Looking into the Future with Appalachia’s Next-Gen Leaders
ARC Strategic Investment Plan

- Investment Area #5: Community Capacity
  - Building the capacity and skills of current and next-generation leaders and organizations to innovate, collaborate, and advance community and economic development.
ARC’s Oak Ridge Summer STEM Programs

Jennifer Tyrell
Section Manager
Oak Ridge Associated Universities
ARC/ORNL High School Summer Math-Science-Technology Institute

- 52 high school students and teachers
- 2 weeks in Oak Ridge, TN
- Small group research experience under mentorship of an ORNL or ORAU researcher
  - Research topics include:
    - Supercomputing
    - Visualization of protein folding
    - Cytogenetic biodosimetry
ARC/ORAU Middle School Summer Science Academy

- 26 middle school students
- 1 week in Oak Ridge, TN
- Group STEM challenge using design thinking as a framework led by master teachers
  - Topics are:
    - Water quality
    - Drones/coding
    - 3D printing and design
Entrepreneurship in STEM

- “Shark Tank” challenge for middle school students
- Design process taught to high school participants through 3D design and printing activities in the evening
- Local entrepreneurs as guest speakers
- EntreEd professional development for teachers
- EntreEd intro to entrepreneurship for high school students
Forming Appalachia’s Next Gen Leaders

• Introducing students to entrepreneurship, a growth mindset, and design thinking
• Setting middle school students up for success in STEM by capturing their interest at a critical time
• Providing authentic STEM research experiences to high school students
• Equipping teachers with experience in research and tools for teaching entrepreneurship

http://orau.org/arc-ornl
2019 ARC/ORNL Summer STEM Program

Shelly Nixon
Math Teacher
School of Inquiry and Life Sciences at Asheville
### Intense Schedule

**ARC/ORNL 2019 High School Summer Institute, July 6-19**

- **Monday, July 8**
  - 7:30 am: Breakfast
  - 8:00 am: Depart for ORNL
  - 8:30 am: Report to research groups
  - 10:00 am: Lunch at ORNL
  - 11:00 am: Meet Dr. Christopher Shoemaker
  - 1:00 pm: Group meetings
  - 3:00 pm: Final Presentations

- **Tuesday, July 9**
  - 7:30 am: Breakfast
  - 8:00 am: Depart for ORNL
  - 8:30 am: Report to research groups
  - 10:00 am: Lunch at ORNL
  - 11:00 am: Meet Dr. Christopher Shoemaker
  - 1:00 pm: Group meetings
  - 3:00 pm: Final Presentations

- **Wednesday, July 10**
  - 7:30 am: Breakfast
  - 8:00 am: Depart for ORNL
  - 8:30 am: Report to research groups
  - 10:00 am: Lunch at ORNL
  - 11:00 am: Meet Dr. Christopher Shoemaker
  - 1:00 pm: Group meetings
  - 3:00 pm: Final Presentations

- **Thursday, July 11**
  - 7:30 am: Breakfast
  - 8:00 am: Depart for ORNL
  - 8:30 am: Report to research groups
  - 10:00 am: Lunch at ORNL
  - 11:00 am: Meet Dr. Christopher Shoemaker
  - 1:00 pm: Group meetings
  - 3:00 pm: Final Presentations

- **Friday, July 12**
  - 7:30 am: Breakfast
  - 8:00 am: Depart for ORNL
  - 8:30 am: Report to research groups
  - 10:00 am: Lunch at ORNL
  - 11:00 am: Meet Dr. Christopher Shoemaker
  - 1:00 pm: Group meetings
  - 3:00 pm: Final Presentations

**Thank you for participating in the 2019 ARC/ORNL High School Summer Institute!**

**Have a Safe Trip Home!**

Revised July 7, 2019
Investigation of Cell Wall Structure to Improve Biofuel Production

Teachers will help produce and characterize biomass from switchgrass and algae as part of a research project that uses neutron scattering and computer simulation to examine the fundamental structure of plant cell walls. The project goal is to find better, faster ways to obtain biofuels and bioproducts from photosynthetic biomass. Switchgrass mutants with specific changes to cell wall components lignin and cellulose are studied for development of better biofuel feedstocks. Algae are being investigated as sources of deuterated cellulose and other polysaccharides for structural studies. Plants and algae are produced under controlled lab conditions to obtain deuterium-labeled biomass samples for neutron scattering and NMR experiments. Labeling with deuterium, the naturally occurring, stable heavy isotope of hydrogen, is a standard method for neutron scattering, NMR, and kinetic research. The teachers will assist in laboratory production of grasses and algae for these structural studies. Light
Evans, Barbara R. <evansbg.oml.gov>

To MREIBSON@WYALUSINGRAMS.COM, chemhawk11@gmail.com, fateamia.fuson@gmail.com, me 

Wed, Jul 17, 12:09 PM

Here are the publications on the switchgrass transgenic strains that we are studying.

Note that there are no published results yet for the strains that overexpress or knockdown CESA 7-2.

I have included a book chapter on the history of switchgrass as a species and as a bioenergy crop, and the USDA info sheet on cultivation.

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7 Attachments

- COMT IRNA SG PN...
- COMT IRNA SG PN...
- baxter_twoyear_yr7...
- Mazarei_2018_SG...
- Mazarei_2018_SG...
- SG as energy crop ...
- Planting&Managin...
Van Rides, Tours, Social Time
Investigation of Biomass to Improve Biofuels Production
Lisa Frye, Fatemia Fuson, Shelly Nixon, Michael Reibson
Mentor: Barbara R. Evans, PhD
Appalachian Regional Commission/Oak Ridge National Laboratory Math-Science-Technology Institute 2019

Introduction

- A growing need to find more sustainable energy projects, the need
  to find scrubbers for automobile exhausts and implementation
  of photoelectrochemical biomass is at the forefront for finding another
  source of chemical energy.
- Scrubbers are a promising alternative for liquid type transportation fuel that
  is becoming more environmentally friendly.
- Algae, Switchgrass, and Hybrid Poplar have been proposed as potential
  sources of biomass for conversion into fuels and biomaterials.

Materials and Methods

The following were used to produce and characterize biomass from
- Algae: ATP treated with sodium
- Switchgrass: Silanization with acetic
- Hybrid Poplar: Silanization with acetic
- Changes in biomass were grown to B201

Background

- Aquatic algae, such as Chlorophyta, can grow in high concentrations of DJF up to
  30% better and can produce large amounts of starch when grown on
- Water stresses on many switchgrass have been produced by introduction of
  grain corns for conversion or biosorption large grains that are made from the
- Silica synthesis in aquatic biomass with increased
- Hybrid Poplar: Populus tremula, a leaf is a popular species for cellulosic
  biomass.

Acknowledgements

Thank you to Barbara R. Evans, PhD. We appreciate the opportunity provided
- Oak Ridge National Laboratory, Oak Ridge Associated Universities
  and the Appalachian Regional Commission along with Jennifer Todd, Dr. Chris
  Nashon, Pam Brown, Dr. Mary Jane All, Bob Loveless, Cell Narramore, Bridget
  Narramore, and Dr. Deana Poxon.
Courtney Rhoades
Black Lung Organizer
Appalachian Citizens’ Law Center
2018 ATP Fellow
2016 ATP Presenter

Appalachian Teaching Project
APPALACHIAN TEACHING PROJECT 2018

www.arc.gov/ATP  #ARCATP

150 STUDENTS FROM 15 PARTICIPATING SCHOOLS

Alfred State College, NY
Auburn University, AL
East Tennessee State University, TN
Fairmont State University, WV
Frostburg State University, MD
Indiana University of Pennsylvania, PA
Ohio University, OH
Radford University, VA
Southeast Kentucky Community and Technical College, KY
Union College, KY
University of Pittsburgh at Bradford, PA
University of Tennessee, TN
Virginia Polytechnic Institute and State University, VA
Young Harris College, GA

WHAT IS THE APPALACHIAN TEACHING PROJECT?

Leadership skills  Strategic planning  Applied research
Professional development  Peer-to-Peer learning

WHAT DO STUDENTS RESEARCH?

Community building  Cultural preservation  Community planning
Population health  Asset development

Since 2001, over 2,250 students from 22 schools across Appalachia have participated in the Appalachian Teaching Project.
Loss of the Railroad

CSX closure ends more than 100 years of railroad operations in Erwin

Neita Lingerfelt:
“They really didn’t want to have local business, they wanted to have run through trains.”

Phillip Laws: “Until the big shutdown at the end... [the job cuts were] slow enough to where it seemed to be absorbed [by the community].”

2016 Appalachian Teaching Project
Running the Health Care Marathon: An Ethnography of a Charitable Clinic in a Rural Appalachian Community

Courtney Rhoades
East Tennessee State University

Follow this and additional works at: https://dc.etsu.edu/etd
ATP Fellowship - Overview

- Builds on ATP experience in understanding the role of the ARC in the region.
- Complete Performance Verifications
  - Learn types of projects supported
  - See the complexity of the ARC
  - Insight into the investments and developing goals of the ARC
- Assist with Appalachian Teaching Project
Takeaways and Career Influence
THANK YOU
Appalachian Leadership Institute
September 2019
Dr. Katie A. Cahill | University of Tennessee
Our Partners

- The University of Tennessee
- Tuskegee University
- Collective Impact
Team Members

• Dr. Tim Ezzell, University of Tennessee
• Dr. Katie Cahill, Howard H. Baker Jr. Center for Public Policy
• Cat Wilt, Institute for a Secure and Sustainable Environment
• Dr. Tammy Laughlin, Tuskegee University
• Bruce Decker, Collective Impact
What's leadership got to do with it?
Leaders inspire others to work toward a common goal.
Values

• Respecting Existing Knowledge and Ideas
• Developing Equitable and Collaborative Partnerships
• Embracing Contributions from Diverse Experiences
• Promoting Shared Visioning
• Responsive to Evolving Needs
Vision

An Institute that promotes action-oriented leadership in the Appalachian Region by increasing capacity and strengthening shared values of civility, inclusivity, integrity, and a commitment to public service.
Our Approach

• Emphasizes Active and Experiential Learning
• Promotes Regional and Critical Thinking
• Encourages Cooperation and Team-Building
• Fosters Creativity and Innovation
• Expands Networks and Builds Lasting Relationships
Session Topics

- Orientation and Leadership
- Economic Opportunities
- Ready Workforce
- Critical Infrastructure
- Natural and Cultural Assets
- Community Capacity
- Graduation (Washington, DC)
Session Activities

- Instruction
- Field Experiences
- Team Challenges
- Keynote Speakers
- Break-Out Discussion
- Networking Opportunities
Toolkit

- Developing a Shared Vision
- Strategic Planning
- Mapping Assets & Partnerships
- Analyzing Costs and Benefits
- Finding Funding
- Measuring Success
Community Advocates

“The essence of public service is to be an advocate— to speak when it matters most for those who otherwise might have no voice.”

~ Sen. Howard H. Baker Jr. (R-TN)
APPALACHIA STRONG
prosperity. progress. growth.
ASHEVILLE, NORTH CAROLINA | SEPTEMBER 4-6, 2019

AN APPALACHIAN REGIONAL COMMISSION SUMMIT
HOSTED BY THE STATE OF NORTH CAROLINA