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Eastern Section News

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Winter '14/'15

News from the Chair

Katy Perry
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The next scheduled Pub Science Series is on Wednesday, January 14 at Brown's Brewing Company in Troy!

Happy New Year wishes from the Eastern Section! The fall frenzy carried us directly into the beginning of winter with an abundance of professional development offerings. Our learning experience aboard the Clearwater Sloop received rave reviews. The Clearwater staff engaged us with environmental learning, sailing skills and local history during this active voyage on the Hudson River. For more information about the Clearwater and it's mission, click [here](#). Our Siena Conference in October brought together 30 presenters, over 150 learners and a fabulous Astrobiology key note by Dr. Karyn Rogers, "Looking for Life: A Hitchhiker's Guide to Extreme Environments." Thank you to all of our dedicated SARS, presenters, and volunteers for making this year a success.

Our Pub Science Series continued in September at Wheatfields in Clifton Park, with Dr. Chris Fasano, from the Neural Stem Cell Institute in Troy, neuralsci.org, who presented his research on human nervous system development and using stem cells to model and treat Parkinson's disease and Autism. In December, at Brown's Brewing Company in Troy, snow and poor weather conditions forced us to reschedule our featured speaker, Dr. Jeremy Kirchman. He is the Curator of Ornithology at the NYS Museum and his talk "Museums, Mountains, and Mutations: Studies of Bird Populations at the Edge of the Boreal Forest" would have focused on his molecular genetics research to document the biogeography and evolution of birds. We hope to reschedule this speaker. We look forward to our spring season of the Pub Science Series. What a wonderful way to learn, network and earn professional development hours!

The State STANYS conference in Rochester truly brought back the wonder. The highlight of the conference was honoring our very own Fred Pidgeon as a new STANYS Fellow. Congratulations Fred and thank you for all the years of entertainment and creativity you have brought to STANYS! We were all enchanted with the chemistry magic of Dr. James Peplowski and the arctic research and beautiful polar exploration photography (penguins!) from keynote speaker, Chris Linder. Dynamic presentations, in-depth hands-on-learning, and STEM workshops abounded. The air was buzzing with discussions about the changing New York State science standards. We will continue to provide updated information and professional development as these new standards are crafted. Many STANYS members are diligently working with the state to provide advice and support. A new STANYS app, QR scan code hunt, and lots of technology-based activities kept everyone talking and trying new things.

Mark your calendars now! The state conference will begin on Saturday, November 7th and run through Monday, November 9th. Since it begins on the weekend, more of us can join in on the learning! We are always looking for conference presenters, volunteers, and committee members. Have a joyous winter!

Sincerely,
Katy Perry, Eastern Section Chairperson

Elementary News

Katy Perry

Elementary SAR

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Recently, I leaned over one of my first grade student's shoulder to see what he was reading, it was a book called "Matter," a graphic science reference book. He was captivated by the information and the comic style illustrations. This is one of the books in the series [Building Blocks of Science](#), produced by WorldBook. After reading the entire book and seeing the value, I immediately brought it to our librarian who ordered a set for the school. Having engaging science books available in the classroom or school library is crucial for sparking interest; especially in this ever increasing age of digital media use. Books enable students to learn and wonder without being plugged in. Current brain research combined with new social norms send mixed messages about technology; check out these links [here](#) and [here](#). Mainly, children below the age of five should be discouraged from using digital media and it should be very limited afterwards. [Researchers](#) comparing print and digital reading have found that readers remember less from the digital format, are more likely to have reduced attention spans, and lack enthusiasm for the content. As educators, we are caught in this balancing act and I try to blend print and digital sources and activities. Bring on the printed books!

While at the conference in Rochester and our Eastern Section's Siena conference, I spoke with many vendors about their printed resources. Some of the smaller companies had a great diversity of resources to share. [Delaney](#), has access to a multitude of publishers, provides on-site consults, and free shipping. They've grouped books from diverse publishers into grade level science collections (NGSS and NYS). [Science Naturally](#), has "I Love a Mystery," "The League of Scientists: Ghost in the Water" and "Innovators in Action", which entertain and educate with mystery and critical thinking skills. The larger companies had nice offerings too and all were wonderful to talk with.

As always, STANYS will continue to provide information and support for curriculum, standards, lessons, and professional development. Contact me anytime with questions!

Greater Capital Region Science and Engineering Fair

By Joan Wagner, Fair Director

The greater Capital Region Science and Engineering Fair will take place on March 21, 2015. The STEM research-based fair is affiliated with the prestigious Intel International Science and Engineering Fair. There is a junior division (grades 6-8) and senior division (grades 9-12). The top projects in the senior division will be invited to the Intel ISEF finals to be held next May in Pittsburgh, PA. Some of the top winners will be invited to participate in the STANYS Science Congress. Top

projects in the junior division will be invited to participate in the Broadcom Masters Program, which is a junior version of the Intel Math and Science Search with \$25,000 being the top award.

These projects will also be invited to the STANYS Science Congress also held in May. Visit us for more information, www.gcrsef.org

Museum of Innovation and Science (MiSci)

Joan Wagner, Informal Education Chair



The Museum of Innovation and Science is located on Nott Terrace in Schenectady, NY. In the past 2 years it has undergone a complete transition to a STEM museum. There is something for all ages. The

Challenger Learning Center is being built as I write this article. It will be ready in late February. During the Holiday season, the famous train exhibit is available to be enjoyed by all ages.

Other exhibits now at miSci are:

Revealing Light-scapes: An Immersive Installation of Light and Sound

October 4, 2014 - January 4, 2015

Installation by Yael Erel; Soundscape by Torben Pastore challenge the limits of human perception. See micro-scale events appear otherworldly and alive when they are transcribed through the simple act of reflection. This interactive, experiential installation uses a light source, a reflecting surface, and a screen to magnify miniscule conditions overlooked by the naked eye.

Play Space

Discover hands-on fun science toys you don't have at home! We've moved the water table inside for the winter. Explore how moving gates from one position to another position affects the flow of a waterway in this instant action-reaction experience. NEW Kids' Supermarket opening this holiday season: discover weight, measurement, sorting, and fun as you explore this kid-sized market!

Making Sense of Sound

June 14, 2014 - June 7, 2015

Discover sound with hands-on fun from San Francisco's Exploratorium. Play and experiment, make some noise, and listen. Explore hearing, human speech and communication. Experience – as never before – the nature of sound, the ways we perceive it, and how we listen.

Science Zone

Saturdays & Sundays 1:00PM – 2:30PM

Explore a different topic each week in the Science Zone! Try hands-on activities and challenges that make you think. miSci Educators ask questions and help you predict results. Discover engineering, nanotechnology, chemistry, and more! Visit our Calendar of Events for a complete schedule.

Erie Canal Audio Tour

Explore the Erie Canal through 14 mobile audio stops. Discover the history and innovative technology that made the canal possible and how this technology impacted the lives of Schenectady residents. Schenectady's location on both the Erie Canal and major rail lines made it attractive for major businesses, including the American Locomotive Company (ALCO) and General Electric (GE), and helped drive 20th century innovation and industrial development. Learn how the footprint of the canal continues to impact the city to this day. miSci (the Museum of Innovation and Science, formerly the Schenectady Museum) partnered with Union College museum studies students to create the Tour.

The Tour is accessible by mobile phone (518) 387-3028 and QR codes at each stop [\[Tour Brochure\]](#). Tour content is also available [online](#). The Erie Canal Audio Tour is free but normal rate plan charges from your phone carrier will apply.

Medical Imaging

Explore the science behind a landmark medical imaging system developed right here in the Capital Region. Magnetic Resonance Imaging (MRI) has transformed health care and revolutionized the methods doctors use to diagnose patients. Get inside a real MRI machine, see images of insides on the outside, discover how MRI technology is shaping the future!

Wind & Solar Power Interactives

Explore the importance of renewable energy, and how advances in wind and solar power may hold the key to reducing our dependence on fossil fuel consumption. Explore wind and solar power as you experiment with interactives! Discover what groundbreaking wind and solar power research is being conducted right here in the Capital Region!

SuperPower

SuperPower is a new part of the Museum's Power House exhibit. Explore the history and technology of high temperature superconductors as well as their applications and effect on the energy grid in this interactive display, which celebrates the 10 year anniversary of Schenectady-based SuperPower, a world leader in the development of commercially feasible second-generation high temperature superconductors.

Fueling the Future

Worldwide, the number of automobiles continues to increase. How will we fuel them? Explore opportunities and challenges of different fuels, including gasoline, ethanol, hydrogen, biodiesel, electricity, and yes, even horsepower!

See how different fuels affect the economy and the environment, with interactives, images, video, and artifacts from our collection, including a one-of-a-kind prototype electric car developed by GE in 1978. □



Intermediate News

Jennifer Gecewicz, Intermediate SAR
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The 2014 STANYS conference in Rochester was a great success, as always. I had the pleasure of listening to many incredible science educators and left inspired and confident to go use what I'd learned with my own classes. Attending the STANYS conference always contributes to my goal of being a lifelong learner. At the conference, I presented a session with a fellow Eastern SAR, Laura Van Glad, and she and I have already decided that we will present together again on a topic that we both enjoy learning about, mindsets.

In 2007, Dr. Carol Dweck, a social and developmental psychologist who works at Stanford University, wrote a book titled Mindset: The New



Psychology of Success. Carol Dweck, is someone with whom I am enamored.

My husband jokes about how *most* people we know like to chat about athletes, singers, or movie stars - and I like to chat about Dr. Dweck's research. In her book, she describes two mindsets that people can have: fixed or growth. When faced with challenges, people with fixed mindsets will shy away from the problems or complain about all the reasons they are not their fault and out of their control. They will not take on more challenging tasks at the risk of failure, because they internalize it as though they believe they themselves are a failure. In contrast, people with growth mindsets, when faced with challenges, view them as opportunities to better themselves. They see them as their chance to grow. They face challenges and setbacks with an attitude that communicates, "well, *that* didn't go as planned! Why not? What can I learn from this? How can I change my behavior/thinking to do better next time?"

Since I began teaching in 2004, I have come across countless students of both mindsets. Once I read Dr. Dweck's book, I realized a lot about my own mindset, and that I have different mindsets for different areas of my life, something Dweck said is not uncommon. You may have a student who gives it their all in one class/sport, but who decides not to try out for this team, or that club, or for this contest because, "well, what if I don't do well?!" How do we help our students see learning and struggling as a good thing? Dr. Dweck suggests in her book that one way to help guide students towards the growth mindset model is through our ways of offering encouragement and praise.

Offering praise in relation to things that are out of a student's control, is like serving up a fixed mindset on a platter. Saying any of the following to a student can help contribute to a fixed mindset:

- "You deserved to win that trophy/prize/etc."
- "You were robbed."
- "If I were the judge, I'd have picked you."
- "Next time you'll be lucky."
- "This challenge isn't important in the big scheme of things."
- "You're smart, you'll get this."

The common denominator between all of these examples is that they are completely out of the child's control. Instead, if effort, persistence, grit, stamina, and endurance are the focus - the student has something with which to work!

Praise effort, not intelligence. Show students that it is through hard work that they will get far in life. Be honest about your own struggles and explain how you worked - or are working - through them. (They love hearing about how we're "human", right?!) Make your classroom an environment in which mistakes are welcomed and tougher challenges are seen as the trail to success. A growth mindset helps establish life-long learners - which is a trait I believe many Middle Level educators

would like for their students. What better gift can we give them? ☐



Why?

By Arden R. Rauch
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Recently I listened to the book The Pleasure of Finding Things Out: The Best Short Works of Richard P. Feynman by Maria Popova and was very impressed by one of his lectures which is extracted below. The book covers many topics: scientific, philosophical, and autobiographical, and is well worth a read (or listen). Feynman's lecture at the 1964 Galileo Symposium in Italy, titled "What Is and What Should Be the Role of Scientific Culture in Modern Society," provides insight into the failure by some to appreciate and comprehend the science of Climate Change.

Feynman also reiterates a crucial point about the nature and purpose of science and critical thinking — the role of ignorance and the importance of embracing uncertainty, met with enormous resistance in a culture conditioned for grasping at answers. A scientist is never certain. We all know that. We know that all our statements are approximate statements with different degrees of certainty; that when a statement is made, the question is not whether it is true or false but rather how likely it is to be true or false. People — I mean the average person, the great majority of people, the enormous majority of people — are woefully, pitifully, absolutely ignorant of the science of the world that they live in, and they can stay that way ... And an interesting question of the relation of science to modern society is just that — why is it possible for people to stay so woefully ignorant and yet reasonably happy in modern society when so much knowledge is unavailable to them?

I think we should teach them wonders and that the purpose of knowledge is to appreciate wonders even more. And that the knowledge is just to put into correct framework the wonder that nature is. "In order to make progress, one must leave the door to the unknown ajar — ajar only." □

Improving Learning in Our Students

Tom Shiland

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Want to improve learning in your students?

Three recent books address exactly that: [A Mind for Numbers](#) by Barbara Oakley; [Making it Stick](#) by Peter C. Brown, Henry L. Roediger and Mark A. McDaniel; and [How We Learn](#) by Benedict Carey. All three books draw on recent research in the field of cognitive science.

Here is the executive summary for busy folks: have students retrieve information from their long-term memory more often to improve their retention of important ideas. Before we look at a few ideas for doing this, it might be good to talk about why retaining information is important.

For a number of people, including our students, the idea of retaining information appears out of date. The Internet and Google are at our fingertips if we have a Smartphone. For the content we are teaching, the question becomes "Why do we need to know this - we can always look it up?" The information on the Internet is viewed as a type of long-term memory. Accepting this as a premise, launches all kinds of new "21st century" learning initiatives that maintain the need to know content in a particular discipline out of date.

But we can only understand new material in the context of what we already understand. Sure, we can look anything up, but we cannot understand it if we are not able to connect it to something we already know. I can read the title of an article called "Quantum Tunneling," but if I fail to connect it to anything already in my memory, it is unlikely I will

understand the article. Having a framework of knowledge in long-term memory is essential to understand new information. The Internet is not a substitute for our personal long-term memory. It will not place new information in a context we can understand, and it will not make connections between new and existing information. To know something you have to know something.

Also, most of us are preparing our students for the Regents exams, which represent learning over an entire year. It is essential that students can retrieve the information they need to do well on the exam. So what do these books say about doing? A simple way to do this is to give more quizzes. These quizzes should be low stakes (but still count for something) and require the student to elaborate on the material.

The act of retrieving the material strengthens it in long-term memory. I have found that thinking about what tomorrow's quiz will be on for my classes keeps me focused on the essential learning that I want to get across. The material on the quiz becomes a "chunk." For the past few years I have been a big fan of "clicker quizzes" which were usually 10-15 multiple-choice questions that the students answered with a "Smart Response" device. This year I have switched to more explain and predict type of questions. I found that this type of student response gives me a more accurate view of what the student knows. It also requires the student to generate and elaborate on their response instead of simply selecting a choice. Having the students actually generate or produce the response is a way to fix it more firmly in long-term memory. The elaboration process might require the student to describe a mechanism about how a particular principle applies or give an example. I have also found that a practice quiz as a closure at the end of class primes the student for a real quiz at the beginning of the next class. No one ever complains about these practice quizzes and

when the chapter exam appears I hear few complaints that questions were never taught.

A second way to improve retention is to mix up the practice. Instead of hammering them with one type of problem over and over again, mix in some problems that appear similar. Although this is more difficult, cognitive science research indicates this is a better technique to retain the information. For example, comparing problems with similar sounding words, or that call for the calculation of the same units (Molarity can be calculated from the formula or found in a titration. There are three different formulas that use joules in the Regents reference table).

A third way to improve retention is to space out the practice. When you combine this with the first way of giving more quizzes and the second way of mixing up the practice you have a powerful means to test for understanding and have the students be able to retrieve the information when they need it. If you have time to read only one book, read Make it Stick. Try giving more low stakes quizzes and I think over time you can blend in the spacing and mixing up the problems on those quizzes. Remember, we are in the learning business and learning means retaining information. □

Brown, Peter C., Roediger, Henry L., McDaniel, Mark A. (2014). Make it Stick- The Science of Successful Learning (Cambridge: Belknap Press).

Carey, Benedict (2014) How We Learn. (New York: Random House)

Oakley, Barbara (2014) A Mind for Numbers (New York:Penguin)



Resolve to Renew Your STANYS Membership

Becky Remis, Membership Chair
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Happy New Year! You are receiving this newsletter as a STANYS Eastern Section member in good standing. And when your membership is about to expire, you are sent two email reminders from the STANYS data manager as well as a snail mail reminder if necessary. Keep your membership continuous and current! The benefits of membership are many: high quality professional development, reduced registration fees for section events, email invitations to local science education events, networking with your colleagues, and the opportunity to grow as a leader by presenting workshops and holding a seat on the Eastern Section board of directors! Renewal is easy and can be done automatically via your credit card. A recent membership form and renewal information can be found on the STANYS web site (www.stanys.org), and you are always welcome to contact me at rremis@aol.com. Please let me know when your contact information (especially email address) changes so we can keep you in the loop! Have a happy and healthy new year, and I look forward to seeing you at the next Eastern Section event! □

Stewardship of the Earth is Common to All Religions

Arden R. Rauch
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After 3 informal meetings, it is evident that there is both an interest and a need to share information and concerns to promote sustainable practices at our houses of worship and also demonstrate to congregants the practical and economic advantages. If you know of a member of a congregation who might be interested in joining this informal 'chat' group, our next meeting is 1/20/15, 3:00PM, at the [West Glenville Reformed Church](#). Feel free to contact me for more information. □

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If you have any questions or concerns regarding your particular branch/level of science, please feel free to contact your STANYS Eastern Section.

