

Forty-Eighth Annual
Arkansas Junior Science
And Humanities Symposium
In Cooperation With

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OBJECTIVES

- To promote research and experimentation in the sciences, mathematics, and engineering at the high school level.
- To recognize the significance of research in human affairs, and the importance of humane and ethical principles in the application of research results.
- To search out talented youth and their teachers, recognize their accomplishments at symposia and encourage their continued interest and participation in the sciences, mathematics, and engineering.
- To expand the horizons of research-oriented students by exposing them to opportunities in the academic, industrial, and governmental communities.
- To increase the number of future adults capable of conducting research and development.

Program

All rooms are located on the main campus of Arkansas Tech University

FRIDAY, MARCH 7, 2014

12:30 pm **Registration, McEver Hall Lobby**
Bus parking is available in the Tucker
Coliseum lot across from the East entrance to
Doc Bryan

1:00—4:15 pm **Demonstration Tours:**
Tours will assemble in the McEver lobby

Demonstration #1: Aging of Organisms and its Practical Uses
McEver 128 ***Dr. John Jackson, ATU Associate Professor of Fisheries Science***
Jared Schluterman, ATU Fisheries and Wildlife Graduate Student
This tour will take you through several different classes of organisms and explain how fisheries and wildlife professionals go about aging those organisms and why it is important. In addition, a demonstration of otolith removal, mounting, and aging will be presented.

Demonstration #2: A Look at Proteins: Gene Mutations, Protein Overexpression and Isolation
McEver 101 ***Dr. Ty Yamashita, ATU Associate Professor of Biology***
Cheryl Flemming, ATU Biology Student
Ken Smith, ATU Biology Student
George Strahan, ATU Biology Student

Proteins are important physiological and cellular components with structural and catalytic properties. In this module, we show how isolated genes can be cloned and over expressed in bacterial cells to create large amounts of a specific protein for further structural and functional studies. We will also explore gene mutations and their effects upon enzymes and biochemical pathways.

Demonstration #3: Don’t Sweat It, It’s Just My Mind-Body Connection at Work
McEver 131 ***Dr. Cindy Jacobs, ATU Associate Professor of Biology***
Dr. Bruce Tedford, ATU Professor of Biology
Jamie Dalton, ATU Instructor of Biology
Laura Harris, ATU Biology Student
Caitlin Oswald, ATU Biology Student

Have you ever experienced a “cold sweat” when you were nervous about something? If so, then you’ve had a psychophysiological response that can be measured by a test known as the GSR (Galvanic Skin Response). Join us as we demonstrate the GSR which is also used as part of the infamous lie detector test. Don’t worry, it won’t hurt and it won’t be a problem.....unless you have something to hide!

Demonstration #4: Why is the Sky Blue?
McEver 37 ***Dr. Jessica Young, Assistant Professor of Physics***
This presentation is an illustration of optical phenomena such as scattering and reflection. We will investigate why the sky is blue, why sunsets are red, and how rainbows are formed.

Demonstration #5: Hands-On Stoichiometry and Energetic Chemistry
McEver 27 ***Dr. Steve Gann, Assistant Professor of Physical Science***
Robert Bowman, ATU Chemistry Student
Taylor Sharp, ATU Chemistry Student

We will be making hydrogen/oxygen rockets and having a shooting-for-distance contest to see who built the most stoichiometrically correct rocket engine. There were also be some demonstrations of exothermic energetic chemical reactions.

4:30 pm **Meeting of All Delegates, Doc Bryan Auditorium**
A meeting of all teachers and delegates with the
director in order to go over policies and procedures.

5:15 pm **Return to Hotel (La Quinta Inn of Russellville)**

6:30 pm **Recognition Banquet, Chambers Cafeteria**
Introductions: Dr. Tackett, Director Arkansas JSHS
Welcome: Dr. Robertson, Dean ATU Nat. & Health Sci.
Recognition of Papers: Dr. Yamashiata, Assoc. Prof. of Bio.
Certificates: Dr. Kellner, Prof. of Wildlife Bio.

8:00 pm **Keynote Speaker, 300 Pendergraft Lib. & Technology Ctr.**
Name: Dr. Rachael Urbanek, Asst. Prof. of Wildlife Sci., ATU
Title: Urban Wildlife: More than Rats and Spiders!

9:15—11:00 pm **Return to Hotel for Pizza Party and Swimming**
La Quinta Inn of Russellville

SATURDAY, MARCH 8, 2014

6:15—7:45 am **Breakfast, La Quinta Inn of Russellville**
Students not presenting papers should be checked out before
leaving the hotel for the paper presentations. Paper presenters
and sponsors will have until 1:00 pm to check out.

8:00 am **Presentation of Student Papers, Doc Bryan Auditorium**
Moderator: Dr. Jackie Bowman Assoc. Prof. of Bio. ATU

11:30—12:30 am **Lunch, Chambers Cafeteria**

12:00—1:00 pm **Poster Setup, 300 Pendergraft Lib. & Technology Center**

1:00—2:00 pm **Judging of Posters, 300 Pendergraft Lib. & Tech. Ctr.**
Head Judge: Dr. Jim Musser, Assoc. Prof. of Physics ATU

2:15—3:45 pm **JSHS Cabaret, Doc Bryan Auditorium**
Performed by the ATU Music Theater Workshop under the
direction of Mr. Kenneth Futterer, Associate Professor of Mu
sic at Arkansas Tech University

4:00—4:30 pm **Awards Presentations, Doc Bryan Auditorium**
Announcement of Arkansas JSHS paper and poster contest
winners.
Announcement of the JSHS Teacher Award

4:30—5:00 pm **Program Evaluation, Doc Bryan Auditorium**

5:00 pm **Adjournment**
There are no arrangements for dinner, you are free to leave.

Judges

Head Judges

Dr. Chris Kellner, Head Paper Judge, Professor of Wildlife Biology, ATU
Dr. Jim Musser, Head Poster Judge, Assoc. Professor of Physics, ATU
Head of the Department of Physical Sciences, ATU

Paper Judges Panel

Dr. Robert Allen, Professor of Chemistry, ATU (Retired)
Dr. Cathy Baker, Professor of Geology, ATU
Dr. Ruth Enoch, Assistant Professor of Mathematics, ATU
Dr. Carl Greco, Assoc. Professor of Electrical Engineering, ATU
Dr. David Osburn, Assoc. Professor of Psychology, ATU
Dr. Hamed Shojaei, Asst. Professor of Physics, ATU
Dr. Ivan Still, Assoc. Professor of Biology, ATU
Dr. Bruce Tedford, Assoc. Professor of Biology, ATU
Dr. Tsunemi Yamashita, Assoc. Professor of Biology, ATU

Planning

Arkansas Tech University Planning Committee

Dr. Jacqueline Bowman, Assoc. Professor of Biology
Mrs. Cheryl Chaney, Asst. Professor of Biology
Dr. Cindy Jacobs, Asst. Professor of Biology
Dr. Linda Kondrick, Assoc. Professor of Physical Science
Dr. Jim Musser, Assoc. Professor of Physics and Head of ATU Physical Sciences
Dr. Jeff Robertson, Professor of Astrophysics and Dean ATU Nat. & Health Sci.

Director, Arkansas Junior Science & Humanities Symposium

Dr. Ron Tackett, Asst. Professor of Physics, Arkansas Tech University



Speaker



Dr. Rachael E. Urbanek
Assistant Professor of Wildlife Science
Department of Biological Sciences, Arkansas Tech University

Urban Wildlife: More than Rats and Spiders!

Human populations are growing exponentially and urban sprawl is creating massive metropolitan areas that are interspersed with green habitats. As this is happening, wildlife species are becoming adapted to urban environments through changes in behavior and population dynamics. More cities are creating preserves or parks to conserve plant and animal species in urban areas necessitating wildlife biologists to overcome new obstacles such as conserving endangered species in a predominantly harsh anthropogenic landscape, maintaining sustainable populations of all biota in limited green space, and managing human-wildlife conflicts that are at an intensity level never experienced in history. Dr. Urbanek will describe how her research has helped overcome some of these obstacles in places as urbanized as the Chicago Metropolitan Area and as small as the city of Russellville, Arkansas.

Dr. Rachael E. Urbanek received her B.S. in Wildlife Science at the Pennsylvania State University in 2005 and her Ph.D. from the Cooperative Wildlife Research Lab at Southern Illinois University Carbondale in 2012. Her background consists of a strong education in wildlife ecology accompanied by a diverse amount of research and teaching experiences. Since 2008, Dr. Urbanek has published her research in 10 scientific journals and given 25 professional presentations on her work. Dr. Urbanek has been recognized by the Council of The Wildlife Society as a future leader in conservation and is currently the secretary/treasurer of the Arkansas Chapter of the society. Over the course of her career, Dr. Urbanek has had the pleasure to conduct research on a wide variety of animals including timber rattlesnakes, ruffed grouse, white-tailed deer, feral cats, Blanding's turtles, raccoons, eastern cottontails, and swamp rabbits. This collection of animals reflects her broad interests in all things ecology; however, nothing excites her more than urban wildlife ecology.



48th Annual Arkansas Junior Science & Humanities Symposium



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March 7-8, 2014
ARKANSAS TECH UNIVERSITY
Russellville, AR 72801