging Excellence,

Lise Weegman, Program Director

2012 was a landmark year for the MN Academy of Science State Science & Engineering Fair– 75 years of scientific research. A few tidbits of information about the MN State Science & Engineering Fair:

- \* MN Academy of Science State Science & Engineering Fair is the longest continuous-running science fair in the United States dating, back to 1937.
- \* MSSEF is older than The International Science & Engineering Fair which began in 1950 as a National Science Fair. In 1958 the name changed to The International Science & Engineering Fair.
- \* 3M Company is the longest running financial contributor of the State Science & Engineering Fair. They have been sponsors of the MN Academy of Science State Science & Engineering fair for all 75 years.

To celebrate, three keynote speakers were brought in to discuss their views of 75 years of changes in science, technology engineering and math. They included:

**Dr. John S. Najarian**, appointed Professor and Chairman of the Surgery Department at the University of Minnesota, Minneapolis, in 1967. Under his leadership, the Minnesota program pioneered innovative and difficult types of transplants; Dr. Najarian achieved unequalled success with diabetic, pediatric, and older patients. He headed clinical research, and made educational contributions to the field of surgery. **Paul Douglas**, a nationally respected meteorologist with 28 years of broadcast television and 32 years of radio experience, spoke to the participants. **Matt Stoltz**, inventor and holder of over 115 issued US patents, addressed the Tuesday morning participants and visitors. Matt is currently a corporate scientist in the Infection Prevention Division Laboratory – working to develop *infection prevention* products for the healthcare field.

The student competition was intense and the MN Academy of Science State Science & Engineering fair staff had ways to loosen up the students to keep them relaxed for judging day. There was movie night on Sunday. The Bakken Museum had heart healthy activities, The Works Museum had structural things to build and the Bell Museum had their Exploradome where the students and adults were able to go inside, lay on the floor and relax looking up at various constellations and learn about the planets in a creative way. 3M Visiting Wizards brought some very fun interactive science demonstrations and a few organizations brought interactive science activities to their display booth: General Mills, Boston Scientific and The Works Museum.

A workshop panel was set up for teachers and non-teachers. Interactive discussions took place and individuals were able to obtain resources to help students who do not have accessibility to a research lab. Serving on the panel were **Dr. Richard Streeper** (Dick), 3M retiree and coordinator of the 3M /Saint Paul Public Schools Partnership, **Matthew Thell**, General Mills Mentorship program, **Dr. Jennifer Hugstad-Vaa**, Science Research program Burnsville High School, **Jodi Prchal**, a New Prague, MN teacher, and **Shawn Stafki**, science teacher from Perham, MN.

513 students in grades 6-12 participated as well; many were recognized at the Special Awards ceremony on Monday evening, as well as at the Grand Awards ceremony Tuesday morning. The Grand Awards are sponsored by Seagate and MN Academy of Science. Students also advanced to International Science & Engineering Fair and/or I-SWEEEP (International Sustainability Environment, Engineering and Energy).

A list of all award winners can be found on [www.mnmas.org](http://www.mnmas.org) under Science & Engineering Fair/awards.



# 44th Annual Junior Science and Humanities Symposium



Lise Weegman, Program Director

The 44th Annual North Central Regional Junior Science & Humanities Symposium of the MN Academy of Science kicked off on March 17th at the Doubletree by Hilton in Bloomington. Seventy papers (from eighty-seven students) advanced to the state symposium from eight regional science fairs and the open competition. After the hustle and bustle of making sure all students, judges and general volunteers were registered, the first round of paper competition was under way.

After the first round, students were able to enjoy an opening ceremony dinner with a jazz trio led by Reid Kennedy ([www.ReidKennedy.com](http://www.ReidKennedy.com)) and listen to the keynote speaker, Dr. Heidi Teoh. Dr. Teoh is a Principal Scientist from General Mills, and delivered a presentation *How Playing With Your Food Can Be a Great Career*. When students and families were not listening to the second round of evening paper presentations, they were able to enjoy some fun and interactive science activities performed by Colin Kilbane, formerly of Mad Scientists of Minnesota. ([www.MadScienceMN.org](http://www.MadScienceMN.org) Colin Kilbane [kilbanio@hotmail.com](mailto:kilbanio@hotmail.com)).

Prior to the Sunday morning awards ceremony, the students enjoyed a breakfast specifically designed for students and scientists in industry and at universities. Students were able to learn more about potential career options with their tablemates. Thank you to this year's scientists:

Leslie Brandt, Ph.D. – U.S. Forest Service's Northern Research Station  
Daryl Elinson – MN DNR West Metro Area Fisheries  
John Hanlin, Ph.D. – Vice President of Public Health, Ecolab, Inc.  
Daniel A. Harki, Ph.D. – Assistant Professor Department of Medicinal Chemistry, University of MN  
Michael W. Hult – P.E. – Environmental Engineering Specialist, 3M Environmental, Health and Safety Operations  
Mike Hurban – Development Principal Engineer, Seagate Technology  
Rachel Robinson – Industrial Hygienist, OSHA, St. Paul office.  
Matt Scholz – 3M Innovator at 3M Healthcare  
Heidi M. Teoh, Ph.D. – Principal Scientist, General Mills, Inc.

The Breakfast with the Scientists was followed by two REAP (Research Engineering Apprentice Program) student presentations by Rishi Sinha, Wayzata Senior High School and Sam Nickolay, Minnetonka High School. The North Central Regional JSHS wrapped up 2012 with an awards ceremony. Congratulations to all who participated. All participants received medals and certificates for their scientific achievements. In addition to medals, a top student advanced to AJAS, (American Junior Academy of Science) Conference held in conjunction with the AAAS (American Association for the Advancement of Science). Students with the top three papers received scholarships of \$2000, \$1500 and \$1000 to any college or university of their choice. Students with the five top papers won all expense paid trips to compete at the National JSHS competition through the Academy of Applied Sciences, and six students each won \$50 cash and certificates of Scientific Excellence. A complete list of awards can be found on [www.mnmas.org](http://www.mnmas.org) under JSHS program/awards.



Photo: Princesa Van Buren Hansen

The Junior Science and Humanities Symposium (JSHS) is a scientific research paper competition. A paper competition is an event in which students present the results of their research paper to a group of judges. JSHS is for students in grades 9-12 in the tri-state (Minnesota, North Dakota and South Dakota) area. The JSHS competition occurs just prior to the State Science & Engineering Fair (the Fair is a project competition for both Middle School and High School students and a paper Competition for Middle School students).

JSHS has an emphasis both on sharing and doing science. The program is modeled after professional scientific symposia: students present the results of their independent research orally in a competition that is as much forensic as scientific.