



Third Annual
Small World Initiative Symposium
at
American Society for Microbiology
(*ASM Microbe 2016*)

SWI TAPAS Presentations



SWI Leadership



From right to left
Erika Kurt, SWI President and CEO
Jo Handelsman, SWI Founder
Nichole Broderick, SWI Partner Instructor Lead

Symposium Organizing Committee

Jean Schmidt
University of Pittsburgh
Mustafa Morsy
University of West Alabama
Betsy Roberts
Southern Connecticut State University
Eric Warrick
State College of Florida

About the Small World Initiative

Formulated at Yale University in 2012 by the current Associate Director of Science at the White House, Jo Handelsman, the Small World Initiative™ (SWI) is an innovative program that encourages students to pursue careers in science while addressing a real-world health threat – the diminishing supply of effective antibiotics. SWI centers around an introductory biology course in which students perform hands-on field and laboratory research on soil samples in the hunt for new antibiotics. Through a series of student-driven experiments, students collect soil samples, isolate diverse bacteria, test their bacteria against clinically-relevant microorganisms, and characterize those showing inhibitory activity. This is particularly relevant as over two thirds of antibiotics come from soil bacteria or fungi.

SWI's novel approach harnesses the power of active learning to achieve both educational and scientific goals and provides a unique and sustainable platform to replenish the antibiotic pipeline by identifying suitable candidates for testing.

Currently, SWI's course is in 108 schools (98 colleges) across 33 US states, Puerto Rico, and ten additional countries – Belize, Canada, Iraq, Ireland, Jordan, Malaysia, Nigeria, the Philippines, and the UK, and has impacted more than 8,000 students.

Leveling down-SWI the Summer Camp Experience

Michael Buckholt, Ph.D.

Worcester Polytechnic Institute



What We Do:

- 2 weeks (actually 8 days)
- ~20 students (campers)
- Welcome letter with warning and waiver
- 1 assistant (usually a former SWI student)
- Lots of liquid nitrogen

What I Can Say:

- Can get results in 8 days
- Good with big concepts without all of the content details
- Recruits students for the university and the department



SWI Biosafety Updates

Kristen Butela, Ph.D.

Seton Hill University



SWI Biosafety Updates

- Updated Student Guide, Instructor Guide, and Research Protocols
- Biosafety Training Powerpoint with training activities
- How to upgrade BSL-1 lab to BSL-2 standards
- Information on regulations for handling potential human and plant pathogens, soil transport, mailing strains, etc.
- Recommendations for immunocompromised students

Small World Initiative alluring Latin@s into Research

Lilliam Casillas, Ph.D.

Universidad de Puerto Rico-Humacao



Small World Initiative

Integrated Labs: (1) Molecular and Cell Biology Lab – Until bacterial ID's of isolates producing antimicrobials.
(2) Introduction to Biotechnology – Chemical Characterization of antimicrobials.
Laboratory Manuals were translated to Spanish
Access to research to all students in the class=Equity

Cybernetic girls can be pinky

Equity in the classroom
Culturally sensitive
Gender differences in
Computational Biology
Empowering Afro decedents
White Fragility
<https://www.aacu.org/tides>

Semester course



4 days workshop



cienciapr.org

The Microbial World: the benefits of an SWI course on non-science major students

Debra Davis, Ph.D.
Wingate University



More Than Just D.I.R.T.T: Piloting the SWI Hunt for Antibiotics in High School

Barbara Fishel, Ph.D.

The Hockaday School



Hockaday's goals matched the SWI approach

- Introduce principles of general biology through authentic research and inquiry-based learning.
- Develop scientific thinking skills.
- Increase confidence and interest in pursuing science.

Student outcomes exceeded expectations

- Invested in goals of SWI and our course.
- Repetition generated ownership of learning, reflected in engagement and performance.
- All nine students reported they applied the biology they learned when designing experiments and interpreting results.



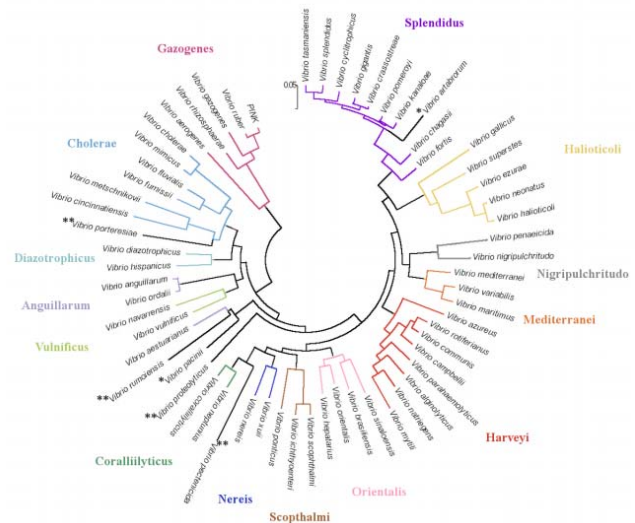
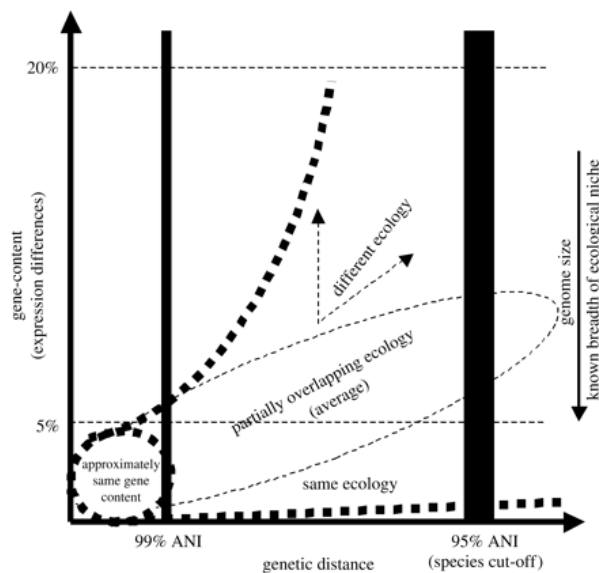
Affordable whole-genome sequencing of 2 novel marine antibiotic producers

Brittany J. Gasper, Ph.D.
Florida Southern College



Extension of SWI Research

- You found something cool!
Now what?
- Whole genome sequencing and ANI
 - Less expensive than you think!
- Multilocus sequence analysis (MLSA)
 - Genus specific
- Polyphasic Analysis
 - FAME, biochemical, etc.



Antimicrobial Agents: What's in the Label

Mary Miller, Ed.D.

Baton Rouge Community College



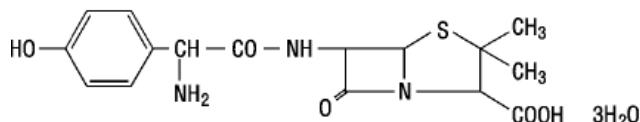
A Classroom Activity

Objective: To expose students to content they will see in their lives, and apply what they have learned to understand mechanisms of actions and susceptibility tests.

- Pair and share
- 15-20 minutes
- Pre-requisites
 - Prokaryote cell structure and function
 - DNA replication and Protein Synthesis

Students find the following information and share with the class:

- Description



- Microbiology
- Susceptibility
 - Kirby-Bauer
 - MIC
- Adverse Reactions

AUGMENTIN[®]
(amoxicillin/clavulanate potassium)
Tablets

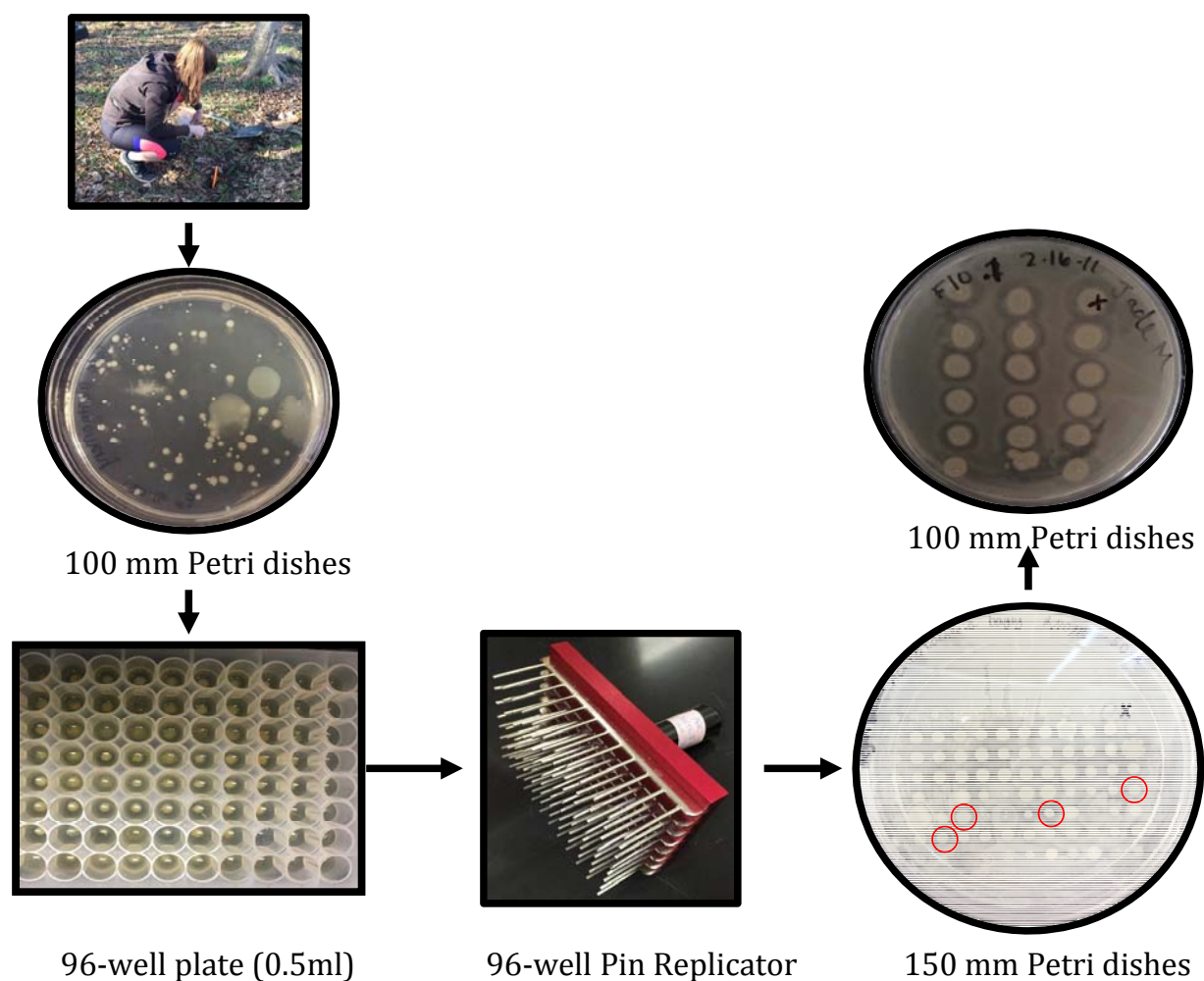
PRESCRIBING INFORMATION

To reduce the development of drug-resistant bacteria and maintain the effectiveness of AUGMENTIN (amoxicillin/clavulanate potassium) and other antibacterial drugs, AUGMENTIN should be used only to treat or prevent infections that are proven or strongly suspected to be caused by bacteria.

High Throughput Antibiotics Screening

Mustafa Morsy, Ph.D.

The University of West Alabama



The Isolation and Characterization of Marine Antibiotic Producing Bacteria

Eric Warrick, Ph.D.
State College of Florida



What does your backyard look like?

At State College of Florida – Bradenton, Florida I've adapted the SWI curriculum to focus on marine antibiotic producing bacteria.

What do you need to culture marine bacteria?

- Supplement the media 0.5M NaCl (PDA, LB, TSA, and R2A)
- Marine Agar

How will the tester strains grow on the media supplemented with 0.5M NaCl?



Pink
Pigmented
Vibrio
isolate



Red
Pigmented
Zooshikella
Isolate



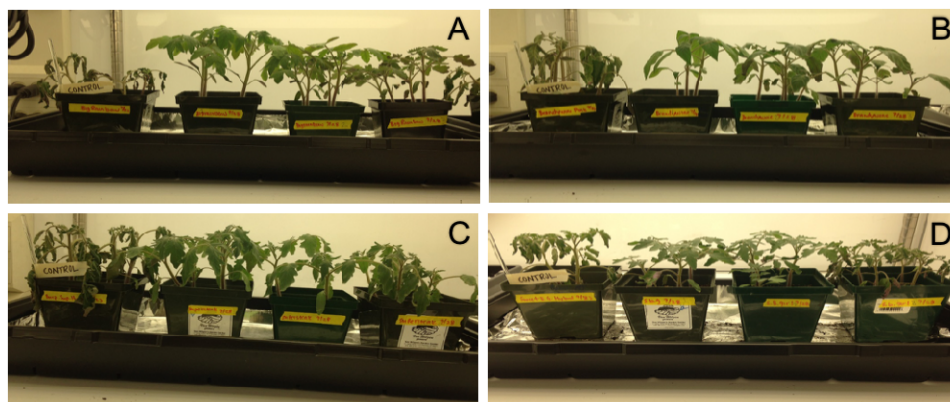
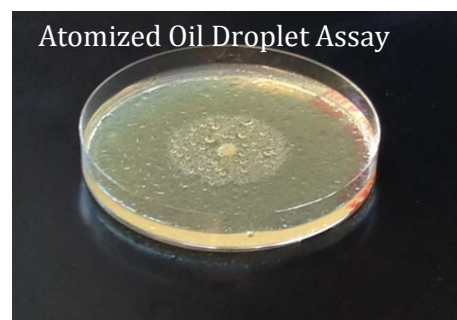
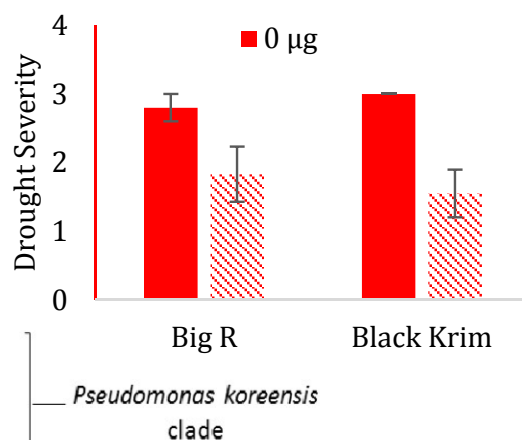
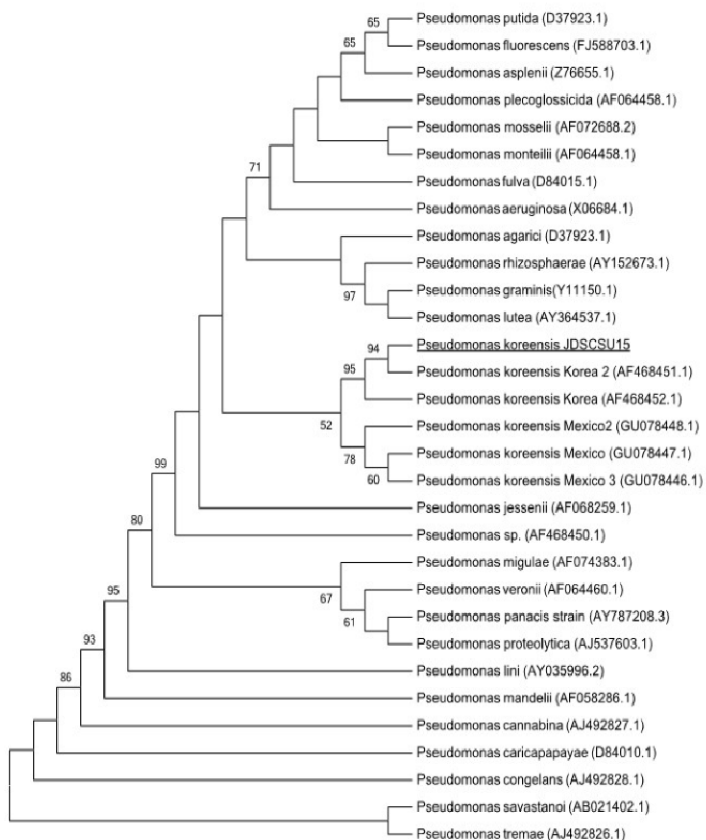
Photobacterium
Isolate

Tester Strain	Gram Reaction / Cellular Morphology
<i>Bacillus subtilis</i>	Gram Positive – Rod
<i>Staphylococcus epidermidis</i>	Gram Positive – Cocci
<i>Chromohalobacter salexigens</i>	Gram Negative – Rod
<i>Vibrio fischeri</i>	Gram Negative – Rod
<i>Vibrio anguillarum</i>	Gram Negative – Rod

What Have We Found?
<i>Vibrio</i> species
<i>Pseudoalteromonas</i> species
<i>Photobacterium</i> species
<i>Halobacillus</i> species
<i>Streptomyces</i> species
<i>Halomonas</i> species
<i>Zooshikella</i> species

Identification of a Biosurfactant by way of the SWI

Elizabeth Lewis Roberts, Ph.D.
Southern Connecticut State University



Small World Initiative™

CROWDSOURCING ANTIBIOTIC DISCOVERY

www.smallworldinitiative.org

