



Education and Outreach: Best Practices 2009-2010

CEOC 2nd Annual Meeting, Sept. 28-29, 2010

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U.S. Department of
Homeland Security

NIMBioS Mission

- *Foster new collaborative efforts to investigate fundamental and applied questions arising in biology using appropriate mathematical and computational methods*
- *Enhance the essential human capacity to analyze complex biological questions and develop necessary new mathematics*
- *Encourage broader public appreciation of the unity of science and mathematics.*

NIMBioS Education and Outreach

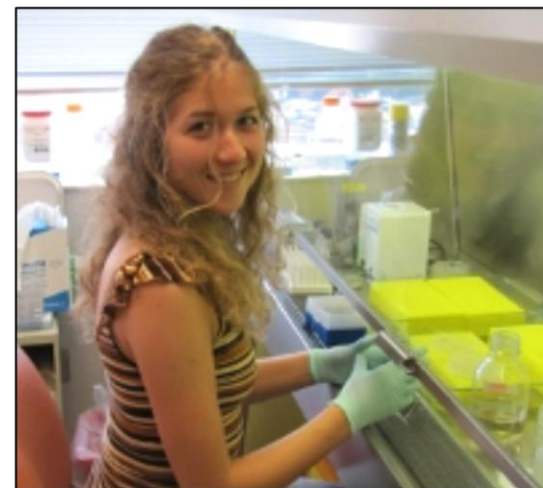
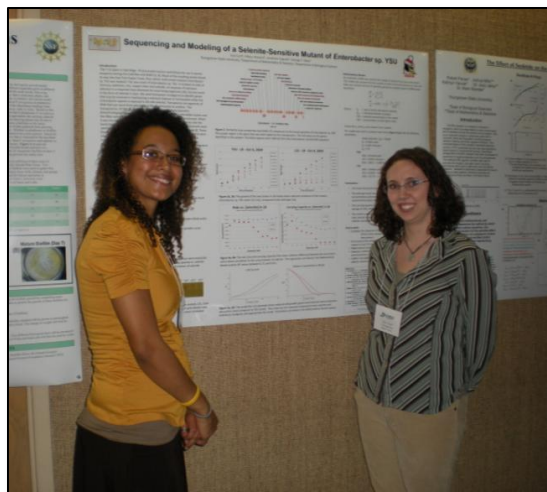
- To offer a diverse array of activities ranging from elementary education to postdoc education
- To focus on the enhancement of education at the interface between mathematics and biology
- To promote cross-disciplinary approaches to science at all levels
- To encourage broad public appreciation of the unity of science and math



*Dr. Suzanne Lenhart
Assoc. Director for Education,
Outreach & Diversity*

The Year's Highlights

- Biology in a Box (K-12 program)
- Undergraduate Research Conference
- NIMBioS Tutorials
- Research Experience for Undergrads/Vet Students (REU)



Biology in a Box

A K-12 Educational and Outreach Program

- Increase student interest in the STEM disciplines
- Encourage inquiry based approaches to science
- Add mathematics examples and exercises to strengthen students quantitative skills
- Foster use in both math and biology classrooms
- Currently in 80 school systems in TN
- Expanded to KY, NC, GA, & George Mason U., VA



Unit 1: Fossils

Unit 2: Of Skulls and Teeth

Unit 3: Fur, Feathers and Scales

Unit 4: Simple Measures

Unit 5: It's in your Genes

Unit 6: Animal Kingdom

Unit 7: Backyard Naturalist

Unit 8: Everything Varies

Unit 9: Forestry

Unit 10: Animal Behavior

Planned additions:

- From Climates to Biomes
- Of Cells and Cell Processes
- Engineering and Biology
- On Size and Life Cycle

Biology in a Box Workshop

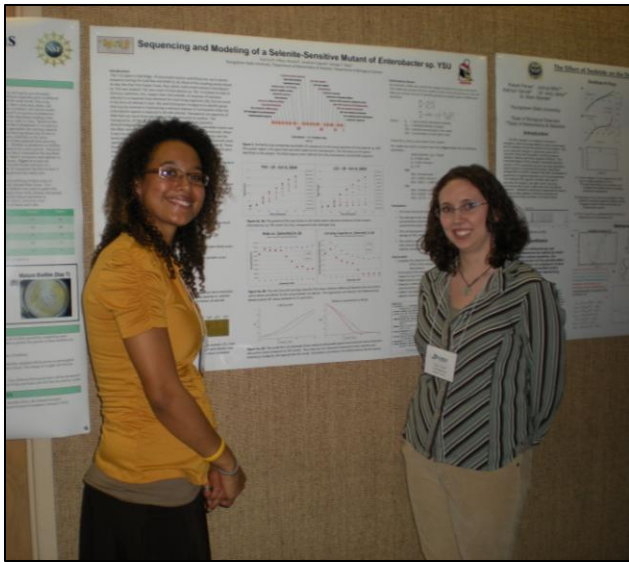
- In this workshop (June 17-18, 2010), 20 biology and mathematics teachers were introduced to new interdisciplinary exercises from the boxes
- Teachers learned how to use the exercises in both biology and mathematics courses to enhance student learning using interdisciplinary, hands-on inquiry based materials

Teams from KY, GA, NC and ten teams from TN



Undergraduate Research Conference

*Undergraduate Research Conference at the Interface of
Biology and Mathematics 2009*



200 participants (106 undergrads)
40 academic institutions present
40 student talks & 35 student posters

The second annual conference takes place November 2010.

NIMBioS Tutorials & Webinars



- *Optimal Control & Optimization for Biologists*, Dec. 2009
- *Graph Theory & Biological Networks*, Aug. 2010
- Upcoming: *HPC for Phylogenetics*, Oct. 2010 and *Stochastic Modeling in Biology*, Jan. 2011
- EcoEd Webinar (co-hosted w/ ESA), Sept. 2010
“Math, Computing, Undergraduate Ecology Education and Large Datasets: An Example from a Citizen Science Program”

REU/REV Summer Program

Research Experience for Undergraduates and Veterinary Students 2010



- 5 projects
- 13 undergrads
- 3 veterinary students
- 2 high school teachers
- 8-week long program
- 2 faculty mentors - 1 biology/1 math

"I learned about mathematical/spatial modeling using computer software that I hadn't used before, and also learned a lot more about the process of investigating data associations in a mathematically rigorous way. It was a great learning experience!"

REU/REV Summer Program

Media Coverage!



Media Advisory
 Photo Opp –
 who/what/when/where



PHOTOS BY ADAM BRIMER/NEWS SENTINEL
 Luong Nguyen of Mount Holyoke College, center, and Dubravka Bodiroga of Hood College, right, participants in the Research Experiences for Undergraduates and Research Experiences for Veterinary Students programs at the University of Tennessee, talk with fellow student Reka Keleman of Iowa State University in UT's Plant Biotech Building Wednesday.

REWARDING RESEARCH

Reka Keleman adds a growth medium to a slide to facilitate growth of a beneficial fungus being used in a study conducted by University of Tennessee researcher Dr. Kim Gwinn in the Plant Biotech Building on the UT campus.



Group participating in 8-week project at UT

BY MIKE BLACKERBY
 news@knoxnews.com

A select group of 17 undergraduate students and two high school teachers from across the nation are conducting cutting-edge research at the University of Tennessee in the Research Experiences for Undergraduates and Research Experiences for Veterinary Students programs.

The eight-week research project is organized by the National Institute for Mathematical and Biological Synthesis (NIMBioS), which is on the UT campus.

The undergraduate researchers, who all major in math, biology or veterinary sciences and were selected from a nationwide pool of

students, work in teams on four different research projects under the direction of UT professors.

They attempt to solve complex problems through the rarely applied interface of biology and mathematics.

"We are the only institution nationally that blends the two," said Catherine Crawley, communications coordinator for NIMBioS.

Kimberly Gwinn, UT associate professor of entomology and plant pathology, said the melding of mathematical and biological concepts and models can lead to quicker cross-disciplinary solutions.

"They say everything interesting happens at an interface," said Gwinn, who co-leads a group along with Jaewook Joo, UT assistant professor of astronomy and physics.

See RESEARCH on A7

Future Directions

- Expand Biology in a Box nationally
- Find funding to expand REV
- Summer School of Mathematical Ecology, July-Aug 2011 (MBI-NIMBioS-CAMBAM)
- Continue to host Undergrad Conference
- More tutorials
- Collaborate on SACNAS
- CCLI

NIMBioS Communication Strategy

Develop and utilize the appropriate communication vehicles, processes, and resources to educate and promote the NIMBioS mission.

K-12

Undergrads

Scientific/
Technical

Faculty

Audience

State/Federal
Agencies

Graduate
Students

Lay
Public

NIMBioS
Partners

External

Staff

Leadership
Team

Postdocs,
Sabbatical
Visitors

UT/ORNL
Collaborators

Audience

Board of
Advisors

Senior
Scientists
& Faculty

GRAs

Short-
term
Visitors

Internal

Strategic Communications

Determine:

specific purpose of communications activity,

specific audience(s),

specific outcome(s)

Scientific/technical (specialized)
audience



Lay audience

