AGENDA

7:00 am  CME Activity Starts
7:00 am  Log-in to Virtual Conference
7:15 am  Welcome and Introductions
          Robert H. Vonderheide, MD, DPhil, Director, Abramson Cancer Center
          Daniel Yoshor, MD, Chairman, Neurosurgery
          Ronald P. DeMatteo, MD, FACS, Chairman, Surgery
          Edward J. Delikatny, PhD, Activity Director
          John Y. K. Lee, MD, MSCE, Activity Director
          Sunil Singhal, MD, Activity Director

SESSION 1:
Phase III Clinical Trials In Intraoperative Molecular Imaging For Cancer Surgery
MODERATOR:  Quyen Nguyen, MD, PhD

7:30 am  5-ALA in the United States Post-Approval Adoption Challenges, Reimbursement and Future Directions: Phase IV
Costas Hadjipanayis, MD, PhD – Neurosurgery

7:50 am  Folate NIR Dye for Ovarian Cancer: Phase 3 US Trial
Janos L. Tanyi, MD, PhD – Gynecologic Oncology, Activity Director

8:10 am  Folate NIR Dye for Lung Cancer: Phase 3 US Trial
Sunil Singhal, MD – Thoracic Surgery

8:30 am  CEA Colon Cancer Trial: Phase 3 European Trial
Alexander L. Vahrmeijer, MD – Oncologic Surgery

8:50 am  Protease Activated Dye in Breast Cancer Surgery: Multicenter, randomized US Trials
Barbara L. Smith, MD, PhD – Breast Surgery

9:10 am  Discussion
9:30 am  Break
SESSION 2:
Phase II Clinical Trials In Intraoperative Molecular Imaging For Cancer Surgery
MODERATOR: Jason G. Newman, MD, FACS, Activity Director

10:00 am  Anti-EGFR Antibody Imaging Strategies for Real-Time Surgical and Pathologic Guidance
Eben Rosenthal, MD – Otolaryngology: Head & Neck Surgery; Radiology: Radiology/Molecular Imaging

10:20 am  Alliance Trial – TumorGlow® in Sarcoma Metastasis to Lung
Linda W. Martin, MD, MPH – Thoracic Surgery

10:40 am  pH Sensitive Dyes in Head & Neck Cancer
Baran Sumer, MD, FACS – Otolaryngology, Head & Neck Surgery

11:00 am  The Road to Image Guidance in Breast Surgery
Ari D. Brooks, MD – Endocrine and Oncologic Surgery

11:20 am  Discussion

12:00 pm  Break

SESSION 3:
Pilot And Phase I Clinical Trials In Intraoperative Molecular Imaging For Cancer Surgery
MODERATOR: Andrew Tsourkas, PhD

12:30 pm  NIR II – with ICG in Human Liver Tumors
Jie Tian, PhD – Automation, Medical Imaging

12:45 pm  TumorGlow® Second Window ICG in Brain Tumors
John Y.K. Lee MD, MSCE – Neurosurgery

1:00 pm  TumorGlow® Second Window ICG in Pancreatic Cancer
Major Kenneth Lee, IV, MD, PhD – Gastrointestinal Surgery

1:15 pm  EGFR Affibody: Design & Implementation of Novel Targeted Tumor Dye
Eric R. Henderson, MD – Orthopedic Oncology

1:30 pm  Tumor Paint™ Imaging – Pediatric Brain Tumors
Amy Lee, MD – Pediatric Neurological Surgery
2:00 pm  Nerve Specific Dyes – Normal Tissue Identification  
Quyen Nguyen, MD, PhD – Otolaryngology: Head & Neck Surgery

2:15 pm  Nerve Specific Dyes – Normal Tissue Identification  
Summer L. Gibbs, PhD – Biomedical Engineering

2:30 pm  Discussion

3:00 pm  Break

SESSION 4:  
Intraoperative Camera And Back Table Imaging Platforms  
MODERATOR: E. James Petersson, PhD

3:45 pm  Review of Fluorescence Camera Imaging: Advantages versus disadvantages  
Brian W. Pogue, PhD – Engineering

4:00 pm  Raman Spectroscopy Imaging of Brain Tumors on the Back Table  
Daniel A. Orringer, MD – Neurosurgery

4:30 pm  Multispectral and Confocal Microscopy  
Cleopatra Charalampaki, MD, PhD – Neurosurgery

4:45 pm  Discussion

4:55 pm  CME Activity Concludes

INDUSTRY SESSION

SESSION 5: Industry Session: Individual Camera & Imaging Platforms  
MODERATOR: Stefan Harmsen, PhD

5:00 pm  Stryker  
John Shen (San Jose, California, USA)

5:15 pm  Medtronic & EleVision  
Alex Chanin (Philadelphia, Pennsylvania, USA)

5:30 pm  Intuitive Surgical  
Jonathan Sorger (Belmont, California, USA)
5:45 pm  **Fluorescence**
Richard Meester (Cleveland, Ohio, USA)

6:00 pm  **Panel Discussion – Future Unmet Needs**
**MODERATOR:** Sunil Singhal, MD
All speakers

6:30 pm  **Industry Session Concludes**

---

**Overview**
Penn’s Abramson Cancer Center and Center for Precision Surgery present this activity to review and discuss recent progress and future challenges in clinical trials for intraoperative molecular imaging during cancer surgery. Lectures and interactive participation will encourage a dynamic exchange of ideas between faculty and attendees.

**Learning Objectives**
At the completion of this course, participants should be able to:
- Describe the status of ongoing or completed clinical trials in the field of intraoperative molecular imaging for cancer surgery
- Define indications and endpoints for intraoperative imaging trials in clinical cancer surgery
- Identify differences in camera imaging systems and advantages/disadvantages of various engineering and technology solutions

**Who Should Attend**
This activity is designed for surgeons and researchers interested in learning about intraoperative molecular imaging. This includes surgical oncologists, neuro-surgeons, thoracic surgeons, gynecologic oncology surgeons, gastrointestinal surgeons, otorhinolaryngologists/head and neck cancer surgeons, and other healthcare professionals involved in intraoperative molecular imaging for cancer such as radiologists, physicists, engineers, research scientists, and technologists.

---

**ACCREDITATION**
In support of improving patient care, Penn Medicine is jointly accredited by the Accreditation Council for Continuing Medical Education (ACCME), the Accreditation Council for Pharmacy Education (ACPE), and the American Nurses Credentialing Center (ANCC), to provide continuing education for the healthcare team.
DESIGNATION OF CREDIT

PHYSICIANS: Penn Medicine designates this live activity for a maximum of 8 AMA PRA Category 1 Credits™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

PHYSICIAN ASSISTANTS: AAPA accepts certificates of participation for educational activities certified for AMA PRA Category 1 Credits™ from organizations accredited by ACCME or a recognized state medical society. PAs may receive a maximum of 8 Category 1 credits for completing this activity.

FACULTY

Activity Directors

John Y. K. Lee, MD, MSCE
Professor of Neurosurgery and Otorhinolaryngology: Head and Neck Surgery
Director of Clinical Research, Center for Precision Surgery
Medical Director, Gamma Knife Center
Perelman School of Medicine at the University of Pennsylvania/Penn Medicine
Philadelphia, Pennsylvania, USA

Sunil Singhal, MD
William Maul Measey Associate Professor in Surgical Research
Executive Director, Center for Precision Surgery
Director, Thoracic Surgery Research Laboratory
Vice Chair of Research, General Surgery
Perelman School of Medicine at the University of Pennsylvania/ Penn Medicine
Philadelphia, Pennsylvania, USA

Activity Co-Directors

Edward J. Delikatny, PhD
Research Professor of Radiology
Director of Translational Research, Center for Precision Surgery
Perelman School of Medicine at the University of Pennsylvania/Penn Medicine
Philadelphia, Pennsylvania, USA

Jason G. Newman, MD, FACS
Professor of Otorhinolaryngology: Head and Neck Surgery
Co-Director, Cranial Base Center
Director, Head & Neck Surgery, Pennsylvania Hospital
Perelman School of Medicine at the University of Pennsylvania/Penn Medicine
Philadelphia, Pennsylvania, USA
Janos L. Tanyi, MD, PhD  
Assistant Professor of Obstetrics and  
Gynecology: Gynecologic Oncology  
Perelman School of Medicine at the University of Pennsylvania/Penn Medicine  
Philadelphia, Pennsylvania, USA

Speakers

Ari D. Brooks, MD  
Professor of Clinical surgery  
Director of Endocrine and Oncologic Surgery  
Director of the Integrated Breast Center, Pennsylvania Hospital  
Perelman School of Medicine at the University of Pennsylvania/Penn Medicine  
Philadelphia, Pennsylvania, USA

Cleopatra Charalampaki, MD, PhD  
Professor of Neurosurgery  
Department of Neurosurgery  
Cologne Medical Center  
Cologne, Germany

Ronald P. DeMatteo, MD, FACS  
Chairman, Surgery  
John Rhea Barton Professor of Surgery  
Perelman School of Medicine at the University of Pennsylvania/Penn Medicine  
Philadelphia, Pennsylvania, USA

Summer L. Gibbs, PhD  
Associate Professor of Biomedical Engineering  
Oregon Health & Science University Knight Cancer Institute, School of Medicine  
Portland, Oregon, USA

Costantinos G. Hadjipanayis, MD, PhD  
Professor of Neurosurgery and Oncological Sciences  
Chair of Neurosurgery, Mount Sinai  
Downtown Union Square/Beth Israel  
Director of Neurosurgical Oncology,  
Mount Sinai Health System  
Director, Brain Tumor Nanotechnology Laboratory  
Icahn School of Medicine at Mount Sinai  
New York, New York, USA
Stefan Harmsen, PhD  
Senior Physical Research Scientist  
Rad/Molecular Imaging Program  
Stanford University  
Stanford, California, USA

Eric R. Henderson, MD  
Assistant Professor of Orthopaedics  
Geisel School of Medicine, Dartmouth  
Hanover, New Hampshire, USA

Amy Lee, MD  
Associate Professor of Neurological Surgery  
Seattle Children’s Hospital and University of Washington  
Seattle, Washington, USA

Major Kenneth Lee, IV, MD, PhD  
Associate Professor of Surgery  
Perelman School of Medicine at the University of Pennsylvania/Penn Medicine  
Philadelphia, Pennsylvania, USA

Linda W. Martin, MD, MPH  
Associate Professor, Surgery (Thoracic)  
University of Virginia School of Medicine  
Charlottesville, Virginia, USA

Quyen Nguyen, MD, PhD  
Professor of Surgery (Otolaryngology)  
University of California San Diego  
La Jolla, California, USA

Daniel A. Orringer, MD  
Associate Professor of Neurosurgery and Pathology  
University of Michigan  
Ann Arbor, Michigan, USA

E. James Petersson, PhD  
Associate Professor of Chemistry  
University of Pennsylvania  
Philadelphia, Pennsylvania, USA
Brian W. Pogue, PhD
Professor of Surgery
Geisel School of Medicine at Dartmouth
Professor of Engineering
Thayer School of Engineering at Dartmouth
Hanover, New Hampshire, USA

Eben Rosenthal, MD
Anne and John Doer Director of Cancer Services
Professor, Otolaryngology: Head & Neck Surgery
Faculty, Molecular Imaging Program at Stanford
Stanford University School of Medicine /Stanford Medicine
Stanford, California, USA

Barbara L Smith, MD, PhD
Professor of Surgery, Harvard Medical School
Director, Breast Program
Massachusetts General Hospital
Boston, Massachusetts, USA

Baran Sumer, MD, FACS
T.C. Lupton Family Professorship in Patient Care Associate Professor of Surgery (Otolaryngology)
Chief of Head and Neck Oncology Division
UT Southwestern Medical Center
The University of Texas Southwestern Medical Center
Dallas, Texas, USA

Jie Tian, PhD
Professor and Director of the Key Laboratory of Molecular Imaging
Chinese Academy of Sciences/Institute of Automation
Beijing, China

Andrew Tsourkas, PhD
Professor of Bioengineering
University of Pennsylvania
Philadelphia, Pennsylvania, USA
Alexander L. Vahrmeijer, MD
Oncologic Surgeon
Research Leader Image-Guided Surgery
Leiden University Medical Center
Leiden, The Netherlands

Robert H Vonderheide, MD, DPhil
Director, Abramson Cancer Center
John H. Glick Abramson Cancer Center’s Director Professor
Vice Dean for Cancer Programs, PSOM
Vice President for Cancer Programs, UPHS
Perelman School of Medicine at the University of Pennsylvania / Penn Medicine
Philadelphia, PA, USA

Daniel Yoshor, MD
Charles Harrison Frazier Professor of Neurosurgery
Chair, Department of Neurosurgery
Vice President, Clinical Integration and Innovation
Perelman School of Medicine at the University of Pennsylvania/Penn Medicine
Philadelphia, PA, USA

Speakers - NON- CME Session
Alex Chanin
Senior Director
Medtronic
Southampton, Pennsylvania, USA

Richard Meester
Chief Executive Officer
Quest Medical Imaging
Cleveland, Ohio, USA

John Shen
Director of R&D
Cross-Specialty Visualization
Stryker Endoscopy

Jonathan Sorger
Vice President of Research & Development
Intuitive Surgical
Belmont, California, USA
PLANNING COMMITTEE MEMBERS

Cynthia L Griffo, MS, RN
Director, Communications and Education
Penn’s Abramson Cancer Center

Barbara Lopez
Associate Director, Education and Outreach
Penn’s Abramson Cancer Center

DISCLOSURE OF RELEVANT FINANCIAL RELATIONSHIPS

Staff in the Office of Continuing Medical and Interprofessional Education at Penn Medicine (Belinda Rose, CHCP and Vaughn Wurst) and Planning Committee Members (Cynthia Griffo, MS, RN and Barbara Lopez) have reported that they have no relevant financial relationships with any commercial interest related to the content of this educational activity.

Faculty Name

The following faculty and planning committee members have disclosed that they have no relevant financial relationship with any commercial interests related to the content of this educational activity:

Ari D. Brooks, MD
Cleopatra Charalampaki, MD, PhD
Edward J. Delikatny, PhD
Amy Lee, MD
Major Kenneth Lee, IV, MD, PhD
E. James Petersson, PhD

Sunil Singhal, MD
Barbara L Smith, MD, PhD
Janos L. Tanyi, MD, PhD
Jie Tian, PhD
Daniel Yoshor, MD

The following faculty and planning committee members have reported the relevant financial relationships with commercial interests related to the content of this educational activity:

<table>
<thead>
<tr>
<th>Faculty Name</th>
<th>Name of Commercial Interest</th>
<th>Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ronald P. DeMatteo, MD, FACS</td>
<td>Blueprint Medicines</td>
<td>Grants/Research Support</td>
</tr>
<tr>
<td>Summer L. Gibbs, PhD</td>
<td>Inherent Targeting, LLC</td>
<td>Board Member</td>
</tr>
<tr>
<td>Costantinos G. Hadjipanayis, MD, PhD</td>
<td>NX Development Corporation Royalties; Consultant Synaptive</td>
<td>Grants/Research Support</td>
</tr>
<tr>
<td></td>
<td>Carl Zeiss Meditec</td>
<td>Consultant</td>
</tr>
<tr>
<td>Eric R. Henderson, MD</td>
<td>Stryker Orthopaedics</td>
<td>Consultant</td>
</tr>
<tr>
<td>Faculty Name</td>
<td>Name of Commercial Interest</td>
<td>Relationship</td>
</tr>
<tr>
<td>------------------------------</td>
<td>---------------------------------------------------</td>
<td>---------------------------------------</td>
</tr>
<tr>
<td>John Y.K. Lee, MD</td>
<td>Medtronic, Inc.</td>
<td>Stock Shareholder</td>
</tr>
<tr>
<td>Linda W. Martin, MD, MPH</td>
<td>AstraZeneca, Pacira On target Laboratories</td>
<td>Advisor/Review Panel Member</td>
</tr>
<tr>
<td>Quyen Nguyen, MD, PhD</td>
<td>Alume Biosciences, Inc.</td>
<td>Founder, CEO</td>
</tr>
<tr>
<td>Daniel A. Orringer, MD</td>
<td>Invenio Imaging NXDC</td>
<td>Stock shareholder Consultant</td>
</tr>
<tr>
<td>Brian W. Pogue, PhD</td>
<td>QUEL Imaging, LLC</td>
<td>Grant/Research support</td>
</tr>
<tr>
<td>Eben Rosenthal, MD</td>
<td>Vergent Biosciences, Rakuten Medical</td>
<td>Advisor/Review Panel</td>
</tr>
<tr>
<td>Baran Sumer, MD, FACS</td>
<td>OncoNano Medicine, Inc, Intuitive, Sanofi-Aventis</td>
<td>Holder of IP, Consultant, Stockholder Consultant</td>
</tr>
<tr>
<td>Andrew Tsourkas, PhD</td>
<td>AlphaThera, LLC</td>
<td>Founder and Scientific Advisory</td>
</tr>
<tr>
<td>Robert Vonderheide, MD, DPhil</td>
<td>Fibrogen, Eli Lilly, Janssen</td>
<td>Grants/Research Support</td>
</tr>
<tr>
<td>Alexander L. Vahrmeijer, MD</td>
<td>SurgiMab, Quest Medical Imaging</td>
<td>Grants/Research Support</td>
</tr>
</tbody>
</table>
The Abramson Cancer Center Gratefully Acknowledges our Supporters

Corporate Grantors

Medtronic
Olympus
Intuitive
Vergent Bioscience
Brainlab