SPIE. TRANSLATIONAL BIOPHOTONICS

Translational Biophotonics

TECHNICAL PROGRAM

14–15 May 2018
BioScience Research Collaborative
Auditorium
Rice University, Houston, Texas

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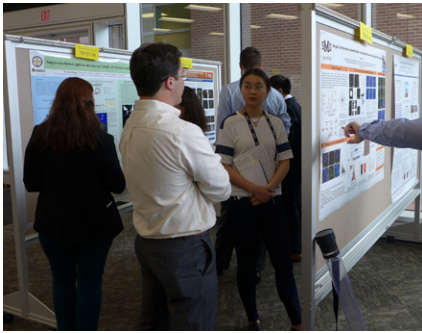

SPIE. TRANSLATIONAL BIOPHOTONICS

14 – 15 May 2018 · Houston, Texas

Welcome

Welcome to SPIE Translational Biophotonics, the interdisciplinary forum for collaboration and learning among top researchers, clinicians, and industrial partners in fields related to medicine and biophotonics.

This event, third in the series, includes both oral and poster presentations with a focus on optical diagnostics, image-guided intervention, novel microscopy techniques, new probes, and system design and implementation. Applications include cancer diagnostics, cardiovascular imaging, and detection of infectious disease.

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SPIE. TRANSLATIONAL BIOPHOTONICS

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Wei-Chuan Shih
Univ. of Houston (USA)

Welcome and Poster Reception

Monday 14 May 2018 • 5:30 to 7:00 pm

Conference participants are invited to attend the poster session and reception on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

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Lab Tours

Location: Varies

Tuesday . . . . . 1:00 to 3:00 pm

Tours on the Rice University campus will take place between 1-3 pm. Off-campus tours will take place after 3 pm. Please see the registration desk for signup and additional details. Labs tours are available to registered conference participants.

Tours include:

Rice University Campus
Tkaczyk Lab.
Richards-Kortum Lab.
Oshman Engineering Design Kitchen

MD Anderson Cancer Ctr.
Sokolov Lab.

University of Houston
Larin Lab.

INVITED SPEAKERS

Brian Applegate
Texas A&M Univ.

Subnanometer functional vibratory imaging in the ear

Adela Ben-Yakar
The Univ. of Texas at Austin

Towards clinical femtosecond laser surgery guided with multiphoton microscopy

Paul Campagnola
Univ. of Wisconsin Madison

Analysis of collagen architecture alterations in human ovarian cancer via SHG polarization and texture analyses

Zhongping Chen
Univ. of California, Irvine

Advances in optical coherence tomography: translation of OCT technology from bench to bedside

Marcus Cicerone
National Institutes of Standards and Technology

Coherent Raman imaging as a potential diagnostic aid for histopathology

Gerard Coté
Texas A&M Univ.

The need for wearable technology advances to achieve true health monitoring

Art Gmitro
The Univ. of Arizona

Biomedical imaging systems based on optical fiber bundles

Zoltan Gorocs
Univ. of California, Los Angeles

Computational sensing technologies for point-of-care diagnostics and global health

Kirill Larin
Univ. of Houston

Dynamic optical coherence elastography of soft tissue

Anita Mahadevan-Jansen
Vanderbilt Univ.

Translation of research grade device to an FDA ready prototype for intraoperative parathyroid detection

INVITED SPEAKERS

Laura Marcu
Univ. of California Davis

Fluorescence lifetime techniques in clinical applications

Jana Kainerstorfer
Carnegie Mellon Univ.

Monitoring of cerebral hemodynamics with near-infrared light during trauma

Rebecca Richards-Kortum
Rice Univ.

Point-of-care diagnostics to improve newborn and women's health in sub-Saharan Africa

Darren Roblyer
Boston Univ.

Improving molecular sensitivity of wide-field measurements with label-free short-wave spatial frequency domain imaging

David Sampson
Univ. of Surrey (United Kingdom)

Resolution versus contrast: where to go with optical coherence tomography?

Eva Sevick
The Univ. of Texas Health Science Ctr. at Houston

Visualizing and delivering immunotherapeutics through the lymphatics

Peter So
Massachusetts Institute of Technology

Extracting biophysical markers for drug responses of sickle cells using interferometric imaging

Melissa Suter
Massachusetts General Hospital

Assessing airway remodeling, structure and function in allergic asthmatics using optical coherence tomography

Ben Vakoc
Wellman Ctr. for Photomedicine

High-speed and long-range OCT by optical subsampling: principles and clinical opportunities

CONFERENCE AT A GLANCE

MONDAY 14 MAY

Session 1 • 8:15 to 9:45 am 9
OCT Technologies I: Research and Translation

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OCT Technologies II: Research and Translation

Session 3 • 12:45 to 2:45 pm 10
Non-Linear Clinical Applications

Session 4 • 3:15 to 4:45 pm 10
Wearable Technologies and Computational Models

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Welcome and Poster Reception • 5:30 pm to 7:00 pm . . . 11

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Clinical Trials and Studies

Lab Tours • 1:00 to 3:00 pm 16

SPIE Translational Biophotonics 2018

MONDAY 14 MAY

SESSION 1

Monday 8:15 to 9:45 am
Location: Auditorium, Bioscience Research Collaborative

OCT Technologies I: Research and Translation

Session Chair: **Mark C. Pierce,** Rutgers, The State Univ. of New Jersey (USA)

8:15 am: **Subnanometer functional vibratory imaging in the ear** *(Invited Paper)*, Brian E. Applegate, Texas A&M Univ. (USA). . . . . [TBP100-1]

8:45 am: **Advances in optical coherence tomography: translation of OCT technology from bench to bedside** *(Invited Paper)*, Zhongping Chen, Beckman Laser Institute and Medical Clinic (USA). . . . . [TBP100-2]

9:15 am: **Dynamic optical coherence elastography of soft tissue** *(Invited Paper)*, Kirill V. Larin, Univ. of Houston (USA). . . . . [TBP100-3]

Coffee Break . . . . . Mon 9:45 am to 10:15 am

SESSION 2

Monday 10:15 to 11:45 am
Location: Auditorium, Bioscience Research Collaborative

OCT Technologies II: Research and Translation

Session Chair: **Brian E. Applegate,** Texas A&M Univ. (USA)

10:15 am: **Resolution versus contrast: where to go with optical coherence tomography?** *(Invited Paper)*, David D. Sampson, Univ. of Surrey (United Kingdom). . . . . [TBP100-4]

10:45 am: **Assessing airway remodeling, structure and function in allergic asthmatics using optical coherence tomography** *(Invited Paper)*, Melissa J. Suter, Massachusetts General Hospital (USA). . . . . [TBP100-5]

11:15 am: **High-speed and long-range OCT by optical subsampling: principles and clinical opportunities** *(Invited Paper)*, Benjamin J. Vakoc, Wellman Ctr. for Photomedicine (USA). . . . . [TBP100-6]

Lunch Break . . . . . Mon 11:45 am to 12:45 pm

SESSION 3

Monday 12:45 to 2:45 pm
Location: Auditorium, Bioscience Research Collaborative

Non-Linear Clinical Applications

Session Chair: **Kirill V. Larin,** Univ. of Houston (USA)

12:45 pm: **Fluorescence lifetime techniques in clinical applications** *(Invited Paper)*, Laura Marcu, Univ. of California, Davis (USA) . . . . . [TBP100-7]

1:15 pm: **Analysis of collagen architecture alterations in human ovarian cancer via SHG polarization and texture analyses** *(Invited Paper)*, Paul J. Campagnola, Kirby R. Campbell, Rajeev Chaudhary, Julia Handel, Univ. of Wisconsin-Madison (USA). . . . . [TBP100-8]

1:45 pm: **Coherent Raman imaging as a potential diagnostic aid for histopathology** *(Invited Paper)*, Marcus T. Cicerone, National Institute of Standards and Technology (USA) . . . . . [TBP100-9]

2:15 pm: **Towards clinical femtosecond laser surgery guided with multiphoton microscopy** *(Invited Paper)*, Adela Ben-Yakar, The Univ. of Texas at Austin (USA) . . . . . [TBP100-10]

Coffee Break . . . . . .Mon 2:45 pm to 3:15 pm

SESSION 4

Monday 3:15 to 4:45 pm
Location: Auditorium, Bioscience Research Collaborative

Wearable Technologies and Computational Models

Session Chair: **Michal E. Pawlowski,** Rice Univ. (USA)

3:15 pm: **The need for wearable technology advances to achieve true health monitoring** *(Invited Paper)*, Gerard Coté, Texas A&M Univ. (USA); Roozbeh Jafari, The Texas A&M Univ. System (USA); Michael McShane, Melissa A. Grunlan, Texas A&M Univ. (USA) . . . . . [TBP100-11]

3:45 pm: **Improving molecular sensitivity of widefield measurements with label-free short-wave spatial frequency domain imaging** *(Invited Paper)*, Darren M. Roblyer, Boston Univ. (USA) . . . . . [TBP100-12]

4:15 pm: **Monitoring of cerebral hemodynamics with near-Infrared light during trauma** *(Invited Paper)*, Jana M. Kainerstorfer, Carnegie Mellon Univ. (USA) . . . . . [TBP100-13]

FLASH POSTER SESSION . . . . . 4:45 TO 5:30 PM

Location: Auditorium, BioScience Research Collaborative

Session Chair: **Tomasz S. Tkaczyk,** Rice Univ. (USA)

This session will include brief overviews by select authors from the poster session.

A step towards Barrett's esophagus autofluorescence imaging using UV LEDs, Theresa Thompson, Phoseon Technology, Inc. . . . . [TBP100-20]

Spectrally encoded miniature objective for high resolution endomicroscopy, Hamin Jeon, Rice Univ. . . . . [TBP100-22]

Emerging techniques in smartphone microscopy: integrated smartphone cytometer, Yu-Lung Sung, Univ. of Houston . . . . [TBP100-30]

Enhancement of luminescence collection in whole-animal imaging using turning mirrors for multi-view acquisition, Madeleine S. Durkee, Texas A&M Univ. . . . . [TBP100-31]

Measuring trabecular bone area in bone marrow biopsies using non-destructive infrared imaging, Rupali Mankar, Univ. of Houston [TBP100-51]

WELCOME AND POSTER RECEPTION

Monday 5:30 to 7:00 pm
Location: Event Hall:
Bioscience Research Collaborative

Conference participants are invited to attend the poster session and reception on Monday evening. Come view the posters, enjoy light refreshments, ask questions, and network with colleagues in your field. Authors of poster papers will be present to answer questions concerning their papers. Attendees are required to wear their conference registration badges to the poster sessions.

Poster Authors: Please set up your poster on Monday during the morning coffee break or the lunch break, and plan to stand by your poster during the poster session. Posters must be removed from the boards following the poster session. Posters that remain on the boards will be discarded.

A step towards Barrett's esophagus autofluorescence imaging using UV LEDs, Theresa Thompson, Jay Pasquantonio, Jasmine Silver, Kayla Taggard, Garth Eliason, Phoseon Technology, Inc. (USA) . . . . . [TBP100-20]

Development of a low-cost lateral flow assay reader for HPV detection, Eduardo Carranza, Sonia Parra, Chelsey Smith, Rebecca R. Richards-Kortum, Kathryn Kundrod, Rice Univ. (USA); Kathleen Schmeler, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA) . . . . . [TBP100-21]

Spectrally encoded miniature objective for high resolution endomicroscopy, Hamin Jeon, Michal E. Pawlowski, Tomasz S. Tkaczyk, Rice Univ. (USA) . . . . . [TBP100-22]

TECHNICAL CONFERENCE

Diagnosis of immunomarkers in vivo via multiplexed surface enhanced Raman spectroscopy with gold nanoantennas, Yu Chuan Ou, Joseph A. Webb, Christine M. O'Brien, Isaac J. Pence, Eugene C. Lin, Ethan S. Lippmann, Anita Mahadevan-Jansen, Rizia Bardhan, Vanderbilt Univ. (USA) . . [TBP100-23]

Fast diffuse optical tomography system for mapping neonate brains, Banghe Zhu, Eva M. Sevick-Muraca, Manish N. Shah, The Univ. of Texas Health Science Ctr. at Houston (USA). . . . . [TBP100-24]

Filter-less fluorescence imaging using ultraviolet illumination, Cynthia Wong, Michal E. Pawlowski, Tomasz S. Tkaczyk, Rice Univ. (USA). [TBP100-25]

Noninvasive imaging of CSF outflow into peripheral lymphatics in mice and swine, Sunkuk Kwon, Christopher F. Janssen, Eva M. Sevick-Muraca, The Univ. of Texas Health Science Ctr. at Houston (USA) . . . . . [TBP100-26]

A novel strategy for improving anti-tumor responses using lymphatic delivery of immunotherapy, Sunkuk Kwon, Christian F. Velasquez, The Univ. of Texas Health Science Ctr. at Houston (USA); Russell Ross, Kimberly-Clark Corp. (USA); Eva M. Sevick-Muraca, The Univ. of Texas Health Science Ctr. at Houston (USA). . . . . [TBP100-27]

Imaging sarcoma with diffuse optical spectroscopy, Hannah Peterson, Boston Univ. (USA); Bang H. Hoang, David Geller, Rui Yang, Montefiore Medical Ctr. (USA); Richard Gorlick, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA); Jeremy Berger, Janet Tingling, Michael Roth, Jonathan Gill, Montefiore Medical Ctr. (USA); Darren M. Roblyer, Boston Univ. (USA). . . . . [TBP100-28]

Spectral unmixing of oxyhemoglobin for dye-free retinal angiography, Jason G. Dwight, Rice Univ. (USA); Christina Y. Weng, Baylor College of Medicine (USA); Michal E. Pawlowski, Tomasz S. Tkaczyk, Rice Univ. (USA) . . . . . [TBP100-29]

Emerging techniques in smartphone microscopy: integrated smartphone cytometer, Yu-Lung Sung, Wei-Chuan Shih, Univ. of Houston (USA) . . . . . [TBP100-30]

Enhancement of luminescence collection in whole-animal imaging using turning mirrors for multi-view acquisition, Madeleine S. Durkee, Texas A&M Univ. (USA); Preeti Sule, Jeffrey D. Cirillo, Texas A&M Health Science Ctr. (USA); Kristen C. Maitland, Texas A&M Univ. (USA) . . . . . [TBP100-31]

In-vivo widefield fluorescence multispectral imaging of oral epithelial neoplasia, Rahul Pal, Paula Villarreal, Gracie Vargas, The Univ. of Texas Medical Branch (USA). . . . . [TBP100-32]

Design of epifluorescent cancer screening patch system for detection of cervical intraepithelial neoplasia across large ectocervical field-of-view, John Gawedzinski, Michal E. Pawlowski, Tomasz S. Tkaczyk, Rice Univ. (USA) . . . . . [TBP100-33]

Multi-point side-firing optical fiber for biomedical applications, Hoang Nguyen, Wei-Chuan Shih, Univ. of Houston (USA). . . . . [TBP100-34]

Towards noncontact in vivo optical coherence elastography, Manmohan Singh, Univ. of Houston (USA); Zhaolong Han, Shanghai Jiao Tong Univ. (China); Gongpu Lan, The Univ. of Alabama at Birmingham (USA); Achuth Nair, Alexander Schill, Univ. of Houston (USA); Michael D. Twa, The Univ. of Alabama at Birmingham (USA); Kirill V. Larin, Univ. of Houston (USA) and Baylor College of Medicine (USA) and Tomsk State Univ. (Russian Federation) . . . . . [TBP100-35]

Plasmonic nanoparticle-based expansion microscopy, Loku Kuruppu Arachchige Dona Dilani Shanika Gunawardhana, Wei-Chuan Shih, Camille G. Artur, Univ. of Houston (USA) . . . . . [TBP100-36]

Induced strain analysis of branched chain amino acids via Raman spectroscopy, Abigail Casey, Gregory E. Triplett, Caroline A. Campbell, Virginia Commonwealth Univ. (USA) . . . . . [TBP100-37]

NIR fluorescence imaging of the impact of advanced pneumatic compression therapy on the lymphatics in head and neck lymphedema, John C. Rasmussen, Melissa B. Aldrich, Banghe Zhu, John R. Morrow, Carolina Gutierrez, Syed Naqvi, Ron J. Karni, Eva M. Sevick-Muraca, The Univ. of Texas Health Science Ctr. at Houston (USA). . . . . [TBP100-38]

NIR fluorescence imaging of lymphatic abnormalities in peripheral venous and arterial disease, John C. Rasmussen, Banghe Zhu, Aaron D. Sahihi, Melissa B. Aldrich, Susan Pouliot, Susan M. Coogan, Stuart A. Harlin, Kristofer Charlton-Ouw, The Univ. of Texas Health Science Ctr. at Houston (USA); Caroline E. Fife, CHI St. Luke's Health (USA); Thomas O'Donnell Jr., Tufts Medical Ctr. (USA); Eva M. Sevick-Muraca, The Univ. of Texas Health Science Ctr. at Houston (USA) . . . . . [TBP100-39]

Mid-infrared photonic chip for label-free and real-time glucose sensing, Pao T. Lin, Texas A&M Univ. (USA). . . . . [TBP100-40]

Flexible mid-infrared photonic sensors for real-time and label-free biomedical compounds detection, Pao T. Lin, Texas A&M Univ. (USA) . . . . . [TBP100-41]

Mid-infrared photonic chips for real-time and non-invasive breath biomarkers analysis, Pao T. Lin, Texas A&M Univ. (USA) . . . . . [TBP100-42]

Advances in laser therapy for bone repair, Mohammad Nazrul Islam, Shaheed Suhrawardy Medical College and Hospital (Bangladesh) . [TBP100-43]

Laser-based infrared spectroscopic imaging of tissue fibrosis, Hari Sreedhar, David Martinez, Shaiju Nazeer, Suman Setty, Michael J. Walsh, Univ. of Illinois at Chicago (USA). . . . . [TBP100-44]

Esophageal cancer screening using motor capsule endomicroscopy, Rohith K. Reddy, Univ. of Houston (USA); Chia-Pin Liang, Jing Dong, Kanwarpal Singh, Tim Ford, Matthew Beatty, Émilie Beaulieu-Ouellet, Catriona Grant, Mireille Rosenberg, Michalina Gora, Guillermo Tearney, Massachusetts General Hospital (USA) . . . . . [TBP100-45]

TECHNICAL CONFERENCE

Label-free classification of infrared spectroscopic images of tumor biopsies using convolutional neural net-works, Sebastian Berisha, Ilker Gurcan, Jahandar Jahanipour, Mahsa Loftollahi, Univ. of Houston (USA); Rohit Bhargava, Beckman Institute for Advanced Science and Technology (USA); Hien V. Nguyen, David Mayerich, Univ. of Houston (USA) . . [TBP100-46]

Super-resolution optical vortex microscopy for non-contact imaging, Bogdan V. Sokolenko, Dmitrii Poletaev, V.I. Vernadsky Crimean Federal Univ. (Russian Federation) . . . . . [TBP100-47]

Understanding ECM remodeling in IPF via multimodal microscopy and machine learning, Darian James, Hsin-Yu (Belle) Chang, Nathan Sandbo, Paul J. Campagnola, Univ. of Wisconsin-Madison (USA). . . . . [TBP100-48]

Characterization of depth sensitivity of a diffuse reflectance spectroscopy probe for in vivo analysis of Balb/c-CT26 murine colon carcinoma tumor allografts, Gage J. Greening, Ariel Mundo, Timothy J. Muldoon, Univ. of Arkansas (USA) . . . . . [TBP100-49]

Mitigating fringing in discrete frequency infrared imaging using time-delayed integration, Shihao Ran, Sebastian Berisha, Rupali Mankar, Wei-Chuan Shih, David Mayerich, Univ. of Houston (USA) . . . . . [TBP100-50]

Measuring trabecular bone area in bone marrow biopsies using non-destructive infrared imaging, Rupali Mankar, David Mayerich, Univ. of Houston (USA); Carlos Bueso-Ramos, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA); Mustafa Kansiz, Agilent Technologies Australia (Australia) . . [TBP100-51]

Diffuse optical measurements of breast tumor hemodynamics during the initial neoadjuvant chemotherapy infusion, Anup Tank, Hannah Peterson, Vivian Pera, Syeda Tabassum, Boston Univ. (USA); Naomi Ko, Boston Medical Ctr. (USA); Darren M. Roblyer, Boston Univ. (USA) . . . . . [TBP100-52]

Multi-model infrared spectroscopic image reconstruction, Nguyen Tran, David Mayerich, Zhu Han, Univ. of Houston (USA). . . . . [TBP100-53]

Model based quantitative estimation of melanin content in skin for vitiligo diagnosis, Kavyakantha Ramakanthakurup Sindhu, Vysakh Vasudevan, Sujatha Narayanan Unni, Indian Institute of Technology Madras (India) . . . . [TBP100-54]

Differential spinning disk microscopy for analyzing nuclear morphology in excised cervical tissue specimens, Pelham Keahey, Alysssa Shapiro, Brady Hunt, Rice Univ. (USA); Kathleen Schmeler, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA); Rebecca R. Richards-Kortum, Rice Univ. (USA) [TBP100-55]

Correlation analysis of microcirculation in rat brain for improved sensitivity during neurosurgical procedures, Krishnapriya Venugopal, Sujatha Narayanan Unni, Indian Institute of Technology Madras (India); Ute Lindauer, Annika Bach, RWTH Aachen Univ. (Germany) . . . . . [TBP100-56]

Digital staining of FTIR spectroscopic images, Mahsa Lotfollahi, Sebastian Berisha, Davar Daeinejad, David Mayerich, Univ. of Houston (USA) . . . . . [TBP100-57]

A comparison of structural and functional optical coherence tomography systems for assessment of hard dental tissues, Christine C. Sahyoun, Rutgers, The State Univ. of New Jersey (USA); Hrebesh M. Subhash, Debbie Peru, Roger Ellwood, LaTonya Kilpatrick, Lynette Zaidel, Colgate-Palmolive Co. (USA); Mark C. Pierce, Rutgers, The State Univ. of New Jersey (USA) . . . . . [TBP100-58]

Multi-spectral imaging of upconverting rare-earth-doped nanocomposites using dual-channel line-scanning confocal microscopy, Carolina Bobadilla Mendez, Harini Kantamneni, Vidya Ganapathy, Rutgers, The State Univ. of New Jersey (USA); Mei Chee Tan, Singapore Univ. of Technology & Design (Singapore); Prabhas V. Moghe, Mark C. Pierce, Rutgers, The State Univ. of New Jersey (USA) . . . . . [TBP100-59]

Auto-focus mechanism for in vivo imaging using high-resolution microendoscopy, Victor F. de Paiva, Univ. de São Paulo (Brazil); Ann M. Gillenwater, The Univ. of Texas M.D. Anderson Cancer Ctr. (USA); Nadarajah Vigneswaran, The Univ. of Texas School of Dentistry (USA); Katelin D. Cherry, Eric C. Yang, Brady Hunt, Alyssa Shapiro, Richard A Schwarz, Rebecca R. Richards-Kortum, Rice Univ. (USA) [TBP100-60]

Multiplexed expansion microscopy with quantum dots, Camille G. Artur, Jason Eriksen, Wei-Chuan Shih, David Mayerich, Univ. of Houston (USA) . . . . . [TBP100-61]

TUESDAY 15 MAY

SESSION 5

Tuesday 8:30 to 10:00 am
Location: Auditorium, Bioscience Research Collaborative

Point of Care/Accessible Technologies

Session Chair: **Darren M. Roblyer,** Boston Univ. (USA)

8:30 am: **Point-of-care diagnostics to improve newborn and women's health in sub-Saharan Africa** *(Invited Paper)*, Rebecca R. Richards-Kortum, Rice Univ. (USA) . . . . . [TBP100-14]

9:00 am: **Extracting biophysical markers for drug responses of sickle cells using interferometric imaging** *(Invited Paper)*, Peter T. C. So, Poorya Hosseini, Sabia Z. Abidi, E. Du, Massachusetts Institute of Technology (USA); Dimitrios Papageorgiou, National Ctr. for Scientific Research Demokritos (Greece); Youngwoon Choi, Korea Univ. (Korea, Republic of); YongKeun Park, KAIST (Korea, Republic of); John M. Higgins, Harvard Medical School (USA); Gregory J. Kato, National Institutes of Health (USA); Subra Suresh, Ming Dao, Zahid Yaqoob, Massachusetts Institute of Technology (USA) . . . . . [TBP100-15]

9:30 am: **Computational sensing technologies for point-of-care diagnostics and global health** *(Invited Paper)*, Zoltan Gorocs, Zachary Scott Ballard, Calvin Brown, Derek Tseng, Dino Di Carlo, Omai Garner, Aydogan Ozcan, Univ. of California, Los Angeles (USA) . . . . . [TBP100-16]

Coffee Break . . . . . Tue 10:00 am to 10:30 am

SESSION 6

Tuesday 10:30 am to Noon
Location: Auditorium, Bioscience Research Collaborative

Clinical Trials and Studies

Session Chair: **David D. Sampson,** Univ. of Surrey (United Kingdom)

10:30 am: **Biomedical imaging systems based on optical fiber bundles** *(Invited Paper)*, Arthur F. Gmitro, Andrew R. Rouse, The Univ. of Arizona (USA) . . . . . [TBP100-17]

11:00 am: **Translation of research grade device to an FDA ready prototype for intraoperative parathyroid detection** *(Invited Paper)*, Anita Mahadevan-Jansen, Vanderbilt Univ. (USA) . . . . . [TBP100-18]

11:30 am: **Visualizing and delivering immunotherapeutics through the lymphatics** *(Invited Paper)*, Eva M. Sevick-Muraca, The Univ. of Texas Health Science Ctr. at Houston (USA) . . . . . [TBP100-19]

Lunch Break . . . . . Tue 12:00 pm to 1:00 pm

LAB TOURS

Tuesday 1:00 to 3:00 pm

SEE PAGE 3 FOR DETAILS.

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