Merits and Broader Impacts of Undergraduate Research in Water Sciences

Dr. Tamim Younos
Research Professor, Virginia Tech
Undergraduate Research: Goals

• Provide individual research opportunity in a stimulating interdisciplinary research environment in water sciences and engineering

• Facilitate opportunities for professional development
  • Develop communication skills (oral, verbal)
  • Participate in seminars, workshops and conferences

• Demonstrate the value of scientific collaboration between various natural science/engineering disciplines and social sciences

• Demonstrate the value of team work

• Increase advancement to graduate school in water sciences

• Facilitate opportunities for social interaction, bonding and diversity
Undergraduate Research: Merits

- Conduct Cutting-Edge Research (example projects)
  - Watershed assessment and instrumentation
  - Ecological stoichiometry
  - Microbial Source Tracking
  - Cycling of metals in aquatic environments
  - Groundwater hydrology
  - Drinking water chemistry
  - Water-energy nexus

- NSF REU Proceedings of Research
  [http://www.vwrrc.vt.edu/nsf_reu.html](http://www.vwrrc.vt.edu/nsf_reu.html)

- Water Center Special Reports

- Conference Proceedings Papers and Journal Articles

- Presentations at Local, Regional and National Conferences
My Undergraduate Research Programs

• Long-Term Programs
  • Semester long up to 3 years

• 10-Week Intensive Programs
  • Summer Internships, NSF REU

• 2-Week Research-Service-Learning Program
  • Study Abroad
Broader Impacts

- Over 60% female, 25% under-represented students
- Over 85% advancing to graduate school
- Increased understanding of global water issues
- Positive change in students’ professional and personal attitudes
Undergraduate Research Programs
Stroubles Creek Watershed Initiative
Long-Term and 10-Week Summer Research

Figure 1. Stroubles Creek Watershed Map
NSF REU Participant Profile 2007 - 2009

Twenty six undergraduate students (16 women and 10 men) from 23 institutes across the country have participated in the REU site research activities.
2007 NSF/REU Fellow Quote:
“I apologize that it has taken me this long to get back in touch with you, but I wanted to update you on what's new with me. I graduated from Hampton University in May 2009 and I am currently a PhD student at the University of South Carolina in Geological Sciences from 2009-2013; and I am loving every minute of it!! Thanks to your support and mentorship during my 2007 REU experience, I am well prepared for graduate school.” 

Christopher Burrell
Hampton University
Reflection Essay

2008 NSF/REU Fellow Quote:
“What is of particular interest to me was how new my topic of study was to myself, and how this involved collaboration with engineers/scientists in fields different than my own. I found this interdisciplinary experience, where I could see how different fields interacted and benefitted each other, to be educational and a necessary experience in today’s world.”

John Kenny
University of Kansas
Reflection Essay

2009 NSF/REU Fellow Quote:
“Each member of the group contributed individual traits and a different background. Getting to know this diverse group of people has given me a new perspective on myself, and my interaction with others. Getting away from the way of life I’m used to and experiencing all new faces and places has allowed me to accept new concepts with open arms.”

Stephanie Debittito
University of Vermont
Study Abroad Program
Dominican Republic
Semester-Based Study