

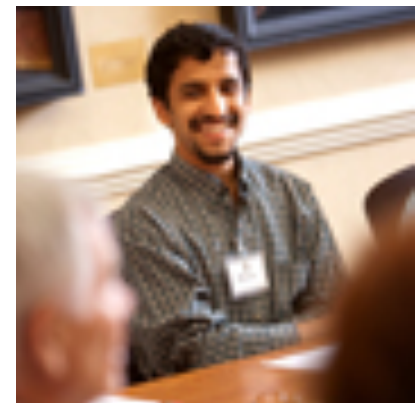
Excel-lent Experiences: Computational Research Internships

Angela B. Shiflet, Ph.D.
Wofford College

SIAM 2012, July 13

Research internships invaluable

- Interdisciplinary teamwork on large problems
- Can make significant contributions
- New ideas, techniques, applications
- Contacts
- Other areas of country/world
- Enhance classroom experience
- Leverage for future



How can we help?



Require

- Wofford's Emphasis in Computational Science
 - Bachelor of Science
 - 5 courses
 - Programming
 - Data Structures
 - Calculus I
 - Data and Visualization
 - Modeling and Simulation
 - Summer internship involving computation in the sciences
- Wofford's Concentration in Applied Mathematics

Early fall - resume

- Online examples
- List skills
- Career services
- Send to professor(s)

Gregory T. Valainis

3 Woodburn Ridge Road, Spartanburg, SC 29302
(864) 580 – 8847
valainisgt@email.wofford.edu

A Wofford College sophomore majoring in Computer Science with a minor in Mathematics and numerous biology and chemistry courses. Committed, hard working, problem solver, team player, and a quick study. Enthusiasm, honesty, and a strong work ethic exemplify my character. Seeking opportunities to be of service and to engage in real life experiences with relevant and meaningful internships.

Education

Wofford College, Spartanburg, SC
Computer Science Major: B.S., Mathematics Minor (May 2013)
GPA: 3.63/4.0

Relevant Courses

Genetics, Cellular Biology, Human Physiology, Organic Chemistry, Programming and Problem Solving (Python), Data Structures (Python & C++), Modeling and Simulation (Stella & MATLAB), Multivariable Calculus, Differential Equations, Linear Algebra (Spring 2012), Theory of Computation (Spring 2012)

Honors and Awards

- Old Main Wofford Scholar
- South Carolina Palmetto Fellow Scholarship
- Dean's List Each Semester at Wofford
- High School Scholarship for Best on Field and in Academics

Work Experiences:

Summer 2010	Smith Dray Moving Company	Greenville, SC
Summer 2011	Seasonal employee at Smith Dray Company. The position required teamwork to work effectively and efficiently with fellow employees and customers.	
Summer 2011	Global Health Organization	Datanli, Nicaragua
	Participant of the Global Health Organization's medical mission trip to Nicaragua. The trip lasted one week and allowed me to obtain clinical experience in dental medicine.	

Affiliations and Awards:

College
Sigma Alpha Epsilon Fraternity Member
Wofford Orientation Staff Member
Math Academy: Service club dedicated to tutoring school students in math and science
Biology Journal Club: The club analyzes and critiques published biology journals

High School

Student Government: Representative during sophomore and senior year
Varsity Soccer Team: Captain Senior Year
Tipplers Club of Spartanburg: Club dedicated to community service

Computer Skills: MATLAB, C++, Python, Stella, Microsoft Word, Excel, PowerPoint
Language: Spanish (Four semesters at Spartanburg High and two semesters at Wofford)

Don't wait 'til the last minute!

- NIH-funded research project in bioinformatics at U. of SC
- Wrote programs to study evolution of bacterial genomes
- Mentor delighted
- Biomedical engineering MS
- Medical school



Meet with student

- Discover
 - Interests
 - Long-term goals
 - Geographic restrictions
- Inspire and encourage
- Discuss application process
- Point to websites, contacts



burruss.kennesaw.edu

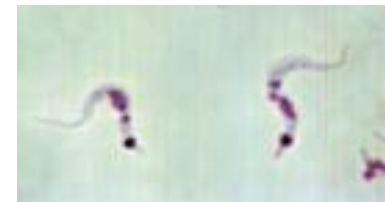


Websites

- NSF REU
 - http://www.nsf.gov/crssprgm/reu/reu_search.cfm
- State Space Grant Consortium
 - Funding for on-campus research
 - Funding for internship at NASA lab
- DoE Labs
 - ORNL RAMS Program
 - <http://computing.ornl.gov/internships/rams/>
- SIAM
 - <http://www.siam.org/careers/internships.php>
- ACM
 - http://jobs.acm.org/home/index.cfm?site_id=1603

NSF REU

- Virginia Commonwealth U. NSF REU
 - Bioinformatics & Bioengineering Summer Institute
 - Center for the Study of Biological Complexity
- *Trypanosoma cruzi* (*T. cruzi*)
 - Causes Chagas' disease
 - 14 million people are affected
- Multi-scale, high performance computational model of lifecycle
- “Wet” and “dry” lab teams



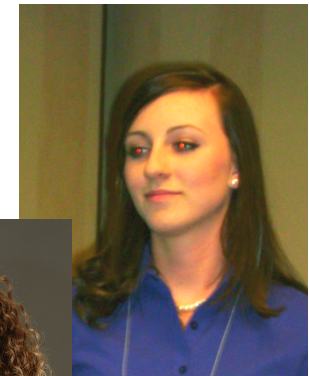
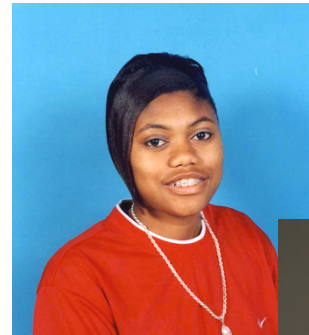
NSF REU

- Junior Summer Abroad Program internship at the University of Vienna Austria
 - Computational chemistry
- NC State
 - Sensitivity analysis tool for Pfizer for research of biological systems pathways
 - Next – ORNL SULI Program



ORNL RAMS Program

- Who are you???
- Computational physics
 - MS
 - Research Professional-Engineering Physics
- Modeling metabolic pathways
 - Research in heart development
 - Medical school
- Biomedical research
 - Modeling bone
 - Modeling heart
- Modeling the electrical grid
 - Ph.D.



DOE Labs

- Pacific Northwest National Lab
 - Even as first-year student
 - Universität Mainz Nuclear Chemistry Department
- Lawrence Livermore National Laboratory
- Los Alamos National Laboratory



NASA Labs

- Goddard Space Flight NASA Academy
- NASA Ames
 - Bioinformatics
- SC Space Grant Palmetto Academy
 - Genes Regulating Elastogenesis
 - St. Jude Research Hospital
- JPL
 - Mars Rover Operations
 - NSF Fellowship
 - Modeling clothe movement



NASA JPL



- Help with application
- Asteroid
- Ph.D. in astrophysics
- "more than any other experience it was those summer internships that pointed me toward a career in planetary science"



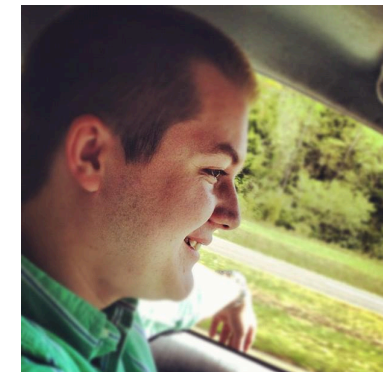
<http://www.utk.edu/tntoday/wp-content/uploads/Kraken1.jpg>

Blue Waters UPEP Interns



Graduate school at
Carnegie Mellon

MS
SPAWAR - Space and Naval War
Communications Command in
Charleston



National Institute for
Computational Sciences –
UT/ORNL
Supercomputers

"Go-Getter"

- Genetic epidemiology at Greenwood Genetic Center
- Developed Perl program to automate linkage analysis on disease genes
- Created database on diets of Honduran women
- Used SAS (Statistical Analysis System) to examine relationship between diet and birth defects



"Go-Getter"

- SIAM Minisymposium on Undergrad Research
- Massachusetts General Hospital/Harvard
- National Institutes of Health
- NIH research fellowship, then Ph.D. in genetics
 - Finding genetic associations with obesity
 - Perl programs
 - Database to store our genotypes
 - Work with many software programs



"Go-Getter"

- Woods Hole Marine Biology Laboratory
- "Blown out of the water"
- Defense mechanisms of cuttlefish
- Graduate school



masseffect.wikia.com



wfu.edu

Networking for other opportunities

- Wadsworth Center, NY Dept. of Health, HHMI
 - Mechanism of protein synthesis
 - Nat'l Center for Biotechnology in Madrid
 - NIH
 - Medical school



spain.info

Make contacts

- EPA
- Juiz de Fora University, Brazil
 - Heart visualization
- U. of Bath, England
 - Impact of Economic Constraints on a *Chlamydia trachomatis* Screening Program
 - Fellowship MD/Ph.D.
- U. of Washington
- Milliken Corp.



skyscrapercity.com



commons.wikimedia.org

Impact on Lab's research

- Dept. of Bioengineering, U. of CA, San Diego
 - Direction of heart research
- Greenwood Genetic Center
 - Hire 2-3 people to pursue research



californiaposted.com



Present work afterwards

- Wofford
- Conferences
 - SIAM
 - SIAM CSE
 - JMM
 - Supercomputing
 - National conferences in subject areas
- Professional papers
 - SIURO



Obtain mentor evaluations

- For future letters of reference



Impact on students

- Jobs
 - GE, ORNL, EPA
- Graduate and medical schools
 - Fellowships
- Life changing
 - Molecular Graphics Lab., Scripps Research Inst.

