Welcome to the 53rd Annual

TENNESSEE REGIONAL

MARCH 8-9, 2018

Holiday Inn World’s Fair Park
525 Henley Street
Knoxville, TN  37902

The Tennessee Junior Science and Humanities Symposium is sponsored by the United States Departments of the Army, Navy, and Air Force, and is administered by the Academy of Applied Science in cooperation with the University of Tennessee, Knoxville.
THURSDAY, MARCH 8, 2018

7:30 AM – 9:30 AM
Check-in
Parkview Atrium

7:30 AM – 9:30 AM
Breakfast
Crystal Room

9:30 AM – 9:45 AM
Board Bus to UT College of Veterinary Medicine
World’s Fair Park Drive
(downstairs on convention level)
outside of the Parkview Atrium

10:00 AM – 11:30 AM
Tour UT College of Veterinary Medicine

11:30 AM – 11:40 AM
Board Bus to Oak Ridge National Lab (ORNL)

12:30 PM – 4:30 PM
ORNL Tour

5:30 PM
Arrive back at the Holiday Inn
World’s Fair Park

5:30 AM – 6:30 PM
Check-in
Holiday Inn
World’s Fair Park
525 Henley Street, Knoxville, TN  37902

6:30 PM – 8:00 PM
Buffet Dinner
Crystal Room

8:00 AM – 8:10 AM
Welcome and Opening Remarks
Cumberland / Leconte Room

8:10 AM – 10:10 AM
Session I – Oral Presentations
Cumberland / Leconte Room

10:10 AM – 10:30 AM
Break

10:30 AM – 12:10 PM
Session II - Oral Presentations
Cumberland / Leconte Room

12:30 PM – 1:10 PM
Lunch
Crystal Room

1:10 PM – 2:50 PM
Session III – Oral Presentations
Cumberland / Leconte Room

2:50 PM – 3:00 PM
Break

3:00 PM – 4:30 PM
Closed Poster Session with Judges
Cumberland / Leconte Room

4:30 PM – 5:00 PM
Open Poster Session
Cumberland / Leconte Room

6:00 PM – 8:00 PM
Awards Banquet and Dinner
Crystal Room

SATURDAY, MARCH 10, 2018

Opens at 6:30 AM
Breakfast
Voucher for Windows on the Park Restaurant
Lobby Level of hotel

12:00 PM
Hotel Check-out

FRIDAY, MARCH 9, 2018

7:00 AM – 9:00 AM
Breakfast
Crystal Room

7:15 AM – 7:50 AM
Student Presenters Check-in and Poster Set-up
Cumberland / Leconte Room
Student Presentations
Holiday Inn World’s Fair Park

FRIDAY, MARCH 9, 2018

8:00 AM – 8:10 AM
Welcome and Opening Remarks
Cumberland / Leconte Room

SESSION I – ORAL PRESENTATION

8:10 AM
Joseph D. Andres, Oak Ridge High School
Development of a Graphic User Interface to Facilitate Image Annotations with Machine Learning

8:30 AM
Radha Awasthi, Oak Ridge High School
Functional Representation of Neutron Data

8:50 AM
Alison Blanton, Central Magnet School
IQ and the Human Canine Connection Effect

9:10 AM
Kevin Chen, Farragut High School
Strain Heterogeneity in Sheared Colloids Revealed by Neutron Scattering

9:30 AM
Jamie Dethero, McCallie School
Optimizing Husbandry and Spawning Conditions and Growing Primary Cell Cultures from the Apical Organs and Tentacle Bulbs of the Ctenophore Mnemiposis Leidyi

9:50 AM
Maya Kiev, Hillsboro High School
Determining the Survival Rate of Stress Induced Wolbachia Infected Fruit Flies

10:10 AM
BREAK

SESSION II – ORAL PRESENTATIONS

10:30 AM
Danai Daniel Lawson, CAK Homeschool
Environmental Screening for Toxicity in French Broad River using Bioluminescent

10:50 AM
Olivia Milloway, Oak Ridge High School
Evaluation of the Amphibian and Macroinvertebrate Community

11:10 AM
Peter Podar, Oak Ridge High School Homeschool
Comparative Diversity and Evolution of Microbial Life Across Temperature Gradients in Yellowstone and Icelandic Hot Springs

11:30 AM
Lauren Proctor, Cleveland High School
Constructed Wetlands: A Comparison of Inflowing and Outflowing Water Sources to Determine Effectiveness

11:50 AM
Caesar Wyatt Siclare, Cleveland High School
The Integration of Man-made Objects in Freshwater Ecosystems

12:10 PM
Grant Smith, McCallie High School
Total Sponge and Coral Proteins Show Promise for Slowing N2a Cancer Cell Division

12:30 PM – 1:10 PM
LUNCH
Crystal Room
SESSION III – ORAL PRESENTATIONS

1:10 PM
Sylvie Stephenson, Hillsboro High School
Establishing a Link Between CCL5 Absence and Calbindin-Positive Amacrine Cells

1:30 PM
Sofia Tomov, Homeschool
On with the Wind: Using Machine Learning to Improve Wind Power

1:50 PM
Alexis Ann Valentine, Gatlinburg Pitman High School
Pseudogymnoascus Destructans?

2:10 PM
Adam von Arnim, Farragut High School
Fluorescent Dye-Incorporated Thermoresponsive Molecular Bottlebrush Polymer

2:30 PM
Joshua West, Hillsboro High School
Teaching Students Computer Science Through AR Development with the Xbox Kinect

2:50 PM – 3:00 PM
BREAK

3:00 PM – 4:30 PM
Closed Poster Session – Judges Only
Cumberland / Leconte Room

4:30 PM – 5:00 PM
Open Poster Session
Cumberland / Leconte Room

6:00 PM – 8:00 PM
AWARDS BANQUET AND DINNER
Crystal Room
Student Poster Presentations

STUDENT POSTER PRESENTATIONS

Saahit Adabala
AGradeAhead
Early Heat Stroke Detection with the Implementation of IoT

Oliver Eagan
Hillsboro High School
Investigating Oxy E as a Cancer Therapeutic using MOCCA Cells

Olivia Eilf
Cleveland High School
Ecology of Algae in Mouse Creek, Cleveland, Tennessee

Jan Jakawski
Oak Ridge High School
Boundary Integral Analysis for Viscous Incompressible Fluids

Andrew Lawson
CAK Homeschool
Structural Testing of Balsa Wood Towers

Hannah Lee
Farragut High School
A Comparison of Isolates from Soil Samples Inhabited by Multiple Species of Plants

Anthony Potchernikov
Hillsboro High School
An Investigation into the Health of Richland Creek between 2013 and 2017 in Nashville, TN.

Sarah Roth
Oak Ridge High School
Using Whole Brain Microscopy Techniques to Identify Regions Essential for Fostering Behavior in Rett Syndrome Model
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<tr>
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<tr>
<td>AGradeAhead</td>
<td>Brentwood City</td>
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<td>Ramesh Adabala</td>
<td>Williamson County</td>
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<td>CAK Homeschool</td>
<td>Maryville City</td>
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<td>Darunee Lawson</td>
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<td>Central Magnet</td>
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<td>Kelly Davis</td>
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<td>Jeannie Cuervo</td>
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<td>Hamilton County</td>
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<td>Jeffrey Williams</td>
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<td>Sharon Thomas</td>
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<td>Oak Ridge National Laboratory</td>
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<td>Mircea Podar</td>
<td>Anderson County</td>
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<td>Tellico Plains High School</td>
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<td>Monica Watson</td>
<td>Monroe County</td>
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<td>Mitchel Witt</td>
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PEGGY BERTRAND, PhD - CLINICAL ASSISTANT PROFESSOR

Peggy Bertrand taught physics, mathematics, environmental science, and research at Oak Ridge High School, where she also served as Science Department Coordinator. She currently is on the clinical faculty of the VolsTeach program at the University of Tennessee, where she teaches and mentors future mathematics and science teachers. Professor Bertrand has been a consultant for the College Board and the Educational Testing Service for many years, serving in the areas of assessment and professional development. She has published articles in *The Science Teacher* and *The Physics Teacher* and has authored many College Board publications.

RACHEL P. MCCORD, PhD - ASSISTANT PROFESSOR

Rachel Patton McCord is an assistant professor at the University of Tennessee, Knoxville where she studies the 3D folding of the human genome: how 6 feet of DNA fit inside a microscopic nucleus and why this matters for diseases like cancer. McCord is a native of Knoxville, Tennessee (Webb School Class of 2000) and received her BS in biophysics from Davidson College (North Carolina) and a PhD in biophysics from Harvard University. As a postdoctoral researcher at the University of Massachusetts Medical School, she began to use DNA sequencing, microscopy, and computer analyses to study 3D genome structure. Returning to Knoxville after 17 years, she now supervises students in 3D genome research in her own lab and strives to integrate the perspectives of math, physics, and biology. McCord also enjoys playing the violin with Knoxville’s Scruffy City Orchestra, bicycle commuting, and spending time with her 4 year old son.

WILFRED M. POST, PhD - RESEARCH PROFESSOR

Wilfred M. Post retired in 2013 as a Senior Scientist in the ORNL Environmental Sciences Division, a staff member of ORNL’s Climate Change Science Institute (CCSI), and an adjunct professor of in the Department of Ecology and Evolutionary Biology at the University of Tennessee, Knoxville. He is a recognized expert on soil carbon dynamics, nutrient relationships between soil and vegetation, and the impact of species composition on ecosystem processes. He has developed approaches to representing the impact of land-use change, and climate change in terrestrial biogeochemistry models and also developed global data sets for the evaluation of global terrestrial biogeochemistry models. He has over 100 peer reviewed open literature publications and co-authored two books. Post has a PhD in ecology from the University of Tennessee, Knoxville and a MS in botany and a BS in mathematics from the University of Wisconsin, Madison.

ADMINISTRATIVE STAFF:  
Nita Ganguly, PhD - Director  
Clinical Associate Professor  
College of Education, Health and Human Sciences  
Dianna Beeler, Accounting Coordinator  
Tennessee Junior Science and Humanities Symposium  
College of Arts and Sciences Administration
TENNESSEE SPONSORS AND SUPPORTERS

The Tennessee Junior Science and Humanities Symposium is hosted by the University of Tennessee, Knoxville, and is administered through the College of Arts and Sciences. Judges are provided by the College of Arts and Sciences and the College of Engineering.

ACADEMIC DEANS
The University of Tennessee, Knoxville

Theresa M. Lee, Dean
College of Arts and Sciences
Professor of Psychology

Wayne Davis, Dean
College of Engineering
Professor of Civil and Environmental Engineering

NATIONAL SPONSORS
The Tennessee Science and Humanities Symposium Program (TJSHS) is jointly sponsored by the research offices of the United States Departments of the Army, Navy, and Air Force in cooperation with leading research universities throughout the nation. The Department of Defense generously provides funding for the National Symposium and the TJSHS scholarships. The TJSHS program is administered nationally through the Academy of Applied Science.

FINANCIAL SUPPORT
Funding for the Tennessee Junior Science and Humanities Symposium is provided by a grant from the Academy of Applied Science. The University of Tennessee, College of Arts and Sciences has provided supplementary support.

Other organizations that helped make the 53rd Annual Tennessee Junior Sciences and Humanities Symposium a success:

Oak Ridge National Labs (ORNl) and Barbara Penland for our wonderful experience and tour
The University of Tennessee, Army ROTC Dragoons for Presenting our Nations Colors

A Special Thanks to the Following for Donating Door Prizes:

56th National Junior Science & Humanities Symposium
U.S. Army, Navy, and Air Force sponsored

May 2-5, 2018, Hunt Valley, Maryland

NATIONAL SYMPOSIUM
The 56th National JSHS will be held May 2 - 5, 2018, in Hunt Valley, Maryland. This symposium brings together 230 high school students who qualify by submitting and presenting original scientific research papers in regional symposia held at universities nationwide. Approximately 130 high school teachers, mentors, university faculty, ranking military guests and others also attend and join in encouraging the future generation of scientists and engineers and celebrating student achievement in the sciences.

56TH NATIONAL JSHS
Registration for the 56th National JSHS is open on the National Registration page. Students must first qualify for the national competition at one of 47 regional events.

The Competition
All regional symposia student finalists are invited to present their research at the National JSHS. The top two regional delegates will present their research in the oral session to compete for military-sponsored undergraduate, tuition scholarships. All other regional delegates will present their research in the poster session to compete for cash awards. Sessions will be organized by categories that are selected by the students during the registration process.

The Scientific and Educational Program
All students will participate in interactive activities to enrich their JSHS experience and to engage with Department of Defense (DOD) researchers, laboratories, and related STEM organizations and professionals. Unique opportunities for JSHS students include:

• The Student Research Presentations, the highlight of the National JSHS, feature the STEM achievements of outstanding students representing the United States, Puerto Rico, and the DOD Dependents Schools of Europe and the Pacific.

• DOD STEM Experiences allow students and teachers to engage with DoD’s world-class STEM professionals and provide exposure to the Department’s cutting edge research and technologies.

• Banquet and awards ceremony recognizes all participants and announces scholarships awarded to students in each competition category of the oral session categories of the National JSHS competition.

Dear JSHS participant,

Evaluators from Purdue University are conducting a study to learn about student experiences in Junior Science & Humanities Symposium (JSHS). We are asking you to fill out this survey because you participated in JSHS. Your feedback will be used to help us improve JSHS for students in the future and provide important information about your experiences. The sponsor of JSHS, the Army Educational Outreach Program (AEOP), is paying for this study. In 2017, more than 7,000 students and 1,000 adults will participate in JSHS and evaluators from Purdue University want to hear from you and your research mentor.

Here’s how you can help:
Complete the JSHS Regional Survey using the hyperlink below. Your parent or guardian has already provided permission for us to ask you to participate in the survey. Now, it is up to you to decide whether you want to participate or not. The survey takes 25-30 minutes to complete on average.

Students will complete the 2018 JSHS Regional Youth Survey: https://www.cvent.com/d/6tq3pb

Pass this email along to adult(s) who supported you as you prepared for JSHS. Ask them to complete the JSHS Mentor Survey using the hyperlink below. The survey will take 25-30 minutes.

All other participants will complete the 2018 JSHS Mentor Survey: https://www.cvent.com/d/ctq3py

If you have any questions about these surveys or your participation in the evaluation study please contact the AEOP Evaluation team at Purdue University – Carla C. Johnson carlacjohnson@purdue.edu or at (765) 494-0019.

Thank you so much for your participation in the evaluation of JSHS!

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If you have questions or concerns regarding the evaluation process, please contact me. I appreciate your efforts to increase the participation in the survey process. It is absolutely essential to the success of the JSHS program at the regional and national levels.

Thank you and best of luck with your events.

Tina White
Junior Science & Humanities Symposium
Academy of Applied Science
24 Warren St., Concord, NH 03301
603-228-4520  jshs.org

FUELING THE SPARK OF GENIUS
The mission of the Academy of Applied Science is to provide programs, pathways and information to develop the intellectual capacity, critical thinking, creativity, and problem-solving abilities of students so that they may become contributing, and forward-thinking members of the science, technology, engineering, mathematics, and invention community.