BIOMEDICAL EXPLORATIONS: BENCH TO BEDSIDE

2010/2011 PROGRAM BOOK

UNIVERSITY OF FLORIDA
CENTER FOR PRECOLLEGIATE EDUCATION AND TRAINING
Biomedical Explorations: Bench to Bedside

A Partnership Program

University of Florida
June 20 – July 2, 2010

JSEHS: February 6 -8, 2011

Funded by a precollege award from:

SEPA
SCIENCE EDUCATION PARTNERSHIP AWARD
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UF
Center for Precollegiate Education and Training
UNIVERSITY of FLORIDA
Welcome to the Bench to Bedside Summer Institute! We are so excited to have the opportunity to work with fantastic high school science teachers from across the state of Florida in this partnership. We hope that you gain many new experiences during your time at the University and are able to translate the current research into your classroom curriculum.

As partners, your feedback is absolutely essential. The program will continue to grow with a new cohort of teachers each year for the next two years, and we hope to improve the program each time. Your comments will help make that happen.

We look forward to our two-weeks together this summer and also to continue communications with you as we collaborate to enrich science teaching and learning and to better prepare and inspire our young students for the diverse array of career opportunities in science and technology.

Go Gators!

The CPET Staff
Biomedical Explorations: Bench to Bedside

Biomedical Explorations: Bench to Bedside is an exciting new opportunity for high school teachers, funded by a Science Education Partnership Award from the National Institutes of Health NCRR, to engage in innovative and continuing professional development.

Bench to Bedside connects researchers in interdisciplinary biomedical sciences with high school teachers to promote students’ interest in and preparation for bioscience careers along the continuum of translational research—from discovery to production of medicines and therapeutics. This innovative program integrates experiences from a summer Institute into classroom action during the school year.

During the Institute, an experimental sequence in basic science and clinical and applied research environments will illustrate scientific content, pedagogical methods, career options, and conceptual and technological interrelationships within translational research. Teachers will work with science, industry and education researchers to develop lessons and laboratory exercises that convey the principles of translational research and drug development in the context of career choices. Teachers also become researchers in their own classrooms as they use tools developed during the institute to study the effectiveness of instruction on student learning outcomes.

During the school year, research proposals, resources, formal presentations, review of classroom outcomes and incentives for ongoing professional development will provide continuing support and encouragement to incorporate scientific processes, real-world skills and enthusiasm for bioscience careers into schools in rural and economically disadvantaged settings.

The project supports science teachers with opportunities for personal enrichment and professional advancement in biotechnology education and empowers them as agents of change in classrooms. It draws on all components of medical and biotechnology research and education at the University of Florida to further the recruitment, education and certification of high school teachers, especially those from rural and underserved communities.

Teacher responsibilities:

- Attend the two-week Summer Institute at UF (June 20- July 2) and create an Action Proposal, incorporating current research focused on emerging pathogens into a classroom-ready unit
- Implement Action Proposals in classroom with graduate student assistance; provide inservice training to other school and district teachers; share progress with B2B program participants and coordinators.
- Present the interim results of Action Proposals at the annual Florida Junior Science, Engineering and Humanities Symposium (JSEHS) held at UF (February, 2011)
- Prepare a final written report detailing the outcomes of the Action Proposal (April, 2011)

Upon successful completion of the Bench to Bedside program requirements, teachers will receive:

- Access to biotechnology equipment lockers and professional support for classroom activities
- A $200 grant to implement action proposals
- Continued communication and assistance from UF
- Expertise and support in modifying curricula aligned with national and state standards
- Priority seating in teacher workshops offered by the UF Center for Precollegiate Education and Training
- Opportunity to participate in summer research internships
- Three credits towards a Certificate in Biotechnology Education, further graduate studies, and/or Florida teacher recertification.

Funding support provided by:

[Image: SEPA Science Education Partnership Award]

[Image: University of Florida]

2010 Bench to Bedside Program Book
UF CPET is the University of Florida’s “umbrella” for the articulation and transfer of current science, technology, engineering and mathematics (STEM) by linking research faculty and students with K-12 school teachers and students through a variety of campus and statewide programs. For almost half a century, CPET has offered discovery-based learning opportunities for secondary school students and, in more recent years, for teachers. The infrastructure of this University Center allows efficient and effective use of resources to administer programs on campus and throughout Florida. Its programs incorporate bridging activities that include teachers, researchers and industry professionals in preparing and delivering effective STEM education and career opportunities from middle school through graduate school. National and state science education standards govern CPET instructional programs. Activities are designed around National Research Council and Florida criteria for students to learn skills and acquire knowledge, and for developing curricula.

As a Center in Academic Affairs, CPET involves more than 300 UF scientists and engineers annually in its outreach programs. CPET also has an established history of collaborations with local, regional and state schools, and with educational and scientific professional societies. Professional development programs supported by NIH NCRR, HHMI, NIEHS, NSF, Woodrow Wilson Foundation and the University of Florida expand the content knowledge, skills, resources, and enthusiasm of in-service teachers. They also forge long-term relationships with researchers that result in converting new expertise into measurably successful new learning modules for students.
2010 PARTICIPANT INFORMATION

Mrs. Renae Allen
Union County High School
Union
allenr@union.k12.fl.us
Hon. Earth Science, Research, Reg. and Hon. Chemistry (9-12)

Mrs. Cynthia Bagley
Bradford High School
Bradford
bagley_c@firn.edu
Hon. Biology and Hon. Anatomy

Ms. Rebecca Bissonnette
Boca Ciega High School
Pinellas
bissonnetter@pcsb.org
Reg. and Hon. Geometry

Mrs. Nancy Browne
Everitt Middle School
Bay
browng@bay.k12.fl.us

Mrs. Stephanie Bundy
Fort White High School
Columbia
bundy_s@firn.edu
Anatomy & Physiology, Reg. and AP Chemistry

Ms. Laura Bushwitz
East Ridge High School
Lake
bushwitzl@lake.k12.fl.us
Hon. Anatomy & Physiology, AP Biology and Biology II (9-12)

Ms. June Camerlengo
Santa Fe High School
Alachua
camerljm@gm.sbac.edu
Industrial Biotechnology (9-12) and Biology (10)

Mrs. Charlynn Campbell
Clay High School
Clay
cwcclay@mail.clay.k12.fl.us
Hon. Anatomy & Physiology, Marine Science and Biology I (10-12)

Mrs. Lavonda Deale
Crestview High School
Okaloosa
lfmdeale@cox.net
AP and Hon. Chemistry (9-12)

Mrs. Donna Donovan
Melbourne High School
Brevard
donovan.donna@brevardschools.org
Chemistry (10-11)

Dr. Karen Ford
Ponte Vedra High School
St. Johns
fordsk@stjohns.k12.fl.us
AP Biology [11-12] and Biology I (9-10)

Mrs. Allison Grant
Walton High School
Walton
granta@walton.k12.fl.us
Physical Science (9), Biology (10) and Environmental Science (11)

Ms. Dawn Hartley
Clearwater High School
Pinellas
hartleyd@pcsb.org
Math/Science Instructional Staff Developer

Ms. Lee Holmes
Columbia High School
Columbia
Chemistry (10-12)

Ms. Theresa Kenna
West Broward High School
Broward
theresa.kenna@browardschools.com
Marine Science and Biology

Mr. Chin-Tang Liu
Western High School
Broward
chintang.liu@gmail.com
Physics and Integrated Science

Ms. Jessica Mahoney
Trenton High School
Gilchrist
mahoneyj@mystogen.org
Biology I, Integrated Science III

Mrs. Allison Moyel
Park Vista Community High School
Palm Beach
allisonmoyel@bellsouth.net
Health Occupations, Medical Skills and Services, Forensics (9,11-12)

Mrs. Teresa Nick
Merritt Island High School
Brevard
nick.teresa@brevardschools.org
Reg. and Hon. Biology and Integrated Science II

Dr. Valerie Pfister
Santa Fe High School
Alachua
pfistervr@gm.sbac.edu
Anatomy & Physiology (11-12)

Mr. James Pignatiello
Flagler Palm Coast High School
Flagler
pignatielloj@flaglerschools.com
IB/AP Biology and IB Chemistry

Mrs. Lesa Rowe
Bell High School
Gilchrist
rowel@mygcsd.org
Integrated Science I and Biology (9-10)

Mrs. Mary Russ
Williston High School
Levy
russm@levy.k12.fl.us
Anatomy & Physiology, Marine Science (11-12) and AP Biology (10)

Mrs. Nicole Sasnett
Columbia High School
Columbia
nicolecrandell@hotmail.com
Integrated Science I (9)

Ms. Kathy Savage
Oviedo High School
Seminole
kathy_savage@scps.k12.fl.us
Hon. and AP Chemistry (10-12)

Ms. Tammy Stundon
J.R. Arnold High School
Bay
stundtm@bay.k12.fl.us
Hon. Biology (9) and BSC1020

Ms. Jennifer Sunderman
The Pine School
Martin
jennifer.sunderman@gmail.com
Reg. and Hon. Biology (9), Anatomy, AP and Marine Biology (10-12)

Ms. Pamela Teske
Melbourne High School
Brevard
teske.pam@brevardschools.org
Hon. Anatomy and Astronomy (10-12)

Mrs. Stephanie Van Den Hurk
Bradford High School
Bradford
vandenhurk_s30@firn.edu
Chemistry I and Physical Science

Mrs. Lois Walsh
Deane Bozeman School
Bay
walshg@bay.k12.fl.us
Hon. Chemistry I, Biology I, Dual Enrolled Human Biology (9-12)
PARTICIPANT BIOGRAPHICAL SKETCHES

Renae Allen, Union County High School

Biographical Sketch: I have served as a science instructor at Union County High School for the past 25 years. I was among Florida’s first National Board Certified Teachers in Adolescent and Young Adult Sciences. I am the Science Department Chair, Science Fair Coordinator, and Research Coordinator for the Union County District. I also serve as a director for the Suwannee Valley Regional Science Fair. I have served on many state assessment committees for science curriculum. I also worked as an advisor, instructor and coach for two MSP grants. I enjoy teaching and working with students to promote a love for science and research. I am married and the mother of three adult children.

Action Research Proposal Title: A Comparative Study of Teaching Strategies in Biotechnology Education Using Computer Game Simulation

Action Proposal Abstract: The purpose of this action research investigation was to determine the impact of gaming techniques on curriculum comprehension using biotechnology concepts. Mission Biotech software developed through a grant with the University of Florida and the National Science Foundation was evaluated. Two classroom content areas were compared using biotechnology curriculum; chemistry and physical science. A health science class served as the control. Students in both experimental classes received identical content and laboratory instruction as well as the opportunity to play the Mission Biotech game. The primary variable was the “education track” students had selected. Students taking chemistry are on a college preparatory track. Students taking physical science are on the general diploma track. However, motivation is often a hidden variable between these students rather than academic ability. The biotechnology unit was divided into three sections: Introduction to Biotechnology, DNA and Viruses, and Biotechnology Careers. Throughout the unit, students were taken to the school computer lab to play the game for a total of 6 visits or four and a half hours of playing time. The final general content knowledge assessment revealed a 44% biotechnology knowledge score for the physical science students and a 71% score for the chemistry students. The coefficient of correlation for the pre and post test comparisons was 0.42 for the physical science class and 0.51 for the chemistry class. The assessment was developed by University of Florida staff.

Cynthia Bagley, Bradford High School

Biographical Sketch: I am from Savannah, Georgia. For 15 years, I have taught science in Florida. Currently, I am working towards my masters in Curriculum and Instruction so that I can better help new teachers—especially science teachers—create an engaging curriculum to ensure higher student success both in and out of the classroom. Today’s education system is changing and the need for health professionals is increasing. More schools have Health Academies now and Biotechnology is at the forefront. I know that this is a growing field of study and will continue to be so with the occurrence of more viruses, mutations, and need for DNA analysis to solve crimes, etc. It is my intention to learn this field, broaden my own knowledge and make myself as diverse as possible so that I do not become invaluable to my students and profession.

Action Research Proposal Title: X-Men Found in Stark! Rare Mutations Threaten Citizens!

Action Proposal Abstract: In today’s society genetic mutations are occurring more frequently and often have devastating effects on afflicted persons. For this reason, it is imperative that scientists continue to search for cures and means to prevent gene mutations or develop counter measures to reverse the physiological impact that mutations have on people. In this Action Research study, students will identify and treat genetic mutations using modern tools to improve student learning through real life application. Biotechnology will be incorporated into the Anatomy curriculum to support and extend on traditional teaching methods. Student learning gains will be measured using pre and post assessments, Likert Scales, journal writing, and group discussions. Upon completion of the Action Research, data will show whether adding Biotechnology into the lessons enhances student performance and develop positive attitudes toward science and become knowledgeable about potential careers in science.
Rebecca Bissonnette, Boca Ciega High School

Biographical Sketch: I am a transplant Florida resident by way of Connecticut. I have been a high school mathematics teacher for the past six years and would not trade my job for anything in the world. Currently I teach Geometry Honors and Geometry Standard at Boca Ciega High School and serve as the mathematics department head. Before teaching at Bogie, I taught a variety of math classes including Algebra I, Algebra II, and Statistics at Woodstock Academy. Although teaching is my chosen career path, I have never lost sight of my true passions in life: soccer and basketball. I have coached both sports, for both girls and boys, for about eight years. I find that coaching also brings a little extra into my classroom because students respond to those that are interested in their life outside of just the classroom.

I have been accepted to the University of Florida and will be pursuing my master’s degree this coming fall in Curriculum and Instruction. I am very excited to start the program. Additionally this summer I will be attending the AP Summer Institute for Statistics and will be teaching AP Statistics, one of my very favorite subjects, next year.

Action Research Proposal Title: A Study of the Impact of an Integrated Approach to Geometry using Biotechnology

Action Proposal Abstract: The purpose of this action research proposal is to measure the effectiveness of an integrated approach to geometry using biotechnology. Throughout the typical geometry course students are taught what many teachers like to call the “art of arguing without yelling.” Over this past summer there were many activities which we were exposed to that I could envision students using this technique. Because many of our sophomores are enrolled in both biology and geometry simultaneously, I am going to work with one of our biology teachers to develop a cross curricular lesson in which our students will take the biological concepts of electrophoresis and the art of arguing by completing the Crime Scene Investigator DNA activity.

Nancy Browne, Everitt Middle School

Biographical Sketch: I grew up in Norborne, Missouri and am a 1982 graduate from the University of Missouri-Columbia with a B.S.Ed. My husband, Steve, is a retired Air Force pilot. We have 4 children: Tucker, 19; Hannah, 17; Aubrey, 16 and Benjamin, 14. During my husband’s career, I worked for the Army as an Education Program Specialist, then for the Air Force as the Coordinator for Family Day Care. Upon the birth of our third child, I took on a new career as a stay at home mom. I volunteered in various school districts as we moved, until 2004 when I started teaching in Bay District Schools.

I have been fortunate to participate in a variety of exceptional learning opportunities throughout the state of Florida including Parent Participation in Sunshine State Scholar Program, Teacher Workshop at Kennedy Space Center to successfully launch and track a balloon with payload, Zero-G Flight with the Hawking Center of Microgravity Education and Research of Space at Kennedy Space Center, STEM Training with Center for the Advancement of Stem Education, PROMISE Earth and Space Institute with Panhandle Area Education Consortium and FSU. I have been selected as a member of the FCAT Rangefinder Committee, Fall 2007 and the FCAT Item Spec Team, Fall 2008. I have been honored as a nominee for Teacher of the Year in 2008 and for the 4 member development and implement team for Bay District Schools Students Pushing the Limits and Soaring Higher (SPLASH), and engaging summer camp for cusp kids.

Action Research Proposal Title: Will the inclusion of material from Bench to Bedside affect my students understanding of biotech?

Action Proposal Abstract: Not everyone is interested in the same things, so a teacher has to present information to make information relevant to the student. It can also be noted that boys and girls learn differently through a variety of teacher instructional techniques. By administering a multiple intelligence test to the students at the beginning of the school year, I am able to determine the range of student learning types in my class -- my students also learn about themselves. Because of this bit of information, I am more able to determine ways to differentiate my instruction. The information that has been made available to me through Bench to Bedside has been tremendous and can be easily tied to the Florida Next Generation Sunshine State Standards. The vastness of designed lessons organized and available, and the opportunity for modeled hands on labs have been tremendous. The thoroughness of presentations by experts and their lecture notes provide an enormity of resources to draw upon in a variety of modalities. The knowledge I received while a participant in Bench to Bedside allows me to provide a greater depth, not just
Stephanie Bundy, Fort White High School

Biographical Sketch: I am married and have two children; Caleb is 14 and going into 9th grade and my daughter is 11 and going into 6th grade. I teach 10th-12th grade at Fort White High School which is a 6-12 school in Fort White, Florida. In the upcoming school year, I will finally have both of my children at my school. I am so excited! I went to college at LCCC for two years and received my AA. I then transferred to FSU and received a BS in Science Education. I have been teaching for 19 years. Over the course of these years, I have taught Regulars and Honors Earth Space Science, Biology, Chemistry, as well as AP Biology and Chemistry. The AP Chemistry was new this year. I required so much time on my own learning information I have not dealt with since college. It has been a challenge, but rewarding as well. I really like the math part of chemistry. I enjoy teaching. I like the kids and I love science.

Action Research Proposal Title: Teaching Biotechnology in the Classroom

Action Proposal Abstract: The purpose of this study is to determine the effects of a two week unit focused on students’ ability to retain information and change their attitudes about learning when using selected bioscience activities in a high school classroom. I will use labs, lesson plans, and ideas from the Bench to Bedside Workshop from June of 2010.

Laura Bushwitz, East Ridge High School

Biographical Sketch: I am an 11 year teaching veteran. I have been teaching AP Biology, Honors Biology I and II, Genetics and Honors Anatomy and Physiology in Lake County, Florida. While I teach full time, I have been a Medical Laboratory Technologist since 1977. I love the biological sciences and thoroughly enjoy opening those doors to high school students. In addition to my career, I am the mother of two great adult children. I am also president of our local Community Theater; I have been actively involved in my community since moving here in the 1980s. I am also a Certified Body Pump Instructor. I enjoy all outdoor activities and traveling. Teaching gives me the opportunity to have a meaningful career as well as time to engage in outdoor activities and travel.

Action Research Proposal Title: Biotechnology Careers - Preparing High School Students

Action Proposal Abstract: As careers in biotechnology rise, qualified individuals are needed to fill those positions. Because many of these careers are new, many Americans are not aware of the opportunities they provide to young people as they begin to decide what they want to be when they grow up. This project was designed to increase high school student’s exposure to the growing field of biotechnology. Students were given the opportunity to learn some of the skills used in biotechnology by performing electrophoresis, transformation, protein crystallization and simulated biotechnology laboratory exercises as they learn the content related to these practices. In addition, students will be exposed to real time research and the scientists and technicians doing that research throughout the course. Students will also progress through the video game Mission Biotech exploring careers in biotechnology. As a result students will be able to identify and hopefully begin to pursue paths that will lead them to careers in molecular biology, medicine and biotechnology. In the process they will gain technical skills used in those same careers.
June Camerlengo, Santa Fe High School

**Biographical Sketch:** I am the Director of Santa Fe High School’s Industrial Biotechnology program here in Alachua County. I was one of the teachers in the team that developed the three course Industrial Biotechnology program for the Department of Education of Florida. Before being included in that exciting and rewarding endeavor I had earned a BS in Horticulture, specializing in Plant Science and Biotechnology, and I earned a M.Ed. in Secondary Education of Science. I worked at EPCOT and UF in plant tissue culture. I have been teaching for 7 years and teaching biotechnology for 3 years. Biotechnology is one of my passions. Working and learning with the amazing groups of science teachers and professionals at CPET workshops is another. I am truly looking forward to this experience for the learning and networking with all the other teachers and professionals.

**Action Research Proposal Title:** A Study on the Effectiveness of “Peer Tutoring” as a Teaching Method in High School Biotechnology Labs

**Action Proposal Abstract:** Following the participation of the researcher in the Bench to Bedside teacher workshop, a study was done to determine if peer tutoring is effective in improving student learning of biotechnology terminology and techniques. This researcher will assign peer tutoring to select groups of biotechnology students as a method to improve their biotechnology vocabulary and biotechnology techniques. Pre tutoring and post tutoring test scores will be compared, in addition to the comparison of tutor test scores to students who did not serve as tutors. The three activities include micro pipeting, isolating DNA and loading gel electrophoresis chambers.

Charlynn Campbell, Clay High School

**Biographical Sketch:** I have been teaching since 1983 and thoroughly enjoy it. I have taught courses from Aquatic Biology to Honors Chemistry to AP Biology and just about everything in between. As a resource teacher with the Lee County Department of Environmental Education I developed curriculum, conducted environmental impact studies, acted as a liaison between public and private entities, and was an instructor for the Environmental Science Research and Political Actions Seminar Class (affectionately referred to as the “Monday Group” as presented in Project WILD). In an effort to stay abreast of current trends in science and research and to satisfy my own desire as a student, I participated in Project SEAS (Science Educators at Sea) for 9 years, a marine research and education initiative through the Florida Institute of Oceanography, and more recently, the ICORE/HHMI Emerging Pathogens Institute at UF.

**Action Research Proposal Title:** Teaching Scientific Inquiry through Translational Bioscience

**Action Proposal Abstract:** Societal benefit depends on the general public’s understandings of biotechnology (Hanegan, 2009). A predictive assessment reveals that incoming Anatomy and Physiology students have not mastered scientific inquiry. Although authentic inquiries provide the best opportunities for cognitive development and scientific reasoning, guided and simple inquiries are more often employed in the classroom (Crawford 2000). Translational bioscience incorporates biotechnology and models scientific inquiry. The research question to guide this study is: how will the study of translational bioscience impact student knowledge and skills as they model the inquiry process used in biomedical research? Teacher efficacy in teaching biotechnology and inquiry skills will be determined through content assessment, attitudinal surveys, and student evaluations.

Lavonda Deale, Crestview High School

**Biographical Sketch:** I am a Chemistry teacher who once did many things in search of the perfect career. Then in between working in Human Biologicals and decorating wedding cakes, a friend asked me to fill in at an Atlanta High School. I was terrified and excited. After two weeks with ninth grade at-risk students, I couldn’t imagine ever leaving the classroom. This has been a personal journey into teaching the science that I know and love using often unproven methods of instruction that have evolved over the years. I am still searching for that perfect method of inspiring students to want to know, to read and enjoy it, to experiment without fear of
failure, and to take personal pride in what they have accomplished. My many life experiences have prepared me to teach and my goal of lifelong learning will continue as I seek new experiences for the benefit of my students.

Action Research Proposal Title: Examining Student Understanding of the Nature of Science in Relation to Frequency of Exposure to Biotechnology Inquiry

Action Proposal Abstract: Student understanding of the Nature of Science is closely tied to experiences in the classroom and the purpose of this study is to examine that understanding in relation to the frequency of exposure to biotechnology inquiry beginning with two week intervals. Students will begin their inquiry on the first day of class and will conduct various biotechnology inquiry activities throughout the semester including virtual, hands-on, historical and philosophical. Student understanding will be measured and recorded through pre- and post-testing as well as journaling.

Donna Donovan, Melbourne High School

Biographical Sketch: I grew up in New Jersey. I earned a B.A. in Biology from Cornell University and a MA in Science Education from Florida Tech. I have been married for 25 years to my husband, Pete, a teacher and basketball coach. I have two children, both of which attend the University of Florida. I have been a science teacher for 25 years. I have taught Biology, Chemistry, and Physics.

Action Research Proposal Title: Using Biotechnology to Improve Comprehension of Mixture Separation and Ability to Express a Reason-based Opinion

Action Proposal Abstract: During my teaching career, I have observed that the more relevant a topic is, the more receptive students are to learning it. That is why I always try to incorporate “real world” examples into my lessons. I’ve also noticed that students become more engaged when I provide opportunities for them to express their opinion. Unfortunately it’s not always easy for me to connect every topic I teach to a practical example that makes learning relevant. Nor is it easy to engage the students in a discussion about their opinion regarding chemistry topics. I believe that by incorporating Biotechnology into my curriculum it will serve to increase relevance and, due to the ethical issues that surround it, provide an opportunity for students to formulate a reasoned opinion.

Karen Ford, Ponte Vedra High School

Biographical Sketch: After I graduated from New College in 1977, I headed to the University of California at Berkeley to pursue graduate work in Plant Physiology, where I was awarded a Ph.D. in 1982. My training in plant tissue culture helped me get a post-doctoral research position at a fledgling plant biotechnology company, Advanced Genetic Sciences, where I learned molecular biology. Following this research experience, I accepted a position and earned tenure at a very lovely College of Charleston, South Carolina in 1990. For personal reasons related to complications in childbirth, I subsequently resigned from my position at the College of Charleston and spent most of the next 9 years as a “stay-at-home” mom. When my daughter entered kindergarten in 2000, I entered high school teaching in St. Augustine, Florida. Ten years later, I am still teaching high school and continually trying to find ways to engage my students and increase their appreciation of biological science. While I am certain that my research background makes me a better high school teacher, especially when it comes to discovery learning, I also realize that the majority of my students are more interested in medicine than plant physiology!

Action Research Proposal Title: Protein Crystallization with Standard Physical Science and Honors Physical Science Students

Action Proposal Abstract: Entering high school freshmen in the St. Johns County school district who are not recommended for honors science courses begin their science sequence with Physical Science. Physical Science Honors students at Ponte Vedra High School are typically sophomores who have completed Biology 1 Honors but were not recommended for Chemistry 1 Honors. The course descriptions for Physical Science and Physical Science Honors are quite similar: they include expectations that students evaluate the impact of biotechnology on individuals, understand the concept of pH, and explore applications of the theory of
electromagnetism. I propose to evaluate and compare the understanding of protein crystallography and its applications for biomedical research in physical science and physical science honors students. Specifically I propose to use the Lysozyme Crystallization protocol developed by Robert McKenna, PhD, and evaluate students using multiple choice and short answer questions. In addition I will assess student attitude towards biotechnology after completion of the lesson.

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**Allison Grant, Walton High School**

**Biographical Sketch:** While this is my first year at Walton High, I have been teaching for 9 years. I have taught Biology, Physical Science, AP Environmental Science and Honors Chemistry. I am originally from Michigan City in Northwest Indiana. I obtained a BS in Biology and Chemistry from Troy University in 2001. I am married with two children, ages 7 and 10. I enjoy watching and coaching my children in their sports, especially softball.

**Action Research Proposal Title:** Change in Student Attitude toward Biotechnological Careers and Standard Achievement after using Mission: Biotech

**Action Proposal Abstract:** I am currently the core science teacher for the Health Science career academy at Walton High School. During class, I am focused on helping my students connect the information in the textbook to real-world application and expose them to all aspects of health science, including available career choices. The purpose of my action research plan is to determine whether the use of technology, in the form of a video game, changes student achievement and attitudes toward careers in the field of biotechnology. I will be giving students a survey regarding their prior knowledge of careers in the biotechnical field and their attitude those careers, along with a pre-test of knowledge. I will then use the Mission: Biotech video game and associated lesson plans as a means to introduce students to the different biotechnical careers and biotechnical equipment. They will then complete another survey to determine how much new knowledge they have gained in respect to the careers and their current attitudes, along with a post-test to determine achievement.

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**Dawn Hartley, Clearwater High School**

**Biographical Sketch:** I obtained BS degrees in mathematics, physics and Secondary Education Mathematics from SUNY Fredonia in New York. For 8 years, I taught at Countryside High School in Clearwater, Florida. I have taught Physics, Physical Science, Earth Science, biology, Algebra I and II, and Integrated Science I, II and III. Currently I am the Math/Science Instructional Staff Developer of Pinellas County Schools. Previously, I managed a convenience store for 7 years, and I drove a tractor trailer, hauling fuel in Western New York while in college. My favorite hobbies include movies and Dungeon and Dragons online!

**Action Research Proposal Title:** Why Biotechnology Professional Development for Secondary Educators

**Action Proposal Abstract:** The purpose of my action research is to support the need for quality professional development for educators in Secondary Education. By providing three separate presentations on multiple forms of biotechnology; through the use of Likert scale assessments I will evaluate how the attitudes, opinions, and desire to implement biotechnology labs, activities, and lesson plans will change throughout the three days of the biotechnology professional development. Basically, will providing teachers with professional development that includes hands on biotechnology labs, activities, and lesson plans motivate teachers to implement these resources acquired from Bench to Bedside into their own classrooms?
Lee Holmes, Columbia High School

Biographical Sketch: I have been a high school science teacher for 7 years, teaching Biology and/or Chemistry. I still enjoy teaching as well as cheesecake, sunshine and personal time.

Action Research Proposal Title: An approach to probe learning progression in understanding molecular structures.

Action Proposal Abstract: Most students enter with the common knowledge of the chemical formula for water. The challenge is to help students progress in understanding that the characteristics of the atoms in the chemical formula influences molecular shape, and consequently, molecular characteristics and biological/physical function. To survey learning progression of students, a unit comparing the protein crystallization experiment/results and an inorganic crystallization experiment/results will be implemented for 1.5 weeks. The students will identify distinctive characteristics of the crystals and hypothesize reasons for the differences.

Chin-Tang Liu, Western High School

Biographical Sketch: I was born in an education family: most of my relatives were school teachers. I have been teaching—both at the high school and college levels—ever since I received my first degree in Physics. I enjoy working with students. As a father of two school-aged children, it is a great privilege to see the emotional and intellectual development of students on a daily basis. Beyond my teaching, I like to do outdoor exercises such as running, playing basketball, and playing tennis.

Action Research Proposal Title: Empower High School Student Research in BioTech

Action Proposal Abstract: BioTech is an emerging and promising field in this technology-driven economy. Yet, limited opportunities are available for students at the high school level, especially with an inquiry-based approach. The proposed research is to study how the student’s attitude and knowledge/skills will evolve as a result of an intensive participation in Biotech science fair project. A combination of qualitative and quantitative method will be used in this project.

Jessica Mahoney, Trenton High School

Biographical Sketch: I am a teaching convert, having started my professional career as a “lab rat” in a pediatric immunology research lab where I ran the flow cytometry core. I decided that my love for research was far too great to be contained in a sterile lab all day and thus ventured into the wonderful world of being a high school science instructor. I strive to bring current research into my classroom everyday and spread my love of science and biomedical to all my students. My professional accomplishments include internships with the Center for Disease Control and Scripps Florida as well as employment with the USF/All Children’s Hospital in St. Petersburg, Florida. I am a member of the NEA, FEA and GE/U.

Action Research Proposal Title: Application of Biotechnology in a Rural School to Assess Student Achievement and Attitudes

Action Proposal Abstract: This action research project will explore the outcomes of the introduction of interactive biotechnology lessons into the rural high school, focused on 9th and 10th grade Biology I students. The focus of this intervention is to introduce concepts and hands on application of topics that have previously been considered non-core concepts to a population that is generally disinterested in science. My action research will measure not only if student achievement on complex concepts improves with direct hands on activities, but also if the general attitude towards science will be changed as well.
Allison Moyel, Park Vista Community High School

Biographical Sketch: I graduated from the University of Florida with two degrees: a Bachelor’s in Medical Technology (’91) and a Master’s in Health Science Education (’95). I worked at Shands Hospital in Gainesville, Florida as a Medical Technologist in the Clinical Chemistry lab for 5 years. I then worked 9 years at Children’s Healthcare of Atlanta as a Medical Technologist, Program Coordinator, and Educator. I currently work at Park Vista Community High School in Lake Worth, Florida as a Health Occupations Teacher. I currently reside in Lake Worth, Florida and have a wonderful husband, Joe, and two kids, Shannon (9) and Josh (3).

Action Research Proposal Title: The Effect of Hands-On Biotechnology Activities and Video Games on the Attitudes, Knowledge, and Career Awareness of Students in a High School Medical Academy

Action Proposal Abstract: The purpose of this paper is to share the results of a study that focused on the effects of hands-on biotechnology activities and video games on the knowledge, attitudes, and career awareness of a group of medical academy students. Biotechnology careers are not commonly covered in the constructs of a medical career academy. This study will look at how biotechnology may be a viable curriculum choice for this population of students.

Teresa Nick, Merritt Island High School

Biographical Sketch: I am a Florida Institute of Technology alumna. I graduated with a B.S. in Biological Science with a minor in Science Education. I am crazy about anything science and love learning about new science research. Many people call me a science nerd! I have always been passionate about educating and exciting others about science. I hope that people see how passionate I am and in turn become more conscious and motivated to make a difference in the lives of students.

Action Research Proposal Title: The Influence of Biomedicine Activities on Attitude and Achievement of High School Students

Action Proposal Abstract: This action research paper describes how new biomedicine activities can be introduced into a high school classroom. The purpose of introducing these new activities is to improve student’s attitude and achievement toward the field of biomedicine and biotechnology associated with the field. Hands on laboratory experiments, lectures, research and virtual gaming will be executed in order to determine the achievement and attitudes of two High school honors biology classes. Students will also be exposed to biomedical careers, lab equipment and techniques used in the field. The expectation of this research is to take a well rounded approach in order to gain interest and better inform students about the field of biomedical sciences. The techniques acquired are from the University of Florida’s CPET: Biomedical explorations and Mission Biotech programs.

Valerie Pfister, Santa Fe High School

Biographical Sketch: I worked in healthcare as a consultant and Public Health Administrator for 13 years. Concurrently, I taught Anatomy and Physiology at Santa Fe Community College and worked with student athletes as a tutor and learning specialist. Upon completion of my doctorate in education, I worked full-time as an advisor and learning specialist before dedicating my professional career to teaching at a local high school this past year.

Action Research Proposal Title: A Study of Inquiry Investigations Using Biotechnology in Anatomy and Physiology Secondary Education to Improve Attitudes towards Science

Action Proposal Abstract: This action research project will compare the attitudes toward science of high school Anatomy and Physiology students receiving a curriculum of biotechnology inquiry-based activities to those of similar students receiving a more traditional curriculum. The inquiry activities will be integrated over a period of 4 weeks of curriculum that covers cell basics and the lymphatic system. Students’ attitudes will be measured prior to the study of the lessons and then immediately following the study units. Observations regarding the students’ interest and activity completion will be collected and recorded daily during the
curriculum study along with the survey data in order to determine any changes in attitude toward science that may result from the inquiry lessons.

James Pignatiello, Flagler Palm Coast High School

Biographical Sketch: I have been teaching for 32 years. I have taught Biology, Chemistry, Integrated Science, Anatomy and Physiology, Medical Science and Math. I’ve worked as a research biochemist for the United States Army with work patented and published. I’ve worked with Grant Wiggins of the CLASS organization from Princeton/SUNY. I completed coursework at Brown University with Ted Sizer and the Coalition of Essential Schools. I worked with the GLOBE Program and Forest Watch Program for global environmental awareness. I have also worked with NSF on a high altitude biology and geology in Colorado.

Action Research Proposal Title: A study of the effects of Computerized Gaming and cutting-edge research on students’ developing a more positive attitude towards and enabling the enduring nature of knowledge and skills in Biotechnology?

Action Proposal Abstract: Computerized Gaming is very visual, personal, competitive and the core of the student’s existence. Thus, it may add the personal interest and emotional response that can increase the attitude towards and the enduring nature of the knowledge and skills beyond the traditional classroom and improve scores (Van Eck 2006). This can especially be helpful in areas of biotechnology where financial issues may negate the actual hands-on experience. Use of the Mission Biotech Gaming program and CCR (Careers, Cases and research) vignettes will be used to lend reality to Biotechnology knowledge and skills. Before and after tests, both multiple choice and open response questions, and an attitudes survey will be used to detect the level of endurance. It is anticipated that the gaming and CCR will yield a smaller increase in the short term as these students typically work well current unit. I expect to see better endurance through impromptu recall yielding less time spent on review in class and better responses to typical IB/AP test questions.

Mary Russ, Williston High School

Biographical Sketch: I am a teacher at Williston High School in Levy County. I am also a graduate of Williston High School. My love for this school and community is grounded in years of attending, teaching, and sending my children through its programs. For the past 35 years, I have taught a wide variety of science classes at Williston High School. This year I teach AP Biology, Marine Science I and II and Human Anatomy and Physiology.

I received my Bachelor’s degree from the University of Florida in 1975. I am married. My husband is a retired Gainesville Police Sergeant and presently teaches American History at Bronson Middle/High School. I have two children. My daughter is a kindergarten teacher and my son is in the United States Army. I have four beautiful grandchildren.

Action Research Proposal Title: A Study of the Impact of Sequencing in 10th Grade Biology Should A Always Come Before B?

Action Proposal Abstract: This action research will be done involving tenth grade biology students. These students will be asked to keep a precise lab log as they accomplish the laboratory investigations that accompany their curriculum. They will be introduced to a computer game that requires them to move sequentially through levels of biotechnology processes. Emphasis will be placed on the importance of learning and doing basic steps before proceeding to the subsequent steps and then to the final product. Comparisons on measures of sequencing success and reading scores will be made, and data will be gathered on student perceptions of the importance of sequenced lab work.
Nicole Sasnett, Columbia High School

Biographical Sketch: I was born and raised in the small town of Callahan, Florida. Living in the small town allowed many an opportunity to develop and apply Christian principles. My family later moved to Jacksonville where I finished out my secondary education at Englewood High School. After high school, I attended Florida A&M University. While there I learned about excellence, social responsibilities and cultural appreciation. Volunteerism was encouraged along with religious sincerity. I pursued both along with high education standards. My new educational zest led me to finish out my studies at the University of Florida, where I completed the Bachelor’s of Forest Resources and Conservation. It was a partner program with FAMU and could only be completed at UF. After graduation, I took one year off to volunteer for AmeriCorps. In this program I would give services to underprivileged youth in Duval County. I was a part the DuvalReads! component. It was the most gratifying experience I had encountered. I then entered the Duval County School System as a science teacher. While volunteering, I met my now husband, Patrick. We were married in 2007 and have two beautiful daughters. In 2009, we moved to Columbia County where I now reside and teach Integrated Science.

Action Research Proposal Title: Attitude is Everything?

Action Proposal Abstract: The study will investigate the use of biotechnology inquiry based activities on student attitudes toward science. The methodology will be a comparison of students treated with biotechnology inquiry based activity vs. those treated with non-biotechnology inquiry activities. The students will be ninth graders. The goal is to compare students with similar reading proficiency according to the Florida Comprehensive Achievement Test. The main assessment instrument is an attitude survey provided by the mission biotech program coordinator. Other data sources will include learning styles, FCAT scores, pre/post unit tests and student surveys. Evaluations occur frequently. The purpose of this study is to introduce ninth grade integrated science students to the field of biotechnology while increasing their interest in the subject area.

Kathy Savage, Oviedo High School

Biographical Sketch: I am 51 years old and have five of my own children, ages 14 to 30. I majored in Chemistry and have a Master’s in Science Education for the University of Central Florida. I teach Honors and AP Chemistry. Our school is starting a “Bioscience Technology Program of Emphasis” this fall and I have been named director of this program. It is very scary, but also very exciting.

I am the sponsor for the Science Honor Society. One of our projects is to hold monthly science cafés that are also open to the public. We have been fortunate enough to secure guest speakers such as Dr. Eugenie Scott from the National Center for Science Education and Dr. Jan Garavaglia from the Discovery Channel’s television show, “Dr. G: Medical Examiner.” I am also on the Board of Directors and the treasurer for the Florida Citizens for Science, which is a grass roots organization that was actively involved in getting our new science standards passed. We hold workshops for teachers, offer presentations to the public, as well as maintain a webpage that is full of useful information for science teachers.

Action Research Proposal Title: Teaching a Lesson in Bioethics in a Biotechnology Class

Action Proposal Abstract: Students are becoming more and more aware of the increasing number of bioethical issues that face our nation and the world every day. Topics such as whether cloning, stem-cell research, and genetically modified organisms should be allowed further advancement in research or in practice will, no doubt, come up at some point in the teaching of a biotechnology course. As students start to understand the science as well as the techniques being used in these fields, we also need to prepare them to understand the ethical dilemma faced by researchers and politicians as they struggle to agree on the ethical standards that societies must obey. This lesson is a first year attempt to teach a brief history of ethics and promote civil discussion of some ethical issues among first year biotechnology students. Students will have a chance to reflect on their own preconceived notions of what is ethical as well as to share and discuss their ideas with their classmates.
Biographical Sketch: I am a native of the Panhandle and am in my 10th year of teaching at J.R. Arnold High School in Panama City Beach. Teaching courses such as Honors Biology, AP Environmental Science and Dual Enrollment Biology, I not only stress the importance of rigor and the skills needed for long term success, but I know that a student learns more when learning is interactive and when the student becomes the teacher. Founder of Sizzling Science, hundreds of Bay District high school students have been able to mentor thousands of elementary/middle school students in various hands-on inquiry based activities at the annual event. Established in 2004 as a vertical team project between my class and a middle school class, the event has grown to include science classes from all of the district’s high schools. Over 1,000 children attended the free family event in 2009. From that event 3rd and 4th grade students have been able to have their own day of science and showcase what they have learned to the K-2nd grades. Learning transcends. In addition to my teaching, I am the Director of Collegiate Studies, my school’s Advanced Placement Program. CS prepares students by providing a rigorous curriculum of a minimum of 6 AP classes, a blend of DE classes and the skills/strategies essential for success in college.

Action Research Proposal Title: Enhancing the learning achievement and attitude of biotechnology for the student with the aid of virtual gaming.

Action Proposal Abstract: Teachers find many roadblocks throughout their careers that limit the learning for the student. Those areas include a shift from student-centered to teacher-centered as a ‘comfort zone’ subconsciously moved by the teacher as the generation gap widens, not to mention the rapidly changing field of biotechnology as well as the inadequately supplied classrooms with even the basic biotechnology equipment. Many researchers have found that the area of virtual gaming can overcome those roadblocks. The virtual gaming also brings in the student’s imagination and interested. We have to enter their world. If done successfully, not only will the students gain ownership of their learning but will gain knowledge in the science of biotechnology that has immeasurable impact on the overall health and well being of society. This study not only analyzed the attitudinal and knowledge impact of biotechnology virtual gaming but sought to find out if simple pre-activities that gave students the opportunities to handle the equipment used in the lab techniques aided in their knowledge and/or attitude change.

Biographical Sketch: Next school year, I will be entering my 5th year of teaching at The Pine School in Stuart, Florida. For the past two years, I taught at Montverde Academy, an international boarding school outside of Orlando, Florida. I taught AP Biology, Anatomy and Physiology, Biology, and Marine Biology at Montverde Academy. I spent two years teaching Biology and Anatomy and Physiology at a public school in Savannah, Georgia. I grew up in Ohio and attended the University of Dayton for my undergraduate degree in Biology and Xavier University where I earned my Master’s in Secondary Education. In my free time I enjoy outdoor activities such as hiking, camping, kayaking, and anything that has to do with the beach.

Action Research Proposal Title: The Effect of Hands-on Biotechnology Curriculum on High School Students’ Understanding of Evolution and Natural Selection

Action Proposal Abstract: The concept of evolution is central to the teaching of biology. The modern synthesis of evolution unites the ideas of Mendel and Darwin. All living organisms share a universal genetic code. Through the use of biotechnology it is now possible for scientists to determine exact measurements of degrees of biochemical similarities and differences among organisms and to establish evolutionary relationships among organisms (Dobzhanski 1972). Despite the overwhelming amount of scientific data, national polls show that over 45% of Americans do not accept the theory of evolution by natural selection (Quammen, 2004). Part of the misconception about evolution and natural selection may result from the fact that “in many courses of study, students’ experience with science is merely a survey of information without any meaningful exposure to the process that produced this information (Clough and Olson 2004). Even students who accept the theory of evolution may not completely understand the mechanism of natural selection. Many students have a Lamarckian view of change in populations and believe that organisms can consciously change their traits in response to the environment because they do not understand genetic variation or mechanisms of inheritance (Heim, 2002). The purpose of this study is to determine the impact of a hands-on biotechnology unit on student’s understanding of evolution and natural selection.
Pamela Teske, Melbourne High School

**Biographical Sketch:** I am an Honors Anatomy and Physiology teacher and have been for the past 10 years. I have a degree in Biology Education and am working on my Master’s in Counseling. Before I was a teacher, I was interested in the medical field and worked as a Pharmacy Technician for a number of years. I was even in Pre-Pharmacy school before switching to Education. I enjoy teaching Anatomy and love seeing the students grow and develop a better, deeper understanding of their own anatomy.

**Action Research Proposal Title:** Mission Biotech Gaming: A study of how video gaming can make difficult subjects in science easier to understand in a High School setting.

**Action Proposal Abstract:** I will be bringing in biotechnology into my classroom by using video gaming and introduction activities focused on biotechnology. Every year, more and more students have been using video games for entertainment, building hand-eye coordination, and education. Teachers and parents have known that when information is presented in game form, learning is a natural outcome to the game. I will be using the biotechnology game called Mission Biotech. This 3-week lesson series will be teaching students about laboratory safety and equipment, basic cell anatomy, DNA and RNA structure and function, viruses, biotechnology careers, analyzing PCR results and understanding of the virtual learning environment.

Stephanie Van Den Hurk, Bradford High School

**Biographical Sketch:** I am a 1987 graduate of the University of Florida. Go Gators! I earned a B.S. in Health Science Education and stayed at the University of Florida for post-baccalaureate studies. I have since taken additional coursework in education and chemistry to name a few. I have taught a range of courses from Honors Chemistry to 6th grade General Science. I am currently certified in the state of Florida in the following areas: 6-12 Chemistry, 5-9 General Science, 5-9 Integrated Curriculum, K-12 Health, and hold a Reading Endorsement. I have a strong desire to learn new techniques and pass them on to others to assist student education. I want to stay current and updated as much as possible with any and all information available as a professional.

**Action Research Proposal Title:** High School Physical Science Students’ Attitudes and Ability to Identify Biotechnology Careers via Student Career Research and Sharing

**Action Proposal Abstract:** Due to a need for trained personnel in the biotechnology industry, it is imperative that students be given the opportunity to investigate career choices in biotechnology. Since today’s student is technologically more adept than previous generations it makes sense to introduce careers in biotechnology by having students research biotechnology via the internet and create power point presentations. This study will monitor student attitudes toward career choices in biotechnology before and after students conduct research and create power point presentations pertaining to biotechnology careers. Students will use their presentations to “recruit” classmates to their biotechnology career. The Likert Survey will be used to collect pre and post survey data to investigate student attitudes toward biotechnology. In addition, a pre and post biotechnology career identification chart will be used to identify student familiarity with biotechnology career choices.

Lois Walsh, Deane Bozeman School

**Biographical Sketch:** I am currently teaching at Deane Bozeman School in Panama City, Florida. I enjoy teaching science and its “ah!” moments. I teach Biology, Chemistry and Physical Science. I have taught 6th through 12th and adjuncted at the community college level. I am married and the mother of two teenagers. Living in the country, I enjoy raising animals, gardening, horticulture and “the great outdoors!” I was born in Johnson City, New York. I earned my B.S. in Biology from SUNY Brockport in New York and my MS in Secondary Science Education from Florida State University.

**Action Research Proposal Title:** ‘An Unknown Protein, Oh No!’: A Quest for a Rainforest Medicine,
Biotechnology Exposure in a Biology I Class

**Action Proposal Abstract:** Man’s knowledge of the human genomes actions and applications is impacting our lives. This is a very young science and dynamic science. I do not feel this area of science is adequately included in the standard high school textbook or very well understood by students. I propose to increase the awareness of biotechnology to my Biology I students by having them investigate a simulated problem scenario of biotechnology. The experience should also increase their knowledge of biotechnology and its applications. In the scenario students will work in a laboratory that has material collected from the rainforest, in a quest to find a new medicine, a working protein, in a plant. The students will find a protein of interest, clone the gene for the protein, and then review the process of bringing that protein to the bedside or market place. The monitoring of students will be a ‘prior knowledge and post knowledge questionnaire’ of biotechnology and a self report of their increase of biotechnology awareness and knowledge.
2010 Demographic Information

Florida Department of Education Reported (2009-2010 data) from the No Child Left Behind Data
Student Demographic Category: Economically Disadvantaged

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<th>School</th>
<th>Approx % of economically disadvantaged students</th>
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<tr>
<td>Boca Ciega High</td>
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<tr>
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<tr>
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<td>Deane Bozeman School</td>
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<tr>
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<td>Williston High</td>
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### 2010 Demographic Information

#### Gender and Ethnicity of Participants

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Mary Jo Koroly, Ph.D.
Research Associate Professor, College of Medicine
Director, UF CPET, Academic Affairs
PI, Bench to Bedside grant
Work: 352-392-7685; Cell: 352-317-5459
Email: korolymj@cpet.ufl.edu

Mary Jo is Director of the University of Florida Center for Precollegiate Education and Training (UF CPET) and a faculty member in the Department of Biochemistry and Molecular Biology in the College of Medicine. She served on the faculties of Bryn Mawr College and Harvard Medical School before coming to UF in 1979. Her research interests and publications are in the area of cell regulation, membrane biochemistry, and science education. From 1989 - 1994, she served as the founding director of the Education and Training Program of the UF Interdisciplinary Center for Biotechnology Research, a laboratory-based workshop program to teach new concepts and techniques of DNA science to scientists and physicians, graduate and medical students, secondary school teachers, and non-science professionals. She continues to teach undergraduate and graduate courses, directs the Biochemistry and Molecular Biology course for medical students, and serves on numerous education committees on campus and throughout Florida. Since 1995, she has led UF CPET in science, math and technology programs that link UF research faculty and graduate students with inservice teachers and their motivated students in grades 6-12. She welcomes new collaborations in basic and applied science outreach with universities and businesses, with UF faculty and students, and with Florida’s K-14 educators and students.

Julie Bokor, MAE
UF CPET Assistant Director
Bench to Bedside Program Coordinator
Cell: 352.317.6367
Email: julie@cpet.ufl.edu

Julie joined CPET in May of 2001. She received her Bachelor’s Degrees in Zoology and Microbiology and Cell Science from the University of Florida as well as a Master’s in Science Education. Julie has worked in both industrial and academic molecular biology laboratories. Her responsibilities include the development and implementation of workshops and educational opportunities designed to update high school and middle school science, math, and technology teachers on recent developments in their content area. Julie coordinates all of the CPET programs for teachers including Bench to Bedside, ICORE, Mini Medical School, and the Summer Science Institutes.

Kim Golart, Ph.D.
Coordinator, Education/Training Programs
Bench to Bedside Program Liaison
Email: kim@cpet.ufl.edu

Kim joined CPET in March of 2010. She has a Ph.D. in Microbiology from North Carolina State University and a B.S. in Biology from High Point University. She is a postdoctoral fellow at CPET and her responsibilities include assisting with the preparation, instruction, and coordination of CPET’s science education and professional development programs. She will be the liaison for the Biomedical Explorations: Bench to Bedside program and will assist with the development and implementation of teacher Action Research Proposals during the school year. Kim also helps with the ICORE teacher program and Science Quest student program.
Erin Kelso, Ph.D.
Laboratory Teaching Specialist
ICORE Program Liaison
Email: ekelso@cpet.ufl.edu
Erin Kelso is a postdoctoral fellow at the CPET at UF. She has a Ph.D. in evolutionary biology from Indiana University, a M.S. in zoology from Washington State University, and a B.S. from the University of California at Davis. Erin is responsible for Science Quest, CPET’s one-week residential science program for rising 10th grade students, and she also assists with CPET’s content-rich professional development programs for teachers. Erin will be the liaison for ICORE teachers during the school year, and will assist with implementation of Action Plans that include equipment loans, classroom support, and class visits to research facilities at UF, UF-IFAS Fort Lauderdale Research and Education Center, or FAU.

Charles D. Lawrence, MPH, Ph.D.
UF CPET Educational, Multimedia & Web Designer
Email: lawrence@cpet.ufl.edu
Chuck Lawrence is a Ph.D. Ecologist (Indiana University) with M.S. degrees in Environmental Health (University of Oklahoma) and Zoology (Indiana University) and a Bachelor’s degree in Environmental Biology (University of Colorado). At CPET, he produces resource books and develops CD and Internet multimedia learning tools and teaching modules for CPET’s teacher outreach programs. He is the author of “The Science Project Encyclopedia”, creator and custodian of the Science Information for Teachers (SIFT) educational service, keeper of The Sifters Guide to Everything (Science) and producer of the Excursions in Science CD-ROM series which can be viewed online.

Rachel Belcher, B.A.
CPET Student Assistant
Rachel joined the CPET staff in February 2008 to assist with the assembly of The Sifters Guide to Everything (Science) and remained as an office aide to help prepare for the summer programs. In May, she earned her undergraduate degree in English and Criminology from the University of Florida. She will be attending the Emory University School of Law in Atlanta, Georgia this August.
BENCH TO BEDSIDE PRESENTERS

Henry Baker, Ph.D.
Professor and Chair
Department of Molecular Genetics and Microbiology, College of Medicine
hbaker@ufl.edu
http://www.mgm.ufl.edu/faculty/hbaker.htm
Dr. Baker’s research focus is in developing gene expression classifiers that can be used to diagnosis illness, predict clinical course and ultimately responsiveness to therapy. Dr. Baker is a participating investigator in Large Scale Collaborative Research Program Inflammation and the Host Response. His laboratory serves as one of three genomic cores for this program. He is a member of the computational analysis and modeling core of the program. The main goals of this project are using microarrays to determine whether patterns of gene expression from whole blood leukocytes can be used to identify trauma and burned patients at risk of developing MODS. The Baker lab is also dedicated to assisting other researchers interested in applying the tools of functional genomics including microarray technology and bioinformatics to medically important problems.

Marianne B. Barnes, Ph.D.
Foundations and Secondary Education
College of Education and Human Services
University of North Florida
mbarnes@unf.edu
Dr. Barnes’ research focuses on action research, teacher leadership, and science inquiry teaching and learning. She has led multiple state and campus-wide collaborative ventures. She has served as project evaluator for teacher and student focused STEM projects. Other research involves delving into implicit factors affecting science learning. She teaches graduate courses on action research and secondary science methods.

Lehman W. Barnes, Ph.D.
Foundations and Secondary Education
College of Education and Human Services
University of North Florida
lbarnes@unf.edu
Dr. Barnes’ research focuses on action research and reflective practice. He has worked closely with multiple school districts in cross-disciplinary projects and with higher education faculty in STEM disciplines. He provides evaluative and professional development services to community agencies that provide programs and support for underserved youth, including data gathering relative to their success in college venues.

Barry Byrne, M.D., Ph.D.
Professor
Molecular Genetics and Microbiology, College of Medicine
bbyrne@ufl.edu
http://www.mgm.ufl.edu/faculty/bbyrne.htm
Dr. Byrne’s laboratory is actively involved in developing new genetic therapies for cardiovascular disease. In the area of cardiomyopathy, they are studying gene replacement in an autosomal recessive form of fatal cardiomyopathy in children. They have used AAV vectors to achieve sustained correction of the gene deficiency and correction of the phenotype in natural and transgenic mouse models of the disease. Secondly, they are investigating the ability of mesenchymal stem cells to undergo myocardial specification for the purpose of tissue repair in the heart. Finally, several projects are focused on the use of AAV vectors injected into striated muscle to achieve sustained release of therapeutic proteins, including thrombolytic factors and coagulation factors.

Kassidy Chauncey, B.S.
Interdisciplinary Program in Biomedical Sciences Student, College of Medicine
kassidy@ufl.edu
http://idp.med.ufl.edu/Students/Current/Chauncey-Kassidy%2008.htm
Kassidy received her B.S. in Microbiology and Cell Science from the University of Florida and is currently concentrating in Immunology and Microbiology at the University of Florida College of Medicine. In 2009 Kassidy received the UF Medical Guild Research Incentive Award.
**Teresa d’Angelo, R.N., B.S.N.**

General Clinical Research Center

Ms. d’Angelo serves as the Nurse Manager of the General Clinical Research Center at the University of Florida. The GCRC at the University of Florida has been in continuous operation since 1962 and currently occupies over 9,700 sq. ft. on the third floor of Shands Hospital. It is one of over 70 GCRCs in major teaching centers throughout the country, where highly qualified investigators have the opportunity to advance medical knowledge in a clinical setting.

**Michael Haller, M.D., M.S-CI**

Assistant Professor
Division of Endocrinology, College of Medicine
hallemj@peds.ufl.edu
http://www.peds.ufl.edu/research/profiles/haller_m.asp

Dr. Haller’s research focuses on predicting, preventing, and reversing type 1 diabetes through a team approach that focuses on translating finding from the laboratory bench to the patient’s bedside in a timely manner. Dr. Haller is an active investigator in the NIH funded Type 1 Diabetes TrialNet, serving as the University of Florida principal investigator (PI) for the anti-CD20 studies and serving as the Chair of the Clinical Implementation Committee for The Environmental Determinants of Diabetes in Youth (TEDDY) study. Dr. Haller is also the PI of a novel study aimed at using autologous umbilical cord blood stem cells as a potential therapy for type 1 diabetes. Dr. Haller has been awarded the Lawson Wilkins Clinical Scholar award, a JDRF innovative research grant, two NIH R21 awards, and a JDRF Early Career Clinically Oriented award to support his work in developing combination therapies for Type 1 diabetes.

**Nancy Hardt, M.D.**

Professor
Department of Pathology, Immunology and Laboratory Medicine, College of Medicine
hardt@ufl.edu
http://mch.peds.ufl.edu/staff/researcher/nancy_hardt.html

Dr. Hardt’s current academic interests include evidence based practice of pathology and laboratory Medicine, physician behavior change using practice data and office based CME, prevention of infant mortality, and K-12 science education in minority students.

**Katherine Hill-Harfe, Ph.D.**

Research Programs Coordinator
Cellular and Molecular Therapy, Powell Gene Therapy Center
kharfe@ufl.edu
http://www.peds.ufl.edu/research/teams/bryne.asp

Dr. Harfe’s graduate studies focused on the genetics of spermatogenesis and reproductive interactions in the model system Caenorhabditis elegans and related species. Post-doctoral studies included using Affymetrix GeneChips to reconstruct transcriptional pathways in C. elegans in a joint position at Harvard University and Wyeth/Genetics Institute, and later at the University of Florida determining the molecular lesion responsible for a unique, mild form of Campomelic Dysplasia (normally fatal in infancy) in a multigeneration family. Her primary career interest remains the genetics of human disease.

**Stephen Hsu, M.D., Ph.D.**

Associate Professor
Nephrology, Hypertension & Renal Transplantation, College of Medicine
Stephen.Hsu@medicine.ufl.edu
http://www.medicine.ufl.edu/neph/hsu.asp

Dr. Hsu’s current research interests reflect an expertise that encompasses a broad interdisciplinary program that includes the study of gene transcriptional regulation and cell cycle progression, molecular genetics/population genetics, and clinical and molecular epidemiology of non-communicable diseases. Ultimately, the goal is “translational medicine” with a starting point in the basic science laboratory, or that takes a public healthcare approach to make clinical interventions in unique populations with high disease burden so as to leverage on these “natural laboratories” by employing population-based disease screening coupled with clinical and molecular epidemiologic studies in order to translate findings to both the “bedside” and to a “population” level.
Philip Laipis, Ph.D.
Professor and Associate Chair
Department of Biochemistry and Molecular Biology, College of Medicine
plaipis@ufl.edu

Dr. Laipis’ lab studies replication and integration of Adeno-Associated Virus (AAV), structure/function of carbonic anhydrase (CA), and gene therapy for phenylketonuria (PKU). AAV, a small DNA virus, requires co-infection with helper virus for replication. Without helper, AAV integrates into human chromosome 19. His lab is defining the cellular requirements for AAV replication and integration, as well as characterizing the AAV Rep protein. His lab has cloned nine mammalian CA genes and made many amino acid mutations. This work has allowed him to analyze structure-function relationships, especially proton transfer. Experiments leading to a CAIII knockout mouse and isozyme specific inhibitors are in progress. Finally, his laboratory has cloned the gene for phenylalanine hydroxylase (PAH), developed AAV-based vectors expressing PAH and successfully cured PKU in the PAHmut2 mouse models. His ultimate goal is human clinical trials.

Marian Limacher, M.D., FACC
Professor
Division of Cardiovascular Medicine, College of Medicine
Director, Advanced Postgraduate Program in Clinical Investigation;
Medical Director, Shands Cardiovascular Clinic
limacmc@medicine.ufl.edu
http://www.medicine.ufl.edu/cardio/limacher.asp

Dr. Limacher is the Principal Investigator for the UF Clinical Center for the Women’s Health Initiative. She is co-PI for the clinical trial, “Treatment of Obesity in Underserved Rural Settings”. She directs the Advanced Postgraduate Program in Clinical Investigation (NIH funded K30 program) at the University of Florida, which provides a didactic curriculum and mentoring program in clinical research career development for faculty and senior fellows. She is a past member of the Board of Trustees of the American College of Cardiology and remains active on committees for the ACC, AHA and American Society of Echocardiography. She was awarded the Health Center Faculty Prize for Clinical Science in 2000, and the UFRF Professorship Award in 2005.

Tammy Mandell
Assistant Director, Education and Training
Center of Excellence in Regenerative Health Biotechnology
tmandell@cerhb.ufl.edu
http://cerhb.rgp.ufl.edu

The Center of Excellence in Regenerative Health Biotechnology (CERHB) facilitates translational research by providing expertise and infrastructure to investigators at the University of Florida, local start-up companies, and other universities, research institutions, and companies in the Southeast. CERHB plays an integral role in developing the biotechnology cluster in Florida by fostering new company formation, existing company expansion, and attracting outside companies to the region. CERHB’s mission is to stimulate promising research and facilitate commercialization of technologies that will provide treatments and cures for human disease, as well as create new companies and high wage jobs for Florida.

Mavis Agbandje-McKenna, Ph.D.
Associate Professor
Department of Biochemistry and Molecular Biology, College of Medicine
mckenna@ufl.edu
http://www.mbi.ufl.edu

Dr. McKenna’s research involves the study of members of the ssDNA virus families: Microviridae, Geminiviridae, Circoviridae and Parvoviridae, which infect bacteria, plants and mammals. The research is focused on the role of the viral capsid and capsid protein in the biological process of the viral life cycle. Her research is also interested in understanding how the capsid adaptations control interactions with the host cell machinery.
Robert McKenna, Ph.D.
Associate Professor
Department of Biochemistry and Molecular Biology, College of Medicine
mckenna@ufl.edu
http://www.mbi.ufl.edu
Dr. McKenna’s research includes studying the structure of biological molecules using advanced techniques such as X-ray crystallography and electron microscopy incorporated with computer modeling to generate a three-dimensional model. Once the model is created, the biochemical properties of the molecule are coupled with the genetics of the molecule in order to create a structural map of the molecule. This very detailed structural map is essential to understanding how the molecule performs its operations. This technique is currently being used to study adenoviruses and carbonic anhydrase.

Ray Moseley, Ph.D.
Associate Professor
Program in Bioethics, Law and Medical Professionalism
rmoseley@ufl.edu
http://www.chfm.ufl.edu/faculty/bioethics/moseley.shtml
Dr. Moseley is the founder and was the first President of the Florida Bioethics Network (FBN), and has played a key role in the development of the FBN as a significant statewide resource and as a model for other bioethics networks around the country. His research includes publications on 'Withdrawal of Life-Sustaining Medical Treatment,' 'Advance Medical Directives,' 'Genetic Testing,' 'New Medical Technologies,' and 'Prenatal Testing.'

Troy Sadler, Ph.D.
Assistant Professor
School of Teaching and Learning, College of Education
tsadler@coe.ufl.edu
http://education.ufl.edu/Faculty/tsadler/
Dr. Sadler’s research agenda relates to understanding how people learn science and what approaches to teaching facilitate learning. He has an ongoing project related to student discourse and argumentation in classrooms. Dr. Sadler is investigating how students learn about science and technology through the social negotiation of experiments and their findings. He teaches courses related to science education and teacher preparation and conducts research in the areas of socioscientific issues, scientific argumentation, and situativity theory.

Greg Shultz, Ph.D.
Professor
Obstetrics and Gynecology, College of Medicine
schultzg@obgyn.ufl.edu
http://idp.med.ufl.edu/BMB/bmbfacultypages/gschultz.html
Dr. Schultz’s research focuses on the role of growth factors, cytokines and proteases in regulating normal wound healing in the eye and skin, and how alterations in these key molecular regulators leads to impaired healing (chronic wounds) or excessive healing (fibrosis). Dr. Schultz’s lab is developing rapid, point-of-care indicators for assessing levels of proteases, nitric oxide (NOx) and biofilms in wound assessment and is involved in clinical trials testing new drugs that reduce inflammation, inhibit proteases, and promote healing of chronic wounds.

Richard Snyder, Ph.D.
Assistant Professor
Department of Molecular Genetics, College of Medicine
Director, Center of Excellence in Regenerative Health Biotechnology
Snyderrr@ufl.edu
http://www.mgm.ufl.edu/faculty/rsnyder.htm
Dr. Snyder’s research involves adeno-associated viruses. The first goal of the lab is to find out how the nucleic acid is inserted into the capsid of the virus. The second goal is to understand adeno-associated virion assembly and specific capsid subunit interactions using computer modeling techniques. Dr. Snyder currently serves both as the director of the Center of Excellence of Regenerative Health Biotechnology (CERHB) and the director of Human Applications within the Powell Gene Therapy Center.
Peggy Wallace, Ph.D.
Professor
Molecular Genetics and Microbiology, College of Medicine
peggyw@ufl.edu
http://idp.med.ufl.edu/BMB/bmbfacultypages/pwallace.html

The major focus of Dr. Wallace's research lab continues to be NF1, as it is a very complex condition clinically and at the molecular/cell biology level. Her lab is trying to determine the pathways involved in NF1 tumor formation (such as neurofibromas, malignant peripheral nerve sheath tumors, and myeloid leukemia), to help develop targeted therapies. This has involved numerous strategies including use of genetically engineered mouse models, cultured tumor cells, protein analysis, and analysis of the NF1 and modifier genes for constitutional and somatic mutations. In addition, her lab is applying molecular genetics and cell biology approaches to study other conditions with a genetic basis, both of Mendelian and multifactorial inheritance. She collaborates with many investigators at the University of Florida and elsewhere.

David Weinstein, M.D., M.M.Sc.
Associate Professor
Division of Endocrinology
Director, Glycogen Storage Disease Program
weinsda@peds.ufl.edu
http://idp.med.ufl.edu/BMB/bmbfacultypages/dweinstein.html

While patients with glycogen storage disease are now surviving into adulthood, long-term complications remain common, and Dr. Weinstein's team has focused on elucidating the cause of these complications. Previous studies have revealed the pathophysiology for anemia and renal complications in GSD, and Dr. Weinstein's lab continues to investigate complications in GSD I including hepatocellular carcinoma, hepatic adenomas, and atherosclerosis. Curing the glycogen storage diseases remains the ultimate goal. Dr. Weinstein’s laboratory is working on ways to cure the disease through gene therapy or replacement of glucose-6-phosphatase activity. Stem cell therapy is presently being attempted in the mice with GSD type Ia, and gene therapy is being performed in the naturally occurring canine model of this disease.
2011 JUNIOR SCIENCE, ENGINEERING, AND HUMANITIES SYMPOSIUM BENCH TO BEDSIDE PRESENTERS

Renae Allen
Rebecca Bissonnette
Stephanie Bundy
Laura Bushwitz
June Camerlengo
Charlynn Campbell
Lavonda Deale
Karen Ford
Allison Grant
Dawn Hartley
Jessica Mahoney
Allison Moyel
Teresa Nick
Valerie Pfister
James Pignatiello
Mary Russ
Nicole Sasnett
Kathy Savage
Tammy Stundon
Stephanie Van Den Hurk
Lois Walsh
Pamela Teske
Jennifer Sunderman
### Schedule of Events

**Sunday, February 6, 2011 – ICORE and Bench to Bedside**

3:00 – 5:00pm  Check-in for JSEHS at Cabot Lodge
5:00 – 6:30pm  Summer Institutes Reunion Dinner  
*Location: McKnight Brain Institute, Room LG110A/B*
7:00 – 9:30pm  JSEHS Opening Ceremony  
*Location: Medical Sciences Auditorium*

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#### Monday, February 7, 2011 – ICORE

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Location</th>
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<tbody>
<tr>
<td>8:00 – 8:30am</td>
<td>ICORE Presentation set-up; coffee available</td>
<td>Room 284, Reitz Union</td>
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<tr>
<td>8:30 – 11:30am</td>
<td>ICORE Teacher Presentations</td>
<td>Room 284, Reitz Union</td>
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<tr>
<td>11:30 – 12:30pm</td>
<td>ICORE Program Discussion</td>
<td>Room 284, Reitz Union</td>
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<td>Action Proposal Implementation Reports</td>
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<td>Reflections on Program</td>
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<td>Evaluation Follow-up – Erin</td>
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<td><strong>Summer Opportunities:</strong></td>
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<td></td>
<td>Research / curriculum writing – Julie</td>
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<td></td>
<td><em>Swine Flu, Bird Flu, Seasonal Flu – Oh My!</em></td>
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<td></td>
<td>Using 3-D Modeling in Your Classroom</td>
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<tr>
<td>12:30 – 1:30pm</td>
<td>Lunch</td>
<td>Arredondo Room, Reitz Union</td>
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<tr>
<td>2:00 – 3:00pm</td>
<td><strong>Swine Flu, Bird Flu, Seasonal Flu – Oh My!</strong></td>
<td>Room 284, Reitz Union</td>
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<tr>
<td>3:00 – 5:00pm</td>
<td>ICORE room open</td>
<td>Room 284, Reitz Union</td>
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#### Monday, February 7, 2011 – Bench to Bedside

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<td>Bench to Bedside room open</td>
<td>Room 285, Reitz Union</td>
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<tr>
<td>10:30 – 11:30am</td>
<td>Swine Flu, Bird Flu, Seasonal Flu – Oh My!</td>
<td>Room 285, Reitz Union</td>
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<tr>
<td>11:30 – 12:00pm</td>
<td>Bench to Bedside Presentation set-up</td>
<td>Room 285, Reitz Union</td>
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<tr>
<td>12:00 – 1:00pm</td>
<td>Lunch</td>
<td>Arredondo Room, Reitz Union</td>
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<tr>
<td>1:00 – 1:30pm</td>
<td>Finish Presentation set-up</td>
<td>Room 285, Reitz Union</td>
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<tr>
<td>1:30 – 4:00pm</td>
<td>Bench to Bedside Teacher Presentations</td>
<td>Room 285, Reitz Union</td>
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<tr>
<td>4:00 – 5:00pm</td>
<td>Bench to Bedside Program Discussion</td>
<td>Room 285, Reitz Union</td>
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<td>Action Research Implementation Reports – Drs. Barnes</td>
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<td>Reflections on Program</td>
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<td>ICORE: June 12 – 24, 2011</td>
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Rejoin JSEHS scheduled events Monday evening and Tuesday
SPECIAL SESSION

Swine Flu, Bird Flu, Seasonal Flu – Oh My!

Come explore protein structure with hands-on activities and materials available through the MSOE Model Lending Library. We will then APPLY this information as we explore the influenza virus – including the infection mechanism, genetic shift and drift, mixing vessels, pandemic strains and how antiviral medicines work – with innovative physical models and visualization tools.

Bench to Bedside teachers: 10:30-11:30am, room 285, Reitz Union

ICORE teachers: 2:00-3:00pm, room 284, Reitz Union

Presented by:

Margaret Franzen, Ph.D.
Program Director
Center for BioMolecular Modeling
E-mail: franzen@msoe.edu
CBM Website: http://cbm.msoe.edu
Milwaukee School of Engineering
MSOE website: www.msoe.edu
SUMMER OPPORTUNITIES

Internships:

- Industry (TeacherQuest – Diane Matthews – six weeks)
- Research labs (at UF – six weeks)
- Research lab with curriculum development (at UF – three weeks summer, plus follow-up)
- Curriculum development (remote during spring/summer, plus follow-up)

ICORE program: June 12 – June 24, 2011

Bench to Bedside program: July 10 – July 22, 2011