

Medical Imaging 2016

Physics of Medical Imaging

Despina Kontos
Thomas G. Flohr
Joseph Y. Lo
Editors

28 February – 2 March 2016
San Diego, California, United States

Sponsored by
SPIE

Cosponsored by
Modus Medical Devices Inc. (Canada)
Bruker (United States)
Poco Graphite (United States)
imXPAD (France)
Carestream Health, Inc.
GE Healthcare

Cooperating Organizations
AAPM—American Association of Physicists in Medicine (United States)
APS—American Physiological Society (United States)
IFCARS—International Foundation for Computer Assisted Radiology and Surgery (Germany)
Medical Image Perception Society (United States)
Radiological Society of North America (United States)
Society for Imaging Informatics in Medicine (United States)
World Molecular Imaging Society
The DICOM Standards Committee

Volume 9783
Part One of Three Parts

Proceedings of SPIE, 1605-7422, V. 9783

SPIE is an international society advancing an interdisciplinary approach to the science and application of light.

Medical Imaging 2016: Physics of Medical Imaging, edited by Despina Kontos, Thomas G. Flohr, Joseph Y. Lo,
Proc. of SPIE Vol. 9783, 978301 · © 2016 SPIE · CCC code: 1605-7422/16/\$18 · doi: 10.1117/12.2230171

The papers in this volume were part of the technical conference cited on the cover and title page. Papers were selected and subject to review by the editors and conference program committee. Some conference presentations may not be available for publication. Additional papers and presentation recordings may be available online in the SPIE Digital Library at SPIEDigitalLibrary.org.

The papers reflect the work and thoughts of the authors and are published herein as submitted. The publisher is not responsible for the validity of the information or for any outcomes resulting from reliance thereon.

Please use the following format to cite material from this book:

Author(s), "Title of Paper," in *Medical Imaging 2016: Physics of Medical Imaging*, edited by Despina Kontos, Thomas G. Flohr, Joseph Y. Lo, Proceedings of SPIE Vol. 9783 (SPIE, Bellingham, WA, 2016) Article CID Number.

ISSN: 1605-7422

ISSN: 2410-9045 (electronic)

ISBN: 9781510600188

Published by

SPIE

P.O. Box 10, Bellingham, Washington 98227-0010 USA

Telephone +1 360 676 3290 (Pacific Time) • Fax +1 360 647 1445

SPIE.org

Copyright © 2016, Society of Photo-Optical Instrumentation Engineers.

Copying of material in this book for internal or personal use, or for the internal or personal use of specific clients, beyond the fair use provisions granted by the U.S. Copyright Law is authorized by SPIE subject to payment of copying fees. The Transactional Reporting Service base fee for this volume is \$18.00 per article (or portion thereof), which should be paid directly to the Copyright Clearance Center (CCC), 222 Rosewood Drive, Danvers, MA 01923. Payment may also be made electronically through CCC Online at copyright.com. Other copying for republication, resale, advertising or promotion, or any form of systematic or multiple reproduction of any material in this book is prohibited except with permission in writing from the publisher. The CCC fee code is 1605-7422/16/\$18.00.

Printed in the United States of America.

Publication of record for individual papers is online in the SPIE Digital Library.

**SPIE. DIGITAL
LIBRARY**
SPIEDigitalLibrary.org

Paper Numbering: Proceedings of SPIE follow an e-First publication model, with papers published first online and then in print. Papers are published as they are submitted and meet publication criteria. A unique citation identifier (CID) number is assigned to each article at the time of the first publication. Utilization of CIDs allows articles to be fully citable as soon as they are published online, and connects the same identifier to all online, print, and electronic versions of the publication. SPIE uses a six-digit CID article numbering system in which:

- The first four digits correspond to the SPIE volume number.
- The last two digits indicate publication order within the volume using a Base 36 numbering system employing both numerals and letters. These two-number sets start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B ... 0Z, followed by 10-1Z, 20-2Z, etc.

The CID Number appears on each page of the manuscript. The complete citation is used on the first page, and an abbreviated version on subsequent pages.

Contents

Part One

xvii	<i>Authors</i>
xxv	<i>Conference Committee</i>
xxix	<i>2016 Medical Imaging Award Recipients</i>

SESSION 1 TOMOSYNTHESIS AND DIGITAL SUBTRACTION ANGIOGRAPHY

9783 02	Feasibility of reduced-dose 3D/4D-DSA using a weighted edge preserving filter [9783-5]
9783 03	Quantification of resolution in multiplanar reconstructions for digital breast tomosynthesis [9783-1]
9783 04	A new generation of stationary digital breast tomosynthesis system with wider angular span and faster scanning time [9783-3]
9783 05	Stationary digital chest tomosynthesis for coronary artery calcium scoring [9783-2]
9783 06	Detection of microcalcification clusters by 2D-mammography and narrow and wide angle digital breast tomosynthesis [9783-4]

SESSION 2 BREAST IMAGING

9783 07	Estimating breast thickness for dual-energy subtraction in contrast-enhanced digital mammography using calibration phantoms [9783-11]
9783 08	Generation of 3D synthetic breast tissue [9783-6]
9783 09	A new, open-source, multi-modality digital breast phantom [9783-10]
9783 0A	Rayleigh imaging in spectral mammography (Second Place, Physics of Medical Imaging Student Paper Award) [9783-7]
9783 0B	Reproducing 2D breast mammography images with 3D printed phantoms [9783-8]
9783 0C	Breast ultrasound tomography with two parallel transducer arrays [9783-9]

SESSION 3 KEYNOTE AND DUAL AND MULTI ENERGY CT

9783 0D	Limited-angle multi-energy CT using joint clustering prior and sparsity regularization [9783-14]
---------	---------------------------------------------------------------------------------------------------------

9783 OE **Dictionary-based image denoising for dual energy computed tomography [9783-13]**

SESSION 4 CONE BEAM CT I: NEW TECHNOLOGIES, CORRECTIONS

9783 OG **Twin robotic x-ray system for 2D radiographic and 3D cone-beam CT imaging [9783-15]**

9783 OH **Five-dimensional motion compensation for respiratory and cardiac motion with cone-beam CT of the thorax region [9783-18]**

9783 OI **Shifted detector super short scan reconstruction for the rotate-plus-shift trajectories and its application to C-arm CT systems [9783-20]**

9783 OJ **Striped ratio grids for scatter estimation [9783-17]**

9783 OK **Image-based motion compensation for high-resolution extremities cone-beam CT [9783-16]**

9783 OL **Over-exposure correction in knee cone-beam CT imaging with automatic exposure control using a partial low dose scan [9783-19]**

SESSION 5 PHASE CONTRAST IMAGING

9783 OM **X-ray differential phase contrast imaging using a grating interferometer and a single photon counting detector [9783-22]**

9783 ON **Potential use of microbubbles (MBs) as contrast material in x-ray dark field (DF) imaging: How does the DF signal change with the characteristic parameters of the MBs? [9783-23]**

9783 OP **High-energy x-ray grating-based phase-contrast radiography of human anatomy [9783-25]**

9783 OQ **Single-shot x-ray phase contrast imaging with an algorithmic approach using spectral detection [9783-21]**

SESSION 6 CONE BEAM CT II: SYSTEM OPTIMIZATION, IMAGE RECONSTRUCTION

9783 OR **Nonlinear statistical reconstruction for flat-panel cone-beam CT with blur and correlated noise models [9783-29]**

9783 OS **Automatic intrinsic cardiac and respiratory gating from cone-beam CT scans of the thorax region [9783-30]**

9783 OT **Design and characterization of a dedicated cone-beam CT scanner for detection of acute intracranial hemorrhage [9783-26]**

9783 OU **C-arm cone beam CT perfusion imaging using the SMART-RECON algorithm to improve temporal sampling density and temporal resolution [9783-28]**

- 9783 0V **Mask free intravenous 3D digital subtraction angiography (IV 3D-DSA) from a single C-arm acquisition** [9783-27]
- 9783 0W **Reduction of beam hardening artifacts in cone-beam CT imaging via SMART-RECON algorithm** [9783-31]

SESSION 7 CT I: TECHNOLOGY, SYSTEM CHARACTERIZATION, APPLICATIONS

- 9783 0X **Fluence-field modulated x-ray CT using multiple aperture devices** [9783-33]
- 9783 0Y **Development of a realistic, dynamic digital brain phantom for CT perfusion validation** [9783-32]
- 9783 0Z **Experimental characterization of extra-focal radiation in CT scanners** [9783-36]
- 9783 10 **Noise characteristics of CT perfusion imaging: how does noise propagate from source images to final perfusion maps?** [9783-35]
- 9783 11 **Accuracy of patient specific organ-dose estimates obtained using an automated image segmentation algorithm** [9783-34]
- 9783 12 **Dual-source multi-energy CT with triple or quadruple x-ray beams** [9783-37]
- 9783 13 **Optimized projection binning for improved helical amplitude- and phase-based 4DCT reconstruction in the presence of breathing irregularity** [9783-38]

SESSION 8 DETECTORS

- 9783 14 **DQE simulation of a-Se x-ray detectors using ARTEMIS** [9783-42]
- 9783 15 **Improving detector spatial resolution using pixelated scintillators with a barrier rib structure** [9783-39]
- 9783 16 **High dynamic range CMOS-based mammography detector for FFDM and DBT** [9783-43]
- 9783 17 **Solid-state flat panel imager with avalanche amorphous selenium (Second Place, Physics of Medical Imaging Student Paper Award)** [9783-40]
- 9783 18 **A novel x-ray detector design with higher DQE and reduced aliasing: Theoretical analysis of x-ray reabsorption in detector converter material** [9783-41]

SESSION 9 CT II: IMAGE RECONSTRUCTION, ARTIFACT REDUCTION

- 9783 19 **A generalized Fourier penalty in prior-image-based reconstruction for cross-platform imaging** [9783-45]
- 9783 1A **Reduction of motion artifacts in cardiac CT based on partial angle reconstructions from short scan data** [9783-49]

- 9783 1B **An open library of CT patient projection data** [9783-44]
- 9783 1C **Limits to dose reduction from iterative reconstruction and the effect of through-slice blurring** [9783-46]
- 9783 1D **Reduction of truncation artifacts in CT images via a discriminative dictionary representation method** [9783-48]
- 9783 1E **Compensation of skull motion and breathing motion in CT using data-based and image-based metrics, respectively** [9783-47]

SESSION 10 PHOTON COUNTING CT I: INSTRUMENTATION

- 9783 1F **Estimation of signal and noise for a whole-body photon counting research CT system** [9783-50]
- 9783 1G **Material decomposition and virtual non-contrast imaging in photon counting computed tomography: an animal study** [9783-51]
- 9783 1H **On the analogy between pulse-pile-up in energy-sensitive, photon-counting detectors and level-crossing of shot noise** [9783-52]
- 9783 1I **A high-resolution imaging technique using a whole-body, research photon counting detector CT system** [9783-54]
- 9783 1J **Lossless compression of projection data from photon counting detectors** [9783-53]

SESSION 11 PET AND MR

- 9783 1K **Initial experience in primal-dual optimization reconstruction from sparse-PET patient data** [9783-58]
- 9783 1L **Short term reproducibility of a high contrast 3-D isotropic optic nerve imaging sequence in healthy controls** [9783-55]
- 9783 1M **Crystal timing offset calibration method for time of flight PET scanners** [9783-56]
- 9783 1N **Solving outside-axial-field-of-view scatter correction problem in PET via digital experimentation** [9783-57]

SESSION 12 PHOTON COUNTING CT II: SPECTRAL IMAGING

- 9783 1O **Improving material decomposition by spectral optimization of photon counting computed tomography** [9783-62]
- 9783 1P **Optimal selection of thresholds for photon counting CT** [9783-63]
- 9783 1Q **"Conventional" CT images from spectral measurements** [9783-61]

- 9783 1R **Spatio-energetic cross-talks in photon counting detectors: detector model and correlated Poisson data generator [9783-59]**
- 9783 1S **Comparison of quantitative k-edge empirical estimators using an energy-resolved photon-counting detector [9783-60]**

SESSION 13 NEW SYSTEMS AND TECHNOLOGIES

- 9783 1U **Multi-gamma-source CT imaging system: a feasibility study with the Poisson noise [9783-65]**
- 9783 1V **High-spatial-resolution nanoparticle x-ray fluorescence tomography [9783-67]**
- 9783 1W **Investigation of noise and contrast sensitivity of an electron multiplying charge-coupled device (EMCCD) based cone beam micro-CT system [9783-66]**
- 9783 1X **800-MeV magnetic-focused flash proton radiography for high-contrast imaging of low-density biologically-relevant targets using an inverse-scatter collimator [9783-69]**
- 9783 1Y **Method for dose-reduced 3D catheter tracking on a scanning-beam digital x-ray system using dynamic electronic collimation [9783-64]**

SESSION 14 SCATTER AND DIFFRACTION IMAGING

- 9783 1Z **Method to study sample object size limit of small-angle x-ray scattering computed tomography [9783-70]**
- 9783 21 **Coded aperture coherent scatter imaging for breast cancer detection: a Monte Carlo evaluation [9783-74]**
- 9783 23 **Coded aperture x-ray diffraction imaging with transmission computed tomography side-information [9783-73]**

SESSION 15 TASK DRIVEN IMAGING, OBSERVERS, DETECTABILITY, PHANTOM STUDIES

- 9783 24 **Task-driven tube current modulation and regularization design in computed tomography with penalized-likelihood reconstruction [9783-75]**
- 9783 25 **Comparison of model and human observer performance in FFDM, DBT, and synthetic mammography [9783-80]**
- 9783 26 **Predicting detection performance with model observers: Fourier domain or spatial domain? [9783-79]**
- 9783 27 **Investigation of optimal parameters for penalized maximum-likelihood reconstruction applied to iodinated contrast-enhanced breast CT [9783-78]**

- 9783 28 **Design, fabrication, and implementation of voxel-based 3D printed textured phantoms for task-based image quality assessment in CT (Second Place, Robert F. Wagner All-Conference Best Student Paper Award) [9783-76]**
- 9783 29 **Detectable change of lung nodule volume with CT in a phantom study with high and low signal to background contrast [9783-77]**

Part Two

POSTER SESSION: BREAST IMAGING

- 9783 2B **Eigenbreasts for statistical breast phantoms [9783-82]**
- 9783 2C **Conceptual detector development and Monte Carlo simulation of a novel 3D breast computed tomography system [9783-81]**
- 9783 2E **Simulation of spiculated breast lesions [9783-84]**
- 9783 2F **Estimation of mammary gland composition using CdTe series detector developed for photon-counting mammography [9783-85]**
- 9783 2G **Discrimination between normal breast tissue and tumor tissue using CdTe series detector developed for photon-counting mammography [9783-91]**
- 9783 2H **Biopsy system guided by positron emission tomography in real-time [9783-90]**
- 9783 2I **Feasibility of generating quantitative composition images in dual energy mammography: a simulation study [9783-94]**
- 9783 2J **Comparison of contrast enhancement methods using photon counting detector in spectral mammography [9783-89]**
- 9783 2K **Grid-less imaging with antiscatter correction software in 2D mammography: the effects on image quality and MGD under a partial virtual clinical validation study [9783-92]**
- 9783 2L **DICOM organ dose does not accurately represent calculated dose in mammography [9783-96]**
- 9783 2M **Analysis of the scatter effect on detective quantum efficiency of digital mammography [9783-88]**
- 9783 2N **Optimal exposure techniques for iodinated contrast enhanced breast CT [9783-83]**
- 9783 2O **Estimation of adipose compartment volumes in CT images of a mastectomy specimen [9783-93]**
- 9783 2P **A new paradigm of dielectric relaxation spectroscopy for non-invasive detection of breast abnormalities: a preliminary feasibility analysis [9783-95]**
- 9783 2Q **Reduction of artifacts in computer simulation of breast Cooper's ligaments [9783-87]**

- 9783 2R **Radiation dose differences between digital mammography and digital breast tomosynthesis are dependent on breast thickness [9783-97]**

POSTER SESSION: CONE BEAM CT

- 9783 2S **Scatter correction in CBCT with an offset detector through a deconvolution method using data consistency [9783-105]**
- 9783 2T **Deblurring in iterative reconstruction of half CBCT for image guided brain radiosurgery [9783-107]**
- 9783 2U **Imaging characteristics of distance-driven method in a prototype cone-beam computed tomography (CBCT) [9783-106]**
- 9783 2V **Lens of the eye dose calculation for neuro-interventional procedures and CBCT scans of the head [9783-101]**
- 9783 2W **A fast GPU-based approach to branchless distance-driven projection and back-projection in cone beam CT [9783-104]**
- 9783 2X **A system to track skin dose for neuro-interventional cone-beam computed tomography (CBCT) [9783-102]**
- 9783 2Y **Regularization design for high-quality cone-beam CT of intracranial hemorrhage using statistical reconstruction [9783-103]**
- 9783 2Z **Properties of the ellipse-line-ellipse trajectory with asymmetrical variations [9783-100]**
- 9783 30 **Library-based scatter correction for dedicated cone beam breast CT: a feasibility study [9783-99]**
- 9783 31 **Ring artifacts removal via spatial sparse representation in cone beam CT [9783-98]**
- 9783 32 **Algorithm for x-ray beam hardening and scatter correction in low-dose cone-beam CT: phantom studies [9783-108]**

POSTER SESSION: CT: ARTIFACT CORRECTIONS

- 9783 33 **MADR: metal artifact detection and reduction [9783-110]**
- 9783 34 **Metal artifact reduction in CT via ray profile correction [9783-111]**
- 9783 35 **Line-ratio based ring artifact correction method using transfer function [9783-112]**
- 9783 36 **Beam hardening and motion artifacts in cardiac CT: evaluation and iterative correction method [9783-109]**

POSTER SESSION: CT: TECHNOLOGY, SYSTEM CHARACTERIZATION, DOSE, APPLICATIONS

- 9783 37 **A geometric calibration method for inverse geometry computed tomography using P-matrices** [9783-113]
- 9783 38 **CT dose minimization using personalized protocol optimization and aggressive bowtie** [9783-114]
- 9783 39 **Segmentation-free x-ray energy spectrum estimation for computed tomography** [9783-115]
- 9783 3A **Noise power spectrum studies of CT systems with off-centered image object and bowtie filter** [9783-116]
- 9783 3B **Prototype adaptive bow-tie filter based on spatial exposure time modulation** [9783-117]
- 9783 3C **Estimation of breast dose saving potential using a breast positioning technique for organ-based tube current modulated CT** [9783-118]
- 9783 3D **Robust dynamic myocardial perfusion CT deconvolution using adaptive-weighted tensor total variation regularization** [9783-119]
- 9783 3E **Organ dose conversion coefficients for tube current modulated CT protocols for an adult population** [9783-120]
- 9783 3F **A technique for multi-dimensional optimization of radiation dose, contrast dose, and image quality in CT imaging** [9783-121]
- 9783 3G **Experimental demonstration of a dynamic bowtie for region-based CT fluence optimization** [9783-122]
- 9783 3H **Hybrid deterministic and stochastic x-ray transport simulation for transmission computed tomography with advanced detector noise model** [9783-123]
- 9783 3I **An automated technique for estimating patient-specific regional imparted energy and dose in TCM CT exams** [9783-124]
- 9783 3J **A framework for analytical estimation of patient-specific CT dose** [9783-125]
- 9783 3K **Modulation transfer function determination using the edge technique for cone-beam micro-CT** [9783-126]
- 9783 3L **An approach for quantitative image quality analysis for CT** [9783-127]
- 9783 3M **Low dose CT perfusion using k-means clustering** [9783-234]

POSTER SESSION: DETECTORS

- 9783 3N **Quantitative comparison using generalized relative object detectability (G-ROD) metrics of an amorphous selenium detector with high resolution microangiographic fluoroscopes (MAF) and standard flat panel detectors (FPD)** [9783-128]
- 9783 3O **Exploration of maximum count rate capabilities for large-area photon counting arrays based on polycrystalline silicon thin-film transistors** [9783-129]
- 9783 3P **Indirect-detection single-photon-counting x-ray detector for breast tomosynthesis** [9783-130]
- 9783 3Q **SWAD: inherent photon counting performance of amorphous selenium multi-well avalanche detector (Cum Laude Poster Award)** [9783-131]
- 9783 3R **Focal spot deblurring for high resolution direct conversion x-ray detectors** [9783-133]
- 9783 3S **Noise power spectrum measurements under nonuniform gains and their compensations** [9783-134]
- 9783 3T **A comparison of quantum limited dose and noise equivalent dose** [9783-135]
- 9783 3U **Optimizing the CsI thickness for chest dual-shot dual-energy detectors** [9783-136]
- 9783 3V **Physical properties of a new flat panel detector with cesium-iodide technology** [9783-137]
- 9783 3W **Detective quantum efficiency: a standard test to ensure optimal detector performance and low patient exposures** [9783-138]
- 9783 3X **MTF and NPS of single-shot dual-energy sandwich detectors** [9783-139]

POSTER SESSION: DUAL AND MULTI ENERGY CT

- 9783 3Y **Computed tomography with single-shot dual-energy sandwich detectors** [9783-140]
- 9783 3Z **Theoretical and Monte Carlo optimization of a stacked three-layer flat-panel x-ray imager for applications in multi-spectral diagnostic medical imaging** [9783-141]
- 9783 41 **Noise suppression for energy-resolved CT using similarity-based non-local filtration** [9783-143]
- 9783 42 **Dual energy x-ray imaging and scoring of coronary calcium: physics-based digital phantom and clinical studies** [9783-144]
- 9783 43 **Enhanced diagnostic value for coronary CT angiography of calcified coronary arteries using dual energy and a novel high-Z contrast material: a phantom study** [9783-145]
- 9783 44 **Reconstruction of limited-angle dual-energy CT using mutual learning and cross-estimation (MLCE)** [9783-146]

- 9783 46 **Calcium scoring with dual-energy CT in men and women: an anthropomorphic phantom study** [9783-148]
- 9783 47 **Dual-energy computed tomography of the head: a phantom study assessing axial dose distribution, eye lens dose, and image noise level** [9783-149]
- 9783 48 **Multi-energy method of digital radiography for imaging of biological objects** [9783-150]

POSTER SESSION: IMAGE RECONSTRUCTION

- 9783 49 **Iterative image reconstruction for multienergy computed tomography via structure tensor total variation regularization** [9783-151]
- 9783 4A **Iterative CT reconstruction using coordinate descent with ordered subsets of data** [9783-152]

Part Three

- 9783 4B **Optimization-based reconstruction for reduction of CBCT artifact in IGRT** [9783-153]
- 9783 4C **Resolution-enhancing hybrid, spectral CT reconstruction** [9783-154]
- 9783 4D **Axial 3D region of interest reconstruction using weighted cone beam BPF/DBPF algorithm cascaded with adequately oriented orthogonal butterfly filtering** [9783-155]
- 9783 4E **Joint regularization for spectro-temporal CT reconstruction** [9783-156]
- 9783 4F **Texture-preserved penalized weighted least-squares reconstruction of low-dose CT image via image segmentation and high-order MRF modeling** [9783-157]
- 9783 4G **Regularized CT reconstruction on unstructured grid** [9783-158]
- 9783 4H **A new look at signal sparsity paradigm for low-dose computed tomography image reconstruction** [9783-159]
- 9783 4I **Texture-preserving Bayesian image reconstruction for low-dose CT** [9783-160]
- 9783 4J **Fast conjugate gradient algorithm extension for analyzer-based imaging reconstruction** [9783-161]
- 9783 4K **Efficient iterative image reconstruction algorithm for dedicated breast CT** [9783-162]
- 9783 4L **Direct reconstruction of enhanced signal in computed tomography perfusion** [9783-163]
- 9783 4M **A method for investigating system matrix properties in optimization-based CT reconstruction** [9783-164]
- 9783 4N **A comparative study of the effects of using normalized patches for penalized likelihood tomographic reconstruction** [9783-165]

- 9783 4O **High-resolution and large-volume tomography reconstruction for x-ray microscopy** [9783-166]
- 9783 4P **An adaptive method for weighted median priors in transmission tomography reconstruction** [9783-167]
- 9783 4Q **Continuous analog of multiplicative algebraic reconstruction technique for computed tomography** [9783-168]
- 9783 4R **Texture enhanced optimization-based image reconstruction (TxE-OBIR) from sparse projection views** [9783-169]
- 9783 4S **Acceleration of iterative tomographic image reconstruction by reference-based back projection** [9783-170]
- 9783 4T **Noise reduction in computed tomography using a multiplicative continuous-time image reconstruction method** [9783-171]
- 9783 4U **Assessment of tomographic reconstruction performance using the Mojette transform** [9783-172]

POSTER SESSION: MEASUREMENTS

- 9783 4V **A wide-acceptance Compton spectrometer for spectral characterization of a medical x-ray source** [9783-173]
- 9783 4W **X-ray spectrum estimation from transmission measurements by an exponential of a polynomial model** [9783-174]
- 9783 4X **A dual-energy medical instrument for measurement of x-ray source voltage and dose rate** [9783-175]

POSTER SESSION: NEW SYSTEMS AND TECHNOLOGIES

- 9783 4Z **In vivo small animal lung speckle imaging with a benchtop in-line XPC system** [9783-177]
- 9783 50 **Seventh-generation CT** [9783-179]
- 9783 51 **A glass-sealed field emission x-ray tube based on carbon nanotube emitter for medical imaging** [9783-180]
- 9783 52 **Organ radiation exposure with EOS: GATE simulations versus TLD measurements** [9783-181]
- 9783 54 **Scattering-compensated cone beam x-ray luminescence computed tomography** [9783-184]
- 9783 55 **Microstructure analysis of the pulmonary acinus by a synchrotron radiation CT** [9783-185]

- 9783 56 **Ultrasound waveform tomography with the second-order total-generalized-variation regularization [9783-186]**

POSTER SESSION: PET, SPECT, MR, ULTRASOUND

- 9783 57 **Quantitative evaluation of susceptibility effects caused by dental materials in head magnetic resonance imaging [9783-192]**
- 9783 59 **Effects of tissue heterogeneity on single-coil, scanning MIT imaging [9783-193]**
- 9783 5A **Quantitative evaluation of PET image using event information bootstrap [9783-195]**
- 9783 5B **Event-by-event PET image reconstruction using list-mode origin ensembles algorithm [9783-187]**
- 9783 5C **In vitro flow assessment: from PC-MRI to computational fluid dynamics including fluid-structure interaction [9783-190]**
- 9783 5D **Quantitative analysis of L-SPECT system for small animal brain imaging [9783-188]**
- 9783 5E **Characterization of various tissue mimicking materials for medical ultrasound imaging [9783-191]**

POSTER SESSION: PHASE CONTRAST IMAGING

- 9783 5F **Construction and evaluation of a high-energy grating-based x-ray phase-contrast imaging setup [9783-196]**
- 9783 5G **Feasibility of using energy-resolving detectors in differential phase-contrast imaging [9783-197]**
- 9783 5H **Joint reconstruction of absorption and refractive properties in propagation-based x-ray phase-contrast tomography via a non-linear image reconstruction algorithm [9783-198]**
- 9783 5I **Improvement of the visibility for x-ray phase contrast imaging using photon counting detector [9783-199]**
- 9783 5J **Quantification of signal detection performance degradation induced by phase-retrieval in propagation-based x-ray phase-contrast imaging [9783-200]**
- 9783 5L **Quantitative imaging of the microbubble concentrations by using an in-line phase contrast tomosynthesis prototype: a preliminary phantom study [9783-202]**
- 9783 5M **Evaluation of a new reconstruction algorithm for x-ray phase-contrast imaging [9783-203]**

POSTER SESSION: PHOTON COUNTING CT

- 9783 5N **Photon counting CT of the liver with dual-contrast enhancement** [9783-204]
- 9783 5O **Feasibility study of sparse-angular sampling and sinogram interpolation in material decomposition with a photon-counting detector** [9783-207]
- 9783 5P **Novel approaches to address spectral distortions in photon counting x-ray CT using artificial neural networks** [9783-206]
- 9783 5Q **Low-dose performance of a whole-body research photon-counting CT scanner** [9783-205]

POSTER SESSION: RADIATION THERAPY

- 9783 5R **Estimation of the influence of radical effect in the proton beams using a combined approach with physical data and gel data** [9783-209]
- 9783 5S **Spot scanning proton therapy plan assessment: design and development of a dose verification application for use in routine clinical practice** [9783-208]

POSTER SESSION: SCATTER AND DIFFRACTION IMAGING

- 9783 5T **Validation of coded aperture coherent scatter spectral imaging for normal and neoplastic breast tissues via surgical pathology** [9783-211]

POSTER SESSION: TASK DRIVEN IMAGING, OBSERVERS, DETECTABILITY, PHANTOM STUDIES

- 9783 5V **Development of a Hausdorff distance based 3D quantification technique to evaluate the CT imaging system impact on depiction of lesion morphology** [9783-212]
- 9783 5X **Development and comparison of projection and image space 3D nodule insertion techniques** [9783-217]
- 9783 5Y **Evaluation of a projection-domain lung nodule insertion technique in thoracic CT** [9783-215]
- 9783 5Z **Synthesized interstitial lung texture for use in anthropomorphic computational phantoms** [9783-216]
- 9783 60 **Second generation anthropomorphic physical phantom for mammography and DBT: Incorporating voxelized 3D printing and inkjet printing of iodinated lesion inserts** [9783-214]

POSTER SESSION: TOMOSYNTHESIS AND DIGITAL RADIOGRAPHY

- 9783 61 **kV x-ray dual digital tomosynthesis for image guided lung SBRT** [9783-218]

- 9783 62 **Design, optimization and evaluation of a “smart” pixel sensor array for low-dose digital radiography [9783-219]**
- 9783 63 **Modeling acquisition geometries with improved super-resolution in digital breast tomosynthesis [9783-220]**
- 9783 64 **Scatter estimation and removal of anti-scatter grid-line artifacts from anthropomorphic head phantom images taken with a high resolution image detector [9783-221]**
- 9783 65 **Optical geometry calibration method for free-form digital tomosynthesis [9783-222]**
- 9783 66 **Initial clinical evaluation of stationary digital chest tomosynthesis [9783-223]**
- 9783 67 **Anatomical decomposition in dual energy chest digital tomosynthesis [9783-224]**
- 9783 68 **Optimization of exposure parameters in digital tomosynthesis considering effective dose and image quality [9783-225]**
- 9783 69 **Digital breast tomosynthesis reconstruction using spatially weighted non-convex regularization [9783-226]**
- 9783 6A **Optimal kVp in chest computed radiography using visual grading scores: a comparison between visual grading characteristics and ordinal regression analysis [9783-227]**
- 9783 6B **On the properties of artificial neural network filters for bone-suppressed digital radiography [9783-228]**
- 9783 6C **Effects of angular range on image quality of chest digital tomosynthesis [9783-229]**
- 9783 6D **Quantitative comparison of spatial resolution in step-and-shoot and continuous motion digital breast tomosynthesis [9783-230]**
- 9783 6E **C-arm technique using distance driven method for nephrolithiasis and kidney stones detection [9783-231]**
- 9783 6F **Ray tracing reconstruction investigation for C-arm tomosynthesis [9783-232]**
- 9783 6G **Integration of kerma-area product and cumulative air kerma determination into a skin dose tracking system for fluoroscopic imaging procedures [9783-233]**

Authors

Numbers in the index correspond to the last two digits of the six-digit citation identifier (CID) article numbering system used in Proceedings of SPIE. The first four digits reflect the volume number. Base 36 numbering is employed for the last two digits and indicates the order of articles within the volume. Numbers start with 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 0A, 0B...0Z, followed by 10-1Z, 20-2Z, etc.

Aagaard-Kienitz, Beveley, 0V
Abadi, Ehsan, 3F
Abou Al-Ola, Omar M., 4Q
Acciavatti, Raymond J., 03, 07, 63
Agasthya, Greeshma, 3C, 3F
Ahmed, Azam S., 0V
Ahn, Jeung Sun, 51
Alakhras, Maram M., 2R
Álamo, J., 2H
Albanese, K. E., 5T
Allison, Jason, 1X
Allmendinger, Thomas, 1A, 1G
Allner, Sebastian, 0E
Alrehily, Faisal, 2E
Anastasio, Mark A., 4Z, 5H, 5J
Andreyev, Andriy, 1N, 5B
Anton, Gisela, 0P, 5F, 5M
Antonuk, Larry E., 3O
Antropova, Natalia, 4K
Augustine, Kurt E., 5S
Aygün, N., 0T, 2Y
Aziz, Moez Karim, 07
Ba, Alexandre, 28
Badal, Andreu, 0B, 1Z, 3B
Badano, Aldo, 14, 1Z, 3Z
Badea, C. T., 4C, 4E, 5P
Baek, Cheol-Ha, 2M
Bakic, Predrag R., 2O, 2Q
Barber, W., 5P
Bartels, Matthias, 1H
Basilico, F., 57
Baturin, Pavlo, 5G
Becchetti, Marc F., 3F, 5Z
Bednarek, Daniel R., 1W, 2V, 2X, 3N, 3R, 64, 6G
Bellan, A., 4V
Beller, Carsten J., 5C
Beltran, Chris J., 5S
Bemelmans, Frédéric, 2K
Benlloch, J. M., 2H
Berggren, Karl, 0A
Besson, G. M., 50
Bian, Zhaoying, 3D, 49
Bier, Elianna, 28
Binaghi, E., 57
Blevis, Ira, 0X
Bochud, François, 28
Boone, John M., 3I, 4K, 61
Bosmans, Hilde, 2K
Bourne, Roger, 2R
Boyce, Sarah J., 3T
Boyd, Douglas, 61
Brady, David J., 23
Bramaje Adversalo, Xenia, 2K
Brankov, Jovan G., 4J
Brehm, Marcus, 0H, 4B
Brennan, Patrick C., 2L, 2R
Brody, S., 4Z
Bruder, Herbert, 1A, 1E
Budde, Adam, 3A
Bues, Martin, 5S
Bysani Krishnakumar, Sumukh, 1W
Calliste, Jabari, 04
Cao, Q., 0K
Cao, Wanjing, 15
Carin, Lawrence, 23
Carrilero, V., 2H
Caudevilla, Oriol, 4J
Chan, Heang-Ping, 69
Cheheltani, Rabee, 1P
Chen, Arthur, 15
Chen, Baiyu, 1B, 26, 5Y
Chen, Buxin, 1K
Chen, Elvis C. S., 5E
Chen, Guang-Hong, 0M, 0N, 0U, 0V, 0W, 10, 1D, 3A
Chen, Jun, 62
Chen, Ting, 0C
Chen, Wei R., 5L
Chen, Yang, 1D
Chen, Ying, 6E, 6F
Chen, Yujia, 5H
Chen, Yun, 4G
Cheng, Chang-Chieh, 4O, 4S
Ching, Yu-Tai, 4O, 4S
Cho, Min Kook, 3J
Cho, Seungryong, 1U, 2S
Choi, Jang-Hwan, 0L
Choi, Mina, 1Z
Choi, Seungyeon, 2I, 67, 68, 6C
Choi, Sunghoon, 2I, 2U, 67, 68, 6C
Chou, Cheng-Ying, 5J
Christensen, Soren, 0Y
Chtcheprov, Pavel, 65
Chung, Yong Hyun, 5A
Clark, D. P., 4C, 4E, 5P
Clark, Matthew, 0B
Clavel, A. H., 52
Cochran, Joe, 3L

Coradi, Thomas, 11
 Cormode, David, 1P
 Correcher, C., 2H
 Cruz-Bastida, Juan P., 3A
 Cunningham, Ian A., 18, 3W, 3Z
 Daerr, Heiner, 1H, 5N
 Daly, Megan, 6I
 Dance, David R., 06, 08, 2E
 Dang, H., 0T, 2Y
 Danielsson, Mats, 0A
 Darbon, A., 52
 Das, Mini, 0Q
 Davis, Brian J., 02
 De Carlo, Francesco, 5H
 De Man, Bruno, 38, 3G
 Der Sarkissian, Henri, 4U
 Dhurjaty, Sreeram, 2P
 Diao, Andrew, 28, 60
 Dietrich, O., 1O
 Diffey, Jennifer, 2R
 Divel, Sarah E., 0Y
 Doki, T., 5I
 Dunkerley, David A. P., 1Y, 37
 Durst, Roger, 3P
 Elangovan, Premkumar, 06, 08, 2E
 El-Mohri, Youcef, 3O
 Eriksson, Markus, 2T
 Escartin, Terenz R., 18, 3W
 Espinoza, Camilo, 1X
 Espy, Michelle A., 4V
 Evans, Joshua D., 0Z
 Fahrig, Rebecca, 0L
 Fang, Yuan, 14
 Fatyga, Mirek, 5S
 Favazza, Christopher, 26
 Fayad, Zahi A., 1P
 Feldkamp, J. R., 59
 Feng, Qianjin, 3D, 49
 Ferretti, R., 57
 Fessler, Jeffrey A., 69
 Fiebich, Martin, 3V
 Fieselman, Andreas, 0G
 Fingerle, Alexander A., 5N
 Fitzgerald, Paul, 3G
 Fleischmann, Christof, 0I
 Fletcher, Joel G., 1B, 5Y
 Flohr, Thomas, 1A, 1E, 1G, 1O
 Foos, David, 0T, 2Y, 66
 Fredenberg, Erik, 0A
 Fredette, Nathaniel R., 0Q
 Freeman, Matthew S., 1X
 Fu, Wanyi, 3C, 3E
 Funk, Tobias, 1Y
 Gang, Grace, 0X, 24
 Gao, Bo, 04
 Gao, Kai, 0C
 Gao, Peng, 32, 3K, 54
 Garrett, John, 0W
 Garson III, A. B., 4Z
 Gauer, Tobias, 13
 Gavrielides, Marios A., 29, 46
 Ge, Yongshuai, 0M, 0N
 Gehm, Michael E., 28, 60
 Gehring, A., 4V
 Ghamraoui, Bahaa, 0B, 1Z
 Ghani, Muhammad U., 5L, 6D
 Ghielmi, M., 57
 Gilat-Schmidt, Taly, 11, 1S
 Gilkeson, Robert C., 42
 Glick, Stephen J., 25, 27, 2N, 60
 Goett III, John Jerome, 1X
 Gold, Garry, 0L
 Goldan, Amir H., 17, 3Q
 Gomez, J., 2H
 Gomez-Cardona, Daniel, 3A
 Gong, Changfei, 3D, 49
 Gong, Qi, 29
 Goodsitt, Mitchell M., 3C
 Graff, Christian G., 09
 Greenberg, Joel A., 21, 23, 5T
 Guédon, Jeanpierre, 4U
 Gunsten, S., 4Z
 Guo, Zijia, 2Z
 Gursoy, Doga, 5H
 Gutjahr, R., 1G, 1O
 Ha, Sungsoo, 33, 34
 Haas, Benjamin, 11
 Hadjipanteli, Andria, 06
 Hahn, Andreas, 0H, 0S
 Hahn, Andreas, 3V
 Hahn, Juliane, 1A
 Hahn, Katharina, 1G, 1I, 1O, 4A, 5Q
 Haines, T., 4V
 Halaweish, Ahmed F., 1I, 5Q
 Hamaguchi, Takashi, 47
 Han, Hao, 4F, 4I
 Haneda, K., 5R
 Hanson, Kenneth, 0C
 Harman, Allison, 05
 Harms, Joe, 41
 Harrigan, Robert L., 1L
 Hartman, Allison E., 65, 66
 Hashemi, SayedMasoud, 2T
 Hassan, Mehadi, 23
 Hatt, Charles R., 37
 Hauke, Christian, 0P, 5F, 5M
 He, Ji, 49
 Heath, Michael, 66
 Hellingman, D., 2H
 Henning, Andre, 1I, 5Q
 Henzler, Thomas, 3M
 Hernandez, Andrew, 61
 Hertz, Hans M., 1V
 Heuveline, Vincent, 5C
 Hoeschen, Christoph, 2C
 Hofmann, Christian, 13
 Hogan, Gary, 1X
 Hollander, Brian, 1X
 Holmes III, David, 1B
 Holmgren, Andrew, 23

Horiba, A., 5I
 Horn, Florian, 0P, 5F, 5M
 Howansky, Adrian, 17
 Hsieh, Jiang, 1D, 3A
 Hsieh, Scott S., 0J, 0L, 1C
 Hu, Yifan, 4I
 Hu, Zhiqiang, 1N
 Huang, Jing, 3D, 49
 Huang, Lianjie, 0C, 56
 Hunter, J., 4V
 Hwang, Dosik, 35
 Hwu, Yeukuang, 4O
 Ichikawa, Katsuhiko, 47
 Ihori, Akiko, 2F, 2G
 Ikejimba, Lynda, 25, 27
 Imran, Abdullah-Al-Zubaer, 2O
 Intrator, Miranda, 0C
 Ionita, Ciprian N., 1W, 3N, 3R
 Itoh, H., 55
 Jafari, Houman, 04
 Jain, Amit, 1W, 2V, 3N, 64
 Jaiswal, Sunil Prasad, 33
 James, M., 4V
 Jang, Dong-Hyuk, 68
 Jeon, Hosang, 2M, 3J, 3U, 3Y, 6B
 Jeon, Pil-Hyun, 68
 Jeong, Jaeik, 51
 Jerebko, Anna K., 0G
 Jiang, Hao, 3P
 Jin, Yannan, 38
 Jo, Byungdu, 2J, 5O
 Job, Isaias D., 3T
 Jorgensen, S., 1I
 Jost, G., 1G
 Jung, Ji Eun, 4P
 Kachelriess, Marc, 0H, 0I, 0S, 1A, 3M
 Kaercher, Joerg, 3P
 Kaganovsky, Yan, 23
 Kalra, Mannudeep K., 38
 Kang, Dong-Joong, 6B
 Kang, Joo Hyun, 5A
 Kao, Chien-Min, 1K
 Kapadia, Anuj J., 21, 5T
 Kappler, Steffen, 1F, 1G, 1I, 1O, 1R, 5Q
 Karellas, Andrew, 30
 Karim, Karim S., 18, 3N, 3Z
 Kato, Misa, 2F, 2G
 Kawamoto, Satomi, 0X
 Kawashima, Hiroki, 47
 Kawata, Y., 55
 Kazerooni, Ella A., 3C
 Ketcha, M., 2B
 Kim, Changhwan, 2S
 Kim, Daecheon, 3Y, 6B
 Kim, Dohyeon, 2J, 5O
 Kim, Dong Sik, 3S
 Kim, Dong Woon, 2M, 3U, 3X, 3Y
 Kim, Eun, 3S
 Kim, Hee-Joung, 2I, 2J, 2U, 5O, 67, 68, 6C
 Kim, Ho Kyung, 2M, 3J, 3K, 3U, 3X, 3Y, 6B
 Kim, Hyemi, 2J, 5O
 Kim, Jin Sung, 6B
 Kim, Jin Woo, 3J
 Kim, Junwoo, 3U, 3X
 Kim, Kyeong Min, 5A
 Kim, Myeongsoo, 6A
 Kim, Namho, 6I
 Kim, Seung Ho, 3Y
 Kim, Seung Hoon, 5I
 Kim, Ye-seul, 2I, 2U, 67, 68, 6C
 Kim, Younguk, 35
 Kimura, K., 5I
 Klasky, M., 4V
 Klotz, Ernst, 3M
 Knaup, Michael, 0I
 Kobayashi, Masanao, 47
 Koder, Yoshie, 2F, 2G
 Kofler, James, 26
 Kojima, Takeshi, 4Q, 4T
 Koliatsos, V. E., 0T, 2Y
 Konieczek, Martin, 3O
 Koo, Chi Wan, 5Y
 Koshida, Kichiro, 47
 Kratzke, Jonas, 5C
 Krauss, B., 1G
 Kuntz, Jan, 0I
 Kuperavage, Adam, 2Q
 Kuzo, Ronald S., 5Y
 Kwak, Junghwan, 5I
 Kwak, Shin Hye, 5A
 Kwiatkowski, Kris, 1X
 Kwon, Young Joon, 03, 07
 Lachner, Sebastian, 0P, 5F, 5M
 Laganis, Philip E., 04
 Lakshmanan, Manu N., 21, 5T
 Lambert, Jack W., 43
 Landman, Bennett A., 1L
 Lane, J., 1I
 Lansberg, Maarten G., 0Y
 Larsson, Daniel H., 1V
 Larsson, Jakob C., 1V
 Lau, Kristen C., 07
 Lauritsch, Guenter, 2Z
 Lee, Dong-Hoon, 2I, 2U, 67, 68, 6C
 Lee, Haenghwa, 2I, 2U, 67, 68, 6C
 Lee, Hyeon, 2S
 Lee, Okkyun, 1R, 36
 Lee, Soo-Jin, 4N, 4P
 Lee, Young, 2T
 Lee, Yueh Z., 04, 05, 65, 66
 Lell, Michael, 0S
 Leng, Shuai, 12, 1B, 1F, 1I, 26, 5Q, 5Y
 Létang, J. M., 52
 Levéille, Sébastien, 17
 Levenston, Marc, 0L
 Levin, David L., 1I, 5Y
 Levinson, Reuven, 0X
 Li, Bin, 4L
 Li, Guang, 3I
 Li, Ke, 0M, 0N, 0U, 10, 1D, 3A

Li, Lihong, 4I
 Li, Ping-Hui, 4S
 Li, Qin, 29, 46
 Li, Yinsheng, 0U, 0V, 0W, 1D
 Li, Yuhua, 5L
 Li, Zhongyuan, 3I
 Li, Zhoubo, 12, 1F, 1I, 5Q
 Liang, Albert K., 3O
 Liang, Zhengrong, 3D, 49, 4F, 4H, 4I
 Liao, Qimei, 32, 3K, 54
 Lin, Youzuo, 0C, 56
 Lipkin, Michael E., 6E
 Liu, Hong, 5L, 6D
 Liu, Langechuan, 15
 Liu, Songtao, 46
 Liu, Wenlei, 32, 3K, 54
 Liu, Xinghui, 62
 Liu, Yan, 4H, 4I
 Lo, Joseph Y., 25, 27, 28, 2B, 60
 Lomako, Andrey, 16
 Looney, Padraig T., 06
 Lopez Maurino, Sebastian, 3Z
 Lopez, Julian, 1X
 Lu, HongBing, 32, 3K, 54
 Lu, Jianping, 04, 05, 65, 66
 Lu, Lijun, 3D, 49
 Lu, Minghui, 15
 Lu, Yao, 4G
 Ludwig, Veronika, 0P, 5F, 5M
 Lundström, Ulf, 1V
 Luo, Shouhua, 3I
 Lyu, Qingwen, 4L
 Ma, Chi, 5Y
 Ma, Jianhua, 3D, 49, 4I, 4L
 Ma, Xiangyuan, 4G
 Macchi, A., 57
 Mackenzie, Alistair, 06
 Maeda, K., 55
 Maidment, Andrew D. A., 03, 07, 2O, 2Q, 63
 Maier, Andreas, 0L, 2Z
 Makeev, Andrey, 27, 2N
 Makhot, S., 4X
 Malalla, Nuhad A. Y., 6E, 6F
 Mariam, Fesseha, 1X
 Marshall, Nicholas, 2K
 Martinez, Michael, 1X
 Mathews, Aswin, 0X
 Matsubara, Kosuke, 47
 Mawn, Louise A., 1L
 McCall, S. J., 5T
 McCollough, Cynthia H., 12, 1B, 1F, 1I, 26, 5Q, 5Y
 McEntee, Mark F., 2L
 Mechlem, Korbinian, 0E
 Medeiros, Henry, 2W
 Medina, Jason, 1X
 Medina, Patrick, 1X
 Mei, Kai, 0E
 Mello-Thoms, Claudia, 2R
 Mendez, J., 4V
 Merrill, Frank, 1X
 Mertelmeier, Thomas, 0G
 Michel, Thilo, 0P, 5F, 5M
 Miller, James J., 16
 Miller, M. I., 2B
 Minami, K., 55
 Mistretta, Charles, 02
 Moir, D., 4V
 Moliner, L., 2H
 Mooney, Doug, 3L
 Moore, William, 4F, 4H, 4I
 Morley, Deborah, 1X
 Morris, Chris, 1X
 Morris, Robert E., 21, 5T
 Mueller, Klaus, 33, 34
 Muenzel, Daniela, 5N
 Müller, Bernhard H., 2C
 Muller, Kerstin, 0L
 Mundy, Daniel W., 5S
 Munro, Peter, 4B
 Murray, Matthew, 1X
 Musinsky, Stephanie, 60
 Myers, Kyle, 29, 46
 Nakajima, Ai, 2F, 2G
 Nakano, Y., 55
 Nam, Jiho, 3J
 Nam, Wooseok, 2T
 Nano, Tomi F., 18, 3W
 Naydenov, S. V., 48, 4X
 Nedrow, Paul, 1X
 Neumann, Bernd, 2C
 Niemann, David B., 0V
 Niki, N., 55
 Niu, Kai, 0U, 0V
 Niu, Tianye, 39, 4R
 Noël, Peter B., 0E, 5N
 Noh, Eunhyong, 5I
 Noo, Frédéric, 2Z, 4A
 Nordström, Håkan, 2T
 Normand, Nicolas, 4U
 Novario, R., 57
 Nye, Katelyn, 42
 Oberstar, Erick L., 02
 Odinaka, Ikenna, 23
 O'Donnell, Thomas, 1P
 Oh, Daejoong, 35
 Ohmatsu, H., 55
 Okada, Masahiro, 2F, 2G
 Okamoto, Chizuru, 2F, 2G
 Olson, Kyle, 04
 Opolonin, O. D., 48, 4X
 Ordovas, Karen G., 43
 Orero, A., 2H
 O'Sullivan, Joseph A., 23
 Ou, Hai, 62
 Paik, Sanghyun, 5I
 Pan, Xiaochuan, 1K, 4B, 4K, 4M, 4W
 Park, Chan-Soo, 0Q
 Park, Eunpyeong, 6B
 Park, Hunkuk, 5I
 Park, Jiwoong, 2M

Park, Junbeom, 6B
 Park, Miran, 2S
 Park, Subok, 2B
 Park, Su-Jin, 2J, 5O
 Parry, Mark D., 5S
 Partain, Larry, 6I
 Paysan, Pascal, 0H, 4B
 Pearce, Caleb, 0S
 Pelc, Norbert J., 0Y, 1C, 1J, 1Q
 Pelizzari, Charles, 4B
 Pelzer, Georg, 0P, 5F, 5M
 Penchev, Petar, 3V
 Peng, Luke, 1S
 Peris, J. L., 2H
 Perkhounkov, Boris, 4W
 Perkins, Amy E., 1K
 Peters, Inge M., 16
 Peters, Terry M., 5E
 Petrick, Nicholas, 29, 46
 Petrillo, Michael J., 3T
 Petrongolo, Michael, 4I
 Pfeiffer, Franz, 0E, 5N
 Pickering, Mark R., 5D
 Pietsch, H., 1G
 Pinto, R. Ferrari, 2E
 Pisana, Francesco, 3M
 Pochet, T., 4X
 Podgorsak, Alexander R., 1W
 Poepping, Tamie, 5E
 Pokrajac, David D., 2O, 2Q
 Politte, David G., 23
 Polster, Christoph, 1G, 1O, 1R
 Popescu, Lucretiu M., 3H
 Porras-Chaverri, Mariela A., 0Z
 Potuzko, Marci, 0S
 Pourmorteza, A., 19
 Preminger, Glenn M., 6E
 Proksa, Roland, 1H, 5N
 Pu, Huangsheng, 54
 Qian, Wei, 2P
 Qin, Bin, 0N
 Qin, Jun, 6E
 Qiu, Yuchen, 2P
 Quirk, S., 59
 Rahimi, Amir, 3L
 Rahman, Tasneem, 5D
 Rajbhandary, Paurakh L., 1Q
 Rana, R., 3R, 64
 Rana, Vijay, 2V
 Rashidnasab, Alaleh, 2E
 Ratnanather, J. T., 2B
 Recur, Benoit, 4U
 Regensburger, Joe, 3L
 Reiser, Ingrid S., 4K
 Ren, Liqiang, 6D
 Ren, Xue, 4N
 Ren, Yi, 4R
 Rengier, Fabian, 5C
 Rickard, Mary, 2R
 Rieger, Jens, 0P, 5F, 5M
 Ritman, Erik L., 1I, 5Q
 Ritschl, Ludwig, 0G
 Robins, Marthony, 5V, 5X
 Robinson, Vance, 3G
 Roessl, Ewald, 1H
 Rohkohl, C., 1E
 Rong, Junyan, 32, 3K, 54
 Rose, Sean D., 1K, 4M
 Royalty, Kevin, 0U
 Rudin, Stephen, 1W, 2V, 2X, 3N, 3R, 64, 6G
 Rui, Xue, 3G
 Rummeny, Ernst J., 5N
 Ruschin, Mark, 2T
 Russ, M., 3N, 3R
 Ryu, Jehwang, 5I
 Ryzhikov, V. D., 48, 4X
 Sahbaee, Pooyan, 3E, 3F, 5V, 5X
 Sahgal, Arjun, 2T
 Sahiner, Berkman, 29, 46
 Sakai, H., 5S
 Salvagnini, Elena, 2K
 Samei, Ehsan, 2I, 2S, 28, 3C, 3E, 3F, 3I, 5V, 5X, 5Z, 60
 Sanchez, Adrian, 4K
 Sanders, Jeremiah W., 3F, 3I
 Sano, S., 5I
 Sato, T., 5I
 Saunders, Alexander, 1X
 Sauppe, Sebastian, 0H, 0S
 Schafer, Sebastian, 0U
 Scheuermann, James R., 17
 Schlifske, Daniel, 2W
 Schmidt, Bernhard, 1G, 3M
 Schoeck, Friederike, 1G, 1O, 1P
 Scholz, Rosemarie, 0G
 Schönberg, Stefan, 3M
 Schöndube, H., 4A
 Schurman, Tamsen, 1X
 Schuster, Max, 0P, 5F, 5M
 Scott, C., 3N
 Sedillo, R., 4V
 Sedlmair, M., 1G
 Segars, William Paul, 0Y, 2B, 3C, 3E, 3F, 3I, 5Z
 Seghers, Dieter, 0H, 4B
 Seifert, Maria, 0P, 5F, 5M
 Seo, Chang-Woo, 2U
 Setlur Nagesh, S. V., 1W, 3N, 3R
 Shan, Jing, 0S, 6S, 66
 Shankar, Alok, 3N, 64, 6G
 Shen, Zeyang, 36
 Shi, Linxi, 30
 Shin, Choul Woo, 3S
 Shin, Junseob, 0C
 Shirai, T., 5I
 Shunhavanich, Picha, 1J
 Shurter, R., 4V
 Sidky, Emil Y., 1K, 4B, 4K, 4M, 4W
 Siewerdsen, Jeffrey H., 0K, 0R, 0T, 0X, 19, 24, 2Y
 Sikaria, Dhiraj, 60
 Sisneros, Thomas, 1X

Sisniega, A., 0K, 0T, 2Y
 Slagowski, Jordan M., 37
 Smit, Chiel, 16
 Smith, Alex K., 1L
 Smith, C. F., 48, 4X
 Smith, Seth A., 1L
 Smith, Walt, 3G
 Solomon, Justin B., 28, 5V, 5X, 5Z, 60
 Song, Bongyong, 2T
 Song, Hankyeol, 5A
 Song, William, 2T
 Song, Xiyun, 1M, 1N
 Soriano, Carmen, 5H
 Speidel, Michael A., 02, 1Y, 37
 Spronk, Derrek, 04
 Star-Lack, Josh, 0J, 11
 Stavro, Jann, 3Q
 Stayman, J. Webster, 0K, 0R, 0T, 0X, 19, 24, 2Y
 Stearns, J., 4V
 Stec, Jessika, 4W
 Steinbrener, Jan, 0G
 Stierstorfer, Karl, 1A, 1E, 4A
 Stoker, Joshua B., 5S
 Strocchi, S., 57
 Strother, Charles, 02, 0U, 0V
 Sturgeon, Gregory M., 2B, 3C, 60
 Suleiman, Moayyad E., 2L
 Sun, Pengfei, 6E
 Sun, Yi, 31
 Sun, Yuxin, 43
 Taguchi, Katsuyuki, 1R, 36
 Tahtali, Murat, 5D
 Tainter, Amy, 1X
 Takahashi, Edwin A., 5Y
 Takata, Tadanori, 47
 Tan, Maxine, 2P
 Tanabe, K., 5I
 Tang, Shaojie, 4D
 Tang, Xiangyang, 4D, 4R
 Tanioka, K., 17
 Tao, Kun, 38
 Tateishi, Kiyoko, 4Q
 Tattersall, P., 2H
 Thevenard-Berger, P., 52
 Thouvenot, Audrey, 5E
 Tian, Xiaoyu, 3C, 3E, 3I
 Tilley, Steven, 0R
 Touch, M., 5P
 Tousignant, Olivier, 17
 Trouw, Frans, 1X
 Tung, Chi-Hua, 1K
 Tupa, Dale, 1X
 Tward, Daniel J., 2B
 Tybo, Josh, 1X
 Umetani, K., 55
 Vågberg, William, 1V
 Van Ongeval, Chantal, 2K
 Van Peteghem, Nelis, 2K
 Van Syoc, K., 4V
 Vasireddi, S., 4Z
 Vedantham, Srinivasan, 30
 Vent, Trevor L., 03
 Verdun, F. R., 52
 Viers, Lyndsay D., 5Y
 Vijayan, Sarath, 2V, 2X, 6G
 Villanueva, Flordeliza, 0N
 Vincent Sheldon, Stephanie A., 5Y
 Vogt, Carmen, 1V
 Voigt, Johannes M, 0G
 Volegov, P., 4V
 Volkov, V. G., 48, 4X
 Vrieze, Thomas, 26
 Walsh, Timothy J., 5S
 Wandner, Johannes, 0P, 5F, 5M
 Wang, Adam S., 0J, 11
 Wang, Hui, 38
 Wang, Jing, 4L
 Wang, Jiong, 05
 Wang, Kai, 62
 Wang, Kun, 5H
 Wang, Tonghe, 41
 Wang, Xiaohui, 0T, 2Y, 66
 Weber, Thomas, 5F
 Wei, Xinzhou, 4F
 Weis, Christian, 5C
 Wells, Kevin, 06, 08, 2E
 Wen, Di, 42
 Werner, René, 13
 Whiting, Bruce R., 0N, 0Z
 Wi, Sunhee, 1U
 Wilde, Carl, 1X
 Wileyto, E. Paul, 63
 Williamson, Jeffrey F., 0Z
 Wilson, David L., 42
 Wintermark, Max, 0Y
 Wolf, Andreas, 0P, 5F, 5M
 Wong, Molly D., 5L, 6D
 Woo, Sang-Keun, 5A
 Wu, Di, 5L, 6D
 Wu, Gongting, 04, 05, 66
 Wu, Mingye, 38, 3G
 Wu, Xizeng, 6D
 Xia, Dan, 1K, 4B
 Xie, Huiqiao, 4R
 Xing, Yuxiang, 0D, 44
 Xiong, Zhenyu, 2V, 2X
 Xu, J., 0T, 2Y
 Xu, Yuesheng, 4G
 Yamaguchi, Yusaku, 4Q, 4T
 Yamakawa, Tsutomu, 2F, 2G
 Yamamoto, Shuichiro, 2F, 2G
 Yang, Kai, 5L, 6D
 Yang, Pengfei, 0V
 Yang, Sook, 6A
 Yang, Yi, 4R
 Yao, Yangyang, 38
 Ye, Jinghan, 1K, 1M, 1N
 Yeh, Benjamin M., 43
 Yeo, Seung Jun, 51
 Yin, Zhye, 38, 3G

Yorkston, J., 0K
Yoshimuta, T., 5I
Yoshinaga, Tetsuya, 4Q, 4T
Youn, Hanbean, 2M, 3J, 3U, 3X, 3Y, 6B
Young, Kenneth C., 06, 08, 2E
Yu, Lifeng, 12, 1B, 26, 5Y
Yu, Zhicong, 1F, 1I, 5Q
Yun, Seungman, 2M, 3J
Zbijewski, Wojciech, 0K, 0R, 0T, 0X, 2Y
Zeng, Dong, 3D, 49
Zeng, Rongping, 29, 46
Zhang, Hao, 4F, 4H, 4I
Zhang, Hua, 3D, 49
Zhang, Huayu, 0D, 44
Zhang, Qiude, 39
Zhang, Ran, 0M, 0N
Zhang, Xinyu, 3D
Zhang, Yakun, 3E, 3F
Zhang, Zheng, 1K, 4B
Zhao, Qihua, 3O
Zhao, Wei, 17, 3Q
Zhao, Wei, 39
Zheng, Bin, 2P, 5L, 6D
Zheng, Jiabei, 69
Zheng, Xiaoming, 6A
Zhou, Bo, 42
Zhou, Kungang, 3T
Zhou, Otto, 04, 05, 65, 66
Zhu, Lei, 30, 41
Zhu, Yang-Ming, 1N
Ziegler, Jens, 2C
Zimmerman, Kevin C., 1S

Conference Committee

Symposium Chairs

Steven C. Horii, The University of Pennsylvania Health System
(United States)

Berkman Sahiner, U.S. Food and Drug Administration (United States)

Conference Chairs

Despina Kontos, The University of Pennsylvania Health System
(United States)

Thomas G. Flohr, Siemens Healthcare GmbH (Germany)

Conference Co-chair

Joseph Y. Lo, Duke University Medical Center (United States)

Conference Program Committee

Andreu Badal, U.S. Food and Drug Administration (United States)

Kirsten Boedeker, Toshiba Medical Research Institute USA
(United States)

Hilde Bosmans, Katholieke Universiteit Leuven (Belgium)

Guang-Hong Chen, University of Wisconsin-Madison (United States)

Mini Das, University of Houston (United States)

Mats E. Danielsson, KTH Royal Institute of Technology (Sweden)

Maria Drangova, Robarts Research Institute (Canada)

Rebecca Fahrig, Siemens Healthcare GmbH (Germany) and Stanford
University School of Medicine (United States)

Taly Gilat-Schmidt, Marquette University (United States)

Stephen J. Glick, U.S. Food and Drug Administration (United States)
and University of Massachusetts Medical School (United States)

Michael Grass, Philips Research (Germany)

Christoph Hoeschen, Otto von Guericke Universität Magdeburg
(Germany)

Marc Kachelriess, Deutsches Krebsforschungszentrum (Germany)

Karim S. Karim, University of Waterloo (Canada)

Hee-Joung Kim, Yonsei University (Korea, Republic of)

Jinyi Qi, University of California, Davis (United States)

Magdalena Rafecas, Universität zu Lübeck (Germany)

Ingrid S. Reiser, The University of Chicago (United States)

John A. Rowlands, Thunder Bay Regional Research Institute (Canada)

John M. Sabol, GE Healthcare (United States)

Joseph W. Stayman, Johns Hopkins University (United States)
Anders Tingberg, Lund University (Sweden)
John Yorkston, Carestream Health, Inc. (United States)
Wei Zhao, Stony Brook Medicine (United States)

Session Chairs

- 1 Tomosynthesis and Digital Subtraction Angiography
Joseph Y. Lo, Duke University Medical Center (United States)
John M. Sabol, GE Healthcare (United States)
- 2 Breast Imaging
Andreu Badal, U.S. Food and Drug Administration (United States)
Wei Zhao, Stony Brook Medicine (United States)
- 3 Keynote and Dual and Multi Energy CT
Despina Kontos, The University of Pennsylvania Health System (United States)
Thomas G. Flohr, Siemens Healthcare GmbH (Germany)
- 4 Cone Beam CT I: New Technologies, Corrections
John Yorkston, Carestream Health, Inc. (United States)
Hilde Bosmans, Katholieke Universiteit Leuven (Belgium)
- 5 Phase Contrast Imaging
Mini Das, University of Houston (United States)
Guang-Hong Chen, University of Wisconsin-Madison (United States)
- 6 Cone Beam CT II: System Optimization, Image Reconstruction
Marc Kachelriess, Deutsches Krebsforschungszentrum (Germany)
Maria Drangova, Robarts Research Institute (Canada)
- 7 CT I: Technology, System Characterization, Applications
Christoph Hoeschen, Otto von Guericke Universität Magdeburg (Germany)
Kirsten Boedeker, Toshiba Medical Research Institute USA, Inc. (United States)
- 8 Detectors
Karim S. Karim, University of Waterloo (Canada)
Rebecca Fahrig, Siemens Healthcare GmbH (Germany) and Stanford University School of Medicine (United States)
- 9 CT II: Image Reconstruction, Artifact Reduction
Joseph W. Stayman, Johns Hopkins University (United States)
Michael Grass, Philips Research (Germany)

- 10 Photon Counting CT I: Instrumentation
Stephen J. Glick, U.S. Food and Drug Administration (United States)
Norbert J. Pelc, Stanford University (United States)

- 11 PET and MR
Jinyi Qi, University of California, Davis (United States)
Christoph Hoeschen, Otto von Guericke Universität Magdeburg (Germany)

- 12 Photon Counting CT II: Spectral Imaging
Taly Gilat-Schmidt, Marquette University (United States)
Norbert J. Pelc, Stanford University (United States)

- 13 New Systems and Technologies
Ingrid S. Reiser, The University of Chicago (United States)
Wei Zhao, Stony Brook Medicine (United States)

- 14 Scatter and Diffraction Imaging
Mini Das, University of Houston (United States)
Guang-Hong Chen, University of Wisconsin-Madison (United States)

- 15 Task Driven Imaging, Observers, Detectability, Phantom Studies
Hee-Joung Kim, Yonsei University (Korea, Republic of)
Anders Tingberg, Lund University (Sweden)

2016 Medical Imaging Award Recipients

Robert F. Wagner Best Student Paper Award

Robert F. Wagner was an active scientist in the SPIE Medical Imaging meeting, starting with the first meeting in 1972 and continuing throughout his career. He ensured that the BRH, and subsequently the CDRH, was a sponsor for the early and subsequent Medical Imaging meetings, helping to launch and ensure the historical success of the meeting. The Robert F. Wagner All-Conference Best Student Paper Award (established 2014) is acknowledgment of his many important contributions to the Medical Imaging meeting and his many important advances to the field of medical imaging.



This award is cosponsored by:



The Medical Image Perception Society

SPIE®

2016 Recipients:

First Place: **MIND Demons for MR-to-CT deformable image registration in image-guided spine surgery** (9786-16)

S. Reaungamornrat, T. De Silva, A. Uneri, Johns Hopkins Univ. (United States), J.-P. Wolinsky, Johns Hopkins Hospital (United States), A. J. Khanna, Johns Hopkins Health Care & Surgery Ctr. (United States), G. Kleinszig, S. Vogt, Siemens Healthcare (Germany), J. L. Prince, J. H. Siewerdsen, Johns Hopkins Univ. (United States)

Second Place: **Design, fabrication, and implementation of voxel-based 3D printed textured phantoms for task-based image quality assessment in CT** (9783-76)

Justin Solomon, Duke Univ. School of Medicine (United States), Alexandre Ba, Institut Univ. de Radiophysique Appliquée (Switzerland), Andrew Diao, Duke Univ. (United States), Joseph Lo, Elianna Bier, Duke Univ. School of Medicine (United States), François Bochud, Institut Univ. de Radiophysique Appliquée (Switzerland), Michael Gehm, Duke Univ. (United States), Ehsan Samei, Duke Univ. School of Medicine (United States)

Conference 9786 Awards

Young Scientist Awards sponsored by Siemens

First Place: **MIND Demons for MR-to-CT deformable image registration in image-guided spine surgery** (9786-16)

S. Reaungamornrat, T. De Silva, A. Uneri, Johns Hopkins Univ. (United States), J.-P. Wolinsky, Johns Hopkins Hospital (United States), A. J. Khanna, Johns Hopkins Health

Care & Surgery Ctr. (United States), G. Kleinszig, S. Vogt, Siemens Healthcare (Germany), J. L. Prince, J. H. Siewerdsen, Johns Hopkins Univ. (United States)

Runner Up: **Image-guided preoperative prediction of pyramidal tract side effect in deep brain stimulation** (9786-29)

C. Baumgarten, Y. Zhao, INSERM (France), LTSI, Univ. de Rennes 1 (France); P. Sauleau, C. Malrain, Ctr. Hospitalier Univ. de Rennes (France); P. Jannin, INSERM (France), LTSI, Univ. de Rennes 1 (France); C. Haegelen, INSERM (France), LTSI (France), Ctr. Hospitalier de Rennes (France)

Runner Up: **Increasing safety of a robotic system for inner ear surgery using probabilistic error modeling near vital anatomy** (9786-51)

Neal P. Dillon, Michael A. Siebold, Jason E. Mitchell, Vanderbilt Univ. (United States), Gregoire S. Blachon, Ramya Balachandran, Vanderbilt Univ. Medical Ctr. (United States), J. Michael Fitzpatrick, Vanderbilt Univ. (United States), Robert J. Webster III, Vanderbilt Univ. Medical Ctr. (United States)

Cum Laude Poster Award

First Place: **Patch-based label fusion for automatic multi-atlas-based prostate segmentation in MR images** (9786-72)

Xiaofeng Yang, Ashesh B. Jani, Peter J. Rossi, Hui Mao, Walter J. Curran, Tian Liu, Winship Cancer Institute, Emory Univ. (United States)