

# COMPUTATIONAL BIOLOGY FOR BIOLOGY EDUCATORS

July 18-24, 2010

North Carolina Agricultural and Technical State University, Greensboro, NC



## OVERVIEW



Contemporary biology is increasingly driven by the computational approaches developed to model biological processes and analyze data. This workshop will be a week-long, hands-on, tutorial on teaching modeling and computational analysis in biology. Modeling and analysis concepts and tools will be introduced using examples from plant biology, biomedicine, biochemistry and systems biology. The workshop is designed for undergraduate faculty from biological sciences, math, and computer science who would like to add computational methods to their teaching, or biological applications to their mathematics or algorithms course. A portion of the time will be spent working in groups to collect and develop materials that can be used by the participants to incorporate computational methods into a course they are teaching.

## PARTICULARS



This workshop will introduce college faculty to various resources that can be used to prepare students to solve problems in the biological sciences computationally. Progress in the life sciences, including plant science, is becoming more dependent on computational modeling, analysis and visualization. Faculty will gain experience in dynamic simulation of photosynthesis, ecophysiological modeling of plant flowering time, probabilistic models of molecular evolution, and phylogenetic tree reconstruction. These and other examples are presented to enable educators to prepare their students to effectively use computational analytical tools, and to understand, use and create models as components of the contemporary scientific method.

## WHO IS THE INTENDED AUDIENCE?



Undergraduate and graduate educators in fields of science, technology, engineering, mathematics, especially those from minority-serving institutions. Priority will be given to groups of faculty from the same institution. The summer workshops are also open to high school teachers collaborating with college faculty. Faculty are encouraged to mentor and support undergraduate and graduate students, especially students assisting in teaching courses, by including them as part of their team.

## WHAT IS THE COST INVOLVED WITH ATTENDING?



Room, board, and all meals except Wednesday dinner are covered by iPlant and NCSI. Participants will be required to cover their own travel expenses and incidental expenses. **Unlike previous years, this year's workshop will NOT require a deposit.**

Register online at <http://www.computationalscience.org/workshops2010>

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**DATE** July 18-24, 2010

**LOCATION** North Carolina A&T Greensboro, NC

Time	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	
8:30-9:00		Breakfast	Breakfast	Breakfast	Breakfast	Breakfast	Breakfast	
9:00-10:30		Dynamic modeling of biological systems - agent-based and system dynamics modeling	Bioinformatics - sequence analysis and more	Team planning of development of materials to take back to the classroom	Team development of materials	Team development of materials	Team presentations and discussion	
10:30-10:45		Break	Break	Break	Break	Break	Break	
10:45-12:15		Enzyme kinetics with Agentsheets, NetLogo, Vensim and Excel	Molecular evolution with Excel and R	Discuss plans between groups and instructors, improve and revise	Break-out session - Intro to MATLAB and resources	Break-out session	Team presentations and discussion	
12:15-1:15		Lunch	Lunch	Lunch	Lunch	Lunch	Lunch	
1:15-3:00		Modeling photosynthesis, Vensim, MATLAB and R	Molecular phylogenetics - Mega 4, Biology Workbench, R	Recreational Activity				Adjourn
3:00-3:30		Break	Break					Break
3:30-5:00		Bringing systems biology methods and resources to the model	Reconciling gene and species trees	Break-out session - Intro to R and resources				
5:30-6:30	Reception & introductions	Dinner	Dinner	Dinner				
7:00-9:00 Evening Lab Time	Dinner - What is Computational Biology?	Evening lab time	Evening lab time	Team development of materials				