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Deep Learning for CT</td></tr>
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Model based iterative reconstruction I</td></tr>
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Novel data acquisition concepts</td><td rowspan="3">13:20 – 14:00
Session T4
Poster highlights

14:00 – 16:20
Poster session

CBCT, Dynamic CT, Data truncation & consistency, Industrial CT, Phase contrast & fluorescence CT

Coffee served at 15:00</td><td rowspan="3">13:20 – 14:00
Session W3
Poster highlights

14:00 – 16:20
Poster session

Analytical methods, MBIR, Deep learning, Spectral CT

Coffee served at 15:00</td></tr>
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Artifacts and noise removal methods</td></tr>
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Limited data CT</td><td>16:30 – 17:50
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Session M1: Model-based iterative reconstruction I
Moderated by TBA

pDART: Discrete algebraic reconstruction using a polychromatic forward model
Six N, De Beenhouwer J, Sijbers J
University of Antwerp, Belgium

Joint image reconstruction for multiphase CT
Xu J, Noo F
Johns Hopkins University, MD, USA; University of Utah, UT, USA

Statistical image reconstruction with sample-based beam-hardening compensation for X-ray CT
Martinez C, Fessler J A, Desco M, Abella M
Carlos III University of Madrid, Spain; University of Michigan, MI, USA

Model based iterative reconstruction with spatially adaptive sinogram weights for wide-cone cardiac CT
Ziabari A, Ye D H, Fu L, Srivastava S, Sauer K D, Thibault J-B, Bouman C A
Purdue University, IN, USA; GE Healthcare Technologies, WI, USA; GE Global Research, NY, USA; University of Notre Dame, IN, USA

A memory-efficient algorithm for large-scale sparsity regularized image reconstruction
Ongie G, Murthy N, Balzano L, Fessler J A
University of Michigan, MI, USA

Session M2: The four best scored abstracts
Moderated by TBA

First experimental validation of a novel concept for dynamic beam attenuation in CT
Huck S M, Parodi K, Stierstorfer K
Ludwig Maximilians University of Munich, Germany; Siemens Healthcare, GmbH, Germany

Detectability indices in anisotropic X-ray dark-field tomography
Boghiu T C, Sharma Y, Pfeiffer F, Lasser T
Technical University of Munich, Germany

Simultaneous reconstruction and separation in a spectral CT framework with a proximal variable metric algorithm
Tairi S, Anthoine S, Morel C, Boursier Y
Aix Marseille University, France

Consistency of fanbeam projections of a translating object along an arc of a circle
Boulier T, Clackdoyle R, Lesaint J, Desbat L
Grenoble Alpes University, France

Session M3: Novel data acquisition concepts
Moderated by TBA

Design and evaluation of a prototype high–throughput micro–CT system for in–vivo small animal imaging
Kuntz J, Funck C, Maier J, Kachelrieß M, Sawall S
German Cancer Research Center (DKFZ), Germany

Performance evaluation of a piecewise-linear dynamic attenuator
Shunhavanich P, Pelc N J
Stanford University, CA, USA

Implementation and assessment of dynamic fluence field modulation with multiple aperture devices
Gang G J, Mao A, Siewerdsen J H, Stayman J W
Johns Hopkins University, MD, USA

First multislit collimator prototype for SparseCT: design, manufacturing and initial validation

Chen B, Muckley M J, Sodickson A D, O'Donnell T, Berner M, Allmendinger T, Stierstorfer K, Flohr T, Schmidt B, Sodickson D, Otazo R

New York University, NY, USA; Harvard Medical School, MA, USA; Siemens Healthcare GmbH, Germany

Reconstruction of reduced-dose SparseCT data acquired with an interrupted-beam prototype on a clinical scanner

Muckley M J, Chen B, O'Donnell T, Berner M, Allmendiger T, Stierstorfer K, Flohr T, Schmidt B, Sodickson A D, Sodickson D K, Otazo R

New York University, NY, USA; Harvard Medical School, MA, USA; Siemens Healthcare GmbH, USA

Session M4: Artifact and noise removal techniques
Moderated by TBA

Stack transition artifact removal for cardiac CT using a symmetric Demons algorithm

Lebedev S, Fournie E, Stierstorfer K, Kachelrieß M

German Cancer Research Center (DKFZ), Germany; Siemens Healthcare GmbH, Germany

Noise reduction via filtering temporal differences

Nett B E, Miao C, Pack J D

GE Healthcare, WI, USA; GE Global Research, NY,USA

Projective invariants for geometric calibration in flat panel computed tomography

Aichert A, Bier B, Rist L, Maier A

University of Erlangen-Nuremberg, Germany

Multi-motion compensation for high-quality cone-beam CT of the head

Sisniega A, Zbijewski W, Wu P, Stayman J W, Aygun N, Stevens R, Wang X, Foos D H, Siewerdsen J H

Johns Hopkins University, MD, USA; Carestream Health, NY, USA

Estimation of the source-detector alignment of cone-beam X-ray systems using collimator edge tracking

Luckner C, Maier A, Mertelmeier T, Ritschl L

University of Erlangen-Nuremberg, Germany; Siemens Healthcare GmbH, Germany

Evaluation of optimization-based reduction of truncation artifacts in C-arm CBCT

Xia D, Chang Y-B, Manak J, Zhang Z, Chen B, Sidky E Y, Pan X

University of Chicago, IL, USA; Canon Medical Research Institute, IL, USA

Session T1: Multi-energy CT I
Moderated by TBA

"X-map 2.0" and "iBHC2" for consistent edema signal enhancement for acute ischemic stroke using non-contrast-enhanced dual-energy CT

Taguchi K, Itoh T, Fuld M K, Fournie E, Lee O, Noguchi K

Johns Hopkins University, MD, USA; Siemens Healthcare GmbH, USA & Japan; University of Toyama, Japan

Eigentissue decomposition for multi-energy CT reconstruction

Simard M, Lalonde A, Bouchard H

University of Montreal, Canada

Optimization of dose distribution and filter thickness in energy-integrating-detector-based multi-energy CT

Ren L, McCollough C H, Yu L

Mayo Clinic, MN, USA

Session T2: Multi-energy CT II
Moderated by TBA

Generalized least squares for spectral and dual energy CT: a simulation study
Mory C, Brendel B, Erhard K, Rit S
University of Lyon, France; Philips Research Laboratories, Germany

Model-based multi-material decomposition using spatial-spectral CT filters
Stayman J W, Tilley II S
Johns Hopkins University, MD, USA

Prior-based multi material decomposition (PBMMD) for dual energy CT
Dorn S, Chen S, Sawall S, Maier J, Knaup M, Maier A, Lell M, Kachelrieß M
German Cancer Research Center (DKFZ), Germany; University of Erlangen-Nuremberg, Germany

Session T3: Novel analytical results
Moderated by TBA

Divergent-beam backprojection-filtration formula with applications to region-of-interest imaging
Reshef A, Riddell C, Trousset Y, Ladjal S, Bloch I
GE Healthcare, Buc, France; Paris Saclay University, France

GCC and FBCC for linear tomosynthesis
Lesaint J, Rit S, Clackdoyle R, Desbat L
Grenoble Alpes University, France; INSA Lyon, France

Session T4: Posters -- Phase contrast & fluorescence CT, CBCT, dynamic CT, data truncation & consistency, industrial CT,
Moderated by TBA

Phase contrast and fluorescence CT

Differential tomography: influence of sensitivity direction and noise-suppressing windows
Kaeppler S, Maier A, Riess C
University of Erlangen-Nuremberg, Germany

Model-based iterative reconstruction for propagation-based phase-contrast computed tomography, suitable for laboratory sources
Hehn L, Morgan K, Dierolf M, Gradl R, Noël P B, Pfeiffer F
Technical University of Munich, Germany; Monash University, Australia

Simulation of a propagation-based phase-contrast imaging system with a compact x-ray light source
Sung Y, Gupta R, Nelson B J, Leng S, Graves W S, McCollough C H
University of Wisconsin-Milwaukee, WI, USA; Massachusetts General Hospital, MA, USA; Arizona State University, AZ, USA; Mayo Clinic, MN, USA

Novel X-ray small-angle scattering radiography system design
Li G, Cong W, Michaelson J S, Liu H, Wang G
Rensselaer Polytechnic Institute, NY, USA; Harvard Medical School, MA, USA; University of Oklahoma, OK, USA

High sensitivity full-field X-ray fluorescence CT imaging method and its experimental results
Li L
Tsinghua University, China

CBCT

A multi pass approach to reduce cone beam artifacts in a circular orbit cone beam CT system

Han C, Baek J

Yonsei University, South Korea

Setting up a low-cost C-arm for its use as a tomograph: preliminary results

Abella M, de Molina C, Ballesteros N, García A, García I, Martínez A, Desco M

Carlos III University of Madrid, Spain

Influence of acquisition angle and slice thickness on the in-plane spatial resolution of calcifications in digital breast tomosynthesis

Luckner C, Schebesch F, Syben C, Maier A, Mertelmeier T, Ritschl L

University of Erlangen-Nuremberg, Germany; Siemens Healthcare GmbH, Germany

3D-2D known-component registration for metal artifact reduction in cone-beam CT

Uneri A, Yi T, Zhang X, Stayman J W, Helm P, Osgood G M, Theodore N, Siewerdsen J H

Johns Hopkins University, MD, USA

Autocalibration of cone beam CT projection matrices based on arbitrary traceable features within a regular tomographic scan

Dittman J, Zabler S

University of Wuerzburg, Germany

Data-fidelity impact on cone-beam artifact reduction in diagnostic CT

Xia D, Liu Y, Yu Z, Chen B, Zhang Z, Thompson R, Sidky E Y, Pan X

University of Chicago, IL, USA; Canon Medical Research Institute, IL, USA

C-arm CT imaging using the ellipse-line-ellipse trajectory: first implementation and initial results

Guo Z, Lauritsch G, Noo F

University of Utah, UT, USA; Siemens Healthcare GmbH, Germany

A practical dose efficient reconstruction algorithm for circular cone beam X-ray tomography

Guo H, Ikhlef A, Miao C, Cui X

FMI Medical Systems Inc., OH, USA

Dynamic CT

Respiratory gating method for low-dose small-animal CT studies: preliminary results

Ballesteros N, Desco M, Abella M

Carlos III University of Madrid, Spain

Fully automatic intrinsic respiratory and cardiac gating of cone-beam CT scans of the thorax region

Hahn A, Kachelrieß M

German Cancer Research Center (DKFZ), Germany

Volumetric blood flow estimation for 4D digital subtraction angiography

Seitz S, Endres J, Doerfler A, Maier A

University of Erlangen-Nuremberg, Germany

Performance evaluation of motion artifact correction for myocardial dual-energy CT perfusion imaging

Yin Z, Rui X, Pack J, Elmore K, Edic P M, Min J K

GE Global Research, NY, USA; Weill Cornell Medical College, NY, USA

Data truncation and consistency

Papoulis-Gerchberg algorithms for limited angle tomography using data consistency conditions

Huang Y, Taubmann O, Huang X, Lauritsch G, Maier A

University of Erlangen-Nuremberg, Germany; Siemens Healthcare GmbH, Germany; Shanghai Jiao Tong University, China

Empirical scatter correction using the epipolar consistency condition

Hoffmann M, Wuerfl T, Maaß N, Dennerlein F, Aichert A, Maier A

University of Erlangen-Nuremberg, Germany; Siemens Healthcare GmbH, Germany

Stereo rectification for X-ray data consistency conditions

Aichert A, Lesaint J, Wuerfl T, Clackdoyle R, Desbat L, Maier A

University of Erlangen-Nuremberg, Germany; Grenoble Alpes University, France

Fast epipolar consistency without the need for pseudo matrix inverses

Preuhs A, Manhart M, Maier A

University of Erlangen-Nuremberg, Germany; Siemens Healthcare GmbH, Germany

A sinogram extrapolation method for CT field of view extension

Tang Q, Matsuura M, Yu Z

Canon Medical Research Institute, IL, USA

Cone-beam artifacts and scatter in diagnostic cone-beam imaging of the hand

Oktay M B, Fieselmann A, Vogt S, Noo F

University of Utah, UT, USA; Siemens Healthcare GmbH, Germany

Volume-of-interest CT imaging with dynamic beam filtering using multiple aperture devices

Wang W, Gang G J, Mao A, Sisniega A, Siewerdsen J H, Stayman J W

Johns Hopkins University, MD, USA

Extrapolation of truncated C-arm CT data using Grangeat-based consistency measures

Punzet D, Frysch R, Rose G

Otto-von-Guericke University Magdeburg, Germany

Industrial CT

Analysis of tomographic influences on the surface definition in industrial X-ray computed tomography

Matern D, Herold F

YXLON International GmbH

Dual-energy CT with nanotube X-ray source array for security scanning

Chen B, Xia D, Zhang Z, Sidky E Y, Pan X

University of Chicago, IL, USA

Edge information diffusion based reconstruction (EIDR) for cone beam computed laminography

Zhao Y, Xu J, Li H, Zhang P

Capital Normal University, China

Anisotropic resolution enhancement for computed tomography of planar objects

Kieß S, Simon S

University of Stuttgart, Germany

Session T5: Limited data CT
Moderated by TBA

A second derivative based regularization model for limited-angle computed tomography

Xu J, Zhu Y, Zhang P

Capital Normal University, China

Image reconstruction method for the exterior problem with 1D edge-preserved diffusion and smoothing

Xu J, Wang Z, Zhao Y, Zhang P

Capital Normal University, China

Iodine quantification in limited angle tomography

Michielsen K, Rodriguez-Ruiz A, Reiser I, Nagy J, Sechopoulos I

Radboud University, The Netherlands; University of Chicago, IL USA; Emory University, GA, USA; Dutch Expert Center for Screening (LRCB), The Netherlands

Session W1: Model-based iterative reconstruction II
Moderated by TBA

FreeCT_ICD: Free, open-source MBIR reconstruction software for diagnostic CT

Hoffman J M, Hsieh S S, Noo F, McNitt-Gray M

David Geffen School of Medicine at UCLA, CA, USA; University of Utah, UT, USA

Improving GPU scaling for X-ray CT

Muthukrishnan H, Wenisch T F, Fessler J A

University of Michigan, MI, USA

Emission EM look-alike algorithms for X-ray CT and other applications

Zeng GL

Weber State University, UT, USA

Session W2: Photon counting CT
Moderated by TBA

Material decomposition using spectral prior image constrained compressed sensing

Tao S, Rajendran K, McCollough C H, Leng S

Mayo Clinic, MN, USA

Three material decomposition for spectral computed tomography enabled by block-diagonal step-preconditioning

Sidky E Y, Barber R F, Gilat-Schmidt T,Pan X

University of Chicago, IL, USA; Marquette University, WI, USA

Digital charge summing for photon counting detectors

Hsieh S S

David Geffen School of Medicine at UCLA, CA, USA

Application of the X-ray transmittance modeling-based three-step algorithm to experimental data from a prototype PCD-CT system

Lee O, Polster C, Kappler S, Rajendran K, McCollough C H, Leng S, Taguchi K

Johns Hopkins University, MD, USA; Mayo Clinic, MN, USA; Siemens Healthcare GmbH, Germany

Photon-counting CT reconstruction using total image constrained diffusion tensor

Niu S, Huang X, Ma J, Wang J

University of Texas Southwestern Medical Center, TX, USA; Gannan Normal University, China; Southern Medical University, China

Session W3: Posters -- Analytical methods, MBIR, spectral CT, deep learning
Moderated by TBA

Analytical methods

Parallel-beam ROI reconstruction with differentiated backprojection and angularly subsampled complementary sinograms

Reshef A, Nikoukhah T, Riddell C, Trousset Y, Ladjal S, Bloch I

GE Healthcare, Buc, France; Paris Saclay University, France

Image reconstruction with two native focal spots for z-flying focal spot tomography

Guo H

FMI Medical Systems, Inc. , OH, USA

Analytical statistical reconstruction algorithm with the direct use of projections performed in spiral cone-beam scanners

Cierniak R

Czestochowa University of Technology, Poland

MBIR

GPU-based tools for multi-channel X-ray CT reconstruction

Clark D P, Badea C T

Duke Center for In Vivo Microscopy NC, USA

Low-Dose CT Image Restoration Using Full-Dose Patch Database

Zhang Y, Cheng L, Lu H, Ma J, Xing Y, Rong J, Gao P, Liu T, Wang Y, Liang J Z

Fourth Military Medical University, China; Qufu Normal University, China; Southern Medical University, China; Tsinghua University, China; Shandong University of Technology, China; NY State University at Stony Brook, NY, USA

Adaptive edge preserve filter for streak artifacts reduction in computed tomography

Miao C, Guo H, Ikhlef A

FMI Medical System, Inc., OH, USA

Advancements in computed tomography for musculoskeletal imaging

Mei K, Kopp F K, Hammel J, Schwaiger B J, Gersing A S, Baum T, Rummeny E J, Noël P B

Technical University of Munich, Germany

New GPU implementation of separable footprint (SF) projector and backprojector : first results

Chapdelaine C, Gac N, Mohammad-Djafari A, Parra E

Paris Saclay University, France; Safran SA, France

High-fidelity modeling of detector lag and gantry motion in CT reconstruction

Tilley II S, Sisniega A, Siewerdsen J H, Stayman J W

Johns Hopkins University, MD, USA

Iterative image reconstruction for CT by emphasizing local image quality

Cai J, Duan J, Shi Y, Mou X

Xi'an Jiaotong University, China

Analysis on optimal selection of regularization parameters based on CT image statistics

Duan J, Cai J, Mou X

Xi'an Jiaotong University, China

Model based image reconstruction with concomitant scale estimation

Xu J, Noo F

Johns Hopkins University, MD, USA; University of Utah, UT, USA

Optimal Lipschitz constant for model-based iterative reconstruction using first-order methods

Noo F, Haase V

University of Utah, UT, USA; Siemens Healthcare GmbH, Germany

Spectral CT

Sparse-view spectral CT reconstruction using image gradient ℓ0–norm and tensor dictionary

Wu W, Zhang Y, Wang Q, Liu F, Chen P, Yu H

University of Massachusetts Lowell, MA, USA; Chongqing University, China

Adaptive non-local means method for denoising basis material images from dual-energy CT

Yuan Y, Zhang Y, Yu H

University of Massachusetts Lowell, MA, USA

DIRA-3D - a model-based dual-energy iterative algorithm for quantitative 3D helical CT

Magnusson M, Bjoernfot M, Tedgren A C, Malusek A

Linkoeping University, Sweden; Karolinska University Hospital, Sweden

Physical constraints for beam hardening reduction using polynomial models

Wuerfl T, Maaß N, Dennerlein F, Aichert A, Maier A

University of Erlangen-Nuremberg, Germany; Siemens Healthcare GmbH, Germany

Reducing partial volume artifacts with spectral CT

Persson M, Pelc N

Stanford University, CA, USA

Locally linear transform based gradient L_0–norm minimization for spectral CT reconstruction

Wang Q, Wu W, Yu H

University of Massachusetts Lowell, MA, USA; Chongqing University, China

Synthetic energy combinations for material decomposition in photon counting CT

O'Donnell T, Halaweish A, Fayad Z, Mani V

Siemens Medical Solutions, USA; Ihcan School of Medicine at Mount Sinai, NY, USA

Non-convex optimization-based reconstruction in multispectral CT

Pan X, Chen B, Sidky E Y, Zhang Z, Xia D

University of Chicago, IL, USA

Non-convex Chambolle-Pock algorithm for multispectral CT

Chen B, Zhang Z, Xia D, Sidky E Y, Pan X

University of Chicago, IL, USA

Coronary artery calcium scoring using dual energy tomosynthesis

Hsieh S S, Budoff M J

David Geffen School of Medicine at UCLA, CA, USA

Deep learning

A deep learning approach for reconstruction filter kernel discretization

Syben C, Stimpel B, Breininger K, Wuerfl T, Fahrig R, Doerfler A, Maier A

University of Erlangen-Nuremberg, Germany

Deep learning interior tomography for region-of-interest reconstruction

Han Y, Gu J, Ye J C

KAIST, South Korea

Towards automatic abdominal multi-organ segmentation in dual energy CT using cascaded 3D fully convolutional network

Chen S, Roth H, Dorn S, May M, Cavallaro A, Lell M M, Kachelrieß M, Oda H, Mori K, Maier A

University of Erlangen-Nuremberg, Germany; Nagoya University, Japan; Ruprecht Karls University Heidelberg, Germany

Noise subtraction for low-dose CT images using a deep convolutional neural network

Missert A D, Leng S, Yu L, McCollough C H

Mayo Clinic, MN, USA

Determination of algorithm parameters by using input/output image pairs
Zeng GL
Weber State University, UT, USA

Deep learning reconstruction for 9-view dual energy CT baggage scanner
Han Y, Kang J, Ye J C
KAIST, South Korea; GEMSS Medical Co., South Korea

Convolutional neural network based CT image post-processing from FBP to ADMIRE
Zhang Y, MacDougall R D, Yu H
University of Massachusetts Lowell, MA, USA; Boston Children's Hospital, MA, USA

Ring reduction for micro CT using deep residual learning
Holbrook M, Clark D P, Badea C T
Duke Center for In Vivo Microscopy, NC, USA

CT sinogram analysis using deep learning
Haneda E, Claus B, FitzGerald P, Wang G, De Man B
GE Global Research, NY, USA; Rensselaer Polytechnic Institute, NY, USA

Session W4: Deep learning
Moderated by TBA

Performance comparison of deep learning based denoising techniques in low-dose CT images
Kim B, Shim H, Baek J
Yonsei University, South Korea

Variational network learning for low-dose CT
Kobler E, Muckley M J, Chen B, Knoll F, Hammernik K, Pock T, Sodickson D K, Otazo R
Graz University of Technology, Austria; New York University, NY, USA

MR to X-ray projection image synthesis
Stimpel B, Syben C, Wuerfl T, Mentl K, Doerfler A, Maier A
University of Erlangen-Nuremberg, Germany

Deep-learning-based CT metal artifact reduction using perceptual loss
Gjesteby L, Shan H, Yang Q, Xi Y, Claus B, Jin Y, De Man B, Wang G
Rensselaer Polytechnic Institute, NY, USA; GE Global Research, NY, USA