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IBB's "COMMERCIALIZE IT" SUCCESS STORIES: THE CREATION OF TWO NEW BIOTECH COMPANIES

In collaboration with the Houston Technology Center, the Rice Alliance and the Rice Office of Technology Transfer, IBB piloted the "Commercialize It" Program this year to help IBB researchers commercialize their ideas. For this program, the Houston Technology Center, the Rice Alliance and the Rice Office of Technology Transfer makes one or more of their bioscience and bioengineering commercializing specialists available for sessions throughout the semester to discuss and evaluate commercialization options for devices and processes that are emerging from the IBB with any faculty, staff or senior students. These informal sessions are either one-on-one or with small group discussions and additional or subsequent meetings can be set up as necessary.

IBB's Commercialize It has helped spawn two new biotech companies in Houston: Nano 3-D Biosciences (n3D) and Houston Medical Robotics (HMR). The IBB faculty involved with n3D include: **Dr. Tom Killian**, Associate Professor of Physics and Astronomy, and **Dr. Robert M. Raphael**, Associate Professor of Bioengineering. Interestingly, Drs. Killian and Raphael first collaborated together with support from an IBB Hamill Innovation Award given in 2006. The IBB faculty involved with HMR includes **Dr. Marcia K. O'Malley**, Assistant Professor of Mechanical Engineering. Thanks to connections formed via Commercialize It, n3D and HMR are client companies of the Houston Technology Center.



Dr. Tom Killian (left) and Dr. Robert M. Raphael (right), IBB Faculty & Two of the CoFounders of Nano 3-D Biosciences

n3D's goal is to commercialize and develop products and services utilizing their new Bio-Assembler technology. This new 3 dimensional cell-culturing technology will overcome current research and development obstacles created by the lack of an *in vitro* or test-tube cell-culturing platform that mimics the natural or *in vivo* environment. The most common method for culturing cells today is on the 2 dimensional (2D) surface of a Petri dish. But 2D culturing significantly modifies cell properties, which leads to inaccurate drug-screening results on poten-

tial efficacy and toxicity. Furthermore, tissues grown in 2D often lack the characteristics needed for developing tissue regeneration therapies. n3D's Bio-Assembler offers *in vitro* culturing of three-dimensional tissue samples using magnetic levitation, which overcomes the drawbacks of existing 3D cell-culturing technologies. Among other capabilities, it allows manipulation of tissue sample shape in a scaffoldless architecture that offers new opportunities for regenerative medicine. This exciting new company hopes to create the industry standard for three dimensional, *in vitro* cell culturing and apply this technology to drug discovery and regenerative medicine.

Along with the unique robotic and micro mechanical design and control skills of Dr. O'Malley, HMR has assembled a highly respected group of medical professionals. The team also consists of renowned cardiothoracic surgeon and medical device innovator **Dr. William E. Cohn**, distinguished pulmonary / critical care physician **Dr. J. Patrick Herlihy**, and critical care / ICU nurse **Mr. K. Wayne Rennicks**.



Dr. Marcia K. O'Malley, IBB Faculty & A CoFounder of Houston Medical Robotics

HMR, working closely with the Houston Technology Center, is developing a medical device that will allow rapid, safe and accurate access to central venous circulation. The primary goal of the device is to safely expedite the placement of a plastic tube or catheter to enable the monitoring of hemodynamic parameters, and to allow the delivery of medicines, intravenous fluid, and blood and blood products to the patient. Currently when vascular access like this is required, complications often develop. The procedure is very often time consuming and multiple attempts are involved. Even with the high degree of skill necessary to perform this procedure, and under the best circumstances when ultrasound imaging is used to locate a suitable blood vessel, the risk elements are not entirely eliminated. HMR's technology will automate much of the central venous access process. Vascular images will be integrated into the control of robotic elements. The automated system will interpret the images, make penetration judgments, and deploy the needle and catheter components. The automation of vascular catheter placement will reduce risks and the time to life saving therapy. This device will become a welcome addition to the tools used by physicians in operating rooms, intensive care units and emergency departments and is sure to be very well received by patients who undergo the procedure.

IBB is delighted with the success of Commercialize It and plans to continue this program. The next Commercialize It is scheduled for January 29, 2009 from 2-3 PM at Rice's Brochstein Pavillion.



**Institute of Biosciences and Bioengineering, Rice University
MS 144
P.O. Box 1892
Houston, TX 77251-1892
E-mail: ibb@rice.edu**

**Check out our website!
<http://ibb.rice.edu>**

UPCOMING IBB EVENTS

November 11, 2008
IBB's NIH Biotech Seminar
Mr. Brent Tarver
Keck Hall 102, Rice U.,
11:00 AM- 12:15 PM

December 2, 2008
IBB's NIH Biotech Seminar
Dr. Eric Nicolalde
Keck Hall 102, Rice U.,
11:00 AM- 12:15 PM

January 14, 2009
IBB's Internship Fair
RMC Grand Hall, Rice U.,
11:30 AM-1:00 PM

January 29, 2009
IBB's "Commercialize It"
Brochstein Pavillion, Rice U.,
2 PM - 3 PM

4th ANNUAL IBB SYMPOSIUM



Dr. Kirby speaks about the CRC.

On June 18, 2008, IBB hosted its 4th Annual IBB Symposium in Rice's Duncan Hall. The Symposium opened with Rice's Vice President for Administration, **Dr. Kevin Kirby**, providing updates on the Collaborative Research Center. **Dr. Rebecca Richards-Kortum**, the Stanley C. Moore Professor of Bioengineering, followed with a talk on impact



Dr. Suh receives her 2008 Hamill Award from Dr. West.

ing global health at Rice. The Symposium also featured lectures from **Dr. Jane Grande Allen**, speaking on heart valves, proteoglycans, and tissue engineering, **Dr. Kevin MacKenzie**, talking on structure and specificity of protein-protein interactions in membranes, **Dr. Braam**, discussing how plants respond to stress, and **Dr. Kenneth Whitney**, focusing on the natural hybridization and adaptation in plants. **Dr. James Moon**, the 2008 IBB Morse Fellow,



Dr. Wong receives his 2008 IBB Medical Award from Dr. West.

were: **Dr. Wong & Dr. Tung**, **Dr. Tkaczyk & Dr. Dickinson**, **Dr. Hartgerink & Dr. Danesh**.

A poster session highlighting the work of IBB student and postdocs followed the Awards Ceremony. The Symposium was capped with a farewell dinner honoring the achievements and contributions of former IBB Director, **Dr. Jennifer West**, who stepped down as IBB Director this past July to become Chair of Rice's Bioengineering Department.

gave a brief account of his research work on the bioengineering of angiogenesis.

After these speeches, the IBB Awards Ceremony commenced and the Hamill Innovation Awardees and the IBB Medical Innovation Awardees were celebrated. The 2008 Hamill Innovators were: **Dr. Bennett & Dr. Kavradi**, **Dr. Grande-Allen & Dr. Lou**, **Dr. Tao & Dr. Kiang**, **Dr. Hafner & Dr. Hartgerink**, **Dr. Silberg & Dr. Suh**. The 2008 IBB Medical Inno-



Outgoing IBB Director, Dr. West, is honored at the IBB Symposium.



POSTER WINNERS FROM THE 4th ANNUAL IBB SYMPOSIUM & 6th ANNUAL IBB NIH BIOTECH RETREAT

Thanks to all who participated and congratulations to the following 4th Annual IBB Symposium poster winners of a \$250 prize awarded to the Best Postdoc, Graduate Student, and Undergraduate Student Poster, and a \$100 prize awarded to the best poster in several research areas. This year's winners are:

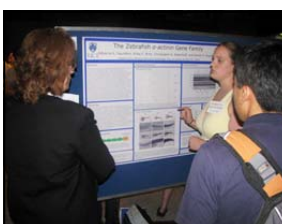
- ◆ **Best Poster by a Postdoctoral Fellow** – **Dr. Xianpeng Cai**, for his poster entitled “Co-production of Riboflavin and Biobutanol in *Clostridium acetobutylicum*.” Dr. Cai is from the Department of Biochemistry and Cell Biology and works in **Dr. Bennett's** laboratory.
- ◆ **Best Poster by a Graduate Student** – **Benjamin Elder**, for his poster entitled “The Effects of Growth Factors and Hydrostatic Pressure in Cartilage Tissue Engineering.” Elder is from the Department of Bioengineering and works in **Dr. Athanasiou's** laboratory.



An aerial shot of the IBB Symposium's Poster Session.

- ◆ **Best Poster by an Undergraduate Student** – **Erol Bakkalbasi**, for his poster entitled “Measuring Stress-induced Mutational Rates in *G.stearothermophilus* Using LacZ Reversion.” Bakkalbasi is from the Department of Biochemistry and Cell Biology and works in **Dr. Shamoo's** laboratory.
- ◆ **Best Poster in the Area of Biochemistry** – **Justin Judd**, for his poster entitled “Engineering Protein Switches that Control Adeno-associated Virus Disassembly for Gene Therapy Applications.” Judd is a graduate student in the Department of Bioengineering and works in **Dr. Suh's** laboratory.
- ◆ **Best Poster in the Area of Genetics** – **Tracy Edwards**, for her poster entitled “Phylogeny of *Dictyostelium discoideum* Based on DNA Sequence: Verifying a Model Organism.” Edwards is a graduate student in the Department of Ecology and Evolutionary Biology and works in **Drs. Queller and Strassmann's** laboratory.

- ◆ **Best Poster in the Area of Biophysics** – **Athanasiou Dousis**, for his posters entitled “Normal-mode Refinement of Anisotropic Thermal Parameters for Potassium Channel KcsA at 3.2 Crystallographic Resolution” and “OPUS-PSP: An Orientation-dependent Statistical All-atom Potential Derived from Side-Chain Packing.” Dousis is a graduate student in the Department of Bioengineering and works in **Dr. Ma's** laboratory.



Poster Judge, Deborah Mansfield (left) listens to Rebecca Saunders (right) present her poster.

- ◆ **Best Poster in the Area of Evolutionary Biology** – **Gerda Saxer**, for her poster entitled “The Effect of Relatedness on the Evolution of Cooperation in the Social Amoeba *Dictyostelium discoideum*.” Saxer is a postdoctoral fellow in the Department of Ecology and Evolutionary Biology and works in **Drs. Queller and Strassmann's** laboratories.

- ◆ **Best Poster in the Area of Cell and Tissue Engineering** – **Elizabeth Stephens**, for her posters entitled “Utilization of Fibronectin for the Isolation of Specific Valve Cell Subpopulations: Application for the Study of Mitral Valve Disease” and “Unique Protein Expression Profiles in Normal and Pathological Pediatric Valves: Implications for a Tissue Engineered Heart Valve.” Stephens is a graduate student in the Department of Bioengineering and works in **Dr. Grande-Allen's** laboratory.



Dr. West presents Ben Elder with his poster award.

- ◆ **Best Poster in the Area of Cell Biology** – **Rebecca Saunders**, for her poster entitled “The Zebrafish α -actinin Gene Family.” Saunders is an undergraduate student in the Department of Biochemistry and Cell Biology and works in **Dr.**

(Continued on page 3)

POSTER WINNERS FROM THE 4th ANNUAL IBB SYMPOSIUM & 6th ANNUAL IBB NIH BIOTECH RETREAT—Cont.

(Continued from page 2)



Dr. West presents Erol Bakkalbasi with his poster award.

Wagner's laboratory.

IBB is grateful to **Vinson & Elkins** for sponsoring some of these awards and the following 4th Annual IBB Symposium Poster Judges: **Mr. Bill Gottfried**, President and Founder of Gottfried International, Inc.; **Ms. Deborah Mansfield**, Director of the Life Science Program for The Houston Technology Center; **Dr. Brian Phillips**, Biological Sciences Licensing Associate for Rice's Office of

Technology Transfer; **Dr. Carolyn Nichol**, Associate Director of Education for CBEN; **Dr. Stacey Kalovidouris**, Executive Director of IBB.

Also, this past June, IBB held its 6th Annual IBB NIH Biotechnology Training Program Retreat and Poster Session. This year's poster winners are:

- ◆ **1st Place IBB NIH Biotech Poster Winner – Stephanie Nemir**, for her poster entitled "PEGDA Hydrogels with Patterned Rigidity for the

Manipulation of Cellular Behavior." Nemir is a graduate student in the Department of Bioengineering and works in **Dr. West's** laboratory.

- ◆ **2nd Place IBB NIH Biotech Poster Winner – Peter Nguyen**, for his poster entitled "Optimizing the Design of Protein Fragment Complementation Assays by Selecting Proteins with Varying Stability." Nguyen is a graduate student in the Department of Biochemistry and Cell Biology and works in **Dr. Silberg's** laboratory.



Ryan Schweller listens to NIH Trainee, Michael Cuchiaro present his poster.

IBB is grateful to the 6th Annual IBB NIH Biotechnology Poster Judges: **Dr. Sunil Chada**, Director of Research & Development at Introgen Therapeutics, Inc.; **Dr. Carol Farhangfar**, Director of Research Planning and Development at M.D Anderson Cancer Center's Division of Cancer Medicine; **Mr. Jason Moore**, Vice President of PLX Pharma, Inc.



THE 2008 EDGAR O'REAR TRAVEL GRANT RECIPIENTS

Edgar O'Rear Travel Grants are given to outstanding graduate students of IBB faculty members. Selected recipients receive funds for costs associated with attending a scientific conference. Students are nominated by their IBB advisor who submits the student's curriculum vitae, the name and description of the conference that the student would attend, a brief statement from the advisor regarding the benefits of this meeting for the student, and a budget of anticipated costs for attending the conference.

The 2008 Edgar O'Rear Travel Grant recipients are:

- ◆ **Debbie Brock**, an Ecology and Evolutionary Biology graduate student, will attend the Society for the Study of Evolution meeting.
- ◆ **Drew Bryant**, a Computer Science and Bioengineering graduate student, will attend the 2008 IEEE Conference on Bioinformatics and Biomedicine.
- ◆ **Juli Carrillo**, an Ecology and Evolutionary Biology graduate student, will be attend the International Workshop and Training Course on Invasive Species.
- ◆ **Clive Chen**, a Bioengineering graduate student, will attend the American Institute of Chemical Engineers Annual Meeting.
- ◆ **Andrew Coughlin**, a Bioengineering graduate student, will attend the American Institute of Chemical Engineers Annual Meeting.
- ◆ **Andria Denmon**, a Biochemistry and Cell Biology graduate student, will attend the RNA Society Annual Meeting.
- ◆ **Nolan Harris**, a Physics and Astronomy graduate student, will attend the meeting of the American Physical Society.
- ◆ **Katherine Horn**, an Ecology and Evolutionary Biology

graduate student, will attend the International Workshop and Training Course on Invasive Species.

- ◆ **Joel Huegel**, a Mechanical Engineering and Materials Science graduate student, will attend the HRI 2009 (Human-Robot Interaction) Conference.
- ◆ **Faiza Hussain**, a Biochemistry and Cell Biology graduate student, will attend the Gordon Conference on Metals in Biology
- ◆ **Anu Maharjan**, a Biochemistry and Cell Biology graduate student, will attend the Annual Meeting of the Society for Leukocyte Biology.
- ◆ **Irene Martinez**, a Chemical and Biomolecular Engineering graduate student, will attend the American Institute of Chemical Engineers Annual Meeting.
- ◆ **Sarah Ratzel**, a Biochemistry and Cell Biology graduate student, will attend the Annual American Institute of Chemical Engineers Annual Meeting.
- ◆ **Darren Roblyer**, a Bioengineering graduate student, will attend the 2009 SPIE Photonics West Conference.
- ◆ **Elizabeth Stephens**, a Bioengineering graduate student, will attend the American Heart Association Conference.
- ◆ **Nadhi Thekkek**, a Bioengineering graduate student, will attend the 2009 SPIE Photonics West Conference.
- ◆ **Yu-Chang Tsai**, a Biochemistry and Cell Biology graduate student, will attend the Keystone Symposium on Plant Sensing, Response and Adaptation to the Environment.
- ◆ **Kostas Tsekouras**, a Chemistry graduate student, will attend the 2009 Biophysical Society Annual Meeting.



IBB THANKS ITS SPONSORS

Rice University / HHMI / NSF / NIH / The Hamill Foundation / The Sid W. Richardson Foundation / The Edgar O'Rear Foundation / The Mary Morse Scholarship Fund / AlphaDev LLC / Gottfried International Inc. / The Houston Technology Center / Vinson & Elkins

UPCOMING HOUSTON TECHNOLOGY CENTER, RICE ALLIANCE, & BIOHOUSTON EVENTS

November 5-7, 2008
BioHouston's Texas Life Science Conference

November 5, 2008
BioHouston's BioBootCamp

November 14, 2008
Gulf Coast Medical Device Manufacturers' Course
"Reimbursement for Emerging Medical Technologies"

November 18, 2008
Houston Technology Center's Gulf Coast Innovation Conference

January 17, 2009
The Houston Technology Center's BioCamp Houston 2009 - an Unconference

February 12, 2009
Rice Alliance Nanotechnology Venture Forum

IBB'S 2008 SUMMER UNDERGRADUATE RESEARCH POSTER SESSION

Undergraduates from nationwide colleges participating in IBB's two summer programs, the HHMI Bionanotechnology and the NSF REU Cellular Engineering Internships, displayed their research work at the 2008 IBB Summer Undergraduate Research Poster Session. For more information on these internships please visit the following websites: <http://www.hhmi.rice.edu> and <http://www.nsfreu.rice.edu>. The following interns won top prize (\$100 each) for their posters:

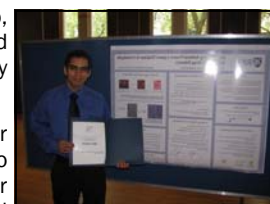


Drs. West and Kalovidouris stand with the HHMI, NSF REU and RET interns.

◆ **Sonia Bendjemil**, a 2008 HHMI Bionanotechnology Summer Intern who worked in **Dr. Richards-Kortum's** lab, for her poster "Developing Targeted Optical Contrast Agents for the Early Detection of Oral Cancer."

◆ **Renan Moreira**, a 2008 HHMI Bionanotechnology Summer Intern who worked in **Dr. Ajayan's** lab, for his poster "Fabrication of Arrays of Carbon Nanotubes for Possible Photonic Crystal."

◆ **Brian Hite**, a 2008 NSF REU Cellular Engineering Summer Intern who worked in **Dr. Diehl's** lab, for his poster "Constructing Artificial Protein Ligand Displays to Investigate Intracellular Drug Delivery."



Brian Hite displays his award next to his poster.



PROFILES OF THE CURRENT NIH BIOTECH TRAINING GRANT GRADUATE STUDENTS

The Biotechnology Training Program for PhD graduate students was established by an NIH Training Grant awarded to IBB in 1991. The goal of the training grant is to train graduate students from various disciplines in the broad aspects of biotechnology and in the industrial application of these techniques. The program provides stipends and research support for graduate students interested in a research career in biotechnology. It allows students access to the tools of biotechnology while specializing in a particular research area. Students receive training in broad areas of biotechnology that relate to commercial application of these techniques. A core interdisciplinary courses is offered and includes a three-to-six month internship in an industrial setting. More information on this program can be found at: <http://nihbiotech.rice.edu>.

The 2008-2009 NIH Trainees are profiled here:



Erica Bakota

Erica Bakota, a second year chemistry graduate student in **Dr. Jeffrey Hartgerink's** group, is researching the use of small peptides in cell scaffolds for dental applications. These peptide scaffolds may induce the cells present in the center of the tooth to proliferate, differentiate, and subsequently secrete minerals, effectively regenerating damaged or decayed human teeth. These peptide scaffolds can

house a number of drugs, including dexamethasone and antibiotics. One goal of her project is to allow these drugs to be attached to the scaffold in a way that allows extended release of the drugs. Erica's other projects include the use of peptides to solubilize single-walled carbon nanotubes.

Erica received her BS in chemistry and BA in German and Slavic Studies from Rice University in May 2006. Upon completing her PhD at Rice, Erica plans to complete a postdoctoral fellowship in chemistry.



Eric Botello

Eric Botello is a fourth year Physics graduate student conducting research in **Dr. Ching-Hwa Kiang's** laboratory. Eric uses the Atomic Force Microscope to obtain dynamic force spectroscopy at the single-molecule level. His research project involves investigating the force distributions of unfolding/stretching of the blood proteins, von Willebrand factor (VWF), necessary in normal hemostasis, and the ultra-large form of VWF (ULVWF), which has been suggested to be directly related to the disorder, thrombotic thrombocytopenic purpura. These studies will shed light on the structure-function relationship of VWF and ULVWF.

Eric graduated magna cum laude from Texas State University's - San Marcos in May 2004 with a BS in Physics. After he completes his PhD at Rice, Eric plans to pursue a career in the biotechnology industry or academics.



Emily Burdett

Emily Burdett, a second year bioengineering graduate student, currently works in both **Dr. Tony Mikos'** lab at Rice and in **Dr. Joseph Ludwig's** lab in the Department of Sarcoma Medical Oncology at M.D. Anderson Cancer Center, as part of the HHMI Med Into Grad Fellowship. She is working to develop an *in vitro* 3-D tumor model that accurately mimics the cancer cell growth and signaling seen *in vivo* so that it can be used for more predictive preclinical drug testing.

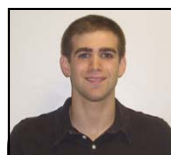
Emily graduated in 2007 from the University of Oklahoma with a B.S. in Chemical Engineering. After she completes her PhD, Emily plans to pursue an academic career, where she hopes to continue applying tissue engineering strategies within the field of cancer medicine.



Michael Cuchiara

Michael Cuchiara, a third year Bioengineering graduate student in **Dr. Jennifer West's** research group, is developing biomimetic hydrogels for microvascular tissue engineering applications. More specifically, Michael is developing microfabrication techniques, such as soft lithography, for directing perfusable, 3D microvascular networks within bioactive poly(ethylene glycol) hydrogels. Michael also hopes to utilize this technology in order to address fundamental cell biology questions through direct manipulation of the cell-cell and cell-matrix microenvironment.

When he was an undergraduate at Arizona State University, Michael majored in Bioengineering and graduated Summa Cum Laude in May 2006. After successfully completing the PhD program at Rice, Michael hopes to work for a medical device or biotechnology start-up company in order to facilitate the ground up development of clinical therapeutics or diagnostics which seek to improve the human quality of life.



Benjamin Elder

Benjamin Elder, a fourth year Bioengineering graduate student in **Dr. Kyriacos Athanasiou's** group and sixth year student in the joint Rice/Baylor MD/PhD program, is working on tissue engineering articular cartilage, and recently defended his thesis, titled "Optimizing a Scaffoldless Approach for Cartilage Tissue Engineering." Specifically, Ben examined the self-assembling process, a scaffoldless approach to cartilage tissue engineering. The use of exogenous growth factor application, including BMP-2, IGF-I, and TGF-β1, alone and in combination was examined. Additionally, optimal magnitudes, frequencies, and application

(Continued on page 5)

PROFILES OF THE NIH BIOTECH TRAINING GRANT GRADUATE STUDENTS –Cont.

(Continued from page 4)

times for hydrostatic pressure were determined, and combined with optimized growth factor conditions, to yield articular cartilage constructs with biomechanical and biochemical properties spanning native tissue values.

As an undergraduate at Yale University, Ben majored in Molecular Biophysics and Biochemistry and graduated *magna cum laude* with both B.S. and M.S. degrees with honors in May 2003, as well as induction into Phi Beta Kappa. Ben will return to Baylor College of Medicine in November to complete his final 1.5 years of medical school. He then plans to complete a Neurosurgery residency with the eventual long-term goal of practicing academic Spinal Neurosurgery such that he can translate tissue engineering strategies for disorders of the spine from the bench to the bedside.



Christy Franco

Christy Franco, a third year Bioengineering graduate student in **Dr. Jennifer West's** lab, is working to create biomimetic scaffolds for brain tissue engineering. Through the use of functionalized hydrogels, Christy is investigating the effects of various adhesion peptides, growth factors, and co-culture conditions on the expansion and differentiation of neural stem cells. Her recent work also involves the adaptation of this polymer system

into an implantable device for the delivery and support of neural stem cells to treat a variety of brain injuries. Through an international collaboration, the cell-laden scaffold is currently being evaluated in an animal model for stroke at the King's College in London.

In May 2006, Christy completed her undergraduate degree with highest honors as part of the first graduating class in Biomedical Engineering at The University of Texas at Austin. After obtaining her PhD at Rice University, Christy plans to begin work in industry in an area of tissue engineering. She hopes to eventually obtain an MBA and pursue a career in engineering management.



Justin Judd

Justin Judd, a second year Bioengineering graduate student in **Dr. Jung-hae Suh's** lab, is using rational and combinatorial protein design schemes to construct novel biomaterials using adeno-associated virus as a platform scaffold.

Justin graduated in 2005 from the University of California, Davis with a BS in Neurobiology, Physiology, and Behavior. After graduation, he worked for two years as a Staff Research Associate at the California National Primate Research Center, engaging in genetic engineering projects related to gene therapy. After completion of his PhD at Rice, Justin will either pursue an academic appointment or an industrial career in biotechnology. His broad research interests encom-



Todd Mollan

pass synthetic biology, including applications in biorenewable energy and carbon sequestration, as well as nanotherapeutics.

Todd Mollan, a fourth-year Biochemistry and Cell Biology Department graduate student in **Dr. John S. Olson's** group studies a protein called Alpha-Hemoglobin Stabilizing Protein (AHSP). This protein is thought to facilitate hemoglobin synthesis in the erythroid precursor cells of many mammals. Todd's work involves using various rapid mixing and spectroscopic techniques to probe AHSP function *in vitro*, and he also evaluates whether AHSP is suitable for use in enhancing heterologous expression yields of recombinant hemoglobins as part of the Olson Laboratory's efforts to develop a blood substitute.

Todd received a BA in biology and philosophy from Augustana College (Rock Island, IL) in 2001. Following graduation, he attended DePaul University College of Law (Chicago, IL) and received a JD in 2004.

Todd practiced law for one year in Chicago, IL, and following graduation from Rice University, he plans to work in patent law.



Donald Responde

Donald Responde, a second year Bioengineering graduate student in **Dr. Kyriacos Athanasiou's** lab, studies articular cartilage tissue engineering. In particular, he works on adding exogenous agents to improve a novel self-assembly process.

Donald graduated in 2007 from the University of Washington with a B.S. in Bioengineering. After he completes his doctorate at Rice, Donald plans to pursue a postdoctoral fellowship.



Kelsey Rosbach

Kelsey Rosbach, a third year bioengineering graduate student in **Dr. Rebecca Richards-Kortum's** lab, is developing and validating contrast agents to enhance the optical detection of oral cancer. She uses fluorescent probes targeted to characteristics of oral cancer such as increased metabolism or increased epidermal growth factor receptor expression to detect potentially malignant oral lesions. Wide-field imaging, high-resolution imaging, and spectroscopy are used to detect fluorescent signal in freshly resected oral tissue. The goal of Kelsey's research is to develop a fast, inexpensive and non-invasive method of detecting oral cancer.

Kelsey graduated with highest honors from the Georgia Institute of Technology in May of 2006, earning a B.S. in Biomedical Engineering. After completing her Ph.D. program at Rice, Kelsey plans to work as a product specialist in the biotechnology industry. Eventually, she hopes to work for a non-profit corporation that uses biotechnology to address global health issues.



PROFILES OF IBB FACULTY



Dr. Rebekah Drezek

Dr. Rebekah Drezek, an Associate Professor in Bioengineering and in Electrical and Computer Engineering, focuses on the development of photonics-based molecular imaging technologies for the screening, diagnosis and monitoring of disease. Specializing in oncology applications, the projects of Dr. Drezek's group include development of novel optical spectroscopy and imaging instrumentation for tissue diagnosis; validating developed optical instrumentation; advancement of molecular specific optical contrast agents; experimental studies to elucidate the biophysical origins of measured optical signals; and computational modeling of light interaction with tissues.

Dr. Drezek joined the faculty at Rice in 2002 after earning her Ph.D. in Electrical Engineering from the University of Texas at Austin. Dr. Drezek has received the Houston Society for Engineering in Medicine and Biology Outstanding Young Scientist Award (2003), MIT TR100's

Top 100 Young Innovators Award (2004), Association for the Advancement of Medical Instrumentation Career Achievement Award (2005), and The Department of Defense Breast Cancer Research Program Era of Hope Scholar Award (2007). She was one of 100 U.S. scientists invited to attend the National Academy of Engineering Frontiers of Engineering event in 2005 and was one of 16 scientists invited to speak at the meeting in 2006. This year, she won the American Society for Photobiology Young Investigator Award and the Outstanding Young Alumni Award by the University of Texas at Austin Cockrell School of Engineering. One of



Dr. Joan Strassmann

Dr. Drezek's most recent publications (*J. Biomed. Opt.* **2007**, 23(4), 0440112) addresses how angularly variable fiber geometry can resolve spatially specific spectral signatures of tissue pathology by interpreting and analyzing the reflectance spectra of increasingly dysplastic epithelial tissue in reflectance-mode Monte Carlo simulation.

Dr. Joan Strassmann, Chair and Harry C. and Olga K. Weiss Professor in Ecology and Evolutionary

(Continued on page 6)

PROFILES OF IBB FACULTY— Cont.

(Continued from page 5)

Biology, studies how cooperative alliances come to be, how conflicts are subsumed into cooperation, what conflicts remain, and how they influence sociality. Dr. Strassmann has investigated alliances in several species of social wasps and stingless bees. Currently she is focusing on the social amoebae (*Dictyostelium*), looking at genetic conflicts of interest in the social stage in several species, kin discrimination, experimental evolution, genomics, and genes that influence social behavior, and their evolutionary history. Her group is in the process of sequencing three more *Dictyostelium* genomes and they are interested in the evolution of DNA microsatellites which are important markers for genetic relatedness and make up nearly 10% of the *Dictyostelium* genome.

Dr. Strassmann joined the faculty at Rice in 1980 after completing a NSF Postdoctoral Fellowship at the University of Texas at Austin, where she also earned her Ph.D. in Zoology. While at Rice, Dr. Strassmann has won a number of awards including Fellowships and Elected Memberships in the Animal Behavior Society (2002), American Association for the Advancement of Science (2004), Houston Philosophical Society (2007) and the American Academy of Arts and Sciences (2008). She currently serves on the Editorial Board of the following journals: *Ecology*, *Ethology*, *and Evolution*, *BMC Evolutionary Biology*, and *Journal of Evolutionary Biology*.



Dr. Sibani Lisa Biswal

One of Dr. Strassmann's most recent publications (*Nature*, **2008**, *451*, 1107-1110) describes how facultative cheater mutants reveal the genetic complexity of cooperation in social amoebae.

Dr. Sibani Lisa Biswal, Assistant Professor in Chemical and Biomolecular Engineering, focuses on understanding and designing interactions among nanoparticles, biomolecules and surfaces. Her research interests fall into the following areas: micro- and nano-scale transport, interfacial phenomena, and self-assembly in colloidal, polymer and biological systems.



Dr. Richard Gomer

Dr. Biswal joined the faculty at Rice in 2006 after completing her postdoctoral fellowship at the University of California at Berkeley. She earned her Ph.D. in Chemical Engineering from Stanford University. While at Rice, Dr. Biswal has received a 2007 Young Investigator Award from the Office of Naval Research for her proposal "Building Responsive and Structured Assemblies with Magnetic Colloids." Dr. Biswal's most recent publication (*Clinics in Laboratory Medicine*, **2007**, *1*, 36-38) uses a microcantilever array for detecting phase transitions and stability of DNA.

Dr. Richard Gomer, Professor of Biochemistry and Cell Biology and Co-Founder of Promedior, uses biochemistry and cell biology to develop potential therapeutics for wound healing and fibrosing diseases. His research accomplishments include finding that a cell-cycle dependent musical chairs mechanism regulates initial cell-type choice in *Dictyostelium* development, identifying and purifying several eukaryotic cell-density (quorum) sensing factors, developing shotgun antisense as a genetic tool, and elucidating the physics and biochemistry of a morphogenetic rearrangement in *Dictyostelium*. He also has designed and built detector and data systems for astrophysics research. A chance meeting with Dr. Darrell Pilling led to the discovery of the regulatory mechanisms of fibrocyte differentiation and their role in fibrotic pathology. These findings led Dr. Gomer to co-found Promedior, a company that develops therapeutics to treat fibrosis.

Dr. Gomer joined the faculty at Rice in 1988 after completing his NIH and American Cancer Society postdoctoral fellowships at the University of California at San Diego. He earned his Ph.D. in Biology from the California Institute of Technology. Dr. Gomer was an HHMI Investigator and was a member of the NIH Surgery, Radiology and Bioengineering special study section. Currently he is on the scientific advisory boards of Trellis and Promedior, the company he helped co-found. One of Dr. Gomer's most recent publications (*J. Cell Sci.*, **2008**, *121*, 2473-2480) reports that the secreted *Dictyostelium* protein CfaD is a chalone.



THE SOUTH TEXAS ISD RECOGNIZES IBB'S SUMMER ACADEMY WITH AN EXCELLENCE AWARD

In August, IBB's Executive Director, **Dr. Stacey Kalovidouris**, received, on behalf of IBB, the "RICE STISD Collaborating To Create A Culture of Excellence For South Texas Independent School District Students" Award from The South Texas ISD Board of Directors. **Dr. Maria Guerra**, STISD's superintendent presented Dr. Kalovidouris with this award during the August STISD Board of Directors meeting.

This award from the STISD honors IBB's Summer Academy which brings high school students and their teacher-sponsors to the Rice campus over the summer for an intensive program designed to excite pre-college students about science, engineering, and biotechnology. This two-week residential program reflects IBB's commitment to increasing the number of bright, young students entering science and engineering university programs throughout the country. The majority of summer academy students, each is of whom is paired with a Rice graduate student mentor, comes from three high schools: The Science Academy of South Texas (which is part of the STISD), Milby High School and



Dr. Stacey Kalovidouris (left) receives an Excellence Award for IBB's Summer Academy from Dr. Maria Guerra (right), the Superintendent of Schools for South Texas

Youth Engaged in Service (YES) College Preparatory School.

The Summer Academy includes lectures, laboratory tours, and hands-on laboratory project demonstrations including labs in physiology, chemistry, microscopy, physics, robotics, cell culture, and plant ecology. **Dr. Mary Tobin**, a lecturer in Rice's Department of English, runs a series of communications workshops where the students prepare college applications essays and meet with Rice undergraduate admissions officers to learn about the college application process. Students spend two hours a day in a Rice laboratory and prepare and present a poster summarizing the science and scientific techniques that they were exposed to at Rice. Over the past 16 years, IBB has had 439 students go through this program and, of those IBB can track (293), all enrolled in college and 63 went on to graduate school. Twenty-three of these graduated from Rice, 18 of those in a STEM (Science, Technology, Engineering and Math) discipline.



A group photo of the South Texas ISD's Science Academy of South Texas high school students and teacher sponsors participating in this past summer's IBB Summer Academy.



WELCOME NEW IBB FACULTY

Please welcome the following Rice faculty doing bio-related research who have been invited to join IBB this year:

Dr. Jeffrey Jacot, Assistant Professor in Bioengineering with a joint appointment with Texas Children's Hospital Division of Congenital Heart Surgery, received a B.S. in Chemical Engineering from the University of Colorado at Boulder, a Ph.D. in Biomedical Engineering from Boston College, and was a Postdoctoral Scholar at University of California at San Diego. His research efforts will focus on modeling cardiac mechanics in congenital heart disease and developing regenerative cardiac therapies for the treatment of pediatric heart disease.

Dr. Dan Carson, the newly appointed Dean of the Wiess School of Natural Sciences and Professor of Biochemistry and Cell Biology, received a B.S. in Biology from the University of Pennsylvania, a Ph.D. in microbiology from Temple University and was a postdoctoral fellow at Johns Hopkins University School of Medicine. Dr. Carson will assume his new position at Rice in early 2009 and currently is the Trustees Distinguished Professor and Chair of the Department of Biological Sciences at the University of Delaware. His research interests include the molecular basis by which mammalian embryos implant into the uterine wall.

Dr. Mary Cindy Farach-Carson, the newly appointed Associate Vice Provost for Research and Professor of Biochemistry and Cell Biology, received a B.S. *magna cum laude* in Biology from the University of South Carolina, a Ph.D. in Biochemistry from the Medical College of Virginia at Virginia Commonwealth University and served as a postdoctoral fellow at Johns Hopkins University and at the University of Texas M.D. Anderson Cancer Center. Dr. Farach-Carson will assume her new position at Rice in late 2009 and currently is the Director for the Center for Translational Cancer Research at the University of Delaware. Her current research collaborations involves engineering artificial salivary glands for cancer patients whose glands are destroyed while receiving radiation treatment of the head and neck

Dr. Nicholas Putnam, Assistant Professor of Ecology and Evolutionary Biology, received his Sc.B. *magna cum laude* in Physics from Brown University, a Ph.D. in Physics with a Designated Emphasis in Genomic and Computational Biology from University of California at Berkeley, and was a postdoctoral fellow at Lawrence Berkeley National Laboratory and University of California at Berkeley. The goal of his research is to reconstruct ancestral genomes, pathways, and regulatory networks and use these reconstructions to test the predictions of models of evolution and functional hypotheses.



CRC UPDATE

The Collaborative Research Center (CRC)'s shell and core is approximately 65% complete with a targeted substantial completion date of March 2009. Curtainwall and brickwork has commenced, the steam and chilled water pipes under the University are installed and the electrical service is currently underway.

The CRC, a building with the purpose of bringing Rice scientists together with colleagues in the medical center so that they may work across disciplines on research aimed at achieving fundamental

breakthroughs in the biosciences and bioengineering, has already garnered support from the Dunn Foundation who has recently awarded Rice \$3 million to jump-start collaborative research studies. Similarly, the Hamill Foundation, who established analogous innovation grants through Rice's IBB, has pledged \$1 million to support the offices of IBB within the CRC.



A recent photo of the CRC.



FACULTY AWARDS & PROMOTIONS

Congratulations to the following IBB faculty for their recent awards:

- ◆ **Dr. Kyriacos Athanasiou's** invention, the Vidacare Corp's EZ-IO, is the Wall Street Journal's Gold winner in the 2008 Innovation Awards Competition. Dr. Athanasiou is the Karl F. Hasselmann Professor of Bioengineering.
- ◆ **Dr. Pedro Alvarez**, the George R. Brown Professor and Chair of Civil and Environmental Engineering, has won the Malcolm Pirnie/AEESP Frontiers in Research Award, which each year honors an individual who has advanced environmental engineering and science through research leadership. The award is given by the Association of Environmental Engineering and Science Professors.
- ◆ **Dr. Michael Diehl**, Assistant Professor of Bioengineering and Chemistry, received a 2008 Research Excellence Award from the W.M. Keck Foundation.
- ◆ **Dr. Rebekah Drezek**, Associate Professor of Bioengineering, has been elected to the American Institute for Medical and Biological Engineering College of Fellows.
- ◆ **Dr. Naomi Halas**, the Stanley C. Moore Professor of Electrical and Computer Engineering, has won the Research Excellence Award from the University of Pennsylvania's Nano/Bio Interface Center. This award is one of nanotechnology's top academic honors. Naomi was selected for her many contributions in the innovative synthesis of nanostructures.
- ◆ **Dr. Rebecca Richards-Kortum**, the Stanley C. Moore Professor of Bioengineering, was inducted as fellow in the Biomedical Engineering Society this past October, has been selected to receive the IEEE Educational Activities Board Vice President Recognition Award, the EAB's highest honor, and has been given a 2008 IMPACT Award from the Rice Women's Resource Center.

- ◆ **Dr. Volker Rudolf**, Assistant Professor of Ecology and Evolutionary Biology, has won a 2008 American Society of Naturalists' Young Investigator Award to "recognize outstanding and promising work by young investigators."
- ◆ **Drs. Ka-Yiu San** and **Ramon Gonzalez** are part of an \$18.5 million NSF-funded Center for Biorenewable Chemicals.
- ◆ **Dr. Ronald Sass**, Professor Emeritus of Ecology and Evolutionary Biology, received a certificate from the Intergovernmental Panel on Climate Change (IPCC) for his contributions to research on global warming that helped the IPCC and former Vice President Al Gore win the 2007 Nobel Peace Prize.
- ◆ **Dr. Moshe Vardi**, the Karen Ostrum George Professor in Computational Engineering, has received a 2008 Presidential Award from the Association for Computing Machinery (ACM).
- ◆ **Dr. Jennifer West**, the Isabel C. Cameron Professor and Chair of Bioengineering, was inducted as a fellow in the Biomedical Engineering Society this past October.
- ◆ **Drs. Kate Beckingham**, **Bruce Weisman**, **Leonardo Duenas-Osorio**, **Devika Subramanian**, **Jane Grande-Allen**, **Joel Moake**, **Jianpeng Ma**, **Ka-Yiu San**, **George Bennett**, **Yousif Shamoo**, **Joan Strassmann** and **David Queller** have won 2008 Rice Faculty Initiative Fund Awards.

Congratulations to the following IBB faculty who were promoted as of July 1, 2008.

- ◆ Promoted from associate to full professor were: **Dr. Andreas Luttge**, Earth Science; **Dr. Dan Mittleman**, Electrical and Computer Engineering; and **Dr. Evan Siemann**, Ecology and Evolutionary Biology.
- ◆ Promoted from assistant to associate professor were: **Dr. Jane Grande-Allen**, Bioengineering; **Dr. Jason Hafner**, Physics and Astronomy; **Dr. Jeffrey Hartgerink**, Chemistry; and **Dr. Rob Raphael**, Bioengineering.



RESEARCH HIGHLIGHTS

Dr. Pedro Alvarez and collaborators from Spain report diclofenac removal from water with ozone and activated carbon. More in: Beltran, F.J., Pocostales, P., Alvarez, P., Oropesa, A. *J. Hazard Mater.* **2008**, Jul 15.

Dr. Pulickel Ajayan and collaborators from Thailand investigate electrochemical sensing properties of electrodes fabricated with ultralong aligned multi-walled carbon nanotube bundles. This work was published in: Punbusayakul, N., Ci, L., Talapatra, S., Susareungchai, W., Ajayan, P.M. *J. Nanosci. Nanotechnol.* **2008**, 8(4), 2085-2090.

Dr. Kyriacos Athanasiou's lab determines the effects of temporal hydrostatic pressure on the properties of scaffoldless bovine articular cartilage constructs. This work was presented in: Elder, B.D., Athanasiou, K.A. *Tissue Eng. Part A* **2008** Oct. 2.

Dr. Andrew Barron's group describes the growth, new growth and amplification of carbon nanotubes as a function of catalyst composition. This was published in: Crouse, C.A., Maruyama, B., Colorado, R., Jr., Back, T., Barron, A.R. *J. Am. Chem. Soc.* **2008**, 130, 7946-7954.

Dr. Bonnie Bartel's group reports that *Arabidopsis* iba response5 suppressors separate responses to various hormones. This work was presented in: Strader, L.C., Monroe, Augustus, M., Rogers, K.C., Lin, G.L., Bartel, B. *Genetics*, **2008** Oct. 1.

Dr. Kathleen Beckingham's group shows that yuri gagarin is required for actin, tubulin and basal body functions in *Drosophila* spermatogenesis. More in: Texada, M.J., Simonette, R.A., Johnson, C.B., Deery, W.J., Beckingham, K.M. *J. Cell Sci.* **2008**, 121, 1926-1936.

Dr. Janet Braam's group in collaboration with researchers from the University of Connecticut show innate immunity signaling in *Arabidopsis* where cytosolic Ca²⁺ elevation is linked to downstream nitric oxide generation through the action of calmodulin or a calmodulin-like protein. More information in: Ma, W., Smigel, A., Tsai, Y.C., Braam, J., Berkowitz, G.A. *Plant Physiol.* **2008** Aug 8.

Dr. Dan Carson describes the molecular and cell biology of embryo-uterine interactions involved in mammalian embryo implantation. This was published in: Carson, D.D. *Semin. Cell Dev. Biol.* **2008**, 19, 160.

Dr. John W. Clark Jr.'s lab presents a mechanical model of the human heart relating septal function to myocardial work and energy. This was reported in: Luo, C., Ware, D.L., Zwischenberger, J.B., Clark, J.W., Jr. *Cardiovasc. Eng.* **2008**, 8(3), 174-184.

Dr. James Coleman and collaborators in Nevada report on the prolonged suppression of ecosystem carbon dioxide uptake after an anomalously warm year. This work was published in: Arnone, J.A. 3rd, Verburg, P.S., Johnson, D.W., Larsen, J.D., Jasoni, R.L., Lucchesi, A.J., Batts, C.M., von Nagy, C., Coulombe, W.G., Schorran, D.E., Buck, P.E., Braswell, B.H., Coleman, J.S., Sherry, R.A., Wallace, L.L., Luo, Y., Schimel, D.S. *Nature*, **2008**, 255, 383-386.

Dr. Vicki Colvin's group and collaborators in North Carolina describe the biological interactions of quantum dot nanoparticles in skin and in human epidermal keratinocytes. More in: Zhang, L.W., Yu, W.W., Colvin, V.L., Monteiro-Riviere, N.A. *Toxicol. Appl. Pharmacol.* **2008**, 228, 200-211.

Dr. Michael Covington and researchers at UC San Diego analyze the global transcriptome and reveal circadian regulation of key pathways in plant growth and development. This work is published in: Covington, M.F., Maloof, J.N., Straume, M., Kay, S.A., Harmer, S.L. *Genome Biol.* **2008**, 9, R130.

Dr. Michael Deem gives a description of Monte Carlo methods for simulation of proteins. This work is described in: Earl, D.J., Deem, M.W. *Methods Mol. Biol.* **2008**, 443, 25-36.

Dr. Mary Farach-Carson and researchers at University of Delaware observe that ribosomal protein L29/HIP deficiency delays osteogenesis and increases fragility of adult bone in mice. This work is presented in: Oristian, D.S., Sloofman, L.G., Zhou, X., Wang, L., Farach-Carson, M.C., Kirn-Safran, C.B. *J. Orthop. Res.* **2008**, Jul 25.

Dr. Ariel Fernandez's lab redesigns kinase inhibitors to enhance specificity. More in: Crespo, A., Zhang, X., Fernandez, A. *J. Med. Chem.* **2008**, 51(16), 4890-4898.

Dr. Raymon Glantz examines polarization vision in crayfish motion detectors. More details can be found in: Glantz, R.M. *J. Comp. Physiol. A. Neuroethol. Sens. Neural Behav. Physiol.* **2008**, 194(6), 565-575.

Dr. Richard Gomer's lab finds that a protein similar to phosphatase and tensin homolog regulates aggregation territory size by decreasing cAMP pulse size during dictyostelium development. This work is presented in: Tang, Y., Gomer, R.H. *Eukaryot. Cell*, **2008**, Aug 1.

Dr. Ramon Gonzalez's group presents a new model for the anaerobic fermentation of glycerol in enteric bacteria. This work appears in: Gonzalez, R., Murarka, A., Dharmadi, Y., Yazdani, S.S. *Metab. Eng.* **2008**, 10(5), 234-245.

Dr. Grande-Allen's group reports on the abundance and location of proteoglycans and hyaluronan within normal and myxomatous mitral valves. This work was presented in: Gupta, V., Barzilla, J.E., Mendez, J.S., Stephens, E.H., Lee, E.L., Collard, C.D., Laucirica, R., Weigel, P.H., Grande-Allen, K.J. *Cardiovasc. Pathol.* **2008**, Jul 11.

Dr. Rudy Guerra's group compares algorithms for pre-processing of SELDI-TOF mass spectrometry data. More is available in: Cruz-Marcelo, A., Guerra, R., Vannucci, M., Li, Y., Lau, C.C., Man, T.K. *Bioinformatics*, **2008**, 24(19), 2129-2136.

Dr. Jason Hafner and collaborators from Belarus develop a method, termed laser-activated nanothermolysis as a cell elimination technology for the selective detection and destruction of individual tumor cells by the generation of intracellular photothermal bubbles around clusters of gold nanoparticles. More details in: Hleb, E.Y., Hafner, J.H., Myers, J.N., Hanna, E.Y., Rostro, B.C., Zhdanok, S.A., Lapotko, D.O. *Nanomed.* **2008**, 3(5), 647-667.

Dr. Naomi Halas's group uses surface-enhanced raman spectroscopy to observe the correlation of molecular orientation and packing density in a dsDNA self-assembled monolayer. This is reported in: Barhouni, A., Zhang, D., Halas, N.J. *J. Am. Chem. Soc.* **2008**, Oct. 4.

Dr. Jeff Hartgerink's group presents the self-assembly of alpha-helical coiled coil nanofibers. More in: Dong, H., Paramonov, S.E., Hartgerink, J.D. *J. Am. Chem. Soc.* **2008**, Sept. 20.

Dr. Nat Holland's group reports on the density-mediated, context-dependent consumer-resource interactions between ants and extrafloral nectar plants. More details can be found in: Chamberlain, S.A., Holland, J.N. *Ecology*, **2008**, 1364-1374.

Dr. Huey Huang's lab describe dual measurements of membrane thickness change and membrane area change due to the binding of the amphiphatic drug curcumin. This is reported in: Sun, Y., Lee, C.C., Hung, W.C., Chen, F.Y., Lee, M.T., Huang, H.W. *Biophys. J.* **2008**, 95(5), 2318-2324.

Dr. Oleg Igoshin and collaborators in the Netherlands examine transient heterogeneity in extracellular protease production by *Bacillus subtilis*. This work is reported in: Veening, J.W., Igoshin, O.A., Eijlander, R.T., Nijland, R., Hamoen, L.W., Kuipers, O.P. *Mol. Syst. Biol.* **2008**, 3, 184.

Dr. Jeffrey Jacot and collaborators in Boston find that endothelial injury induces vascular smooth muscle cell proliferation in highly localized regions of a direct contact co-culture system. More in: Jacot, J.G.,

Wong, J.Y. *Cell Biochem. Biophys.* **2008**, 52(1), 37-46.

Dr. Lydia Kavradi and collaborators at the University of Pennsylvania show that electrostatic contributions drive the interaction between *Staphylococcus aureus* protein Efb-c and its complement target C3d. This work is published in: Haspel, N., Ricklin, D., Geisbrecht, B.V., Kavradi, L.E., Lambris, J.D. *Protein Sci.* **2008**, Aug. 7.

Dr. Marek Kimmel and collaborators in Poland use model-based analysis to investigate the interferon-beta induced signaling pathway. More in: Smieja, J., Jamaluddin, M., Brasier, A.R., Kimmel, M. *Bioinformatics* **2008**, 24(20), 2363-2369.

Dr. Michael Kohn's group examines decoupled differentiation of gene expression and coding sequence among *Drosophila* populations. More details in: Kohn, M.H., Shapiro, J., Wu, C.I. *Genes Genet. Syst.* **2008**, 83(3), 265-273.

Dr. Anatoly Kolomeisky's group studies how spatial fluctuations affect the dynamics of motor proteins. This work was presented in: Das, R.K., Kolomeisky, A.B. *J. Phys. Chem. B.* **2008**, 112(35), 11112-11121.

Drs. Rebecca Richards-Kortum and Phil Kortum study the impact of inaccurate Internet health information in a secondary school learning environment. More details in: Kortum, P., Edwards, C., Richards-Kortum, R. *J. Med. Internet Res.* **2008** 20, e17.

Dr. Stephan Link's group finds chain-length dependent nematic ordering of conjugated polymers in a liquid crystal solvent. This was published in: Tcherniak, A., Solis, D., Jr., Khatua, S., Tangonan, A.A., Lee, T.R., Link, S. *J. Am. Chem. Soc.* **2008**, 130(37), 12262-12263.

Dr. Jianpeng Ma's group presents a minimalist network model for course-grained normal analysis and its application to biomolecular x-ray crystallography. This work was published in: Lu, M., Ma, J., *Proc. Natl. Acad. Sci. U.S.A.* **2008**, Oct. 1.

Drs. Kathleen Matthews and Sarah Bondos' groups find that multiple intrinsically disordered sequences alter DNA binding by the homeodomain of the *Drosophila* hox protein ultrabithorax. More in: Liu, Y., Matthews, K.S., Bondos, S.E., *J. Biol. Chem.* **2008**, 283(30), 20874-20887.

Dr. James McNew's group uses *in vitro* fusion assays to characterize how specific interactions between Munc18a and the neuronal SNAREs enhance the rate and extent of membrane fusion. This work appears in: Rodkey, T.L., Liu, S., Barry, M., McNew, J.A. *Mol. Biol. Cell.* **2008**, Oct. 1.

Drs. Antonios Mikos' and Rob Raphael's groups and collaborators from Portugal study the influence of hydrolytic enzymes (alpha-amylose or lipase) on the degradation of fiber mesh scaffolds based on a blend of starch and poly(epsilon-caprolactone) and the osteogenic differentiation of osteogenic medium-expanded rat bone marrow stromal cells and subsequent formation of extracellular matrix on these scaffolds under static culture conditions. More details in: Martins, A.M., Pham, Q.P., Malafaya, P.B., Sousa, R.A., Gomes, M.E., Raphael, R.M., Kasper, F.K., Reis, R.L., Mikos, A.G. *Tissue Eng. Part A* **2008** Aug 23.

Dr. Luay Nakhleh's group rapidly explores structural and dynamic properties of signaling networks using PathwayOracle. More in: Ruths, D., Nakhleh, L., Ram, P.T. *BMC Syst. Biol.* **2008**, 2, 76.

Dr. John Olson's group in collaboration with researchers from University of Wisconsin-Madison use structural analysis of fish versus mammalian hemoglobins to probe the effect of the heme pocket environment on autooxidation and heme loss. More details are available in: Aranda, R., 4th, Cai, H., Worley, C.E., Levin, E.J., Li, R., Olson, J.S., Phillips, G.N., Jr., Richards, M.P. *Proteins*, **2008**, Sept. 2.

Dr. Graham Palmer in collaboration with researchers from the University of Texas Health Science Center at Houston studies two heme centers in adrenal cytochrome b(561), a transmembrane protein that shuttles reducing equivalents derived from ascorbate. More in: Liu, W., Rogge, C.E., da Silva, G.F., Shinkarev, V.P., Tsai, A.L., Kamensky, Y., Palmer, G., Kulmacz, R.J. *Biochim. Biophys. Acta.* **2008**, 1777, 1218-1228.

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Drs. David Queller and Joan Strassmann report that ant eggs lack totipotency. More in: Strassmann, J.E., Queller, D.C. *Curr. Biol.* **2008**, 18(7), R299-301.

Dr. Jennifer Rudger's lab examines the imperfect vertical transmission of fungal endophytes in grasses. This work appears in: Afihami, M.E., Rudgers, J.A. *Am. Nat.* **2008**, 172(3), 405-416.

Dr. Volker Rudolf's lab studies the impacts of cannibalism and size refuges in prey on intraguild predation systems. More in: Rudolf, V.H., Armstrong, J. *Oecologia* **2008**, 157(4), 675-685.

Dr. Laura Segatori and collaborators at the University of Texas at Austin present the *de novo* design and evolution of artificial disulfide isomerase enzymes analogous to the bacterial DsbC. More in: Arredondo, S., Segatori, L., Gilbert, H.F., Georgiou, G. *J. Biol. Chem.* **2008**, Sept. 9.

Dr. Joff Silberg's group shows that the human escort protein Hep binds to the ATPase domain of mitochondrial hsp 70 and regulates ATP hydrolysis. This work was published in: Zhai, P., Stanworth, C., Liu, W., Silberg, J.J. *J. Biol. Chem.* **2008**, 283(38), 26098-26106.

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Dr. Jennifer West's group demonstrates micropatterning of poly(ethylene glycol) diacrylate hydrogels with biomolecules to regulate and guide endothelial morphogenesis. More details in: Moon, J.J., Hahn, M.S., Kim, I., Nsiah, B.A., West, J.L. *Tissue Eng. Part A* **2008** Sept 19.

Dr. Lon Wilson and collaborators at Baylor College of Medicine assess transneuronal dysfunction by utilizing manganese-enhanced MRI. More in: Serrano, R., Deshazer, M., Smith, K.D., Ananta, J.S., Wilson, L.J., Paulter, R.G. *Magn. Reson. Med.* **2008**, 60(1), 169-175.

Dr. Weiwei Zhong and collaborators at Caltech present a lensless high-resolution on-chip optofluidic microscope for *Caenorhabditis elegans* and cell imaging. More in: Cui, X., Lee, L.M., Heng, X., Zhong, W., Sternberg, P.W., Psaltis, D., Yang, C. *Proc. Natl. Acad. Sci. U.S.A.* **2008**, 105(31), 10670-10675.

NEWS FOR NEXT ISSUE?

Please send information to: Stacey.Kalovidouris@rice.edu