



**VIRGINIA
STEAM
ACADEMY**

Where intellect and innovation converge

Summer STEAM

TO INSPIRE AND EXPOSE

SESSION 1: JULY 6-12, 2014
SESSION II: JULY 20-26, 2014

120 seats available

a free, one-week Academy for rising 6th, 7th, and 8th graders drawn from across the Commonwealth of Virginia and interested in science, technology, engineering, and applied mathematics.



To apply, please visit www.VASTEAM.org/SummerSteam

Submit your application electronically or mail to Virginia STEAM Academy, PO Box 324, Suffolk, VA 23439

Apply online or postmark your application to be received by **March 28, 2014**. You will receive a response by April 18, 2014.

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Thomas Jandl	Old Point National Bank		
Robert Johnson			

Special thanks to



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CONTACT: Contact Virginia STEAM Academy Co-founders Judy Stewart and Caroline Martin at judy.stewart@vasteam.org and caroline.martin@vasteam.org, or write to us at VA STEAM Academy, PO Box 324, Suffolk, VA 23439

The Virginia Science Technology Engineering and Applied Mathematics (STEAM) Academy, Inc. is a 501c3 non-profit, charitable organization

OFFERINGS

 **Session I: On the campus of Old Dominion University, Hampton Roads (July 6-12, 2014)**

TRACK I: FOUNDATIONAL PHYSICS

This combined morning and afternoon course will provide rising sixth, seventh and eighth grade students with a foundational model of thinking. Students will build a strong, creative approach to grappling with complex physics concepts. Students will conduct hands-on experiments in light, sound, electricity, force, energy, and motion. They will enjoy building and learning science and math principles and concepts that will be useful throughout their education.

FACULTY: This course is being team taught by Mrs. Tonya Bates and Ms. Melissa Brichacek. Mrs. Tonya Bates is an eighth grade physical science teacher in the Chesapeake City Public Schools division, and science department chair at her middle school. For the past six years, she has served as an instructor at the JLab Science Activities for Teachers (JSAT) program sponsored by the Thomas Jefferson National Accelerator Facility. Highly adept at developing curricula and well-balanced lesson plans, Mrs. Bates incorporates experiments, technology, and visual representations in her lessons. Mrs. Bates worked with Summer STEAM 2013 and is returning for Summer STEAM 2014.

Melissa Brichacek, also a physical science teacher in the Chesapeake City Public Schools division, returns for a second summer with Summer STEAM 2014 to co-teach Foundational Physics. Ms. Brichacek creates engaging and challenging daily activities to introduce students to the basic ideas of physics.

TRACK II: MATHEMATICAL MODELING

The behavior of many things in our world can be modeled and studied mathematically: the spread of disease, the path of a hurricane, the cost of gas, the number of fish that will breed in the James River. You get the picture. Models help us draw conclusions and make predictions. In the morning session, students will learn about things that can be modeled with a quadratic equation (for example, and spoiler alert, ANGRY BIRDS). In the afternoon, students will create their own mobile apps and model real-world challenges in MIT App Inventor (a visual programming environment that does not require previous programming experience). As a capstone project, students will have the opportunity to create their own graphing machine.

FACULTY: This track is being team taught by two high school teachers. Mrs. Linnea Haase will lead the morning session. Mrs. Haase teaches geometry, Algebra II and algebra functions at Granby High School in Norfolk. She previously taught for seven years at Academic Magnet High School in North Charleston, South Carolina. There she taught Honors Geometry, Honors Algebra II, Honors Pre-calculus, and AP Calculus AB. She sponsored Relay for Life, Mu Alpha Theta, organized community service opportunities, advised several student thesis projects, and served as faculty organizer of the math peer-tutoring program.

Mrs. Olympia Stein will lead the afternoon session. Mrs. Stein is a technology teacher at Surry County High School. Mrs. Stein's students won first place at the 2013 Technology Student Association (TSA) State Conference «Technosphere» and 4th place at the 2013 TSA Nationals in Engineering Design as well as Best in State award in the Verizon Innovative App Challenge 2013. Mrs. Stein teaches Pre-Engineering and Technology of Robotics Design. She is Surry's FIRST Tech Challenge robotics team coach.

TRACK III: INTRODUCTION TO MATERIAL SCIENCE

NASA Langley and Newport News Shipbuilding are among the world's leaders in material science. NASA Langley engineers will teach the

morning, theoretical session; Newport News Shipbuilding engineers will teach the afternoon, applied learning session. Course topics will include the review of material properties, applied load/stress, material strength, resulting deflection, point of failure, and factor of safety. As the theory and concepts are learned each day, students will conduct their own experiments using materials under varying loads. The last couple of days will focus on model bridge design and construction using the same materials. Throughout the course, other examples of material science employed at NASA and Newport News Shipbuilding will be introduced.

FACULTY: NASA Langley Research Center instructors will be material engineers and scientists with backgrounds in structural dynamics, advanced materials, and structural mechanics. Most instructors have experience working with middle and high school students through formal and informal NASA programs.

Newport News Shipbuilding will utilize an experienced team of engineers, designers, and laboratory technicians with varying educational degrees in design, mechanical engineering, structural engineering and/or the material sciences. Most of the team members have experience in teaching engineering concepts to middle school and high school students through Newport News Shipbuilding's Career Pathways Programs.

TRACK IV: MATH REASONING AND ENCRYPTION

MATH REASONING

This three-hour morning, five days/week course is for students who are able to grasp abstract and complicated mathematical concepts at a very fast pace. Material covered will include topics from number theory, Euclidian and non-Euclidian geometries, and RSA coding. In addition, students will develop new techniques and short cuts for solving both routine and difficult math problems taken from MathCounts, AMC8, and other middle and high school contests.

FACULTY: Mr. Vern Williams has taught math in the Fairfax County Public School system and in its gifted and talented program for over thirty years. He has twice received awards for distinguished teaching from the Mathematical Association of America. A MathCounts coach for fourteen years, Mr. Williams helped his teams earn regional, state, and national awards. Mr. Williams taught Math Reasoning for The Johns Hopkins Center for Talented Youth summer program (1994-2000), was one of 17 experts appointed to the National Mathematics Advisory Panel (2007), and currently serves on the Virginia Department of Education Advisory Board on Teacher Education and Licensure (ABTEL). Mr. Williams worked with Summer STEAM 2013 and is returning for Summer STEAM 2014.

ENCRYPTION – taught at the Virginia Modeling, Analysis and Simulation Center (VMASC)

Students who enroll in Math Reasoning will spend their afternoons studying codes, cryptography and information theory through lectures, computer labs, and hands-on learning. Students will be introduced to the Visual Basic for Applications computer programming language and construct codes using ancient methods. Some prior experience with Microsoft Excel is useful but not required.

FACULTY: Dr. Andrew Collins is a research assistant professor at the VMASC and an adjunct professor for the Modeling, Simulation and Visualization Engineering (MSVE) department at Old Dominion University. Dr. Collins holds a Ph.D. in Operations Research from the University of Southampton, England. Dr. Collins has taught the encryption camp for high schoolers and introduced it to his first class of motivated, highly able middle school students at Summer STEAM 2013.

OFFERINGS

➔ **Session II: On the campus of Radford University, southwestern Virginia (July 20-26, 2014)**

TRACK I: FORENSIC ANTHROPOLOGY, BIOARCHAEOLOGY, AND FORENSIC SCIENCE

In this track, students will learn about laboratory methods Forensic Anthropologists and Bioarchaeologists use in studying human remains. They will begin by learning to recognize all the bones in the human body. They will then learn how to analyze human bone, create a biological profile for an individual based on his or her skeleton, and examine bones for disease and trauma. By the end of the week, students will apply their knowledge to a mock crime scene. They will compete in teams to be the first to solve the crime. They will also reconstruct diet and health from a sample of prehistoric skeletons to understand how people in the past lived.

FACULTY: This track is being taught by two college professors who are both osteologists (scientists who study the human skeletal system). The morning session will be led by Dr. Cassidy Urista, chair of the Anthropological Sciences Department at Radford University. Her major area of research is in Bioarchaeology, reconstructing information from skeletons from archaeological sites. In particular, she looks at diet and health from the people interred at archaeological sites. She has worked in Ireland, Denmark, Guatemala, Bolivia and sites in the southeastern United States.

The afternoon session will be led by Dr. Donna Boyd. Dr. Boyd teaches Forensic Anthropology and Forensic Science at Radford University and is Eminent Professor of Anthropological Sciences and Co-Director of the Radford University Forensic Science Institute. She consults for the Virginia Office of the Chief Medical Examiner (having completed over 100 cases for this office) and the U.S. Disaster Mortuary Operational Response Team, serving in Haiti in the aftermath of the 2010 earthquake.

TRACK II: MATHEMATICAL MODELING

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in Engineering Design as well as Best in State award in the Verizon Innovative App Challenge 2013. Mrs. Stein teaches Pre-Engineering and Technology of Robotics Design. She is Surry's FIRST Tech Challenge robotics team coach.

STEAM Beyond the Tracks

CHRYSLER GLASS STUDIO SESSION I

Last year's Evening with a Glass Artist was a tremendous hit. This year, students will take a field trip to the Chrysler Museum Glass Studio for an onsite demonstration of how physics and glassblowing connect. Closed toe shoes and cotton clothing are required.

THE RADFORD UNIVERSITY MUSEUM OF THE EARTH SCIENCES AND PLANETARIUM SESSION II

The Radford University Museum of the Earth Sciences offers an interdisciplinary approach to earth science-related fields of geology, meteorology, oceanography, planetary astronomy and physical anthropology. The Planetarium focuses on astronomy, solar system astronomy, and the physical sciences. Schedule permitting, students will have a docent tour at both sites.

RECREATION AND PERSONAL DISCOVERY

Students will have access to Old Dominion and Radford universities' recreation centers at reserved times. In addition, they will enjoy team building activities, evening "camp fire" sessions, and movie night.

STEAM EXPERTS IN YOUR MIDST

Students will meet with STEAM professionals who use science, technology, engineering, and applied mathematics in their daily work.



Safety is #1

- **Criminal, child protection, and reference background checks on ALL personnel (youth and adult)**
- **Campers will live and learn on the campuses of Old Dominion University and Radford University**
- **Safe, contained living-learning space: one dorm, multiple classrooms**
- **Keyed access only to dormitory**
- **Bus transportation to VMASC and field trips**
- **24/7 residential staffers**
- **Campus health care facility**
- **Campus police**