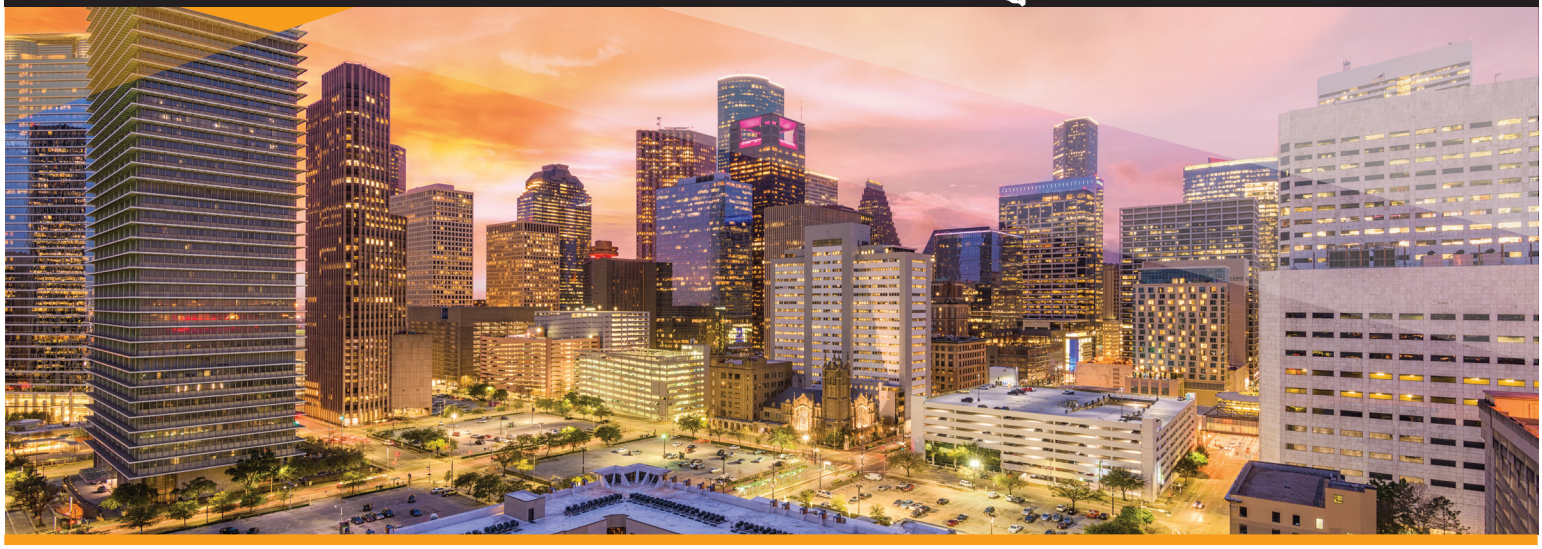
CALL FOR PAPERS

SPIE. MEDICAL IMAGING

15–20 February 2020
Marriott Marquis Houston
Houston, Texas, USA



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

Conference Chairs: **Po-Hao Chen,** Cleveland Clinic (USA); **Thomas M. Deserno,** Technische Univ. Braunschweig (Germany)

Program Committee: **Peter R. Bak,** McMaster Univ. (Canada); **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); **Brian Park,** The Univ. of Pennsylvania Health System (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, and research in the field emphasizes the development and evaluation of new and efficient means of extracting and transforming 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 three different topics to assist in the review process.

1. PACS-based multimedia data
2. data security and blockchains
3. data management for precision medicine
4. big data management
5. artificial intelligence
6. advanced visualization and 3D printing
7. digital operation theatres
8. innovation, regulations, and economics
9. images for education

THEME 1: PACS-BASED 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.

- data standardization and workflow management
- data management and PACS integration
- multimedia data in clinical practices
- social media for medical imaging
- translational informatics of non-radiology imaging

THEME 2: DATA SECURITY AND BLOCKCHAINS

With ever-increasing volume, interconnectedness, and interoperability of imaging data, medical imaging systems are increasingly subject to cybersecurity risks. Maleficent attackers may steal or hold ransom millions of patient records with a single breach. Furthermore, the tempering of imaging systems during diagnostic or therapeutic procedures can physically harm patients. Security research in medical imaging hardware and software, as well as emerging technology such as blockchain and other distributed ledgers that promise to improve data security and access, are welcome.

- cybersecurity threats to medical imaging
- imaging data protection and encryption
- imaging data recovery
- application of blockchain technology
- other distributed ledger technology

CONTINUED NEXT PAGE➡

Submit abstracts by 7 August 2019

www.spie.org/MI107call

SPIE.

THEME 3: 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 requires novel strategies for data management, too. Research enhancing precision medicine is welcome.

- 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 4: BIG DATA

Modern medicine increasingly depends on efficient collaboration between radiologists, physicians, and patients. Collaboration is commonplace in the consumer market, where numerous social media platforms exist and are universally accessible. Additionally, the cloud and "big data" technologies have made data management, modeling, sharing, and collaboration possible at scale.

- FAIR data management
- cloud-based and collaborative image use
- crowdsourced image analysis and modeling
- content-based image retrieval and indexing
- image-based, patient-specific data modeling

THEME 5: ARTIFICIAL INTELLIGENCE

Advances in artificial intelligence (AI), especially deep learning and reinforcement learning 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. Furthermore, integrating AI with clinical medical imaging requires interfacing with the clinical providers' existing workflow.

- data analytics
- machine learning / deep learning
- natural language processing
- heuristic search and fuzzy logic
- integration of AI with PACS and EHR

THEME 6: 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 simulated, immersive environments. 3D printing provides new ways to prototype personalized medical devices. New technical milestones or clinical applications involving the use of 3D objects, both physically printed or virtually visualized, are welcome.

- 3D model generation and printing
- virtual reality for simulation and training
- augmented reality visualization
- device assessment
- integration of advanced visualization technologies

THEME 7: 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 topics that bridge the gaps between research, diagnosis, and treatment are encouraged.

- intelligent surgical instruments and robotics
- situation-aware robotic devices for therapeutics
- surgical cockpit systems
- therapeutic navigated control
- intelligent infrastructure and processes

THEME 8: INNOVATION, REGULATIONS, AND ECONOMICS

In the new regulatory environment, providers are rewarded by outperforming their peers in quality metrics. Today's radiology practices also face a mounting pressure to create and measure value - right imaging choice to the right patient at the right time, all the while managing ever-increasing imaging volumes. This theme welcomes submissions on research and innovations tackling practical problems in the practice of clinical radiology.

- business intelligence
- patient safety
- quality improvement and productivity enhancement
- work environment monitoring
- ergonomics

THEME 9: 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

Abstracts Due: **7 AUGUST 2019**
Author Notification: **14 OCTOBER 2019**
Manuscripts Due: **22 JANUARY 2020**

Submit abstracts by 7 August 2019

www.spie.org/MI107call

SPIE. MEDICAL IMAGING Submission Guidelines

CALL FOR PAPERS

Present your research at SPIE Medical Imaging

Follow these instructions to develop a successful abstract and accompanying manuscript for the conference and for publication in the Proceedings of SPIE in the SPIE Digital Library.

How to submit an abstract

1. Browse the conference program and select one conference that most closely matches the topics in your abstract. *Please do not submit the same, or similar, abstracts to multiple conferences.*
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 is due 7 August 2019 and should include the following:

1. Title
2. Author(s)' information
3. 250-word abstract for technical review
4. 100-word summary for the program
5. Keywords used in search for your paper (optional)
6. A 2-4 page abstract file including supplemental information. See below for supplemental file specifications.
7. Your decision on publishing your presentation recording to the SPIE Digital Library (slide capture and audio)
8. 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.

SUPPLEMENTAL FILE SPECIFICATIONS

- Prepare your 2-4 page **supplemental MS Word or PostScript file.** Download supplemental file instructions. For full consideration this file **must include** the paper title, authors, 250-word abstract text, and the following supplemental information:
  - Description of purpose
  - Method(s)
  - Results
  - New or breakthrough work to be presented
  - Conclusions
  - Whether the work is being, or has been, submitted for publication or presentation elsewhere, and, if so, indicate how the submissions differ.
  - This file may contain supporting images/ tables /figures
  - Failure to follow these guidelines may disqualify your submission.

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 6-20 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	7 August 2019
Author notification (by email) of acceptance and presentation details	14 October 2019
Manuscripts due	22 January 2020

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.
- Conference Chair/Editors reserve the right to reject for presentation any paper that does not meet content or presentation expectations.
- Final placement in an oral or poster session is subject to Chair discretion.

Publication of Proceedings in the SPIE Digital Library

- Conference Chair/Editors may require manuscript revision before approving publication and reserve the right to reject for publication any paper that does not meet acceptable standards for a scientific publication.
- Conference Chair/Editors' decisions on whether to allow publication of a manuscript is final.
- Authors must be authorized to transfer copyright of the manuscript to SPIE, or provide a suitable publication license.
- Only papers presented at the conference and received according to publication guidelines and timelines will be published in the conference Proceedings of SPIE in the SPIE Digital Library.
- Oral presentations are recorded, capturing the slides synced with the presenter's audio. Only those with author permission will be published in the SPIE Digital Library.
- SPIE partners with relevant scientific databases to enable researchers to find the papers in the Proceedings of SPIE easily. The databases that abstract and index these papers include Astrophysical Data System (ADS), Ei Compendex, CrossRef, Google Scholar, Inspec, Scopus, and Web of Science Conference Proceedings Citation Index.
- More publication information available on the SPIE Digital Library.

Contact information

For questions about your presentation, submitting an abstract post-deadline, or the meeting, contact **Kirsten Anderson**, your Conference Program Coordinator.

For questions about your manuscript, contact **AuthorHelp@spie.org**.

SAVE THE DATE

Abstracts Due:
7 August 2019

Author Notification:
14 October 2019
The contact author will be notified of acceptance by email.

Manuscripts Due:
22 January 2020

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.

SPIE. DIGITAL LIBRARY

SPIE WILL PUBLISH YOUR RESEARCH GLOBALLY

www.SPIEDigitalLibrary.org

Your work will live far beyond the conference room—all proceedings from this meeting will be published in the SPIE Digital Library. Promote yourself, your ideas, and your organization to millions of key researchers from around the world through this web-based repository of the latest technical information.

www.spie.org/MI107call