36TH ANNUAL MEETING OF THE SOCIETY FOR THERMAL MEDICINE
UNITING OUR STRENGTHS FOR A CURE
APRIL 28 - MAY 2, 2019 • ST. PETE BEACH, FLORIDA
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MEETING INFO/MAPS

Registration Desk Hours of Operation in the GRAND PALM COLONNADE WEST

Monday, April 29th   7:00AM – 5:30PM
Tuesday, April 30th  7:00AM – 5:30PM
Wednesday, May 1st  7:00AM – 5:30PM
Thursday, May 2nd   7:00AM – 5:00PM

PROPERTY MAP
<table>
<thead>
<tr>
<th>Time</th>
<th>Events</th>
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<tbody>
<tr>
<td>Sunday, April 28</td>
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<tr>
<td>9:00-9:30 AM</td>
<td>Welcome Reception - Breck Deck North</td>
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<td>9:00-9:30 AM</td>
<td>Continental Breakfast - Pavilion</td>
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<tr>
<td>10:00-11:30 AM</td>
<td>Continental Breakfast for all attendees - Pavilion</td>
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<tr>
<td>11:00-11:30 AM</td>
<td>Keynote #1 - Dr. Brian Gastman - Pavilion</td>
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<td>1:00-2:00 PM</td>
<td>Keynote #2 - Dr. May Abdel-Wahab - Pavilion</td>
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<td>Welcome Reception - Breck Deck North</td>
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<td>8:00-8:30 AM</td>
<td>Grand Palm Registration - Colonnade West</td>
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<td>8:30-9:00 AM</td>
<td>Continental Breakfast for all attendees - Pavilion</td>
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<td>9:00-9:30 AM</td>
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<td>9:30-10:00 AM</td>
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<td>10:00-10:30 AM</td>
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<td>Keynote #3 (Dr. Marc S. Ernstoff)</td>
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<td>8:30-9:00 AM</td>
<td>Keynote #4 (Dr. Ruediger Wessalowski)</td>
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<td>9:00-9:30 AM</td>
<td>Breakout: Tumor Immunology</td>
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<td>9:30-10:00 AM</td>
<td>Breakout: Nanoparticles #1</td>
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<td>10:00-10:30 AM</td>
<td>Breakout: Nanoparticles #2</td>
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<tr>
<td>10:30-11:00 AM</td>
<td>STM President’s Symposium: “Hot Science in the Face of a Cold Reality”</td>
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<td>12:00-12:30 PM</td>
<td>STM Business Meeting</td>
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<td>Breakout: Career Development Workshop</td>
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<td>Breakout: Standardizing Language and Data for the Thermal Medicine Community: A Joint STM-ASME Workshop</td>
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<td>Closing Program/Remarks</td>
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<td>Robinson Award Reception</td>
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**Registration**
- Grand Palm West
- Continental Breakfast for All Attendees
- Thursday, May 2
Dear colleagues, friends and sponsors of the Society for Thermal Medicine,

I am pleased to welcome you to the 36th Annual Meeting of the Society for Thermal Medicine, held on the shores of sunny St. Pete’s Beach, FL.

Thermal medicine has come a long way since ancient times when it was recognized for its healing powers. Over the centuries, we have refined its delivery and improved our understanding of its biologic underpinnings. These insights have led to new technologies, including ablation, that have transformed care from traditional surgery to minimally invasive approaches. Advances in thermal modeling and temperature measurement have expanded care to the most sensitive organs, including brain, to permit treatment of diseases that may otherwise be considered too difficult to access surgically. Meanwhile, advances in nanotechnology and drug delivery that create heat or release drugs in a temperature dependent manner are improving clinical care. While these technological advances were being made, biologists have uncovered new mechanisms of action of thermal medicine. These include changes in cell stress responses, changes in cancer cells themselves, the tumor microenvironment and the immune system that facilitate a robust immunologic response.

The excitement in thermal medicine continues to build and span multiple disciplines. More than ever, building effective teams across disciplines to improve clinical care is paramount. This serves as the theme of our meeting: Uniting Our Strengths for a Cure.

Kicking off the meeting will be the inaugural Clinical Hyperthermia Practice Guidelines Workshop that offers practical information on starting and improving your clinical hyperthermia program. Following this workshop will be our Education Day workshop on April 29 that will provide a brief history of thermal therapy and discuss systemic effects of temperature on the immune system and microbiome.

The meeting officially opens with a keynote address by Dr. Brian Gastman, the lead surgeon who built a team to pioneer face transplantation and give new life to a young patient. Keynote addresses by leaders in medicine will open each following day. These speakers include Dr. May Abdel-Wahab, who serves at the United Nations as Director of Human Health at the International Atomic Energy Association who has brought new technologies and improved treatment standards around the world, Dr. Mark Ernstoff who has designed and led national immunotherapy clinical trials, and Dr. Rudiger Wesselowski who has pioneered thermal therapy with chemotherapy to improve outcomes for pediatric patients.

These keynote addresses will be rounded out by a diverse array of breakout sessions. We will hold a dedicated Quality Assurance Symposium and joint special STM-ASME workshop to improve quality and safety. We will hold multiple sessions devoted to the interplay between thermal therapy and biology, including effects on the immune system, DNA damage repair and cell stress responses. Multiple sessions will be devoted to advanced thermal modeling, clinical advances in traditional hyperthermia and ablation technology, and advances in nanotechnology and drug delivery. Education is also a priority, and we will hold a dedicated Career Development Workshop for young (and not so young) investigators.

LETTER FROM THE PROGRAM CHAIR

JENNIFER YU, MD, PhD
This is a diverse meeting with presenters from all around the world encompassing subjects from basic science to physics to clinical medicine. This would not be possible without the generous support from our membership, sponsors and partnership societies, the American Society of Mechanical Engineers and Cell Stress Society International. We look forward to this exciting conference, and we are delighted to have you join.

Sincerely,

Jennifer Yu, MD, PhD
Program Chair, President-Elect, Society for Thermal Medicine
Associate Professor, Department of Molecular Medicine
Staff, Department of Radiation Oncology
Staff, Department of Cancer Biology
Director, Center for Hyperthermia
Co-Leader, Cancer Stem Cell Working Group, Case Comprehensive Cancer Center
Cleveland Clinic
Cleveland, OH, USA

MISSION STATEMENT
The Society for Thermal Medicine is a 501(c)(3), non-profit organization whose mission is to significantly improve patient treatment outcomes by advancing the science, development and application of Thermal Therapy.

OUR SOCIETY STRIVES TO:
1. To encourage the advancement of thermal medicine in all areas of natural and medical sciences.
2. To facilitate cooperative research among the disciplines of physics, engineering, biology, chemistry, and medicine in the study of the properties and effects of thermal medicine.
3. To promote dissemination of knowledge in these and related fields through publications, meetings and educational symposia.
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At BTG, we are exploring the synergy between our Interventional Oncology products (IO) and Immuno-Oncology agents (I-O) to help drive patients’ own immune systems to fight cancer.

“The logical starting point for these combinations would be the disease areas where there is already a rationale for using these loco-regional therapies, like the liver and kidney. However the science might indicate new justifications for our Interventional Oncology products or suggest experimenting with combinations in different organs altogether.”

Karen Skinner, VP Immuno-Oncology, BTG

**COME AND SEE US ON OUR BOOTH TO FIND OUT MORE**

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These chosen papers were selected by the Editorial Board of the *International Journal of Hyperthermia* as the best of Young Investigator papers (in their respective categories) that were published in 2018. Authors self-nominate themselves with the criteria being that they are less than 35 years of age. The editors have rigorous scoring criteria to help them select the winning papers. Our congratulations go to the following recipients of the 2018 awards:

### PHYSICS

**SRI KAMAL KANDALA**

Johns Hopkins University School of Medicine, Baltimore, MD, USA

*Temperature-controlled power modulation compensates for heterogeneous nanoparticle distributions: a computational optimization analysis for magnetic hyperthermia*

Sri Kamal Kandala, Eleni Liapi, Louis L. Whitcomb, Anilchandra Attaluri & Robert Ivkov

*International Journal of Hyperthermia, Volume 36, 2019 - Issue 1*

Published Online: 12 Dec 2018 -
https://doi.org/10.1080/02656736.2018.1538538

### BIOLOGY

**QI SHAO**

University of Minnesota, Minneapolis, MN, USA

*Engineering T cell response to cancer antigens by choice of focal therapeutic conditions*

Qi Shao, Stephen O'Flanagan, Tiffany Lam, Priyatanu Roy, Francisco Pelaez, Brandon J Burbach, Samira M Azarin, Yoji Shimizu & John C Bischof

*International Journal of Hyperthermia, Volume 36, 2019 - Issue 1*

Published Online: 24 Jan 2019 -
https://doi.org/10.1080/02656736.2018.1539253
These chosen papers were selected by the Editorial Board of the *International Journal of Hyperthermia* as the best of Young Investigator papers (in their respective categories) that were published in 2018. Authors self-nominate themselves with the criteria being that they are less than 35 years of age. The editors have rigorous scoring criteria to help them select the winning papers. Our congratulations go to the following recipients of the 2018 awards:

**CLINICAL**

JIANMING LI  
Beijing Friendship Hospital, Capital Medical University, Beijing, CN

*Ultrasound-guided percutaneous microwave ablation versus surgery for papillary thyroid microcarcinoma*  
Jianming Li, Yujiang Liu, Jibin Liu & Linxue Qian

*International Journal of Hyperthermia, Volume 34, 2018 - Issue 5*  
**Published Online:** 11 Apr 2018  
https://doi.org/10.1080/02656736.2018.1453092
KEYNOTE SPEAKER #1

DR. BRIAN GASTMAN, MD
Cleveland Clinic, Cleveland, Ohio

IT TAKES A VILLAGE – TURNING MULTIDISCIPLINARY EFFORTS INTO CLINICAL SUCCESS - THE STORY OF KATIE – A FACE TRANSPLANT RECIPIENT

MONDAY, APRIL 29th, 4:00PM – 5:30PM / PAVILLION

DR. GASTMAN is the Surgical and co-director for Cleveland Clinic’s Melanoma and High-risk Skin Cancer Program. Dr. Gastman is also Professor of surgery at Cleveland Clinic Lerner College of Medicine. He is double boarded in otolaryngology and plastic surgery, his research interests include melanoma, non-melanoma skin and soft tissue cancers specifically in tumor immune evasion and chemotherapy resistance; interaction between lymph node, tumor, and immune system; and less invasive sentinel lymph node surgery.

He is a member of the Society of Immunotherapy of Cancer’s Melanoma Task Force, as well as on the National Comprehensive Cancer Network (NCCN) Melanoma and skin cancers Treatment Guideline Committee. Active with the NCI-based Cancer Immunotherapy Trial Network and ECOG-ACRIN, he is the national principal investigator for the largest Merkel Cell carcinoma trial. He is institutional PI on multiple trials as well. Dr. Gastman serves on the editorial board of Annals of Surgical Oncology. As a surgeon he is active in improving outcomes in reconstructive surgery and was the primary surgeon for two patients who underwent facial allotransplantation.
Dr. May Abdel-Wahab, MD, PhD is the Director of the Division of Human Health at the International Atomic Energy Agency (IAEA), a United Nations (UN) agency with over 170 member states worldwide. The IAEA’s Division of Human Health conducts clinical trials, training and educational initiatives and provides expertise to technical cooperation projects in countries requesting support in radiotherapy, medical physics and diagnostic imaging, including particle therapy as well as missions and audit services to support radiotherapy quality assurance globally.

Dr Abdel-Wahab has more than 30 years of experience in patient care, teaching and research in the field of radiation medicine. Prior to joining the IAEA Dr Abdel-Wahab was a Professor at the Cleveland Clinic Lerner School of Medicine, Case Western University and was Section Head of Gastro-Intestinal Radiation Oncology at the Cleveland Clinic, USA. A former residency program director, Dr Abdel-Wahab continues to hold a special interest in education and curriculum development, and has chaired numerous symposia and scientific meetings as scientific secretary. In addition to serving on FRS Board of directors, and several advisory and editorial boards, Dr Abdel-Wahab also served on various national and international committees, both as a member and/or chair, including the United Nations Interagency Task Force steering committee (UNIATF), the ASTRO Diversity and Disparity committee, Integrated Healthcare Enterprises in Radiation Oncology (IHERO) planning committee, and the Steering committee of the UN Joint Project on Cancer Cervix Prevention and Control, among others. Dr May Abdel-Wahab is a fellow of the American Board of Radiology, Fellow of the American Society of Radiation Oncology and was on the Best Doctors in America listing, among other honors. She is an avid lecturer and participant on scientific panels, served on expert panels for treatment guidelines and is published widely (over 150 publications). She has an interest in healthcare access and training, as well as novel solutions to address disparity and diversity issues in healthcare with an emphasis on radiation oncology.
THE ROLE OF ADRENERGIC STRESS IN CANCER IMMUNOLOGY AND IMPLICATIONS FOR THERAPY IN MELANOMA

WEDNESDAY, MAY 1st, 8:00AM – 9:00AM / PAVILLION

DR. MARC S. ERNSTOFF, MD

Department of Medicine and Senior Vice President of Clinical Investigation at Roswell Park Comprehensive Cancer Center, Buffalo, NY, USA

DR. MARC S. ERNSTOFF, MD is Professor and Chair of the Department of Medicine and Senior Vice President of Clinical Investigation at Roswell Park Comprehensive Cancer Center, Buffalo, NY, USA. Born in Brooklyn NY he studied History of Art at Emory University in Atlanta, GA and then medicine at NYU in NY, NY earning his MD degree in 1978. He completed his training in Internal Medicine at the Bronx Municipal Hospital and the Albert Einstein School of Medicine in the Bronx, NY and then oncology at Yale University New Haven, CT. He did a postdoctoral fellowship in cancer immunology and immunotherapy under the mentorship of Dr. John M. Kirkwood. Since then, he has focused his research on better understanding the immunobiology of cancer and on developing novel immune therapies for melanoma, renal cell carcinoma, myeloma, prostate cancer and gliomas. His research extends across a broad variety of immunotherapies including cytokine therapies, dendritic cell vaccines, immune checkpoint inhibition, targeted therapies and ex vivo expanded effector cells for adoptive transfer. Most recently he is investigating the role of tumor derived exosomes on the tumor microenvironment, and the impact of the beta adrenergic pathway on immune suppression. He currently serves on the Society for Immunotherapy of Cancer (SITC) and the American Society of Clinical Oncology (ASCO) Melanoma Guidelines committees, the SITC and National Comprehensive Cancer Network (NCCN) Immuno-oncology toxicity guideline committees, and the Cancer Immunotherapy Network (CITN) executive committee.
PD DR. RUEDIGER WESSALOWSKI, MD
Clinic for Pediatric Oncology, Hematology and clinical Oncology
Heinrich-Heine-University, Medical Faculty, Düsseldorf, Germany

THE ROLE OF HYPERTHERMIA IN CHILD & ADOLESCENT CANCER

THURSDAY, MAY 2nd, 8:00AM – 9:00AM / PAVILLION

DR. WESSALOWSKI was born and raised in the Lower Rhine region of Germany, where he received his education. After he received his license to practice medicine in 1987, he obtained his MD degree from Heinrich-Heine-University Duesseldorf in 1993 and specialized in pediatric oncology and hematology. From 1991-2019 Dr. Wessalowski has been a Scientist within the Hyperthermia Study Group at Heinrich-Heine-University Duesseldorf, and since 2000 an Associate Professor in the Clinic for Pediatric Oncology, Hematology and Clinical Immunology in the Medical Faculty Duesseldorf, Germany, where he leads a clinical research program for regional deep hyperthermia for children, adolescents and young adults.

Dr. Wessalowski has devoted his research career to the development of hyperthermia strategies for children and translation of the hyperthermia technology to clinical practice in childhood cancer. His efforts led to the world’s first prospective human trial of regional deep hyperthermia in infants and small children with refractory and/or recurrent cancer (Hyper-PEI protocol).

The hyperthermia strategy in childhood cancer according to the Hyper-PEI protocol - registered at the German Cancer Society (number 50-2732) - now has investigational approval in Germany, and is being evaluated clinically by the German Society of Pediatric Oncology and Hematology (GPOH) since 2004.

He has been honored for his work by the European Society of Hyperthermic Oncology with the ESHO-BSD-award in 2013. He is editorial board member of the International Journal of Hyperthermia (IJH) and deputy spokesman of the Interdisciplinary Hyperthermia Working Group (IAH) of the German Cancer Society.

In addition to the development of clinical hyperthermia therapy strategies in children, adolescents and adults, Dr. Wessalowski has explored the potential for non-invasive temperature measurement in the body of children and adults using BSD 2000-3D-Hydrid System. His interests include also the preclinical and clinical analysis of heat shock proteins as immune modulators, preclinical and clinical drug testing for thermosensitisation, and translation of experimental hyperthermia treatment strategies into clinical evaluation.
2019 GEORGE M. HAHN AWARD & LECTURE
AWARD WINNER

CHRIS J. DIEDERICH, PHD
Professor in the Department of Radiation Oncology
and Director of Clinical Hyperthermia Physics and
Thermal Therapy Research
University of California, San Francisco

WEDNESDAY, MAY 1, 3:30PM - 5:00PM / PAVILION

The George M. Hahn Award is presented every other year to an investigator whose research has contributed in a significant way to new clinical applications in thermal therapy. This lecture is named in honor of Dr. George Hahn who received the first Robinson Award in 1989. Dr. Hahn led a highly productive clinical program grant at Stanford for many years and his fundamental work in the heat shock response and in how hyperthermia modifies chemotherapy sensitivity still stand today as foundational work. His highly productive career exemplifies the translational attributes of this award.

Chris J. Diederich, PhD is a Professor in the Department of Radiation Oncology and Director of Clinical Hyperthermia Physics and Thermal Therapy Research at the University of California, San Francisco. He received his MSEE under Dr. Robert Roemer and his PhD under Dr. Kullervo Hynynen from the University of Arizona, and in 1990 joined the faculty and Hyperthermia Program at UCSF. Dr. Diederich has approximately 30 years of experience as a Medical Physicist in the field of Hyperthermia Therapy, with clinical applications of ultrasound and electromagnetic systems for delivering superficial, interstitial, and deep hyperthermia. He has contributed to numerous clinical studies including those combining heat with HDR/brachytherapy, Doxil, and ThermoDox. His research focus involves the use of experimental and theoretical approaches toward the development of ultrasound devices and treatment delivery strategies for targeted hyperthermia, thermal ablation therapies, drug delivery, and non-thermal tissue effects. This includes integration of MRTI and US image-guidance techniques for monitoring therapy delivery. Catheter based ultrasound technology developed by his group has been applied in clinical study of hyperthermia in conjunction with HDR brachytherapy for the treatment of locally advanced prostate and cervix cancer. He is an active and contributing member of the AAPM, ISTU and STM scientific societies. Dr. Diederich is a Fellow of AAPM, and currently serving on the Board of Associate Editors for Medical Physics and on the AAPM Scientific Program as Director of the Ultrasound Specialty Track. He is currently an Associate Editor of the International Journal of Hyperthermia. He has served on numerous committees and as Councilor, Secretary-Treasurer, and 17th President (2001) of STM/ North American Hyperthermia Society, and received the J. Eugene Robinson Award in 2010 in recognition of his contributions to the field of hyperthermia.

Hyperthermia’s Wild Ride -
Taking the Sound Approach

The support for and practice of hyperthermia and thermal therapy research has changed considerably over the last three decades in response to factors such as clinical trial outcomes, market forces, reimbursements, health care environment, regulatory requirements, NIH budget, and trending science topics. Further, clear needs for comprehensive
QA, changes to practice guidelines, and required improvements to device performance and dosimetry were established. I was “raised” in a culture of ULTRASOUND, with a mindset where problems/obstacles encountered with alternative heating modalities could be overcome through development of new and novel ultrasound technology. In part, this presentation will track changes within this environment and the influence on my research directions and collaborations – navigating toward development of endocavity, endoluminal, and catheter-based ultrasound technology with an intent to provide enhanced spatial control, depth of heating, and conformal targeting for applications of hyperthermia and thermal ablation. Image-guidance with MRI derived temperature and thermal dose mapping has been integrated for specific device applications, and plays a critical role for more precise therapy delivery and treatment verification. Examples include interstitial and endocavity devices applied for treating prostate and cervical cancer with hyperthermia in conjunction with HDR brachytherapy; highly conformal and directional interstitial ultrasound applicators for ablation in sites such as brain, liver, prostate, and spine; transurethral ultrasound applicators for ablation of prostate cancer and BPH under MRTI guidance; and recent development of site-specific ultrasound technology such as novel endoluminal applicators for MR guided applications targeting pancreas from within the GI tract, endobronchial ablation of pulmonary tumors, and non-thermal treatment of back pain. Additionally, general highlights and new directions across the field of image-guided therapeutic ultrasound will be discussed, extending well beyond thermal therapies and toward drug delivery, immunotherapy, and exploiting non-thermal effects of mechanical ultrasound. Finally, from a practical perspective, the (few if any :) shortcomings of ultrasound technology will be positioned against significant advances in “alternative” technologies.
The J. Eugene Robinson Award is presented annually to an investigator who has made outstanding contributions to the field of hyperthermic oncology in one or more of the three main disciplines: Medicine/Clinical, Biology/Physiology, and Physics/Engineering. It is the highest and most prestigious award of the Society for Thermal Medicine. The award is named after J. Eugene Robinson who was a pioneer of hyperthermia research from the 1960’s through the 1980’s and a strong proponent of combined radiation and hyperthermia for cancer therapy.

RÜDIGER WESSALOWSKI, MD is an internationally recognized physician scientist and Associate Professor of Pediatric Oncology at the Medical Faculty of the Heinrich-Heine-University Düsseldorf. Dr Wessalowski’s research program focuses on the understanding of synergistic interactions between anticancer drugs and hyperthermic temperatures in pediatric cancer. Preclinical findings from Dr. Wessalowski have guided in the development of a Phase I/II clinical trial (Hyper-PEI Protocol). He is being honored for over three decades of achievement in the field of thermal therapy, including the development of the first prospective clinical program of regional deep hyperthermia in refractory childhood cancer. His recent interest is the development of technology to enable non-invasive temperature measurement by MRI.

Dr. Wessalowski has actively served the Society for Thermal Medicine as board member and scientific program chair for the STM annual meeting in New Orleans, Louisiana and Cancun, Mexico. He is currently a Section Editor for the International Journal of Hyperthermia, and he is a previous awardee of the ESHO-BSI award from the European Society of Hyperthermic Oncology.
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2019 STM SCHOLAR-IN-TRAINING TRAVEL AWARDS

We are pleased to announce that The Society for Thermal Medicine, is providing travel grants to 10 Scholars-in-Training to encourage participation at the 2019 STM annual meeting.

Awardees will receive a $500 travel grant, registration to the meeting and a 2020 membership in the society.

Travel Awards recipients are based upon a competitive evaluation of their submitted abstracts and New Investigator Award applications.

HEATHER CAMPBELL
Evaluation of a New Housing Apparatus for Laboratory Mice that Permits Self Selection of Ambient Temperature: Evaluation of Tumor Growth

Roswell Park Comprehensive Cancer Center, Buffalo, NY, USA

PADRAIG DONLON
Using Microwave Thermal Ablation To Precisely Target The Adrenal Cortex, Taking A Minimally Ablative, Cortical-Sparing Approach

National University of Ireland Galway, Galway, Galway, Ireland

MARLOES IJFF
Hyperthermia increases ionizing radiation induced cell reproductive death of cervical cancer cells by affecting two DNA DSB repair pathways.

Amsterdam UMC, Amsterdam, Netherlands

A. COLLEEN CROUCH
Sex and age mediate vascular response to core body temperature via redistribution of blood volume in arteries and veins: A Murine MRI Study

University of Michigan, Ann Arbor, MI, USA

PEGAH FARIDI
Microwave ablation system integrated with MRI thermometry for experimental validation of 3D temperature profiles predicted by computational models

Kansas State University, Manhattan, KS, USA

EMILY KOWALSKI
Concurrent External Thermal Therapy and Radiation in the Treatment of Cutaneous Malignancies: A Single Institution Experience

University of Maryland Medical Center, Baltimore, MD, USA
PING LIU
A Novel Multi-Mode Thermal Therapy for Systemic Immunomodulation in Patients with HCC/CLM: A Pilot Study
School of Biomedical Engineering and Med-X Research Institute, Shanghai Jiao Tong University, Shanghai, China

JIANNING SHAO
Stereotactic Laser Ablation for Treatment of Brain Tumors: Lessons Learned from 240 Cases Over the Past Decade
Cleveland Clinic, Cleveland, OH, USA

ANJAN MOTAMARRY
Real-time visualization and quantification of doxorubicin delivered by thermosensitive liposomes
Medical University of South Carolina, Charleston, South Carolina, USA

EMILY THOMPSON
Applications of 19F Magnetic Resonance Imaging in Thermochemistry with Pathologic Correlation
The University of Texas MD Anderson Cancer Center, Houston, Texas, USA
The goal of this workshop is to provide practical training for hyperthermia therapy personnel, including physicians, nurses, radiation therapists, and physicists. All speakers have clinical experience in their fields. Lectures from well-known experts on clinical, physics, and biology of hyperthermia will provide participants a comprehensive overview of practice guidelines to deliver safe and effective hyperthermia treatments. This multi-disciplinary workshop will also include talks on clinical workflow and reimbursement. The workshop is the first of its kind organized by STM and is open to STM2019 participants of all thermal therapy backgrounds.

7:00AM Breakfast

8:00AM Clinical Practice
1. How to establish a hyperthermia program (30 min)
   Dr. Zeljko Vujaskovic, University of Maryland, Baltimore MD
2. Practice guidelines for superficial hyperthermia (25min)
   Dr. Jason Molitoris, University of Maryland, Baltimore MD
3. Practice guidelines for deep hyperthermia (25min)
   Dr. Mark Hurwitz, Thomas Jefferson University, Philadelphia PA
4. Practice guidelines for interstitial hyperthermia (25min)
   Dr. John Hayes, Gamma West, Salt Lake City UT

9:45 Coffee Break (15min)

10:00AM Physics of hyperthermia treatments
5. Equipment, planning, and execution of MW superficial hyperthermia treatment (30min)
   Dr. Paul Stauffer, Thomas Jefferson University, Philadelphia PA
6. Equipment, planning, and execution of RF deep hyperthermia treatment (30min)
   Dr. Dario Rodrigues, University of Maryland, Baltimore MD
7. Assessment of hyperthermia treatments based on hypoxia imaging (30 min)
   Dr. Mark Dewhirst, Duke University, Durham NC

11:30AM Clinical workflow and reimbursement
8. Clinical workflow, documentation and reimbursement of hyperthermia treatments (30 min)
   Erika Maynor, University of Maryland, Baltimore MD

12:00PM Working lunch and panel discussion (1h30min)

Sponsored by: Pyrexar MEDICAL
Thermal therapy has been shown to improve locoregional control in wide variety of cancers. However, its widespread adoption has been hampered by technical and clinical limitations. New improvements in temperature monitoring now permit non-invasive thermometry. Advances in thermal delivery have expanded treatment options for patients using minimally invasive hyperthermia or cryotherapy techniques. Additionally, the impact of thermal therapy on the cellular stress response, immune system and microbiome are now better appreciated. Designing effective strategies to take advantage of these biologic effects of thermal therapy may improve patient survival. In this education session, we will provide a brief history of thermal therapy including cutting edge technology that facilitates treatment in delicate organs including the brain, and discuss systemic effects of thermal medicine on the immune system and microbiome.

This session will feature:

**History of Hyperthermia in Neuro-Oncology**
Alireza Mohammadi, Cleveland Clinic, Cleveland, Ohio, USA

**The crosstalk and impact of the microbiome on cancer initiation, progression and treatment modalities**
Ruud Dings, University of Arkansas for Medical Sciences, Little Rock, AR, USA

**Using thermal therapy to fire up immunotherapy? Where are we now?**
Elizabeth Repasky, Department of Immunology, Roswell Park Comprehensive Cancer Center, Buffalo, NY, USA
STANDARDIZING LANGUAGE AND DATA FOR THE THERMAL MEDICINE COMMUNITY:

A JOINT STM-ASME WORKSHOP

THURSDAY, MAY 2, 1:00PM – 3:00PM / SNOWY EGRET

MODERATED BY

DARIO RODRIGUES, PhD
University of Maryland School of Medicine, STM

JOHN BISCHOF, PhD
University of Minnesota, STM

ROBERT IVKOV, PhD
John Hopkins University School of Medicine, STM

RYAN CRANE,
Director, Codes and Standards Initiatives, ASME

CHRISTINE REILLEY
Director, Healthcare, ASME

LUIS PULGARIN
Project engineering advisor, Codes and Standards Initiatives, ASME

Why Attend?

• Learn about the latest developments in the creation of a lexicon covering key terms and definitions in thermal medicine.

• Explore the need for a standardized database of temperature-dependent properties.

• Be a part of the next steps of the joint STM-ASME projects aimed at bridging the communication gap among engineers, biologists, physicists, clinicians, and other experts on multidisciplinary thermal medicine teams.
Background

The Society for Thermal Medicine and STM and The American Society of Mechanical Engineers (ASME), recognizing the shared aspects of their vision, mission and knowledge base, held a kickoff workshop at last year’s STM Annual Meeting where the following key challenges emerged following group discussions of more than 80 conference attendees:

• The thermal medicine community needs standardized language to resolve communication hurdles among the various players comprising multidisciplinary teams working in the field.

• A repository of temperature-dependent properties for a tissue properties database is required to advance thermal medicine research and development.

• There is a need for standardized computational anatomical models to promote an effective comparison between different thermal medicine techniques.

• The appropriate level of evidence necessary to support the use of computer simulations in the development of medical devices and treatment planning platforms needs to be identified.

Now in its second year, this joint STM-ASME interactive session offers an opportunity to discuss thermal medicine-related topics, applications, and standards needs and to build upon the opportunities uncovered in the 2018 session.

Who Should Attend?

• Clinical practitioners
• Medical physicists
• Bioengineers
• Medical device developers
• Researchers
The Society for Thermal Medicine has long and tightly-held associations with two areas of seemingly ever-increasing interest: nanoparticles/nanomedicine and immunology/immunotherapy. Both of these realms of research have experienced peaks and valleys of perceived relevance and therapeutic credibility over the years. They are again in the white-hot spotlight of not only academic scientific and clinical attention, but are the subjects of significant investment by pharma and biotech. Also, a hopeful public reads and hears of apparent success in treating patients with such modalities, further promoting their appeal, but often generating unreasonable hype. As scientists, engineers, and clinicians, we need to maintain that unyielding sense of hope and wondrous curiosity, but must also temper that vision with doses of reality.

Our two speakers in today’s Presidential Symposium are known among their peers and colleagues (and sometimes annoyed rivals) for their keen scrutiny of science amidst the inevitable hype and overstatement of things we wish were true. Their insights are based on both experience and perception; their outputs are based on hard work and rigor. Their respect for the history of scientific research is not nostalgia, but reflects the efficiency of avoiding past failures while nonetheless appreciating the efforts. This does not make them curmudgeons, but instead makes them realists.

Michael Graner, PhD
President, Society for Thermal Medicine

University of Colorado Denver
School of Medicine
Department of Neurosurgery
Aurora, CO
Dr Rob Ivkov has played many roles in STM as Secretary-Treasurer, Vice President-Elect, Vice President, President, and Immediate Past President. He continues to bring expansive energy to STM and is a driver of outreach and outside-the-box thinking. His research touches on hard-core engineering, nanoparticle development, and now has delved into immunology with elements of “old-fashioned” nanoparticles. He has worked in industry, co-founded a company, ended up at Johns Hopkins, and attracted the attention of the Koskinas/Giovanis Foundation, resulting in lab funding for him and a major donation to STM for the outstanding 2017 Meeting. Among other editorial board appointments (including IJH), he is Editor-in-Chief of Convergent Science Physical Oncology, which is wholly and completely fitting for his views of the “interactome” of science. His talk today will cover his lab’s efforts to probe the role of the immune microenvironment following iron oxide nanoparticle exposure, suggesting that immune-incompetent models may be inadequate to represent the effectiveness of such approaches.

Dr Tom Anchordoquy is a tenured Professor at the University of Colorado Skaggs School of Pharmacy and Pharmaceutical Sciences. He holds numerous patents and patent filings for novel development of drug delivery vehicles, including some available on the market. He has co-founded companies and served as Director for one while maintaining an intensely active academic research lab. He sits on numerous editorial boards and NIH study sections and review panels; he has actually won awards as a reviewer, and has won several as an educator, as well. He is an internationally-known expert in drug delivery, liposome and nanoparticle formulation, and has recently focused research efforts on cow milk exosomes for oral drug ingestion of compounds that otherwise must be delivered intravenously due to toxicity. That work represents a convergence of “rational” particle design with what is biologically successful in nature. While the culmination of those efforts are likely yeas away, he has been in the national news with this work, with one hopeful patient thanking him for “having a curious mind”, which aptly sums him up. His talk today will review successes and failures in areas of the nano-delivery field with injections of cold reality, but cloaked in the promise of something better.
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# PROGRAM

## SUNDAY, APRIL 28TH 2019

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<tr>
<td>08:00 - 10:00</td>
<td>STM Other Committee Meetings</td>
<td>Snowy Egret</td>
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<tr>
<td>10:00 - 12:00</td>
<td>STM Governing Council Meeting</td>
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<td>13:00 - 15:00</td>
<td>STM Finance Committee Meeting</td>
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<td>15:00 - 17:00</td>
<td>IJH Editorial Board Meeting</td>
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## MONDAY, APRIL 29TH 2019

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<tr>
<td>07:00 - 17:30</td>
<td>Registration</td>
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<tr>
<td>07:00 - 08:00</td>
<td>Continental Breakfast - For Workshop Registrants Only</td>
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<tr>
<td>08:00 - 12:00</td>
<td>*Clinical Hyperthermia Practice Guidelines Workshop</td>
<td>Pavilion</td>
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**Chair(s): Dario Rodrigues & Zeljko Vujaskovic**

**MON 1 | How to establish a hyperthermia program**
Z. Vujaskovic, University of Maryland School of Medicine, Baltimore, MD, USA

**MON 2 | Practice guidelines for superficial hyperthermia**
J. Molitoris, University of Maryland School of Medicine, Baltimore, MD, USA.

**MON 3 | Practice Guidelines for Deep Hyperthermia**
M. Hurwitz, Thomas Jefferson University, Philadelphia, PA, USA

**MON 4 | Interstitial Hyperthermia**
J. Hayes, Gamma West Cancer Services, Salt Lake City, UT, USA

**MON 5 | Equipment, Planning and Execution of Microwave Superficial Hyperthermia Treatments**
P. Stauffer, Thomas Jefferson University, Philadelphia, PA, USA

**MON 6 | Equipment, planning, and execution of RF deep hyperthermia treatment**
D. B. Rodrigues, University of Maryland School of Medicine, Baltimore, MD, USA

**MON 7 | A critical analysis of methods to image and quantify hypoxia in the context of hyperthermia and thermal ablation trials**
M. Dewhirst, Duke University, DURHAM, NC, USA

**MON 8 | Clinical workflow, documentation and reimbursement of hyperthermia treatments**
E. Maynor, University of Maryland School of Medicine, Baltimore, MD, USA

* Requires separate registration
10:00 - 10:30  AM Break | Banyan Breezeway

12:00 - 13:30 Working Lunch/Panel Discussion - For Workshop Registrants Only | Pavilion

13:30 - 14:00 PM Break #1 | Banyan Breezeway

14:00 - 15:30 Education Day/Refresher Courses
Chair(s): Jennifer Yu

MON 9 | History of Hyperthermia in Neuro-Oncology
A. Mohammadi, Cleveland Clinic, Cleveland, Ohio, USA

MON 10 | The crosstalk and impact of the microbiome on cancer initiation, progression and treatment modalities
R. Dings, University of Arkansas for Medical Sciences, Little Rock, AR, USA

MON 11 | Using thermal therapy to fire up immunotherapy? Where are we now?
E. Repasky, Department of Immunology, Roswell Park Comprehensive Cancer Center, Buffalo, NY, USA

15:30 - 16:00 PM Break #2 | Banyan Breezeway

16:00 - 17:30 Welcome & Keynote #1
Chair(s): Jennifer Yu

MON 12 | It takes a village – turning multidisciplinary efforts into clinical success - The story of Katie – a face transplant recipient
B. Gastman, Cleveland Clinic, Cleveland, OH, USA

19:00 - 21:30 Welcome Reception | Breck Deck North

TUESDAY, APRIL 30TH 2019

07:00 - 08:00 Continental Breakfast - for all attendees | Pavilion

08:00 - 09:00 Keynote #2
Chair(s): Jennifer Yu

TUES 1 | Addressing Cancer Challenges through Nuclear Applications: The Role of the IAEA
M. Abdel-Wahab, International Atomic Energy Agency, Vienna, Austria

09:00 - 09:30 AM Break & Exhibit Time | Banyan Breezeway
09:30 - 11:30 | Breakout Session: Traditional Hyperthermia: Recurrent Breast or Skin Cancer

Chair(s): Gerard van Rhoon & Emily Kowalski

*TUES 2 | Concurrent External Thermal Therapy and Radiation in the Treatment of Cutaneous Malignancies: A Single Institution Experience
E. Kowalski, University of Maryland Medical Center, Baltimore, MD, USA.

TUES 3 | COMBINED RADIOThERAPY AND INFRARED HYPERTHERMIA FOR IMPROVED NON-MELANOMA SKIN CANCER TREATMENT: A PILOT FEASIBILITY STUDY TO EVALUATE LOCAL CONTROL AND COSMESIS
E. Abraham, M.D., Hyperthermia Associates, LLC, Claremore, OK, USA.

TUES 4 | A Pilot trial of Hyperthermia in Combination with Olaparib in Breast Cancer Patients with Chest wall Recurrences
M. Hurwitz, Thomas Jefferson University, Philadelphia, PA, USA.

TUES 5 | Hyperthermia and radiation for recurrent breast cancer
J. Zeng, Cleveland Clinic, Cleveland, OH, USA.

TUES 6 | Temperature and thermal dose during hyperthermia treatment for patients with recurrent breast cancer: a systematic review of the relationship to tumor response and hyperthermia associated toxicity
A. Bakker, UMCA, Amsterdam, Netherlands.

TUES 7 | A Single-Institution Experience of Concurrent External Thermal Therapy with Radiation Therapy as a Palliative Cancer Treatment
O. Siddiqui, University of Maryland, Baltimore, MD, USA.

09:30 - 11:30 | Breakout Session: Ablation

Chair(s): Erik Cressman, Padraig Donlon & Emily Thompson

TUES 8 | Thermal ablation of musculoskeletal tumors: Indications, Techniques, and Results.
H. Ilaslan, Cleveland Clinic, Cleveland, Ohio, USA

*TUES 9 | Applications of 19F Magnetic Resonance Imaging in Thermochemistry with Pathologic Correlation
E. Thompson, The University of Texas MD Anderson Cancer Center, Houston, Texas, USA

TUES 10 | Pilot survival study of catheter-based ultrasound thermal ablation of tumors in genetically engineered oncogenic pigs
E. Burdette, Acoustic MedSystems, Inc., Savoy, IL, USA.

* 2019 Scholar-in-training Travel Award Winner
TUES 11 | Endoluminal ablation of the main pancreatic duct as an exocrine pancreatic atrophy-inducing procedure: a pioneer method for an old need
E. Ewertowska, BioMIT, Department of Electronic Engineering, Universitat Politècnica de València, Valencia, Spain.

TUES 12 | Comparative assessment of experimental techniques for broadband tissue dielectric property measurements at ablative temperatures
H. Fallahi, Kansas State University, Manhattan, Kansas, USA.

TUES 13 | Transcriptome analysis indicates that combined thermal and osmotic stresses cause widespread compromise of cytoprotective responses in HepG2 cells
C. Guo, MD Anderson Cancer Center, Houston, TX, USA.

TUES 14 | MEK inhibition enhances sensitivity to thermal ablation by blunting HSF1 activation in HepG2 cells
C. Guo, MD Anderson Cancer Center, Houston, TX, USA.

TUES 15 | Combining laser ablation with other therapeutic modalities in high-grade glioma
D. Placantonakis, NYU School of Medicine, New York, NY, USA

09:30 - 11:30 | Breakout Session: Multiphysics Modeling | Snowy Egret
Chair(s): Hana Trefna & Colleen Crouch

TUES 16 | Sex and age mediate vascular response to core body temperature via redistribution of blood volume in arteries and veins: A Murine MRI Study
A. Crouch, University of Michigan, Ann Arbor, MI, USA

TUES 17 | Evaluation of hydrogels as water bolus in hyperthermia treatment
H. Dobsicek Trefna, Chalmers University of Technology, Gothenburg, Sweden

TUES 18 | Targetability of sites in variable pelvic geometries using MR-guided high-intensity focused ultrasound (MRgHIFU) as assessed in an in vivo porcine model.
M. Altman, Washington University in St. Louis, St. Louis, MO, USA.

TUES 19 | Bipolar Radiofrequency Ablation of the Brain Using a Virtual Patient Population: An Exploration of Lesion Size Dependency on Voltage Differential
E. Neumann, Department of Biomedical Engineering, Lerner Research Institute, Cleveland Clinic, Cleveland, OH, USA.

TUES 20 | Mathematical model developments for thermoembolization
D. Fuentes, MD Anderson, Houston, TX, USA
TUES 21 | Magnetic Nanoparticle Hypothermia for Treating Locally Advanced Unresectable Pancreatic Cancer: Role of Tumor size  
A. Attaluri, The Pennsylvania State University – Harrisburg, Middletown, Pennsylvania, USA.

TUES 22 | Dual-Input Maximum Slope Model Assumption And Implications For Calculating Liver Tumor Wide-Array CT Perfusion Values  
E. Liapi, Johns Hopkins University, Baltimore, MD, USA.

TUES 23 | Assessing specific loss power demands on magnetic nanoparticles in hyperthermia and nanowarming applications.  
A. Sharma, University of Minnesota, Minneapolis, MN, USA.

11:30 - 13:00  Lunch on own

13:00 - 15:00  Quality Assurance Symposium  
Chair(s): Paul Stauffer & Allison Payne

TUES 24 | Overview of recent ESHO sponsored QA guidelines: the summary of overall changes and current challenges  
H. Dobsicek Trefna, Chalmers University of Technology, Gothenburg, Sweden

TUES 25 | Thermal monitoring strategies for superficial hyperthermia  
A. Bakker, UMCA, Amsterdam, Netherlands

TUES 26 | Quality Assurance guidelines in Interstitial and superficial Hyperthermia and their potential impact on future clinical trial results  
J. Crezee, Amsterdam UMC, University of Amsterdam, Amsterdam, Netherlands

TUES 27 | QA of radiative deep hyperthermia systems: refresher on available techniques.  
G. van Rhoon, Department of Radiation Oncology, Erasmus MC Cancer Institute, Rotterdam, Netherlands

TUES 28 | Quality assurance of MR-guided deep hyperthermia systems: an international multi-institution evaluation with an anthropomorphic phantom  
S. Curto, Department of Radiation Oncology, Erasmus MC Cancer Institute, Rotterdam, Netherlands

TUES 29 | Concepts in Quality Management for MR-guided Laser Ablation  
R. Stafford, The University of Texas MD Anderson Cancer Center, Houston, TX, USA

TUES 30 | Quality assurance in magnetic resonance guided focused ultrasound therapy  
A. Payne, University of Utah, Salt Lake City, Utah, USA
**Breakout Session: Hyperthermia and Radiation Biology**

Arlene Oei, Marloes Ijff & Heather Campbell

*TUES 31 | Hyperthermia increases ionizing radiation induced cell reproductive death of cervical cancer cells by affecting two DNA DSB repair pathways.
M. Ijff, Amsterdam UMC, Amsterdam, Netherlands

*TUES 32 | Differential effects of 42°C-hyperthermia on radiation response of breast cancer spheroids vs. normal human skin explants
A. Thomsen, Department of Radiation Oncology, Medical Center – University of Freiburg, Freiburg, Germany.

*TUES 33 | Combination of radiation and hyperthermia in cancer treatment: Assessment of dose response in multicellular tumour spheroids
S. Michlíková, OncoRay – National Center for Radiation Research in Oncology, Faculty of Medicine and University Hospital Carl Gustav Carus, TU Dresden and Helmholtz-Zentrum Dresden–Rossendorf, Dresden, Germany.

*TUES 34 | Polymer Nanoparticles for Imaging and Ablation of Colorectal Cancer Tumor Organoids
B. McCarthy, Wake Forest University, Winston-Salem, NC, USA.

*TUES 35 | Hyperthermia increases sensitization of proton beam therapy in chordoma cell lines
Z. Vujaskovic, Division of Translational Radiation Sciences (DTRS), Department of Radiation Oncology, University of Maryland School of Medicine, Baltimore, Maryland, USA.

*TUES 36 | Evaluation of a New Housing Apparatus for Laboratory Mice that Permits Self Selection of Ambient Temperature: Evaluation of Tumor Growth
H. Campbell, Roswell Park Comprehensive Cancer Center, Buffalo, NY, USA.

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**Breakout Session: Pelvic Thermal Therapy - HIPEC - Cryotherapy**

Chair(s): Nicole Levi & Brian Loggie

*TUES 37 | Clinical applications of Hyperthermic Intraperitoneal Chemotherapy; a review.
R. Helderman, Amsterdam University Medical Centers, Amsterdam, Netherlands

*TUES 38 | Prospective, single institution evaluation of HIPEC in ovarian cancer
T. Dellinger, City of Hope National Medical Center, Duarte, CA, USA

*TUES 39 | Single Incision Laparoscopic Cytoreductive Surgery and Heated Intraperitoneal Chemotherapy for Recurrent Cases of Pseudomyxoma Peritonei
B. Loggie, Creighton University, Division of Surgical Oncology, Omaha, NE, USA

* 2019 Scholar-in-training Travel Award Winner
TUES 40 | Towards thermal therapy treatment planning for hyperthermic intraperitoneal chemotherapy
D. Löke, Department of Radiation Oncology, Amsterdam UMC, University of Amsterdam, Amsterdam, Netherlands.

TUES 41 | ERAS Protocol Implementation for Cytoreductive Surgery with Heated Intraperitoneal Chemotherapy
E. Samlowski, Creighton University, Omaha, Nebraska, USA

TUES 42 | HIPEC models to predict tumor drug penetration in a dynamic 3D environment.
D. Löke, Department of Radiation Oncology, Amsterdam UMC, University of Amsterdam, Amsterdam, Netherlands.

TUES 43 | Magnetic Resonance Imaging-guided, Salvage, Percutaneous Cryoablation of Recurrent Prostate Cancer After Radical Prostatectomy: 24-Month Follow-up.
D. Woodrum, Mayo Clinic, Rochester, MN, USA

15:00 - 15:30 PM Break & Exhibit Time | Banyan Breezeway

18:00 - 20:00 Poster Session & Competition (with drinks and hors d'oeuvres) | Banyan Breezeway

POS 1 | Lidocaine-induced Potentiation of Thermal Damage in Skin and Carcinoma Cells
M. Purschke, Massachusetts General Hospital, Boston, MA, USA.

POS 2 | A new, tunable, multimodal strategy for ablation: exothermic reaction of thioglycolic acid for thermal denaturation whilst targeting disulfide bonds to alter protein structure
E. Cressman, MD Anderson Cancer Center, Houston, TX, USA

POS 3 | FIRST DETAILED PATHOLOGY OF HEPATIC THERMOEMBOLIZATION IN A SWINE MODEL
E. Cressman, MD Anderson Cancer Center, Houston, TX, USA

POS 4 | TISSUE MICROARRAY ANALYSIS OF MORPHOLOGY AND MECHANISMS OF TISSUE DAMAGE BY THERMAL, CHEMICAL, AND THERMOCHEMICAL MODALITIES
C. Guo, MD Anderson Cancer Center, Houston, TX, USA

POS 5 | MULTISITE SOFTWARE PLATFORM OF MRI-GUIDED FOCUSED ULTRASOUND HYPERThERMIA APPLICATIONS
M. Siddiqui, University of Calgary, Calgary, Alberta, Canada.

POS 6 | Polarized macrophages interact specifically with antibody-labeled magnetic iron oxide nanoparticles
C. Yang, Department of Oncology, Johns Hopkins University School of Medicine, Baltimore, Maryland, USA

POS 7 | Systemically delivered antibody-labelled BNF are less toxic than BNF-plain under alternating magnetic fields
C. Yang, Institute of Biomedical Engineering, National Taiwan University, Taipei, Taiwan.
POS 8 | Consistent evaluation of specific loss power in magnetic particle hyperthermia
S. Curto, Department of Radiation Oncology, Erasmus MC Cancer Institute, Rotterdam, Netherlands

POS 9 | IRON OXIDE NANOPARTICLE PERFUSION AND REWARMING IN RAT HEARTS
Z. Gao, University of Minnesota, Minneapolis, MN, USA

POS 10 | Core-shell engineering of ZnxMn1-xFe2O4@SiO2:zNd3+ nanoparticles for magneto-photothermal therapy and nanothermometry
A. F. Bakuzis, Institute of Physics, Federal University of Goiás, Goiania, Goias, Brazil

POS 11 | Thermally sensitive natural extracellular vesicles for cancer therapy
R. Griffin, University of Arkansas for Medical Sciences, Little Rock, Arkansas, USA

POS 12 | Characterization of Antigen Presentation and T Cell Response under Different Focal Therapeutic Conditions
M. Jiang, University of Minnesota, Minneapolis, Minnesota, USA

POS 13 | Photothermal elimination of Pseudomonas aeruginosa biofilm using Poly(3,4-ethylenedioxythiophene) nanotube/silicone nanocomposite
S. Yates, Wake Forest University Health Sciences, Winston-Salem, NC, USA

POS 14 | Characterizing miniature probes used for focal therapies on small animals
P. Ranjbartehrani, University of Minnesota, Minneapolis, MN, USA.

POS 15 | The use of gold nanoparticles for targeted leukemia cell ablation in mixed testicular cell cultures
A. Altamimi, Wake Forest University Health Sciences, Winston-Salem, NC, USA

POS 16 | The HSP-Accessorized Exosome: Presence in States of Danger, Disease, and Disruption
M. Graner, University of Colorado Denver Anschutz Medical Campus, Aurora, Colorado, USA.

POS 17 | Finite element simulation of thermal effect of radiation therapy on breast tumor and tissue
E. Liapi, Johns Hopkins University, Baltimore, MD, USA.
WEDNESDAY, MAY 1ST 2019

07:00 - 17:00  Registration  | Grand Palm
               Colonnade West

07:00 - 08:00  Continental Breakfast - for all attendees  | Pavilion

08:00 - 09:00  Keynote #3  | Pavilion
Chair(s): Jennifer Yu

**WED 1 | The Role of Adrenergic Stress in Cancer Immunology and Implications for Therapy in Melanoma**
M. Ernstoff, Roswell Park Comprehensive Cancer Center, Buffalo, NY, USA

09:00 - 09:30  AM Break & Exhibit Time  | Banyan Breezeway

09:30 - 11:30  Breakout Session: Tumor Immunology - Sponsored by BTG  | Banyan/Citrus
Chair(s): Steve Fiering, Ping Liu & Heather Campbell

*WED 2 | A Novel Multi-Mode Thermal Therapy for Systemic Immunomodulation in Patients with HCC/CLM: A Pilot Study*
P. Liu, School of Biomedical Engineering and Med-X Research Institute, Shanghai Jiao Tong University, Shanghai, China.

**WED 3 | Focal therapy with immunotherapy promotes formation of tumor antigen-specific CD8 T cells and tumor growth control**
Q. Shao, University of Minnesota, Minneapolis, MN, USA

**WED 4 | Immune checkpoint inhibitors enhance the abscopal effect of local thermo-radiotherapy in a metastatic mouse model**
A. Oei, Department of Radiation Oncology and Molecular Radiation Sciences, Johns Hopkins University School of Medicine, Baltimore, Maryland, USA.

**WED 5 | Stress-induced immunity by regional hyperthermia: A cold tumor becomes hot**
R. Issels, Dept. of Medicine III, Munich, Germany.

**WED 6 | Hyperthermia and radiation effects on the glioma immune microenvironment**
C. Gilmour, Cleveland Clinic, Cleveland, OH, USA.

**WED 7 | Better Than Expected Treatment Outcome of an Advanced Anorectal Squamous Cell Carcinoma Using Interstitial Thermoradiotherapy, Possible Abscopal Immune Response**
J. Hayes, Gamma West Cancer Services, Salt Lake City, Utah, USA.

* 2019 Scholar-in-training Travel Award Winner
**WED 8 |** Prussian blue nanoparticles-based antigenicity and adjuvanticity trigger robust antitumor immune responses against neuroblastoma  
J. Cano-Mejia, University of Maryland, College Park, MD, USA.

**WED 9 |** Tumour Ablation Induced Thermal Necrosis Modulates Immune-related Cytokines by Magnetic Resonance-guided Focused Ultrasound Surgery in Bone Metastatic Lesions  
F. Hsu, Ph.D. Program for Transnational Medicine, School of Medical Science, Taipei Medical University, Taipei, Taiwan.

**WED 10 |** What about CAR-T Therapy? An Update of Immune Therapy & Potential of Thermal Therapy  
J. Bull, UT McGovern Medical School, Houston, TX, USA

**09:30 - 11:30 Thermal Therapy Treatment Planning Symposium | Blue Heron**  
Chair(s): Dario Rodrigues & Dieter Haemmerich

**WED 11 |** Computer support for ablative liver therapies  
J. Strehlow, Fraunhofer MEVIS, Bremen, Germany.

**WED 12 |** Recent advancements in 3D patient-specific treatment planning for radiofrequency and microwave hyperthermia  
P. Kok, Department of Radiation Oncology, Amsterdam UMC, University of Amsterdam, Amsterdam, Netherlands

**WED 13 |** Treatment Planning for MR-Guided High Intensity Focused Ultrasound  
P. Yarmolenko, Children's National Medical Center, Washington, DC, USA.

**WED 14 |** Data-driven methodologies for guiding treatment planning of MRgLITT  
D. Fuentes, MD Anderson, Houston, Tx, USA

**WED 15 |** Requirements on HIPEC treatment planning to optimize treatment protocols and improve the efficacy of HIPEC cancer treatment  
N. Hanna, University of Maryland School of Medicine, Baltimore, MD, USA.

**09:30 - 11:30 Breakout Session: Nanoparticles #1 - Photothermal Therapy | Snowy Egret**  
Chair(s): Rajiv Chopra, Elizabeth Sweeney & Samir Jenkins

**WED 16 |** Mild hyperthermia enhances drug accumulation and photodynamic therapy efficacy  
S. Jenkins, University of Arkansas for Medical Sciences, Little Rock, AR, USA.

**WED 17 |** Preclinical Safety and Clearance Profile of Plasmonic Gold Nanorods: Bringing Practical Photothermal Therapy to the Clinic.  
L. Pagliaro, Siva Therapeutics Inc., Austin, TX, USA
WED 18 | Combined Nanoparticle-based Photothermal Therapy and Epigenetic Immunomodulation for Melanoma
D. Ledezma, The George Washington University Cancer Center, Washington, D.C., DC, USA.

WED 19 | Evaluating the immunological effects of nanoparticle-based photothermal therapy for melanoma
E. Sweeney, George Washington University, Washington, DC, USA.

WED 20 | A biocompatible nanoparticle platform for photothermal therapy of melanoma
S. Torres-Hurtado, The University of Texas at Austin, Austin, TX, USA.

WED 21 | IR820-Loaded PLGA Nanoparticles for Photothermal Therapy of Triple-Negative Breast Cancer
E. Day, University of Delaware, Newark, DE, USA

WED 22 | Sealing and Repair of Soft Tissues using Photothermal Nanomaterials
K. Rege, Arizona State University, Tempe, AZ, USA

WED 23 | EVALUATION OF A PHOTOTHERMAL NANOCOMPOSITE FOR DISTRUPTION OF STAPHYLOCOCCUS AUREUS BIOFILMS
P. Sanchez, Wake Forest School of Medicine, Winston Salem, NC, USA

11:30 - 13:00
STM President's Symposium: Hot Science in the Face of a Cold Reality - includes lunch
Chair(s): Michael Graner

WED 24 | Barriers to Successful Nanoparticle-Mediated Delivery
T. Anchordoquy, Skaggs School of Pharmacy and Pharmaceutical Sciences, Anschutz Medical Campus, University of Colorado, Aurora, Colorado, USA

WED 25 | The tumor immune microenvironment is reshaped after systemic exposure to magnetic iron oxide nanoparticles: A study in mouse models of breast cancer
R. Ivkov, Johns Hopkins University School of Medicine, Baltimore, MD, USA.

13:00 - 15:00
Breakout Session: Cranial and Head and Neck
Chair(s): Ali Mohammadi & Jianning Shao

WED 26 | Laser Interstitial Thermal Therapy for Intracranial Lesions
P. Fecci, Duke University, Durham, NC, USA

WED 27 | Mechanisms of Blood-Brain Barrier Permeability by Laser Interstitial Thermal Therapy in a Mouse Model of Glioblastoma
A. Kim, Washington University, Saint Louis, MO, USA
*WED 28 | Stereotactic Laser Ablation for Treatment of Brain Tumors: Lessons Learned from 240 Cases Over the Past Decade
J. Shao, Cleveland Clinic, Cleveland, OH, USA

WED 29 | Magnetic hyperthermia therapy of experimental glioblastoma in combination with chemoradiation
C. Hadjipanayis, Icahn School of Medicine at Mount Sinai, NYC, NY, USA.

WED 30 | MR guided Head&Neck Hyperthermia: Accuracy Through Integration
G. van Rhoon, Department of Radiation Oncology, Erasmus Medical Center Cancer Institute, Rotterdam, Netherlands.

WED 31 | MR thermometry phantom validation and modeling of a 915 MHz annular phased-array for treatment of brain tumors
D. B. Rodrigues, University of Maryland School of Medicine, Baltimore, MD, USA.

13:00 - 15:00 Breakout Session: Advances in Image Guided Therapy
Chair(s): Chris Diederich & Pegah Faridi

WED 32 | Image-guided doxorubicin delivery for pediatric tumors using MRI-guided high-intensity focused ultrasound hyperthermia and temperature-sensitive liposomes
R. Chopra, UT Southwestern Medical Center, Dallas, TX, USA

WED 33 | Development and pre-clinical evaluation of a microwave ablation system integrated with an image-guidance and treatment planning platform for bronchoscopic transparenchymal lung access
P. Prakash, Kansas State University, Manhattan, KS, USA.

WED 34 | Thermochemical Ablation and the Necessity of a Multi-Modal Imaging Approach
E. Thompson, The University of Texas MD Anderson Cancer Center, Houston, TX, USA

*WED 35 | Microwave ablation system integrated with MRI thermometry for experimental validation of 3D temperature profiles predicted by computational models
P. Faridi, Kansas State University, Manhattan, KS, USA.

WED 36 | MRI-guided focused ultrasound robotic system for experiments with mice.
C. Damianou, Cyprus university of technology, limassol, Cyprus

*WED 37 | USING MICROWAVE THERMAL ABLATION TO PRECISELY TARGET THE ADRENAL CORTEX, TAKING A MINIMALLY ABLATIVE, CORTICAL-SPARING APPROACH
P. Donlon, National University of Ireland Galway, Galway, Galway, Ireland.

* 2019 Scholar-in-training Travel Award Winner
**Breakout Session: Drug Delivery and Thermal Sensitive Liposomes**
Chair(s): Timo ten Hagen & Anjan Motamarry

**WED 38 | CONVECTION ENHANCED DELIVERY OF THERAPEUTICS TO THE CNS: CHALLENGES AND OPPORTUNITIES**
M. Vogelbaum, Moffitt Cancer Center, Tampa, FL, USA

**WED 39 | The Drug Delivery Controversy**
T. ten Hagen, Erasmus MC, Rotterdam, Netherlands

**WED 40 | Effect of different hyperthermia methods on drug delivery with thermosensitive liposomes**
K. Ramajayam, Department of Pediatrics, Medical University of South Carolina, Charleston, SC, USA.

**WED 41 | Therapeutic efficacy of thermosensitive liposomal doxorubicin and short duration focused ultrasound hyperthermia in rabbit Vx2 tumors**
M. Santos, University of Toronto, Toronto, ON, Canada.

**WED 42 | Real-time visualization and quantification of doxorubicin delivered by thermosensitive liposomes**
A. Motamarry, Medical University of South Carolina, Chalreston, South Carolina, USA.

**WED 43 | The effect of thermosensitive liposomal doxorubicin dose on localized doxorubicin deposition and therapeutic index in Vx2 tumors using MR-HIFU mild hyperthermia**
R. Chopra, UT Southwestern Medical Center, Dallas, TX, USA.

**WED 44 | Development of a thermosensitive liposome formulation of the anti-cancer drug vinorelbine: parameters that influence drug loading and release**
M. Regenold, University of Toronto, Toronto, Ontario, Canada.

**PM Break & Exhibit Time**
Banyan Breezeway

**STM Awards Symposium**
Pavilion

- 2019 George M. Hahn Award Presentation - Hyperthermia's Wild Ride: Taking the Sound Approach - Chris J. Diederich, PhD
- 30TH J. Eugene Robinson Award Presentation: Apoptosis or Necrosis – Mechanisms of Cell Death induced by Hyperthermia - Ruediger Wessalowski, MD
- 2019 STM Scholar-in-Training Travel Award Winners
- 2018 International Journal of Hyperthermia Editor’s Award Winners

**Robinson Award Reception**
South Lawn/Gazebo

**Robinson Award Banquet**
Garden Courtyard

*2019 Scholar-in-training Travel Award Winner**
**Requires separate ticket**
THURSDAY, MAY 2ND 2019

07:00 - 17:00  Registration  | Grand Palms  
Colonnade West

07:00 - 08:00  Continental Breakfast - for all attendees  | Pavilion

08:00 - 09:00  Keynote #4  | Pavilion
Chair(s): Jennifer Yu

THUR 1 | The Role of Hyperthermia in Child & Adolescent Cancer  
R. Wessalowski, Heinrich-Heine-University, Medical Faculty,  
Düsseldorf, Germany

09:00 - 09:30  AM Break & Exhibit Time  | Banyan Breezeway

09:30 - 11:30  Breakout Session: Temperature Monitoring  | Banyan/Citrus
Chair(s): David Fuentes and Eleni Liapi

THUR 2 | Non-invasive intratumoral thermal dose determination  
during magnetic nanoparticle hyperthermia  
A. Bakuzis, Federal University of Goias, Goiania, Goias, Brazil

THUR 3 | Preclinical demonstration of the application of magnetic  
resonance thermal imaging with the VectRx™ multi-applicator coil  
inductive heating system in swine  
P. Floriano, NeoTherma Oncology, Wichita, KS, USA.

THUR 4 | Thermal imaging for monitoring tumor response of  
diffusing alpha-emitters radiation therapy in a murine model of  
breast cancer  
E. Liapi, Johns Hopkins University, Baltimore, MD, USA

THUR 5 | MR Thermometry of Fat based on Synthesized  
Temperature Property of Methylene and Methyl Signals  
K. Kuroda, Course of Electrical and Electronic Engineering, Graduate School  
of Engineering, Tokai University, Hiratsuka, Kanagawa, Japan.

THUR 6 | Feasibility of CT thermometry of laser ablations in ex-vivo  
porcine liver  
M. Jacobsen, University of Texas MD Anderson Cancer Center, Houston,  
TX, USA.
Heat Shock Proteins in Health and Disease Symposium; sponsored by Cell Stress Society International
Chair(s): Michael Graner & Antonio De Maio

THUR 7 | THE HEAT SHOCK RESPONSE: FROM THE DISCOVERY TO THE NEW DOGMA
A. De Maio, Division of Trauma, Critical Care, Burns and Acute Care Surgery, Department of Surgery, University of California San Diego, La Jolla, CA, USA.

THUR 8 | HSP72, CANCER STEM CELLS, RESISTANCE TO THERAPY AND METASTASIS
S. Calderwood, Department of Radiation Oncology, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA, USA.

THUR 9 | Bridging Innate and Adaptive Immune Responses by Large Stress Protein for Cancer Immunotherapy
X. Wang, Department of Human & Molecular Genetics, Virginia Commonwealth University School of Medicine, Richmond, VA, USA.

THUR 10 | Stressed exosomes (“sexosomes”): stress balls or care packages in passaging stress phenotypes to recipient cells?
M. Graner, University of Colorado Denver Anschutz Medical Campus, Aurora, Colorado, USA

THUR 11 | Hyperthermia induces peroxiredoxin antioxidant defenses through transcription factor Nrf2
D. Averill-Bates, Université du Québec à Montréal, Montréal, Québec, Canada

THUR 12 | Development of Heat Shock Protein Inhibitor-Containing Thermosensitive Liposomes for Combination Therapy with ThermoDox and Hyperthermia
M. Dunne, University of Toronto, Toronto, Canada.

THUR 13 | Intravascular Immune Suppression: Overlooked Checkpoint for Cancer Immunotherapy
S. Evans, Roswell Park Comprehensive Cancer Center, Buffalo, New York, USA

09:30 - 11:30 | Breakout Session: Nanoparticles #2 - Iron Oxide
Chair(s): Rohan Fenandes & Hattie Ring

THUR 14 | PEG-Coated Iron Oxide Nanoparticles for Nanowarming
J. Pasek-Allen, University of Minnesota, Minneapolis, MN, USA.

THUR 15 | Distribution of Iron Oxide Nanoparticles in Hypothermic Perfused Tissues
H. Ring, University of Minnesota, Minneapolis, MN, USA.
THUR 16 | Novel insights into the possible mechanism of action by nanoparticle mediated tumor growth delay in a transgenic mouse model of breast cancer
P. Korangath, Johns Hopkins University, Baltimore, MD, USA.

THUR 17 | Hexagonal-disk magnetic nanoparticles emphasize the secondary role of Brownian rotation to heating and allow switching between domains of actuation
R. Chantrell, University of York, York, United Kingdom

THUR 18 | Eliciting an Immunological Response Through the Use of Mild Hyperthermia via a Vascular Targeted Iron Oxide Nanoparticle
G. Covarrubias, Case Western Reserve University, Cleveland, OH, USA

THUR 19 | Erythrocyte membrane-coated magneto-fluorescent nanocarriers for thermal therapy and heat-induced immunological responses
A. SOUSA-JUNIOR, Federal University of Goias, Goiania, Goias, Brazil

THUR 20 | Enhancing hyperthermia through magnetic nanoparticle clusters
R. Chantrell, University of York, York, United Kingdom.

THUR 21 | SCALABLE SILICA COATED IRON OXIDE NANOPARTICLES FOR NANOWARMING IN REGENERATIVE MEDICINE
Z. Gao, University of Minnesota, Minneapolis, MN, USA

11:30 - 13:00  STM Business Meeting - working lunch(STM members only) | Pavilion

13:00 - 15:00  Career Development Workshop
THUR 22 | A practical workshop to increase NIH grant success
M. Dewhirst, Duke University, DURHAM, NC, USA.
D. Haemmerich, Medical University of South Carolina
E. Repasky, Roswell Park Comprehensive Cancer Center, Buffalo, NY, USA
J. Yu, Cleveland Clinic, Department of Radiation Oncology, Department of Cancer Biology, Cleveland, OH, USA

13:00 - 15:00  Breakout Session: Traditional Hyperthermia - Deep Hyperthermia or Proton Therapy
Chair(s): Gerard van Rhoon & Ruediger Wessalowki

THUR 23 | Early Outcomes of Locoregional Deep Hyperthermia with Pencil Beam Scanning Protons Indicate Modest Toxicity with the Promise of Increasing Efficacy
J. Molitoris, University of Maryland School of Medicine, Baltimore, MD, USA.
THUR 24 | Toxicity and Efficacy Outcomes of Concurrent Radiation and Hyperthermia in Soft Tissue Sarcoma
C. DeCesaris, University of Maryland Medical Center Department of Radiation Oncology, Baltimore, MD, USA.

THUR 25 | The effect of the time interval between radiation and hyperthermia on clinical outcome in 400 locally advanced cervical carcinoma patients.
G. van Rhoon, Department of Radiation oncology, Erasmus MC Cancer Institute, Rotterdam, Netherlands.

THUR 26 | Concurrent Pencil Beam Scanning Proton Therapy and External Thermal Therapy: Growing Clinical Experience with Promising Results
J. Snider, University of Maryland School of Medicine, Baltimore, MD, USA.

THUR 27 | Similar Rates of Skin Toxicity Associated with Concurrent External Thermal Therapy When Delivered with Pencil Beam Scanning Proton Therapy or Photon/Electron Techniques
S. Samanta, University of Maryland, Baltimore, MD, USA

THUR 28 | Improved Local Control with Hyperthermia (HT) Plus Proton Beam Therapy Compared to Electrons Plus Hyperthermia in Recurrent Breast Cancer?
E. Nichols, University of Maryland School of Medicine, Department of Radiation Oncology, Baltimore, MD, USA

13:00 - 15:00
Standardizing Language and Data for the Thermal Medicine Community: A Joint STM-ASME Workshop
| Snowy Egret

THUR 29 | Overview of the ASME standards development process & Framework for verification and validation of computational modeling and simulation for medical devices
Dario Rodrigues, PhD, University of Maryland School of Medicine, STM
John Bischof, PhD, University of Minnesota, STM
Robert Ivkov, PhD John Hopkins University School of Medicine, STM
Ryan Crane, Director, Codes and Standards Initiatives, ASME
Christine Reilley, Director, Healthcare, ASME
Luis Pulgarin, Project engineering advisor, Codes and Standards Initiatives, ASME

15:00 - 15:30
PM Break & Exhibit Time
| Banyan Breezeway

15:30 - 17:00
Closing Program/Remarks
| Pavilion
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Deep Regional Hyperthermia System installed at the Maryland Proton Treatment Center.

Congratulations to the University of Maryland School of Medicine. World's First Combined Proton Therapy / Hyperthermia Center of Maryland School of Medicine.

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