



## In This Issue

### Virtual Instruments –Valuable Teaching Tools



As a teacher are you frustrated with a lack of scientific equipment? Are half your microscopes broken or out for repair? Would you like to use a spectrophotometer, but even a cheap one is way out of budget?

UT Southwestern is developing a suite of virtual instruments that could be of great benefit to your teaching efforts. The first two of these are ready and the others will be developed in the next few years. The Virtual Microscope (VI) simulates an actual binocular compound microscope. When the software is started up, your students observe a 3-D microscope. The parts of the microscope are labeled with a click of a mouse. In fact, the mouse is used to turn all knobs and push buttons. At present time several human tissues, both normal and in diseased state, can be selected for viewing. We have just recently added mitosis slides and several lesson plans to use with the slides.

A spectrophotometer is essential in most labs at UT Southwestern and is a great educational tool to teach students how chemicals or macromolecules can be identified or quantified. Unfortunately, spectrophotometers are expensive. The Virtual Spectrophotometer is available for your students. The software comes with several solutions, or you can make your own (instructions are included). Your students can determine the absorbance of solutions and calculate concentrations of solutes with Beer's Law.



The VI's come with a Teacher's Manual and a QuickStart Guide. This software runs on the PC or on Mac's that can run windows. This software is available (at no charge to teachers) on a CD or on a website for download at <https://ais.swmed.edu/starslab>.

The virtual instruments are a part of the Howard Hughes Medical Institute-provided grant to UT Southwestern with additional funding by The Peter O'Donnell Foundation and the UTSW medical school. The software was written by Dr. Ken Meissner at Texas A&M. The Lab View software engine was donated by National Instruments.



### STARS Science Suitcase

Check It Out! FOUR Science suitcases, the Enzyme Instigator, Organelle Extravaganza, Light, Carbon, Action! Photosynthesis, and Evolution are available for check out. They contain everything from lesson plans, curriculum guides, and homework worksheets to videos, models, and wet labs needed to teach a concept. The Cell Membrane and Genetics Suitcases will be available soon for checkout.

Contact the STARS office (214) 648-9505 for more details or email us at [STARSmal@utsouthwestern.edu](mailto:STARSmal@utsouthwestern.edu).

#### Overview - Enzyme Instigator

- 1) Teacher/Student Manuals
- 2) Animation DVD (questions)
- 3) Manipulable Hands-On Model - (enzyme & 3 substrates)
- 4) Jeopardase Game
- 5) 2 Labs (pH and temperature on enzyme activity) (All lab supplies included)

#### Overview - Organelles Extravaganza

- 1) Teacher/Student Manual
- 2) Animation DVD (questions)
- 3) Protein Production Game
- 4) 3 Labs (plant vs. animal, paper chromatography, and feeding paramecia) (all supplies included)

#### Overview - Lights, Carbon, Action! Photosynthesis

- 1) Teacher/Student Manual



- 2) Award Winning Animation DVD (questions)
  - 3) Leaf Cell Model
  - 4) Sugar Rush! Board Game
  - 5) 3 Labs (stomata! stomata!, reactions in the dark, and floating leaf disks) (all supplies included)
- Overview - Evolution
- 1) Teacher/Student Manual
  - 2) Animation DVD (questions)
  - 3) Beak Niche Adaptation Game (natural selection, gene flow, and genetic drift)
  - 4) Fossil Lab (phylogeny)



### Science & Health Careers Exploring Post at UT Southwestern

Learn about careers in science and medicine, meet professionals in the field, come and meet other students who are passionate about science, enjoy free snacks, and engage in hands-on activities.

Upcoming Meetings: April 25th and May 23rd in D1.200 from 6:00-7:30 pm

### NEW STARS STAFF MEMBER



Meet the newest of our STARS staff, Pearlie Crawford! She joined our staff in September 2010 as a STARS education assistant. She previously was employed for 12 years as a District Manager Senior Administrative Assistant for Chase. She supported 3 district managers and 38 branch banks, as well as provided customer support. Previous to that, she worked as a secretary at DISD and helped with teacher training and programs. This gave her a wealth of experience in similar programs that STARS offers, as well as administrative and people skills.

Pearlie is excited about the opportunity to work at UT Southwestern Medical Center. She says, "Working in STARS has been a great experience. I am excited about the opportunity to be working with such a wonderful program that both teachers and students from schools all over can benefit from. In the short time that I have been here, I've learned and experienced many new things. STARS is a great program and I think that any teacher or student who can, should take advantage of the program."

Feel free to contact Pearlie, to welcome her to the STARS program, register for our events, request science ambassadors or science fair judges, and inquire about our science suitcases. She is here to help you and your students in any way.

## Symposia Events

All STARS activities and events are offered free of charge to teachers in the State of Texas.

STARS symposia consist of a series of lectures given by scientists and physicians currently doing research at UT Southwestern Medical Center and affiliated institutions. The science symposia and in-service sessions are excellent resources for teachers to learn about cutting-edge research in the biomedical sciences, to discover new classroom activities, and to obtain professional development credit at the same time. If you wish to attend any event, please pre-register by calling 214-648-9505 or visiting our online registration page at <https://ais.swmed.edu/starsevent/>.

### Mini-Symposium: Ethics-September 13, 2010

Our first talk by Frederick Grinnell, Ph.D., Professor, Cell Biology, was on *Everyday Practice of Science: Where Intuition and Passion Meets Objectivity and Logic*. Dr. Grinnell talked about the process of science and discovery and its implications on our society. Dr. Grinnell, then gave an introduction to Bioethics and how to have a successful science and ethics discussion in the classroom followed by a small group breakout session: Student's Little Helper. After the breakout session, the teachers reconvened for a group discussion.

### Basic Science Symposium: Epigenetics (In Collaboration with the National Society of Genetic Counselors & The Museum of Nature and Science) - Oct. 16, 2010

Epigenetics is the study of the inherited changes in phenotype or gene expression caused by mechanisms other than the changes in the underlying DNA sequence. Stress, diet, behavior, toxins and other factors activate chemical switches that regulate gene expression. This was a major STARS event that involved national exposure and collaborators. It was a featured "satellite event" of the USA Science and Engineering Fair in Washington D.C., and was described on the fair's website. The first speaker was Ben Tu, Ph.D., Assistant Professor of Biochemistry, and his topic was on *How Cells Decide to Grow*. The morning session concluded with a talk by Jane E. Johnson, Ph.D., Professor, Department of Neuroscience, on *Transcriptional Control of Neuronal Diversity*. The afternoon session began with a presentation on *Epigenetic Control of HPV Gene Expression* by Cheng-Ming Chiang, Ph.D., Professor, Simmons Comprehensive Cancer Center. The final presentation was on the Application to Genetic Counseling by Members of the National Society of Genetic Counselors. The genetic counselors did a genetic counseling session demonstration. During two of the presentations, the middle/high school students participated in Hands-On Activities provided by Melinda Ludwig, Instructor, The Museum of Nature and Science. The students got an overview of genetics and epigenetics, did an inherited phenotypes activity, and did a simulated microarray analysis of cancer genes that all tied into the topic of epigenetics. After the symposium, some of the teachers attended the NSGC National Education conference. They got to tour the exhibits, view the posters, and then attend some of the breakout sessions.

### Mini-Symposium: Nervous System - Nov. 1, 2010

This mini-symposium featured two talks, one on neurogenesis and another one on treating major depressive disorders. Amelia Eisch, Ph.D., Associate Professor, Psychiatry, gave a presentation on *Something Old, Something New in the Central Nervous System: New Neurons to the Rescue!*. Dr. Eisch focused on the factors that regulate adult neurogenesis and the behavioral consequences of altered adult neurogenesis. After the break, Shawn McClintock, Ph.D., Assistant Professor, Psychiatry, finished the symposium session with a lecture on *Treating Major Depressive Disorder with Electroconvulsive Therapy (ECT)*. His talk focused on depression, the history of ECT, current-day neurostimulation interventions, and its effectiveness as a treatment.

### Teacher In-service: Science Suitcases- Dec. 4, 2010

This in-service started with a presentation by Stephen Wooding, Ph.D., Assistant Professor, McDermott Center for Growth and Development, on *Genetics and Evolution of Bitter Taste Receptors*. Dr. Wooding talked about how population history and natural selection have interacted to produce patterns of genetic variation in bitter taste perception. The morning session concluded with an in-depth look at the Evolution Suitcase by Corbyn Beach, Medical Illustrator. He demonstrated his beak niche game that deals with genetic variation, genetic drift, and natural selection and his fossil lab that deals with phylogeny. In the afternoon session, we featured the fourth and fifth of our seven planned science suitcases on Genetics and Membranes. The creator of the Genetics Suitcase, Richard Lankes, Student Research Assistant, Biomedical Communications, came and gave an introduction and an overview of his work. He previewed his story board for his animation video, his mutations card game, and posters. Joel Goodman, Ph.D., Professor of Pharmacology & STARS Director, showcased the membranes suitcase. He showed the 3-D animation video and went through the activities and labs (build-a-membrane activity, hydrophobic activity, and cell membrane lab). The final presentation by Alexandra Gordon, Student Research Assistant, Biomedical Communications, concluded the in-service. She talked about her ideas for the cellular respiration suitcase and got valuable feedback from the teachers.

**Mini-Symposium: Rhythms in Biology - Jan. 10, 2011**

Our first symposium for the semester was focused on rhythms in biology. The first talk of the evening began with a talk on *Understanding the Mechanism of Circadian Clocks Using a Simple Eukaryotic Mouse Model System* by Yi Liu, Ph.D., Professor of Physiology and Chairman, Integrative Biology Graduate Program. Dr. Liu talked about circadian rhythms, how it can be control daily events (sleep-wake cycles, etc.), and how malfunctions can lead to depression and sleep disorders. He then talked about his research study on filamentous fungus *Neurospora crassa* and how it can guide research in other eukaryotic organisms. His talk was followed by Dr. Joseph Takahashi, Ph.D., Professor and Chair of Neuroscience, presenting on *Neurogenetics of Circadian Clocks in Mammals*. Dr. Takahashi talked about the molecular and genetic basis of circadian rhythms and his use of genetic approaches for gene discovery.

**Teacher In-service: Virtual Instruments- Feb. 5, 2011**

The spring in-service was a workshop on our virtual instruments, The Virtual Microscope and The Virtual Spectrophotometer, which were developed through a collaboration between UT Southwestern, The O'Donnell Foundation, National Instruments, and Texas A&M University. This in-service started with an introduction to the virtual instruments by Joel Goodman, Ph. D., Professor of Pharmacology & STARS Director. After the introduction, Dr. James Richardson, Ph.D., Professor of Pathology, gave an in depth introduction into pathology and then a discussion on pancreas, health, and disease. The rest of the in-service was spent on going through the newly created virtual instrument lesson plans. In the afternoon session, Stuart Ravnik, Ph.D., Assistant Dean Graduate Schools & STARS Associate Director, taught a lesson on the *Normal Pancreas vs. Alcohol Pancreatitis*. Then, teachers were walked through a lesson on *Determining and Discussion of Beer's Law* by Dr. Joel Goodman.

**Special Symposium: Women In Science and Medicine - March 5, 2011**

Our Special symposium for the Spring semester was our Women in Science & Medicine Symposium. This event was organized by the WISMAC (Women in Science & Medicine Advisory Committee). Joel Goodman, Ph.D., Professor of Pharmacology & STARS Director, and Carol Mendelson, Ph.D., Co-Chair, WISMAC, Professor of Biochemistry, opened the symposium and welcomed all the guests. The morning presentations were given by Megan Wachsman (medical student), Emi Sei (graduate student), Swalpa Udit (MD/PhD student), and Jordan Mayberry and Miriam Karamali (P.A. students). They gave a lecture on how to get into the different schools and what's it's like to be in that profession.

The second portion of the symposium centered around 3 rotational demonstrations:

**Medical School Demo:**

**What it's like to be a physician:** Tour of Parkland and Children's Hospitals with Medical Students

Tour Guides: Erin Hansen, Alyson Garcia, Jamie Walker, Andrew Tyan, Feng Jiang, Robert Martin, and Megan Wachsman

**Graduate School Demo:**

**What it's like to be a basic scientist** Laboratory Demonstrations

Swalpa Udit, Joshua Owen, and Chris Javadi, MD/PhD students (The brain and obesity)

Joanie Neumann, Ph.D. (Zebrafish as a model system in research, fishroom tour)

Deborah Clegg, Ph.D., Assistant Professor, Touchstone Diabetes Center (Sex hormones and fat)

**School of Health Professions Demo:**

**What it's like to be a prosthetist-orthotist, clinical dietitian and physician's assistant:**

Presentations by School of Health Professions: Linda Michalsky, Ph.D. Assistant Professor, Clinical Nutrition, coordinator.

Clinical Nutrition: Megan Rothschild

Prosthetics and Orthotics : Marissa Berkowitz and Allison Lipper

Physical Therapy : Montie Oballa, David Cook, Stefanie Arnold, Stephanie Zimmerer, Kelsey Howen, and Cassie Noble

**Mini-Symposium: Protein Degradation in Health & Disease - April 4, 2011**

Microbes as Pirates was the topic of the evening for our last symposium. Kim Orth, Ph.D., Associate Professor of Biochemistry, began the session with a look at *Black Spot, Black Death, Black Pearl: The Tales of Bacterial Effectors*. Dr. Orth talked about understanding the activity of virulence factors from pathogenic bacteria so that we can gain insights into the eukaryotic signaling systems. Neal Alto, Ph.D., Assistant Professor, Microbiology, followed the lecture with a talk on *Host-Pathogen Interactions: From Atoms to Biology*. He talked about the success of pathogens, the evolution of virulence factors, and his study of infectious disease mechanisms.

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