

# IAP 2014

## For Credit

### Introduction to Molecular Biology Techniques

(7.396: Independent Study in Experimental Biology)

**For Credit:**

Level: U

6 units (0-4-2)

Graded P/D/F

Can be repeated for credit. Fee: \$85.00

See "[The Art of Microbiology](#)" from the MIT News office (IAP 2012).

Instructors: Dr. Mandana Sassanfar, Lori Ling

Topics of current or special interest. This intensive "boot-camp" style course will provide hands-on instruction in basic molecular biological techniques including isolation and quantification of nucleic acid and protein, agarose and SDS-PAGE gel electrophoresis, PCR, microbiology, and bioinformatics. In addition students will learn more elaborate techniques such as ultracentrifugation and electron microscopy to purify and view virus particles. Emphasis will be on real-world application and experimentation in preparation for a more successful UROP experience. Priority will be given to freshmen with no prior research experience. Interested students must fill out an application form (see below) and email it to Dr. Sassanfar ([mandana@mit.edu](mailto:mandana@mit.edu)). Deadline 12/06/13. You will be notified by 12/16/13 whether you are enrolled in the class.

**Jan 13-17, 20-24, 27, 12:30 – 5:00pm, 68-089**

Enter departmental lottery by: December 06, 2013

Do not preregister on Websis.

Limited to 12 participants. No listeners.

Prereq: 7.01x or AP Biology - *This course is not a substitute for 7.02*

[Download Application](#) (linked .doc file)

Contacts:

- Dr. Mandana Sassanfar, 68-270A, x2-4371, [mandana@mit.edu](mailto:mandana@mit.edu)
- Lori Ling, 68-522 x8-8122, Lorraine Ling, [loriling@mit.edu](mailto:loriling@mit.edu)

### Chemistry and Biology of Antibiotics

Course can be taken for credit or non-credit. Auditors are welcome.

Open to undergraduate, graduate students, and postdocs

3 Units (1-0-2)

Instructor: Prof. Jason K. Sello, Ph.D.

**Jan 6\*, 7, 8, 14, 15, 16, 21, 22, 27, 28, 29, 30\*, 3:30pm - 5:00pm, 68-180 (class will be held in 68-121 on Jan 6 and 30)**

**Registration:**

Register for 7.931 Special Subject in Biology for Graduate Students

Pre-register for IAP subjects by Friday, January 3, 2014 by 5pm.

After January 3rd, course can be added by submitting an add/drop/change form.

**Course description:**

An antibiotic is defined as a small molecule produced by a microorganism that kills or compromises the growth of another microorganism. These molecules are likely to be used for chemical defense in Nature, but they have long been exploited in biological research, biotechnology, and medicine. In this course, we will address the following questions:

Which microorganisms produce antibiotics?

How are antibiotics discovered and structurally characterized?

How do the major structural classes of antibiotics work?

What are the bases of antibiotic resistance?

How are the major structural classes of antibiotics biosynthesized?

How is antibiotic biosynthesis integrated into microbial physiology?

How are the major structural classes of antibiotics made by man?

How are antibiotics used in Nature, the laboratory, and the clinic?

This course is designed to highlight the connections between chemistry and biology. A wide array of topics at the interface of chemistry and biology will be covered. It is open to students with backgrounds in the biological and/or the physical sciences. It is expected that students with strong backgrounds in chemistry will learn fundamental concepts in biology; those with a strong knowledge in biology will learn fundamental concepts in chemistry. Some familiarity with basic concepts of organic chemistry, biochemistry, and genetics will be assumed.

**Course activities:**

This course includes lectures, in-class discussions, and problem sets.

**Instructor:** Prof. Jason K. Sello is currently the M. L. K., Jr. Visiting Associate Professor of Biology at MIT and an Associate Professor in the Department of Chemistry at Brown University. Prior to his appointment at Brown, Prof. Sello was a visiting scientist at the John Innes Centre in Norwich, England and a post-doctoral research fellow at Harvard Medical School with Prof. Christopher T. Walsh. He earned a Ph.D. in biophysics from Harvard University in 2002 under the supervision of Prof. Stuart L. Schreiber and a B.S. in biology from Morehouse College in 1997. In his independent career, Prof. Sello has been synergistically using experimental methods from chemistry, molecular biology, biochemistry, and genomics to develop new anti-infectives and biotechnology platforms for the conversion of plant biomass to biofuels and commodity chemicals. At MIT, he is working collaboratively with Prof. Robert T. Sauer in the Department of Biology on antibacterial agents that act by critically perturbing protein turnover in bacteria.

Contact info: Prof. Jason Sello - [jsello@mit.edu](mailto:jsello@mit.edu)

## **Non-Credit**

### **Life After MIT: A Sampling of Careers in Science**

This program will cover non-traditional paths for Biology PhDs. Please join us at six exciting seminars featuring speakers who are at the top of these respective fields.

#### **Government and Policy Panel**

Amanda Arnold, MSc, Senior Policy Advisor, MIT Washington Office  
Zofia Gajdos, PhD, Lecturer and Curriculum Fellow in Microbiology and Immunology, Harvard University  
Ellie Graeden, PhD, Director of Strategic Systems Analysis, Gryphon Scientific  
David Healey, PhD Candidate, Gore Lab, MIT Department of Biology

A scientist's skills need not be applied only to the lab and classroom. Come find out how scientists can employ their expertise in government and policy agencies, playing a role in shaping research infrastructure and public perception and understanding of science!

**Wednesday, January 8th, 1–3pm, 68-181**

#### **A Career in Venture Capital/Consulting**

Kevin Starr, Partner at Third Rock Ventures  
Carlos Loya, Scientist II in Drug Discovery at Sage Therapeutics  
David Weingeist, Senior Consultant at Simon-Kucher & Partners  
Shalia Rahman, VenureLabs Associate at Flagship Ventures

The business of Biology is booming! This seminar features capitalists, who finance biological enterprises, and consultants, who suggest the best way to merge Biology with business. Come listen and speak with PhDs who have made the transition from bench work to the business world.

**Thursday, January 9th, 1–3pm, McGovern Auditorium, Whitehead Institute**

#### **Science Writing Panel**

Ann Cheung, PhD, Scientific Editor, Cancer Cell  
Elizabeth McKenna, PhD, Science Writer, Cancer Discovery  
Joanne Kotz, PhD, Director of Scientific Outreach, Broad Institute Center for the Science of Therapeutics  
Thomas Levenson, Professor of Science Writing, MIT  
Richard Saltus, Senior Science Writer at Dana-Farber

How can we apply our scientific training to effective communication, both among scientists and to the public? Come learn about the different ways our panelists have ventured into science writing as editors, writers, and communicators with broad audiences.

**Monday, January 13th, 1–3pm, 68-181**

#### **A Career in the Biotechnology Industry**

Michael Schlabach, Lab Head at Novartis  
Rami Rahal, Lab Head at Blueprint Medicines  
Ashok Chander, CEO at Cellanx Diagnostics  
Charles Kung, Associate Director of Biology at Agios Pharmaceuticals

Are you considering a job in industry or perhaps starting your own company? What are the main differences between academic and industry labs? Join us for an exciting Q&A session with a panel of scientists who belong to different areas of industry, and find out whether industry is right for you.  
**Thursday, January 16th, 1–3pm, 68-181**

## **Patent Law**

David Bartel, Whitehead Institute, Professor  
John Prince, Novartis, Functional Patent Head  
Lauren Foster, Koch Institute  
Min Wang, Agios, Senior Director of IP and Legal Affairs

Speakers will share their path to the field of Patent Law, and interact with those who are interested in a career in Patent Law.  
**Tuesday, January 21st, 1–3pm, 68-181**

## **Education & Outreach**

Berri Jacque, PhD, Research Assistant Professor, Co-Director of the Center for Translational Science Education, Tufts Medical School  
Irene Porro, PhD, Leadership Team for Fenix Center for Innovative Schools  
Leslie McClain, PhD, Education and Diversity Program Manager for NSF Science and Technology Center EBICS (Emergent Behaviors of Integrated Cellular Systems)  
Tyler Dewitt, PhD, Education Consultant and Teaching Lead, Socratic.org

Do you enjoy teaching and helping people learn? Come hear about careers that are focused on science education and science outreach and learn how you can share your love of science with the public.  
**Tuesday, January 28th, 1–3pm, 68-181**

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# **Life After MIT: Taking the Next Step in Academic Science**

MIT Biology presents a selection of talks on the practice of science, navigating academia, and balancing it all with a life outside the lab

## **Grant Writing**

Andrew Murray, Professor, Harvard  
Hidde Ploegh, Professor, MIT  
Barbara Spalholz, Chief, Cancer Cell Biology Branch, NCI  
Charles Morrow, Scientific Review Officer, NIH

Getting grants is critical to both starting and maintaining your research lab. Come hear from faculty who have been through the process from both the application and review side, and from NIH program officers familiar with the grant application process.

**Tuesday, January 7th, 1–3pm, 68-181**

### **Finding a Faculty Position**

Stephen Bell, Professor of Biology, MIT and HHMI Investigator

Jing-Ke Weng, Assistant Professor of Biology, MIT

Omer Yilmaz, Assistant Professor of Biology, MIT

Wendy Garrett, Assistant Professor at the Harvard School of Public Health, Harvard Medical School and Dana-Farber Cancer Institute

The search for a faculty position is a daunting process. What type of institution should you apply to? What do search committees look for? And how should you prepare for the interview? Come hear the perspectives of different institutions and faculty at different stages in their careers.

**Friday, January 10th, 10am–12pm, 68-181**

## **New Professor Experience**

Stephen Fuchs, Assistant Professor, Tufts University

Mary Gehring, Assistant Professor, MIT/Whitehead Institute

Michael Goldberg, Assistant Professor, Harvard Medical School

Jennifer Trowbridge, Assistant Professor, The Jackson Laboratory/Tufts University School of Medicine

What are some of the biggest challenges when setting up a lab? What turned out to be easier than expected? What is it like teaching? What about hiring lab members? Come learn from faculty at different kinds of institutions what it's like to be a new professor!

**Tuesday, January 14th, 1–3pm, 68-181**

## **Finding the Right Post Doc**

Alan Grossman, Praecis Professor of Biology; Associate Department Head; Director of Scientific Operations

Alexandra Grassian, Presidential Postdoctoral Fellow, Novartis Institutes for BioMedical Research

Justin Pritchard, Lab Head Experimental/Computational Biology, Ariad Pharmaceuticals

Raquel Deering, Postdoctoral Fellow, Novartis Institutes for BioMedical Research

Not sure if you want to do an industry or an academic postdoc? Want to know how to find a postdoc? What do people look for when hiring a postdoc? Come find out!

**Wednesday, January 22nd, 1–3pm, 68-181**

## **Thriving at MIT**

Frank Solomon, Professor of Biology, MIT

Susanna (Zan) Barry, Senior Program Manager, Community Wellness at MIT Medical

Batula Zaidi, Co-chair of the Whitehead Postdoctoral Association

Biology graduate students from the BioRefs

When you're stressed about lab or life in general, do you ever wonder what's available to you to help you de-stress? Stressed or not, want some more information about how to improve different aspects of your

mental and physical well-being? These knowledgeable panelists will share tips and ways to make your time at MIT more enjoyable.

**Wednesday, January 29th, 1–3pm, 68-181**

## **Fellows Panel**

Lauren O’Connell, Bauer Fellow, Center for Systems Biology, Harvard University

Sebastian Lourido, Whitehead Fellow, Whitehead Institute, MIT

Angelika Amon, former Whitehead Fellow, Koch Cancer Center, MIT

Are you ready to be your own boss and start your own lab? Is another 4 years of work as a postdoc just not appealing to you? Come learn about becoming a Fellow instead! Hear from current and past Fellows and find out if becoming a Fellow is right for you!

**Thursday, January 30th, 1–3pm, McGovern Auditorium, Whitehead Institute**

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## **The Impact of Chemistry on Understanding Biology**

### **Jay Bradner**

Chipperfield Lecture Assistant Professor, Department of Medicine, Harvard Medical School“

Chemical Modulation of Chromatin Structure and Function”

**Tuesday, January 7th 4pm–5pm, 32-123**

### **Jason Sello**

Associate Professor, Department of Chemistry, Brown University and MLK Jr. Visiting Associate

Professor of Biology at MIT

“Chemical Genetics and the Genetics of Chemistry”

**Wednesday, January 8th 11am–noon, 76-156**

### **Joanne Stubbe**

Novartis Professor of Chemistry; Professor of Biology, MIT

“Homeostasis: Controlling Metallation and Oxygen Sensitivity: Ribnucleotide Reductases as a Paradigm”

**Tuesday, January 14th 11am–noon, 76-156**

### **Alfred Goldberg**

Professor of Cell Biology, Harvard Medical School

“New Insights Into Proteasome Function: From Protein Degradation to Cancer and Neurodegeneration”

**Wednesday, January 22<sup>nd</sup> 10am–11am, 76-156**

### **Angela Koehler**

Assistant Professor, Department of Biological Engineering, MIT

“Modulating Transcriptional Regulation using Small Molecules”

**Friday, January 31st 11am–noon, 76-156**

## **William Sellers**

Global Head of Oncology, Novartis Institutes for BioMedical Research (NIBR)  
“The Genetic Basis for Cancer Therapeutics”

**Monday, February 3rd 4pm–5pm, 76-156**

*Presented by the Biology Department and Biology Graduate Students at MIT. Web:*  
<https://biology.mit.edu/about/iap>*Contact: Matt Vander Heiden, 76-561, mvh@mit.edu*

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## **Introduction to Computer Programming for Biologists**

**January 14-31, 5:30 PM Tuesdays and Thursdays (and possibly Fridays) (46-1015)**

There is an increasing demand for computational and quantitative methodology in the biological sciences as the techniques in the field begin to produce ever vaster amounts of data. In this short course you will be introduced to programming in Python, the de facto standard language used in scientific computing, and how to leverage its ease of use and powerful external libraries for use with biology. You will learn the basics of the language, the solutions to common computational problems encountered in research, and how to use these skills to analyze and produce interesting questions from common biological data.

**By the end of this course you will be able to:**

- Create and understand programs used to automate common technical tasks;
- Become familiar with common data formats used in biology and how to work with them;
- Use common repositories of biological data;
- Conduct basic statistical analysis and visualization of biological data.

**Contact:** Talmo Pereira ([talmo@mit.edu](mailto:talmo@mit.edu))

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## **High Profile Publishing in Molecular Biology**

**January 29, 2014, 3-5pm (68-181)**

**Topics:**

- The field of Molecular Biology: inception to current trends
- Behind the scenes and the role of the Editor
- Preparing a high quality article in Molecular Biology

Presentation: 30 min

Discussion panel, with faculty and Elsevier editors from Journal of Molecular Biology and Molecular Cell  
Reception to follow