

# Ultrasound Therapy and Image Guided Interventions Special Symposium – Two Day Track

Program Directors: Chris Diederich & Stanley Benedict

## Advances in Ultrasound Guided Radiotherapy

Monday August 5<sup>th</sup>, Room 144

\*\* - Invited Talks

### **Symposium 1            US guided RT Intervention & Novel Technologies (2:00-3:55)**

Chairs: Jean Pouliot, John Wong

- 2:00 PM            \*\* Robotic US probe for real-time 3DUS-guidance in breast brachytherapy  
Luc Beaulieu, Radiation Oncology Physics, Université Laval, Canada
- 2:25 PM            \*\* Integrating proven US guidance techniques with new technologies for interventional brachytherapy: EM guided interactive needle navigation, 3D-printed patient-specific templates, and co-robots, Adam Cunha, Radiation Oncology, UCSF
- 2:50 PM            \*\* Real Time Ultrasound Guidance for Optimizing High Dose Rate Prostate Brachytherapy  
Bruce Libby, PhD University of Virginia Health System
- 3:15 PM            \*\* Integrated on-board CBCT-US imaging system for soft tissue IGRT and real-time intra-fraction monitoring, J Wong(1), M Bell(2), H Tutkun(2), R Teboh(1), I Iordachita(3) , M Lachaine(4) and P Kazanzides(2); (1) Radiation Oncology and Molecular Radiation Sciences, (2) ComputerScience, (3) Mechanical Engineering; Johns Hopkins University, Baltimore, MD (4) Elekta Inc.
- 3:40 PM  
MO-D-144-2        Ultrasound Transducer Localization Using the CyberKnife's X-Ray System  
R. Bruder\*, S. Ipsen, P. Jauer, F. Ernst, O. Blanck, A. Schweikard

### **Symposium 2            US guided Systems for RT and Treatment Planning (4:30-6:00)**

Chairs: Stanley Benedict, David Schlesinger

- 4:30 PM            \*\* Challenges and opportunities of TRUS based prostate HDR brachytherapy  
I.C. Joe Hsu, University of California, San Francisco
- 4:48 PM            \*\* Ultrasound-Based Real-Time Monitoring of Intrafraction Prostate Motion- A transperineal approach,  
Bill Salter, Radiation Oncology, Huntsman Cancer Institute, University of Utah School of Medicine

- 5:06 PM      **\*\* Real-time telerobotic 3D ultrasound for soft-tissue guidance concurrent with beam delivery**  
Dimitre Hristov (1), Jeffrey Schlosser (2), Kenneth Salisbury (3), Vijay Shamdasany (4), Stephen Metz (4); (1) Radiation Oncology, Stanford University. (2) Sonitrac Systems Inc. (3) Computer Science, Stanford University. (4) Ultrasound Investigations, Philips Healthcare
- 5:24 PM      **\*\* Speed of sound aberration evaluation and correction in US-gRT applications**  
Davide Fontanarosa, MAASTRO Clinic, Maastricht, The Netherlands
- 5:40 PM  
MO-F-144-2      **Real-Time 4D Ultrasound Prostate Gland Motion Tracking During Radiotherapy Fraction Delivery**, R. Sandhu\*, O. Marina, J. Wloch, S. Martin, D. Krauss, D. Yan, D. Ionascu
- 5:50 PM  
MO-F-144-3      **Real-Time Guidance and Planning in Breast High Dose Rate Brachytherapy Using 3D Ultrasound**, E. Poulin\*, L. Gardi, A. Fenster, J. Pouliot, L. Beaulieu

## **Advances in Therapeutic Ultrasound** **Tuesday August 6<sup>th</sup>, Room 144**

\*\* - Invited Talks

### **Symposium 1      Clinical Delivery and Advanced Novel Technologies/Strategies (8:00-9:55)**

Chairs: Steffen Sammet, Arik Hananel

- 8:00 AM      **\*\* Update On Treatment of Prostate Cancer with HIFU**  
Narendra T. Sanghvi, SonaCare Medical, Indianapolis, IN
- 8:25 AM      **\*\* MRg HIFU – current and future trends of MR guided Focused Ultrasound in Radiation Oncology**, Arik Hananel, Focused Ultrasound Foundation and the University of Virginia
- 8:50 AM      **\*\* MR Guided Focused Ultrasound for Treatment of Bone Metastases**  
Mark Hurwitz, Kimmel Cancer Center, Thomas Jefferson University
- 9:15 AM      **\*\* MRI guided High Intensity Focused Ultrasound for tumor ablation in breast and liver**  
Chrit Moonen, University Medical Center Utrecht, Utrecht, Netherlands

### **Symposium 2      Advanced Novel Technologies & Therapeutic Strategies (10:30-12:30)**

Chairs: Charlie Ma, Cyril Lafon

- 10:30 AM      **\*\* The role of ultrasound in image-guided drug delivery**  
Azadeh Kheirloomoom, Chun-Yen Lai, Andrew Wong, Brett Z. Fite, Yu Liu, Shengping Qin, Jai Woong Seo, Hua Zhang, Elise R. Robinson, Sarah M. Tam, Lisa M. Even, Elizabeth S. Ingham, Katherine W. Ferrara\*, Department of Biomedical Engineering, UC Davis, Davis CA

- 10:50 AM      **\*\* High-frequency ultrasound detection of tumor vascular hypoxia as a targeting modality for focused ultrasound ablation to complement chemoradiation**  
Robert J. Griffin(1) , Nathan A. Koonce(1), Xin Chen(2), Sunil Sharma(1), David Y-W. Lee(3), James A. Raleigh(4); (1) University of Arkansas for Medical Sciences, Department of Radiation Oncology, (2) Stanford University, Department of Radiation Oncology, (3) Bio-Organic & Natural Products Chemistry, McLean Hospital, Harvard Medical School, Belmont MA, (4) Radiation Oncology, UNC School of Medicine, Chapel Hill, NC.
- 11:10 AM      **\*\* Therapeutic ultrasound as an autologous in situ tumor vaccine**  
Chandon Guha, Montefiore Medical Center, Albert Einstein College of Medicine, Bronx, NY
- 11:30 AM      **\*\* Ultrasound-mediated drug delivery for the treatment of cardiovascular disease**  
Jonathan T. Sutton<sup>1</sup>, Kirthi Radhakrishnan<sup>1</sup>, Jason L. Raymond<sup>1</sup>, Kenneth B. Bader<sup>2</sup>, Guillaume Bouchoux<sup>2</sup>, Kevin J. Haworth<sup>1,2</sup>, Gail Pyne-Geithman<sup>3</sup>, Christy K. Holland<sup>1,2</sup> University of Cincinnati, College of Engineering and Applied Science, Biomedical Engineering Program, Cincinnati, OH USA<sup>1</sup>; University of Cincinnati, College of Medicine, Internal Medicine, Division of Cardiovascular Diseases, Cincinnati, OH USA<sup>2</sup>; University of Cincinnati, College of Medicine, Department of Neurosurgery & University of Cincinnati Neuroscience Institute, Cincinnati, OH <sup>3</sup>
- 11:50 AM      **\*\* Implantable ultrasound device for repeated opening of the blood brain barrier : a promising technology for drug delivery into the brain**  
C. Lafon (1), M. Canney (1,2), K. Beccaria (2), C. Horodyckid (2), A. Vignot (2), J.Y. Chapelon (1), A. Carpentier (2); 1- INSERM, Université Claude Bernard, Lyon, France 2- Carthéra SAS, Paris, France
- 12:10 PM  
TU-C-144-2      **Antivascular Ultrasound for Cancer Treatment: The Role of Thermal Effects**  
C. Sehgal\*, S. Hunt, B. Levenback, A. Wood
- 12:20 PM  
TU-C-144-3      **MR Guided Non Thermal Pulsed High Intensity Focused Ultrasound Therapy of Breast Cancer in Vivo**, C. Ma\*, X. Chen, D. Cvetkovic, L. Chen

### **Symposium 3                      Image Guidance and Assessment (2:00-3:50)**

Chairs: E. Clif Burdette, Emad Ebbini

- 2:00 PM      **\*\* MR temperature monitoring for ultrasound thermal therapies**  
Viola Rieke, Radiology & Biomedical Imaging, University of California, San Francisco
- 2:20 PM      **\*\* Dual-mode Ultrasound Arrays for Image-guided Interventions**  
Emad S. Ebbini, Electrical and Computer Engineering, University of Minnesota Twin Cities
- 2:40 PM      **\*\* Echo decorrelation imaging for guidance of ultrasound ablation**  
TD Mast(1)\*, S Subramanian(1), SM Rudich(2), FM Hooi(1), TR Fosnight(1), AS Nagle(1), MB Rao(1), MH Slayton(3), PG Barthe(3); (1) University of Cincinnati, Cincinnati, OH, (2) Wright State University, Dayton, OH, (3) Guided Therapy Systems/Ardent Sound, Mesa, AZ

- 3:00 PM      **\*\* The Use of Ultrasound Imaging in Planning, Tracking, and Assessing HIFU Treatments**  
Mark Carol, Sonacare Medical, Charlotte NC 28202
- 3:20 PM      **\*\* 3D tracked image-guided interventional therapeutic ultrasound devices and system for thermal ablation of tumors**, E. Clif Burdette, Acoustic MedSystems, Savoy, IL
- 3:40 PM  
TU-E-144-2      **Dependence of Ultrasound Echo Decorrelation On Tissue Temperature During Radiofrequency Ablation of Ex Vivo Bovine Liver**, S. Subramanian\*, D. Schmidt, T. Fosnight, M. Rao, D. Mast

**Symposium 4            Treatment Strategies, Modeling, Control (4:30-6:00)**

Chairs: Eduardo Moros, Doug Christenson

- 4:30 PM      **\*\* Development of a Comprehensive HIFU Ablation System for Oncology: Parallels to the Development of IMRT**  
Mark Carol, Sonacare Medical, Charlotte NC
- 4:55 PM      **\*\* Modeling of MR-guided HIFU for Breast and Brain Therapy**  
Douglas Christensen(1,2), Allison Payne(3), Nick Todd(3), Scott Almquist(4), Alexis Farrer(1) and Dennis Parker(3); 1-Department of Bioengineering, 2-Department of Electrical & Computer Engineering, 3-Utah Center for Advanced Imaging Research, 4-Department of Computer Science University of Utah, Salt Lake City, UT
- 5:20 PM      **\*\* Multiphysics Framework for Modeling of FUS/HIFU and Induced Effects**  
E. Neufeld (1) A. Kyriakou (1,2) B. Werner (3) N. Kuster (1,2); 1- IT'IS Foundation for Research on Information Technologies in Society, 2- ETH Zurich (Swiss Federal Institute of Technology), 3- Kinderspital Zurich (Children's Hospital)