LASER
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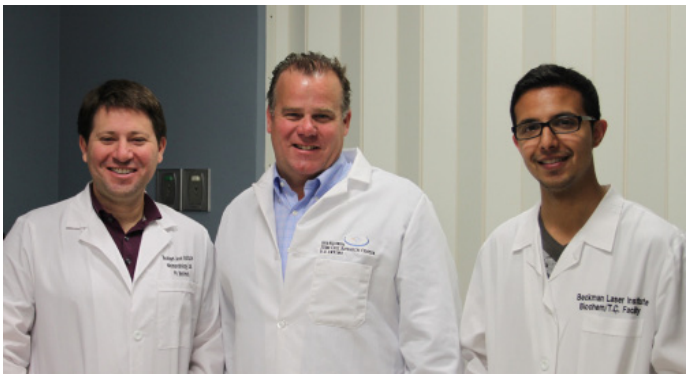
IN THE NEWS

SPRING 2013

Grant Awarded to Demonstrate a New Medical Device for the Reversal of Diabetes

Assistant Professor of Biomedical Engineering and Surgery Elliot Botvinick and co-PI Dr. Jonathan Lakey, Associate Professor and Director of Research in the Department of Surgery, were recently awarded a 1-year grant from the Iacocca Family Foundation for "Two-phase approach to pancreatic islet cell transplantation." The project will be spear-headed by Beckman Laser Institute (BLI) postdoctoral researcher Bhupinder Shergill, Ph.D., who has already made significant progress towards the project's goals.



From left to right: Drs. Elliot Botvinick, Jonathan Lakey and Bhupinder Shergill.

Diabetes is the 4th leading cause of death in the United States with more than 3 million Americans currently suffering from type 1 diabetes. Approximately 80 people per day are diagnosed with the disease, with half of those being children, and presently there is no cure. The primary treatment for type 1 diabetes is the delivery of artificial insulin via injection or pump combined with careful monitoring of blood glucose levels using blood-testing monitors. In type 1 diabetes, the body's immune system mistakenly destroys the beta cells produced by the pancreas which causes the pancreas to lose the ability to make insulin. Transplantation of tissue containing cells that secrete insulin (beta cells housed in structures called islets)

(Diabetes Grant continued on p. 5)

BLI-Korea

(Translated by Joon You, Ph.D., from an article by Jin-Sup Choi which appeared in *JoongAng Ilbo News*, December 7, 2012)

Dankook University, in partnership with the Beckman Laser Institute (BLI), has recently established a new collaborative research center in biophotonics and biomedical optics. The new institute, named Beckman Laser Institute-Korea (BLI-Korea) will be located in Cheonan, South Korea. Dankook University is one of two awardees among 13 competing institutions for a new Korean government initiative to attract world leading foreign research institutes to South Korea. Funded by the Ministry of Education, Science and Technology, this initiative will allow Dankook University to build a world-class hub which will attract high quality research personnel for the purpose of producing cutting edge research and development technology.

An estimated total funding of $10 million for the next 6 years will come from the Korean government ($3.5 million) and matching contributions from multiple institutions and local governments, including the BLI, Dankook University, Dankook University Hospital, Chung-Nam Province, Cheonan City, and several industry partners.

BLI-Korea will focus on training students and postdoctoral fellows through the development of core technologies for state-of-the-art optical medical devices. Specific clinical applications will include cancer diagnostics using lasers for cancers of the breast and head and neck. This endeavor is expected to fuel local economic growth through job creation of a highly skilled work force in biomedical technology as well as creation of innovative companies. The establishment of BLI-Korea will be a welcome addition to the existing local business network supported by the Cheonan International Science Business Belt program.

BLI-Korea will be led by Chung Phil-Sang, M.D., who is also a professor of Otolaryngology at Dankook University Hospital. According to Dr. Chung, the establishment of BLI-Korea will leverage the existing infrastructures at Dankook's medical, dental and pharmacy schools as well as the Dankook University Hospital

(BLI-Korea continued on p. 4)

Humility and Integrity

by Michael W. Berns, Ph.D.
Arnold and Mabel Beckman Professor
Co-Founder, Beckman Laser Institute

In my last column (Fall 2012), I mentioned that once a year I listen to Arnold O Beckman's words of wisdom on a 1992 videotape in which he responds to questions at a UCI roundtable luncheon. I view that tape each year to remind me who Arnold Beckman was, what he stood for, and what his values were. It's a potent and poignant refresher course because he is no longer here as mentor and advisor—but I can still listen to his words and watch him wave his arms with excitement. His answer to the question, "How do you decide which projects to fund?" demonstrated his *humility*. He said he realized he did not have near enough the necessary knowledge to evaluate the many diverse proposals he received so he established a Grants Advisory Council (GAC) to advise him and his Foundation on what projects to support. The GAC consists of the Directors of the five Beckman Institutes/Centers. As he put it, "What better group of people to help make these decisions than the scientists I have already placed my trust in?" I was indeed proud to serve ten years on the GAC and equally proud that my protégé, Professor Bruce Tromberg, succeeded me on the GAC when I stepped down as the Director of the Beckman Laser Institute.

In that same 1992 tape, at the age of 92, Arnold Beckman gave his opinion on another favorite subject: *integrity*. He felt that today, somehow, *integrity* was not as "automatic" as it should be—in science and in everyday actions. One of his heroes was Benjamin Franklin, and when Dr. Beckman was inducted into the Benjamin Franklin Hall of Fame for inventing the pH meter, it was one of the most cherished highlights of a life chock full of highlights. He remarked that *integrity* to Benjamin Franklin and his peers was engrained within their moral fabric; they did not have to think about it or remind others about it. *Integrity* was just part of their lives.

Integrity, humility, and a sense of humor were built into Arnold Beckman's fabric—as they were into Benjamin Franklin's and others of that period. Since the future is rooted in the past, we should always remember to glance back for guidance as we look forward. ▪

Newsbriefs

New Addition to BLI Faculty

Dr. Robert Brown

Dr. Robert G. W. Brown has joined the Beckman Laser Institute (BLI) as Adjunct Professor. Dr. Brown, who is also affiliated with the UCI Department of Computer Science, has over 30 years of experience in leading Photonics and Optics research at various research centers around the world. At BLI, he is currently developing real-time, stitched 3D-endoscopy using micro-video-cameras that will be fitted to both standard-size and 3mm-diameter endoscopes. The goal of this work is to provide a low cost approach for quantitative 3D endoscopic imaging to aid in minimally invasive surgery. He is working with Drs. Bruce Tromberg, Albert Cerussi, Ken Chang, Brian Wong and Petra Wilder-Smith on this project.

Visitor from NIH

Dr. Sally Rockey, Deputy Director of the National Institutes of Health (NIH) Extramural Research, visited the Beckman Laser Institute for a tour of the building and research labs on February 21, 2013. Dr. Rockey delivered a public lecture at Calit2 on "NIH and You" where she described new opportunities and programs she is helping develop at NIH, including the emerging brain research initiative and new funding for students and trainees who wish to pursue careers in biomedical research.

From left to right: UCI Asst. Vice Chancellor Jacob Levin, UCI Institute for Clinical and Translational Science Director Dan Cooper, NIH Deputy Director Sally Rockey, BLI Director Bruce Tromberg.

Research Paper Featured Online

"A prospective study to assess in vivo optical coherence tomography imaging for early detection of chemotherapy-induced oral mucositis" by A. Calantog, L. Hallajian, T. Nabelsi, S. Mansour, A. Lee, J. Epstein and P. Wilder-Smith in *Lasers in Surgery and Medicine* was featured on the www.MDLinx.com site on January 17, 2013. MDLinx is the world's most current index of articles that matter in the daily lives of physicians and other healthcare professionals. The article can be seen at http://www.mdlinx.com/internal-medicine/news-article.cfm/4390703.

(Newsbriefs continued on p. 3)

UCI Vice Chancellor for Research Visits Calit2 for Demonstrations by BLI Faculty

Dr. Albert Cerussi shows the inner workings of the miniature DOSI instrument that was constructed at Calit2 to Vice Chancellor John Hemminger.

Dr. John Hemminger, UCI Vice Chancellor for Research, visited the California Institute for Telecommunications and Information Technology (Calit2) on February 14, 2013, to view demonstrations by Beckman Laser Institute (BLI) faculty. Hosted by BLI Director Bruce Tromberg, Vice Chancellor Hemminger saw demonstrations by four groups who are part of the BLI laboratory located at Calit2. Located on the UCI campus, Calit2 is a multidisciplinary research institute. Its goal is to develop innovative information technology-based products and services to benefit society and ignite economic development in the region and state.

Dr. Zhongping Chen and his group demonstrated an integrated intravascular imaging catheter for diagnosis of cardiovascular diseases. Dr. Chen's group is the first to demonstrate the integration of optical coherence tomography and ultrasound imaging into a single catheter. The Calit2's biophotonics laboratory provided the optical fiber fabrication and splicing workstation, an essential tool for making this unique fiber optic catheter. The translation of this technique to clinical application will have a significant impact in diagnosis and management of cardiovascular disease.

Diffuse Optical Spectroscopic Imaging (DOSI) technologies were presented by Dr. Albert Cerussi and his colleagues who demonstrated portable medical imaging technologies that measure tissue perfusion and metabolism deep below the skin. The Calit2 space is being used to advance several aspects of DOSI technology, including novel board and chip designs, component testing, and DOSI system integration. Prototypes developed by Dr. Cerussi and his team have already been fabricated in Calit2 and delivered to M. D. Anderson and Boston University to be used in multi-center clinical research trials in breast cancer.

Dr. Gopi Meenakshisundaram and his group demonstrated interactive deformable surface geometry reconstruction capabilities using the latest off-the-shelf, gesture-based gaming devices. This will be used along with the DOSI probe to co-register surface and sub-surface features on breast cancer patients for in-situ visualization and analysis.

Dr. Anthony Durkin's group demonstrated their evolving testing station that will enable optimizing the selection of optical components that might be in new spatial frequency domain imaging (SFDI) systems. SFDI is a quantitative, wide-field imaging technology that was invented at BLI and is being investigated for a myriad of applications ranging from burn severity assessment to optimization of photodynamic therapy. The tissue phantom characterization station that was configured by Dr. Rolf Saager was also highlighted. Tissue simulating phantoms are used in many facets of the group's device development process, and it is essential that these phantoms be accurately and methodically characterized. The creation of a dedicated testing station has led to new collaborations with several companies interested in acquiring well characterized phantoms. ■

Newsbriefs *(cont'd from p. 2)*

Residency at UCIMC

Anthony Chin Loy

Dr. Anthony Chin Loy, a postdoctoral fellow working in the lab of Dr. Brian Wong, has been accepted for a residency position in Otolaryngology-Head and Neck Surgery at the University of California, Irvine Medical Center beginning June 1, 2013.

Honors and Awards

Elliot Botvinick, Ph.D.

Assistant Professor Elliot Botvinick has received a 1-year grant from the Iacocca Family Foundation for "Two phase approach to pancreatic islet cell transplantation" (see Cover Story on page 1). Dr. Botvinick has also received a 3-year grant from the National Science Foundation for "Regulation of mammary epithelial signaling by local matrix stiffness."

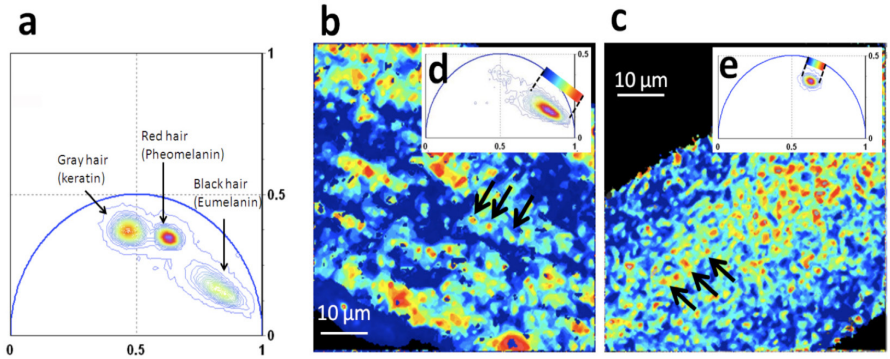
Matthew Brenner, M.D.

Professor of Pulmonary and Critical Care Medicine Matthew Brenner has been awarded a new, 5-year grant sponsored by the National Institutes of Health (NIH) CounterACT program. The mission of the CounterACT U54 program is to develop new and improved therapeutics for chemical threats. The grant is a U54 Center of Excellence award, with Harvard as the administrative center, as well as one of the 3 scientific research and development sub-proj-

(Honors and Awards continued on p. 7)

A New Way to Characterize and Image Melanins

A new method for measuring human eumelanin and pheomelanin in tissue based on two-photon excited fluorescence (TPEF) has recently been published by Beckman Laser Institute (BLI) researchers ("Two-photon excited fluorescence lifetime imaging and spectroscopy of melanins in vitro and in vivo" by T. Krasieva, C. Stringari, F. Liu, C.-H. Sun, Y. Kong, M. Balu, F. L. Meyskens, E. Gratton and B. J. Tromberg in *Journal of Biomedical Optics* 18: 031107, 2012). The method is based on TPEF using short-pulse, near infrared (NIR) lasers. It is rapid, label-free, and non-destructive.



(a) Phasor plot of black hair (containing predominantly eumelanin), red hair (containing predominantly pheomelanin), and gray hair (containing predominantly keratin). (b) and (c): FLIM color map of black hair (b) and red hair (c) showing the relative concentration of melanins and keratin, according to the linear cluster of (d) and (e), respectively; (d) and (e): phasor plot selection using linear cluster combination representing all possible relative contributions of keratin (blue) and eumelanin (red-yellow) for black hair (d) and relative contributions of keratin (blue) and pheomelanin (red-yellow) for red hair (e); each point along the line has a color that corresponds with a specific relative concentration of the two chemical species. Melanosomes are indicated by the black arrows.

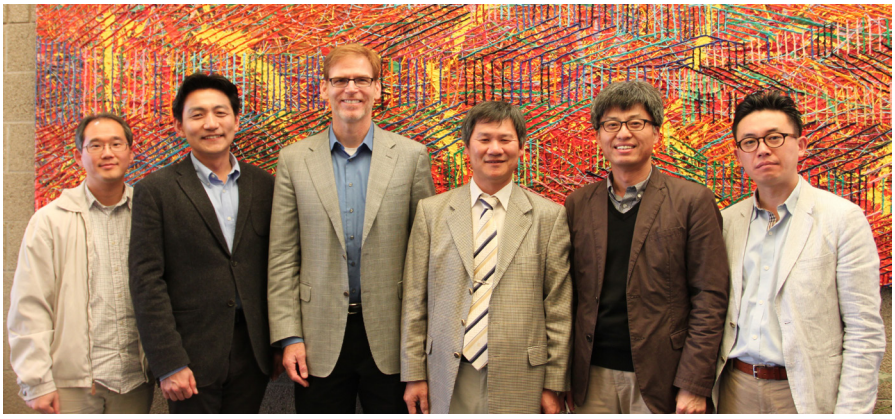
Human skin and hair color are determined by melanin type and content. There are two major forms of this naturally occurring pigment: eumelanin and pheomelanin. Changes in the amounts of eumelanin and pheomelanin have been associated with carcinogenesis. Epidemiology studies have shown that red hair and light skin color are risk factors for melanoma. Mutations in the human Mc1R gene are associated with red hair and light skin color which are characterized by a high pheomelanin/eumelanin ratio. Rapid, non-degrading, non-invasive optical methods for melanin ratio measurements would be highly desirable.

Previous studies on melanin emission spectral properties in human skin were extended by the BLI researchers by characterizing naturally occurring eumelanin and pheomelanin using two-photon excited fluorescence spectra and lifetimes. In vitro measurements were obtained from melanoma cells and artificial constructs, and in vivo measurements were obtained from healthy volunteers. By comparing TPEF to conventional chemical separation methods, the researchers were able to obtain new insight regarding the origin of melanin fluorescence in vivo and validate the optical approach. In addition, a practical optical index for measuring the relative concentrations of eumelanin and pheomelanin in vivo was developed. Two-photon excited fluorescence provides a clear fingerprint identification of keratin, eumelanin and pheomelanin in a single, label-free image. This could potentially be used for rapid in vitro and in vivo characterization and imaging of melanoma. ■

BLI-KOREA *(cont'd from p. 1)*

on the Cheonan campus. Dr. Chung adds, "BLI-Korea will advance Korean optical medical device technologies to the level of other developed countries in the world."

The Beckman Laser Institute, located at the University of California, Irvine, is a leading institution in research, development and commercialization of biomedical laser technologies. Established in 1986, the Institute has grown to 20 full-time faculty and more than 200 medical doctors, researchers and graduate students. ■



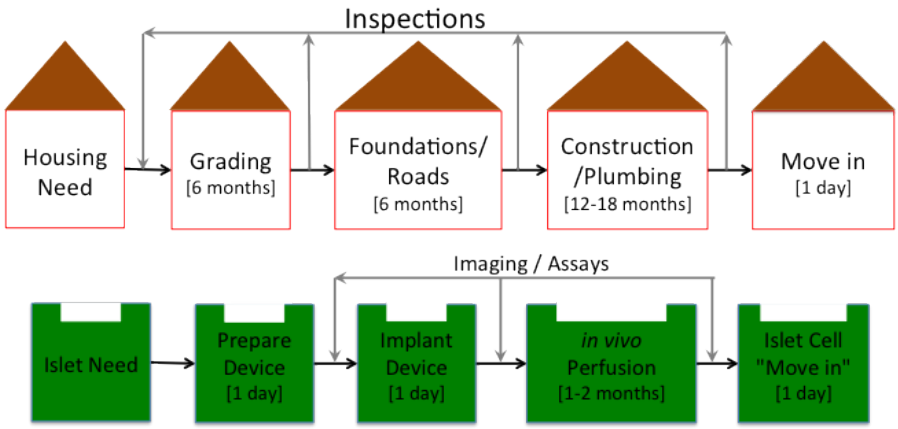
As part of the BLI-Korea collaboration, staff from Dankook University visited and toured the BLI on January 15-20, 2013. From left to right: BLI Project Scientist Keun-Sik No; Kim Daegun, Ph.D. (Prof. of Mechanical Engineering); BLI Director Bruce Tromberg; Chung Phil-Sang, M.D., Ph.D. (Prof. of Otolaryngology, Dankook University Hospital); Lee Seung-Ha, Ph.D. (Assoc. Prof. of Biomedical Engineering); Ahn Jin-Chul, Ph.D. (Asst. Prof. of Pre-Medical Science).

DIABETES GRANT *(cont'd from p. 1)*

restores normal levels of sugar in the blood but requires the patient to take drugs that suppress the immune system for the remainder of his/her life. Because these drugs have significant side effects, including elevated risk of infections and cancer, this transplantation method is appropriate only for diabetic patients with life-threatening complications. Prof. Botvinick has designed a medical device for subcutaneous implantation of pancreatic islet cells. The thin-sheet encapsulation device is designed to preserve islet cell function for the reversal of type 1 diabetes without the requirement of chronic pharmaceutical immune suppression.

Encapsulation of islet tissue is a promising method that prevents direct contact between implanted cells and the host's immune system. Additionally, it may allow use of suitable animal tissue, which is in great supply compared to human. Because encapsulation provides some degree of mechanical support, it is compatible with several accessible implantation sites, including under the skin, that avoid the risk associated with injecting islets into a major vessel or an internal organ. Current encapsulation techniques do not instantaneously provide the implanted tissue with adequate blood flow which is the tisssue's primary source of oxygen and other nutrients as well as its primary pathway for removing waste. Efforts by other groups to prevascularize encapsulation devices have resulted in a random meshwork of small blood vessels that are disorganized, often malformed, and have no obvious inlet or outlet.

When existing devices are implanted into the body, there is a period of days before the host's micro-vessels invade and connect to the engineered meshwork of vessels. This approach is destined to fail because: (1) significant islet cell death occurs during the several day period before the host vasculature invades and connects to the implant's vasculature, and (2) the random network of blood vessels cannot be fully perfused when the host connects to it. Interestingly, numerous publications have shown that over time there can be a well-developed network of capillaries, but they are likely new microvessels made by the host (or patient). This finding inspired Prof. Botvinick's design which tricks the body into "thinking" the device is a wound. After the body naturally builds a new perfused vasculature, only then are the islet cells implanted in a fashion that disrupts neither the implant site, nor the islets.



Islet transplantation is a process, not an acute event. Drawing an analogy to building a new neighborhood, the necessary infrastructure (i.e., plumbing) is created in the implant before islets are introduced to enhance long term viability.

Prof. Botvinick compares his strategy for transplantation to the development of new housing communities. A housing community is somewhat like a physiological organ, where it is the people functioning within the infrastructure that defines the community, just as an organ is made of cells functioning within the tissue. How then is a new community created? It is unthinkable for homeowners to arrive before the housing and infrastructure are established. *Yet this strategy captures the current "state of the art" in pancreatic islet encapsulation.* In the development of communities, and long before the arrival of the first homeowner, construction workers establish the infrastructure required to sustain comfortable living: water, power, sewage, telecommunications and roads. Throughout this process, inspections are made to insure the quality and safety of newly constructed homes. Only after inspection deems a home habitable, do the homeowners move in. Compared to the one to two year long construction phase, the move-in is instantaneous. Importantly, the homeowners arrive unharmed with all of their living needs met.

This inspired Prof. Botvinick's two-phase design wherein the body spends weeks remodeling the device after an initial implantation, a doctor makes inspections of the device, and only when the newly formed microenvironment is deemed safe, are islet cells implanted. Compared to the weeks-long remodeling phase, the "move in" phase is instantaneous and islet cells are fully supported for health and function. Importantly, the islet cells are implanted without damaging either the cells or the microenvironment.

In the proposed work, the reversal of diabetes in diabetic mice will first be demonstrated. The goal is to determine the minimum number of islets required for reversing diabetes in the system. Importantly, Prof. Botvinick expects a significant increase in islet cell survival over existing methods and expects to need fewer cells. He will also demonstrate the ability to rapidly replace cells without additional surgery or disruption of the microvessels. Finally, a preliminary study in pigs will be conducted to further validate the device and ultimately move the technology into the clinic. ■

BLI Newsletter Staff
Editor: Bruce Tromberg
Writers: Elaine Kato, Erin Miller, Deborah Birnie
Layout & Design: Brian Hill

Ya-Sin Peaks, M.D.

Ya-Sin Peaks wanted to be an astronaut. To that end, he joined the ROTC at the University of Michigan at Ann Arbor and earned a B.S. degree in Nuclear Physics in 1995. After graduation, he was commissioned into the U.S. Marine Corps and flew Apache helicopters and jets in Bosnia. In 1999, he took a leave of absence from the military and went to graduate school at Boston University and earned an M.B.A. in 2002. From 2000-2011, he was on active duty and in the Army reserves where he participated in many overseas aviation campaigns, including the Middle East. During this period, he was able to take leaves of absence, which enabled him to earn another Master's degree in Mechanical Engineering in 2004.

While on active duty, he decided he could contribute more to society if he were a doctor. He switched from Attack Aviation to Search & Rescue/MedEvac so he could get a finer appreciation of the medical field. In 2006, Ya-Sin was accepted to medical school at the University of Michigan. He was recalled back to active duty in 2008 to enforce No Fly Zones over Iraq. In 2009, he returned and completed medical school at the University of Alabama, Birmingham, earning his M.D. in 2011. He spent his intern year (2011-2012) specializing in general surgery at Allegheny General Hospital in Pittsburgh, PA. Based on work done with the head and neck surgeons at the hospital, he decided to sub-specialize in Head and Neck Surgery, especially in trauma.

In 2012, Dr. Peaks joined the Beckman Laser Institute (BLI) laboratory of Brian Wong, Professor and Director of Facial Plastic Surgery in the UCIMC Department of Otolaryngology-Head and Neck Surgery, as a Hewitt Foundation Postdoctoral Fellow. He chose Irvine "based on the academic reputation of the BLI and the strong work and cutting edge research coming out of Dr. Wong's lab." Dr. Peaks "knew this would give me more exposure in the

Ya-Sin Peaks

field of Head and Neck Surgery and position me as a stronger residency applicant in this field." While at BLI, his research has focused on in vivo investigation of sub-glottic stenosis in the pediatric population using optical coherence tomography (OCT). When a child has a constricted airway due to trauma or birth defect, it is difficult to use a standard scope to visualize any problems without causing more trauma and scarring. An MRI would expose the child to harmful radiation. Dr. Wong, with the expertise of Biomedical Engineering Professor Zhongping Chen, has devised a mini-probe that uses harmless infrared light. To date, they have been able to safely image 14 children and several adults with this new technology.

As he hoped, this experience helped him match into an advanced residency position in Oral and Maxillofacial Surgery at the University of Alabama at Birmingham for the next five years which he will begin in May 2013. His goal is to practice academic medicine and eventually teach in the U.S. and abroad, hopefully in the field of pediatrics. For example, he would like to use his skills to teach other doctors in third world countries how to repair cleft palates in children.

Coming from a family of eight children (four boys, four girls) where his mother, a special education teacher, and his father, a teacher and business store owner in Detroit, stressed that "education was paramount," it is not difficult to understand the success and motivation behind Dr. Peaks whose four sisters, he proudly points out, are all teachers. ▪

Selected Recent Publications

"Optical imaging correlates with magnetic resonance imaging breast density and reveals composition changes during neoadjuvant chemotherapy" by T. O'Sullivan, A. Leproux, J.-H. Chen, S. Bahri, A. Matlock, D. Roblyer, C. E. McLaren, W.-P. Chen, A. E. Cerussi, M.-Y. Su and B. J. Tromberg in *Breast Cancer Research* 15: R14, 2013.

"Quantitative near infrared spectroscopic analysis of Q-switched Nd:YAG treatment of generalized argyria" by R. B. Saager, K. M Hassan, C. Kondru, A. J. Durkin and K. M. Kelly in *Lasers in Surgery and Medicine* 45: 15-21, 2013.

"Optical histology: a method to visualize microvasculature in thick tissue sections of mouse brain" by A. Moy, M. Wiersma and B. Choi in *PLoS ONE* 8(1): e53753, 2013.

"Quantitative assessment of partial vascular occlusions in a swine pedicle flap model using spatial frequency domain imaging" by A. Ponticorvo, E. Taydas, A. Mazhar, T. Scholz, H.-S. Kim, J. Rimler, G. R. D. Evans, D. J. Cuccia and A. J. Durkin in *Biomedical Optics Express* 4: 298-306, 2013.

"Biomolecular imaging with coherent nonlinear vibrational microscopy" by C.-Y. Chung, J. Boik and E. O. Potma in *Annual Review of Physical Chemistry* 64: 77-99, 2013.

"High-speed upper airway imaging using full-range optical coherence tomography" by J. Jing, J. Zhang, A. C. Loy, B. J. F. Wong and Z. Chen in *Journal of Biomedical Optics* 17: 110507, 2012.

Arrivals and Departures

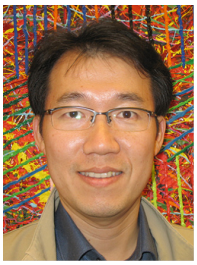
ARRIVALS


Dongyel Kang

Dongyel Kang, Ph.D., has joined Dr. Brian Wong's lab as a postdoctoral fellow. He received his degree in Optical Sciences at the University of Arizona and will be working on pediatric airway projects and focusing on image analysis and optical coherence tomography.


Hanna Kim

Hanna Kim has been hired as Assistant to the BLI Director, Bruce Tromberg. Hanna has a B.A. from UC Davis and a Master's in Teaching from the University of Washington. She previously worked at the Moores (UCSD) Cancer Center where her duties included recruiting underrepresented minority students for a summer science program.


Sehwan Kim

Sehwan ("Paul") Kim, Ph.D., who is affiliated with BLI-Korea, will be working with Dr. Keun-Sik No on technological advances for diffuse optical spectroscopic imaging (DOSI).


Marius Viseroi

Marius Viseroi, M.D., has joined Dr. Matthew Brenner's lab to work on studies using diffuse optical spectroscopy (DOS) and continuous wave near-infrared spectroscopy (CWNIRS) technologies for examining the physiological effects of cyanide poisoning and the development of novel antidotes to treat mass casualty cyanide poisoning.


Rui Li

Rui Li, Ph.D., is a postdoctoral fellow in the lab of Dr. Zhongping Chen. She will be working on optical coherence elastography.

DEPARTURES

Hosain Haghany, Ph.D., who worked in Dr. Bruce Tromberg's lab, has been hired as a Sr. Biomedical Engineer at Cutera, Inc., in Brisbane, CA. He will be working on developing medical devices based on Biophotonics technologies.

James Kim, B.S., has been accepted into the post-baccalaureate pre-medical program at Scripps College in Claremont, CA. James worked in Dr. Brian Wong's lab.

Jessica Stambaugh, B.S., who worked in Dr. Michael Berns' lab, is going to medical school at UC San Diego on a U.S. Navy Scholarship. Her father was a dentist in the Navy.

Honors and Awards *(cont'd from p. 3)*

ects. Dr. Brenner at UCI and Dr. Gerry Boss at UCSD are a second Center sub-project. The title of the Center award is "A discovery and development pipeline for cyanide countermeasures," and the UCI and UCSD sub-project is entitled "Validating promising drug candidates in mammalian models of cyanide poisoning." The Brenner lab uses diffuse optical spectroscopy and other noninvasive spectroscopic techniques invented at the BLI to follow the consequences of cyanide poisoning and to validate the efficacy of new drug therapies.

Albert Cerussi, Ph.D., and Joon You, Ph.D.

Associate Researcher Albert Cerussi and Project Scientist Joon You were awarded a grant from the UCI Institute for Clinical and Translational Science in collaboration with the Naval Hospital, Camp Pendleton, for "A pilot study to investigate non-invasive metabolic guidance for improving therapeutic ultrasound treatment of lower back muscle injuries." Working with Commander Dr. Todd J. May of the Naval Hospital, the pilot project goal is to use portable, bedside-capable functional monitoring technology to track short-term (i.e., minutes) and long-term (weeks) effects of therapeutic ultrasound in the lower back muscles of patients seen at the Naval Hospital in Camp Pendleton. This pilot data will be used for the long-term goal of improving detection and treatment of musculoskeletal injuries, particularly in the lower back.

Bernard Choi, Ph.D.

Associate Professor Bernard Choi was named the Henry Samueli School of Engineering Honoree for Excellence in Undergraduate Education (2013), and for the third time over the last five years, Prof. Choi was selected as the Engineering Student Council Biomedical Engineering Faculty of the Year (2012-2013). With co-PI Professor **Petra Wilder-Smith**, director of BLI's dental program, he also received a 3-year R01 grant from the National Institutes of Health for "Low-cost, noninvasive method to assess pulpal vitality." This new award from the National Institute of Dental and Craniofacial Research (NIDCR) will allow Drs. Choi and Wilder-Smith to develop new, point of care technology that can be rapidly moved from the laboratory to the clinic.

Eric Potma, Ph.D.

Associate Professor Eric Potma was named the School of Physical Sciences Honoree for Excellence in Undergraduate Education for 2013. Recipients, who were selected by the Deans of their respective Schools, were honored at the 20th Annual Celebration

(Honors and Awards continued on p. 8)

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Honors and Awards *(cont'd from p. 7)*

of Teaching held on April 12, 2013.

Brian Wong, M.D., Ph.D.
Professor Brian Wong has been elected as a Fellow by the Society for Optics and Photonics (SPIE) for achievements in biomedical optics for head and neck surgery and otolaryngology. Each year, SPIE promotes members as new Fellows of the Society. SPIE honored 69 new Fellows in 2013.

Marlon S. Mathews, M.D.
Neurosurgery Resident Marlon Mathews has been selected as the 2013 recipient of the Young Investigators Award by the journal *Lasers in Surgery and Medicine* and Wiley Publishing for his submission of "Glioma cell growth inhibition following photochemical internalization enhanced non-viral PTEN gene transfection" which was published in Volume 44, Number 9, of *Lasers in Surgery and Medicine*.

Tyler Rice, Ph.D.

Tyler Rice

Tyler Rice presented his dissertation defense, "Quantitative, depth-resolved determination of particle motion using multi-exposure speckle imaging and spatial frequency domain analysis," on April 5, 2013. Tyler, who worked in Dr. Bruce Tromberg's lab, is planning on seeking employment in the biophotonic medical device industry.

Barbara Alcaraz Silva, B.S.
Developmental and Cell Biology graduate student Barbara Alcaraz Silva received a "National Institute of General Medical Sciences (NIGMS) Ancillary Training Program Scholarship" from the Keystone Symposia to attend the Keystone Conference on "Genomic and DNA Repair" in Banff, Alberta, Canada, on March 3-8, 2013. Barbara, who works in Dr. Michael Berns' lab, presented her research project entitled "Damage to mitotic telomeres results in DDR (DNA damage response) and SAC (spindle assembly checkpoint) activation that leads to cell delay and micronucleation."

Sam Vesuna, B.S.

Sam Vesuna

Medical student Sam Vesuna has received a 2013 Dean's Summer Research Stipend. In a multi-group collaboration between BLI and UCIMC's Division of Cardiology, Sam intends to use optical spectroscopy to characterize adipose tissue oxygenation in response to a weight-loss intervention and will work to develop a portable diagnostic cardiology technology which could be used to obtain hemodynamic measurements at the bedside.