



# BU Bioinformatics Program Newsletter

Issue #51  
May 14, 2012

## CALENDAR OF EVENTS

This Week & Beyond

Wednesday, May 16, 2012

**Bioinformatics Student Seminar** - 4:00 Graham Rockwell, 4:45 Matt Schu will present on a conference he attended.  
LSE Room 103, 24 Cummington Street

Thursday, May 17, 2012

**Systems Biology Seminar** - Pinkesh Patel who will be visiting the Segre & Mehta will present a talk.  
12:15 - Pizza – 12:45 – Talk. LSE Room 103, 24 Cummington Street

Sunday, May 20, 2012

**University Commencement**

Wednesday, June 6, 2012

**5<sup>th</sup> Annual Bioinformatics Student Organized Symposium** - Time: 9am-5pm  
Location: LSE B01

**Speakers:**

**Atul Butte**, Stanford University School of Medicine, Pediatric Bioinformatics  
"Exploring Systems and Personalized Medicine through Translational  
Bioinformatics"

**Hana El-Samad**, UCSF, Biochemistry and Biophysics  
"What Molecular Fluctuations tell us Cellular Organization"

**David Stern**, HHMI, Princeton University Ecology and Evolutionary Biology  
"What Molecular Fluctuations tell us Cellular Organization"

**King Jordan**, Georgia Tech, Biology  
"Organization of Human Chromatin by Transposable Elements"

**Martin Frith**, BU Bioinformatics Alumnus, Computational Research Center  
Japan "What They Don't Teach You about Sequence Comparison"

**Sign Up to Present a Poster (4:20pm-5:20pm)**

We could really use your help to fill up the LSE Atrium for the Poster Session and Reception. Refreshments will be served throughout. Sign up here and read through the instructions. We will follow up with you shortly.

Thursday, June 14, 2012

**Systems Biology Seminar Series** – Presents the Challenge Project Class Presentations. LSE Room 103, 24 Cummington Street  
12:15 Lunch, 12:45 Presentations Begin

July 22 – July 26, 2012

**BU Bioinformatics Graduate Program** is hosting the 2012 International Workshop on Bioinformatics and Systems Biology. Look for more information coming soon!

**RECENT BIOINFORMATICS PROGRAM  
STUDENT/FACULTY PUBLICATIONS**

[Curr Opin Biotechnol](#). 2011 Aug. 22(4):541-6. Epub 2011 May 16.

“Ecosystems biology of microbial metabolism.”

[Klitgord N, Segrè D.](#)

Bioinformatics Program, Boston University, Boston, MA 02215.

## **Abstract**

The metabolic capabilities of many environmentally and medically important microbes can be quantitatively explored using systems biology approaches to metabolic networks. Yet, as we learn more about the complex microbe-microbe and microbe-environment interactions in microbial communities, it is important to understand whether and how system-level approaches can be extended to the ecosystem level. Here we summarize recent work that addresses these challenges at multiple scales, starting from two-species natural and synthetic ecology models, up to biosphere-level approaches. Among the many fascinating open challenges in this field is whether the integration of high throughput sequencing methods and mathematical models will help us capture emerging principles of ecosystem-level metabolic organization and evolution.

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**Please send full bibliographic citations for any papers you have published so far in 2011!** Send these to [mohr@bu.edu](mailto:mohr@bu.edu) AND [johannas@bu.edu](mailto:johannas@bu.edu).

## **QUOTES OF THE WEEK**

**(apropos of the paper summarized in the next section)**

“This is a huge step. I would have predicted this method would work to some extent. I just didn’t know how well.” (Eric Kool, Stanford chemist).

“It’s miles and miles from being a synthetic life form.” (Gerald F. Joyce, Scripps biochemist).

These quotations are taken from a *Nature* NEWS article by Helen Shen, published on 19 April 2012. [<http://www.nature.com/news/enzymes-grow-artificial-dna-1.10487>]

## **NOTEWORTHY NEW PAPERS AND BOOKS**

## Chetanya Pandya reports:

Any college level genetics textbook would tell you that the only organic molecules capable of molecular memory (prerequisite for heredity) and undergoing Darwinian evolution are RNA and DNA. A recent study by Pinheiro *et al.* (Science 20 April 2012: 336 (6079), 341-344) expands the palette considerably. Introducing a technique they refer to as “synthetic genetics”, they report six novel organic polymers that mimic DNA and can be used to store and propagate information. These xeno-nucleic acids (XNAs) can be copied into natural DNA by modified versions of enzymes that copy natural DNA. To take this idea a step further, one of these XNAs was made to undergo Darwinian evolution in response to imposed selection constraints. These additions to the genetic alphabet will enable researchers to write new chemical functions into DNA like unnatural amino acid incorporation into proteins, which could help usher in a wide array of biotechnology advances. Also, this is a critical step along the way to making semi-synthetic life forms, utilizing a novel genetic code.

In the authors’ own words, a philosophical quote on the origin of life itself:

*“Thus, heredity and evolution, two hallmarks of life, are not limited to DNA and RNA but are likely to be emergent properties of polymers capable of information storage.”*

Every issue of the newsletter will highlight one or more new papers (or books) that should be of general interest and provide awareness of significant new developments in the broad field of bioinformatics and integrative/systems biology. Please send suggestions for such items to [mohr@bu.edu](mailto:mohr@bu.edu). Better still, write a short review yourself (and send it to Scott Mohr for editing and inclusion in an upcoming *bioInforBeat*).

## USEFUL WEBSITES TO SUPPORT BBMB RESEARCH (BBMB = Bioinformatics, Biochemistry & Molecular Biology)

The BioBricks Foundation (BBF) is a 501(c)(3) public-benefit organization founded in 2006 by scientists and engineers who recognized that synthetic biology had the potential to produce big impacts on people and the planet and who wanted to ensure that this emerging field would serve the public interest.

The BBF homepage is at: <http://biobricks.org/>.

From the homepage you can navigate to the four main components of the BBF organization: OPENWETWARE, SYNTHETIC BIOLOGY, PARTS REGISTRY AND IGEM.

Check it out!