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Teaching Undergraduates at the Peer Review Level

Thomas J. Manning
Valdosta State University

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Teaching Science at the Peer Review Level

Tom Manning
Chemistry, Valdosta State
STEM, Georgia Southern, 2013



Can your class project turn into a paper or ???

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Mini-Reviews in Medicinal Chemistry, 2013, 13, 000-000

1

Taxol: Efficacy Against Oral Squamous Cell Carcinoma

Kaitlyn Ledwitch, Ryenne Ogburn, Jodi Cox, Rebekah Graham, Allison Fritzsche, Donna Gosnell and Thomas Manning*

Chemistry Department, Valdosta State University, Valdosta Ga. 31698

Abstract: In medicinal chemistry, one of the most studied molecules in recent history is taxol. Taxol is a versatile natural product that is used in various cancer treatment regimens. It is administered to patients with breast, lung, and ovarian cancers, and is currently being studied for the treatment of squamous cell carcinoma of the oral cavity and tongue. Taxol has been tested in a number of research and clinical phase trials to determine feasibility, toxicity, and cytotoxicity against oral squamous cell carcinoma as a single drug regimen and as a contributing drug component in treatment plans. This paper reviews over forty articles that examine cell lines, murine models, and human results for the response of taxol against squamous cell carcinoma (SCC) of the oral cavity and the tongue.

Keywords: 5-fluorouracil (5-FU), cisplatin, carboplatin, hydroxyurea, hyaluronic acid, oral squamous cell carcinoma (OSCC), oxaliplatin, paclitaxel, taxol, oral cancer, tongue cancer.

INTRODUCTION

One of the most prominent molecules in medicinal

estimated to be between 36.8% and 54.4% [3]. Taxane-based therapies have shown an increase in recovery and

Some examples....

Exploratory Projects.....

1. Balance books and experience
2. **It's the students....**
3. Incremental improvement
4. Adaptable
5. Technology
6. Long term impact
7. **My job is.....**
8. **The students job is.....**
9. Good enough to publish...



At the Peer Review level.....

1. The Civil War and a pancreatic cancer drug
2. A balloon and an adventure
3. Copper and Tb drugs
4. A book with students and Cubans
5. Quantum computer, nanotubes, Senate and a **Patent Application.....**
6. Shrimp and a spin off company
7. 24 hour labs and the Florida Keys
8. **ROV's and middle school teachers**
9. *Farming the ocean* for Alzheimer's drug

1. The Civil War and Pancreatic Cancer

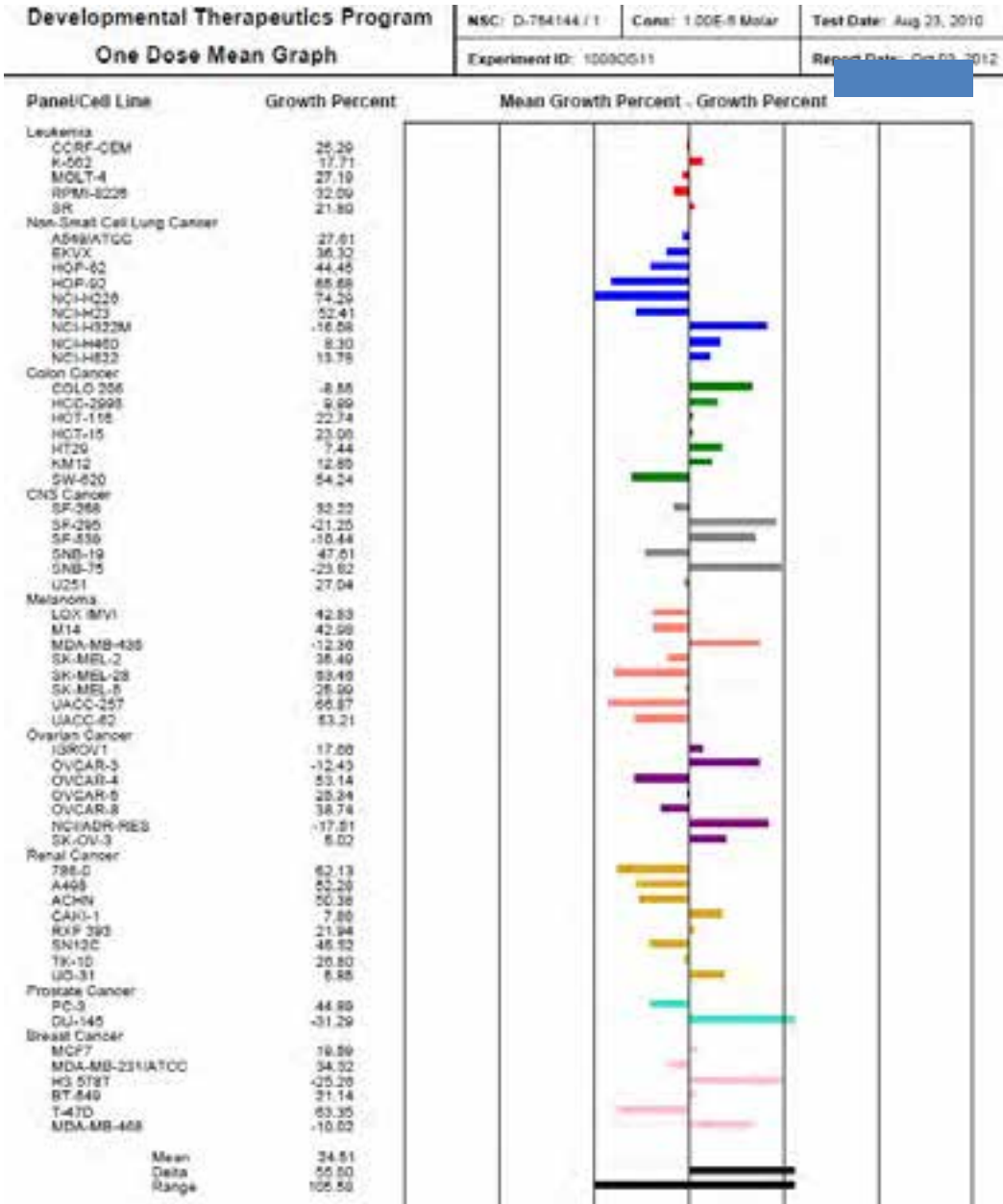


In 2000, we took a trip down the Suwannee River.....

Correlating Civil War folklore with a natural products discovery.

Published: June 22, 2003 | Manning, Thomas; Umberger, Tice; Strickland, Stacy; Lovingood, Derek; Borchelt, Ruth; Manning, James C.; Phillips, Dennis |

Fast Forward, 2013.....work with NCI



Compound that includes malaria drug.

Patent pending (2/2012)

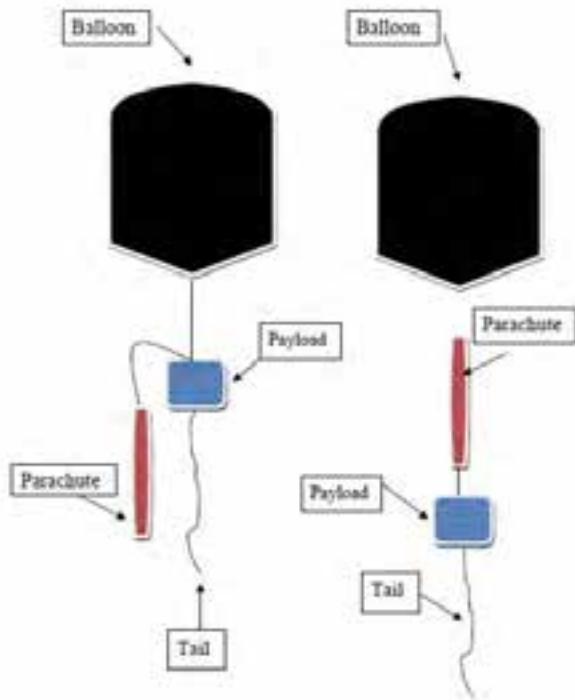
Students:

Ryenne Ogburn,
Kaitlyn Ledwitch

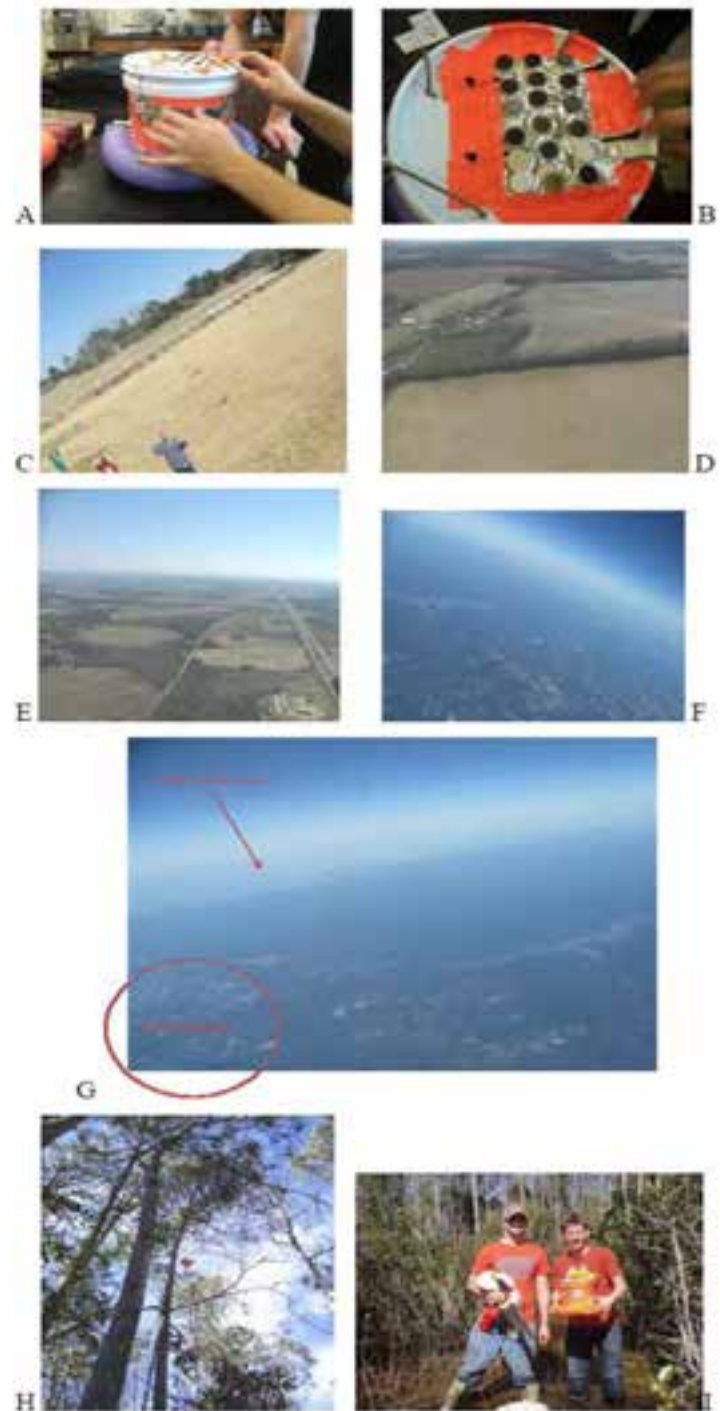
are co-authors

Several rounds of testing at NCI.

2. A balloon(s) and Adventure Science



- Lots of Saturdays
- STP = Solve the problem
- Not in a book
- Motivation from other fields
- Madagascar Cock-Roaches and Middle School Kids



3. Copper Complex and Tb drugs

- 2 billion have Tb
- Built up resistance
- Antibiotics failing, resistance

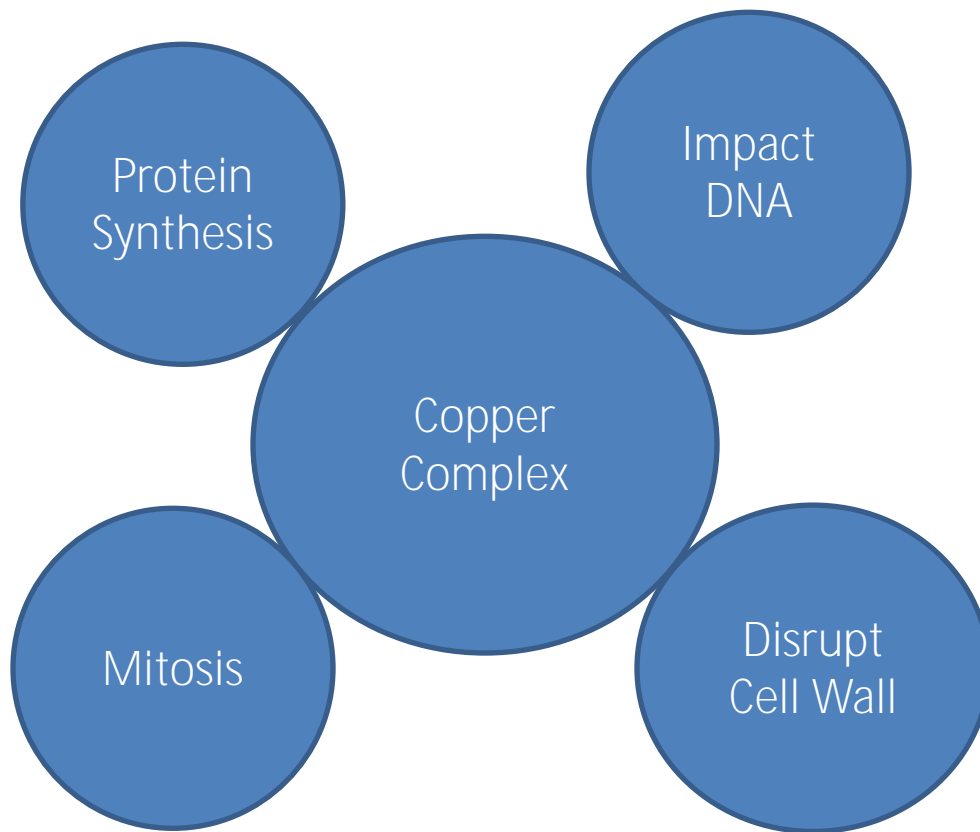


Massive advantages to undergrad group in drug development

a. If we can make it.....

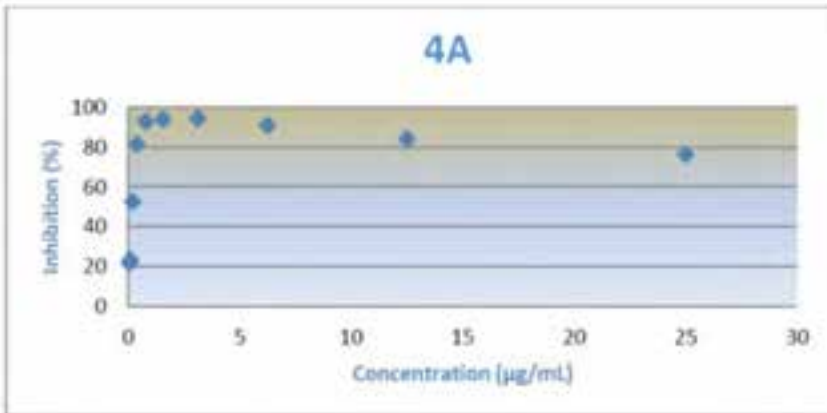
b. notoriously inaccurate, in-**house cell line data.....NIH**
tests ours

Our Approach.....Tb and Cancer



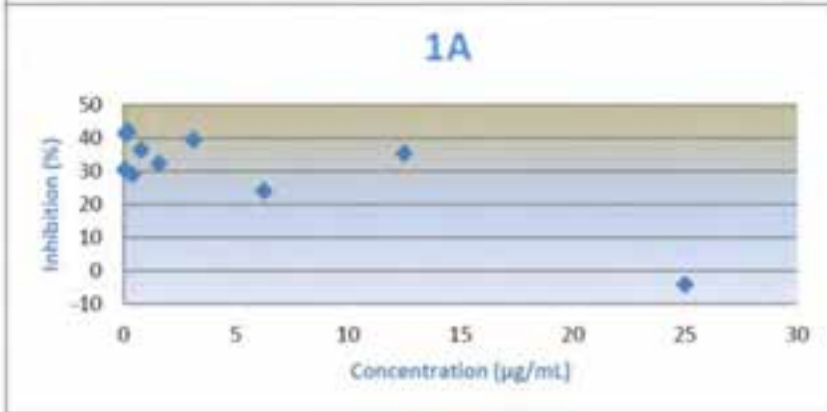
- Improve water solubility
- Consistent bioavailability
- **Different MOA's**
- Same dosage arrive at site
- Stability
- Improved properties (SA, etc.)

- One Pot Reaction
- Economical

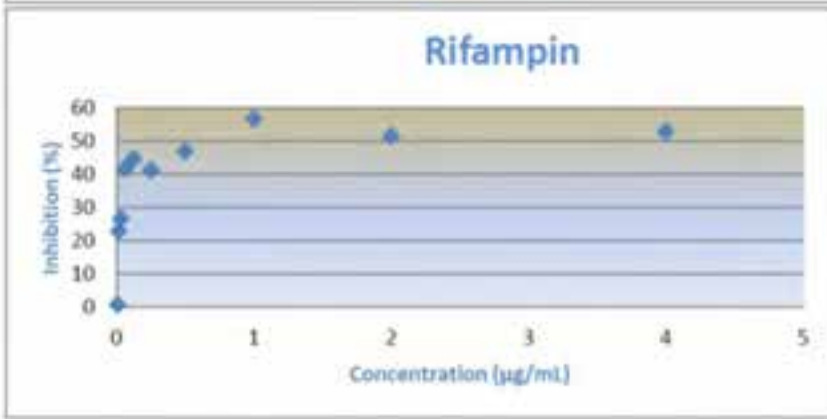


Our carrier/capreomycin

IMPROVED MIC 250 X



Existing antibiotic
(capreomycin)



Current drug of choice
(resistance built up).

Figure 3. Dose Response Graphs (RMP-R)

Find a Way for Students to Contribute
*Management approach to
motivate and achieve*

- They have energy
- They have Ambition
- Can be Tech savvy
- Idealistic

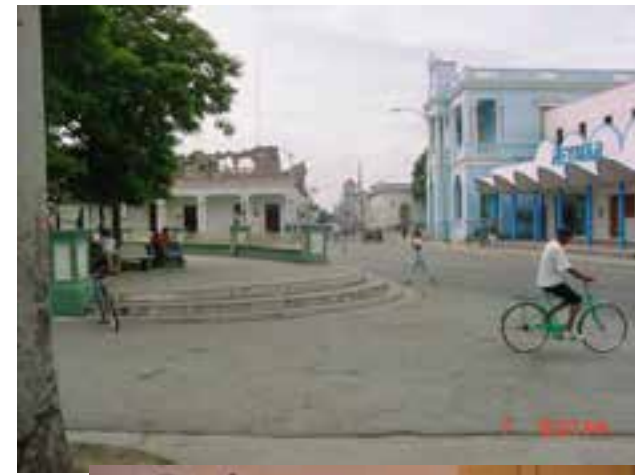
4. *Computer Based Projects for a Chemistry Curriculum*

- General Chem Book
- In press
- With Cuban faculty
- Most internet limited
- Communism = control issues
- Student co-authors from VSU



Geyser Fernández Catá,
Peter Vu, Sofia Bullah, CJ Mock, Landon Lassiter,
Vineet Kumar, Jeff Felton, Caley Allen, Travis Ireland

USMC, 1940's Las Tunas'



5. Insert the Quantum Computer in the Nanotube

Do Mn_{12} 's special properties shift when trapped in a nanotube?

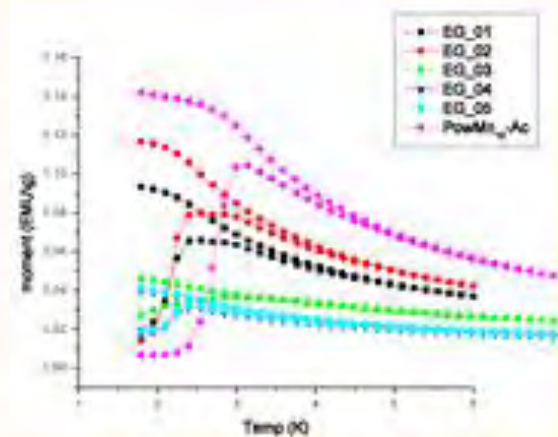


Figure 13. ZFC and FC x -T curves of Mn_{12} as a pure cluster (Pow Mn_{12} -Ac) and after encapsulation at 10 (EG1), 30 (EG2), 60 (EG3), 90 (EG4), and 300 (EG5) minutes.

[Part Research; Part Exploratory Project in P-Chem Lab.](#)

Nomenclature System for Planar, Spherical and Tubular Chemical Structures

THOMAS MANNING¹, RUPA RESHA GOKAL¹, CHIHARU KONDA¹, REINHOLD HETZEL^{1,3}, DEREK LOVINGOOD¹ AND DENNIS PHILLIPS²

¹Department of Chemistry, Valdosta State University, Valdosta, Georgia, USA

²Department of Chemistry, University of Georgia, Athens, Georgia, USA

³Graz University of Technology, Austria

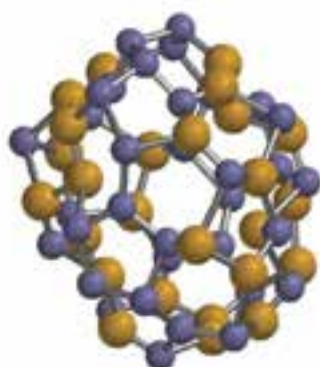
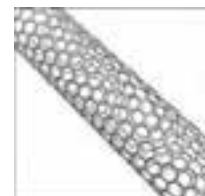
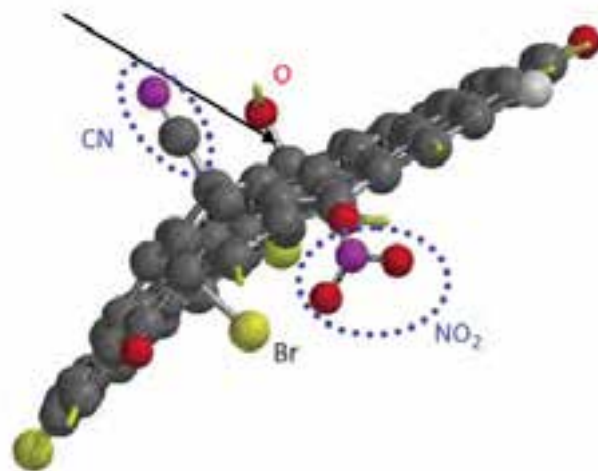
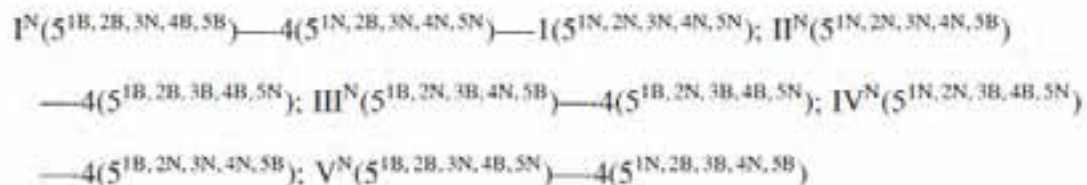
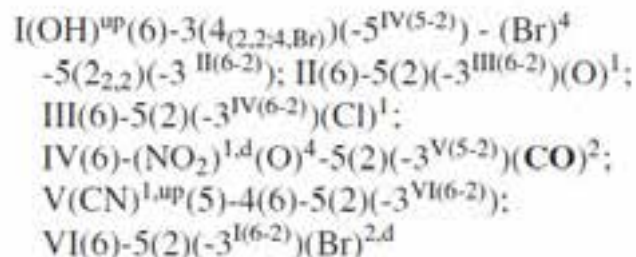


Figure 7. The spherical structure of $C_{60}N_2$ (color space available online).



third atom is also connected to the six member ring connected back to a central atom (position V) by a five member ring.



Nobel Laureate visits nano-strudents



6. *Shrimp and a Company*

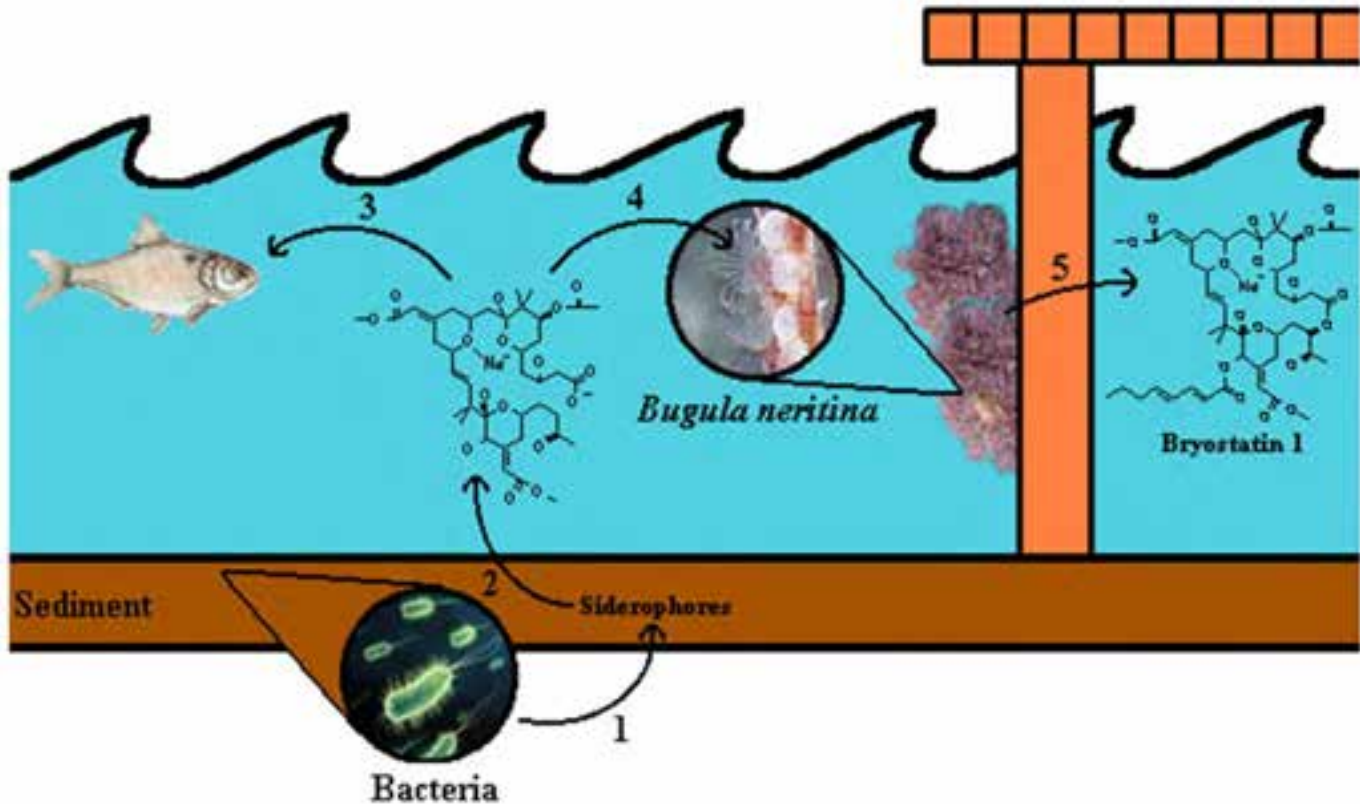
- Research at VSU
- US Patent 6,022,456
- MIC Systems Inc (Valdosta, GA)
- Company won 2 Federal R&D Contracts
- * Built 2 structures in Tifton
- * Shrimp aquaculture



The progression

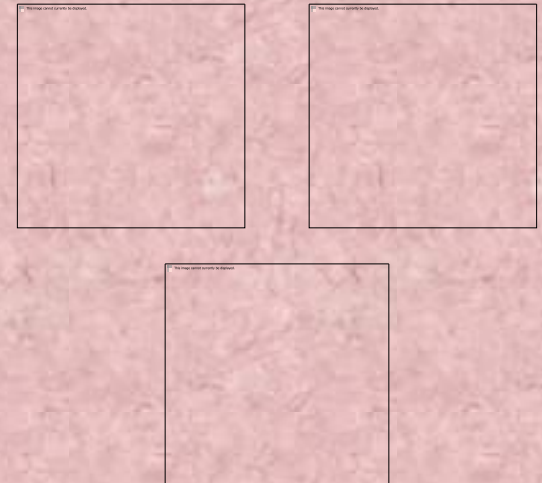
- **PhD involved high temperature plasma's**
- Post Doc involved environmental chemistry (humics)
- VSU, worked with papermill (funding op, TIP3 build ozone system (plasma makes ozone water treatment))
- Paper mill demands too much, but got patent
- Sought other app, NOAA had RFP for shrimp
- 3rd world countries – too cheap, can compete
- Thought of growing marine creatures

7. Farming the Ocean for An Alzheimer's Drug



Sigma-Aldrich: \$240 for 10 ug.....

It takes **14 tons** of *Bugula* to
obtain **15 grams** of Bryostatins!



14 tons is how much the
average school bus weighs!

15 grams is the weight of 3
nickels!

Farm the Ocean



1. 100 chemicals (6 groups) used as nutrients
2. Soaked on material
3. 1-2 months; bacteria colonize
4. Extraction

8. One week from today.....

Research Experience →

Educational Opportunities

Spring 2008, Spring 2009
CHEM4920 Marine chemistry.



Chem. Educator **2010**, *15*, 387–391 387

© 2010 *The Chemical Educator*, S1430-4171(10)12311-2, Published 12/12/2010,
10.1333/s00897102311a, 15100387.pdf

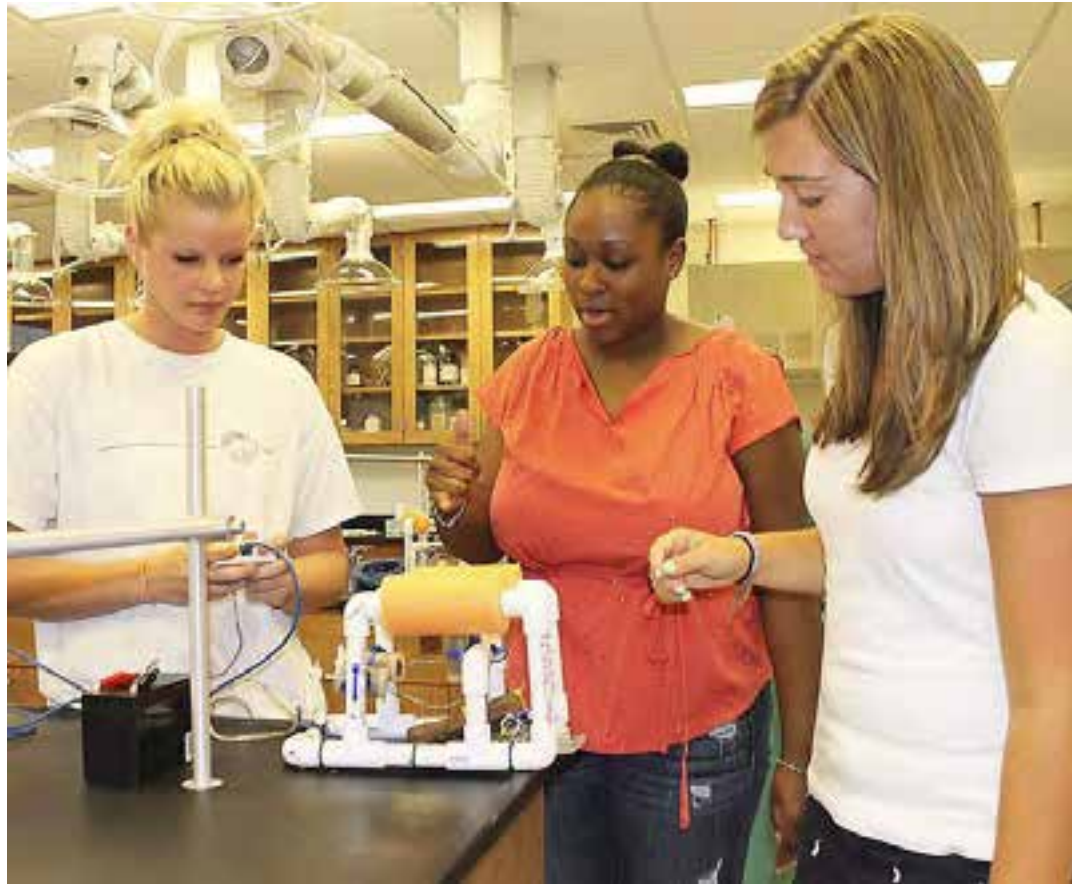
A 24-Hour Marine Science Exercise: An Upclose, Personal and Exhausting Exercise with the Ocean

Mallory P. Brackin, Chelsea M. Connolly, Frédérique N. Dunham, Christina M. Dyson, David K. Edwards, Timothy W. Feuser, Katlyn M. Fix, Jamie P. Fulp, Sonya R. Fulp, Carissa R. Lannon, Stephanie N. Patterson, Christopher A. Pyles, Tiffany N. Stewart, Chris Shipman, Thomas J. Manning*

Department of Chemistry, Valdosta State University, Valdosta, Georgia, 31698,
tmanning@valdosta.edu *Received June 17, 2010. Accepted September 2, 2010.*

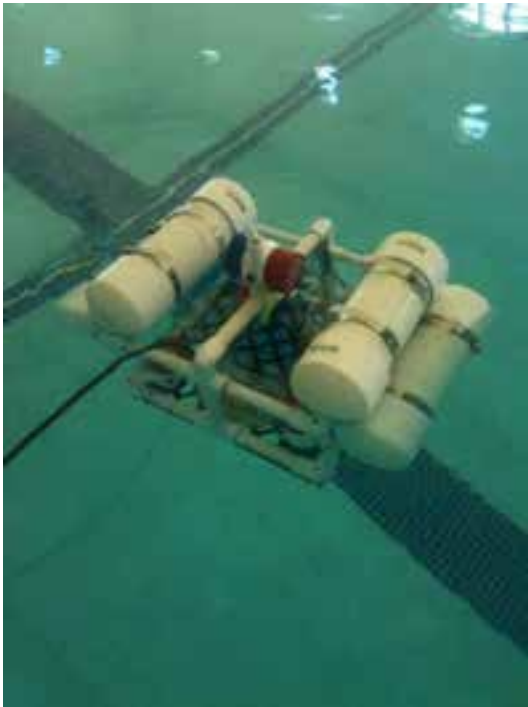
- 9 days/8 nights in tents
- 4 abstracts submitted
- Three locations, 24 hours each.
- Dolphin research Center, NOAA, Snorkel reef, Pigeon Key, etc.

9. ROV's and middle school teachers



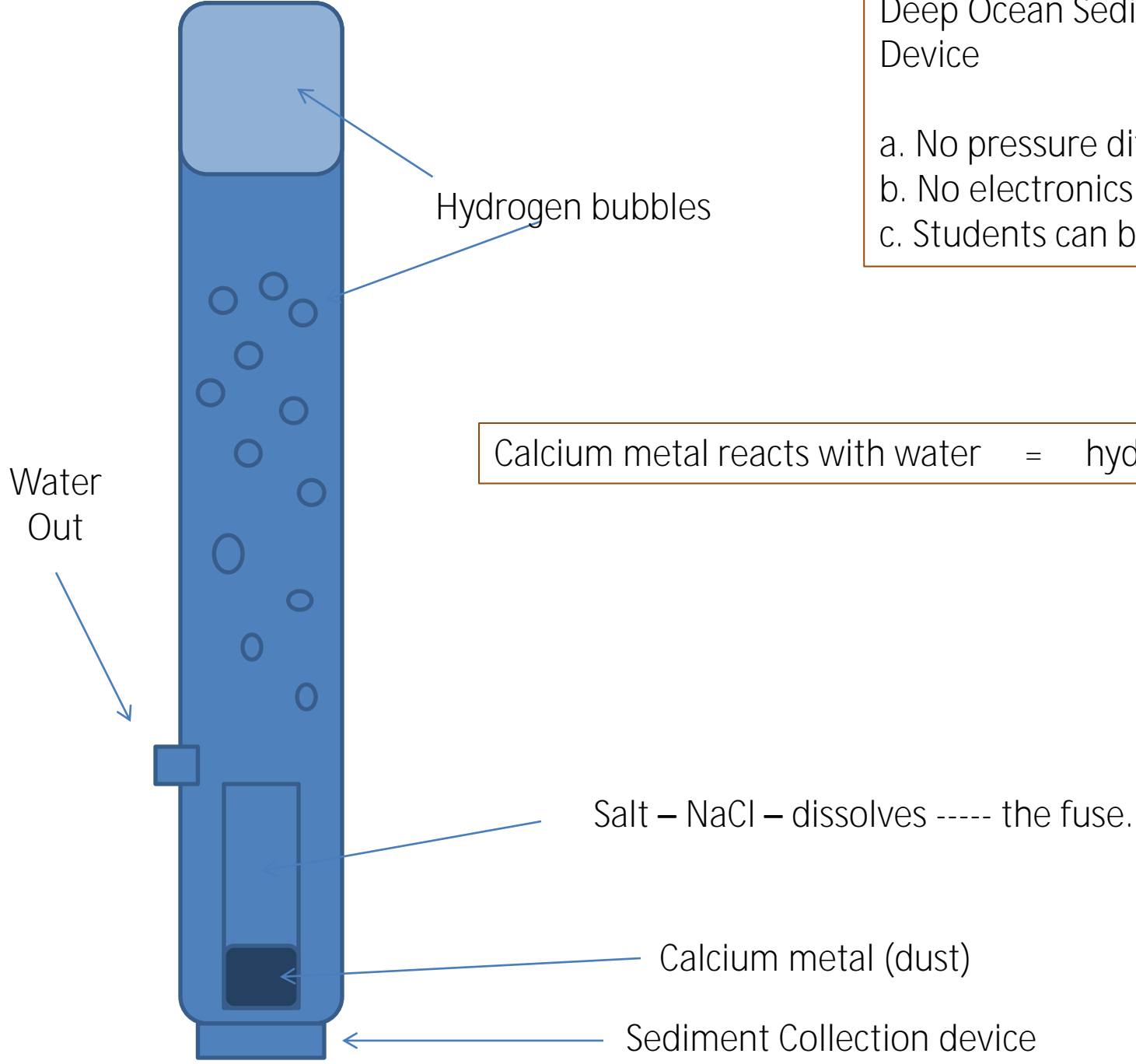
Retrieve sediment samples from Gulf.....
.....Deep Ocean.....Mariana's trench potential

Middle School teachers Work with VSU students

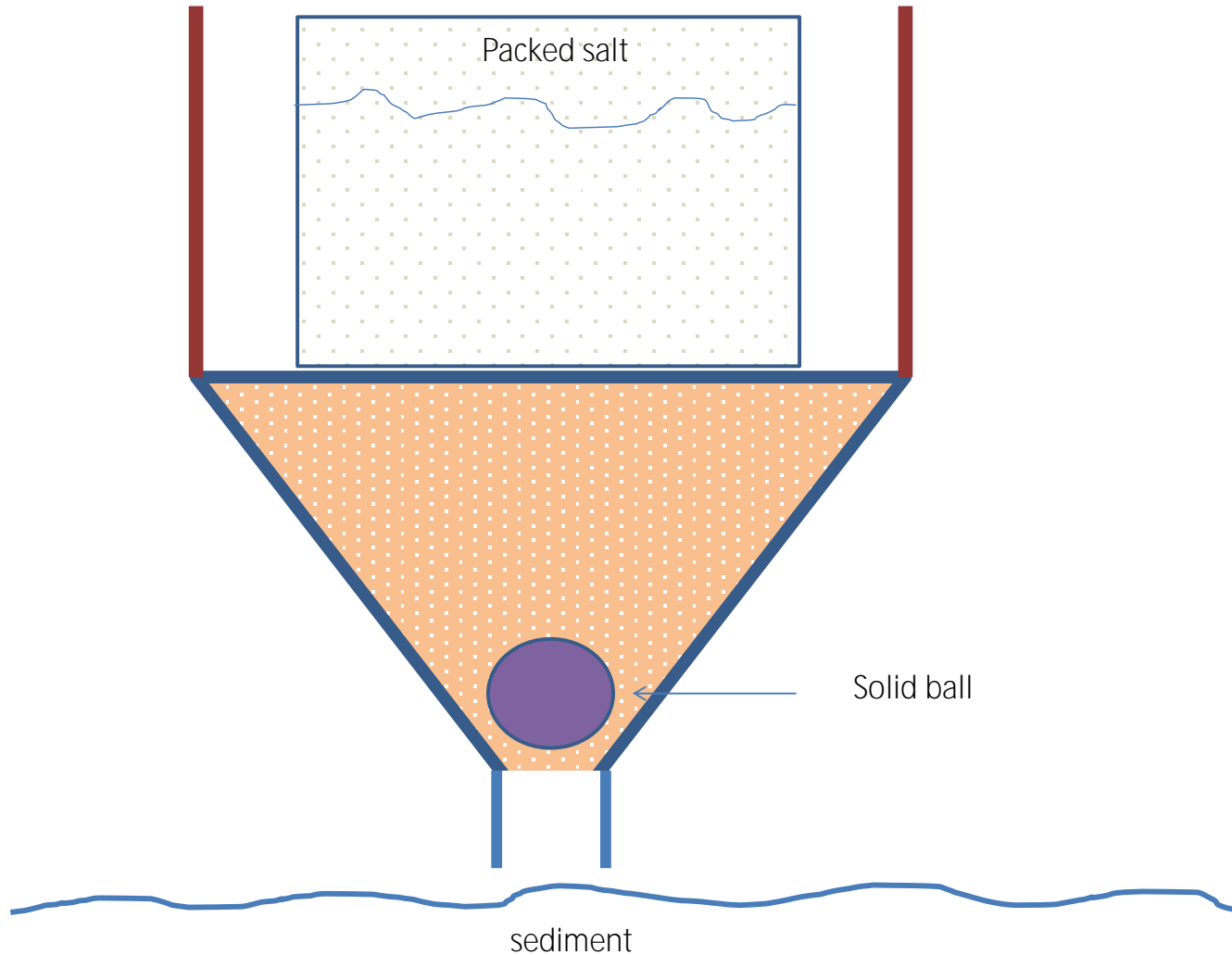


Deep Ocean Sediment Collection Device

- a. No pressure differentials
- b. No electronics
- c. Students can build



Grab sediment



Trickle Down.....

- Dozens in Undergraduate Research class
- Green Tech Experiment in Env. Chem
- LC-MS Experiment in Instrumental
- Field trip in Gen Chem

HIDDEN TREASURE:

THE STEINBECK-RUDLOE LETTERS

BY THOMAS MANNING, SUZANNE MATOS, AND
BRIAN ADLER

A HALF CENTURY AGO, in the midst of a productive literary career, John Steinbeck published *The Sea of Cortez*, *Cannery Row*, and *Sweet Thursday*, a work of nonfiction and two novels centered on the life of a marine collector. Later in life, Steinbeck was good friends with a young man who lived in the Florida panhandle named Jack Rudloe, the founder and managing director of Gulf Marine Specimen Laboratory in Florida. His education and research

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Development of a Green Technology Approach to Marine Natural Products Synthesis: Mineral-Based Microbial Amplification System to Make Bryostatins

Thomas J. Manning,^{*} Riland Jones,^{*} Brett Little,^{*} Carissa Lannon,^{*}
Greg Kean,[†] and James Nienow[‡]

^{*}Department of Chemistry, Valdosta State University, Valdosta, GA, USA

[†]College of Medicine, Mercer University, Macon, GA, USA

[‡]Biology Department, Valdosta State University, Valdosta, GA, USA

Microbial amplification chambers (MACs) are chemical and material mixtures that allow marine microbes, particularly bacteria, to colonize and reproduce. Many marine natural products are produced by marine microbes that enjoy a symbiotic relationship with a larger marine organism (i.e., bryozoans,

CONCLUSION

Teaching Students.....

The talent of being an
American is...



Is not a grade or a degree.....

BUT

Use your education to

To make the world a better place.....

Good ideas and Work well

Thank you

- STEM conference organizers
- National Science Foundation
- EPA-P3
- VSU-QEP
- NIH (NCI, NAISD)
- Nat. Magnet Lab
- GSML
- VSU
- Students