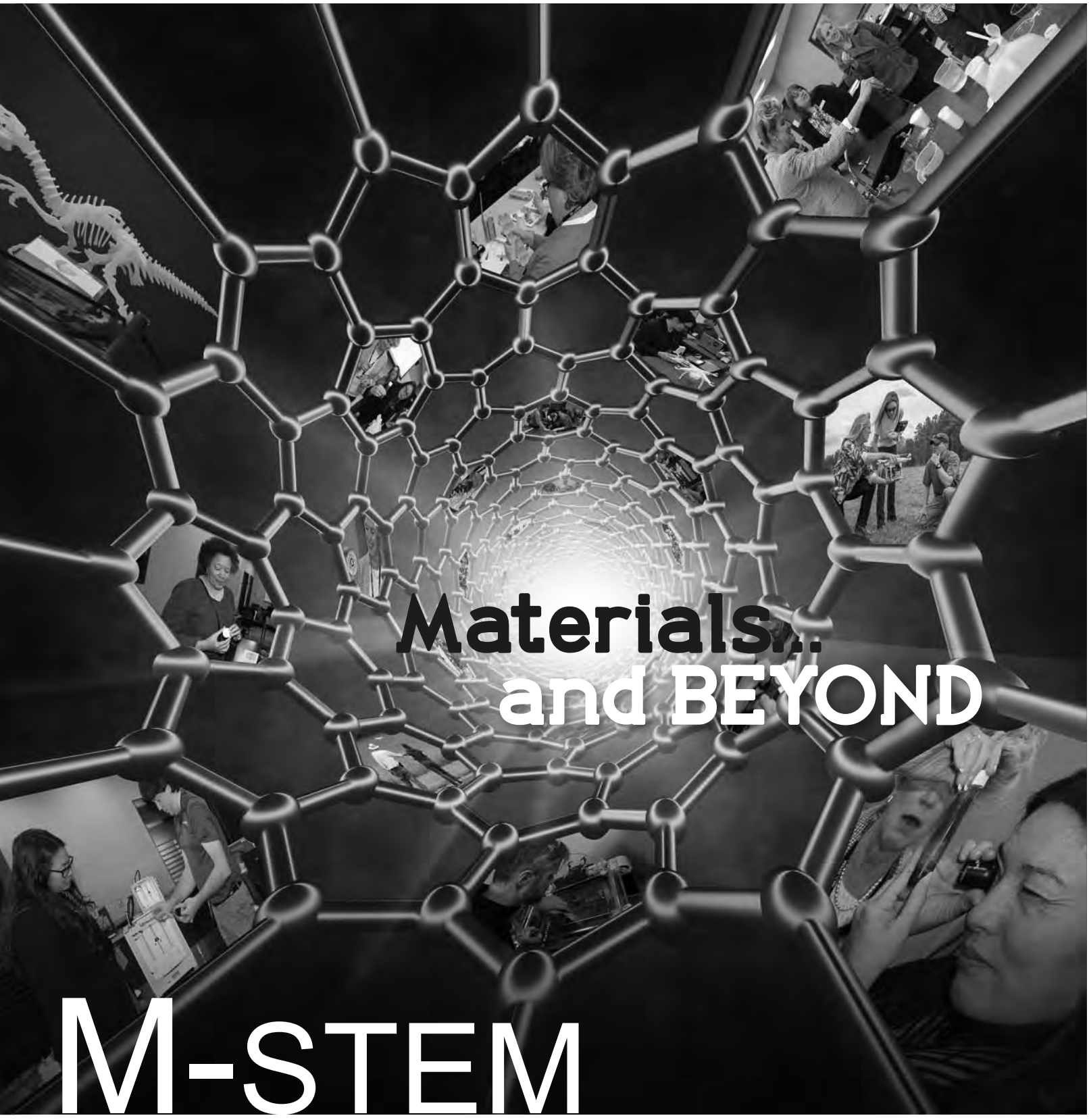


M-STEM

MATERIALS in SCIENCE | TECHNOLOGY | ENGINEERING | MATH

MatEdu
National Resource Center

November 6 - 7, 2017
Hampton VA

Hosted by:
THOMAS NELSON
The Peninsula's Community College

TABLE OF CONTENTS

TRIBUTE

DEVDAS MIZAR PAI
Oct 5, 1960 – Aug 19, 2017

Greensboro, NC
Professor of Mechanical Engineering,
NC A&T State University

M-STEM lost a valued contributor, supporter, and dear friend this year. It is with deep appreciation that we thank Professor Pai, his wife (Anjana) and family for giving us many years of devotion. He will always be remembered for his contributions to education and to his beloved Indian community.

His talent, humor, and friendship will be greatly missed by us all.

OUR PARTNERS

GeoTEd-UAS

Virginia Space Grant Consortium

MRS® ENDORSED MEETINGS

EDMONDS COMMUNITY COLLEGE

MatEdu National Resource Center www.materialseducation.org

Nano-Link Center for Nanotechnology Education

NSF

THOMAS NELSON The Peninsula's Community College

[1] Endorsed by the Materials Research Society®

ABOUT M-STEM

The Materials in STEM theme, "Materials… and Beyond", beckons us to look at the reach of materials science and technology here on Earth and in to the depths of our solar system.

This year you'll find projects, programs and initiatives at M-STEM that:

- Provide unique learning experiences
- Accelerate learning with new models, tools and techniques
- Address the individual's critical needs in the classroom
- Form strategies to engage students
- Inspire teachers with professional development opportunities

We have top-notch keynotes lined up and a special demonstration from the STEM Guitar project. Our exhibitors as well as our presenters will amaze you, and there are plenty of networking opportunities with them and your fellow attendees.

There is a focus on labs and hands-on activities and methods in our sessions this year called Intensives. It is our aim to give M-STEM attendees the knowledge and skill they need to teach the foundations in materials science and technology in a relevant and fun format.

We invite you to join us in all these activities and discussions and hope you enjoy M-STEM 2017 and Thomas Nelson, The Peninsula's Community College.

About the cover image

From the Earth's core to space and in our labs and schools the study and discovery of materials sparks the imagination of future scientists and technicians. In the images we show the amazing diversity and reach of materials that can be explored.

A message from the President of

EDMONDS COMMUNITY COLLEGE

Welcome!! I am very proud of the excellent collaboration and sharing of ideas that occurs each year at M-STEM. To have the opportunity to bring K-12, higher education, and industry partners together to share innovative ideas and learn from one another is how we can best address the workforce and educational needs of our nation.

Our country is facing challenging times as we continue to see significant growth in the demand for middle and high skill science, technology, engineering, and math (STEM) talent. According to a recent article published in USA Today, "STEM jobs — those requiring a mastery of science, technology, engineering or math skills — are overwhelmingly in high demand and will account for about 38% of all high-skill jobs created; they are also typically among the highest paid."

The U.S. Department of Labor projects that by 2018, the U.S. will have more than 1.2 million job openings in STEM-related occupations. However, the demand will far exceed the supply of qualified college graduates at the community college and university levels. For example, only 16 percent of all bachelor's degrees by 2020 will focus on STEM fields. To maintain our competitive edge, we must continue to engage students in these subject areas, from early in their primary education and beyond as lifelong learners.

Edmonds Community College is home to the National Resource Center for Materials Technology Education (MatEdU), funded by the National Science Foundation's Advanced Technological Education directorate. As educators, we collectively understand that it is imperative for us to keep pace with technological innovation and evolving employer needs. Equally important is that we work together to advance teaching and learning in support of our students. This Center provides curriculum resources for materials technology program enhancement and improvement at community and technical colleges nationwide.

The MatEdU team, and the organizer and sponsor of M-STEM, have planned an exciting few days for you. We appreciate all that the team has done. I also want to express my appreciation to Thomas Nelson Community College for hosting M-STEM 2017, MatEdU National Advisory Board, and our sponsors for partnering with us. Thank you!!

I hope you find the M-STEM **Materials…and Beyond** 2017 workshop invigorating, thought-provoking, and engaging.

Sincerely,

Dr. Jean Hernandez
President, Edmonds Community College

A message from the President of

THOMAS NELSON COMMUNITY COLLEGE

All of us at Thomas Nelson Community College are pleased to welcome you to the 2017 M-STEM Workshop.

Thomas Nelson has valued our role as a MatEdU partner college for over ten years. Furthering that relationship by hosting Materials in STEM this year, we highlight our continuing commitment to provide professional development opportunities for faculty throughout our region. We are happy that S. Stewart "Stu" Harris, Jr., an outstanding alumnus of Thomas Nelson with a distinguished career at nearby NASA Langley Research Center, currently serves as chair of MatEdU's NSF Advisory Board. Stu also serves as Thomas Nelson's project coordinator for our AIM (Advanced Integrated Manufacturing) initiative that is deeply related to materials science. An item of note is that Thomas Nelson developed the first composites course within the Virginia Community College System and supports it with a well-equipped lab and network of SMEs.

For the past fifty years, Thomas Nelson has been on the leading edge of STEM education, providing highly skilled technicians and technologists, as well as future engineers, scientists, and mathematicians, who support the major industries and research agencies that are the backbone of the economy on the Virginia Peninsula. We take pride in helping all of our students realize their potential for success and thereby contribute to the well-being and prosperity of the larger community.

I hope that you enjoy your stay in this special part of Virginia that has an exceptionally rich history and a very bright future. Best wishes for a highly productive workshop.

Sincerely,

John T. Dever
President, Thomas Nelson Community College

SCHEDULE

AT-A-GLANCE

MATERIALS... AND BEYOND!

Day 1 - Monday, November 6, 2017

8:30 – 8:45 am	Continental Breakfast and Networking
8:45 – 9:45 am	Welcome/Keynote Address
10:00 – 11:50 am	Concurrent Sessions
11:50 – 1:05 pm	Lunch/Keynote Address/Networking
1:10 – 3:00 pm	Concurrent Sessions
3:15 – 5:15 pm	Concurrent Lab-based Sessions
5:30 – 5:45 pm	Evaluations Day One and Prize Drawings
5:45 – 7:30 pm	Banquet and Virtual Reality Presentation

Day 2 - Tuesday, November 7, 2017 (limited space)

8:00 – 8:30 am	Continental Breakfast and Morning Welcome
8:30 – Noon	Tuesday Intensive Sessions
Noon – 1:00 pm	Lunch/Networking
1:00 – 4:00 pm	Tuesday Intensive Sessions and Evaluations Day Two

We'd like to say a special thanks to Tennessee Tech University and Purdue University Northwest for sponsoring the meals for M-STEM.

[1] Tennessee Tech University DUE # 1601587
[2] Purdue University Northwest DUE # 1700674

Virginia Space Grant Consortium

The M-STEM Hosts wish to thank VSGC for their sponsorship and for sharing the wonderful GeoTEd-UAS project with us.

GeoTEd-UAS

AGENDA

MONDAY
November 6, 2017

8:00 am - 5:00 pm	Registration Open Thomas Nelson Community College, P Building		
8:30 am - 8:45 am	Continental Breakfast Room 1301		
8:45 am - 9:00 am	Welcome - Announcements Mel Cossette, Principal Investigator, MatEdU Dr. Carey Schroyer, Dean of STEM, EdCC John T. Dever, President, TNCC Room 1301		
9:00 am - 9:45 am	Keynote Address Darrel Tenny "Highlights of NASA Research on Materials for Advanced Aircraft and Space Launch Vehicles" Room 1301		
9:45 am - 10:00 am	Break / Exhibits		
10:00 am - 10:50 am SESSIONS	STEAM + ME = Success Veronica Dean 75 minutes 10:00-11:15 Room 1301	Microlearning Techniques Kim Grady Room 2262	Choose a session
11:00 am - 11:50 am	Using Visualization and Active Learning to Teach Material Properties Anselm Spoerri 11:20-11:50am Room 2264	Thermoset vs. Thermoplastic Polymers Brianna Richardson/Scott Spohler Room 2262	Choose a session
11:50 am - 1:05 pm	Lunch Keynote Address "Guitar Building Institute" Tom Singer Room 1301		
1:10 pm - 2:00 pm	Composites Recycling Ann Avary and Kristin Hardin Room 1301	The Toothpick Factory Marilyn Barger Room 2264	Choose a session
2:10 pm - 3:00 pm	Ceramics and Glass Debbie Goodwin Room 315 - Hastings Hall	Remotely Accessible Technology Bob Ehrmann Room 2235	Choose a session

MONDAY
November 6, 2017 (continued)

3:15 pm - 5:15 pm LABS	Engineering Water Rockets Craig Johnson Room 1301	Teachers with Torches Brianna Richardson Room 2262	Choose one of these two hour labs
	Composite Sandwich Panels Jean Frank Room 2264	When Size Matters… Nanoscience and STEM Education NanoHU Room 319 - Hastings Hall	
5:30 pm - 5:45 pm	Evaluations and Prize Drawing Room 1301		
5:45 pm - 7:30 pm	Banquet "Virtual Reality for Interactive Problem-solving and Active Learning in STEM Disciplines" Magesh Chandramouli		

TUESDAY
November 7, 2017

8:00 am - Noon	Registration		
8:00 am - 8:30 am	Continental Breakfast, Welcome and Introduction to the Day Ahead Room 1301		
	Pick one intensive and stay with it throughout the day. Gain a skill through these intensive sessions!		
8:30 am - Noon	3D Printing Introduction- Gary Wainwright Tom Pringle Room 317 - Hastings Hall	Solids - Science of Stuff Debbie Goodwin/Andy Nydam Room 315 - Hastings Hall	Unmanned Aircraft Systems Chris Carter /Scott Bellows Room 2235
Noon - 1:00 pm	Lunch: Networking Room 1301		
1:00 pm - 4:00 pm	3D Printing Intensive Continued Evaluations	Materials Science Intensive Continued Evaluations	UAS Intensive Continued Evaluations

TUESDAY

INTENSIVES

NOVEMBER 7, 2017

Intensives are a unique opportunity to accomplish a new skill through a more comprehensive full-day training format. Intensives promise a lot of interactivity and hands-on activities replicable in classrooms. You'll be contacted for your choice after you register. Space may be limited. **Choose one topic area and attend all day Tuesday:**

Solids-the Science of "Stuff"

Debbie Goodwin and Andy Nydam

Use solids to make chemistry and physical science more STEM-friendly, easier to teach and learn and relevant for students. Inexpensive and readily available materials are used to show practical and engaging ways to involve students in STEM projects/labs – with an emphasis on the "E" (engineering). Attendees actively participate in labs and activities and take home a CD of information and resources.

Unmanned Aircraft Systems

Chris Carter, Dr. Scott Bellows and Cherie Aukland

Unmanned Aircraft Systems (UAS), commonly referred to as drones, are increasingly being used to collect data and support decision making in numerous employment sectors. This emerging technology is revolutionizing the collection of data including scientific research, construction and infrastructure inspections, precision agriculture, real estate and wedding photography, forestry, emergency management, package delivery, and more. A UAS consists of a vehicle, sensors, ground control, and operators. This session highlights the many forms of UAS and allows participants to gain hands-on experience as an operator technician to fly a UAS. Attendees learn about vehicles, safety and federal regulations, sensors and more while flying in competitions and collecting and reviewing real data. Educators build a drone and learn about the many components of a UAS including data analysis tools that are used to turn data into decisions.

3D Printing Classroom Integration

Tom Pringle with Introduction by Gary Wainwright

3D printing is being used to prototype inventions and parts, print food, engineer medical devices, and other uses we couldn't imagine five years ago. In this hands-on intensive, participants gain the skills to adopt this technology in multiple ways in the classroom. As Technology Outlook: STEM + Education 2013-2018 stated: 3D printing is relevant in teaching and learning as a way to enable more authentic exploration of objects that may not be readily available to teachers and students; it provides a means to let students handle fragile objects, such as fossils and artifacts that can be fairly quickly prototyped and printed out; and it opens up new possibilities for learning activities.

SESSION

DESCRIPTIONS

MONDAY

November 6, 2017

8:00 am – 5:00 pm	**Registration and Exhibits Open:** Thomas Nelson Community College, P Building
8:30 – 9:45 am	**Welcome, Keynote Address:** PWDC - Room 1301 Darrel Tenney, Senior Aerospace Technologist, Analytical Services and Materials, Hampton, VA Highlights of NASA Research on Materials for Advanced Aircraft and Space Launch Vehicles
10:00 – 10:50 am	**Microlearning Techniques for STEM:** Room 2262 Microlearning is basically an approach of key content delivery in small, dynamic, focused units. Learning "nuggets" (often 3-5 minutes long or shorter) are designed to meet a specific learning outcome and are typically in media rich formats. New ways to develop and deliver these nuggets is presented including using the camera in the classroom and the next generation of flash cards, "Knowledge Cards". Key components of microlearning-based content design and delivery are discussed. Techniques specific for using microlearning techniques for STEM content delivery are covered. **Kim Grady**, Principal, BehaveHeuristics, Apache Junction, AZ
10:00 – 11:15 am	**STEAM + ME = Success:** Room 1301 STEAM (Science, Technology, Engineering, Arts, Mathematics + ME (Materials Engineering) = Success is a societal awareness engineering project to construct academic tools for survival packs. The project is for students grades K through 12 and post-secondary. Students construct a variety of carry on or carry around packs for homeless students, homeless people, or veterans (Veteran Resource Center). Participants: recognize and realize the numbers of homeless student population, homeless people, or veterans in their neighborhood and their need for maintaining dignity and quality of life. Participants will construct academic tools and packs using STEAM + ME principles. **Veronica Dean**, Faculty, Mt. Healthy Jr./Sr. High, Cincinnati, OH
11:00 – 11:50 am	**Thermoset vs. Thermoplastic:** Room 2262 Polymers can be characterized as thermoplastic or thermoset. Thermoplastics can be reshaped after heating and are therefore recyclable. Thermosets are the result of a heat-producing chemical reaction. They are non-recyclable except for use as fillers. A few examples of thermoset products are shown. After a brief description of the chemistry that is involved in the "setting" of the polymers, participants have the opportunity to make some polyurethane foams, both rigid and flexible. They also make some polyurethane resin shapes using molds. The properties of the different polyurethanes are discussed as well as how the chemistry creates or influences those properties. Additional classroom uses for the products made are suggested. **Brianna Richardson**, K-12 Science Faculty, Washington High School, Washington Court House, OH and **Scott Spohler**, K-12 Science Faculty, Madison Plains Schools
11:20 – 11:50 am	**Using Visualization and Active Learning to Teach Material Properties:** Room 2264 This presentation explores why interactive data visualization is such a powerful teaching tool for Material Science and Engineering (MSE). Typically, students look up individual material properties data in a table in a book or search for it online. Students then focus on which value to use as they attempt to choose from thousands of materials – completely missing the point of why materials have the property values they do (materials science) and which ones they can change as a materials engineer or design as a materials scientist. Much time is spent selecting materials and looking up data, when more time could be spent exploring material properties or understanding fundamental materials science. Interactive data visualization can bridge this gap by presenting material properties data in dynamic visualizations that tell a story with the data and by enabling students to actively engage with the data so they can develop a deeper understanding of MSE. **Anselm Spoerri**, Assistant Professor, Rutgers University, New Brunswick, NJ

11:50 – 1:05 pm	**Keynote Lunch:** Room 1301 **Tom Singer**, Faculty and Director of the STEM Guitar Project, Sinclair Community College, Dayton, OH
1:10 – 2:00 pm	**The Toothpick Factory:** Room 2264 The Toothpick Factory is hiring! Meeting the demands of a highly competitive custom toothpick industry, the "Toothpick Factory" challenges participants to not only make the best custom toothpicks but also to become great team members. Even those employees with strong technical skills often lack adequate employability skills. It's very important for educators to continuously embed these skills in education. The FLATE Center of Excellence for Advanced Technological Education's Toothpick Factory simulation offers a great way to focus participants on teamwork and communication skills in a non-threatening and fun hands-on simulation set in a manufacturing workplace setting. **Marilyn Barger**, Executive Director, Florida Advanced Technological Education Center of Excellence, Tampa, FL
	Composite Recycling Technician Education Program/CRTEP: Room 1301 CRTEP provides an innovative workforce education solution to an industry-identified need for technicians who can safely and efficiently identify, handle, sort, track and catalogue scrap material diverted during the manufacturing process for repurposing. Skagit Valley College and the University of Alabama at Birmingham are creating curriculum and a database for composite technicians working with composite waste stream and scrap material. Session attendees learn about the project outcomes, lessons learned, and have the opportunity to provide feedback on the curriculum modules and test the database template Participants are requested to bring a connected device. **Ann Avary**, Director, Skagit Valley College, Mt. Vernon, WA and **Kristen Hardin**, Graduate Student, University of Alabama Birmingham, AL
2:10 – 3:00 pm	**Remotely Accessible Technology and Problem-Based Learning Experiments:** Room 2235 The Remotely Accessible Instruments for Nanotechnology (RAIN) Network (led by NACK) is growing and now has more than ten providers across the United States. Several classroom laboratory activities that integrate remote access have been created and are now available for use in K-to-college classrooms. The presenters will share the results of a recent study on the impact of using problem-based learning (experiments from the RAIN library) integrated with remote access technology (from RAIN providers) focused on underrepresented minority student populations. Extension of remote access into other technologies is explored. **Robert Ehrmann**, Director, Penn State University, University Park, PA
	Ceramics and Glass: Labs and Demos for the High School Science Classroom: Room 1301 This workshop includes a primer on the basic chemistry and properties of glass and ceramics. Participate in four labs/demonstrations that support the NGSS Science and Engineering Standards. This interactive workshop includes background information that gives participants a new perspective on phases of matter, the periodic table and bonding. Labs and demonstrations that support the NGSS Science and Engineering Standards are provided. **Debbie Goodwin**, Teacher/Trainer, ASM International, Chillicothe, MO
3:15 – 5:15 pm LABS	**Engineering Water Rockets:** Room 1301 Water rocket activities are one of the most popular STEM activities used in primary, secondary, and higher education, yet are typically void of engineering, though engineering is heavily implied in the STEM acronym. We'll investigate the amount of engineering present in water rocket activities, and options for emphasizing engineering more using an open-platform flight simulator for use by educators to enable students to predict flight parameters of a water rocket they designed, and test those predictions against experimental data. We've developed a simulator we can further validate by looking at multiple parameters... AND we'll have fun doing it! **Craig Johnson**, Foundry FEF Key Professor, Center Washington University, Ellensburg, WA
	Teachers with Torches: Room 2262 This workshop is designed to increase comfort level with using torches in classrooms. We will provide this opportunity to practice working with torches and materials, to gain confidence and expertise in the use of hot work in the classroom. We'll provide an array of affordable lab activities that demonstrate material properties and how those properties can be changed or manipulated. Activities to be done include working with glass, metal and ceramics. **Brianna Richardson**, K-12 Science Faculty, Washington High School, Washington Court House, OH

	When Size Matter... Nanoscience and STEM Education: Room 319 – Hastings Hall Nanoscience and nanotechnology are rapidly growing fields that are interdisciplinary in nature; encompassing various areas of Science, Technology, Education and Mathematics (STEM). The purpose of this session is to introduce educators to fundamental concepts in nanotechnology. Participants engage in simple, hands-on experiments that demonstrate the impact of nanotechnology. While "playing" with memory wire and magic sand, participants explore how fundamental properties change at the nanoscale and deliberate on how these ideas might be incorporated into courses. Participants have the opportunity to explore how biomimetics can inform the next generation of materials in nanotechnology. The workshop is conducted by representatives from "NanoHU" (The Nanoscience Project at Hampton University), established in 2012 with funding from the National Science Foundation (HRD 1238838). The NanoHU team includes: **Dr. Michelle Claville** (Principal Investigator), **Mr. Brandon Parker** (Program Manager), **Dr. Sainath Babu** and **Dr. Shawn Dash**
	Composites Sandwich Panels: Room 2264 The objective of this activity is to engage secondary education students in improving the mechanics of sandwich composites via construction and testing. Groups/teams fabricate composite paper panels and create both beams and signboards. The beams are tested for specific stiffness, while the team signboards are compared by popular votes. Participants quantitatively compare the mechanical properties (e.g. specific stiffness) of single sheet paper and sandwich composites in bending and evaluate and apply recycling criteria to composites such as this one. We'll also discuss what "soft skills" we use in this type of team classroom activity. **Jean Frank**, Instructor, Thomas Nelson Community College, Hampton, VA
5:30 – 5:45 pm	**Evaluations and Prize Drawing**
5:45 – 7:30 pm	**Banquet, Virtual Reality for Interactive Problem-solving and Active Learning in STEM Disciplines:** Room 1301 **Magesh Chandramouli**, Associate Professor of Computer Graphics Technology, Purdue University Northwest, Hammond, IN

TUESDAY

November 7, 2017

8:00 am – Noon	**Registration Open:** Thomas Nelson Community College, P Building
	Welcome - Announcements **Robin Ballard**, Program Manager, MatEdU
8:30 am – Noon	**Intensives** 3D Printing Solids – Science of Stuff Unmanned Aircraft Systems
Noon – 1:00 pm	**Lunch - Networking**
1:00 pm – 4:00 pm	**Intensives (Continued)** 3D Printing Solids – Science of Stuff Unmanned Aircraft Systems
3:45 pm – 4:00 pm	**Evaluations**

AM WATCH

ADDITIVE MANUFACTURING WORKFORCE ADVANCEMENT TRAINING COALITION AND HUB

M-STEM and MatEdU's Technician Education in Additive Manufacturing and Materials (TEAMM) program join to gratefully acknowledge the support from Tennessee Tech University and wish to recognize their leadership through the AM - WATCH, Additive Manufacturing Workforce Advancement Training Coalition and Hub.

M-STEM sponsors take a moment to salute the accomplishments and recent 100 YEAR celebration at NASA Langley, "The Unknown and Impossible."

"Every big, important thing that happened in aviation in that time period, up to World War II, was dependent upon the research done by NACA at Langley."--Hampton native and NASA legend, Christopher Kraft

Thank you for permissions granted by Daily Press, *NASA Langley at 100 Years: The Unknown and Impossible*

OUR

EXHIBITORS

We wish to acknowledge and thank our exhibitors at M-STEM 2017

THOMAS NELSON™

The Peninsula's Community College

CMI | Critical Materials Institute

CERAMIC AND GLASS INDUSTRY FOUNDATION

The American Ceramic Society

Virginia Space Grant Consortium

ATE CENTERS

www.atecenters.org

Mc Graw Hill Education

ASM Materials Education Foundation

Nano-Link

Center for Nanotechnology Education

Jefferson Lab

They are here to share information, answer questions and talk through situational problem solving with you. They are rich in resources and happy to assist within their areas of expertise. We are delighted to welcome them and hope you will stop by and chat with each of them.

[1] Jefferson Lab logo used with permission

AIM for Success. Increase your skill set and earning potential by becoming a multi-skilled technician. Learn through exiting real-world, hands-on experiences with local industry partners.

THOMAS NELSON
The Peninsula's Community College

tncc.edu/aim

Contact Thomas Nelson at: **(757) 825-2800** or email: **admissions@tncc.edu**

FLATE

Made in FLORIDA

FLATE

www.fl-ate.org www.madeinflorida.org

NSF

Florida Advanced Technological Education Center

Connecting Manufacturers, Educators & Students with Florida High-Tech Workforce

CURRICULUM ~ OUTREACH ~ PROFESSIONAL DEVELOPMENT

SPEAKER

BIOS

Avary, Ann	Director, Center of Excellence for Marine Manufacturing & Technology, Skagit Valley College; Principal Investigator, Composite Recycling Technician Education Program (CRTEP)

Ms. Avary works directly with the marine industries of Washington State and national partners to embed standards-based technologies, processes and best practices in the classroom and lab. Since 2006 she has led six research projects focused on the marine industries workforce and has sponsored the development of skill standards for composite technicians. As Principal Investigator for the Composite Recycling Technician Education Program (CRTEP), she has taken a leadership role in the introduction of innovative curriculum for technician education and applied research for two-year students via a composite scrap material database template. She also serves as Chair of the Marine League of Schools, a national consortium of marine technology education providers. Ms. Avary holds a B.A. in Economics, and is currently working on a "project" boat, named Bucket.

Babu, Dr. Sainath	Assistant Professor, Department of Biological Sciences at Hampton University, Hampton, VA

Dr. Sainath Babu is an Assistant Professor in the Biological Sciences at HU. He works with Dr. Michelle Claville to execute technical research projects associated with the NanoHU program. Dr. Babu received his doctorate (Ph.D.) in Environmental Toxicology from Southern University A & M College (Baton Rouge, Louisiana) and has expertise in biochemical reactions, peptide synthesis and nano-assemblies. Dr. Babu currently focuses on understanding the mechanisms of biochemical and electrochemical oxidations of methionyl- and cystyl- peptides. Dr. Babu is author/co-author of ten peer-reviewed articles, and numerous presentations at national and international meetings.

Barger, Dr. Marilyn	Executive Director and Principal Investigator, FLATE, Tampa, FL

Florida Advanced Technological Education is a National Science Foundation Regional Center of Excellence located at Hillsborough Community College in Tampa Florida. Dr. Barger has undergraduate degrees in chemistry and civil engineering and a Ph.D. in Environmental Engineering. She has over 20 years developing, writing and deploying STEM curriculum for all levels in our education system. Dr. Barger is a licensed professional engineer in Florida, holds a licensed patent and has authored a number of peer-reviewed journal articles.

Bellows, Dr. Scott	Technical Programs Coordinator at the Virginia Space Grant Consortium where he heads GEOTREK-12, Hampton, VA

Dr. Bellows has 14 years experience in geospatial technology (GST). Scott specializes in spatial modeling of ecological survey data and spent six years teaching GST courses at Old Dominion University, Norfolk, Virginia. His primary research involved working with the Mosquito Control Commission for the City of Chesapeake, Virginia, to develop GIS-based models for identifying the habitats of mosquitoes responsible for the transmission of West Nile Virus and eastern equine encephalitis. Scott has also worked with researchers at the Virginia Coast Reserve Long-Term Ecological Research Project in developing GIS models for isolating geomorphic landscape features.

Carter, Chris	Deputy Director, Virginia Space Grant Consortium; Principal Investigator, Geospatial Technician Education-Unmanned Aircraft Systems (GeoTEd-UAS)

As the Deputy Director of the VSGC, Mr. Carter oversees the consortium's comprehensive higher education, precollege and outreach programs including VSGC's scholarship and fellowship program, and several internship programs. The VSGC receives seed funding from NASA to coordinate and develop STEM education, research and workforce development programs statewide. Mr. Carter also served as the Principal Investigator for two previous National Science Foundation, Advanced Technological Education Program funded GeoTEd projects. Carter holds a B.S. in Management Science from Virginia Tech and an M.Ed. in Instructional Technology from East Tennessee State University (ETSU).

Chandramouli, Dr. Magesh	Associate Professor of Computer Graphics Technology, Purdue University Northwest, Hammond, IN

Formerly a Frederick Andrews Fellow at Purdue University, West Lafayette, Dr. Chandramouli completed his doctoral studies from the Department of Computer Graphics Technology. He obtained a Master of Engineering from the National University of Singapore and Master of Science from the University of Calgary, Canada. He completed his Bachelor of Engineering from the College of Engineering, Guindy, India. Dr. Chandramouli has published journal articles in prestigious international journals and has presented papers in respected national and international conferences. He has received federal, regional and international grants for his work in areas including virtual reality, STEM education, Human Computer Interaction and Genetic Algorithms in Graphics.

Claville, Dr. Michelle	Assistant Dean, School Science/ Principal Investigator for the Nanoscience Project at Hampton University (NanoHU)

Dr. Claville is the Principal Investigator for the Nanoscience Project at Hampton University (NanoHU). She also serves as the University's Assistant Dean for the School of Science, Professor of Chemistry, and a member of the American Chemical Society's Committee for Professional Training. She received the prestigious NSF Faculty Early Career Development Award, and has mentored scores of students and faculty in biological chemistry. Together with her protégés, she has published 17 peer-reviewed scientific publications, and presented papers at over 50 scientific conferences. She possesses a Ph.D. and B.S. in Chemistry, and B.A. in English, all earned at the University of Florida (Gainesville, Florida).

Dash, Dr. Shawn T.	Assistant Professor in the Department of Biological Sciences at Hampton University, Hampton, VA

Dr. Dash is an Assistant Professor in Biological Sciences in the School of Science at Hampton University. Principal Investigator and Mentor for NanoHU Pioneers Summer Research Program. Teaching a variety of courses including introductory and organismal biology, ecology, entomology, invertebrate zoology, desert ecology, zoology, medical entomology, animal behavior, birds and mammals, anatomy and physiology, animal ecology, and human biology, Dr. Dash strives to share his passion for biology. Frequently, an invited speaker to local nature organization, Dr. Dash's research focuses on biodiversity and systematics of invertebrates, particularly ants. In addition to his myrmecological research, Dr. Dash is dedicated and focused on science education, with a deep interest in using taxonomy as a means of introducing the scientific process to undergraduates.

Dean, Veronica	Science Teacher, Mt. Healthy Jr./Sr. High, Cincinnati, OH

With 25 years of experience in education, Ms. Dean has an interesting road in her career as an educator. She was a White House reporter for a financial wire service, a radio announcer, an entertainer, a spokesmodel for several Procter and Gamble products, and runway model. She produced, wrote, and starred in a cable television show, Café Science, for 10 years. She also had the honor of reviewing National Science Foundation grants. In her current position, she is the advisor for the University of Cincinnati Minorities in Mathematics Science and Engineering Club. This is her 17th year in this position. Veronica has presented at numerous STEM conferences and was nominated for the Presidential Award for Excellence in Mathematics Science and Technology; the recipient of Teacher of the Year from University of Cincinnati Minorities in Mathematics Science and Engineering; and three-time nominee for Teacher of the Year with Mt. Healthy City Schools. Ms. Dean has a B.S. in Social Sciences, and an M.Ed. in Elementary Education.

Ehrmann, Robert	Managing Director, Penn State Center for Nanotechnology Education and Utilization (CNEU), University Park, PA

The CNEU is the home to the National Nanotechnology Applications and Career Knowledge (NACK) National Support Center that has a national mission to facilitate the development of nanotechnology workforce education programs at community and technical colleges across the nation. The CNEU is also the home of the Pennsylvania Nanofabrication Manufacturing Technology (NMT) Partnership, the nation's leading program in associate and baccalaureate level nanotechnology education. Mr. Ehrmann previously worked for 23 years for Corning, Inc. where he held multiple positions in engineering and product development as well management positions in engineering, production and project management. Mr. Ehrmann earned a B.S. in Ceramic Engineering from Rutgers University as well as an MBA from West Virginia University.

Frank, Jean	Assistant Professor of Industrial Technology, Thomas Nelson Community

Ms. Frank has 25 years of experience in aviation and nuclear power generation industries. As faculty at Thomas Nelson Community College, she teaches composites and is developing a series of modules for the National Science Foundation's Innovative Model to Augment Technician Education with Competencies (IMATEC) project. She holds a Master in Science in Applied Science and Technology, Federal Aviation Administration Airframe and Powerplant credential, Certified SpaceTEC Examiner and holds multiple Siemens certifications.

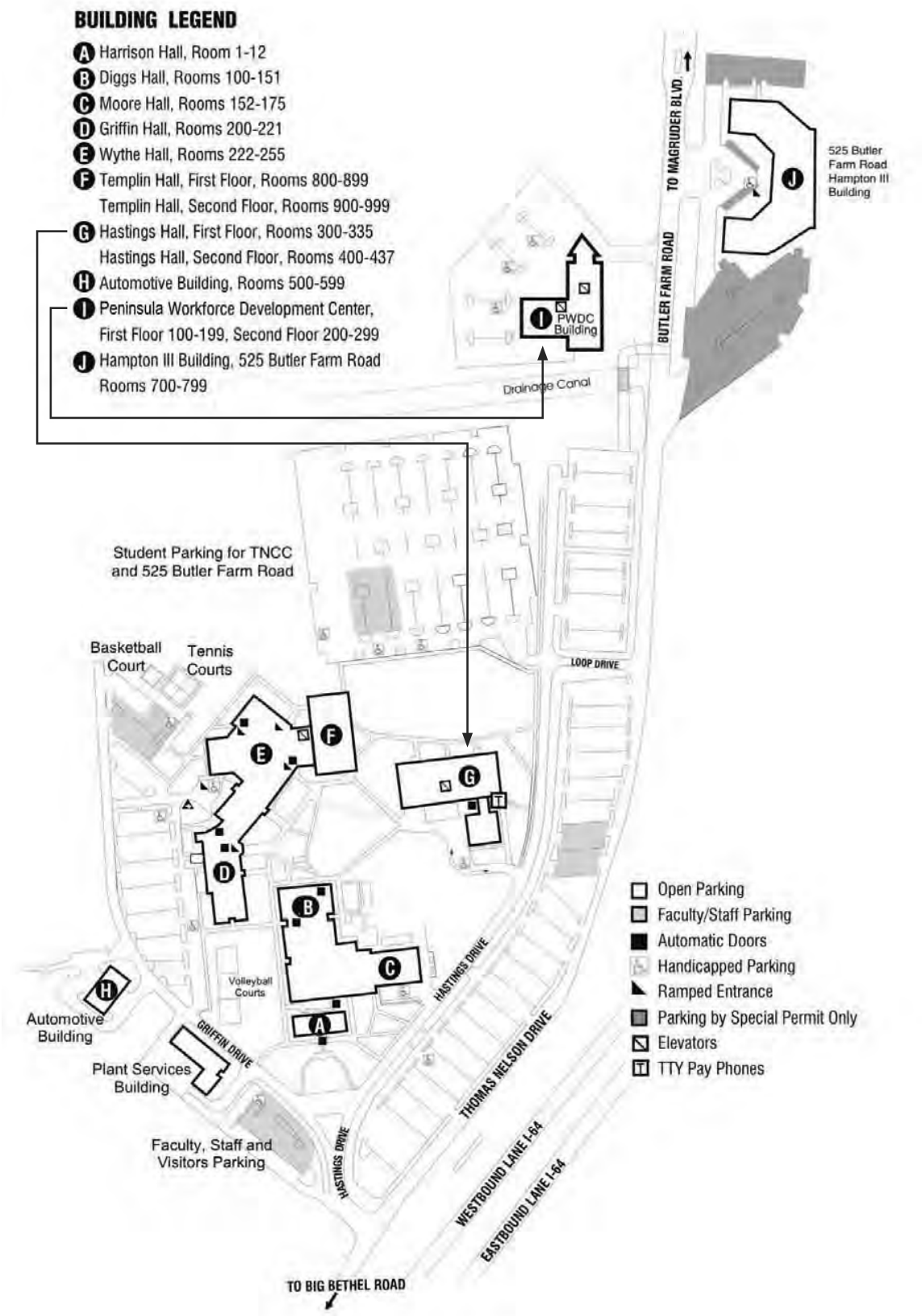
Goodwin, Debbie	Materials Science Teacher Trainer, ASM Education Foundation, Chillicothe, MO
Ms. Goodwin has 31 years of teaching experience in high school and middle school science. Debbie retired from Chillicothe High School in Missouri where she taught Materials Science and Technology (MST) for 17 years. Other subjects she has taught include Biology, Chemistry, Physical Science and Applied Biology/Chemistry. She has made MST presentations at numerous regional and national conferences including National Science Teachers Association (NSTA). She has also instructed at summer workshops on Applied Biology/Chemistry (ABC) and MST in various states including serving as a Master Teacher for the ASM Materials Science Teachers Camp program since 2002. Debbie has a B.S. in Education (Biology/Chemistry) from Southwest Missouri State University and her M.S. in Education from Central Methodist College.	
Grady, Kim	Principal of BehaveHeuristics, Apache Junction, AZ
BehaveHeuristics is a consulting firm located in Arizona. Ms. Grady's background is in teaching curriculum development, learning theory and learning technologies. Her combination of experience with fortune 500 technology companies and higher education learning organizations has provided her with unique insights into the future of education and established her as an expert on the convergence of learning and technology. She has written and managed federal and regional grants for the National Science Foundation's Advanced Technological Education Program centers and projects. She shares her insight and experience through speaking, writing and mentoring clients in the area of learning system design. She holds a B.S. in Education and M.Ed. in Instructional Technology & Computers from Arizona State University.	
Hardin, Kristin	Graduate Student, University of Alabama Birmingham Materials Engineering
Ms. Hardin holds her Bachelor and Master in Materials Engineering from UAB and is a member of a number of professional and student chapters of organizations including President of the Society for the Advancement of Materials and Process Engineering (SAMPE); Vice President of the Society for Plastics Engineers (SPE); and Alpha Sigma Mu, the international professional and academic honor society for the field of materials science and engineering. Ms. Hardin is a member of the American Composites Manufacturing Association's (ACMA) Recycling Committee, a group that combines industry and academic professionals on the topic of composite recycling. Her award winning work has been featured at the Composites and Advanced Materials Expo (CAMX) and SAMPE. She has been a part of the composites group and Materials Processing Application Development (MPAD) Center at UAB since 2012.	
Johnson, Dr. Craig	Faculty, Central Washington University; Foundry FEF Key Professor, Ellensburg, WA
Dr. Johnson uses his P.E. in Materials Engineering to consult in failure analysis, weld inspections and material characterization along with his students in the Mechanical Engineering Technology Program. His work with the CWU green sand foundry, composites facilities and characterization labs allows research in solidification, joining/interfaces and systems performance. His prior secondary education experience supports continued education research as noted in ASEE and MatEdU.	
Nydam, Andrew	Materials Science Teacher Trainer – ASM Education Foundation, Olympia, WA
Mr. Nydam is a retired materials science teacher who helped develop materials science curriculum beginning at Pacific Northwest National Labs in the 1980's. Mr. Nydam taught for 30 years at North Thurston and Olympia School Districts. Presently working for Ohio State University and ASM (American Society of Metals) on STEM teacher training as well as middle school and additive manufacturing initiatives.	
Parker, Brandon	Program Manager for the Nanoscience Project at Hampton University (NanoHU), Hampton, VA
Mr. Parker manages all the technical aspects and daily fiscal operations of the NanoHU program. Mr. Parker received his B.S. in Chemistry from Southern University and A & M College (Baton Rouge, Louisiana) and M.S in Educational leadership at Argosy University (Sarasota, Florida). His research interests are educational policies and procedures associated with interdisciplinary STEM programs. Mr. Parker is pursuing his Ph.D. in Higher Education Administration at the University of Phoenix (Phoenix, Arizona).	
Pringle, Thomas	Faculty, Thomas Nelson Community College, Hampton, VA
Mr. Pringle has been teaching drafting and additive manufacturing in the STEM division at Thomas Nelson Community College since 2008. He holds an A.S.T., ITT Technical Institute and a B.B.A., American Intercontinental University.	
Richardson, Briana	Faculty, Washington High School, Washington Court House, OH
Ms. Richardson has taught science for 8 years. Before teaching, she was a pastor and has a Master of Theology from Trinity Lutheran Seminary (Columbus, OH). She also has undergraduate degrees in biology and chemistry from Thiel College (Greenville, PA), education classes from Muskingum University (Muskingum, OH) and has learned materials science through ASM and Ohio State University. Briana is teaching a year-long materials science class at her current high school this year and for several years has worked with ASM to introduce teachers to materials science through ASM's free professional development summer camps. In addition, she has presented at the National Science Teachers Association (NSTA) regional and national conferences as well as state science conferences.	

Singer, Tom	Professor, Mechanical Engineering Technology, Sinclair Community College, Dayton, OH
Mr. Singer focuses his instruction in the area of design and manufacturing of products in the MET program curriculum. He also manages the CollabNFAB FAB lab at Sinclair that produces 1000+ guitar kits a year for The STEM Guitar Project. A Project Lead The Way affiliate professor for IED, NISOD Teaching Excellence award winner and ETAC-ABET Commissioner, Mr. Singer has taught both at the high school and collegiate levels. http://www.guitarbuilding.org	
Spoerri, Anselm	Assistant Professor, Rutgers University, New Brunswick, NJ
Dr. Spoerri is a faculty member at the School of Communication and Information at Rutgers University. He has conducted research in the field of information visualization for the last 20 years and teaches students how best to visualize data. Dr. Spoerri holds a Ph.D. from Massachusetts Institute of Technology, MIT.	
Spohler, Scott	Faculty, Madison Plains High School, London, OH
Mr. Spohler has 26 years of teaching experience in physics, chemistry, physical science, engineering and a host of other science classes. Many years ago, Scott received his Bachelor of Natural Science from Adrian College (Adrian, MI) and completed his Master of Curriculum and Instruction from Ohio Dominican University (Columbus, OH). He has made presentations at the Science Educators Council of Ohio Conference and the National Science Teachers Association (NSTA) regional and national events. For the last six years, Mr. Spohler has been involved with ASM and working with other teachers at free professional development camps across the United States helping to bring materials science into more classrooms. He now teaches at the Global Impact STEM Academy in Springfield, Ohio.	
Tenney, Dr. Darrel	Program Manager, Senior Aerospace Technologist, Analytical Services and Materials (ASM)
 Dr. Tenney has extensive experience with aerospace technology development programs. He has a wide-range of knowledge in research and development of advanced com¬posites and metallic materials, application of advanced composites to aerospace structures for both aircraft and spacecraft, environmental effects on materials in both aircraft and space applications, technology assessments, identification and solutions to critical barriers, identification of key challenges for developing new R&D efforts, and experience in formulating and advocating new programs. He was the lead on the "Evaluation of Advanced Composite Structures Technologies for Application to NASA's Vision for Space Exploration" study, recently conducted by AS&M for NASA LaRC. Dr. Tenney was the Director, Aerospace Vehicle Systems Technology Office (AVSTPO), NASA LaRC until 2004 and prior to that was Chief of the Materials Division, NASA LaRC. Dr. Tenney also served as Assistant Chief, Materials Division, LaRC (1986-1987); Head, Environmental Effects Branch, LaRC (1980-86); Research Project Manager, LaRC (1974-80); and Assistant Professor, Materials Engineering, Virginia Tech (1969-74). He holds a Ph.D. of Materials Engineering, VA Tech, Blacksburg, VA, and is a graduate of the Harvard University Program for Management Development (PMD).	
Wainwright, Gary	Lead Engineering Technician in the Advanced Fabrication Processes section at NASA Langley Research Center (LaRC)
His career began in 1987 when Mr. Wainwright was hired as a part of the cooperative education program with Thomas Nelson Community College (TNCC) and NASA LaRC. He successfully transitioned to the LaRC apprentice program and graduated in 1992. Mr. Wainwright has been working in additive manufacturing since 1996 when LaRC purchased a sterolithography (SLA) system. He currently has over 20 years' experience and holds a certification in Additive Manufacturing from the Society of Manufacturing Engineers. Mr. Wainwright has perfected the fabrication of lightweight, dynamically scaled wind tunnel models, spin models, general transport airplanes, helicopters and satellite models fabricated via additive manufacturing methods. Towards this, he has expertise in SLA, fused deposition modeling (FDM), selective laser melting (SLM), and wax printing systems. Some of the projects he has been involved in over the years include the Space Shuttle, the Shuttle Return to Flight Project, the Blended Wing Body (BWB) Boeing X-48, and Orion. Prior to additive manufacturing, Mr. Wainwright developed manufacturing expertise in composites and ceramics through the fabrication of research models and fan blades for wind tunnels. He regularly mentors students and is a key participant in a number of public outreach programs including the TNCC "Imagineering" Additive Manufacturing Summer camp for middle/high school students.	

NOTES

CAMPUS

MAP


BUILDING LEGEND
A Harrison Hall, Room 1-12
B Diggs Hall, Rooms 100-151
C Moore Hall, Rooms 152-175
D Griffin Hall, Rooms 200-221
E Wythe Hall, Rooms 222-255
F Templin Hall, First Floor, Rooms 800-899
Templin Hall, Second Floor, Rooms 900-999
G Hastings Hall, First Floor, Rooms 300-335
Hastings Hall, Second Floor, Rooms 400-437
H Automotive Building, Rooms 500-599
I Peninsula Workforce Development Center,
First Floor 100-199, Second Floor 200-299
J Hampton III Building, 525 Butler Farm Road
Rooms 700-799
TO MAGRUDER BLVD.
BUTLER FARM ROAD
525 Butler Farm Road Hampton III Building
PWDC Building
Drainage Canal
Student Parking for TNCC and 525 Butler Farm Road
Basketball Court
Tennis Courts
LOOP DRIVE
Volleyball Courts
HASTINGS DRIVE
Automotive Building
GRIFFIN DRIVE
Plant Services Building
Faculty, Staff and Visitors Parking
THOMAS NELSON DRIVE
WESTBOUND LANE I-64
EASTBOUND LANE I-64
TO BIG BETHEL ROAD
Open Parking
Faculty/Staff Parking
Automatic Doors
Handicapped Parking
Ramped Entrance
Parking by Special Permit Only
Elevators
TTY Pay Phones

"Welcome to this year's Materials in Science, Technology, Engineering and Math Workshop."

"It is through information sharing and developing partnerships that we create a strong, viable STEM network on a local and national level. We hope you leave the event with new ideas, contacts, and a renewed excitement for inspiring and educating the next generation of thinkers, leaders, and skilled workers."

-Dr. Jean Hernandez, President of Edmonds Community College

M-STEM
Materials in STEM
www.materialsinstem.org

MatEdu
National Resource Center
www.materialseducation.org

Save the Date

M-STEM 2018
November 5 - 6, 2018