

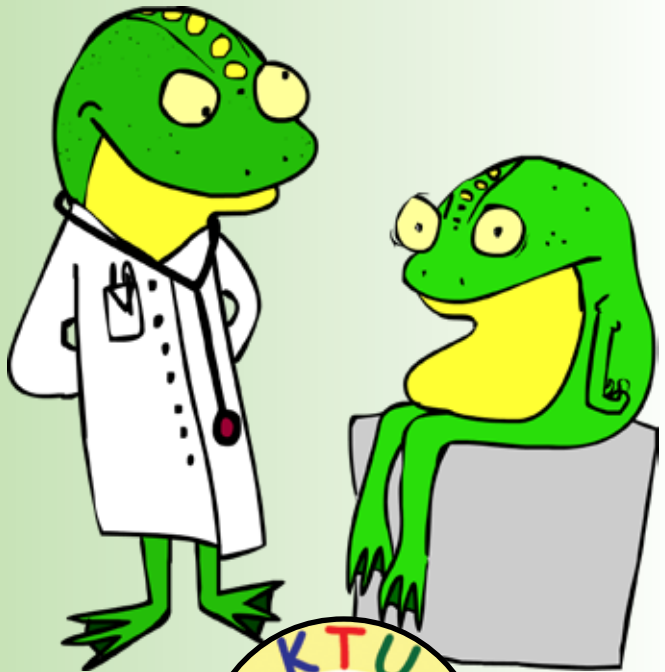
KIDS'

TECH UNIVERSITY

2011 Program at Virginia Tech

March 26, 2011
Dr. Tyrone Hayes

Why do we
care about frogs'
health?



Thank you to all of our supporters!

Your generous support helps to make
Kids' Tech University possible!

SPONSORS

Virginia Bioinformatics Institute
Virginia 4-H
Virginia Tech Center of Academic
Enrichment and Excellence
Virginia Tech Department of
Mathematics
Virginia Tech Outreach and
International Affairs Office

Virginia Tech Services, Inc.
Virginia Tech Office for Equity and
Inclusion
Virginia Tech Center for the
Enhancement of Engineering
Diversity
Virginia Tech Citizen Scholar
Experience

DONORS (12/2009 TO 12/2010)

Mrs. Lisa M. Bauman
Mr. William B. Bell, III
Mr. Keith A. Bluestein
Mrs. Carolyn F. Bosiger
Mr. Marty R. Bullins
Ms. Cheryl M. Chrisley
Ms. Elizabeth L. Clement
Mrs. Brownie L. Cole
Mr. Oliver J. Cromer, Jr.
Dr. Joseph D. Eifert
Miss Marcella M. Foster
Mrs. Tanya M. Hall
Ms. Theresa H. Haskins
Mr. Christopher A. Lawson

Mr. William Mulcahy
Mr. Joshua M. Shallom
Ms. Shamira Shallom
Mr. James E. Stoll, Jr.
Skip and Cathy Todd
Mrs. Amelia Wilson
Mr. Shuhai Xiao
B. Wilson Porterfield,
Jr. Foundation
Norfolk Southern
Foundation
Proteus Foundation
Tallinn Group, LLC

VOLUNTEERS

Many members
from the
Virginia Tech
and Blacksburg
community

ADDITIONAL SUPPORT is always welcomed. If you would like to help us
provide this exciting opportunity for children, please contact:

Dr. Kristy Collins

540-231-1389

kdivitto@vbi.vt.edu

<http://kidstechuniversity.vbi.vt.edu/>

ABOUT THE PROGRAM

The goal of Kids' Tech University is to spark interest and excitement about **Science, Technology, Engineering, and Mathematics** in children between the ages of 9 -12. KTU's curriculum features three parts:

STORYTELLING SESSION

- Held once a month from January to April, in a lecture hall on the Virginia Tech campus

HANDS-ON ACTIVITY

- Held after each storytelling session
- Focused on the specific discipline being discussed in the storytelling session

VIRTUAL LAB

- Activities that are designed to cultivate children's interest in the lecture topics - <http://ktu.vbi.vt.edu/>
- Performed at home after the day's events

MARCH 26TH AGENDA

10:00 AM

Parents drop off their children for the **storytelling session** in McBryde Hall 100

10:30 - 11:45 AM

Kids enjoy a storytelling session led by Dr. Tyrone Hayes titled "**Why do we care about frogs' health?**" in McBryde Hall 100

Parents are invited to view the event in a satellite location, over a live video feed, in Torgersen Hall 2150

11:45 AM

Parents pick up their children and kids receive a Hokie Passport lunch card containing \$6.00 for **lunch** at one of the specified dining halls on campus

1:30 - 3:30 PM

After the storytelling session the students will be escorted by their parents to have lunch and then to the **hands-on portion** of the event. There the students will enjoy the experience of interacting with various exhibits from the Virginia Tech community.

TABLE OF CONTENTS

WELCOME LETTER 3
Dr. John Dooley, VT

MARCH 26TH STORYTELLING SESSION 4

MARCH 26TH HANDS-ON EXHIBITS 4

After the storytelling session the students will be escorted by their parents to have lunch and then to the hands-on portion of the event. There the students will enjoy the experience of interacting with various exhibits from the Virginia Tech community.

TEACHER WORKSHOPS 11



Answering real questions at Virginia Tech...

That's the KTU difference.

January 14, 2011

Parents and Participants of Kids' Tech University:

Welcome to the Virginia Tech campus and to Kids' Tech University!

Kids' Tech University, with informative lectures and exciting hands on events, is designed to ignite an interest in Science, Technology, Engineering and Mathematics (STEM) disciplines for you and your child. We are currently in our third year of offering the Kids' Tech University program through the coordination of Virginia Bioinformatics Institute (VBI) and Virginia 4-H and the leadership of Dr. Kristy Collins, Dr. Reinhard Laubenbacher and Dr. Kathleen Jamison.

Virginia Tech has a strong commitment to connecting national prominence in research and discovery to advance quality STEM programs across the Commonwealth. Kids' Tech University is just one example of this commitment.

As Vice President for Outreach and International Affairs, I am pleased to welcome you to such a successful program hope you and your child leave with great excitement and interest in the disciplines of Science, Technology, Engineering and Mathematics.

Sincerely,



John E. Dooley, Ph.D.
Vice President for Outreach and International Affairs

/s/

Invent the Future

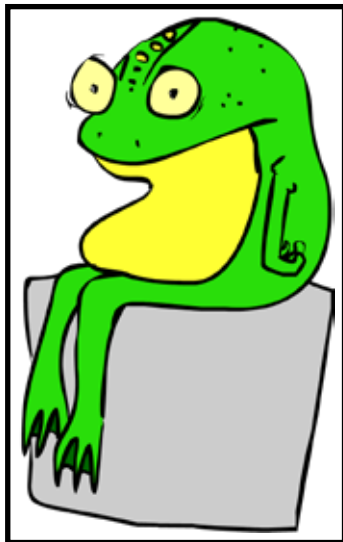
VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY
An equal opportunity, affirmative action institution

DR. TYRONE HAYES

MARCH 26, 2011 STORYTELLING SESSION

"Why do we care about frogs' health?"

WE LIVE IN A WORLD full of chemicals. They're used to preserve and flavor food, help plants grow, kill bugs and other pests, dye fabrics and clean our homes. Chemicals help us in many aspects of our everyday lives. While some chemicals are not harmful to us, our pets, or the Earth, some can actually hurt our environment if not used properly. Our program will explore the world of chemical pollution and the many ways chemicals can be both helpful and harmful. We will examine the impacts chemicals can have on people, animals. Where are these chemicals coming from? How have frog populations, other animals, and humans suffered? And what can be done to help the frogs and improve our own health?



DR. TYRONE HAYES is a Professor of Integrative Biology, at the University of California, Berkeley.

HANDS-ON EXHIBITS



DNA IS THE GENETIC MATERIAL that gives living organisms their characteristics.

The Biochemistry Club of Virginia Tech invites all KTU participants to engage in a hands-on DNA extraction from strawberry. We use strawberries as a source for extracting DNA because they are soft and easy to pulverize, and they produce enzymes which aid in breaking down the plant cell walls. Strawberries have enormous genomes. They are octoploid, which means they have eight of each type of chromosome (which equals abundant DNA). At the end of this experiment participants can take their strawberry DNA home.

HANDS-ON EXHIBITS

ENTOMOLOGY TOUR

Insects, as small as they are, might be ignored by many people. However, giving their enormous number, far outweighing the population size of human beings, insects have tremendous impacts on our lives. Why are some of their normal activities beneficial to us, while others cause tremendous problems to our welfare?

The Virginia Tech Department of

Entomology is proud of providing extension services to the community. Our graduate students, working on various aspects of entomology, will be very delighted to share with the kids their knowledge and their experiences working with insects. In addition, we will exhibit specimens of various insect species, and will also have hands-on activities with live insects available for the kids.

VIRGINIA CAREER VIEW

We're all about exploring . . . careers! Want to learn more about science and technology careers? Drop by our table to visit Career Town, our interactive game, pick up some "to-go" activities for kids, and get helpful information for parents.

Funded by the Virginia State Department of Education's Career and Technical Education office, all Virginia Career VIEW resources are supportive of Standards of Learning and Virginia Counseling Standards.

Visit our site at:

<http://www.vacareerview.org/>
for more information.

PLANT YOUR OWN BASIL!

The Horticulture Graduate Student Organization has prepared a booth where kids can plant their own basil to take home. We will talk about the needs of plants and the benefits that plants give back to us. Have fun potting your small basil plant and take home a recipe that you can use to make a tasty dish with your

edible plant!

The Horticulture Graduate Student

Organization is composed of graduate students with a love for plants. Our goal is to create a community that encourages one another in our current educational stage and to serve the local community. We love sharing our interest in plants with others.

DNA STRUCTURE

In this Hands-On Exhibit we will teach the kids about helical structure of DNA molecule. We will use a Ball-and-stick model to teach the kids how four different nucleotides work together to make a double helix in DNA molecules. In general kids will learn about the importance of DNA in cells, its roles and its structure.

Founded in 2006, GenBioOrg was established to help provide academic, educational, and social cohesiveness for Genetic, Bioinformatics and Computational Biology graduate students. The group works to promote the program and field of study to the Virginia Tech community by inviting external speakers to give campus-wide seminars at the university and by participating in outreach activities such as KTU.

THE MICROBIOLOGY CLUB OF VIRGINIA TECH exhibit will focus on the role microbes play in our daily lives both good and bad. We will have microscopes set up so that individual bacterial cells may be seen and we will have bacterial cultures from different environments available for observation. The small size of bacteria will be emphasized as well as the importance of hand washing before eating.

The Microbiology Club of Virginia Tech is a student chapter of the American Society for Microbiology. Its memberships consists primarily of undergraduate students from across campus with an interest in microbiology.



SURFACE WATER RUNOFF can contribute to pollutants leaking into major water bodies that can be detrimental to human health. Understanding how infiltration affects soil runoff is important to controlling the quality of runoff. It is important that the soil can retain enough water to maintain a strong soil structure to reduce the amount of runoff. Storm runoff can cause soil erosion and wash away important nutrients, sediment and organic matter, therefore reducing water quality in rivers, streams and lakes. Extreme runoff can result in flooding which would damage roads in more urban areas and be a safety hazard for the public. In this demonstration, a few small tubs of different surface cover (grass, hay, mulch, trash, etc) will be subject to “rainfall” (probably just pouring some water) and runoff water will be collected and observed. Discussion will follow about the turbidity and quality of water.

Theta Tau is a professional engineering fraternity which provides a chance for engineering students to meet up with people of similar interests and participate in acts of brotherhood, professional development, and engineering outreach.

THE NEW RIVER VALLEY MASTER GARDENER ASSOCIATION'S booth will have information and hands-on projects which show the connection between life in the home and life in the garden.

Students will learn about worm composting (vermicomposting), which food items and packaging can be recycled and in what ways, and how composting and recycling work to build gardens in the backyard. We'll have directions for easy experiments and projects that can be done at home and students will be able to investigate a real worm compost bin.

POLYMER BOUNCY BALLS

Alpha Chi Sigma, the Professional Chemistry Fraternity, is hosting a presentation on polymers by demonstrating how to make bouncy balls.

Kids will be able to make and take home their creation!

HAVE YOU EVER THOUGHT ABOUT what happens to water once it goes down the drain? If you said YES come by the Environmental Student Organization booth to make your own “wastewater” and to learn how wastewater is treated in the United States.

The Environmental Student Organization is hosting an activity on wastewater treatment. We plan on having a few posters to describe some of the basics of how water is treated. We also will have an activity where the kids mix “waste material” (such as coffee grounds, soil, food scraps, etc) into water and then they will have to figure out the best way to make the water clean again. For cleaning the water we will use spoons, straws, coffee filters, etc. Once the kids try to figure out on their own how water is cleaned we will talk about how the water is actually treated.

RAINBOW EGGS

The Poultry Club will be exhibiting “Rainbow eggs”. The yolk, which is mainly composed of fat, is responsible in providing the embryo with the nutrients needed for development. The hen converts part of the feed she consumed into a layer of yolk. The development of the yolk takes place inside

HANDS-ON EXHIBITS

the hen and is performed daily until the yolk has reached the required size for ovulation. It should also be noted that during this time more than one yolk is being developed. By providing fat soluble dyes to the hens, we shall be able to see the development of the yolk indicated by the ring/layer colors.

The purpose of the Poultry Club is to help bridge the gap between poultry students and the poultry industry.

EXPLORING GROUNDWATER WITH GEOLOGY CLUB!

The Geology Club at Virginia Tech is a group of students dedicated to educating ourselves and you about our planet. Water covers 70 percent of the Earth, so hydrology (the study of groundwater) is an important part of earth science. Chemicals, including pollutants, can stay in groundwater for hundreds of years. This affects vegetation, wildlife (including frogs), and humans!

This year at KTU, we will look at how groundwater flows, what's in groundwater, and what problems come from polluted groundwater. Most importantly, we will learn about how we can protect our favorite resource: water. Get your hands wet at our hands-on exhibits!

AMERICAN WATER RESOURCES ASSOCIATION STUDENT CHAPTER AT VIRGINIA TECH

The Student Chapter of American Water Resources Association will be hosting an exhibit with locally caught macro-invertebrates ("bugs") in containers for students to try and spot. They will show how each animal is used in stream monitoring techniques and which ones are worth more "points" than others. The exhibit will allow for kids to explore what life on the bottom of a river looks like and how our everyday activities can affect what they'll find. This will allow kids to see how stream monitoring works, what factors are used to test stream quality, how to use a bug identification key, how bugs can

be an indicator of water pollution, and how learning about streams can be fun!

About AWRA:

The American Water Resources Association (AWRA) is a multidisciplinary student organization. Student members come from many different fields and backgrounds (engineering, education, forestry, soils, biology, ecology, geography, management, regulation, hydrology, etc.) but share a general interest in our water resources. Group activities include co-sponsoring seminars, participating in volunteer/outreach activities, providing support in water education, stream monitoring with Save-Our-Stream techniques, and supporting Amman Imman—a non-profit organization that works to supply safe-drinking water to African communities. Overall, AWRA's mission is to support the **education, management, and research** of our water resources.

AIDEN McHUGH FROM THE CENTER FOR STUDENT ENGAGEMENT AND COMMUNITY PARTNERSHIPS VIRGINIA TECH

NASA's Kepler space probe is searching for exoplanets (planets that orbit other stars). The Kepler Space telescope is in an earth trailing orbit and looks for planets by observing dips in the luminosity emitted by stars as planets pass in front of them. If these dips in luminosity are regular, they can indicate the presence of a planet or multiple planets orbiting a star.



HANDS-ON EXHIBITS

This demonstration will give information on how the Kepler space probe works, as well as what it has found and could find. There will also be a simplified mechanical model demonstrating how Kepler detects light dips associated with planetary transits.

SEEDS BLACKSBURG NATURE CENTER

What can you tell from the skull of an animal? What did it eat? How big was the animal? What kind of animal was it?

In this hands-on exhibit, kids can use their own skulls (and the brains inside) to figure out more about a variety of animal skulls that are among the collection at the SEEDS Blacksburg Nature Center. SEEDS is a local non-profit with a mission to develop future leaders as people conducting themselves with civic responsibility and accountability in a sustainable society.

Visit the SEEDS Blacksburg Nature Center at the Price House, 107 E. Wharton Street, or find us online at www.seedsguys.org or on Facebook.

NOISE POLLUTION

led by Andrea Boyette, Katelyn Melton, and Tara Meredith

For our exhibit, we will talk about noise pollution and how it affects different animal populations. These include owls, bats and Zimbabwe elephants. We have decided to discuss this topic because we find it interesting since most people do not think of noise as pollution.

Our exhibit will consist of a poster with information and we will talk about the information then ask the kids questions on what we discussed. We will discuss facts such as, the definition of noise pollution and

examples, different types of animals that are affected and could possibly be affected in the future and what people can do to help decrease noise pollution.

SOURCES: <http://webecoist.com/>

SOIL AND WATER CONSERVATION SOCIETY

DEPARTMENT: BIOLOGICAL SYSTEMS ENGINEERING (BSE)

Host: Lisa Janovsky (President of Virginia Tech Chapter)



The Soil and Water Conservation Society promotes soil and water sustainability through save our streams activities, educational workshops, water education training and outreach in local schools and the surrounding community. At Kids Tech University, we proudly present our activity:

H₂O Olympics!

The students will compete in Water Olympics to learn about two important properties of water: adhesion and cohesion. The unique properties of water allow essential processes

HANDS-ON EXHIBITS

to occur in everyday life including movement of blood throughout the body and a water striders ability to skate on water! In four interactive activities titled Balance Beam, Pole Vaulting, Backstroke and Slalom the students will explore and learn how precious water really is to the environment and more specifically to their everyday lives!

VIRGINIA TECH LUNABOTICS TEAM

The Virginia Tech Lunabotics Team is a senior design project tasked to build an excavating

analysis of eleven undergraduate engineering seniors. Seven of these students are aerospace engineers lead by Dr. Kevin Shinpaugh, and four of the students are mining and minerals engineers guided by Dr. Erik Westman.

OUR ROLE IN CONSERVATION: BUILDING A BETTER TOMORROW

led by Richlands High School T₂H (Trees to Hug)

At the Kids' Tech University Exhibit, T₂H would like to discuss what students can do to conserve and better the environment. There will be a focus on what students can do individually, or as a group, to improve their schools, homes, or parks. Many students want to help the environment but do not know what they can do to help. T₂H students have first hand experience on this topic and would like to share what they have learned with students from other schools.

T₂H (Trees to Hug) was started in Fall 2008 by Mrs. Melissa Addison and Mrs. Tiffany Stillwell, teachers at Richlands High School. Our members come from a variety of social and economic backgrounds that have banded together to promote conservation and

robot for submission into the NASA Lunabotics Mining Competition. At competition, the robot will have fifteen minutes to traverse the play field and excavate simulated lunar regolith. The collected regolith must then be deposited into a collection bin. The team to deposit the most regolith will be determined the winner.

This year's team is competing in the competition for the second straight year. Their project, named T-REX (Telerobotic Regolith EXcavator), is a culmination of the design and

sustainable living. The purpose of the club was to bring green ideas and practices into the school setting. Richlands High School now has a recycling program, participates in the science fair, sponsors school run activities, and promotes green living practices by being examples for the rest of the student body. During Earth Week we sponsor week long activities, including fundraisers, presentations, and school and town improvement projects. We work with the surrounding middle and elementary schools to teach younger students ways they can make a difference in their



HANDS-ON EXHIBITS

schools and homes by recycling, conserving water and electricity, and working together to make a better tomorrow. Our T₂H members realize that small differences now can mean a better future for us all.

THE BELDEN LAB FROM THE DEPARTMENT OF BIOLOGICAL SCIENCES will have several native amphibians to see. Many amphibian populations around the world have disappeared in recent years. One of the primary causes of these declines is a fungal infection. In our lab, we are working to develop a treatment that prevents fungal infection by using natural bacteria that can live on amphibian skin and that produce compounds that inhibit fungal growth.

PROJECT BUTTERFLY WINGS

This hands-on exhibit will encourage interest, understanding and long-term involvement in science. Youth without previous knowledge of butterflies can participate in activities to transform them from beginner to engaged citizen scientists. Youth will be given the opportunity to learn characteristics of butterflies and return home to collect butterfly information in their communities. They can enter the data they collect on the



WINGS web site, where Scientists and the public use the information to further scientific knowledge and view the distribution and population trends of common butterfly species.

WINGS, Winning Investigative Network for Great Science is a partnership between 4-H youth and professional scientists, providing participating youth information to transform them into “citizen scientists” who collect data on butterflies to help professional scientists.

THE NEW RIVER VALLEY CHAPTER OF VIRGINIA MASTER NATURALISTS is part of a state-wide corps of volunteers. After basic training in natural resource topics, we volunteer as educators, citizen scientists, and stewards helping Virginia conserve and manage its natural resources.

Our fifth year of classes, offered on the Virginia Tech campus, is in session through spring 2011. After training and certification, our volunteers work in their local communities to benefit natural resources and care for the environment as a whole.

CURRENTLY CLIMATE CHANGE AND EMPHASIS ON ENVIRONMENTAL LITERACY nudge educators to focus on learner outcomes around sustainability, ecological footprints, land use, natural capital, and health. Through activities in the 4-H Curriculum, Exploring Your Environment, participants will explore ways to assist youth to: 1) examine ecosystem services and their functions: regulating, provisioning, cultural, and supporting; 2) articulate personal sphere of influence over what can and can't change in daily life to reduce ecological footprints; 3) explore life cycle analysis, abundance and scarcity, and ways to maintain better health. Inquiry strategies through an experiential learning model will be used. Teachers enrolled in the KTU Teacher workshop for March 25 and 26th will be leading the hands-on activities they learned about in the workshop.

Lead by: Dr. Kathleen Jamison, Virginia 4-H

WE ARE EXCITED to offer CEU (Continuing Education Unit) credits for teachers in conjunction with the KTU program.

Teachers will learn it, teach it, and take it back to the classroom.

Interact with:

- Scientists
- Technology Experts
- Engineers
- Mathematicians

YOU WILL ENGAGE in an exciting, hands-on teaching experience, and then apply what you learned in a unique, first-hand teaching environment with 3rd-6th graders. You will also be able to participate in ongoing community blogs and network with other teachers and education specialists.

THIS PROGRAM IS IDEAL for elementary and middle school teachers, or others, interested in STEM teaching.

WORKSHOPS

Day 1 (day before KTU program)

- Interact with Scientists, Technology Experts, Engineers, and Mathematicians
- Includes a 4-hour interactive hands-on training

Day 2 (day of KTU program)

- You interact with KTU students at learning stations to deploy what was learned in Day 1
- You watch a lecture given to kids on topics related to Day 1, led by a world renowned research scientist
- You will learn how to incorporate fundamentals and concepts from the lecture and training into your classrooms

COST

Virginia 4-H is paying the registration fee for the first 10 participants for each workshop. Register early to hold your spot for April! The cost per workshop is \$30. However, if there is a hardship please let us know by emailing, Dr. Kristy Collins.

MARCH TEACHER WORKSHOP

“Interactive Learning with Science: Exploring Your Environment”

WORKSHOP INSTRUCTOR: DR. KATHLEEN JAMISON

March 25, 12:30-4:30pm & March 26, 9am-4:30pm

CEU credits offered- 1.1

Exploring Your Environment is a 2 volume 4-H Curriculum with a facilitator guide designed for middle school age learners, but has been used effectively with upper elementary school aged children. It teaches basic ecological concepts that help learners understand how nature works and how we affect it and are affected by it. Each section of the curriculum focuses on an environmental question or issue and has a corresponding activity that allows learners to jump right

into real-world issues that affect our life by completing investigations and explorations of the natural world. The primary focus areas are: ecosystem services, water conservation, energy use, climate change, recycling, natural resource stewardship and air quality.

Please visit

<http://kidstechuniversity.vbi.vt.edu/>

for further information, and to register for the next KTU Teacher Workshop.



KTU is a program at Virginia Tech with one primary goal – sparking kids' (ages 9-12) interest in –

**Science,
Technology,
Engineering,
and Mathematics**



KTU 2011 PROGRAM DATES

Jan 29 | Math Day
Feb 26 | Engineering Day
Mar 26 | Technology Day
Apr 09 | Science Day

CONTACT

Dr. Reinhard Laubenbacher
VBI at Virginia Tech
reinhard@vbi.vt.edu

Dr. Kristy Collins
VBI at Virginia Tech
kdivitto@vbi.vt.edu



THE FUTURE OF SCIENCE



We look forward
to seeing you in
April!

