Graduate Extension Scholars Program
Strengthening Cooperative Linkages
Between Land-Grant Universities,
School-based Agricultural Education,
and 4-H Youth Development

Hannah H. Scherer, Ayla A. Wilk
& Matthew Spindler

Agricultural, Leadership, and Community Education

Virginia Tech
Invent the Future
Motivations: graduate student capacity

- Communicating science
- STEM Pedagogy
- Engaging Practitioners

Quality outreach
Motivations: connect youth to STEM research in agriculture

Agriculture teachers

4-H Agents
Motivations: connect youth to STEM research in agriculture

In order to feed a growing global population, we need professionals with skills in these six agriculture fields:

- Plant / Soil Science
- Life Sciences
- Mechanization / Engineering
- Food Science & Technology
- Economics, Business & Management
- Animal Sciences
Motivations: connect youth to STEM research in agriculture

IN 2012
31,852
STUDENTS GRADUATED IN THESE FIELDS

IN 2014
406,320
HIRES WILL BE MADE BY THE INDUSTRY

AG UNIVERSITIES EXPERIENCED A 28.5% ENROLLMENT GROWTH FROM 2005-2013.
INDUSTRY DEMAND IS 12X MORE THAN WHAT THEY ARE PRODUCING.
Motivations: encourage partnerships

Diagram:
- Land-grant university
- County-based Extension
- School-based agricultural education

Interconnections:
- Land-grant university to County-based Extension
- Land-grant university to School-based agricultural education
- County-based Extension to School-based agricultural education
- County-based Extension to Land-grant university
- School-based agricultural education to County-based Extension
- School-based agricultural education to Land-grant university
County-based team model promotes cooperative linkages

- Graduate Extension Scholar
- Project leadership at Land-grant University
- 4-H Agent
- Agriculture Teacher
GES program supports experiential learning for scholars

- Educational module development
- Site visits
- Seminar
- One-on-one meetings

Program Activities

- Education practitioners
- Education faculty
- Peers (cohort)
- Education graduate student
Resources provided to teams support efforts

- $3,500 Scholar stipend
- $250 Partner stipend
- $1,000 budget

$5,000 per team
Overview of program planning timeline

**Spring 2014**
- Planning team formation & grant writing
- Graduate Extension Scholar recruitment

**Fall-Winter 2014**
- Development of seminar syllabus
- Partner recruitment

**Spring 2015**
- Seminar
- Educational module development & piloting

**Summer 2015**
- Educational module dissemination
- Program evaluation and revision
Shade for cows: What does it take to convert a pine plantation into a silvopasture?

- Consultation and site visit with resource professionals including
  - J. B. Daniels (NRCS grassland agronomist)
  - Miller Adams (DOF area forester)
  - Dr. John Fike (VT CSES associate professor)
- Timber cruising and marking trees for removal
- Soil testing and lime and fertilizer recommendations
Demonstrating the Science Behind the Green Thumb: Bringing Nursery Industry Best Management Practices into the Secondary Classroom

In this module, students:

• Participate in a challenge to grow plants with resource use efficiency.
• Learn about production costs, like seed, fertilizer, and potting soil.
• Apply their new ideas and conclusions to a landscape planting activity.
Inspiring the Next Generation of Agronomists Through New Biofuel and Biochar Educational Resources

Fifth grade students discover:

- What does it mean to be an agronomist?
- What do plants need to grow?

Hands-on activities include:

- Use of research devices (i.e. infiltrometer and lab pipettes)
- Planting different seed species with different levels of treatments.

Twelfth grade students conduct a real field-setting experiment with different corn stover removal rates and biochar applications.
Biotech in the Ag Classroom: DNA Based Plant Pathogen Identification

Students will:

• Receive hands-on experience in a biotech lab
• Understand ubiquity of plant diseases and their impact
• Conduct polymerase chain reaction (PCR) to amplify DNA
• Run gel electrophoresis to visualize DNA
• Use computer resources for DNA comparison and organism identification
Successes from pilot year projects

- Modules implemented student-centered pedagogy
- Locally relevant topics shaped by meaningful practitioner input
- Unexpected partnerships increased opportunities for students
- Modules engage students in the practices of scientists in creative ways
Next steps

- Program evaluation - underway
- Research on graduate student experience - underway
- Second cohort Fall 2015 - recruiting
- Seeking sustained funding
Thank you!

Contact Hannah for more information:
hscherer@vt.edu