TED’s President Column
By Jeff Thomas

Dear TED Members:

Let me start by welcoming all new and returning TED members, and I wish all of you a great start to the new academic year marked by good health and happiness. We hope the summer provided you time for relaxation, reflection, and inspiration to renew your efforts to improve science teacher education, particularly in the earth sciences.

A key initiative TED is planning for this upcoming academic year is to seek, review, and organize a collection of teacher preparation resources that we plan to include on the NAGT-TED webpage. The goal of this initiative is to provide a place for science teacher educators to find and use resources that can better support and prepare their preservice science teachers for student teaching and beyond. We are particularly looking for resources that support preservice teachers’ understanding of the Next Generation Science Standards (NGSS), such as instructional strategies to improve K-12 students’ ability to develop and use models, to construct science explanations, and to engage in argument from evidence to support scientific claims.

Thus, to meet this goal, TED will be emailing the membership this fall to inquire about the kinds of teacher preparation resources that are already being used with students. These resources could be videos that demonstrate effective teaching strategies (e.g. developing models to explain natural phenomena), instructional and assessment resources (e.g. differentiation strategies), or modules (e.g. InTeGrate) for science teacher educators that can be used with students. We will also invite volunteers to vet these resources and eventually include them on our TED webpage for all to use. We look forward to hearing from you this fall!

Again, best wishes for a successful school year, and I look forward to working with you in the near future.

Sincerely,

Dr. Jeff Thomas

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1. **Connecticut Aims to Improve Earth and Space Science Education with the Adoption of NGSS**
   by Jeff Thomas, TED President

From the mid 2000’s to present, the Connecticut science standards placed emphasized the life and physical science and to a lesser degree the earth sciences. However, on November 4, 2015, Connecticut State Board of Education officially voted to become the sixteenth state to adopt the Next Generation Science Standards (NGSS). With this adoption, earth science now has a more prominent role for all primary and secondary schools across the state.

Since NGSS includes more earth science content in it when compared to the old Connecticut science standards, there is a gap in teachers’ understanding of earth science. To confront this problem, Dr. Jeff Thomas, the principal investigator from Central Connecticut State University, secured multi-year funding from the federally-funded Teacher Quality Partnership Grant program to improve the preparation of middle school science teachers’ earth science content knowledge and pedagogy through intensive and focused professional development (PD) multi-year project. This PD project, titled *Next-Gen Earth and
Space Science Literacy and Expertise or NESSLIE, also seamlessly integrates NGSS three-dimensional learning (i.e. science practices, disciplinary core ideas, and crosscutting concepts) and science-specific literacy practices that aligns with the Common Core of State Standards (CCSS).

To meet these project goals, teachers, thus far, completed six earth science units that were collaboratively developed by between science content and education specialists. Three of these units were completed during the summer of 2015 and three during the summer of 2016. Additional units are planned for the summer of 2017. In addition, teachers are required to adapt and implement one or more of these units for Year One and one or more of these unit for year two with their students.

During the first year of NESSLIE, teachers completed three earth science units. Unit 1: Water Usage was based on ESS3.C: Human Impacts on Earth Systems and primarily focused on groundwater. Unit 2: Plate Tectonics was based on ESS2.B: Plate Tectonics and Large Scale Interactions. This unit focused primarily focused how plate tectonics formed and shaped Connecticut from when Pangea was formed to present. The last unit was Unit 3: The Earth, Moon, Sun System which was based on ESS1.A: The Universe and its Stars. This unit focused primarily on the phases of the moon as well as reasons for the seasons. All three units centered on three high leverage practices including developing and using models, constructing explanations, and engaging in argument from evidence. Many of the CCSS literacy strategies (e.g. talk moves, summary tables), which were embedded throughout each unit, aligned with these practices too.

During the 2015-16 academic year, middle school science teacher participants adapted and implement one or more of the three NGSS earth science units they completed over the summer. The most common unit implemented was the Earth, Moon, Sun System. Two members of the NESSLIE project team, Drs. Jeff Thomas and Sally Drew were invited into the classrooms of ten teachers. One of the accomplishments of this project thus far was how successful teachers were able to implement instruction that focused on students developing models (e.g. phases of the moon) independently. As students developed these models, it was obvious they were truly investigating this phenomenon as naïve conceptions were prevalent, especially as depicted from their initial models to explain the phases of the moon.

Other achievements of NESSLIE include the integration of literacy practices as part of science instruction, not only with the earth science units teachers adapted and implemented from the NESSLIE project, but also units they modified that they previously done. In fact, teachers have consistently rated this part of the project as the most successful. To date, over 40 practical literacy strategies have been included as part of the first six science units. These literacy strategies were also included in a mini-booklet for teachers to easily access and adapt them as part of their everyday instruction.

More recently, during the summer of 2016, teachers completed three more NGSS earth science units. These units include: Unit 1: Shaping CT Landscapes, aligns with NGSS MS ESS2.C: The Role of Water in Earth’s Surface Processes, Unit 2: Forecasting CT Weather, aligns with NGSS MS ESS2.D: Weather and Climate, and Unit 3: Motions and Formation of Our Solar System, aligns with NGSS MS-ESS1.B: Earth and the Solar System. These units again explicitly address three dimensions: disciplinary core ideas (e.g. MS ESS2.D: Weather and Climate), science and engineering practices (e.g. engaging in argument from evidence), and crosscutting concepts (e.g. patterns). Science-specific literacy practices, based on the CCSS seamlessly blended with these dimensions (e.g. writing formal scientific or technical arguments). Similar to the first year of the project, teachers will implement NGSS earth science units during the 2016-17 academic year.
The project team looks forward to collecting more data about this project as well as planning for the third and final year of NESSLIE. We feel confident that this project has helped a significant number of science teachers improve their understanding of earth science as well as the instructional shifts related to NGSS and CCSS. The project team also plans to refine the units so they can be shared with other middle school science teachers across Connecticut and perhaps beyond our borders too.

2. Provide Input on NSTA Recognition Standards on Accreditation of Teacher Preparation Programs by Eric Pyle

Dear TED members and friends, In your role for Earth science teacher education, you may have had direct or secondary responsibility for ensuring that your preparation program receives accreditation and national recognition. In many cases, accreditation takes place through the Council for the Accreditation of Educator Programs (CAEP, formed from the merger of NCATE and TEAC), a process that generates a range of reactions among those that must prepare the portfolios for review. National recognition for secondary science teachers is subsequently sought through the National Science Teachers Association.

Currently, NSTA is engaged in an effort with the Association for Science Teacher Education to revise the NSTA recognition standards, and we are seeking the input of our professional peers, such as NAGT-TED, in the development of a broader, more facilitative recognition framework. To that end, we would like your responses to a brief survey, found at this link, which will ask about your experiences in the accreditation/recognition process for your teacher preparation program, and your thoughts on what a stronger recognition process would look like. On behalf of NSTA, ASTE, and NAGT-TED, I thank you in advance for your input.

Eric Pyle
Professor, Department of Geology & Environmental Science
James Madison University
Eric Pyle <pyleej@jmu.edu>

3. On-Line Educator Professional Development For The Alumni Of A Summer Undergraduate Pre-Service Stem Teacher Science Research Experience by Mark Abolins

During June of 2016, 5 of the 30 alumni of the 2013-2015 “Geoenvironmental Challenges” summer undergraduate science research experience participated in a two-week on-line curriculum development project. “Geoenvironmental Challenges” was the National Science Foundation (NSF) Geosciences Directorate’s first Research Experience for Undergraduates (REU) Site designed specifically for pre-service middle school and high school STEM teachers. During each of the summers of 2013, 2014, and 2015, the project recruited 10 participants, and these participants completed a nine-week experience of which approximately seven weeks consisted of mentored science research and approximately two weeks consisted of ancillary activities including field trips. The 5 alumni who participated in the 2016 curriculum development project self-selected, and they worked on-line alongside a veteran in-service high school Earth science teacher. Dr. Abolins, a geoscience professor and the REU Site principal investigator, guided the curriculum development project.

Dr. Abolins created ten on-line assignments organized around Next Generation Science Standard HS-ESS2-5, “Investigations of the properties of water,” with a focus on the geological features of karst and
the social issue of environmental justice. The participants used Google Docs daily to share and learn from each other, and they twice used Facebook for discussions. Anonymous participant post-project reflections suggest that most thought that learning outcomes were attained, and most thought that the overall experience was of relatively high quality (mean of 4.5 on a 5-point scale) and had exceeded their expectations (mean of 4.3). The curriculum development project was aligned with the original objectives of this particular REU Site, the current goal of the REU program to provide ongoing mentoring to REU Site participants, and research indicating that educators often benefit from on-going professional development.

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4. Upcoming 3rd annual SAGE2YC* NYC/Long Island Local Workshop by JoAnn Thissen, Nassau Community College

On Friday, November the 4th JoAnn Thissen (Nassau Community College) and Sean Tvelia (Suffolk Community College) will host the 3rd annual SAGE2YC* NYC/Long Island local workshop. This year we are focusing on helping students with reading and writing in science, helping faculty participants develop active learning, hands-on activities including using online tools and data to enhance geoscience courses and involving community college students in projects and research. There is no fee to attend and all science faculty, including 4 year colleges, are encouraged to join us. If you're interested, or would like more information, contact JoAnn Thissen at joann.thissen@ncc.edu. In the meantime, here is the link to last year’s workshop: http://serc.carleton.edu/sage2yc/studentsuccess/local2015nyc/index.html
*Supporting and Advancing Geoscience Education in 2 year colleges.

5. “All-American” Eclipse in 2017: Start Planning Now by Suzanne Metlay, Western Governors University

On 21 August 2017, a total eclipse of the Sun will be visible across a large swath of the United States. For those not in the path of totality, a partial eclipse can still be seen, often during traditional school hours. This is a great opportunity to help our science educators get ready and to introduce them to apps they (and we) may use in the classroom. These apps and links include interesting ways to view the Sun, look at Earth, and consider the interactions between them.
Credit: [http://learningcenter.nsta.org/products/online_courses/VC_161015.aspx](http://learningcenter.nsta.org/products/online_courses/VC_161015.aspx)


Teachers and students may use this event to more thoughtfully consider the effects of solar activity on Earth’s climate. HHMI’s excellent EarthViewer app ([http://www.hhmi.org/biointeractive/earthviewer](http://www.hhmi.org/biointeractive/earthviewer)) is terrific for group activities with up to 4 students per device. Students can work in teams to discuss paleoclimates as surface temperatures change, continents shift positions, or O₂ levels fluctuate along the geologic time scale. The newly updated GeoMapApp ([http://www.geomapapp.org/](http://www.geomapapp.org/)) brings oceanography to the discussion with three map projections and a variety of datasets for students to manipulate. Globe.gov’s Globe Observer app ([http://observer.globe.gov/](http://observer.globe.gov/)) allows students to take and upload their own cloud cover data – even very young children can participate in data collection with a smartphone.

[http://spaceweather.com/](http://spaceweather.com/) is a beloved source of news, images, and data about Sun-Earth interactions. My community college students would take and analyze solar data from the left-hand sidebar every day for 2 weeks to look for trends. (We also analyzed data on near Earth asteroids from the bottom of the page – students taught each other how to read tables and make simple graphs to determine the relationship between asteroid diameter and miss distance.) NOAA’s Space Weather Prediction Center
provides plenty of data at http://www.swpc.noaa.gov/communities/space-weather-enthusiasts. Middle school teachers may prefer http://www.spaceweathercenter.org/education/01/01.html or http://www.classroomengineers.org/media/space-weather-and-magnetism-engineer/.

http://nasawavelength.org/ has a wealth of information and activities for all grades (P-16) on a variety of topics. They are also beta-testing resources for educators: http://nasawavelength.org/lists-by-user.

Contact Suzanne T. Metlay, Ph.D. at Western Governors University at suzanne.metlay@wgu.edu

6. Discovering, Creating, and Using YouTube Geoscience Video Snips and Tutorials for Teaching and Learning by Scott Brande, University of Alabama at Birmingham

Are you looking for short video segments suitable for teaching and learning in a geoscience course? Do you use YouTube, but don't like the web page distractions? You may find these videos, created with our new web service, EZSnips, useful. We developed EZSnips for showing video in my geology courses. To remove YouTube distractions. To make playing a video snip automatic with a single click.

Now I'm preparing video snips for my introductory geology course with EZSnips. We're looking for beta testers for feedback on use. No charge.

I'm making available for download my original PPT files with hotlinked videos that will play on a single click. Files are topic-specific. The first three are included below - 01-Introduction, 02- Minerals, 03-Volcanic. Each individual topic to follow as I continue preparing topics for my fall course.

PPT file with videos for Introduction
PPT file with videos for Minerals
PPT file with videos for Igneous Rocks - Volcanic Processes

Each posted file has additional slides with information on EZSnips, as I presented at the Earth Educators Rendezvous 2016, Univ. Wisconsin-Madison. Click Link here for my presentations, and folders of resource files.

Contact me with any questions, problems, or feedback. Please distribute to colleagues who may use YouTube video, or might be interested in using YouTube video. If you'd like to be notified as each new PPT topic file becomes available for your viewing or download, just send me your request.
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The Department of Earth and Atmospheric Sciences at SUNY Oneonta was proud to host the New York Earth Science Teachers Association (NYESTA) 3rd Annual Geologic Field Conference, July 20-22, 2016. The field trips were led by Jim Ebert, with assistance from Les Hasbargen and Deep Sen, all members of the department. The conference included an observing session at the College’s Observatory, featuring the one-meter telescope, the largest telescope east of the Mississippi. The observing session was hosted by Jason Smolinski of the Department of Physics and Astronomy.

The conference participants were great and very engaged in all of the activities, including the collection of class samples of everything from gneiss to fossiliferous limestones. We also visited karst features, including Howe Caverns. The conference ended with an awards banquet at which Jeff Callister was honored for his incredible service to Earth Science education in New York over a span of several decades.

Oneonta’s Department of Earth and Atmospheric Sciences expresses our gratitude to Renee Aubry, Rose Sanders and Ken Abbott for their help with organizing the meeting. We can’t wait to host NYESTA again!


Project Atmosphere Summer 2016. I was selected for an incredible professional development opportunity this summer: the Project Atmosphere Workshop. With support from NOAA and NSF, the American Meteorological Society hosted a 12-day workshop that was about all things weather. Previously, I completed the DataExtreme Weather course through AMS. This course highlighted oceanic, atmospheric and terrestrial climate and problem-focused activities to use with my students. At the Project Atmosphere Workshop, there were 24 participants from all across the US and Canada. Many different grade-level teachers attended this workshop. Each day we would meet at the Kansas City National Weather Service Training Center and listen to guest speakers. The Director of the National Weather Service, Dr. Louis W. Uccellini, was one of our speakers! The information and materials that I received the workshop would be wonderful resources for any teacher who teaches meteorology. I would recommend this workshop to anyone who wants to learn more about meteorology!

For more information on Datastreme visit: https://www.ametsoc.org/ams/index.cfm/education-careers/education-program/k-12-teachers/datastreme-program/

In addition to professional development for teachers the National Weather Service Training Center offers unpaid internship opportunities for students enrolled in accredited universities and colleges in a variety of fields including photography, videography, instructional design, web design, meteorology, and more http://www.nwstc.noaa.gov/
9. **Report on Summer 2016 Teacher Professional Development at Western Michigan University** by Dr. Todd Ellis

From August 10 through the 12th, Dr. Todd Ellis (Western Michigan University) partnered with the Kalamazoo Nature Center to host their first Southwest Michigan GLOBE Training at the Heronwood Field Station outside of Kalamazoo, MI. This workshop provided training on how to make atmospheric and hydrologic measurements following measurement protocols established by the GLOBE program, an international citizen and school science program now entering its 21st year. Teacher participants from around Southwest Michigan were able to get certified as GLOBE teachers, and establish implementation plans for the coming school year. This workshop, which was funded by a WMU Faculty Research and Creative Activities Award, is the first workshop hosted by Dr. Ellis in Michigan. For more information on this workshop, the GLOBE Program, or if you are interested in hosting your own GLOBE training, please contact Dr. Ellis at todd.ellis@wmich.edu.

10. **POSITION ANNOUNCEMENT: Science Education at University Northern Iowa**

University Northern Iowa is currently accepting applications for a non-tenure track, renewable-term instructor’s position. The successful applicant would primarily teach several sections of our Inquiry into Earth and Space Science content course for the Elementary Education majors, but opportunities may exist for teaching a science teaching methods course. Requirements include a master’s degree or higher with course work in Earth Science and sufficient coursework in physical science or biology to teach one of the inquiry courses for those subjects. Dr. Kyle Gray will also be at GSA if anyone wants to talk with him about the position. Kyle can also be contacted at kyle.gray@uni.edu or (319) 273-2809. Applications received by January 6, 2017 will receive full consideration. To apply, visit http://jobs.uni.edu/. Inquiries may be sent to Dr. Lawrence Escalada, Chair of Science Education at Lawrence.Escalada@uni.edu or by phone at (319) 273-7357.

11. **NAGT Announcements: some of the major events, activities, and deadlines of interest to all NAGT members both in print, on calendars, and on your individual websites.**

- This past July NAGT and partners held a very successful Earth Educators' Rendezvous in Madison, WI. Plans for Rendezvous 2017 are already in the works. Please promote the "Save the Date" event: July 17-21, 2017 at the University of New Mexico in Albuquerque, NM. http://serc.carleton.edu/earth_rendezvous/2017/index.html

- We are also running a very successful Fall InTeGrate webinar series. Free and open to the public, this series will incorporate InTeGrate pedagogies into teaching practices, provide resources available for adoption, and create a forum for participants to learn and share teaching strategies. Check out the website for upcoming topics and dates. http://serc.carleton.edu/integrate/workshops/index.html

- The Traveling Workshops Program brings national leaders in geoscience education to your campus or regional event. Formerly part of the Building Strong Geoscience Departments project, previous traveling workshops visited 22 departments from 2009-2013, meeting with 241 faculty members at two-year colleges, four-year colleges, comprehensive universities and research
intensive, PhD granting institutions.
Application Deadlines: October 15 (for Spring Workshops) March 15 (for Fall Workshops) http://nagt.org/nagt/profdev/twp/index.html

- **Attending GSA and/or AGU this year.** NAGT will be there!
  Check out NAGT’s events at GSA: http://nagt.org/nagt/profdev/GSA/2016GSA/index.html
  Check out NAGT’s events at AGU: http://nagt.org/nagt/profdev/AGU/2016AGU/index.html

Stop by booth #457 at GSA or booth #308 at AGU to learn more about our events and programming, pick up great swag, and meet other NAGT members and staff. We are always looking for volunteers to help staff the booth-- email kherbstr@carleton.edu if you are interested.

- **Our organization is only as strong and health as our membership.** Please remember to remind folks to **renew their memberships.** http://nagt.org/nagt/membership/index.html

12. **Upcoming TED Events at the 2016 Geological Society of America national meeting, Denver, CO, Sept 25-28.**

**Business and social events:**

- **NAGT Teacher Education Div. (TED) Business Meeting** - Sunday, September 25, 5:00 p.m. to 7:00 p.m., Centennial Ballroom H (Hyatt Regency Denver at CCC). All TED members are encouraged to attend as we discuss accomplishments and future directions for the Division.

- **Geoscience Educator’s Reception** (GSA, GSA Div. Geo. Ed., NAGT, DLESE, Cutting Edge, InTeGrate, IRIS, JOI, UNAVCO, EARTHSCOPE, Teacher Prep Table - Sunday, September 25, 6:30 p.m. to 8:00 p.m., Centennial Ballroom B (Hyatt Regency Denver at CCC). This event is open to anyone interested in geoscience education. From 7:00-7:30 p.m., TED, Geo-2YC, and GER will co-sponsor a “Meet and Greet” networking event where you can:
  - Identify K-12, 2YC and 4YC collaborators – both as active investigators on projects and as participants to help implement interventions or collect data
  - Find collaborators with complementary skills: statisticians, social scientists, people with expertise in specific areas (e.g. interviews, observations, analyzing data)
  - Identify others interested in asking similar questions around geoscience education research and practice

- **NAGT/GSA Geo. Ed. Div/CUR Awards luncheon** - Tuesday, September 27, 11:30 a.m. to 1 p.m., Centennial Ballroom A-B (Hyatt Regency Denver at CCC). Mingle with TED colleagues during the annual award luncheon celebrating geoscience education.
TED-sponsored topical sessions:

- **T72. Advances in In-Service and Pre-Service K–12 Earth Sciences Teacher Preparation and Professional Development**

  Sunday, 25 September 2016: 1:30 PM-5:30 PM  
  Mile High Ballroom 4D (Colorado Convention Center)

  Hosts: Suzanne T. Metlay, Mark Abolins

  Innovative approaches in teacher preparation and professional development by two-year and four-year colleges and universities may successfully address the needs of earth science educators, especially in rural or traditionally underserved areas.

- **T87. Supporting Students with Disabilities: Innovations and Strategies for Geo-Success**

  Tuesday, 27 September 2016: 1:30 PM-5:30 PM  
  Mile High Ballroom 4EF (Colorado Convention Center)

  René A. Shroat-Lewis, Wendi J.W. Williams

  This session is aimed at sharing effective geology classroom (fully face2face, hybrid, online formats), laboratory, and field experience strategies for students with disabilities (to include Universal Design applications, too).