MESSAGE IN A BOTTLE

SEA PHAGES

June, 2016

Graham F. Hatfull
Lead Scientist

Welcome to the 8th Annual SEA-PHAGES Symposium, and the sixth issue of Message in a Bottle. We are delighted to meet all the new members of Cohort 9, and are pleased to see faculty and students from across the SEA-PHAGES program. This past spring we saw an explosion of new phage genomes from SEA-PHAGES schools, including 186 genomes from phages isolated on some of the new Actinobacterial hosts. We thank the SEA-PHAGES pioneers who are leading the way into phage hunting with *Arthrobacter*, *Rhodococcus*, *Streptomyces*, and *Gordonia*. The clusters have grown to Cluster Z, and are waiting to see which phages will inaugurate our first double-letter mostly-mycobacteriophage cluster. We've been busy exploring more secrets of these phages and you may be interested in looking at the latest papers on partitioning systems and unusual tyrosine intgrases.

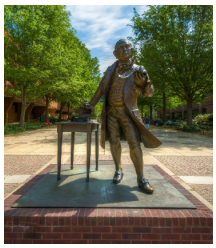
We want to extend a warm welcome to our 2016 keynote speaker, Bonnie Bassler. Bonnie is an HHMI Investigator, and her work at Princeton on quorum-sensing in bacteria lead to her election to the National Academy of Sciences, the American Academy of Arts and Sciences, and she recently won the Shaw prize.

IMPORTANT DATES

- **June 16-20, 2016**
  ASM Microbe; General Meeting, Boston, MA
- **June 26-July 1, 2016**
  Phage Discovery Workshop A
  UMBC
- **July 10-July 15, 2016**
  Phage Discovery Workshop B, UMBC
- **October 31, 2016**
  Application deadline for new schools

TWENTY NEW SCHOOLS JOINING SEA-PHAGES IN 2016

We are delighted to welcome the students and faculty at 20 Cohort 9 institutions starting their first experiences in phage discovery and genomics. The new schools are:



Austin Community College
Collin College
Dominican College of Blauvelt
Fayetteville State University
George Mason University
La Sierra University
Marywood University
Mount Saint Mary College
Northwestern College
Queens University of Charlotte
Rockland Community College
University of Evansville
University of Maine at Farmington
University of Mary
University of Nebraska-Lincoln
University of North Georgia
University of West Alabama
Virginia Union University
Webster University
Winthrop University

NEW PHAGE DISCOVERY GUIDE

SEA PHAGES

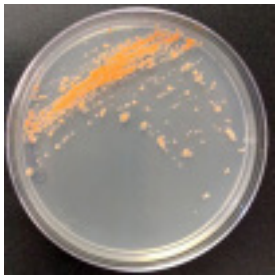
We are delighted to present the SEA-PHAGES Phage Discovery Guide (PDG) and accompanying Phage Instructors Guide (PIG) for Actinobacteria hosts *Mycobacterium smegmatis*, *Gordonia terrae*, and *Arthrobacter spp*. The new guides include several useful chapters on both classic phage biology and new phage frontiers. The protocols are more streamlined, with an eye towards time- and cost-saving measures. The accompanying instructor guides highlight areas of the protocols that are more flexible, and include tips and hints for instructors to optimize protocols as needed in their own classrooms. Finally, we have added chapters on host insensitivity to phage infection, mechanisms by which this can occur, and how to explore them in the lab, as well as an introduction to bioinformatics. We especially thank Marianne Poxleitner for spearheading this effort. The guide will be available online at **seaphages.org.**

Did you know?

What is the difference between excise and excisionase?

Many temperate phages encode two proteins: the integrase – a recombinase that promotes site-specific recombination between phage and bacterial genomes – and excise, a Recombinational Directionality Factor (RDF). So what is excisionase? A misnomer. The suffix "-ase" on the end of a protein name implies it is an enzyme with catalytic activity, as in "integrase". Excise, however, plays an architectural role, promoting prophage excision by redirecting integrase to use *attL* x *attR* rather than *attP* x *attB* substrates. Excise thus is not an enzyme, and should not have an "-ase" at the end of its name. "Excise" is short and sweet; and correct!

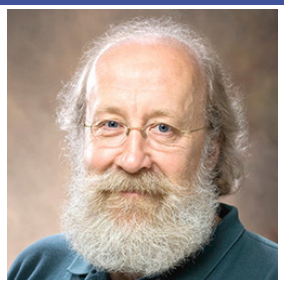
EVEN MORE ACTINOBACTERIA HOSTS



Over the past year, over 67 newly sequenced phages were isolated on *Gordonia terrae* 3612, last summer's big winner of the race to be the new SEA-PHAGES host strain. Preliminary investigations of the genomes of these phages has revealed curious new oddities not previously seen in phages, as well as added approximately 36 new clusters and singletons to the phage database. Our response? Find the next host! Researchers at Pitt, HHMI, and across the SEA are testing over 20 new Actinobacterial hosts – representing at least five genera – for ease of growth under standard conditions and sensitivity to phage infection from environmental samples. The current front runner is *Microbacterium foliorum*, which grow under similar conditions as *G. terrae*, is a lovely lemon yellow color, and has been yielding one new phage for every two samples tested.

IN MEMORIAM

We are saddened by the loss of two of our SEA-PHAGES colleagues this year: David Dunbar of Cabrini College and Gary Janssen of Miami University of Ohio. Both professors are remembered for their dedication to science, their passion for teaching, and their enthusiastic participation in our community. They will be missed.



WELCOME AND A FOND FAREWELL

The SEA-PHAGES team is pleased to announce the addition of two new members: Becky Garlena, at the University of Pittsburgh, and Priscilla Kobi at HHMI. Becky works closely with Dan on sequencing and assembly of phage genomes for the SEA-PHAGES program, and is a master of Illumina MiSeq technology. Priscilla is a research assistant at HHMI, working closely with Vic on testing new techniques and protocols.

Kevin Bradley has moved on from HHMI and the SEA-PHAGES program after eight years to join the Association of Public Health Laboratories, where he'll be developing and implementin workshops aimed to coordinate scientists at CDC, FDA, WHO and state and local public health laboratories. We wish you all the best, Kevin.

WHAT'S GOING ON AT YOUR PLACE?

We are always delighted to hear of news and events going on in the SEA-PHAGES community and would be delighted to share them via the Message in a Bottle newsletter. Please send them to info@seaphages.org.

SUBSCRIBE: If you wish to receive Message in a Bottle, please subscribe at **phagesdb.org/miab/**

PUBLICATIONS OF INTEREST

- **Petrova et al (2015)**
  Mycobacteriophage-repressor mediated immunity as selectable genetic markers:Adephagia and BPs repressor-selection. *Microbiology, August 161(8):1539-51.*
- **Pope and Hatfull (2015)**
  Adding pieces to the puzzle: New insights into bacteriophage diversity from integrated research-education programs *Bacteriophage Aug 18;5(4):e1084073*
- **Lunt and Hatfull (2016)**
  Brujita integrase: A simple armless, directionless, and promiscuous tyrosine integrase system.
  J Mol Biol Apr 22 pii: S0022-2836(16)30082-1
- **Dedrick et al (2016)**
  Function, expression, specificity, diversity, and incompatibility of actinobacteriophage parABS systems. *Mol. Micro. May 5 doi: 10.1111/mmi.13414*
- **Staub et al (2016)**
  Scaling up: Adapting a phage-hunting course to increase participation of first-year students in research. *CBE Life Sci. Ed. vol. 15 no. 2 ar13*

THE SEA-PHAGES TEAM:

Graham Hatfull (Pitt)
David Asai (HHMI)
Billy Biederman(HHMI)
Steve Cresawn (JMU)
Becky Garlena (Pitt)
Priscilla Kobi (HHMI)
Debbie Jacobs-Sera (Pitt)
Crystal Petrone (Pitt)
Welkin Pope (Pitt)
Dan Russell (Pitt)
Vic Sivanathan (HHMI)