LASER
BECKMAN LASER INSTITUTE

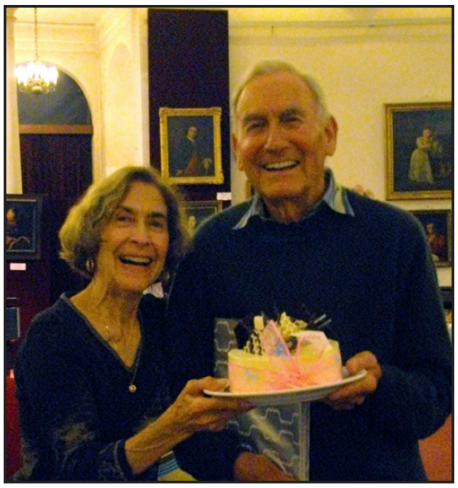
IN THE NEWS

FALL 2010

JERRY SPANIER FETED AT 80 IN WARSAW

Beckman Laser Institute (BLI) Researcher Jerry Spanier, Ph.D., recently celebrated his 80th birthday in June. Dr. Spanier is Professor of Mathematics Emeritus at Claremont Graduate University. Before joining BLI as a visiting researcher, he served as the Vice President for Academic Affairs and Dean of the Claremont Graduate University from 1982-1990.

In August, Dr. Spanier was honored at the 9th Biennial International Conference on Monte Carlo and Quasi-Monte Carlo Methods in Scientific Computing (MCQMC) in Warsaw, Poland. The MCQMC conferences are the pre-eminent conferences in Dr. Spanier's field, and they have steadily grown in size and scope as the theory underlying the methods and the applications of Monte Carlo have rapidly expanded. The 9th conference in the series was held on the campus of Warsaw University and included two special sessions of four papers, each dedicated to Dr. Spanier on the occasion of his 80th birthday. These "Festschrift" sessions were co-organized by Dr. Carole Hayakawa (BLI Assistant Project Scientist and 2002 doctoral student of Dr. Spanier) and Prof. Fred Hickernell, one of the senior figures in the field. The eight talks were presented by Dr. Spanier's students, collaborators and friends on a diverse set of topics. Dr. Spanier had participated in the seminal event in 1990 from which the idea of the MCQMC conference series sprang, and he has attended all but two of the international conferences held in the intervening 20 years. Dr. Spanier hosted MCQMC3 in Claremont in 1998 with ample help from Dr. Hayakawa, who was then his Ph.D. student, and from his entire family.



Bunny and Jerry Spanier admire his birthday cake in Warsaw.

The first special "birthday" session at MCQMC9 took place on the first morning of the conference. The first speaker was Alexander Keller, one of the rising stars of the field, whom Dr. Spanier had first met at MCQMC1 in Las Vegas in 1994 when Dr. Keller was completing his doctoral dissertation in Germany. Dr. Keller was followed by another young researcher, Francis Kuo of the University of New South Wales, Australia, where Jerry had visited in 1990 as a guest of Dr. Kuo's thesis supervisor, Ian Sloan. The final talks of the morning session were delivered by Giray Okten, Earl Maize and John Sepikas, all of whom were/are Dr. Spanier's Claremont doctoral stu-

(Spanier continued on p. 5)

Newsbriefs

Top Story

An article by BLI Dental Director Petra Wilder-Smith, "Human gingiva-derived mesenchymal stem cells elicit polarization of M2 macrophages and enhance cutaneous wound healing," published in *Stem Cells* was recently cited as Top Story in *Mesenchymal Cell News*, August 24, 2010. Researchers describe the interplay between gingiva-derived mesenchymal stem cells and macrophages and the potential relevance in skin wound healing.

OLLI Visit

Beckman Laser Institute (BLI) Director Bruce Tromberg hosted members of the Osher Lifelong Learning Institute (OLLI) at the BLI on September 16, 2010. OLLI is a group of retired and semi-retired adults who enjoy literature, history, science, the arts and travel. Its mission is to enhance the quality of life for mature adults by promoting intellectual growth in a center for senior learning.

Editor Appointment

As of October 2010, BLI Associate Professor Anthony Durkin and former BLI postdoctoral fellow Andrew Dunn (now Assistant Professor of Biomedical Engineering at the University of Texas at Austin) are Editors of the *Virtual Journal of Biophotonics*, a monthly online only amalgam of all biophotonics content

(Newsbriefs continued on p. 4)

"How has BLI Made an Impact?"

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

When Arnold O. Beckman and I first met on a rainy December day in 1979, it was on the occasion of the opening of the NIH LAser Microbeam Program (LAMP) at UCI. It was clear from this first meeting that we both shared an excitement about the potential use of light to study fundamental biological questions and, through that understanding, improve human health. Following that meeting, we formed the non-profit Beckman Laser Institute and Medical Clinic Inc. (BLIMC) for the purpose of bringing this vision into reality. Soon thereafter, a $2.5M "matching challenge grant" was made by the Arnold and Mabel Beckman Foundation to build the world's first research institute exclusively for the purpose of studying light and how it can be applied to problems of human health. Since BLIMC's doors opened in 1986, faculty, fellows and students have published several thousand fundamental and applied research articles and books on light (primarily laser), and submitted and/or been granted 55 patents on specific laser-based devices or methods of application of light. In addition, physicians in the BLIMC clinic have treated or diagnosed over 75,000 patients using the technologies developed in the adjacent basic and applied BLIMC research labs.

Of the many innovative technologies developed and/or still under development at the BLIMC, none stands out more than the Dynamic Cooling Device (DCD) invented by Dr. J. Stuart Nelson and his interdisciplinary team, consisting of postdoctoral fellow Thomas E. Milner (now Professor at the University of Texas at Austin) and Professor Lars Svaasand from the University of Trondheim, Norway, who was spending a sabbatical year at the BLIMC. The embodiment of this invention involved performing complex basic experiments on the way in which light-induced heat is conducted through and dissipated by tissue. With this knowledge, this interdisciplinary BLIMC team developed a method to precisely control the laser-induced heat so as to result in selective damage to the abnormal targeted tissue below the skin surface without damaging adjacent tissue, thus minimizing scarring or causing unwanted changes in the normal skin pigmentation. The DCD method and device were successfully patented in September 1998 and subsequently licensed to Candela Corporation in Massachusetts for commercial development and marketing. It is now a standard technology on more than 20,000 Candela lasers sold worldwide as well as on lasers of other companies that have sub-licensed the technology.
Remarkably, for the ten-year period from 2001–2010, this BLIMC invention has been one of the top 10 patents in the entire multi-campus UC system (in 2005 and 2006, it was ranked 2nd and 3rd, respectively). To date, the DCD patent has generated $40M in royalties to UC of which almost $7M has been reinvested in the BLIMC program.

The most dramatic impact of the DCD has been on the treatment of disfiguring vascular birthmarks of the skin in infants and young children. Dr. Nelson and his team have specialized in these treatments and have performed over 10,000 treatments on children who have come to the BLIMC from virtually every state in the U.S. as well as from all over the world. The DCD is now included on laser systems sold in North and South America, Europe, the Middle East, Asia, Australia and, in the near future, China, Hong Kong, Indonesia, Malaysia, Singapore and Vietnam. This means that millions of patients worldwide are and will be benefiting from this BLIMC invention.

This combination of basic research, engineering, and proof-of-principle clinical testing of a seminal idea is exactly what was envisioned over 30 years ago when the idea of the BLIMC was first conceived. ■

Honors and Awards

Elliot Botvinick, Ph.D.
Assistant Professor of Biomedical Engineering Elliot Botvinick has received a seed grant from the Edwards Lifesciences Center for Advanced Cardiovascular Technology for "Laser softening of glutaraldyhyde crosslinked bovine pericardium for an improved heart valve material." The goal of the project is to finalize a method for modifying sections of pericardium or other naturally or synthetically derived tissue such that the distribution of mechanical stiffness matches that of an anatomical leaflet. Dr. Botvinick has also received additional funds from the Edwards Lifesciences Center to develop a new tool for resecting highly vascularized tissues.

Anthony Durkin, Ph.D.
BLI Associate Professor Anthony Durkin is the Principal Investigator of a 2-year R03 grant from the National Institutes of Health/National Institute of Biomedical Imaging and Bioengineering (NIH/NIBIB) for "Spatially modulated quantitative spectroscopy for dermatologic applications." The central goal of this proposed research is to design, test and deploy a novel, compact, clinically robust measurement platform capable of determining intrinsic optical properties and chromophore concentrations of in-vivo skin across a broad spectral range.

(Honors and Awards continued on p. 6)

Customizing Pediatric Surgery for Individual Children

A 4-year R01 grant from the National Heart, Lung, and Blood Institute (NHLBI) of the National Institutes of Health (NIH) has been awarded to Brian Wong, M.D., Ph.D., Professor and Director of the Division of Facial Plastic Surgery in the Department of Otolaryngology-Head and Neck Surgery, Professor of Biomedical Engineering Zhongping Chen, Ph.D., and Professor of Mechanical and Aerospace Engineering Said E. Elghobashi, Ph.D., for "Modeling the pediatric upper airway using anatomic optical coherence tomography and computational fluid dynamics." The grant proposal was submitted in response to a challenge from the NHLBI aimed at developing and validating new modeling and *in vivo* measurement tools for evaluating and predicting upper airway dysfunction in children.

Upper airway obstruction is a problem that affects up to 3% of all children. The most common cause of upper airway obstruction is related to adenotonsillar hypertrophy. Adenotonsillectomy (AT) is among the most common operations performed in the United States with about 600,000 children undergoing AT each year. AT results in significant improvement in relieving symptomatic airway obstruction in the vast majority of children. However, large numbers of children do not benefit from this treatment, and this is particularly true in children with cranial facial anomalies, Down syndrome, and obesity. Identifying children who fail to respond to AT prior to surgery is exceptionally challenging.

The integrated multi-center international team (collaborators include faculty from Queens University, Kingston, Ontario, Canada; University of North Carolina; and the Medical College of Wisconsin in Milwaukee) will focus on the development of supercomputer-based computational models to simulate airflow and then identify the anatomical components contributing to upper airway obstruction. To provide *in vivo* anatomic data for modeling, the principal investigators will develop a high speed Fourier Domain mode locked swept source laser based anatomic optical coherence tomography (FD-A-OCT) system to achieve near real-time 3-D imaging of the upper airway. The broad long-term objective of this proposal is to accurately model upper airway airflow using high-speed 3-D FD-A-OCT in tandem with supercomputer-based computational fluid dynamics. The goals are to (1) image upper airway anatomy in awake children and then (2) simulate the flow of air through the nose and pharynx to gain information on flow, pressure, and turbulence. Dr. Wong and colleagues ultimately hope to use this technology to improve accuracy in selecting

(Pediatric Surgery continued on p. 7)

A Novel Way to Treat Port Wine Stain Birthmarks

Associate Professor of Dermatology Kristen Kelly, M.D., and Assistant Professor of Biomedical Engineering Bernard Choi, Ph.D., have been awarded a 5-year R01 grant from the National Institutes of Health (NIH) for "Novel optical treatment approach for vascular birthmarks." Each year, approximately 400,000 children are born with port wine stain (PWS) birthmarks. They and their families are confronted with the devastating psychological and physical consequences of this disease. This proposal is a multidisciplinary collaboration between basic and physician scientists designed to improve treatment of pediatric PWS and provide clinical translation of a novel therapeutic regimen: combined photodynamic therapy and pulsed dye laser (PDT+PDL) treatment.

Preliminary data has indicated that the combined treatment can enhance the removal of targeted microvasculature. The objective of the proposal is to investigate the safety and efficacy of PDT+PDL which, it is hoped, will achieve better PWS skin blanching compared to conventional PDL alone. Specific aims are to: (1) identify PDT+PDL therapeutic protocols with clinical applicability; (2) identify candidate mechanisms of action of the PDT+PDL protocol; (3) identify clinically relevant light doses with therapeutic efficacy; and (4) determine clinical outcomes of the selected PDT+PDL protocol on adolescent and adult patients.

The proposed translational research will introduce a new therapeutic method to the field of pediatric dermatological therapy. If successful, the outcome will be a more effective clinical method for treating patients with PWS birthmarks. Removing PWS birthmarks in children will eliminate the physical and psychosocial trauma these lesions inflict and will significantly and positively impact the life of affected individuals and their families. ■

Newsbriefs *(cont'd from p. 1)*

from each of the Journals published by the Optical Society of America.

LEGOs and Optics

It started with a simple request to BLI Director Bruce Tromberg for a tour of the Beckman Laser Institute to spark the imaginations of a group of 10-13 year old boys who would be competing in this year's First LEGO League (FLL) with the biomedical theme of "Body Forward." This would be their second year of competition. It resulted in the "Demo/ Magical Photonics Show" on November 5, 2010. Organized by BLI Postdoctoral

BLI researchers with LEGO team

Fellow Darren Roblyer, with a lot of help from his colleagues, including Professor Bernard Choi and Postdoctoral Fellow Rolf Saager, the BLI library was set-up as laser speckle imaging (LSI) and mini-Diffuse Optical Spectroscopy (DOS) labs. The boys who comprise the LEGO robot club/team saw optics demonstrations that included an infrared camera, holograms, blacklight with a dollar bill, diffraction grating and balloon popping with a laser. There were also demonstrations on LSI and DOS. The LEGO competition was held on November 7, and according to the coach, Peter DeBarber, "I am happy to report that our team did very well in yesterday's tournament. We received a 1st place award for robot performance and a 2nd place overall award so that means we qualify to compete in the regional championship in December. The boys were thrilled because last year we did not qualify for the regionals. Quite a turn around for them."

Treating Cancer with Light

A talk given by BLI postdoctoral fellow Rolf Saager entitled "A LED based spatial frequency domain imaging system for optimization of photodynamic therapy of basal cell carcinoma (BCC)" on October 26, 2010, at the 94th Annual Meeting of the Optical Society (OSA) in Rochester, NY, has been noted on the websites of Yahoo!India, Photonics Online and CNET News. Dr. Saager, who works in the lab of BLI Associate Professor Anthony Durkin in collaboration with Associate Professor of Dermatology Kristen Kelly and Modulated Imaging Inc., is developing new technologies that simplify and enhance the way that photodynamic therapy (PDT) could be used to treat skin cancer. In PDT, photosensitizing chemicals that absorb light are injected into a tumor which is then exposed to light. The chemicals generate oxygen radicals from the light energy, destroying the cancer cells. PDT is currently approved by the U.S. Food and Drug Administration (FDA) for the treatment of esophageal and lung cancer. Exploiting a technique known as spatial frequency domain imaging, Dr. Saager and his colleagues have designed a new device with an array of five different colors of LEDs that illuminates skin with distinct intensity patterns. These patterns can change depending on the structure of the tissue and the pigments in the skin. With appropriate models of light propagation, the resulting images reveal the biochemistry of the tissue. "Through this imaging modality, it is now possible to assess how the therapeutic light will travel throughout the affected tissue, quantify the drug present within the lesion and monitor its efficacy during treatment," says Saager. He hopes that this imaging technique will provide a better map for targeting and optimizing PDT for basal cell carcinoma, the most common type of skin cancer.

ASLMS Aesthetics Course

The American Society for Laser Medicine and Surgery (ASLMS) presented a weekend course designed for physicians and other clinicians who currently use or are investigating use of lasers in their practice at the Beckman Laser Institute on November 6-7, 2010. The course provided the 48 participants with an understanding of lasers and other light energy-based technology and their use in clinical aesthetic applications. Speakers included J. Stuart Nelson, M.D., Ph.D., Medical Director of the Beckman Laser Institute and Medical Clinic, Emil A. Tanghetti, M.D., Center for Dermatology and Laser Surgery in Sacramento, CA, Richard E. Fitzpatrick, M.D., La Jolla Cosmetic Surgery Center, and E. Victor Ross, M.D., Scripps Clinic, Laser and Cosmetic Dermatology.

ARCS Visit BLI

The Orange County chapter of the National ARCS (Achievement Rewards for College Scientists) Foundation, Inc., met at the Beckman Laser Institute on November 10, 2010. A luncheon talk was given by BLI Medical Director J. Stuart Nelson on laser treatment of vascular malformations in infants and young children. Afterwards, tours of the Institute were given by Director of Development Erin Miller and

ARCS members pictured in front of Beckman Laser Institute.

Technology Transfer Manager Deborah Birnie which included demonstrations by some of the BLI researchers. The foundation is a unique, non-profit, national volunteer organization of women dedicated to providing scholarships to academically outstanding U.S. citizens studying to complete their degrees in science, medicine and engineering. The foundation funds the ARCS Scholar Awards (http://www.grad.uci.edu/ finance/arcs/index.htm) which are intended to recognize and reward UC Irvine's most academically superior doctoral students exhibiting outstanding promise as scientists, researchers and public leaders.

Congratulations to UROP, SURP, ID-SURE and B-SURP Recipients

Each academic year (Fall, Winter, Spring quarters), the UCI Undergraduate Research Opportunities Program (UROP) awards fellowships to support noteworthy research. For summer, the UROP funds noteworthy research under the SURP (Summer Undergraduate Research Program), ID-SURE (Interdisciplinary Summer Undergraduate Research Experience) and B-SURP (Biophotonic-Summer Undergraduate Research Program). On August 19, 2010, half of the B-SURP fellows gave oral presentations at the BLI Library while the other half presented posters. The following undergraduate students were named as UROP Fellows for 2009-2010.

Holly Aguigam (UROP), UC Irvine, received funding for "Clinical research study to evaluate the effects of prototype dentifrices on soft-tissue architecture."

Mahtasedat Alvai (B-SURP), UC Irvine, received funding for "Design and construction of an active microrheometer."

Anthony Au (B-SURP), UC Irvine, received funding for "Validation of a numerical model for port wine stain laser therapy."

David Avila (UROP), UC Irvine, received funding for "Investigating the correlation between frontal and lateral views of the face using internet-based ratings."

Faisal Chaabani (B-SURP), UC Irvine, received funding for "The miniaturization of a laser breast scanner with a praevium light source for diffuse optical spectroscopic imaging."

Jason Chen (B-SURP), Johns Hopkins, received funding for "Anatomical optical coherence tomography for sleep apnea."

Derek Chien (UROP, SURP), UC Irvine, received funding for "Design and construction of an active micro-rheometer."

Chih-Hsuan Chou (UROP), UC Irvine, received funding for "Treatment

(UROP Fellows continued on p. 6)

Selected Recent Publications

"A physical method to enhance transdermal delivery of a tissue optical clearing agent: combination of microneedling and sonophoresis" by J. Yoon, D. Park, T. Son, J. Seo, J. S. Nelson and B. Jung in *Lasers in Surgery and Medicine* 42: 412-417, 2010.

"Analysis of DNA double-strand break response and chromatin structure in mitosis using laser microirradiation" by V. Gomez-Godinez, T. Wu, A. J. Sherman, C. S. Lee, L.-H. Liaw, Y. Zhongsheng, K. Yokomori and M. W. Berns in *Nucleic Acids Research* 1-18, doi:10.1093/nar/gkq836, 2010.

"Ability of optical coherence tomography to detect caries beneath commonly used dental sealants" by J. S. Holtzman, K. Osann, J. Pharar, K. Lee, Y.-C. Ahn, T. Tucker, S. Sabet, Z. Chen, R. Gukasyan and P. Wilder-Smith in *Lasers in Surgery and Medicine* 42: 752-759, 2010.

"A biological global positioning system: considerations for tracking stem cell behaviors in the whole body" by S. C. Li, L. M. L. Tachiki, J. Luo, B. A. Dethlefs, Z. Chen and W. G. Loudon in *Stem Cell Reviews and Reports* 6: 317-333, 2010.

"Imaging of normal and pathologic joint synovium using nonlinear optical microscopy as a potential diagnostic tool" by N. Tiwari, S. Chabra, S. Mehdi, P. Sweet, T. B. Krasieva, R. Pool, B. Andrews and G. M. Peavy in *Journal of Biomedical Optics* 15: 056001, 2010.

Spanier *(cont'd from p. 1)*

dents. Okten, who received his Ph.D. in 1997, is now Associate Professor of Mathematics at Florida State University. Maize is currently Deputy Program Manager and Manager for Spacecraft Operations at the Jet Propulsion Laboratory in Pasadena, CA; he received his Ph.D. in 1981. Maize shared the podium with Sepikas, who is now completing his dissertation on topics in the same general area as Maize's thesis. Dr. Hayakawa spoke in the afternoon "birthday" session about research on adaptive Monte Carlo methods, work that she, Dr. Spanier and Rong Kong, another Claremont Ph.D. (1999), are performing. The other afternoon talks were offered by Ilya Medvedev, a young Russian mathematician, and by Fred Daum of Raytheon and R. Gabriel Esteves of the University of Waterloo in Canada. These last two speakers work on Kalman filters and nonlinear optimization techniques, a topic on which another of Dr. Spanier's Claremont students, Kaiqi Xiong, has contributed extensively and on which he based his 1996 Claremont dissertation. The conference website http://mcqmc.mimuw.edu.pl/ provides a closer look at the event and has a number of photos taken throughout the week.

A conference highlight is the traditional Wednesday evening banquet which was held this year in a magnificent art gallery, an easy walk from the Warsaw University campus. The sumptuous meal complemented the elegant surroundings and was followed by a beautiful concert featuring the flute, violin and piano. At the banquet, Dr. Spanier was presented with a beautiful volume of photographs of Warsaw, a bottle of very special "Chopin" vodka (2010 marks the 200th anniversary of Chopin's birth in a small town near Warsaw), and a festive birthday cake. The photograph book had been inscribed by many of the conferees – another surprise for Dr. Spanier. Dr. Spanier was accompanied to Warsaw by his vivacious wife, Bunny, who was so pleased to share this very memorable occasion with her husband of 58 years. ■

UROP Fellows *(cont'd from p. 5)*

of malignant brain tumors using non-viral PAX6 gene therapy and photochemical internalization."

Dominic Gallegos (B-SURP), MIT, received funding for "Laser calibration curve and photonic crystal profile for the LFD."

Gregory Grant (B-SURP), UC Santa Barbara, received funding for "Quantitative spectroscopy of layered media: interpretation of depth-dependent optical properties."

Ashley Hamamoto (UROP), UC Irvine, received funding for "Determining the perfect aesthetics of an ideal eyebrow in Caucasian females."

Michael Hoang (ID-SURE), UC Irvine, received funding for "Ex vivo oral wetness."

Kenji Ikemura (B-SURP), UC Irvine, received funding for "Generating pre-stress and its analysis by imaging."

Shauna Ingle (B-SURP), UC Irvine, received funding for "CARS detection of a deuterated compound applied to hair."

Deena Jamal (UROP), UC Irvine, received funding for "The role of the glycocalyx layer in endothelial cell mechanotransduction and its presence in vitro."

Jean Kang (B-SURP), Scripps College, received funding for "Exploring the use of discrete wavelengths versus spectral bandwidth in determining hemoglobin oxygen saturation in breast cancer tissue."

Infranali Kermalli (B-SURP), UC Irvine, received funding for "Cross-validation techniques for absorption/scattering spectra of silicone-based phantoms."

Jinwan Kim (SURP), UC Irvine, received funding for "Control of costal cartilage warping using electromechanical reshaping."

Amanda Lim (UROP), UC Irvine, received funding for "Evaluating the relationship between voltage magnitude and degree of tissue softening in EMR-treated rabbit septal and auricular cartilage."

Justin Lin (UROP), UC Irvine, received funding for "The centrosome

(UROP Fellows continued on p. 8)

Honors and Awards *(cont'd from p. 2)*

Jennifer Holtzman, D.D.S., D.P.H.

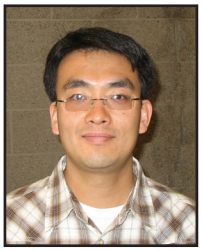
BLI Assistant Professor Jennifer Holtzman is the Principal Investigator of a mini-grant from the UCI Center for Future Health Professionals entitled "Open wide, trek inside." Using a curriculum devised by the National Institutes of Health, UCI students, under the direction of Dr. Holtzman, will be visiting 1st and 2nd grade classrooms to provide a series of 6-20 minute lessons that will help children understand major concepts related to oral health by focusing on the science of the oral environment. The program integrates science, language arts, and mathematics with health through mini-documentaries, animation, and interactive activities.

Amaan Mazhar, Ph.D.

Dr. Amaan Mazhar

Amaan Mazhar defended his thesis, "Absorption, fluorescence, and dynamic scattering in spatial frequency domain imaging (SFDI)," on August 27, 2010. He worked in BLI Director Bruce Tromberg's lab. Receiving his Ph.D. degree in Biomedical Engineering, Amaan has accepted a postdoctoral position with Drs. Tony Durkin and Bernard Choi at BLI to accelerate translation of Wide-field Imaging (WiFI) technologies for clinical applications.

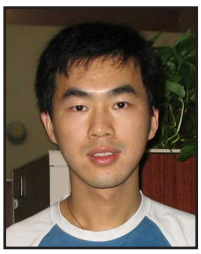
Chang Soo Kim, Ph.D.



Dr. Chang Soo Kim

Chang Soo Kim defended his thesis, "Optimized delivery of tailored gold nanoparticles for enhanced optical coherence tomography imaging," on November 22, 2010. He worked in the labs of Professor of Biomedical Engineering Zhongping Chen and Professor of Chemical Engineering Young Jik Kwon. Chang Soo plans to study nanoparticle synthesis and its applications for cancer detection and therapy.

Jing Liu, Ph.D.



Dr. Jing Liu

Jing Liu defended his thesis, "Three-dimensional diffuse optical spectroscopic imaging in reflectance geometry," on November 30, 2010. He worked in the DOSI (diffuse optical spectroscopy imaging) lab under the supervision of Dr. Bruce Tromberg. Jing has accepted a postdoctoral position at the Center for Molecular and Genomic Imaging at UC Davis.

Nicole Wakida, Ph.D.

Dr. Nicole Wakida

Nicole Wakida defended her thesis, "Optical manipulation of the cell cytoskeleton," on September 2, 2010. She worked in the lab of Dr. Michael W. Berns.

Lih-Huei (Leacky) Liaw

Newly retired BLI Director of the Histology and Electron Microscope Facility Leacky Liaw recently returned from her junior high school reunion in Taiwan with a Distinguished Alumni Award from her class. She also received a Distinguished Alumni Award from her high school last year.

Samar Shreim

Samar Shreim, a graduate student in Biomedical Engineering, has received a training fellowship from the Edwards Lifesciences Center for Advanced Cardiovascular Technology for "Measuring mechanics at the blood-endothelial interface." Samar works in the lab of Dr. Elliot Botvinick.

Arrivals and Departures

ARRIVALS


Ashley Hamamoto

Ashley Hamamoto, B.S., has been hired as a Jr. Specialist. She will work for Dr. Brian Wong on developing methods to reshape cartilage tissue.

Jennifer Holtzman, D.D.S., D.P.H., has joined Dr. Petra Wilder-Smith's lab as an Assistant Professor after directing community-based service projects for the last 10 years through the University of Southern California School of Dentistry. She will be working with Dr. Wilder-Smith on translational research that focuses on tooth decay prevention.


Karsten Koenig

Karsten Koenig, Ph.D., Professor and Head of the Department of Biophotonics and Laser Technology of the University of Saarland, Germany, and President of the company, JenLab GMbH, will be at BLI for a few months to focus on multimodal multiphoton microscopy including CARS. He has plans to establish a clinical multiphoton tomography instrument (multimodal) at BLI to perform the first two-photon imaging studies on patients with dermatological disorders. He will be working with a variety of researchers including Drs. Bruce Tromberg, Eric Potma and Petra Wilder-Smith as well as clinicians, Drs. J. Stuart Nelson and Kristen Kelly.

Thomas O'Sullivan, Ph.D., is a postdoctoral fellow from Stanford University who is joining Dr. Bruce Tromberg's research team to work on the development and application of diffuse optical spectroscopy and imaging in cancer.


Dmitry Yudovsky

Dmitry Yudovsky, Ph.D., will be working with Dr. Anthony Durkin. He recently earned his Ph.D. from UCLA and has come to BLI to work in the Wide-field Functional Imaging (WiFI) technologies lab. He will be involved with a couple of different projects, including development of the next-generation spatial frequency domain imaging system in collaboration with Modulated Imaging Inc., as well as lending his expertise in layered systems and modeling of the problem of optical characterization of wounds with a particular emphasis on burns.


Thomas O'Sullivan and Jennifer Holtzman

DEPARTURES

Devi Callian, Purchasing Assistant in the BLI Administrative Office for five years, has left to spend more time with her family and new grandchild.

Pediatric Surgery *(cont'd from p. 3)*

patients for and predicting the response to surgery.

This proposal integrates the expertise in optical coherence tomography of Dr. Chen, device design of Dr. Wong, and computational fluid dynamics of Dr. Elghobashi to develop a system to generate real-time, 3-D volumetric images of the internal airway structure and estimate airflow dynamics in children. The structural information on internal airway anatomy will allow simulation of upper airway airflow and estimation of the impact of surgery on relieving airway obstruction. In turn, modeling will provide a means to determine which children will benefit from specific upper airway operations and is a first step toward developing individualized surgical therapy.

According to Dr. Wong, the lead Principal Investigator, "If we are successful, we will be able to use this combined technology platform to individualize surgery and even perform virtual surgery prior to the surgeon ever touching the patient. That is, at least, the dream. We are in an age of molecular medicine where treatment and therapy are becoming individualized based upon the specific genetic information for each patient. This approach we are advocating is very similar to individualized medicine except that we are focusing on each individual's unique anatomy, rather than their genes per se. I envision a day when we will have children with cranial facial deformities who have upper airway problems undergo modeling and simulation which will allow surgeons to identify not only the sight of the airway obstruction but also simulate the procedures which would treat this and simulate the outcomes." ■

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

BECKMAN LASER INSTITUTE

1002 Health Sciences Road East

Irvine, California 92612

http://www.bli.uci.edu

Nonprofit Organization
U.S. Postage
PAID
Santa Ana, CA
Permit No. 1202

Return Service Requested

UROP Fellows *(cont'd from p. 6)*

and its role in the process of cell migration."

Tiffany Liu (UROP), UC Irvine, received funding for "Determining the perfect aesthetics of an ideal eyebrow in Caucasian females."

Vincent Liu (B-SURP), UC Berkeley, received funding for "OCT elastography of bovine retina."

Tony Nguyen (UROP), UC Irvine, received funding for "Mechanical changes in stiffness of bovine tendon following electromechanical reshaping."

Katherine Nielsen (UROP), UC Irvine, received funding for "Monitoring of the microvascular network of VEGF-GFP transgenic mice following photothermal injury to blood vessels."

Breanna Padilla (UROP, SURP, B-SURP), UC Irvine, received funding for "Quantifying the nature of ECM influence on cell behavior in 3-D microenvironment using active microrheology."

Payal Patel (B-SURP), UC Irvine, received funding for "Development of a molecular imaging phantom for diffuse optical spectroscopic imaging."

Sarin Patel (SURP, B-SURP), UC Irvine, received funding for "Three-dimensional surface profile and height correction for spatial frequency domain imaging."

Vaidya Poorva (B-SURP), UCLA, received funding for "Degradation of cellulose into ethanol analyzed by Raman spectroscopy."

Rombod Rahimian (B-SURP), UC Irvine, received funding for "Spatial frequency domain imaging."

David Rolfe (B-SURP), Harvey Mudd College, received funding for "Design of a novel tracking device for diffuse optical spectroscopic imaging."

Adria Sherman (UROP, B-SURP), UC Irvine, received funding for "A characterization of the DNA damage response for parameterized laser induced DNA damage of mitotic chromosomes."

Scott Strayer (UROP), UC Irvine, received funding for "Construction of an active micro-rheometer."

Erica Su (UROP), UC Irvine, received funding for "Evaluation of laser ablation of knee cartilage as an alternative to microfracture surgery."

Kathleen Teves (UROP), UC Irvine, received funding for "Monitoring of the microvascular network of VEGF-GFP transgenic mice following photothermal injury to blood vessels."

Alex Truong (UROP), UC Irvine, received funding for "Assessing the impact of mechanical properties of the ECM on smooth muscle cell morphology."

Travis Tucker (UROP) UC Irvine, received funding for "Ex vivo oral wetness."

Diana Vu (UROP), UC Irvine, received funding for "Spectral characterization of dental demineralization and decay."

Joseph Youssef (UROP, ID-SURE), UC Irvine, received funding for "Pulp vitality with laser speckle imaging."