



## BECKMAN LASER INSTITUTE

## IN THE NEWS

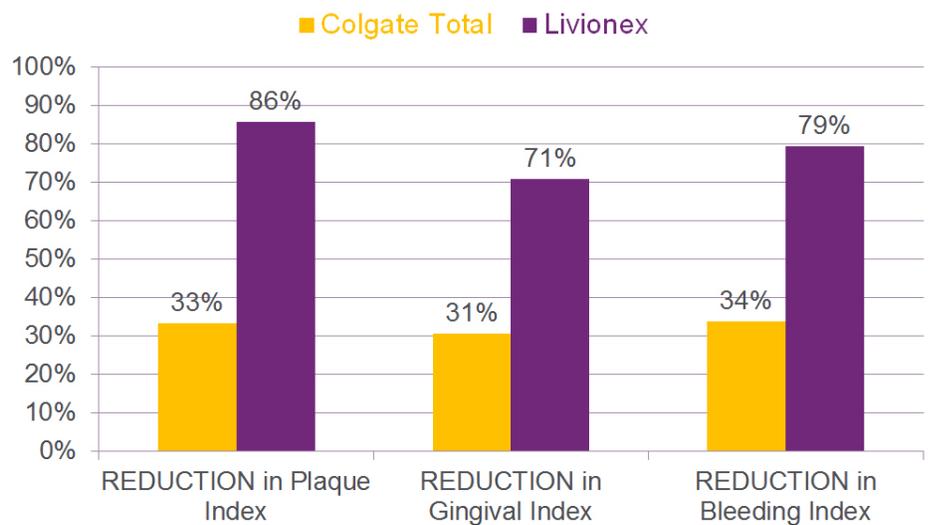
Founder's Column	2
Newsbriefs	3
Research Update	4
Recent Publications	5
Arrivals and Departures	7

SPRING 2015

## Research Performed at BLI Highlighted on Morning Television

Beckman Laser Institute (BLI) Dental Director Petra Wilder-Smith appeared on *CBS This Morning* regarding her research that was funded by a grant from Livionex, entitled "Safety and efficacy of Livionex dental gel in reducing plaque, gingival inflammation and gingival bleeding." The segment, which was taped at BLI, aired on March 3, 2015.

Livionex founder and CEO Amit Goswamy claims that conventional toothpaste uses detergents and abrasives to remove plaque, but Livionex is the first to attack bacteria at the molecular level, making it more difficult for it to stick to teeth in the first place. After a three-week study which compared Livionex gel to top-rated Colgate Total, Dr. Wilder-Smith found that subjects who used Livionex had 2.5 times less plaque, and their gums were more than twice as healthy. "But also the structure of the plaque was quite different," Dr.



Wilder-Smith noted. "They did not seem to be bound onto the teeth in the same fashion as we normally see in dental plaque." Images of a tooth four hours after using Livionex compared to regular toothpaste reveal much less bacteria and

less of the sticky substance that binds the bacteria to the tooth.

When asked what would have happened if her research had found that the product was no more effective than

*(Dental Research continued on p. 6)*

## Honors and Awards

### Elliot Botvinick, Ph.D.

Associate Professor Elliot Botvinick has won one of just four technology development awards from the University of California Center for Accelerated Innovation (UC CAI). The UC CAI, a collaboration of all five UC medical campuses, is focused on advancing promising medical/health technologies from research to commercialization. Dr. Botvinick is developing a microchip device to continuously monitor lactate concentration in critically ill patients. While lactate monitoring has been shown to significantly improve outcomes

in trauma and sepsis patients, current technologies require the logistical burdens of serial monitoring and/or lab panels. This real-time measurement device can return results continuously, helping doctors better achieve goal-directed treatment.

### Zhongping Chen, Ph.D.

A multi-institute, 4-year grant, "Combined OCT/US/PAT system for intravascular imaging," has been awarded by the National Institutes of Health (NIH), National Heart, Lung and Blood Institute, to Dr. Zhongping Chen, Beckman Laser Institute (BLI) at UCI, Dr. Qifa Zhou, NIH Transducer

Resource Center at USC, and Dr. Pranov Patel, Department of Cardiology at UCI. The broad, long term objective of this proposal is to develop an integrated multimodal intravascular imaging system that combines intravascular ultrasound (IVUS), optical coherence tomography (OCT), and photoacoustic tomography (PAT). The multimodal intravascular imaging system is unique in that it combines the advantages of high spatial resolution of OCT, broad imaging depth of US, and molecular contrast of PAT. The integrated IVUS/OCT/PAT will provide the physician with a powerful tool for imaging, diagnosing, and managing vul-

*(Honors and Awards continued on p. 6)*

## Robbie

by Michael W. Berns, Ph.D.

Arnold and Mabel Beckman Professor  
Co-Founder, Beckman Laser Institute

Robbie was my partner from the beginning: from when the embryonic idea to establish a laser institute first materialized until it matured into something tangible. I distinctly recall the Open House in Steinhaus Hall in 1980 to celebrate the opening of the National Institutes of Health (NIH) Laser Microbeam Program (LAMP). It was her idea to have the open house around my birthday so we could celebrate afterwards. She helped me design the open house flyer, and she coached me every inch of the way because I had never done something like this. She was the “people-person,” and I was the scientist. We were the perfect team. Then when Dr. Arnold Beckman showed up at the open house,

she encouraged me to pursue a relationship with him in a slow but deliberate way. When he subsequently asked me for a proposal, Robbie’s writing skills rescued me. (Her textbook, Child, Family, School, Community, came out in its tenth edition a week before she passed away; it’s been adopted by over 100 colleges and universities over the years. I’m sad she won’t be able to enjoy its continued success.)

Robbie has been at my side during BLI fundraising, during the building construction, the gala opening, through all the management/control issues over 30 years, and through the planning of programmatic directions. She was there when Democratic presidential candidate Michael Dukakis visited BLI and laser-carved his name in a honeydew melon. She told me to “chill-out” when not one of the staunchly Republican BLI board members would attend the event, and it was Robbie who took on the responsibility of organizing the now famous 90th

birthday party in 1990 for Dr. Beckman with Ninetta Herbert at the former Nixon Western White House in San Clemente. The birthday card commemorating the event with signatures of 5 of the living presidents at the time is on display at the BLI Library.

Robbie has been with me every step of the way. Without her, I doubt very much there would be a BLI. It’s not something I could have done alone. Her own achievements in education [her textbook, founding the Department of Human Development and establishment of “Project Special” (a program to train handicapped students to become teachers) at Saddleback College] are remarkable in their own right, but she never liked to talk about her accomplishments. I am probably violating her wishes by mentioning them here, but I can’t help myself, and people need to know who she was and how she touched their lives. ■

## Ph.D. Recipients

**Goutham Ganesan, Ph.D.**



Goutham Ganesan (left) with Dr. Pietro Galassetti

Goutham Ganesan, who worked in the labs of Dr. Bruce Tromberg and Dr. Pietro Galassetti, presented his dissertation defense,

“Applications of diffuse optical spectroscopy in exercise physiology and metabolic disease,” on March 18, 2015. Goutham will be concentrating on completing medical school at UCI for the next two years.

**Jiawen Li, Ph.D.**

Jiawen Li, who worked in the lab of Dr. Zhongping Chen, presented her dissertation thesis, “Development of an ultrafast



Dr. Zhongping Chen (left) with Jiawen Li

integrated IVUS-OCT system and catheter for in vivo applications” on June 9, 2015.

Jiawen has accepted a Research Fellow position

at the School of Electrical Engineering, University of Western Australia, Perth, Australia.

**Wesley Moy, Ph.D.**



Dr. Bernard Choi (left) with Wesley Moy

Wesley Moy, who worked with Dr. Bernard Choi, presented his dissertation defense, “Alternative therapies in

the treatment of port wine stain birthmarks,” on May 19, 2015. Wesley has accepted a postdoctoral position at the Beckman Laser Institute in the lab of Dr. Brian Wong.

**Kyle Nadeau, Ph.D.**



Dr. Bruce Tromberg (left) with Kyle Nadeau

Kyle Nadeau, who worked in the lab of Dr. Bruce Tromberg, presented his dissertation defense, “High-speed, quantitative tissue spectral

imaging in the spatial frequency domain,” on May 29, 2015. Kyle will begin working at Fitbit in San Francisco, CA, in July as a Research Scientist.

**UC Regent Visits BLI**

UC Regent Fred Ruiz visited the Beckman Laser Institute (BLI) on December 11, 2014, for a tour that highlighted the ongoing research that takes place at the institute. Accompanied by UCI Associate Chancellor Ramona Agrela, UC Regent Ruiz is interested in fostering closer relationships between UC campuses and the UC Regents.



*Demonstrations in the Advanced Technology Suite (ATS). From left to right: M.D./Ph.D. student Michael Ghijsen, UCI Associate Chancellor Ramona Agrela, UC Regent Fred Ruiz and Prof. Bernard Choi.*

The tour began in the Advanced Technologies Suite (ATS) in the BLI Clinic that enables efficient testing of newly evolving technologies within the context of IRB approved human studies. Demonstrations in the ATS included diffuse optical spectroscopy and imaging of tissue metabolism, blood flow imaging, and in-vivo microscopy. The tour continued to the Operating Room where Dr. Kristen Kelly highlighted the success of the dynamic cooling device, an example of a technology that was developed at BLI which has had a dramatic impact in terms of enabling laser therapies and has been very successful commercially. The next stop was the optical coherence tomography lab where graduate students demonstrated the latest advances in microscopic imaging technologies that can be delivered to the various anatomical locations via optical fiber. The non-linear microscopy facility was the next stop on the tour where staff scientists illustrated recent advances in imaging of engineered tissues, breast cancer, and melanoma. The tour concluded with Dr.

Petra Wilder-Smith describing her research to develop a low-cost portable screening device to detect possible oral cancer for use by field workers in India.

**Top Doctors in Orange County**

Three physicians who do research at the Beckman Laser Institute were selected as “Top Doctors of 2015” in the January 2015 issue of *Orange Coast* magazine. The doctors are: Matthew Brenner (Pulmonary Disease), Kristen M. Kelly (Dermatology), and Brian J. F. Wong (Otolaryngology). Doctors were selected from a survey conducted by Castle Connolly Medical Ltd. which is a health care research and information company founded in 1991 to help guide consumers to America’s top doctors and top hospitals. Castle Connolly’s physician-led team of researchers follows a rigorous screening process to select top doctors on the national and regional levels.

**Former BLI Alumni Elected to ASLMS Student Board**



*Austin Moy (left) and Edward Kuan*

Austin Moy, Ph.D., who earned his Ph.D. in the lab of Dr. Bernard Choi, and Edward Kuan, M.D., M.B.A., who worked with Dr. Brian Wong, were elected to the Student Board of the American Society for Laser Medicine and Surgery (ASLMS) by the ASLMS Board at the recent 35th Annual ASLMS Meeting in Kissimmee, FL, held on April 22-26, 2015. Dr. Moy (Early Career Scientist Representative) and Dr. Kuan (Resident/Fellow Representative) will serve two year terms.

**BLI Adjunct Full Professor Robert G. W. Brown Joins AIP as CEO**

Effective June 1, 2015, Beckman Laser Institute (BLI) Adjunct Full Professor Robert G. W. Brown is the Chief Executive Officer (CEO) of the American Institute of Physics (AIP). Formed 84 years ago, AIP is a non-profit federation of scientific societies, including the



*Dr. Robert Brown’s appointment announced at NY Times Square.*

Optical Society of America and the American Physical Society, that enhances the disciplines within the physical sciences, fosters collaborative efforts and promotes the value of science to the public, government officials and agencies, policy makers and other influential individuals. AIP Member Societies collectively represent more than 120,000 scientists, engineers, educators and students in the global physical sciences community.

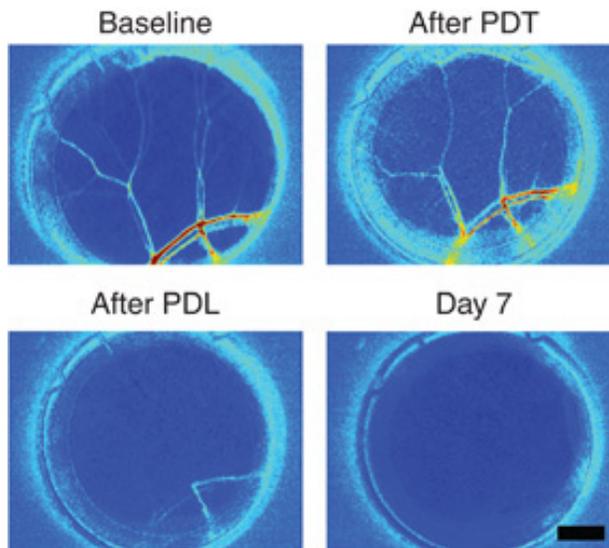
Dr. Brown comes to AIP with 40 years of experience as a leader in the physical sciences. In addition to his affiliation with BLI, he is also an adjunct full professor in UCI’s Department of Computer Science. He previously served as the chief sensor scientist at the Advanced Technology Center of Rockwell Collins, Inc. “I am honored to have been chosen to lead AIP and help shape physics and physical sciences for the 21st century,” said Dr. Brown. “Discoveries in the physical sciences inform our understanding of everything

*(Newsbriefs continued on p. 4)*

## A New Approach for Port Wine Stain Treatment

Currently, standard treatment for port wine stain (PWS) birthmarks in the United States involves the use of lasers or intense pulsed light to selectively photocoagulate the abnormal vasculature. With photothermal therapy, PWS often become lighter, but patients must undergo many treatments. Furthermore, treatment of skin types IV-VI is difficult owing to absorption of light by overlying epidermal melanin, limiting treatment safety and efficacy.

Photodynamic therapy (PDT), an alternative option, involves optical excitation of photosensitizers localized primarily within the intravascular component enabling targeted vascular destruction. Treatment can be effective, but it is associated with prolonged photosensitivity and substantial scarring risk. Talaporfin sodium (TS) is a photosensitizer with proven selective vascular effects in preclinical studies. In “Talaporfin sodium-mediated photodynamic therapy alone and in combination with pulsed dye laser on cutaneous vasculature” published in the *Journal of Investigative Dermatology* 135:



Combining talaporfin sodium (TS)-mediated photodynamic therapy (PDT) and pulsed dye laser (PDL) allows use of lower energies for both treatments, improving safety, while still achieving long term shutdown of blood vessels. Representative maps of blood flow that demonstrate long term blood vessel shutdown at day 7. In this specific example, PDT ( $60 \text{ J cm}^{-2}$ ) was applied followed by PDL ( $6 \text{ J cm}^{-2}$ ). This combination resulted in blood vessel shutdown that lasted for 7 days.

302-304, 2015, Beckman Laser Institute researchers K. M. Kelly, W. J. Moy, A. J. Moy, B. S. Lertsakdadet, J. J. Moy, E. Nguyen, A. Nguyen, K. E. Osann and B. Choi test the hypothesis that dual phototherapy treatment with TS-mediated PDT and ensuing pulsed dye laser (PDL)

therapy will achieve persistent vascular shutdown with lower radiant exposures than either PDT or PDL irradiation alone. Their preliminary results indicated that the combination of talaporfin solution (TS)-mediated photodynamic therapy (PDT) and pulsed dye laser (PDL) irradiation leads to a significant reduction in the characteristic PDT radiant exposure required to achieve persistent vascular shutdown (see Figure).

Dual phototherapy represents a potential new approach for more effective treatment of PWS birthmarks. Drs. Kristen Kelly and Bernard Choi have initiated a trial approved by the Investigational Review Board to evaluate intravenously administered TS/664-nm laser light-mediated dual phototherapy for PWS treatment.

Completion of this study will determine whether lesion lightening is greater with dual phototherapy than PDL alone. It is hoped that this combined low-energy dual phototherapy will offer clinicians and patients of all skin types improved lesion lightening in fewer treatments. ■

### Newsbriefs *(cont'd from p. 3)*

around us and are the basis for most of the modern technologies we use every day. AIP has been a mainstay for me throughout my career, and I am excited to build upon its strong tradition of member services while fostering the exchange of ideas among physical science and engineering professionals from around the globe.”

#### **BLI Professor named Editor-in-Chief**

Brian Wong, M.D., Ph.D., Professor, Vice-Chairman, and Fellowship Director

in Otolaryngology-Head and Neck Surgery, has been appointed to a 5-year term as Editor-in-Chief of *Lasers in Surgery and Medicine*.

#### **Col. Hack Visits BLI**

Col. Dallas C. Hack, M.D., visited the Beckman Laser Institute (BLI) on December 1, 2014, for a tour of the BLI. Col. Hack, Brain Health/Fitness Coordinator for the U.S. Army Medical Research and Materiel Command, was hosted by Dr. George Peavy, D.V.M., Director of Comparative Medicine Programs and Coordinator of the Military Medical Photonics Program at

BLI. In addition, Col. Hack presented a seminar entitled “Clinical needs in brain health and fitness—a Department of Defense perspective.”



Col. Dallas Hack (left) with Dr. George Peavy

## Recent Publications

“Multimodality imaging of the effects of a novel dentifrice on oral biofilm” by J. Ajdaharian, M. Dadkhah, S. Sabokpey, J. Biren-Fetz, N. E. Chung, C. Wink and P. Wilder-Smith in *Lasers in Surgery and Medicine* 46: 546-552, 2014.

“Distinct mechanism regulating mechanical force-induced Ca<sup>2+</sup> signals at the plasma membrane and the ER in human MSCs” by T. J. Kim, C. Joo, J. Seong, R. Vafabakhsh, E. L. Botvinick, M. W. Berns, A. E. Palmer, N. Wang, T. Ha, E. Jakobsson, J. Sun and Y. Wang in *Elife* 4: e04876, 2015.

“Effects of a novel dental gel on plaque and gingivitis: a comparative study” by M. Dadkhah, C. Wink, N. E. Chung, J. Ajdaharian, J. Holtzman, P. Klokkevold, R. Bhushan and P. Wilder-Smith in *Dentistry* 4: 239, 2014.

“Effect of blood flow restriction on tissue oxygenation during knee extension” by G. Ganesan, J. A. Cotter, W. Reuland, A. E. Cerussi, B. J. Tromberg and P. Galassetti in *Medicine and Science in Sports and Exercise* 47: 185-193, 2015.

“Laser-induced shockwave paired with FRET: a method to study cell signaling” by V. Gomez-Godinez, D. Preece, L. Shi, N. Khatibzadeh, D. Rosales, Y. Pan, L. Lei, Y. Wang and M. W. Berns in *Microscopy Research and Technique* 78: 195-199, 2015.

“Laser microbeam targeting of single nerve axons in cell culture” by N. Hyun, L. Z. Shi and M. W. Berns in *Methods in Molecular Biology* 1254: 211-226, 2015.

“Intraoperative long range optical coherence tomography as a novel method of imaging the pediatric upper airway before and after adenotonsillectomy” by F. B. Lazarow, G. S. Ahuja, A. C. Loy, E. Su, T. D. Nguyen, G. K. Sharma, A. Wang, J. Jing, Z. Chen and B. J. F. Wong in *International Journal of Pediatric Otorhinolaryngology* 79: 63-70, 2015.

“Combination of low level light therapy and nitrosyl-cobinamide accelerates wound healing” by R. Spitler, H. Ho, F. Norpetlian, X. Kong, J. Jiang, K. Yokomori, B. Andersen, G. R. Boss and M. W. Berns in *Journal of Biomedical Optics* 20: 051022, 2015.

“Long-range Fourier domain optical coherence tomography of the pediatric subglottis” by V. Volgger, G. K. Sharma, J. C. Jing, Y. S. A. Peaks, A. Chin Loy, F. Lazarow, A. Wang, Y. Qu, E. Su, Z. Chen, G. S. Ahuja and B. J. F. Wong in *International Journal of Pediatric Otorhinolaryngology* 79: 119-126, 2015.

“Rethinking nasal tip support: a finite element analysis” by D. Shamouelian, R. P. Leary, C. T. Manuel, R. Harb, D. E. Protsenko and B. J. Wong in *Laryngoscope* 125: 326-330, 2015.

“Long-term in vivo electromechanical reshaping for auricular reconstruction in the New Zealand white rabbit model” by K. W. Badran, C. T. Manuel, A. C. Loy, C. Conderman, Y. Y. Yau, T. Tjoa, E. Su, D. Protsenko and B. J. Wong in *Laryngoscope* (published online March 16, 2015).

“Electromechanical reshaping of ex vivo porcine trachea” by S. Hussain, C. T. Manuel, D. E. Protsenko and B. J. Wong in *Laryngoscope* (published online February 17, 2015).

## UCI Multimodality Intravascular Team Wins ICTS Science Award

The UC Irvine (UCI) Multimodality Intravascular Imaging Team has won the 2015 Robert Newcomb Interdisciplinary Team Science Award given by The Institute for Clinical and Translational Science (ICTS). This award was established to highlight and honor individuals who have played a formative role in bringing together teams of researchers from diverse, trans-, multi-, and interdisciplinary backgrounds in studies and projects that have advanced biomedical and clinical research. The Intravascular Imaging Team is a transdisciplinary col-

laboration of three groups of investigators from three institutions: OCT group (**Dr. Zhongping Chen** from the Department of Biomedical Engineering at UCI); IVUS group (**Dr. Qifa Zhou** from the NIH Transducer Resource Center at USC); and Interventional Cardiology group (**Dr. Pranav Patel** from the Department of Medicine and Division of Cardiology at UCI Medical Center). The Intravascular Imaging Team evolved from the common goal to develop an integrated intravascular imaging modality that can detect, diagnose, and manage vulnerable plaques to prevent the lethal consequences of atherosclerosis.

Dr. Chen leads UC Irvine's optical coherence

tomography research group which developed fundamental imaging systems that integrated OCT and other imaging modalities with complementary imaging contrast. Dr. Zhou from USC provides expertise in miniature ultrasound transducers and ultrasound imaging systems. Dr. Patel and his cardiology team leads in understanding the clinical problems and challenges, as well as providing guidance and development of in vivo animal studies and clinical protocols. Together, they have addressed the problem of designing and constructing a new intravascular imaging platform that integrates intravascular ultrasound (IVUS), optical coherence tomography (OCT), photoacoustic tomography (PAT), and acoustic radiation force optical coher-

(ICTS Award continued on p. 7)

### BLI Newsletter Staff

Editor: Bruce Tromberg

Writers: Elaine Kato, Erin Miller, Deborah Birnie

Layout & Design: Brian Hill

## Dental Research *(cont'd from p. 1)*

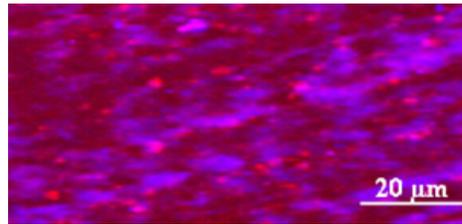
Colgate or Crest, Dr. Wilder-Smith responded, "Then that's what we would have published. We reserve the right to publish the results no matter what they are because we're scientists, and we're clinicians."

Livionex is not inexpensive. It is \$20 for 1.7 ounces, but Goswamy said cavities and root canals aren't inexpensive either. He said that the discussion moves from how does it taste to how does it work? "Twenty dollars is expensive, but if you're investing in your oral health, it pays back many times over."

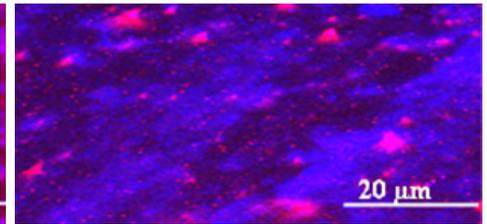
Dr. Wilder-Smith's work done with Livionex was also cited in the April 13-19, 2015, issue of *Orange County Business Journal*. ■

**In vivo multi-modality microscopy of oral plaque at gingival margin of the upper central left incisor - after brushing 2x daily for 3 weeks.**

### Colgate



### Livionex



**Top view:** Enamel rods are clearly visible in this 3-D reconstructed top view image. Blue signal originates from tooth and saliva; pink signal originates from salivary pellicle and red signal is from bacterial plaque. There is less bacterial plaque (red signal) in Livionex.



**Optical section of 3-D image:** A lateral view confirms the presence of pellicle and reduced bacterial plaque on the tooth surface for Livionex.

## Honors and Awards *(cont'd from p. 1)*

nerable plaques. Early detection of plaque lesions is the first and necessary step in preventing the lethal consequences of atherosclerosis. Atherosclerosis is a progressive disease that is characterized by the accumulation of lipids, cholesterol, fibrous constituents, monocytes, and various other inflammatory cells in the arterial wall. It is one of the major causes of morbidity and mortality in developed countries. The majority of deaths from heart attacks (86%) and brain aneurysms (45%) is due to "vulnerable plaques" that rupture suddenly and trigger a blood clot or thrombus that blocks blood flow. Cardiovascular disease is the number one killer in America. This proposal is expected to have significant impact on the earlier detection, prevention, and treatment of cardiovascular diseases.

### Eric Potma, Ph.D.

Associate Professor Eric Potma, co-collaborating with Profs. Filippo Capolino, Kuman Wickramasinghe and Ara Apkarian, has been awarded a grant from the W. M. Keck Foundation to develop a photonic "magnetic nanoprobe," a microscope able to amplify, detect and possibly manipulate the

extremely weak optical-frequency magnetic fields in matter. The microscope will allow the scientists to understand the interaction of matter with the magnetic component of light which would open up entirely new opportunities and fields of research in the engineering, physical and biological sciences.

### Alexander Lin, M.D., Ph.D.



*Alexander Lin (left) with Dr. Bruce Tromberg*

Alexander Lin, who worked in Dr. Bruce Tromberg's lab, graduated from the UC Irvine Medical Scientist Training

Program, earning an M.D./Ph.D. Alexander will be completing a medical intern year at UC Irvine before going to Washington University in St. Louis, MO, as a resident in radiation oncology.

### Jiawen Li, B.S.

Biomedical Engineering graduate student Jiawen Li received the Best Technical Poster Award for "Ultrahigh speed IVUS-OCT for clinical use" at the Optics in Cardiology Symposium held in

Rotterdam, The Netherlands, on March 11-13, 2015.

### Christian Crouzet, B.S.



*Christian Crouzet*

Biomedical Engineering graduate student Christian Crouzet has been named a recipient of a 2015 Graduate Research Fellowship from the National Science Foundation

(NSF) for his project entitled "Vascular normalization to restore cerebral metabolic activity and cognition during hypoxia." The proposed project involves investigating brains that have an inadequate blood vessel network to supply blood and, therefore, oxygen to the brain. This lack of oxygen consequently leads to specific bodily and cognitive impairment. The proposal attempts to utilize cognitive tests and quantitative optical imaging techniques to investigate how a tissue engineering-based strategy can restore and sustain an adequate blood vessel network, blood flow, oxygen supply, and cognitive function to a brain environment deprived of oxygen. The Graduate Research Fellowship Program (GRFP) offers fellowship awards directly

*(Honors and Awards continued on p. 8)*

# Arrivals and Departures

## ARRIVALS

**Adamo do Monte, Ph.D.**, is an Associate Professor from the Institute of Physics, Federal University of Uberlandia, Brazil. He is working with Drs. Anthony Durkin, Bruce Tromberg and Bernard Choi on “Characterization of phantoms and tissues using gold nanoparticles and spatial frequency domain techniques” for the next year.



Adamo do Monte

**Chang Hoon Han, M.D.**, is a visiting pulmonologist from the National Health Insurance Ilsan Hospital in South Korea. He is working in the lab of Dr. Matthew Brenner for one year to learn



Chang Hoon Han

about critical care translational model development and to use diffuse optical spectroscopy for developing effective cyanide antidotes.

**Mayer Saidian, M.Sc.**, a Ph.D. student from the School of Pharmacy, The Hebrew University of Jerusalem, Israel, has joined the lab of Dr. Bruce Tromberg as a Research Scholar for two years. He is collaborating with Drs. Elliot Botvinick, Jonathan Lakey, Tatiana Krasieva, Mihaela Balu, and Tony Durkin on non-invasive methods for detecting internal diseases, such as diabetes mellitus. Using multiphoton and Raman imaging, laser speckle imaging (LSI), and special frequency domain imaging (SFDI), Mayer will also evaluate the wound healing process in diabetics.



Mayer Saidian

**Zhuqing Zhu, Ph.D.**, is a Visiting Scholar from the School of Physical Sciences and Technology, Nanjing Normal University, China, who is working in the lab of Dr. Zhongping Chen for one year. He will be involved with optical coherence tomography (OCT) data processing as well as studying vector optical beams in OCT.



Zhuqing Zhu

## DEPARTURES

**Jun Zhang, Ph.D.**, has accepted a position as Assistant Professor at the Sun Yat-Sen University-Carnegie Mellon University Joint Institute of Engineering in Guangzhou, China. Dr. Zhang started as a postdoctoral fellow in Dr. Zhongping Chen's lab in 2002 working on optical coherence tomography. In 2006, he became a Project Scientist and then an Assistant Researcher in 2011.

## ICTS Award *(cont'd from p. 5)*

ence elastography (ARF-OCE). The multimodal intravascular imaging system is unique in that it combines the advantages of the high spatial resolution of OCT, broad imaging depth of US, molecular contrast of PAT, and tissue mechanical contrast of ARF-OCE. This multimodality intravascular imaging system will provide clinicians with a critically important tool for diagnosing vulnerable plaques, monitoring the progression of disease, and evaluating the efficacy of intervention.

The team has received multiple NIH multi-PI R01 grants to develop and translate this technology for clinical applications. They developed and demonstrated the first integrated IVUS/OCT technology for in vivo imaging of vulnerable plaques, and the IP granted for this technology has been licensed by OCT Medical Imaging Inc. The technol-

ogy has potential impact not only on cardiology but also on ophthalmology in diagnosis of corneal diseases and oncology in diagnosis of cancers in respiratory, urogenital, and gastrointestinal tracts. Finally, the intravascular PAT technology was recently published in *Science Report*. This team has truly shown the essence of Bob Newcomb's commitment to translational research at UC Irvine and the joining of researchers from diverse, trans-, multi-, and interdisciplinary backgrounds.

Other team members include: **Jiawen Li, M.S.**, Ph.D. student, Biomedical Engineering, UCI; **Teng Ma, M.S.**, Ph.D. student, Biomedical Engineering, USC;



UCI Multimodality Intravascular Imaging Team

**Dilbahar Mohar, M.D.**, Cardiology fellow, UCIMC; **Earl Steward**, Staff Research Associate, UCIMC; **Rachel Qu, M.S.**, Ph.D. student, Biomedical Engineering, UCI; **Ryan Jonathan-William Burris, M.D.**, Internal medicine resident, UCIMC; **Jiang Zhu, Ph.D.**, postdoctoral fellow, Beckman Laser Institute (BLI); and **Zhonglie Piao**, visiting graduate student, BLI.

The team was honored at the 7th Annual ICTS Awards Dinner, “People Who Make a Difference in Human Health,” on May 12, 2015. ■



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**Honors and Awards** *(cont'd from p. 6)*

to graduate students selected through a national competition. The GRFP provides three years of financial support within a five-year fellowship period for graduate study that leads to a research-based master's or doctoral degree in science or engineering. Former NSF Fellows include numerous individuals who have made transformative breakthroughs in science and engineering, become leaders in their chosen careers, and been honored as Nobel laureates. Christian works in the lab of Dr. Bernard Choi.

**Albert Aparicio, B.S.**



Albert Aparicio

Medical student Albert Aparicio has received a summer fellowship from the Howard Hughes Medical Institute (HHMI) Medical Research Fellows Program Initiative

for Howard University College of Medicine. The goal of the initiative is to increase the number of underrepresented medical students who pursue careers as physician-scientists. Over the summer of 2015, Albert's project will involve designing an optical coherence tomography (OCT) probe capable of imaging the neonate nasal cavity. A 3D-printed phantom will be developed as a testing dummy for the reconstructed OCT probe. Once successful imaging of the phantom nose is completed, imaging of ex vivo rabbit nares, and possibly human neonatal nose, will be performed. Albert works in Dr. Brian Wong's lab.

**Janet Ajdaharian, B.S.**



Janet Ajdaharian

Pre-dental student Janet Ajdaharian, who worked in Dr. Petra Wilder-Smith's lab, received a travel grant for "Malignant change and margins: novel miniaturized

probes in the quest for markers of malignancy" from the American Society for Laser Medicine and Surgery (ASLMS). The grant enabled Janet to attend the 2015 annual meeting of the ASLMS on April 22-26 in Kissimmee, FL.

**Karan Sahni, B.S.**



Karan Sahni

Pre-dental student Karan Sahni, who works in Dr. Petra Wilder-Smith's lab, received a travel grant for "Mapping the effectiveness of anti-plaque treatments" from the

American Society for Laser Medicine and Surgery (ASLMS). The grant enabled Karan to attend the 2015 annual meeting of the ASLMS on April 22-26 in Kissimmee, FL.