

2021

Medical Imaging

CALL FOR PAPERS

Submit abstracts by 5 August 2020

14–18 February 2021

Town and Country Resort and
Convention Center
San Diego, California, USA

www.spie.org/mi21call
#SPIEMedicalImaging



Present your work in San Diego at Medical Imaging 2021

The leading conference that explores the science of medical imaging

Why Medical Imaging is at home in California

More than just a vacation destination – this state is rich in medical research and advances directly affecting next-generation technologies in medical imaging and analysis.

The area is home to a combination of top-notch universities and world-renowned research institutes known for their science and technology programs. Some of these top ranked medical universities include University of California San Francisco, UC San Diego School of Medicine, and Stanford School of Medicine. The region also offers clinical facilities for patient care, translational research and medical advancements thanks to the it's world-renowned medical research programs and hospitals.

Plan to present in San Diego and network with like-minded leaders gathering in one city.



Plan to Participate



The SPIE Medical Imaging meeting is the internationally recognized forum for reporting state-of-the-art research and development in medical imaging. The symposium covers the full range of medical imaging modalities focusing on image acquisition, display, processing, analysis, perception, decision support, and informatics. Broad topics of interest include the following:

- imaging physics, systems analysis and modeling
- X-ray imaging and computed tomography
- ultrasonic acquisition and processing
- magnetic resonance imaging (MRI)
- molecular imaging
- digital pathology
- emerging image acquisition technologies
- tomographic image reconstruction
- quantitative imaging
- image processing and analysis
- novel contrast enhancement agents
- image and molecular data fusion
- multimodal imaging
- molecular imaging
- computed tomography
- computer-aided detection and diagnosis
- computational models
- image-guided therapies
- visual rendering of complex datasets
- visual perception and observer performance
- technology assessment
- physiological and functional interpretation of image data
- clinical evaluations of new technologies
- image data management (storage, retrieval, transmission)
- medical informatics
- medical diagnostic imaging
- imaging for precision medicine
- deep learning / machine learning / artificial intelligence
- augmented reality/ virtual reality uses
- technology miniaturization/ handheld imaging and probing capability
- digital operating room
- brain informatics

Join your peers where collaboration brings ideas to life and technology to market. Hear the work, network with leaders in the field, and see the applications of the future. We look forward to seeing you in San Diego!

SYMPOSIUM CHAIRS:



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Wake Forest Baptist
Medical Ctr. (USA)
Symposium Chair



Robert M. Nishikawa

Univ. of Pittsburgh (USA)
Symposium Cochair

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Thomas M. Deserno, Technische Univ. Braunschweig (Germany)

Karen Drukker, The Univ. of Chicago (USA)

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John E. Tomaszewski, Univ. at Buffalo (USA)

Aaron D. Ward, The Univ. of Western Ontario (Canada)

Lifeng Yu, Mayo Clinic (USA)

Wei Zhao, Stony Brook Univ. (USA)

COOPERATING ORGANIZATIONS

AAPM - American Association of Physicists in Medicine

IFCARS - International Foundation for Computer Assisted Radiology and Surgery

MIPS - Medical Image Perception Society

SIIM - Society for Imaging Informatics in Medicine

WMIS - World Molecular Imaging Society

MEDICAL IMAGING 2021 PLENARY SPEAKER

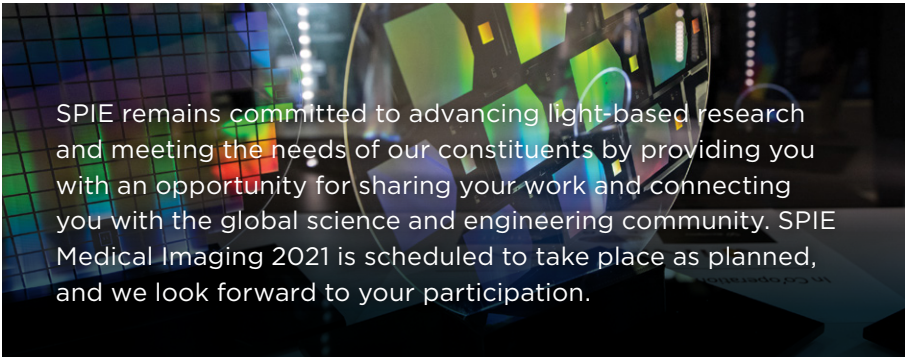


Rebecca Richards-Kortum

Malcolm Gillis University, Prof of Bioengineering

Director of Rice 360: Institute for Global Health Technology, Rice University

Dr. Richards-Kortum will speak on Biophotonics Solutions to Global Health Challenges.



SPIE remains committed to advancing light-based research and meeting the needs of our constituents by providing you with an opportunity for sharing your work and connecting you with the global science and engineering community. SPIE Medical Imaging 2021 is scheduled to take place as planned, and we look forward to your participation.



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www.spie.org/signup

Contents

MI101	Physics of Medical Imaging (Hilde Bosmans; Wei Zhao; Lifeng Yu).....	4
MI102	Image Processing (Ivana Išgum; Bennett A. Landman)	6
MI103	Computer-Aided Diagnosis (Maciej A. Mazurowski; Karen Drukker).....	8
MI104	Image-Guided Procedures, Robotic Interventions, and Modeling (Cristian A. Linte; Jeffrey H. Siewerdsen)	9
MI105	Image Perception, Observer Performance, and Technology Assessment (Frank W. Samuelson; Sian Taylor-Phillips)	11
MI106	Biomedical Applications in Molecular, Structural, and Functional Imaging (Barjor S. Gimi; Andrzej Krol).....	12
MI107	Imaging Informatics for Healthcare, Research, and Applications (Thomas M. Deserno; Brian J. Park) ..	14
MI108	Ultrasonic Imaging and Tomography (Brett C. Byram; Nicole V. Ruiter) ...	16
MI109	Digital and Computational Pathology (John E. Tomaszewski; Aaron D. Ward).....	17
	General Information.....	19
	Submission of Abstracts	21



2021 STUDENT PAPER AWARDS INFORMATION

ATTENTION STUDENTS

Submission instructions and eligibility requirements for the 2021 All Conference Best Student Paper Awards will be available in October 2020.

See 2020 Award Winners online: www.spie.org/awards2021



Nominations now being accepted for the

SPIE HARRISON H. BARRETT AWARD

Nominate a colleague in recognition of outstanding accomplishments in medical imaging. Deadline for 2021 nominations is **1 June 2020**.

View award details and past winners online.

2020 AWARD RECIPIENT

Harold L. Kundel

University of Pennsylvania

Philadelphia, Pennsylvania, USA

Physics of Medical Imaging (MI101)

Conference Chairs: **Hilde Bosmans**, Katholieke Univ. Leuven (Belgium); **Wei Zhao**, Stony Brook Univ. (USA)

Conference Co-Chair: **Lifeng Yu**, Mayo Clinic (USA)

Program Committee: **Shiva Abbaszadeh**, Univ. of Illinois at Urbana-Champaign (USA);

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Taly Gilat Schmidt, Marquette Univ. (USA); **Stephen J. Glick**, U.S. Food and Drug Administration (USA),

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(Germany); **Karim S. Karim**, Univ. of Waterloo (Canada); **Hee-Joung Kim**, Yonsei Univ. (Korea, Republic

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Public Health (USA); **Quanzheng Li**, Massachusetts General Hospital (USA); **Joseph Y. Lo**, Duke Univ.

(USA); **Peter B. Noël**, Univ. of Pennsylvania (USA); **Frédéric Noo**, The Univ. of Utah (USA); **Jinyi Qi**,

Univ. of California, Davis (USA); **John M. Sabol**, GE Healthcare (USA); **Ioannis Sechopoulos**, Radboud

Univ. Medical Ctr. (Netherlands); **Behrouz Shabestari**, National Institute of Biomedical Imaging and

Bioengineering (USA); **Joseph W. Stayman**, Johns Hopkins Univ. (USA); **Anders Tingberg**, Lund Univ.

(Sweden); **Adam S. Wang**, Stanford Univ. School of Medicine (USA); **Yuxiang Xing**, Tsinghua Univ. (China);

John Yorkston, Carestream Health, Inc. (USA)

This conference will cover all aspects of image formation in medical imaging, including systems using ionizing radiation (x-rays, gamma rays) or non-ionizing techniques (ultrasound, optical, thermal, magnetic resonance, or magnetic particle imaging). Papers of a theoretical nature or papers reporting new experimental results and applications using Artificial Intelligence techniques are invited. Topics of particular interest include novel methods for image formation, experimental methods and results regarding image performance, algorithms for image reconstruction and correction, detector materials and electronic design, analytical and computer modeling of imaging systems, and physics of contrast media. Work directed toward the imaging of human subjects, small animals, or tissue specimens are welcome. The conference will also cover dedicated approaches for various imaging applications resulting from the above mentioned general imaging framework, for example cardiovascular or neuroimaging applications.

Original papers are especially requested in the following areas:

IMAGING SCIENCE

- Physics of signal detection, image formation and signal degradation
- Object characterization and contrast mechanisms
- Characterization of detector and system performance (MTF, NPS, DQE, task- and observer-based)

TECHNOLOGY

- Novel medical imaging systems and methods including contrast media / nanoparticles
- Properties of scintillating, photoconductive, or other sensor materials
- Novel sources of radiation
- Image reconstruction methods (e.g., for CT, tomosynthesis, SPECT and PET, optical imaging, MRI, etc.)
- Machine learning approaches to image formation
- Multi-energy (spectral) x-ray and CT imaging

- Computer simulation of imaging systems including models for radiation sources, imaged objects, physical interactions, and detectors
- Phantoms (physical and numerical)
- Photon counting
- Proton based imaging
- Imaging method for radiation therapy
- Radiation (e.g., optical) and signal transport
- Radiation dose, dosimetry, and dose effects (risk), as well as possible stratification

DEVICES

- Advanced multi-slice or cone beam CT systems
- Advanced radiographic, fluoroscopic, or angiographic systems (including phase contrast and diffraction)
- Ultrasound, MRI, optical, thermal, magnetic particle imaging (and other non-ionizing radiation systems)
- Small animal imaging systems
- Nuclear medicine imaging methods (SPECT and PET)
- Multi-modality imaging devices
- Low-cost imaging devices with global health applications

APPLICATIONS

- Cardiovascular imaging
- Neuroimaging
- Mammographic imaging
- Interventional imaging
- Imaging applications in therapy (e.g., radiation therapy, surgery, in-vivo verification)
- Advanced applications (clinical, translational, preclinical, basic science, biomarkers)
- Novel medical imaging for precision medicine applications

TOPIC AREAS: FOR THIS CONFERENCE ONLY

During the submission process, you will be asked to choose three different topics to assist in the review process.

- ALG - Algorithmic developments, simulations, calibration, classification, etc. (for reconstruction and machine learning use dedicated categories)
- CARD - Cardiovascular imaging
- CLIM - Clinical evaluation
- CON - Physics of contrast enhancement using contrast media / nanoparticles
- CT - All conventional and multi-energy CT topics (for cone beam use dedicated category)
- CTCB - Cone beam CT
- DET - Detector technology; scintillators, photoconductors, diodes, TFT
- DIAG - Diagnostic imaging
- DOSE - Radiation dose, dosimetry, and dose effects
- IGI - Image guided interventions
- IMG - Imaging methods including optical, MR, ultrasound, etc. (for x-ray, CT, or nuclear based methods use dedicated categories)
- MAM - Imaging of the breast (any device)
- METR - Measurement methods (MTF, NPS, DQE, eDQE, gDQE, Spectra, ...)
- ML - Machine Learning applied to imaging physics (reconstruction, corrections, evaluations, etc...)
- MULTI - Multi modality imaging
- NEURO - Neuroimaging
- NUC - Nuclear medical imaging innovations
- ONC - Oncology
- OTHER - Other methodology, systems or applications
- PCI - Photon counting imaging
- PER - Observer or perception-based performance evaluations of systems
- PHS - Phase contrast imaging
- PHT - Work involving development of phantoms or anatomical simulation models
- PRI - Proton based imaging
- RECON - Image reconstruction including CT, SPECT, PET, OCT and tomosynthesis
- SMAX - Small animal or microscopic imaging
- TSY - Tomosynthesis
- XIM - X-ray imaging, x-ray sources, scatter reduction techniques
- XME - Multi-energy radiography or mammography

Save the date

ABSTRACTS DUE: 5 AUGUST 2020

**AUTHOR NOTIFICATION:
12 OCTOBER 2020**

The contact author will be notified of acceptance by email.

MANUSCRIPTS DUE: 20 JANUARY 2021

PLEASE NOTE: Submission implies the intent of at least one author to register, attend the conference, present the paper as scheduled, and submit a full-length manuscript for publication in the conference proceedings.

Submit your abstract today: www.spie.org/mi21call

Image Processing (MI102)

Conference Chairs: **Ivana Išgum**, Amsterdam UMC (Netherlands); **Bennett A. Landman**, Vanderbilt Univ. (USA)

Program Committee: **Elsa D. Angelini**, Imperial College London (United Kingdom), Columbia Univ. (USA), Télécom ParisTech (France); **Meritxell Bach-Cuadra**, Univ. de Lausanne (Switzerland); **Ulas Bagci**, Univ. of Central Florida (USA); **Antong Chen**, Merck & Co., Inc. (USA); **Olivier Colliot**, Ctr. National de la Recherche Scientifique (France); **Tolga Çukur**, Bilkent Univ. (Turkey); **Benoit M. Dawant**, Vanderbilt Univ. (USA); **Marleen de Bruijne**, Erasmus MC (Netherlands); **Lotta Maria Ellingsen**, Univ. of Iceland (Iceland); **Alexandre X. Falcão**, Univ. Estadual de Campinas (Brazil); **Aaron Fenster**, Roberts Research Institute (Canada); **James Fishbaugh**, NYU Tandon School of Engineering (USA); **Alejandro F. Frangi**, Univ. of Leeds (United Kingdom); **Yu Gan**, The Univ. of Alabama (USA); **Mona K. Garvin**, The Univ. of Iowa (USA); **James C. Gee**, Univ. of Pennsylvania (USA); **Benjamin Glocker**, Imperial College London (United Kingdom); **Miguel Angel González Ballester**, Univ. Pompeu Fabra (Spain); **Hayit Greenspan**, Tel Aviv Univ. (Israel); **David R. Haynor**, Univ. of Washington (USA); **Tobias Heimann**, Siemens Healthineers (Germany); **Bulat Ibragimov**, Univ. of Copenhagen (Denmark); **Leigh Johnston**, The Univ. of Melbourne (Australia); **Stefan Klein**, Erasmus MC (Netherlands); **Tianhu Lei**, MD Imaging Research (USA); **Tim Leiner**, Univ. Medical Ctr. Utrecht (Netherlands); **Karim Lekadir**, Univ. de Barcelona (Spain); **Boudewijn P. F. Lelieveldt**, Leiden Univ. Medical Ctr. (Netherlands); **Natasha Lepore**, The Univ. of Southern California (USA); **Marius George Linguraru**, Children's National Medical Ctr. (USA); **Murray H. Loew**, The George Washington Univ. (USA); **Cristian Lorenz**, Philips Research (Germany); **Frederik Maes**, Katholieke Univ. Leuven (Belgium); **Vincent A. Magnotta**, The Univ. of Iowa Hospitals and Clinics (USA); **Rashindra Manniesing**, Radboud Univ. Medical Ctr. (Netherlands); **Diana Mateus**, Ecole Centrale de Nantes (France); **Jhimli Mitra**, GE Global Research (USA); **Sunanda D. Mitra**, Texas Tech Univ. (USA); **Marc Modat**, King's College London (United Kingdom); **Albert Montillo**, Univ. of Texas Southwestern Medical Ctr. (USA); **Kensaku Mori**, Nagoya Univ. (Japan); **Mads Nielsen**, Niels Bohr Institute (Denmark); **Ipek Oguz**, Vanderbilt Univ. (USA); **Dzung L. Pham**, Henry Jackson Foundation/USU (USA), National Institutes of Health (USA), Johns Hopkins Univ. (USA); **Jerry L. Prince**, Johns Hopkins Univ. (USA); **Xin Qi**, Rutgers, The State Univ. of New Jersey (USA); **Maryam E. Rettmann**, Mayo Clinic (USA); **Letícia Rittner**, Univ. Estadual de Campinas (Brazil); **Mirabela Rusu**, Stanford Univ. School of Medicine (USA); **Punam K. Saha**, The Univ. of Iowa (USA); **Lin Shi**, The Chinese Univ. of Hong Kong (China); **Marius Staring**, Leiden Univ. Medical Ctr. (Netherlands); **Martin A. Styner**, The Univ. of North Carolina at Chapel Hill (USA); **Kenji Suzuki**, Illinois Institute of Technology (USA); **Tanveer F. Syeda-Mahmood**, IBM Research - Almaden (USA); **Raphael Sznitman**, Univ. Bern (Switzerland); **Zeike A. Taylor**, Univ. of Leeds (United Kingdom); **Yubing Tong**, Univ. of Pennsylvania (USA); **Jayaram K. Udupa**, Univ. of Pennsylvania (USA); **Koen Van Leemput**, Harvard Medical School (USA), Massachusetts General Hospital (USA); **Tomaž Vrtovec**, Univ. of Ljubljana (Slovenia); **Wolfgang Wein**, ImFusion GmbH (Germany)

Original papers are invited on all aspects of the processing and analysis of medical, small animal, or cellular images, with applications in medicine, biological, and pharmaceutical research. Of interest are algorithms applied to all imaging modalities, including x-ray, DSA, CT, MRI, neuroimaging, nuclear medicine, optical, ultrasound, macroscopic, and microscopic imaging. Papers dealing with the challenges of bringing advances in research laboratories into clinical application are particularly welcomed.

Papers typically involve research that includes one or more of the following categories (in alphabetical order):

- Augmented/virtual reality
- Classification
- Compressed sensing, sparse reconstruction methods
- Computational anatomy and atlases
- Computer vision
- Connectome analysis
- Deep learning
- Deformable geometry
- Diffusion MRI analysis
- Functional imaging analysis
- Generative/adversarial learning
- Image representation and compression
- Image restoration and enhancement
- Image synthesis
- Imaging genetics
- Machine learning and pattern recognition
- Methods for training and validation, including ground truth generation
- Model-based image analysis
- Motion/time series analysis
- Open software for medical image processing
- Population/clinical studies
- Quantitative image analysis/quantitative imaging biomarkers
- Registration methodologies
- Radiomics and texture representation/analysis
- Segmentation methodologies
- Shape representation and analysis
- Statistical methodology
- Visualization methods
- Voxel/deformation/tensor-based morphometry

TOPIC AREAS: FOR THIS CONFERENCE ONLY

To assist the reviewers, choose up to three keywords in order of relevance from the following list.

- Augmented/virtual reality
- Classification
- Compressed sensing, sparse reconstruction methods
- Computational anatomy and atlases
- Computer vision
- Connectome analysis
- Deep learning
- Deformable geometry
- Diffusion MRI analysis
- Functional imaging analysis
- Generating virtual populations
- Generative/adversarial learning
- Image representation and compression
- Image restoration and enhancement
- Image synthesis
- Imaging genetics
- Machine learning and pattern recognition
- Methods for training and validation, including ground truth generation
- Model-based image analysis
- Motion/time series analysis
- Multi-scale imaging (from single cell to whole body)
- Open software for medical image processing
- Population/clinical studies
- Quantitative image analysis/quantitative imaging biomarkers
- Registration methodologies
- Radiomics and texture representation/analysis
- Segmentation methodologies
- Shape representation and analysis
- Statistical methodology
- Visualization methods
- Voxel/deformation/tensor-based morphometry

SPECIAL SECTION IN JOURNAL OF MEDICAL IMAGING

Best evaluated manuscripts accepted for oral presentations will be invited to submit an extended version of their paper for a Special Section in the *Journal of Medical Imaging*. Further details regarding this Special Section will be announced by the *Journal of Medical Imaging*. In order to be considered for this Special Section, please submit an abstract and a 6-8 page supplemental file by 5 August 2020. Please also enter the following text in the custom tracking title when prompted, "JMI Special Section".

DEEP-DIVE SESSION

A limited number of papers selected for oral presentation will be chosen for a novel deep-dive session. This session will comprise of very few oral presentations followed by a longer more in-depth discussion that will be led by experienced researchers. In order to be considered for this Deep-dive session, please submit an abstract and a 6-8 page supplemental file by 5 August 2020. Please also enter the following text in the custom tracking title when prompted, "Deep-dive".

OPEN-SOURCE SOFTWARE

We are supporting development of open source software. Accepted manuscripts describing open source code via public repositories will be indicated in the program.

Save the date

ABSTRACTS DUE: 5 AUGUST 2020

**AUTHOR NOTIFICATION:
12 OCTOBER 2020**

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MANUSCRIPTS DUE: 20 JANUARY 2021

PLEASE NOTE: Submission implies the intent of at least one author to register, attend the conference, present the paper as scheduled, and submit a full-length manuscript for publication in the conference proceedings.

Submit your abstract today: www.spie.org/mi21call

Computer-Aided Diagnosis (MI103)

Conference Chairs: **Maciej A. Mazurowski**, Duke Univ. (USA); **Karen Drukker**, The Univ. of Chicago (USA)

Program Committee: **Samuel G. Armato III**, The Univ. of Chicago (USA); **Susan M. Astley**, The Univ. of Manchester (United Kingdom); **Esther E. Bron**, Erasmus MC (Netherlands); **Matthew S. Brown**, Univ. of California, Los Angeles (USA); **Kenny H. Cha**, U.S. Food and Drug Administration (USA); **Heang-Ping Chan**, Univ. of Michigan (USA); **Weijie Chen**, U.S. Food and Drug Administration (USA); **Marleen de Bruijne**, Erasmus MC (Netherlands); **Thomas M. Deserno**, Technische Univ. Braunschweig (Germany); **Jan Ehrhardt**, Univ. zu Lübeck (Germany); **Catalin Fetita**, Télécom SudParis (France); **Hiroshi Fujita**, Gifu Univ. School of Medicine (Japan); **Maryellen L. Giger**, The Univ. of Chicago (USA); **Hayit Greenspan**, Tel Aviv Univ. (Israel); **Lubomir M. Hadjiiski**, Univ. of Michigan (USA); **Horst K. Hahn**, Fraunhofer MEVIS (Germany), Jacobs Univ. Bremen (Germany); **Helen Hong**, Seoul Women's Univ. (Korea, Republic of); **Khan M. Iftekhharuddin**, Old Dominion Univ. (USA); **Nico Karssemeijer**, Radboud Univ. Nijmegen Medical Ctr. (Netherlands); **JongHyo Kim**, Seoul National Univ. Hospital (Korea, Republic of); **Despina Kontos**, Penn Medicine (USA); **Zhengrong Jerome Liang**, Stony Brook Univ. (USA); **Marius George Linguraru**, Children's National Medical Ctr. (USA); **Fabrice Meriaudeau**, Univ. de Bourgogne (France); **Kensaku Mori**, Nagoya Univ. (Japan); **Janne J. Näppi**, Massachusetts General Hospital (USA), Harvard Medical School (USA); **Noboru Niki**, Univ. of Tokushima (Japan); **Carol L. Novak**, Siemens Healthineers (USA); **Nicholas A. Petrick**, U.S. Food and Drug Administration (USA); **Prateek Prasanna**, Stony Brook Univ. (USA); **Letícia Rittner**, Univ. Estadual de Campinas (Brazil); **Clarisa I. Sánchez**, Radboud Univ. Nijmegen Medical Ctr. (Netherlands); **Ronald M. Summers**, National Institutes of Health (USA); **Kenji Suzuki**, Illinois Institute of Technology (USA); **Pallavi Tiwari**, Case Western Reserve Univ. (USA); **Georgia D. Tourassi**, Oak Ridge National Lab. (USA); **Rafael Wiemker**, Philips Research (Germany); **Axel Wismüller**, Univ. of Rochester Medical Ctr. (USA); **Shandong Wu**, Univ. of Pittsburgh (USA); **Xiaofeng Yang**, Emory Univ. (USA); **Hiroyuki Yoshida**, Massachusetts General Hospital (USA), Harvard Medical School (USA); **Chuan Zhou**, Univ. of Michigan Health System (USA)

This conference will provide a forum for researchers involved in development and application of computer-aided detection and diagnosis (CAD) systems in medical imaging. Original papers are requested on all applications of machine learning (including deep learning) to medical imaging and all other aspects of CAD, including radiomics, radiogenomics, CAD workstation design, human-computer interaction, databases, and performance evaluation. Applications in all medical imaging modalities are encouraged, including but not limited to X-ray, computed tomography, magnetic resonance imaging, nuclear medicine, molecular imaging, optical imaging, ultrasound, endoscopy, macroscopic and microscopic imaging, and multi-modality technologies.

LIVE DEMONSTRATIONS WORKSHOP

A workshop featuring real-time demonstrations of algorithms and systems will be held during the conference. This workshop is intended to be a forum for developers to exhibit their software, find new collaborators, and inspire the attendees. All participants of the SPIE Medical Imaging Symposium are invited to submit a proposal for a demonstration. More information will be provided at a later date.

- TOPIC AREAS: FOR THIS CONFERENCE ONLY**
- During the submission process, you will be asked to choose no more than three topics (one Application and up to two Topics) from the following list to assist in the review process.
- Choose one from the following applications list:
- Applications: Abdomen
 - Applications: Breast
 - Applications: Cardiovascular
 - Applications: Eye, retina
 - Applications: Head & neck
 - Applications: Lung
 - Applications: Musculoskeletal
 - Applications: Multiple organ systems
 - Applications: Neuro
 - Applications: Pediatrics, fetal
 - Applications: Skin
 - Applications: Other (please specify)
- Choose up to two keywords from the following topics list:
- Content-based image retrieval, reference libraries
 - Deep learning
 - Detection
 - Classification
 - Machine learning
 - Novel convolutional neural network architectures
 - Novel training in deep learning
 - Quantitative imaging
 - Radiomics
 - Radiogenomics
 - Risk assessment
 - Segmentation
 - Staging, treatment response assessment
 - Outcomes prediction
 - System quality, validation
 - Visualization, human factors
 - Data harmonization
 - Other (please specify)

Image-Guided Procedures, Robotic Interventions, and Modeling (MI104)

Conference Chairs: **Cristian A. Linte**, Rochester Institute of Technology (USA); **Jeffrey H. Siewerdsen**, Johns Hopkins Univ. (USA)

Program Committee: **Purang Abolmaesumi**, The Univ. of British Columbia (Canada); **Matthieu Chabanas**, Univ. Grenoble Alpes (France); **Elvis C. S. Chen**, Robarts Research Institute (Canada); **Baowei Fei**, The Univ. of Texas at Dallas (USA); The Univ. of Texas Southwestern Medical Ctr. (USA); **Gabor Fichtinger**, Queen's Univ. (Canada); **Ryan J. Halter**, Thayer School of Engineering at Dartmouth (USA); **David R. Haynor**, Univ. of Washington (USA); **William E. Higgins**, The Pennsylvania State Univ. (USA); **David R. Holmes III**, Mayo Clinic (USA); **Pierre Jannin**, Univ. de Rennes 1 (France); **David M. Kwartowitz**, Grand Canyon Univ. (USA); **Shuo Li**, Western Univ. (Canada); **Michael I. Miga**, Vanderbilt Univ. (USA); **Kensaku Mori**, Nagoya Univ. (Japan); **Parvin Mousavi**, Queen's Univ. (Canada); **Jack H. Noble**, Vanderbilt Univ. (USA); **Maryam E. Rettmann**, Mayo Clinic (USA); **Frank Sauer**, Siemens Healthineers (USA); **Eric J. Seibel**, Univ. of Washington (USA); **Amber L. Simpson**, Queen's Univ. (Canada); **Stefanie Speidel**, National Ctr. for Tumor Diseases Dresden (Germany); **Tamas Ungi**, Queen's Univ. (Canada); **Satish E. Viswanath**, Case Western Reserve Univ. (USA); **Andrew D. Wiles**, Northern Digital Inc. (Canada); **Ivo Wolf**, Hochschule Mannheim (Germany); **Ziv R. Yaniv**, National Institute of Allergy and Infectious Diseases (USA)

This conference is primarily concerned with applications of medical imaging data in the engineering of therapeutic systems. Original papers are requested in the following topic areas:

- Image-guided procedures
- Minimally invasive surgery
- Computer-assisted therapy and therapy planning
- Robotic interventions and surgical tools
- COVID-related robot-assisted tools for patient management in hazardous environments
- Localization technologies and navigation systems
- Tracking and calibration
- Intra-operative imaging
- Novel image-to-patient registration for surgery and intervention
- Mathematical modeling to guide and understand therapy
- COVID-related modeling to better understand disease and guide/predict therapy
- Modeling of intra-procedural changes
- Modeling and analysis of procedures and procedure workflows
- Techniques in population-specific and patient-specific model generation
- Image-based models for characterization of tissue and disease properties
- Image-based characterization and differentiation of COVID vs. non-COVID-induced lung disease
- Medical image-based simulation and training
- Augmented / Virtual / Mixed Reality Visualization
- 3D / stereoscopic visualization
- Novel interfaces for therapy and visualization of data
- Clinical applications and technology integration
- High performance computing for real-time modeling and/or large dataset visualization
- Machine Learning & Artificial Intelligence for Surgical / Interventional / Therapeutic Applications
- Interventional / Therapeutic Assessment and Prediction
- Surgical / Interventional / Therapeutic Data Science

- Safety and standards for image-guided and robotic procedures
- Other related areas.

Submissions that cross over between this conference and others at SPIE Medical Imaging, and which would be appropriate for combined sessions, are also welcomed.

AWARDS:

The Image-guided procedures, Robotic Interventions and Modeling conference features three awards:

- the **Intuitive Best Student Paper Award**, for which all first author students are eligible to apply;
- the **Siemens Young Scientist Award**, for which all first author early career scientists (students and postdoctoral fellows) are eligible to apply, and;
- the **NDI Poster award**, for which all posters on display are automatically eligible.
- Starting with SPIE Medical Imaging 2021, we also intend to give special recognition to authors whose conference proceedings are accompanied by open source access to datasets and software.

Limited student travel awards are also available, for which all student authors of SPIE Medical Imaging papers are eligible to apply.

TOPIC AREAS: FOR THIS CONFERENCE ONLY

During the submission process, you must choose no more than three topics from the following list to assist in the review process.

- Abdominal procedures
- Calibration
- Cardiac procedures
- Pelvic procedures
- AI and Deep Learning applications for therapy planning/ modeling/ monitoring
- Diagnosis and disease characterization
- Image-based characterization and differentiation of COVID vs. non-COVID-induced lung disease

CONTINUED NEXT PAGE ➔

Image-Guided Procedures, Robotic Interventions, and Modeling (MI104 continued)

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| <ul style="list-style-type: none">• Endoscopic procedures• Human factors• Image-guided therapy• Data integration for the clinic/OR• Intra-operative imaging• Localization and tracking technologies• Machine Learning and AI for surgical/ interventional applications• Medical robotics• COVID-related robot-assisted tools for patient management in hazardous environments• Geometric / Physiological / Therapeutic Modeling• COVID-related modeling to better understand disease and guide/predict therapy | <ul style="list-style-type: none">• Monitoring and feedback• Multimodality display• Neurosurgical procedures• Registration• Segmentation• Stereoscopic display• Surgical / Interventional / Therapeutic data science• Treatment / therapy modeling and (surgical) simulation• Treatment and therapy planning• Ultrasound image guidance• Validation/evaluation• Virtual, augmented, and mixed reality visualization and interaction |
|--|--|
-

Image Perception, Observer Performance, and Technology Assessment (MI105)

Conference Chairs: **Frank W. Samuelson**, U.S. Food and Drug Administration (USA); **Sian Taylor-Phillips**, The Univ. of Warwick (United Kingdom)

Program Committee: **Craig K. Abbey**, Univ. of California, Santa Barbara (USA); **Mark A. Anastasio**, Washington Univ. in St. Louis (USA); **Susan M. Astley**, The Univ. of Manchester (United Kingdom); **Jongduk Baek**, Yonsei Univ. (Korea, Republic of); **François O. Bochud**, Ctr. Hospitalier Univ. Vaudois (Switzerland); **Jovan G. Brankov**, Illinois Institute of Technology (USA); **Yan Chen**, Loughborough Univ. (United Kingdom); **Brandon D. Gallas**, U.S. Food and Drug Administration (USA); **Howard C. Gifford**, Univ. of Houston (USA); **Stephen L. Hillis**, The Univ. of Iowa (USA); **Elizabeth A. Krupinski**, Emory Univ. School of Medicine (USA); **Matthew A. Kupinski**, College of Optical Sciences, The Univ. of Arizona (USA); **Mark F. McEntee**, Univ. College Cork (Ireland); **Claudia R. Mello-Thoms**, Univ. Iowa Carver College of Medicine (USA); **Univ. of Pittsburgh (USA)**; **Robert M. Nishikawa**, Univ. of Pittsburgh (USA); **Ljiljana Platiša**, Univ. Gent (Belgium); **Ingrid S. Reiser**, The Univ. of Chicago (USA); **Pontus A. Timberg**, Scania Univ. Hospital (Sweden)

This conference focuses on a broad understanding of medical image perception, observer-performance assessment, and the application of these methods to the evaluation of medical technology. Areas of traditional interest include, but are not limited to, optimizing image acquisition, display and workstations, psychophysical and vision-science based models of human observer performance, perceptual factors that affect the diagnostic process, eye-movement studies, observer performance methods, human-computer interaction, medical decision-making strategies, statistical models for evaluation of observer performance, and observer variability assessment. The conference welcomes new areas of research related to medical image perception and observer performance assessment. Standardized, stand-alone performance measurements for the purposes of developing imaging technologies may be more relevant to other device-specific conferences.

Original papers and posters are requested in the following areas:

- Technology assessment related to medical image perception & observer performance
- Diagnostic-performance evaluation methodologies (ROC, FROC and alternatives)
- Observer performance evaluation of new technologies (acquisition devices, CAD/AI/ML, display devices etc.)
- Cognitive aspects of image interpretation

- Visual search of medical images
- Perceptual and performance factors in diagnostic workstation and environmental design
- Perceptual and performance factors in new modalities (e.g., digital pathology and telemedicine)
- Models of detection, discrimination, and localization
- The nature of reader expertise
- Sources of observer variance
- Human Factors

TOPIC AREAS: FOR THIS CONFERENCE ONLY

To assist the reviewers, choose up to three keywords in order of relevance from the following list.

- Image Display
- Image Perception
- Observer Performance Evaluation
- ROC Methodology
- Model Observers
- Technology Assessment
- Technology's Impact
- Human Factors

Save the date

ABSTRACTS DUE: 5 AUGUST 2020

**AUTHOR NOTIFICATION:
12 OCTOBER 2020**

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MANUSCRIPTS DUE: 20 JANUARY 2021

PLEASE NOTE: Submission implies the intent of at least one author to register, attend the conference, present the paper as scheduled, and submit a full-length manuscript for publication in the conference proceedings.

Submit your abstract today: www.spie.org/mi21call

Biomedical Applications in Molecular, Structural, and Functional Imaging (MI106)

Conference Chairs: **Barjor S. Gimi**, Cooper Medical School, Rowan Univ. (USA); **Andrzej Krol**, SUNY Upstate Medical Univ. (USA)

Program Committee: **Amir A. Amini**, Univ. of Louisville (USA); **Juan R. Cebal**, George Mason Univ. (USA); **Nancy L. Ford**, The Univ. of British Columbia (Canada); **Alejandro F. Frangi**, Univ. of Leeds (United Kingdom); **Xavier Intes**, Rensselaer Polytechnic Institute (USA); **Ciprian N. Ionita**, Univ. at Buffalo (USA); **Vikram Kodibagkar**, Arizona State Univ. (USA); **Changqing Li**, Univ. of California, Merced (USA); **Armando Manduca**, Mayo Clinic College of Medicine (USA); **Robert C. Molthen**, GE Healthcare (USA), Marquette Univ. (USA), Medical College of Wisconsin (USA); **Nicholas J. Tustison**, Univ. of Virginia (USA); **John B. Weaver**, Dartmouth Hitchcock Medical Ctr. (USA); **David L. Wilson**, Case Western Reserve Univ. (USA); **Axel Wismüller**, Univ. of Rochester Medical Ctr. (USA); **Baohong Yuan**, The Univ. of Texas at Arlington (USA)

This conference will cover all aspects of observing, measuring, quantifying and modeling molecular, structural and functional parameters from biomedical images.

Descriptions of work based on any imaging technology, including multidimensional and multimodality, are invited. Techniques, methods, and systems for evaluation and interpretation of structure-function relationships and interrelationships from images of intact, living tissues, are of particular interest. Work in emerging areas such as novel imaging probes, small animal imaging, optical or electrical impedance tomography, and multi-modality imaging is also of special interest.

Original papers are requested in, but not limited to, the following areas:

- Breast imaging
- Bone and skeletal imaging: micro-structure, orthopedic, finite-element models, and segmentation
- Biomechanical imaging and modeling
- Cardiac structure and function: perfusion, modeling, electrophysiology
- Electrical impedance, electrical impedance spectroscopy (EIS), terahertz or microwave imaging
- Functional neuroimaging and brain mapping, fMRI, rsfMRI, fcMRI, PET, SPECT, tractography, connectome
- Image processing, detection, segmentation, registration, and analysis for quantifying and modeling molecular, structural and functional parameters
- Machine learning, deep learning, deep convolutional neural networks in molecular, structural, and functional imaging
- Magnetic resonance imaging (MRI)
- MRI quantitation of fat, diffusion and CEST, MRI spectroscopy
- Multimodality imaging, hybrid imaging
- Nanoparticle, biosensors and magnetic particle imaging (MPI)
- Ocular imaging, segmentation
- Novel physiological imaging agents/probes: quantum dots, nanoparticles, radiopharmaceuticals
- Novel molecular and functional imaging technologies
- Nuclear medicine: PET, SPECT, molecular breast imaging (MBI), molecular brain imaging, scintigraphy, Cerenkov luminescence imaging
- Optical imaging, optical coherence tomography (OCT), diffuse optical tomography, NIRS

- Soft tissue imaging: deformation, quantification, segmentation, detection, analysis
- Preclinical and clinical imaging, small animal imaging, molecular imaging, fluorescence tomography, bioluminescence tomography, x-ray phase contrast tomography, photoacoustic tomography, Cerenkov luminescence imaging, X-ray fluorescence computed tomography (XFCT), X-ray luminescence computed tomography (XLCT)
- Physiologic modeling applied to imaging: metabolism, receptor-ligand binding
- Pharmacokinetic models applied to imaging
- Vessel and airway imaging: detection, segmentation, modeling, trees, reactivity, blood flow, perfusion

TOPIC AREAS: FOR THIS CONFERENCE ONLY

During the submission process, you will be asked to choose no more than three topics from the following list to assist in the review process.

- Breast imaging
 - Bone and skeletal imaging
 - Cardiac imaging
 - Imaging agents/molecular probes
 - Image processing, detection, segmentation, registration, and analysis for quantifying and modeling molecular, structural and functional parameters.
 - Magnetic particle imaging (MPI)
 - Nanoparticle imaging
 - Neuroimaging, neurochemistry, brain mapping, fMRI, brain PET, brain SPECT
 - Novel imaging methods
 - Machine learning, deep learning, deep convolutional neural networks in molecular, structural, and functional imaging
 - Ocular imaging
 - Optical imaging
 - Pulmonary structure and function imaging: perfusion, ventilation, mechanics, segmentation
 - Vascular imaging
-

KEYNOTE ADDRESSES (PAST 5 YEARS):

“Label-free molecular imaging with spins: a path to high resolution through learned subspaces”

Zhi-Pei Liang, University of Illinois Urbana-Champaign (2020)

“The dawning of AI in radiology: a brave new world”

Christopher Filippi, North Shore Long Island Jewish Health System (2019)

“Imaging biomarkers in precision medicine”

Martin G. Pomper, The Johns Hopkins University School of Medicine (2018)

“Advances in neuroimaging”

Bruce Rosen, Massachusetts General Hospital (2017)

“Interesting in vivo magnetic resonance experiments that are not quite ready for prime time and some that are”

Joseph Ackerman, Washington University in St. Louis (2016)

Save the date

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Imaging Informatics for Healthcare, Research, and Applications (MI107)

Conference Chairs: **Thomas M. Deserno**, Technische Univ. Braunschweig (Germany), Hannover Medical School (Germany); **Brian J. Park**, Oregon Health & Science Univ. (USA)

Program Committee: **Peter R. Bak**, McMaster Univ. (Canada); **Po-Hao Chen**, Cleveland Clinic (USA); **Tessa S. Cook**, The Univ. of Pennsylvania Health System (USA); **Steven C. Horii**, The Univ. of Pennsylvania Health System (USA); **Maria Y. Law**, Hong Kong Sanatorium and Hospital (Hong Kong, China); **Heinz U. Lemke**, Computer Assisted Radiology and Surgery (Germany); **Brent J. Liu**, The Univ. of Southern California (USA); **Eliot L. Siegel**, Univ. of Maryland Medical Ctr. (USA); **Wyatt Tellis**, Univ. of California, San Francisco (USA); **Shandong Wu**, Univ. of Pittsburgh (USA)

Imaging informatics is a multidisciplinary field. Current research and applications emphasize the development and evaluation of new and efficient means of extracting and transforming the ever-increasing volumes of data to improve patient outcomes. In the era of advanced imaging modalities and data complexity, there is a need for more efficient workflow, accurate analytics, and sophisticated 3D visualizations. Also, the growing demand for personalized, precision medicine requires the integration of clinical information, molecular and genomic data, imaging results, and pathology. Imaging informatics supports new technical solutions that can accommodate the needs of all imaging-rich clinical specialties, not just radiology, while keeping patient data both accessible to health professionals and safe from malicious agents. This track focuses on new methods for obtaining, transferring, managing, analyzing, and visualizing data for healthcare, biomedical, and educational applications. The conference will include but is not limited to the following themes.

TOPIC AREAS (FOR THIS CONFERENCE ONLY):

During the submission process, you will be asked to choose no more than three topics from the following list to assist in the review process:

1. PACS-Integration of Multimedia Data
2. Data Management for Precision Medicine
3. Big Data & Analytics
4. Advanced Visualization and 3D Printing
5. Digital Operating Theatres
6. Images for Education
7. Mobile Imaging & Image-based Vital Data

THEME 1: PACS-INTEGRATION OF MULTIMEDIA DATA

Data generated in cardiology, endoscopy, ophthalmology, dermatology, and surgery has been widely used in screening, diagnosis, treatment, and rehabilitation, and it often becomes part of the electronic medical record. Compared to radiology-centric imaging practices, the data acquisition methods, workflow operations and management of these non-radiological images are quite different.

- PACS integration and standardization
- Data and workflow management
- Data security and block-chains
- Multimedia data in clinical practices
- Social media for medical imaging

THEME 2: DATA MANAGEMENT FOR PRECISION MEDICINE

Precision medicine involves using detailed, patient-specific molecular, genetic and imaging information to diagnose and categorize disease, then guide treatment to improve clinical outcome. The combination of medical imaging, genomics, and molecular markers presents a new opportunity to link observations made at the cellular or molecular levels to macroscopic phenotypes but also requires novel strategies for data management.

- Imaging informatics for translational research
- Correlative analytics of genomics, imaging, and clinical phenotypes
- Molecular diagnostic and biomarkers
- Combined quantitative and functional imaging
- Application of translational research

THEME 3: BIG DATA & ANALYTICS

The cloud and “big data” technologies have made image data management, modeling, sharing, and collaboration possible at scale. Advances in artificial intelligence (AI) are poised to change health care profoundly. However, integrating AI into the clinical environment requires active communications with traditional PACS and the wider electronic health records (EHR) of the health system.

- FAIR data management
- Cloud-based and collaborative image use
- Crowdsourced image analysis and modeling
- Content-based image retrieval and indexing
- Integration of AI with PACS and EHR

THEME 4: ADVANCED VISUALIZATION AND 3D PRINTING

Three-dimensional (3D) image data can be visualized and handled in actual 3D space. Technology in augmented reality (AR) juxtaposes medical imaging data with the real world, while virtual reality (VR) can create entirely immersive environments. 3D printing provides new ways to simulate procedures or prototype personalized medical devices. New technical milestones or clinical applications involving the use of 3D objects, either physical or virtual, are welcome.

- 3D model generation and printing
- Virtual reality for simulation and training
- Augmented reality visualization
- Device assessment
- Integration of advanced visualization technologies

THEME 5: DIGITAL OPERATING THEATRES

The DICOM standard has broadened its scope of interoperability to include use cases within radiation oncology, optical imaging, and digital pathology. Furthermore, imaging has made the digital operating room possible via surgical PACS. Research aims at bridging the gaps between diagnostic and interventional imaging.

- Intelligent surgical instruments and robotics
- Situation-aware robotic devices for therapeutics
- Surgical cockpit systems
- Therapeutic navigated control
- Intelligent infrastructure and processes

THEME 6: IMAGES FOR EDUCATION

The new generation of learning professional work through interconnected, immersive, and self-directed environments, have been made possible through technology. Additionally, modern patients reviewing their own medical imaging and diagnostic reports can take a more active role in their medical decisions with proper technology providing timely and clear explanations. This theme welcomes research and technical breakthroughs about the education of students, patients, and other healthcare professionals.

- Context-sensitive reference tool
- Massive-online classroom
- Simulations and immersive learning environment
- Educational multimedia database and repository
- Reference tools

THEME 7: MOBILE IMAGING & IMAGE-BASED VITAL DATA

Medical imaging becomes mobile. Small devices integrate ultrasound, endoscopy, fundoscopy and other imaging modalities. The use of smart phones for medical imaging is rapidly increasing. However, mobile data is different from clinic-based diagnostics with respect to type, data quality and management. Furthermore, vital signs are computed from mobile acquired photographs and videos. This data needs management, integration, and evaluation.

- Mobile imaging technology
- Recording image-based vital signs
- Management of mobile data
- References and ground truth for mobile data
- Integrating mobile and stationary imaging

Save the date

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Submit your abstract today: www.spie.org/mi21call

Ultrasonic Imaging and Tomography (MI108)

Conference Chairs: **Brett C. Byram**, Vanderbilt Univ. (USA); **Nicole V. Ruiter**, Karlsruher Institut für Technologie (Germany)

Program Committee: **Mark A. Anastasio**, Washington Univ. in St. Louis (USA); **Jeffrey C. Bamber**, The Royal Marsden NHS Foundation Trust (United Kingdom); **Johan G. Bosch**, Erasmus Univ. Rotterdam (Netherlands); **Jan D’hooge**, Univ. of Leuven (Belgium); **Marvin M. Doyley**, Univ. of Rochester (USA); **Aaron Fenster**, Robarts Research Institute (Canada); **James F. Greenleaf**, Mayo Clinic (USA); **Peter E. Huthwaite**, Imperial College London (United Kingdom); **Michael Jaeger**, Univ. Bern (Switzerland); **Jørgen Arendt Jensen**, Technical Univ. of Denmark (Denmark); **David H. Kim**, Pohang Univ. of Science and Technology (Korea, Republic of); **Cuiping Li**, Delphinus Medical Technologies, Inc. (USA); **Bilal H. Malik**, QT Ultrasound LLC (USA); **Stephen A. McAleavey**, Univ. of Rochester (USA); **Mohammad Mehrmohammadi**, Wayne State Univ. (USA); **Svetoslav I. Nikolov**, BK Medical (Denmark); **Olivier Roy**, Barbara Ann Karmanos Cancer Institute (USA); **François Varray**, CREATIS (France); **James W. Wiskin**, QT Ultrasound LLC (USA)

This conference provides a forum for in-depth discussions related to medical ultrasound engineering, imaging and clinical applications. We are soliciting original contributions related to the following topics: physics of ultrasound wave propagation, image reconstruction techniques, hardware and system design, novel transducer technologies, ultrasound image analysis strategies, ultrasound functional imaging, contrast agents and biological and biomedical applications of new ultrasound imaging modalities.

A joint session with the Image-Guided Procedures, Robotic Interventions, and Modeling conference will be held in order to have a high-level discussion on the state-of-the-art in ultrasound guidance of medical interventions.

TOPIC AREAS: FOR THIS CONFERENCE ONLY

During the submission process, you will be asked to choose no more than three topics from the following list to assist in the review process.

- Physics and computer simulations
- Transducer technologies
- Ultrasound hardware development and evaluation
- Beamforming techniques
- Ultrasound tomography and reconstruction
- Tissue characterization
- Elastography
- Motion and deformation imaging
- Blood flow imaging
- Contrast imaging
- US assisted drug delivery
- Ultrafast imaging
- Shear-wave imaging
- High frequency imaging
- Ultrasound image processing and analysis
- Photoacoustic imaging
- Acoustic microscopy
- Ultrasound therapeutics
- High intensity focused ultrasound methods and applications
- Ultrasound procedure guidance
- Clinical applications of ultrasound and US tomography
- New applications of ultrasound in medicine and biology

Save the date

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Digital and Computational Pathology (MI109)

Conference Chairs: **John E. Tomaszewski**, Univ. at Buffalo (USA); **Aaron D. Ward**, The Univ. of Western Ontario (Canada)

Program Committee: **Selim Aksoy**, Bilkent Univ. (Turkey); **Ulysses J. Balis**, Univ. of Michigan Health System (USA); **Rohit Bhargava**, Univ. of Illinois at Urbana-Champaign (USA); **Ulf-Dietrich Braumann**, Hochschule für Technik, Wirtschaft und Kultur Leipzig (Germany); **Weijie Chen**, U.S. Food and Drug Administration (USA); **Wei-Chung Cheng**, U.S. Food and Drug Administration (USA); **Eric Cosatto**, NEC Labs. America, Inc. (USA); **Scott Doyle**, Rutgers, The State Univ. of New Jersey (USA); **Michael D. Feldman**, The Univ. of Pennsylvania Health System (USA); **David J. Foran**, Rutgers Cancer Institute of New Jersey (USA); **Marios A. Gavrielides**, U.S. Food and Drug Administration (USA); **April Khademi**, Ryerson Univ. (Canada); **Tom R. L. Kimpe**, Barco N.V. (Belgium); **Elizabeth A. Krupinski**, Emory Univ. School of Medicine (USA); **Richard M. Levenson**, Univ. of California, Davis (USA); **Olivier Lazoray**, Univ. de Caen Basse-Normandie (France); **Geert Litjens**, Radboud Univ. Medical Ctr. (Netherlands); **Anant Madabhushi**, Case Western Reserve Univ. (USA); **Derek R. Magee**, Univ. of Leeds (United Kingdom); **Anne L. Martel**, Sunnybrook Research Institute (Canada); **Erik Meijering**, The Univ. of New South Wales (Australia); **James P. Monaco**, Inspirata, Inc. (USA); **Mehdi Moradi**, IBM Research (USA); **Bahram Parvin**, Lawrence Berkeley National Lab. (USA); **Josien P. W. Pluim**, Image Sciences Institute (Netherlands); **Nasir M. Rajpoot**, The Univ. of Warwick (United Kingdom); **Gustavo Kunde Rohde**, Carnegie Mellon Univ. (USA); **Berkman Sahiner**, U.S. Food and Drug Administration (USA); **Chukka Srinivas**, Ventana Medical Systems, Inc. (USA); **Darren Treanor**, Univ. of Leeds (United Kingdom); **Jeroen van der Laak**, Radboud Univ. Nijmegen Medical Ctr. (Netherlands); **Martin J. Yaffe**, Sunnybrook Research Institute (Canada); **Bülent Yener**, Rensselaer Polytechnic Institute (USA)

This conference will address digital and computational pathology, from acquisition of pathology data to its management, analysis, and interpretation by observers. With the recent advances in whole slide scanners and novel instrumentation for multispectral, multiparametric tissue imaging the use of digital pathology data is growing in importance. Both the pre-clinical and clinical modeling of disease states are addressed by the developing field of computational pathology. The evolving concepts of human intelligence-artificial intelligence interactions in our understanding of image data are foundational in computational pathology. There is evidence that digital and computational pathology can improve diagnosis and grading of cancer and other pathology tasks, but there are still limitations and challenges that must be addressed before it can be fully incorporated into the clinical workflow.

Although there has been great progress in the development and application of computational pathology methods over recent years, there are several significant computational challenges specific to pathology imaging that distinguish it from its radiological counterpart. There are also unique challenges in terms of how digitized pathology specimens and correlated data are presented to, modified and interpreted by clinicians and computers.

We invite submissions that address specific problems related to image acquisition, display, interpretation, computer-aided diagnosis, and quantitative image analysis of pathology specimens. We particularly welcome contributions that identify and address challenges encountered in digital pathology imaging as well as in new approaches for image capture and analysis.

TOPIC AREAS: FOR THIS CONFERENCE ONLY

During the submission process, you will be asked to choose no more than three topics from the following list to assist in the review process.

IMAGE ACQUISITION, STORAGE AND DISPLAY

- Acquisition, storage, display and processing of digital microscopy images
- Image mosaicking of nontraditional near-real-time microscopy (OCT, confocal)
- Multispectral imaging
- High-dimensional multiplexed staining and imaging of tissues
- Multi-focus volume imaging
- Compression
- Methodologies for the objective technical assessment of digital pathology systems including color calibration
- Whole slide imaging
- Strategies for data storage and remote processing

QUANTITATIVE IMAGE ANALYSIS

- Computer-aided diagnosis, prognosis and predictive analysis
- Automated quantification of tissue biomarkers
- Grading and classification of pathology images
- Segmentation of cellular and tissue structures
- Shape analysis and morphology in pathology imaging
- Architectural feature extraction and quantification
- Multispectral- and volume-based segmentation
- Content-based image retrieval
- High-performance computing for whole-slide tissue image analysis
- Multi-stain and multiplexed image analysis
- Correlative microscopy
- Understanding of image data across scale.
- Machine learning trends in digital pathology: handcrafted features versus deep learning

CONTINUED NEXT PAGE ➔

Digital and Computational Pathology (MI109)

INFORMATION FUSION

- Radiology-pathology registration and fusion
- Registration of multiple stained tissue microscopy images
- Integration of digital image features with ‘omics’ data for fused diagnostics

DIGITAL/COMPUTATIONAL PATHOLOGY AND THE PATHOLOGIST

- Observer performance, human factors, reading strategies, and diagnostic interpretation issues
- Remote consultation
- Metrics, variability and standardization issues unique to digital pathology
- Methodologies for the objective technical assessment of digital pathology systems
- Optical probe tracking and visualization tools
- PACS and new DICOM standards for histopathology
- Making the case for clinical digital pathology systems in pathology practice



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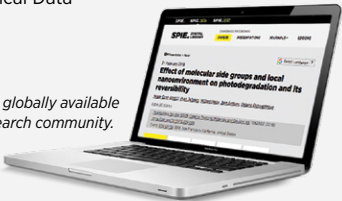
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REGISTRATION

SPIE Medical Imaging registration will be available October 2020

All participants, including invited speakers, contributed speakers, session chairs, co-chairs, and committee members, must pay a registration fee. Authors, coauthors, program committee members, and session chairs are accorded a reduced symposium registration fee.

Fee information for conferences, courses, a registration form, and technical and general information will be available on the SPIE website in October 2020.

HOTEL INFORMATION

Opening of the hotel reservation process for SPIE Medical Imaging 2021 is scheduled for the beginning of October 2020. SPIE will arrange special discounted hotel rates for SPIE conference attendees.

The website will be kept current with any updates.

STUDENT AUTHOR TRAVEL GRANTS

The Society offers a small number of supplemental travel grants to eligible and selected SPIE student members who are authors, and plan to present and publish an accepted paper at an SPIE meeting. For more information visit:

www.spie.org/mitravelgrants

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If government and/or company clearance is required to present and publish your presentation, start the process now to ensure that you receive clearance if your paper is accepted.

IMPORTANT NEWS FOR ALL VISITORS FROM OUTSIDE THE UNITED STATES

Find important requirements for visiting the United States on the SPIE Medical Imaging website. There are new steps that ALL visitors to the United States need to follow.

Online at: www.spie.org/visa

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Maryellen Giger, Editor-in-Chief,
The University of Chicago

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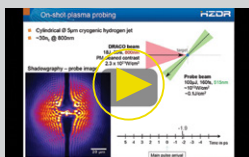
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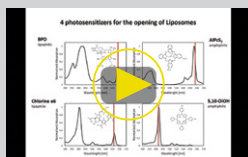
SEARCH ›



16 August 2019

Frontiers of applications of petawatt laser physics (Conference Presentation)

[Ulrich Schramm](#)



23 August 2019

Light-induced permeabilization of liposomes

[Paula Enzian, et al.](#)



22 April 2019

Chromatic line confocal technology in high-speed 3D surface-imaging applications

[Karri Niemelä](#)

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Present your research at SPIE Medical Imaging

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How to submit an abstract

1. Browse the conference program and select the conference(s) that most closely matches the topics of the work you wish to present. Important: each abstract may be submitted to one conference only.
2. Click “Submit an Abstract” from within the conference you’ve chosen, and you’ll be prompted to sign in to your spie.org account to complete the submission wizard.

What you will need to submit

A completed electronic submission should include the following:

- Title
- Author(s) information
- 250-word abstract for technical review
- 100-word summary for the program
- Keywords used in search for your paper (optional)
- A 2- to 4-page extended abstract file including supplemental information. [Download the supplemental file specifications.](#)
- Your decision on publishing your presentation recording to the SPIE Digital Library (slide capture and audio)
- Some conferences may indicate additional requirements in the Call for Papers (for example: instructions for competing for awards)

NOTE: Only original material should be submitted. Commercial papers, papers with no new research/development content, and papers with proprietary restrictions will not be accepted for presentation.

Submission agreement

Presenting authors, including keynote, invited, oral, and poster presenters, agree to the following conditions by submitting an abstract. An author or coauthor will:

- Register and attend the meeting.
- Present as scheduled.
- Publish a 6- to 20-page manuscript in Proceedings of SPIE in the SPIE Digital Library.
- Obtain funding for registration fees, travel, and accommodations, independent of SPIE, through their sponsoring organizations.
- Ensure that all clearances, including government and company clearance, have been obtained to present and publish. If you are a DoD contractor in the USA, allow at least 60 days for clearance.

Important dates

Abstracts due	5 August 2020
Author notification (by email) of acceptance and presentation details	12 October 2020
Manuscripts due	20 January 2021

Review and program placement

- To ensure a high-quality conference, all submissions will be assessed by the Conference Chair/Editor for technical merit and suitability of content.
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Contact information

For questions about your presentation, submitting an abstract post-deadline, or the meeting, contact [Kirsten Anderson](#), your Conference Program Coordinator.

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