15th International Meeting on Fully Three-Dimensional Image Reconstruction in Radiology and Nuclear Medicine

2–6 June 2019
Philadelphia, PA, USA

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Welcome/Introduction

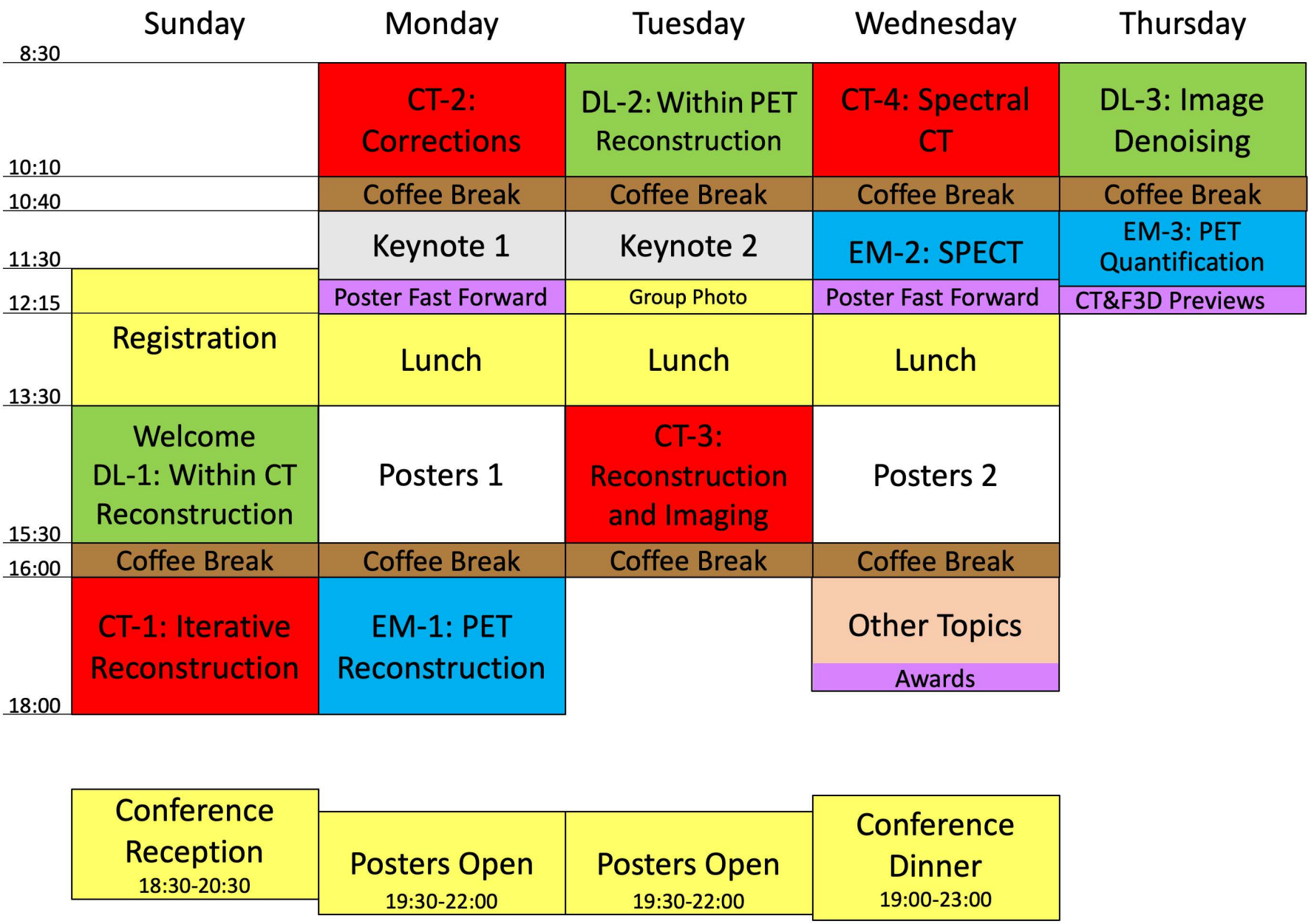
The 15th International Meeting on Fully Three-Dimensional Image Reconstruction in Radiology and Nuclear Medicine will be held June 2-6, 2019 on the campus of the University of Pennsylvania, Philadelphia, PA, USA.

Fully3D is a workshop-style conference focusing on algorithmic and computational methods for reconstruction of multi-dimensional data sets typically acquired using CT, PET, or SPECT. It is well known for bringing together experts in the field in an informal setting for greater depth of discussion on issues pertaining to reconstruction. The fact that nearly all recent major advances in image reconstruction have been first presented at the Fully3D meeting emphasizes the high relevance of this meeting.

We would like to thank the many cooperative participants, who submitted very high-quality abstracts and uploaded the final versions for this volume on time, the many reviewers that are listed in the organizing committee, who provided insightful and timely reviews, our corporate sponsors, and the personnel at SPIE for their extensive cooperation and accommodation in putting this together. We would also like to thank Dr. Stephen Moore, who has advised on the conference, Dr. Peter Noël, who advised on program decisions related to CT, and Drs. Paul Gravel and Yusheng Li, who provided extensive assistance in putting the program together.

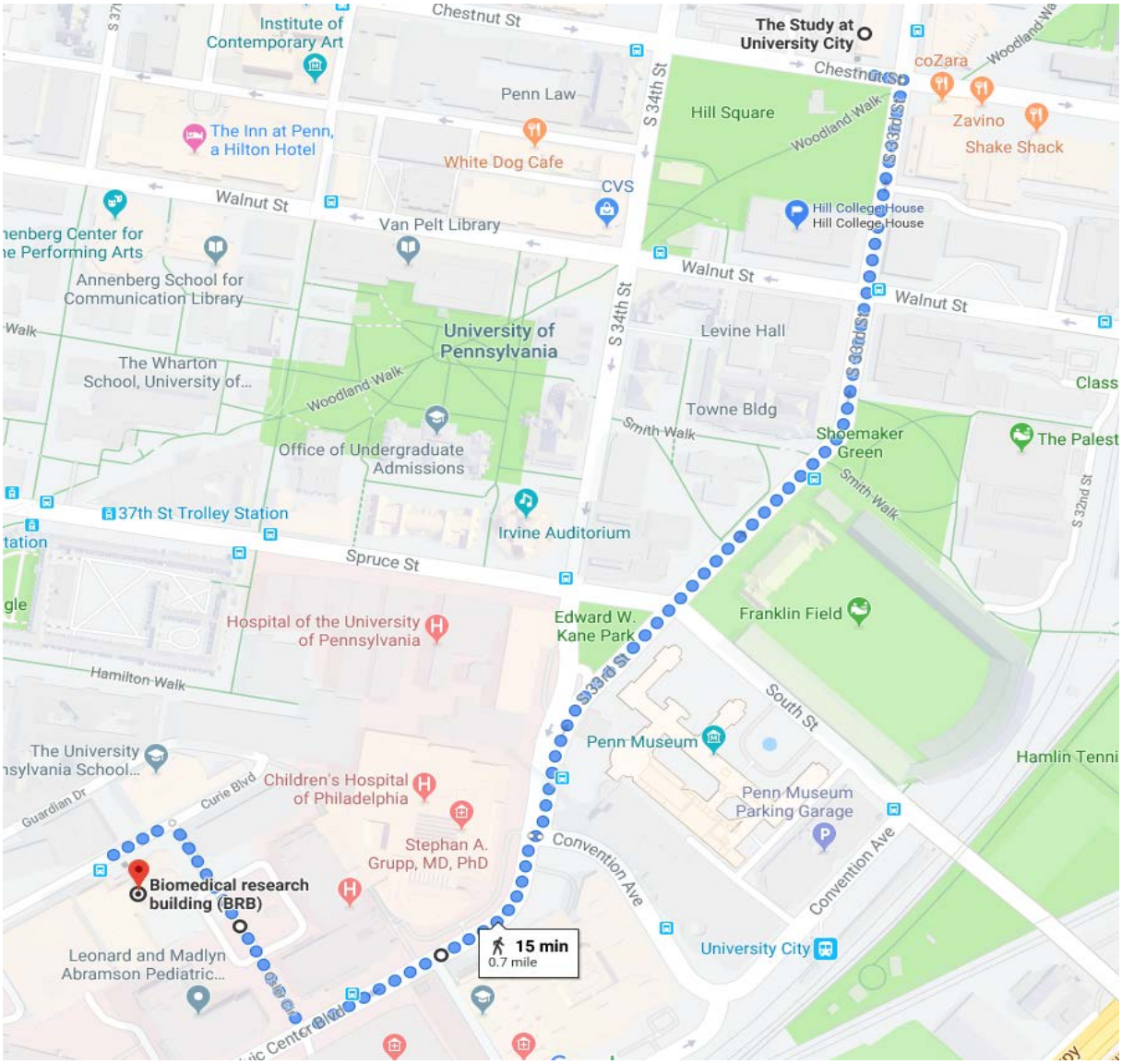
Scott D. Metzler, General Chair
Samuel Matej, Program Chair

Conference Schedule



Walking Map

The Study to BRB via 33rd Street and Osler Circle



DIRECTIONS FROM THE STUDY TO BRB:

- Turn Right onto S 33rd St
- Continue onto Civic Center Blvd
- Turn Right onto Osler Circle
- Revolving entrance doors to BRB are located to the Right of Au Bon Pain

BIOMEDICAL RESEARCH BUILDING:
421 Curie Blvd, Philadelphia, PA 19104

THE STUDY AT UNIVERSITY CITY
20 S 33rd St, Philadelphia, PA 19104

PENN MUSEUM
3260 South St, Philadelphia, PA 19104

Social and Other Events

Conference Reception:

The conference reception will be held on Sunday evening 18:30-20:30 at the Penn Museum, which is located at 33rd and South Street.

Conference Dinner:

The conference dinner will be held at The Waterworks on Wednesday evening 19:00-22:00. Buses will leave from the conference hotel beginning at 18:30. Buses will return guests to the hotel with the last bus departing at 22:45.

Evening Poster Viewing:

Posters will be open to attendees on Monday and Tuesday evening 19:30-22:00.

Free Afternoon:

We have designated the second half of Tuesday afternoon as open for those who wish to visit sites in the city without missing a session.

15th International Meeting on Fully Three-Dimensional Image Reconstruction in Radiology and Nuclear Medicine

Scientific Program Overview:

Sunday, June 2, 2019

F3D	Welcome	13:30-13:50
DL-1	Deep Learning within CT Reconstruction	13:50-15:30
CT-1	Iterative Reconstruction in CT	16:00-18:00

Monday, June 3, 2019

CT-2	CT Corrections	8:30-10:10
K-1	Keynote 1	10:40-11:40
PF-1	Poster Fast Forward 1	11:40-12:15
P-1	Poster Session 1	13:30-15:30
EM-1	PET Reconstruction	16:00-18:00

Tuesday, June 4, 2019

DL-2	Deep Learning within PET Reconstruction	8:30-10:10
K-2	Keynote 2	10:40-12:00
CT-3	CT Reconstruction and Imaging	13:30-15:30

Wednesday, June 5, 2019

CT-4	Spectral CT / Material Decomposition	8:30-10:10
EM-2	SPECT Imaging	10:40-11:40
PF-2	Poster Fast Forward 2	11:40-12:15
P-2	Poster Session 2	13:30-15:30
OT	Other Novel Applications and Approaches	16:00-17:20

Thursday, June 6, 2019

DL-3	Deep Learning for Image Denoising and Characterization	8:30-10:10
EM-3	Quantitative Methods in PET	10:40-12:00
F3D	Future Fully 3D and CT meetings & Conference Closing	12:00-12:20

Scientific Program:

Sunday, June 2, 2019

F3D	**Welcome**	**13:30-13:50**
DL-1	**Deep Learning within CT Reconstruction**	**13:50-15:30**
CT-1	**Iterative Reconstruction in CT**	**16:00-18:00**

F3D Welcome **13:30-13:50**

DL-1 Deep Learning within CT Reconstruction **13:50-15:30**
Marc Kachelrieß, DKFZ (Germany)
Ruben De Man, Stonybrook University (USA)

DL-1.1: A Hierarchical Approach to Deep Learning and Its Application to Tomographic Reconstruction
Lin Fu and Bruno De Man
GE Global Research, Niskayuna, NY, USA

DL-1.2: Quality-Guided Deep Reinforcement Learning for Parameter Tuning in Iterative CT Reconstruction
Chenyang Shen[a,b,c], Min-Yu Tsai[a,b,c], Yesenia Gonzalez[a,b,c], Liyuan Chen[b,c], Steve B. Jiang[b,c], Xun Jia[a,b,c]
[a]*iTORCH Laboratory, University of Texas Southwestern Medical Center, Dallas, TX, USA*
[b]*MAIA Laboratory, University of Texas Southwestern Medical Center, Dallas, TX, USA*
[c]*Department of Radiation Oncology, University of Texas Southwestern Medical Center, Dallas, TX, USA*

DL-1.3: A Machine Learning Approach to Construct a Tissue-Specific Texture Prior from Previous Full-Dose CT for Bayesian Reconstruction of Current Ultralow-Dose CT Images
Yongfeng Gao[a], Jiaxing Tan[a], Yongyi Shi[a], Siming Lu[a,b], Zhengrong Liang[a,b]
[a]*Department of Radiology, State University of New York, Stony Brook, NY, USA*
[b]*Department of BME, State University of New York, Stony Brook, NY, USA*

DL-1.4: Low-dose CT Reconstruction Assisted by a Global CT Image Manifold Prior
Chenyang Shen[a,b,c], Guoyang Ma[a,b,c,d], Xun Jia[a,b,c]
[a]*iTORCH Laboratory, University of Texas Southwestern Medical Center, Dallas, TX, USA*
[b]*MAIA Laboratory, University of Texas Southwestern Medical Center, Dallas, TX, USA*
[c]*Department of Radiation Oncology, University of Texas Southwestern Medical Center, Dallas, TX, USA*
[d]*Westwood High School, Austin, TX, USA*

DL-1.5: Learned Primal-Dual Reconstruction for Dual Energy Computed Tomography with Reduced Dose
Dufan Wu[a], Kyungsang Kim[a], Mannudeep K. Kalra[b], Bruno De Man[c], Quanzheng Li[a]
[a]*Massachusetts General Hospital and Harvard Medical School, Gordon Center for Medical Imaging, Boston, USA*
[b]*Massachusetts General Hospital and Harvard Medical School, Department of Radiology, Boston, MA, USA*
[c]*GE Global Research, Niskayuna, NY, USA*

CT-1 Iterative Reconstruction in CT 16:00-18:00

Xiaochuan Pan, University of Chicago (USA)
Yusheng Li, University of Pennsylvania (USA)

CT-1.1: Statistical Iterative Reconstruction for Spectral Phase Contrast CT

Korbinian Mechlem[a,b], Thorsten Sellerer[a], Julia Herzen[a], Franz Pfeiffer[a,b,c]
[a]*Dpt. of Physics and Munich School of BioEng., Technical University of Munich, Garching, Germany*
[b]*Dpt. of Diagnostic and Interventional Radiology, Technical University of Munich, Munich, Germany*
[c]*Institute for Advanced Study, Technical University of Munich, Garching, Germany*

CT-1.2: Application of Proximal Alternating Linearized Minimization (PALM) and inertial PALM to dynamic 3D CT

Nargiza Djurabekova[a], David Hawkes[a], Guy Long[b], Andrew Goldberg[a,c], Marta Betcke[a]
[a]*University College, London, UK*
[b]*Curvebeam, UK*
[c]*RNOH NHS Trust, UK*

CT-1.3: Convergence Criterion for MBIR Based on the Local Noise-Power Spectrum: Theory and Implementation in a Framework for Accelerated 3D Image Reconstruction with a Morphological Pyramid

A. Sisniega[a], J.W. Stayman[a], S. Capostagno[a], C.R. Weiss[b], T. Ehtiati[c], J.H. Siewerdsen[a,b]
[a]*Department of Biomedical Engineering, Johns Hopkins University, Baltimore, MD, USA*
[b]*Russell H. Morgan Department of Radiology, Johns Hopkins University, Baltimore, MD, USA*
[c]*Siemens Medical Solutions USA, Inc., Imaging & Therapy Systems, Hoffman Estates, IL, USA*

CT-1.4: Contrast-medium Anisotropy-aware Tensor Total Variation Model for Robust Cerebral Perfusion CT Reconstruction with Weak Radiation: a preliminary study

Yuanke Zhang[a,b], Dong Zeng[a], Sui Li[a], Yuting Liao[a], Zhaoying Bian[a], Yongbo Wang[a], Ji He[a], Xiao Jia[a], Deyu Meng[c], Hongbing Lu[b], Jianhua Ma[a]
[a]*Southern Medical University, School of Biomedical Engineering, Guangzhou, China*
[b]*Fourth Military Medical University, School of Biomedical Engineering, Xi'an, China*
[c]*Xi'an Jiaotong University, School of Mathematics and Statistics, Xi'an, China*

CT-1.5: Clinical Study of Soft-Tissue Contrast Resolution in Cone-Beam CT of the Head Using Multi-Resolution PWLS with Multi-Motion Correction and an Electronic Noise Model

P. Wu[a], A. Sisniega[a], J. W. Stayman[a], W. Zbijewski[a], D. Foos[b], X. Wang[b], N. Aygun[b], R. Stevens[d], J.H. Siewerdsen[a,c]
[a]*Department of Biomedical Engineering, Johns Hopkins University, Baltimore, MD, USA*
[b]*Carestream Health, Rochester, NY, USA*
[c]*Department of Radiology, Johns Hopkins University, Baltimore, MD, USA*
[d]*Department of Anesthesiology and Critical Care Medicine, Johns Hopkins University, Baltimore, MD, USA*

CT-1.6: Adaptive Smoothing Algorithms for MBIR in CT Applications

Jingyan Xu[a], Frederic Noo[b]
[a]*Johns Hopkins University, Baltimore, MD*
[b]*University of Utah, Salt Lake City, UT*

Monday, June 3, 2019

CT-2	**CT Corrections**	**8:30-10:10**
K-1	**Keynote 1**	**10:40-11:40**
PF-1	**Poster Fast Forward 1**	**11:40-12:15**
P-1	**Poster Session 1**	**13:30-15:30**
EM-1	**PET Reconstruction**	**16:00-18:00**

CT-2 CT Corrections 8:30-10:10

J. Webster Stayman, Johns Hopkins University (USA)
Zijia Guo, University of Utah (USA)

CT-2.1: Motion Gradients for Epipolar Consistency
Alexander Preuhs[a], Michael Manhart[b], Elisabeth Hoppe[a], Markus Kowarschik[b], Andreas Maier[a]
[a]*Pattern Recognition Lab, Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany*
[b]*Siemens Healthcare GmbH, Forchheim, Germany*

CT-2.2: A Motion Estimation and Compensation Algorithm for 4D CBCT of the Abdomen
Seongjin Yoon[a], Alexander Katsevich[a,b], Michael Frenkel[a], Peter Munro[c], Pascal Paysan[c], Dieter Seghers[c], Adam Strzelecki[c]
[a]*iTomography Corp., Texas Medical Center Innovation Institute, Houston, TX, USA*
[b]*University of Central Florida, Mathematics Department, Orlando, FL, USA*
[c]*Varian Medical Systems Imaging Laboratory, Daettwil, Switzerland*

CT-2.3: A Preliminary Study on Explicit Compensation for the Non-Linear-Partial-Volume Effect in CT
Xin Liu[a,b], Buxin Chen[a], Zheng Zhang[a], Dan Xia[a], Emil Y. Sidky[a], Xiaochuan Pan[a,c]
[a]*Department of Radiology, The University of Chicago, Chicago, IL, USA*
[b]*Key Laboratory of Optoelectronic Devices and Systems of Ministry of Education and Guangdong Province, College of Optoelectronic Engineering, Shenzhen University, Shenzhen, Guangdong, China*
[c]*Department of Radiation and Cellular Oncology, The University of Chicago, Chicago, IL, USA*

CT-2.4: Reduction of Irregular View-Sampling Artifacts in a Stationary Gantry CT Scanner
Alexander Katsevich[a,b], Seongjin Yoon[a], Michael Frenkel[a], Ed Morton[c], William Thompson[c]
[a]*iTomography Corp., Texas Medical Center Innovation Institute, Houston, TX, USA*
[b]*University of Central Florida, Mathematics Department, Orlando, FL, USA*
[c]*Rapiscan Systems, Torrance, CA, USA*

CT-2.5: Reduction of Metal Artefacts in CBCT Caused by Needles Crossing the FOV Border
Dirk Schäfer[a], Christian Haase[a], William van der Sterren[b], Michael Grass[a]
[a]*Philips Research Hamburg, Hamburg, Germany*
[b]*Philips Healthcare, Best, The Netherlands*

K-1 Keynote 1 **10:40-11:40**

Fully3D Tensor Tomography
Grant Gullberg, PhD
Department of Radiology and Biomedical Imaging, University of California, San Francisco, CA, USA

PF-1 Poster Fast Forward 1 **11:40-12:15**

P-1 Poster Session 1 **13:30-15:30**
Scott Metzler, University of Pennsylvania (USA)
Jianan Cui, Massachusetts General Hospital (USA) and Zhejiang University (China)

P-1.1: Analysis of Scatter Artifacts in Cone-Beam CT Due to Scattered Radiation of Metallic Objects
Domenico Iuso, Robert Frysch, Tim Pfeiffer, Georg Rose
Otto von Guericke University, Institute for Medical Engineering, Magdeburg, Germany

P-1.2: CTL: Modular Open-source C++-Library for CT-Simulations
Tim Pfeiffer, Robert Frysch, Richard N. K. Bismark, Georg Rose
Otto von Guericke University Magdeburg, Institute for Medical Engineering, Magdeburg, Germany

P-1.3: Photon-Counting CBCT Iterative Reconstruction for Adaptive Proton Therapy
Takashi Yamaguchi
Sumitomo Heavy Industries, Ltd., Yokosuka, Kanagawa, Japan

P-1.4: A Fast Gradient-Based Algorithm for Image Reconstruction in Inverse Geometry CT Architecture with Sparse Distributed Sources
Frédéric Jolivet, Clarisse Fournier, Andrea Brambilla
CEA, LETI, Univ. Grenoble Alpes, MINATEC Campus, Grenoble, France

P-1.5: Clipping-Induced Bias Correction for Low-Dose CT Imaging
Kevin M. Brown
Philips Healthcare, Cleveland, OH, USA

P-1.6: Multislice Anthropomorphic Model Observer for Detectability Evaluation on Breast Cone Beam CT Images
Minah Han, Jongduk Baek
School of Integrated Technology and Yonsei Institute of Convergence Technology, Yonsei University, Incheon, South Korea

P-1.7: Low Dose Photon Counting CT Reconstruction Bias Reduction with Multi-Energy Alternating Minimization Algorithm
Jingwei Lu[a], Shuangyue Zhang[a], David G. Politte[b], Joseph A. O'Sullivan[a]
[a]*Washington University in St. Louis, Department of Electrical and Systems Engineering, St. Louis, MO, USA*
[b]*Washington University School of Medicine, Electronic Radiology Laboratory, Mallinckrodt Institute of Radiology, St. Louis, MO, USA*

P-1.8: Noise Reduction in Photon-Counting CT Using Frequency-Dependent Optimal Weighting
Mats Persson[a,b], Norbert J. Pelc[a,b,c]
[a]*Department of Bioengineering, Stanford University, Stanford, CA, USA*
[b]*Department of Radiology, Stanford University, Stanford, CA, USA*
[c]*Department of Electrical Engineering, Stanford University, Stanford, CA, USA*

P-1.9: Reduction of Beam Hardening Induced Metal Artifacts Using Consistency Conditions
Shiras Abdurahman, Robert Frysch, Georg Rose
Institute for Medical Engineering and Research Campus STIMULATE, Magdeburg, Germany

P-1.10: Beam Hardening Correction Using Pair-Wise Fan Beam Consistency Conditions
Shiras Abdurahman, Robert Frysch, Georg Rose
Institute for Medical Engineering and Research Campus STIMULATE, Magdeburg, Germany.

P-1.11: Bone Sparsity Model for Computed Tomography Image Reconstruction
Emil Y. Sidky[a], Holly L. Stewart[b], Christopher E. Kawcak[b], C. Wayne McIlwraith[b], Martine C. Duff[c], Xiaochuan Pan[a]
[a]*The University of Chicago, Department of Radiology, Chicago IL, USA*
[b]*Colorado State University, Department of Clinical Sciences, College of Veterinary Medicine and Biomedical Sciences, Fort Collins, CO, USA*
[c]*Savannah River National Laboratory, Aiken, SC, USA*

P-1.12: Edge-Masked CT Image Reconstruction from Limited Data
Victor Churchill, Anne Gelb
Dartmouth College, Department of Mathematics, Hanover, NH, USA

P-1.13: Real-Time GPU Implementation of a Weighted Filtered Back-Projection Algorithm for Stationary Gantry CT Reconstruction
William Thompson[a], Edward Morton[a], Alexander Katsevich[b,c], Seongjin Yoon[b], Michael Frenkel[b]
[a]*Rapiscan Systems, Torrance, CA, USA*
[b]*iTomography Corp., Texas Medical Center Innovation Institute, Houston, TX, USA*
[c]*University of Central Florida, Mathematics Department, Orlando, FL, USA*

P-1.14: Toward Quantitative Short-Scan Cone Beam CT Using FDK with Equal Weighting and Image Domain Shading Correction
Linxi Shi[a], Lei Zhu[b], Adam Wang[a]
[a]*Department of Radiology, Stanford University, Stanford, CA, USA*
[b]*Department of Engineering and Applied Physics, University of Science and Technology of China, Hefei, China*

P-1.15: Double-Helix Trajectory for Image Guided Radiation Therapy: Geometry and Image Reconstruction
Zhicong Yu, Chuanyong Bai, Daniel Gagnon
Imaging Technologies, Accuray Incorporated, Solon, OH, USA

P-1.16: Combination of CT Motion Simulation and Deep Convolutional Neural Networks with Transfer Learning to Recover Agatston Scores
Thomas Wesley Holmes, Kevin Ma, Amir Pourmorteza
Emory University, Department of Radiology and Imaging Sciences, Atlanta, GA, USA

P-1.17: A Sinogram Inpainting Method Based on Generative Adversarial Network for Limited-angle Computed Tomography (Proceedings only)
Ziheng Li, Wenkun Zhang, Linyuan Wang, Ailong Cai, Ningning Liang, Bin Yan, Lei Li
National Digital Switching System Engineering & Technological Research Centre, Zhengzhou, Henan, China

P-1.18: Bone Induced Artifacts Elimination using Two-Step Convolutional Neural Network
Bin Su, Yanyan Liu, Yifeng Jiang, Jianwei Fu, Guotao Quan
United Imaging Healthcare, Shanghai, China

P-1.19: A Deep Learning Approach for Dual-Energy CT Imaging Using Single-Energy CT Data
Wei Zhao[a], Tianling Lv[b], Peng Gao[a], Liyue Shen[a], Xianjin Dai[a], Kai Cheng[a], Mengyu Jia[a], Yang Chen[b], Lei Xing[a]
[a]*Stanford University, Department of Radiation Oncology, Stanford, CA, USA*
[b]*Southeast University, Department of Computer Science and Engineering, Nanjing, China*

P-1.20: Learned Digital Subtraction Angiography (Deep DSA): Method and Application to Lower Extremities
Elias Eulig[a], Joscha Maier[a], Michael Knaup[a], Thomas Koenig[b], Klaus Hörndler[b], and Marc Kachelrieß[a]
[a]*German Cancer Research Center (DKFZ), X-Ray Imaging and Computed Tomography, Heidelberg, Germany*
[b]*Ziem Imaging GmbH, Nürnberg, Germany*

P-1.21: Low-Dose Cerebral CT Perfusion Restoration via Non-Local Convolution Neural Network: Initial Study
Sui Li[a,b], Dong Zeng[a,b], Zhaoying Bian[a,b], Jianhua Ma[a,b]
[a]*Southern Medical University, School of Biomedical Engineering, Guangzhou, China*
[b]*Southern Medical University, Key Lab. of Medical Radiation Imaging & Detection Technology, Guangzhou, China*

P-1.22: Direct Image Reconstruction from Raw Measurement Data Using an Encoding Transform Refinement-and-Scaling Neural Network
William Whiteley[a,b], Jens Gregor[a]
[a]*The University of Tennessee, Knoxville, Tennessee, USA*
[b]*Siemens Molecular Imaging, Knoxville, Tennessee, USA*

P-1.23: A Hybrid Ring Artifact Reduction Algorithm Based on CNN in CT Images
Shaojie Chang, Xi Chen, Jiayu Duan, and Xuanqin Mou
Xi'an Jiaotong University, Institute of Image Processing and Pattern Recognition, Xi'an, Shaanxi, China

P-1.24: GCC-Based Extrapolation of Truncated CBCT Data with Dimensionality-Reduced Extrapolation Models
Daniel Punzet[a,b], Robert Frysch[a,b], Tim Pfeiffer[a,b], Oliver Beuing[b,c], Georg Rose[a,b]
[a]*Otto von Guericke University Magdeburg, Institute for Medical Engineering, Magdeburg, Germany*
[b]*Forschungscampus STIMULATE, Magdeburg, Germany*
[c]*University Hospital Magdeburg, Institute for Neuroradiology, Magdeburg, Germany*

P-1.25: Non-uniformity Correction for Photon-counting Detectors Using Double GANs
Wei Fang[a,b], Liang Li[a,b], Zhiqiang Chen[a,b]
[a]*Department of Engineering Physics, Tsinghua University, Beijing, China*
[b]*Key Laboratory of Particle & Radiation Imaging (Tsinghua University), Ministry of Education, Beijing, China*

P-1.26: Synthesize Monochromatic Images in Spectral CT by Dual-Domain Deep Learning
Chuqing Feng[a,b], Kejun Kang[a,b], Yuxiang Xing[a,b]
[a]*Department of Engineering Physics, Tsinghua University, Beijing, China*
[b]*Key Laboratory of Particle & Radiation Imaging (Tsinghua University), Ministry of Education, Beijing, China*

P-1.27: Green's One-Step-Late Algorithm Does Not Work for SPECT with Attenuation Correction
Larry Zeng[a,b]
[a]*Weber State University, Department of Radiology, Ogden, UT, USA*
[b]*University of Utah, Salt Lake City, UT, USA*

P-1.28: Superiterative Image Reconstruction in PET
Pablo Galve[a], Jose Manuel Udias[a,b], Alejandro Lopez-Montes[a], Joaquin L. Herraiz[a,b]
[a]*Complutense University of Madrid, Faculty of Physical Sci., Nuclear Physics Group and IPARCOS, Madrid, Spain*
[b]*Health Research Institute of the Hospital Clínico San Carlos (IdISSC), Madrid, Spain.*

P-1.29: Reconstruction Performance for Long Axial Field-of-View PET Scanners with Large Axial Gaps
Margaret E. Daube-Witherspoon[a], Varsha Viswanath[b], Suleman Surti[a], Joel S. Karp[a]
[a]*University of Pennsylvania, Department of Radiology, Philadelphia, PA, USA*
[b]*University of Pennsylvania, School of Engineering and Applied Sciences, Philadelphia, PA, USA*

P-1.30: Versatile Regularisation Toolkit for Iterative Image Reconstruction with Proximal Splitting Algorithms
Daniil Kazantsev[a], Edoardo Pasca[b], Mark Basham[a], Martin Turner[b], Matthias J. Ehrhardt[c], Kris Thielemans[d], Benjamin A. Thomas[d], Evgueni Ovtchinnikov[b], Philip J. Withers[e], Alun W. Ashton[a]
[a]*Diamond Light Source Ltd., Scientific Software Dep., Diamond House, Harwell Sci. & Innov. Campus, Didcot, UK*
[b]*Scientific Computing Department, STFC, Rutherford Appleton Laboratory, Didcot, UK*
[c]*Institute for Mathematical Innovation, University of Bath, Bath, UK*
[d]*Institute of Nuclear Medicine, UCL, London, UK*
[e]*The Manchester X-Ray Imaging Facility, School of Materials, The University of Manchester, UK*

P-1.31: Multi-Streaming and Multi-GPU Optimization for a Matched Pair of Projector and Backprojector
Nicolas Georgin[a], Camille Chapdelaine[a,b], Nicolas Gac[b], Ali Mohammad-Djafari[c], Estelle Parra[a]
[a]*Safran Tech, Signal and Information Technologies Department, Magny-Les-Hameaux, France*
[b]*Laboratoire des signaux et systèmes, CNRS, CentraleSupélec-Univ Paris Saclay, Gif-sur-Yvette, France*
[c]*International Science Consulting & Training, France*

P-1.32: Bulk Motion Detection and Correction Using List-Mode Data for Cardiac PET Imaging
Tao Sun, Yoann Petibon, Paul Han, Chao Ma, Sally J. W. Kim, Nathaniel M. Alpert, Georges El Fakhri, Jinsong Ouyang
Gordon Center for Medical Imaging, Department of Radiology, Massachusetts General Hospital, Boston, MA, USA
Department of Radiology, Harvard Medical School, Boston, MA, USA

EM-1 PET Reconstruction 16:00-18:00

Georges El Fakhri, Harvard Medical School, Massachusetts General Hospital (USA)
Zhaoheng Xie, University of California, Davis (USA)

EM-1.1: Simultaneous Micro-PET Imaging of F-18 and I-124 with Correction for Triple-Random Coincidences
Stephen C. Moore, Srilalan Krishnamoorthy, Eric Blankemeyer, Sean D. Carlin, Joel S. Karp, Scott D. Metzler
University of Pennsylvania, Physics & Instrumentation Group, Department of Radiology, Philadelphia, PA, USA

EM-1.2: Application of the Pseudoinverse for Real-Time 3D PET Image Reconstruction
Alejandro López-Montes[a], Pablo Galve[b], Jose Manuel Udias[a,b], Joaquin L. Herraiz[a,b]

[a]*Complutense University of Madrid, Faculty of Physical Sciences, Nuclear Physics Group and IPARCOS, CEI Moncloa, Madrid, Spain*
[b]*Health Research Institute of the Hospital Clínico San Carlos (IdISSC), Madrid, Spain*

EM-1.3: Non-TOF Fourier-Based Analytic Reconstruction from TOF Histo-Projections for High Resolution TOF Scanners
Vladimir Y. Panin[a] and Samuel Matej[b]
[a]*Siemens Medical Solutions USA, Knoxville, TN, USA*
[b]*University of Pennsylvania, Philadelphia, PA, USA*

EM-1.4: Preliminary Investigation of Optimization-Based Image Reconstruction for TOF PET with Sparse Configurations
Zheng Zhang[a], Buxin Chen[a], Amy E. Perkins[b], Chien-Min Kao[a], Emil Y. Sidky[a], Ravindra M. Manjeshwar[b], Xiaochuan Pan[a,c]
[a]*Department of Radiology, The University of Chicago, Chicago, IL, USA*
[b]*Philips Healthcare, USA, Cleveland, OH, USA*
[c]*Department of Radiation & Cellular Oncology, The University of Chicago, Chicago, IL, USA*

EM-1.5: Rapid Construction of System Response Matrix Based on Geometric Symmetries for a Quad-head PET System
Jian Cheng, Fanzhen Meng, Yu Shi, Ye Mao, Chenfeng Li, Jimin Liang, Shouping Zhu
Engineering Research Center of Molecular and Neuro Imaging of Ministry of Education, and School of Life Science and Technology, Xidian University, Xi'an, China

EM-1.6: Extension of the Emission EM Look-Alike Algorithms to Bayesian Algorithms
Larry Zeng[a,b]
[a]*Weber State University, Department of Radiology, Ogden, UT, USA*
[b]*University of Utah, Salt Lake City, UT, USA*

Tuesday, June 4, 2019

DL-2	**Deep Learning within PET Reconstruction**	**8:30-10:10**
K-2	**Keynote 2**	**10:40-12:00**
CT-3	**CT Reconstruction and Imaging**	**13:30-15:30**

DL-2 Deep Learning within PET Reconstruction 8:30-10:10

Johan Nuyts, KU Leuven (Belgium)
Arkadiusz Sitek, IBM Watson Health Imaging (USA)

DL-2.1: MAPEM-Net: An Unrolled Neural Network for Fully 3D PET Image Reconstruction
Kuang Gong[a], Dufan Wu[a], Kyungsang Kim[a], Jaewon Yang[b], Tao Sun[a], Georges El Fakhri[a], Youngho Seo[b], Quanzheng Li[a*]
[a]Gordon Center for Medical Imaging, Massachusetts General Hospital and Harvard Med. School, Boston, MA USA
[b]Physics Research Laboratory, Department of Radiology and Biomedical Imaging, University of California, San Francisco, CA, USA

DL-2.2: Generative Adversarial Networks Based Regularized Image Reconstruction for PET
Zhaoheng Xie, Reheman Baikejiang, Kuang Gong, Xuezhu Zhang, Jinyi Qi
Department of Biomedical Engineering, University of California, Davis, CA, USA

DL-2.3: Motion Correction of Respiratory-gated PET Image Using Deep Learning Based Image Registration Framework
Tiantian Li[a], Mengxi Zhang[a], Wenyuan Qi[b], Evren Asma[b], Jinyi Qi[a]
[a]Department of Biomedical Engineering, University of California, Davis, USA
[b]Canon Medical Research USA, Inc., Vernon Hills, IL, USA

DL-2.4: Direct Patlak Reconstruction from Dynamic PET Using Unsupervised Deep Learning
Kuang Gong[a], Ciprian Catana[b], Jinyi Qi[c], Quanzheng Li[a]
[a]Gordon Center for Medical Imaging, Massachusetts General Hospital and Harvard Med. School, Boston, MA USA
[b]Martinos Center for Biomedical Imaging, Department of Radiology, Massachusetts General Hospital and Harvard Medical School, Boston, MA, USA
[c]Department of Biomedical Engineering, University of California, Davis, Davis, CA, USA

DL-2.5: On the Impact of Input Feature Selection in Deep Scatter Estimation for Positron Emission Tomography
Yannick Berker, Marc Kachelrieß
German Cancer Research Center (DKFZ), Heidelberg, Germany

K-2 Keynote 2 10:40-12:00

Challenges in Clinical CT
Harold Litt, MD
University of Pennsylvania, Philadelphia, PA, USA

Oncologic Applications of 3D PET
David Mankoff, MD, PhD
University of Pennsylvania, Philadelphia, PA, USA

CT-3 CT Reconstruction and Imaging 13:30-15:30
Tobias Lasser, Technical University of Munich (Germany)
Grace Gang, Johns Hopkins University (USA)

CT-3.1: Theoretically-Exact Filtered-Backprojection Reconstruction from Real Data on the Line-Ellipse-Line Trajectory
Zijia Guo[a,c], Günter Lauritsch[b], Andreas Maier[c], Frédéric Noo[a]
[a]*Dept. of Radiology, University of Utah, Salt Lake City, Utah, USA*
[b]*Siemens Healthcare, GmbH, Forchheim, Germany*
[c]*Pattern Recognition Lab, University of Erlangen-Nu ̈rnberg, Germany*

CT-3.2: Optimization of Cone-Beam CT Scan Orbits for Cervical Spine Imaging
Chumin Zhao[a], Magdalena Herbst[b], Sebastian Vogt[b], Ludwig Ritschl[b], Steffen Kappler[b], Jefferey H. Siewerdsen[a,c], Wojciech Zbijewski[a]
[a]*Department of Biomedical Engineering, Johns Hopkins University, Baltimore, MD, USA*
[b]*Siemens Healthineers, Forchheim, Germany*
[c]*Russell H. Morgan Department of Radiology, Johns Hopkins University, Baltimore, MD, USA*

CT-3.3: Low Frequency Recovery in 16cm Coverage Axial Multi-Detector Computed Tomography
Stanislav Zabic[a], ZhicongYu[a], WenjingCao[b], LuWang[b]
[a]*UIH America, Inc., ASDC, Cleveland, Ohio, USA, *Formerly*
[b]*United Imaging Healthcare, Shanghai, China*

CT-3.4: Performance Analysis for Nonlinear Tomographic Data Processing
Grace J. Gang, Xueqi Guo, J. Webster Stayman
Johns Hopkins University, Department of Biomedical Engineering, Baltimore, MD, USA

CT-3.5: Simulating Lower-Dose Scans from an Available CT Scan
Masoud Elhamiasl, Johan Nuyts
Nuclear Medicine and Molecular Imaging, Department of Imaging and Pathology, KU Leuven, Leuven, Belgium

CT-3.6: Optimized Conversion from CT Numbers to Proton Relative Stopping Power Based on Proton Radiography and Scatter Corrected Cone-Beam CT Images
Nils Krah, Simon Rit
University Lyon, CREATIS, Lyon, France

Wednesday, June 5, 2019

CT-4	**Spectral CT / Material Decomposition**	**8:30-10:10**
EM-2	**SPECT Imaging**	**10:40-11:40**
PF-2	**Poster Fast Forward 2**	**11:40-12:15**
P-2	**Poster Session 2**	**13:30-15:30**
OT	**Other Novel Applications and Approaches**	**16:00-17:20**

CT-4 Spectral CT / Material Decomposition 8:30-10:10

Peter Noël, University of Pennsylvania (USA)
Korbinian Mechlem, Technical University of Munich (Germany)

CT-4.1: Local Response Prediction in Model-Based CT Material Decomposition
Wenying Wang, Steven Tilley II, Matthew Tivnan, J. Webster Stayman
Department of Biomedical Engineering, Johns Hopkins University, Baltimore MD, USA

CT-4.2: Image-domain Multi-Material Decomposition Using a Union of Cross-Material Models
Zhipeng Li[a], Saiprasad Ravishankar[b], Yong Long[a]
[a]University of Michigan – Shanghai Jiao Tong University Joint Institute, Shanghai, China
[b]Theoretical Division, Los Alamos National Laboratory, Los Alamos, NM, USA

CT-4.3: Optimized Spatial-Spectral CT for Multi-Material Decomposition
Matthew Tivnan, Wenying Wang, Steven Tilley, Jeffrey H. Siewerdsen, J. Webster Stayman
Department of Biomedical Engineering, Johns Hopkins University, 720 Rutland Ave., Baltimore MD, USA

CT-4.4: Photon-Counting Spectral CT with De-noised Principal Component Analysis
Huiqiao Xie[a], Thomas Thuering[b], Yufei Liu[c], Wenting Long[a], Xiangyang Tang[a]
[a]Department of radiology and imaging sciences, Emory University School of Medicine, Atlanta, GA, US
[b]DECTRIS Ltd., Switzerland
[c]SinoVision Technologies (Beijing) Co. Ltd., Beijing, China

CT-4.5: Known-Component Model-Based Material Decomposition for Dual Energy Imaging of Bone Composition in the Presence of Metal Hardware
S. Z. Liu, S. Tilley, Q. Cao, J. H. Siewerdsen, J. W. Stayman, W. Zbijewski
Department of Biomedical Engineering, Johns Hopkins University, Baltimore, MD, USA

EM-2 SPECT Imaging 10:40-11:40

Michel Defrise, Vrije Universiteit Brussel (Belgium)
Paul Gravel, University of Pennsylvania (USA)

EM-2.1: Investigation of a Monte Carlo Simulation and an Analytic-Based Approach for Modeling the System Response for Clinical ^{123}I Brain SPECT Imaging

Benjamin Auer[a], Navid Zeraatkar[a], Jan De Beenhouwer[b], Kesava Kalluri[a], Philip H. Kuo[c], Lars R. Furenlid[c], and Michael A. King[a]
[a]*University of Massachusetts Medical School, Department of Radiology, Worcester, MA, USA*
[b]*University of Antwerp, imec-VisionLab, Antwerp, Belgium*
[c]*University of Arizona, Department of Medical Imaging, Tucson, AZ, USA*

EM-2.2: Preliminary Investigation of AdaptiSPECT-C Designs with Square or Square and Hexagonal Detectors Employing Direct and Oblique Apertures

Kesava Kalluri[a], Navid Zeraatkar[a], Benjamin Auer[a], Philip H. Kuo[b], Lars R. Furenlid[b], Michael A. King[a]
[a]*University of Massachusetts Medical School, Department of Radiology, Worcester, MA, USA*
[b]*University of Arizona, College of Optical Sciences, Tucson, AZ, USA*

EM-2.3: GPU-Accelerated Generic Analytic Simulation and Image Reconstruction Platform for Multi-Pinhole SPECT Systems

Navid Zeraatkar[a], Benjamin Auer[a], Kesava Kalluri[a], Arda Könik[a], Lars R. Furenlid[b], Philip Kuo[b], and Michael A. King[a]
[a]*University of Massachusetts Medical School, Department of Radiology, Worcester, MA, USA*
[b]*University of Arizona, Department of Medical Imaging, Tucson, AZ, USA*

PF-2 Poster Fast Forward 2 11:40-12:15

P-2 Poster Session 2 13:30-15:30

Samuel Matej, University of Pennsylvania (USA)
Benjamin Auer, University of Massachusetts Medical School (USA)

P-2.1: Truncation Artifacts Caused by the Patient Table in Polyenergetic Statistical Reconstruction on Real C-Arm CT Data

Richard N.K. Bismark and Georg Rose
University of Magdeburg, Institute for Medical Engineering, Magdeburg, Germany

P-2.2: K-Edge Imaging Visualization of Multi-Material Decomposition in CT Using Virtual Mono-Energetic Images

Kevin C. Ma, Thomas W. Holmes, Amir Pourmorteza
Emory University, Department of Radiology and Imaging Sciences, Atlanta, GA, USA

P-2.3: Scatter Correction Using Pair-Wise Fan Beam Consistency Conditions

Shiras Abdurahman, Robert Frysch, Georg Rose
Institute for Medical Engineering and Research Campus STIMULATE, Magdeburg, Germany

P-2.4: Enhanced Spatial Resolution in Cone Beam X-Ray Luminescence Computed Tomography Using Primal-Dual Newton Conjugate Gradient Method
Peng Gao, Junyan Rong, Tianshuai Liu, Hongbing Lu
Fourth Military Medical University, Xi'an, China

P-2.5: Linear Interpolation Based Structure Preserved Metal Artifact Reduction in X-Ray Computed Tomography
Huisu Yoon, Kyoung-Yong Lee
Samsung Electronics, Bundang-gu, Seongnam-si, Gyeonggi-do, Republic of Korea

P-2.6: Curvature Constraint Based Image Reconstruction for Limited-Angle Computed Tomography
Xiao Xue[a,b], Shusen Zhao[a,b], Yunsong Zhao[a,b], Peng Zhang[a,b]
[a]*Capital Normal University, School of Mathematical Sciences, Beijing, China*
[b]*Capital Normal University, Beijing Advanced Innovation Center for Imaging Technology, Beijing, China*

P-2.7: Fast Ordered Subsets Chambolle-Pock Algorithm for CT Reconstruction
Xiaojuan Deng[a,b], Wenbin Xu[a,b], Hongwei Lia[b]
[a]*School of Mathematical Sciences, Capital Normal University, Beijing, China*
[b]*Beijing Advanced Innovation Center for Imaging Technology, Capital Normal University, Beijing, China*

P-2.8: Attenuation Correction for X-Ray Fluorescence Computed Tomography (XFCT) Utilizing Transmission CT Image
Siyuan Zhang[a,b], Liang Li[a,b], Zhiqiang Chena[b]
[a]*Tsinghua University, Department of Engineering Physics, Beijing, China*
[b]*Tsinghua University, Ministry of Education, Key Laboratory of Particle and Radiation imaging, Beijing, China*

P-2.9: Multi-Energy Computed Tomography Reconstruction Using an Average Image Induced Low-Rank Tensor Decomposition with Spatial-Spectral Total Variation Regularization
Lisha Yao[a,b], Dong Zeng[a,b], Zhaoying Bian[a,b], Jianhua Ma[a,b]
[a]*Southern Medical University, School of Biomedical Engineering, Guangzhou, China*
[b]*Southern Medical University, Guangzhou Key Laboratory of Medical Radiation Imaging and Detection Technology, Guangzhou, China*

P-2.10: Statistical Iterative Material Image Reconstruction with Patch Based Enhanced 3DTV Regularization for Photon Counting CT
Danyang Li[a,b], Sui Li[a,b], Dong Zeng[a,b], Zhaoying Bian[a,b], Jianhua Ma[a,b]
[a]*Southern Medical University, School of Biomedical Engineering, Guangzhou, China*
[b]*Southern Medical University, Guangzhou Key Laboratory of Medical Radiation Imaging and Detection Technology, Guangzhou, China*

P-2.11: Reducing High-Density Object Artifacts with Iterative Image Reconstruction in Digital Tomosynthesis
Hyeongseok Kim[a], Jongha Lee[a,b], Seungryong Cho[a]
[a]*KAIST, Department of Nuclear and Quantum Engineering, Daejeon, Republic of Korea*
[b]*Samsung Electronics, Medical Imag. R&D Group, Health & Medical Equip. Business, Suwon, Republic of Korea*

P-2.12: Artifacts Reduction Method in 4DCBCT Based on a Weighted Demons Registration Framework
Shaohua Zhi[a], Bangliang Jiang[a], Marc Kachelrieß[b], Xuanqin Mou[a]
[a]*The Institute of Image Processing and Pattern Recognition, Xi'an Jiaotong University, Xi'an, Shaanxi, China*
[b]*Division of X-Ray Imaging and CT, German Cancer Research Center (DKFZ), Heidelberg, Germany*

P-2.13: A Field of View Based Metal Artifact Reduction Method with the Presence of Data Truncation
Seungwon Choi, Seunghyuk Moon, Jongduk Baek
School of Integrated Technology and Yonsei Institute of Convergence Technology, Yonsei University, Incheon, South Korea

P-2.14: Inverse-Geometry CT with Linearly Distributed Source and Detector: Stationary Configuration and Direct Filtered-Backprojection Reconstruction
Tao Zhang[a,b], Yuxiang Xing[a,b], Hewei Gao[a,b], Zhiqiang Chen[a,b], Li Zhang[a,b]
[a]*Department of Engineering Physics, Tsinghua University, Beijing, China*
[b]*Key Laboratory of Particle & Radiation Imaging (Tsinghua University), Ministry of Education, Beijing, China*

P-2.15: Efficient Nullspace-Constrained Modifications of Incompletely Sampled CT Images
Robert Frysch, Sebastian Bannasch, Vojtěch Kulvait, Georg Rose
Otto von Guericke University Magdeburg, Institute for Medical Engineering, Magdeburg, Germany

P-2.16: Dynamic Angle Selection for Few-View X-Ray Inspection of CAD Based Objects
Alice Presenti, Jan Sijbers, Jan De Beenhouwer
University of Antwerp, imec-Vision Lab, Department of Physics, Antwerp, Belgium

P-2.17: Non-Uniformity Correction for MARS Photon-Counting Detectors
Matthew Getzin[a], Mengzhou Li[a], David Rundle[b], Anthony P. Butler[b], Ge Wang[a]
[a]*Rensselaer Polytechnic Institute, Department of Biomedical Engineering, Troy, NY, USA*
[b]*MARS Bioimaging Ltd., Christchurch, NZ*

P-2.18: Evaluation of Image Quality of a Deep Learning Image Reconstruction Algorithm
Meghan Yue, Jie Tang, Brian E. Nett, Jiang Hsieh, Roy Nilsen, Jiahua Fan
GE Healthcare, Waukesha, WI, USA

P-2.19: A Novel Transfer Learning Framework for Low-Dose CT
Hongming Shan, Uwe Kruger, Ge Wang
Biomedical Imaging Center, Dep. of Biomedical Engineering, Rensselaer Polytechnic Institute, Troy, NY, USA

P-2.20: Quadratic Autoencoder for Low-Dose CT Denoising
Fenglei Fan, Hongming Shan, Ge Wang
Rensselaer Polytechnic Institute, Biomedical Imaging Center, Dep. of Biomedical Engineering, Troy, NY, USA

P-2.21: Reconstructing Interior Transmission Tomographic Images with an Offset-Detector Using Deep Neural Network
Hoyeon Lee, Hyeongseok Kim, Seungryong Cho
Korea Advanced Institute of Science and Technology, Dep. of Nuclear and Quantum Engineering, Daejeon, Korea

P-2.22: Information Retrieval in X-Ray Imaging with Grating Interferometry Using Convolution Neural Network
Chengpeng Wu[a,b], Yuxiang Xing[a,b], Hewei Gao[a,b], Li Zhang[a,b], Xinbin Li[a,b], Shengping Wang[c], Weijun Peng[c]
[a]*Tsinghua University, Department of Engineering Physics, Haidian District, Beijing, China*
[b]*Key Laboratory of Particle & Radiation Imaging (Tsinghua University) of Ministry of Education, Beijing, China*
[c]*Fudan University Shanghai, Cancer Center, Shanghai, China*

P-2.23: A Spatial Information Incorporation Method for Irregular Sampling CT Based on Deep Learning
Zaifeng Shi[a], Zhongqi Wang[a], Huilong Li[a], Jinzhuo Li[a], Qingjie Cao[b]
[a]*School of Microelectronics, Tianjin University, Tianjin China*
[b]*School of Mathematical Sciences, Tianjin Normal University, Tianjin, China*

P-2.24: Projection Super-resolution Based on Convolutional Neural Network for Computed Tomography (Proceedings only)
Chao Tang, Wenkun Zhang, Ziheng Li, Ailong Cai, Linyuan Wang, Lei Li, Ningning Liang, Bin Yan
National Digital Switching System Engineering & Technological Research Centre, Henan, China

P-2.25: Medical (CT) Image Generation with Style
Arjun Krishna, Klaus Mueller
Stony Brook University, Computer Science Department, Stony Brook, USA

P-2.26: Awake Preclinical Brain PET Imaging Based on Point Sources
Fernando Arias-Valcayo[a], Joaquín L. Herraiz[a,b], P. Galve[a], J. J. Vaquero[c,d], M. Desco[d], José M. Udías[a,b]
[a]*Complutense University of Madrid, Faculty of Physical Sci., Nuclear Physics Group and IPARCOS, Madrid, Spain*
[b]*Health Research Institute of the Hospital Clínico San Carlos (IdSSC), Madrid, Spain*
[c]*Universidad Carlos III de Madrid, Departamento de Bioingeniería e Ingeniería Aerospacial, Madrid, Spain*
[d]*Instituto de Investigación Sanitaria del Hospital Gregorio Marañón, Unidad de Medicina y Cirugía Experimental, Madrid, Spain*

P-2.27: EM-ML Algorithm Based on Continuous-to-Continuous Model for PET
Robert Cierniak[a], Piotr Dobosz[a], Andrzej Grzybowski[b]
[a]*Czestochowa University of Technology, Institute of Computational Intelligence, Czestochowa, Poland*
[b]*Czestochowa University of Technology, Institute of Mathematics, Czestochowa, Poland*

P-2.28: Parametric Image Estimation Using Residual Simplified Reference Tissue Model
Kyungsang Kim[a], Young Don Son[b], Jong-Hoon Kim[b], Quanzheng Li[a]
[a]*Massachusetts General Hospital and Harvard Medical School, Boston, MA, USA*
[b]*Gachon University, Incheon, South Korea*

P-2.29: Virtual Clinical Trials Using 3D PET Imaging (Presented on Monday)
Paul E Kinahan[a], Darrin Byrd[a], Kristen Wangerin[b], Mark Muzi[a], Lanell Peterson[a], Brenda Kurland[c], Jennifer Specht[a,d], Hannah Linden[a,d]
[a]*University of Washington, Seattle, WA, USA*
[b]*GE Healthcare, Waukesha, WI, USA*
[c]*University of Pittsburgh, Seattle, WA, USA*
[d]*Seattle Cancer Care Alliance, Seattle, WA, USA*

P-2.30: Fiber Assignment by Continuous Tracking for Parametric Fiber Reinforced Polymer Reconstruction
Tim Elberfeld, Jan De Beenhouwer, Jan Sijbers
imec-VisionLab, Dept. of Physics, University of Antwerp, Antwerp, Belgium

P-2.31: elsa - An Elegant Framework for Tomographic Reconstruction
Tobias Lasser, Maximilian Hornung, David Frank
Technical University of Munich, Department of Informatics, Computer Aided Medical Procedures, Germany

P-2.32: Spectral CT reconstruction algorithm based on Adaptive tight frame wavelet and total variation (Proceedings only)
Huihua Kong[a,b], Lei Lei[a,b], Ping Chen[b]
[a]*School of Science, North University of China, Taiyuan, China*
[b]*Shanxi Key Laboratory of Signal Capturing & Processing, North University of China, China*

P-2.33: Study on Spectral CT Material Decomposition via Deep Learning (Proceedings only)
Xiaochuan Wu, Peng He, Zourong Long, Pengcheng Li, Biao Wei and Peng Feng
Chongqing University, The Key Lab of Optoelectronic Technology and Systems of the Education Ministry of China, Chongqing, China

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OT Other Novel Applications and Approaches 16:00-17:20

Stephen Moore, University of Pennsylvania (USA)
Fatma Terzioglu, University of Chicago (USA)

OT-1: Exact Inversion of an Integral Transform Arising in Passive Detection of Gamma-Ray Sources with a Compton Camera
Fatma Terzioglu
University of Chicago, Department of Statistics, Chicago, IL, USA

OT-2: Task-driven Acquisition in Anisotropic X-Ray Dark-Field Tomography
Theodor Cheslerean Boghiu[a], Franz Pfeiffer[b,c], Tobias Lasser[a]
[a]*Technical University of Munich, Dept. of Informatics, Computer Aided Medical Procedures, Germany*
[b]*Technical University of Munich, Dept. of Physics and School of BioEngineering, Germany*
[c]*Technical University of Munich, Klinikum rechts der Isar, Dept. of Diagnostic and Interventional Radiol., Germany*

OT-3: A Step Toward a Clinically Viable ABI Phase-Contrast Imaging: Double Emission Line Artifacts Correction
Oriol Caudevilla, Wei Zhou, Jovan G Brankov
Illinois Institute of Technology, Medical Imaging Research Center, ECE, Chicago, USA

OT-4: Registration Methods for Augmented Reality-Assisted 3D Image-Guided Interventions
Brian Park MD, Gregory Nadoski MD, Stephen Hunt MD, PhD, Terence Gade MD, PhD
University of Pennsylvania, Penn Image-Guided Interventions Lab, Dept of Radiology, Philadelphia, PA, USA

Thursday, June 6, 2019

DL-3	**Deep Learning for Image Denoising and Characterization**	**8:30-10:10**
EM-3	**Quantitative Methods in PET**	**10:40-12:00**
F3D	**Future Fully 3D and CT meetings & Conference Closing**	**12:00-12:20**

DL-3 Deep Learning for Image Denoising and Characterization 8:30-10:10

Jinyi Qi, University of California, Davis (USA)
Yannick Berker, German Cancer Research Center (Germany)

DL-3.1: Feature aware deep learning CT image reconstruction
Masakazu Matsuura[a], Jian Zhou[a], Naruomi Akino[b], Zhou Yu[a]
[a]*Canon Medical Research USA, Inc., Vernon Hills, IL, USA*
[b]*Canon Medical Systems Corporation, Ohtawara, Tochigi, JAPAN*

DL-3.2: Low-dose CT Image Denoising without High-dose Reference Images
Nimu Yuan[a,b], Jian Zhou[c], Jinyi Qi[b]
[a]*Northeastern University, Sino-Dutch Biomedical and Information Engineering School Shenyang, China*
[b]*University of California, Davis, Davis, CA, USA*
[c]*Canon Medical Research USA, Vernon Hills, IL, USA*

DL-3.3: Deep Learning Based Adaptive Filtering for Projection Data Noise Reduction in X-Ray Computed Tomography
Tzu-Cheng Lee, Jian Zhou, Zhou Yu
Canon Medical Research USA, Inc. Vernon Hills, IL, USA

DL-3.4: Population and Individual Information Guided PET Image Denoising Using Deep Neural Network
Jianan Cui[a,b], Kuang Gong[c], Ning Guo[c], Chenxi Wu[b], Kyungsang Kim[c], Huafeng Liu[a], Quanzheng Li[c]
[a]*State Key Laboratory of Modern Optical Instrumentation, College of Optical Science and Engineering, Zhejiang University, Hangzhou, China*
[b]*Department of Radiology, Massachusetts General Hospital, Boston, MA, USA*
[c]*Gordon Center for Medical Imaging, Massachusetts General Hospital and Harvard Med. School, Boston, MA, USA*

DL-3.5: Comparison of Deep Learning and Human Observer Performance for Lesion Detection and Characterization
Ruben De Man[a], Grace J. Gang[b], Xin Li[c], Ge Wang,[d]
[a]*Stony Brook University, Department of Biochemistry & Cell Biology, Stony Brook, NY, USA*
[b]*Johns Hopkins University, Department of Biomedical Engineering, Baltimore, MD, USA*
[c]*GE Global Research, Radiation Imaging Sciences, Niskayuna, NY, USA*
[d]*Rensselaer Polytechnic Institute, Department of Biomedical Engineering, Troy, NY, USA*

EM-3 Quantitative Methods in PET 10:40-12:00

Margaret Daube-Witherspoon, University of Pennsylvania (USA)
Kuang Gong, Massachusetts General Hospital (USA)

EM-3.1: A Linear Estimator for Timing Calibration in Time-Of-Flight PET

Michel Defrise
Vrije Universiteit Brussel, Department of Nuclear Medicine, Brussels, Belgium

EM-3.2: Joint Reconstruction of Activity and Attenuation with Autonomous Scaling for Time-of-Flight PET

Yusheng Li, Samuel Matej, Joel S. Karp
University of Pennsylvania, Physics and Instrumentation Group, Department of Radiology, Philadelphia, PA, USA

EM-3.3: Dynamic PET Imaging with the Generalized Method of Moments

Joaquin L. Herraiz[a,b], Miguel Angel Morcillo[c], Jose Manuel Udias[a,b]
[a]*Complutense University of Madrid, Faculty of Physical Sciences, Nuclear Physics Group and IPARCOS, CEI Moncloa, Madrid, Spain*
[b]*Health Research Institute of the Hospital Clínico San Carlos (IdISSC), Madrid, Spain*
[c]*Research Centre for Energy, Environment and Technology - CIEMAT, Madrid, Spain*

EM-3.4: Multiresolution Spatiotemporal Mechanical Model of The Heart as a Prior to Constrain the solution for 4D Models of the Heart

Grant T. Gullberg[a], Alexander I. Veress[b,c], Uttam M. Shrestha[a], Jing Liu[a], Karen Ordovas[a], W. Paul Segars[d], Youngho Seo[a]
[a]*Department of Radiology and Biomedical Imaging, University of California, San Francisco, CA, USA*
[b]*Department of Mechanical Engineering, University of Washington, Seattle, WA, USA*
[c]*Numeric Design Engineering, LLC. Seattle, WA, USA*
[d]*Department of Radiology, Duke University, Raleigh-Durham, NC, USA*

F3D Future Fully 3D and CT meetings & Conference Closing 12:00-12:20

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