CARS 2020
COMPUTER ASSISTED RADIOLOGY AND SURGERY
34th International Congress and Exhibition
JUNE 23–27, 2020 · MUNICH / GERMANY
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Joint Congress of IFCARS, ISCAS, CAR, CMI, CAD, IPCAI

CARS 2020 Final Program

CARS 2020 Computer Assisted Radiology and Surgery
34th International Congress and Exhibition
June 23 - 27, 2020
Klinikum rechts der Isar der TUM, Munich, Germany
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CARS 2020 Opening Ceremony

Tuesday, June 23, 2020

18:00 Opening Ceremony

Hubertus Feussner, MD, President of CARS 2020

and the CARS 2020 General Chairs

Alois Knoll, PhD
Tim Lüth, PhD
Daniel Ostler, MSc
Dirk Wilhelm, MD
Nassir Navab, PhD

Keynote Lectures:
The Impact of Biomedical Engineering on Future Surgery
Ines Gockel, MD, MBA, DFNWC
Director of Department of
Visceral, Transplant, Thoracic and Vascular Surgery,
University Hospital of Leipzig (DE)

Paging the Surgineers: Curriculum at the Cutting Edge
Jeffrey H. Siewerdsen, PhD, FAAPM, FAIMBE
John C. Malone Professor and Vice-Chair,
Department of Biomedical Engineering; Co-Director,
The Carnegie Center for Surgical Innovation,
The I-STAR Lab; Johns Hopkins University, Baltimore, MD (US)

19:30 CARS 2020 Reception

CARS 2020 President
Hubertus Feussner, MD

CARS 2020 General Chairs
Hubertus Feussner, MD
Alois Knoll, PhD
Tim Lüth, PhD
Nassir Navab, PhD
Dirk Wilhelm, MD

CARS 2020 Scientific Medical Committee
Ulrich Eck, PhD
Alissa Jell, MD
Yannick Krieger, MSc
Alexander Lenz, PhD
Daniel Ostler, MSc
Jana Steger, MSc

CARS Organizer
Heinz U. Lemke, PhD

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Pierre Jannin, PhD (FR)
Leo Joskowicz, PhD (IL)
Shoji Kido, MD, PhD (JP)
Heinz U. Lemke, PhD (DE)
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Terry M. Peters, PhD (CA)
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Hans G. Ringertz, MD, PhD (SE)
Yoshinobu Sato, PhD (JP)
Ramin Shahidi, PhD (US)
Akinobu Shimizu, PhD (JP)
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CARS 2020 Final Program

24th Annual Conference of the International Society for Computer Aided Surgery (ISCAS)

Chairs: Kensaku Mori, PhD (JP), Cristian A. Linte, PhD (US)

Wednesday, June 24, 2020

8:00-9:15 Modeling, Simulation and Segmentation Techniques for Image-guided Therapy

Session Chairs: Kensaku Mori, PhD (JP), Volker Rasche, PhD (DE)
Technical Chair: Nassir Navab, PhD (DE)

Real-time catheter tip segmentation and localization in 2D x-ray fluoroscopy using deep convolutional neural network
I. Vernikouskaya, W. Rottbauer, V. Rasche, Ulm Univ. Medical Center (DE) [ISCAS-LE-5]

Development of multimodal ultrasound and X-ray tissue-mimicking phantoms for image-guided percutaneous interventions
E. Maneas, P. A. Patel, A. Lane, C. D. Little, A. E. Desjardins, Univ. College London (GB) [ISCAS-LE-214]

Computer-assisted Transanal Total Mesorectal Excision (TaTME): Real-time automatic prostate segmentation
D. Kitaguchi, N. Takeshita, H. Matsuzaki, H. Hasegawa, R. Honda, T. Oda, M. Ito, National Cancer Center Hospital East, Kashiwa, Univ. of Tsukuba (JP) [ISCAS-LE-132]

Needle tip force estimation by deep learning from raw spectral OCT data
M. Gromniak, N. Gessert, T. Saathoff, A. Schlaefer, Technical Univ. Hamburg (DE) [ISCAS-LE-20-00046]

Blood vessel segmentation from laparoscopic video using ConvLSTM U-Net
M. Oda, S. Morimitsu, S. Yamamoto, T. Ozawa, T. Kitasaka, Y. HayashiM. Ito, N. Takeshita, K. Misawa, K. Mori, Nagoya Univ.; Aichi Inst. of Technology, Toyota; National Cancer Center Hospital East, Chiba (JP) [ISCAS-LE-206]

Tool usage in open surgery video data
S. Laufer, A. Goldbraikh, A. L. D'Angelo, C. Pugh, Technion, Haifa (IL); Mayo Clinic, Rochester, Stanford Univ. (US) [ISCAS-LE-109]

Navigated tissue characterization during skin cancer surgery
M. Kaufmann, J. Rudan, N. N. Janssen, A. Santilli, A. Jamzad, K. Vanderbeck, K.Y.M. Ren, T. Ungi, P. Mousavi, D. McKay, A. Wang, G. Fichtinger, Queen's Univ., Kingston, ON (CA) [ISCAS-LE-20-00051]

Wednesday, June 24, 2020

9:15-10:00 Augmented, Virtual and Mixed Realities in Image-guided Therapy

Session Chairs: Gabor Fichtinger, PhD (CA), Gabriele von Voigt, PhD (DE)
Technical Chair: Ulrich Eck, PhD (DE)

Augmented reality visualization of live ultrasound images using HoloLens for ultrasound-guided procedures
T. Nguyen, R. Shekhar, W. Plishker, X. Liu, I. Hossain, K. Sharma, A. Matisoff, Children's National Hospital, Washington; IGI Technologies, Inc., Silver Spring (US) [ISCAS-LE-106]

Virtual Reality exploration for fetal surgery
V. Comte, M. Ceresa, M. Altaba, M. Sanchez-Fibla, J. Torrents-Barrena, B. Lalande, E. Eixarch, E. Gratacós, M. A. Gonzalez Ballester, Univ. Pompeu Fabra; Fetal i+D Fetal Medicine Research Center, Barcelona (ES) [ISCAS-LE-167]

First visualization results of intraoperative multispectral tissue differentiation
E. L. Wisotzky, A. Hilsmann, P. Eisert, Fraunhofer Heinrich-Hertz-Inst., Berlin (DE) [ISCAS-LE-188]

Fast and accurate online calibration of optical see-through head-mounted display for AR based surgical navigation using microsoft HoloLens
X. Chen, S. Qichang, M. Yongfeng, Y. Rong, T. Ji, Shanghai Jiao Tong Univ.; Shanghai Jiao Tong Univ. School of Medicine (CN) [ISCAS-LE-20-00111]

Wednesday, June 24, 2020

10:00-11:00 Video-based Instrumentation and Image-guided Therapy

Session Chairs: Jumpei Arata, PhD (JP), Armin Schneider, PhD (DE)
Technical Chair: Jana Steger, MSc (DE)

Grasping and detaching force evaluation of a cassette type flexible forceps
R. Yamaguchi, R. Doine, T. Dohi, K. Kuwana, Tokyo Denki Univ. (JP) [ISCAS-LE-154]

Sterility oriented drive concept for the manipulation of flexible endoscopic instruments
R. Krumpholz, L. Bernhard, D. Ostler, D. Wilhelm, H. Feußner, Y. Krieger, T. Lueth, Klinikum rechts der Isar, Munich; Technical Univ. Munich (DE) [ISCAS-LE-212]

Novel design to improve the lifespan and range of motion of 3.5 mm surgical manipulator comprises of elastic elements through stress management, S. Bandara, W. Zongpeng, W. Kajihara, J. Arata, Kyushu Univ., Fukuoka (JP) [ISCAS-LE-209]

Softness sensing probe with multiple acoustic paths for laparoscopic surgery
T. Ukai, Y. Tanaka, T. Fukuda, T. Kajikawa, H. Miura, Y. Terada, Nagoya Inst. of Technology, Graduate School of Engineering; Akita Univ. (JP) [ISCAS-LE-20-00064]

Intra-operative detection of stapedius reflex based on a 3D digital operation microscope
L. Demaret, P. Geissler, A. Keerl, H. Kiening, E. Kögel, D. Schmitt, A. Schneider, ARRI Medical GmbH; Pripares, Munich (DE) [ISCAS-LE-164]

Suction-fixing surgical device for assisting liver manipulation with laparoscopic forceps
Y. Nakajima, R. Suzuki, T. Sugino, T. Kawase, S. Onogi, H. Seki, T. Fujiwara, K. Ouchi, Tokyo Medical and Dental Univ. (JP) [ISCAS-LE-20-00080]

Wednesday, June 24, 2020

11:15-12:15 Image-guided Interventions and Therapy

Session Chairs: Cristian A. Linte, PhD (US), Thomas Neumuth, PhD (DE)
Technical Chair: Michael Kranzfelder, MD (DE)

Analysis of pitch distortion in continuous time for cochlear implantation surgery
M. Ceresa, S. Mantzagriotis, N. Mangado, M. A. Gonzalez Ballester, Universitat Pompeu Fabra, Barcelona (ES) [ISCAS-LE-185]

Image guidance for fetoscopic laser photocoagulation in twin-to-twin transfusion syndrome fetal surgery
M. A. González Ballester, M. Ceresa, J. Torrents-Barrena, R. López-Velazco, E. Eixarch, B. Valenzuela-Alcaraz, G. Piella, E. Gratacós, Univ. Pompeu Fabra; Fetal i+D Fetal Medicine Research Center, Barcelona (ES) [ISCAS-LE-187]

Surgical tracking characterization and registration performance assessment for image-guided renal interventions
P. Jackson, R. Simon, C. Linte, Rochester Inst. of Technology (US) [ISCAS-LE-204]

Digitizing rhinoplasty: a web application for three dimensional preoperative planning
O. Topsakal, M.I. Akbas, D. Demirel, B. Smith, M. F. Perez, M.M. Celikoyar, Florida Polytechnic Univ., Lakeland, FL; Embry-Riddle Aeronautical Univ. (US); Istanbul Bilim Univ. (TR) [ISCAS-LE-20-00067]

Air flow simulation in the nasal valve may optimize surgical intervention
M. Berger, M. Pillei, A. Mehrle, W. Recheis, F. Kral, M. Kraxner, W. Freysinger, Medical Univ. of Innsbruck; MCI Innsbruck; Kardinal Schwarzenberg Hospital, Schwarzach im Pongau (AT); Friedrich-Alexander-Univ. Erlangen-Nürnberg (DE) [ISCAS-LE-68]

Wednesday, June 24, 2020

12:15-12:45 Surgical Workflow Assessment

Session Chairs: Cristian A. Linte, PhD (US), John J. van den Dobbelsteen, PhD (NL)
Technical Chair: Michael Kranzfelder, MD (DE)

Surgical phase recognition using laparoscopic videos
A. Guédon, S. Meij, K. van Stralen, M. Grimbergen, Q. Eijsbouts, J. van den Dobbelsteen, A. Twinanda, Spaarne Gasthuis, Hoofddorp; Delft Univ.; Cosmonio, Groningen (NL) [ISCAS-LE-95]

Recognizing workflow tasks in central venous catheterization using convolutional neural networks and reinforcement learning
R. Hisey, B. Chen, D. Camire, J. Erb, D. W. Howes, G. Fichtinger, T. Ungi, Queen's Univ., Kingston, ON (CA) [ISCAS-LE-180]

Towards generalizable surgical activity recognition using spatial temporal graph convolutional networks
D. Sarikaya, P. Jannin, Univ. of Rennes 1 (FR) [ISCAS-LE-20-00101]

Wednesday, June 24, 2020

14:00-15:00 Image-guided Neuro-interventions and Applications

Session Chairs: Yoshihiro Muragaki, MD, PhD (JP), Javier Pascau, PhD (ES)
Technical Chair: Kornelia Kreiser, MD (DE)

Overlay of brain structure and estimated brain function position onto microscopy using pre- and intra-operative MRI in awake surgery for glioma
A. Sato, I. Sato, K. Ohshima, Y. Fujino, K. Kusuda, Y. Horise, M. Tamura, Y. Muragaki, K. Masamune, Future Univ. Hakodate; Tokyo Women's Medical Univ. (JP) [ISCAS-LE-96]

Intraoperative outcome evaluation in craniosynostosis reconstruction surgery using 3D photography
D. García-Mato, M. García-Sevilla, S. Ochandiano, R. Moreta-Martinez, J. V. Darriba-Allés, R. García-Leal, J. I. Salmerón, J. Pascau, Univ. Carlos III of Madrid; Inst. de Investigación Sanitaria Gregorio Marañón, Madrid (ES) [ISCAS-LE-102]

Diffusion Weighted Imaging (DWI) tractography filtering tools for Stereotactic Electro-Encephalography (SEEG)
A. Higueras-Esteban, I. Delgado-Martínez, L. Serrano, A. Principe, M. î González Ballester, R. Rocamora, L. Serra, G. Conesa, Galgo Medical S.L.; Univ. Pompeu Fabra; Hospital del Mar, Barcelona (ES) [ISCAS-LE-170]

A method for estimation of brain function positions based on the standard brain model using retrospective information in awake surgery for glioma
K. Ohshima, I. Sato, A. Sato, Y. Fujino, K. Kusuda, Y. Horise, M. Tamura, K. Masamune, Y. Muragaki, Future Univ. Hakodate; Tokyo Women's Medical Univ. (JP) [ISCAS-LE-134]

Path planning for laser ablation in neurosurgery; exploring the advantages of a curved insertion path in retrospective data
S. Frisken, C. Mirabel, P. Juvekar, T. Kato, S. Drouin, T. Noh, V. Chavakula, W.I. Essen, D. Segar, G. R. Cosgrove, A.J. Golby, Harvard Medical School, Cambridge, MA; Brigham and Women's Hospital; Canon USA (US); École de Technologie Supérieure (CA) [ISCAS-LE-20-00043]

A prototype for video-based hemodynamic analysis in neurosurgery implemented on a mobile augmented reality system
E. Léger, R. Vassallo, T. Popa, T. Peters, Y. Xiao, M. Kersten-Oertel, Concordia Univ., Montréal; Western Univ., London (CA) [ISCAS-LE-112]

Wednesday, June 24, 2020

15:15-16:30 Image-guided Orthopedic Interventions and Applications

Session Chairs: Philipp Honigmann, MD (CH), Leo Joskowicz, PhD (IL)
Technical Chair: Rainer Burgkart, MD (DE)

Improving accuracy in intertrochanteric osteotomy for patients with slipped capital femoral epiphysiolysis with 3D printed surgical guides
V. Lagerburg, S. Besseling, J. Schoutsen, M. Witbreuk, OLVG, Amsterdam (NL) [ISCAS-LE-131]

A novel drilled surface image for evaluating the contact anatomy and contact bone volume of implanted screws in spinal fusion surgery
C.-T. Shih, Y.-W. Chen, H.-M. Huang, S.-L. Peng, T.-C. Chen, Chung Shan Medical Univ., Taichung; Asia Univ.; China Medical Univ. Hospital (TW) [ISCAS-LE-20-00073]

Optimizing bone alignment in the application of an oblique double-cut rotation osteotomy
I. Dobbe, S. Strackee, G. Streekstra, Univ. of Amsterdam (NL) [ISCAS-LE-133]

Hierarchical deep curriculum learning for the classification of proximal femur fractures
A. Jiménez-Sánchez, D. Mateus, S. Kirchhoff, C. Kirchhoff, P. Biberthaler, N. Navab, M. A. G. Ballester, G. Piella, Universitat Pompeu Fabra; ICREA; Barcelona (ES); Ecole Centrale de Nantes (FR); Klinikum rechts der Isar of TUM, Technical Univ., Munich (DE) [ISCAS-LE-15]

Overnight and in-house 3D–printed patient-specific casts for non-operative treatment of distal radius fractures – a prospective randomized trial
M. Keller, A. Gübeli, P. Honigmann, Kantonsspital Baselland, Liestal (CH) [ISCAS-LE-37]

Patient-specific modelling and simulation of knee joint motion using position-based dynamics
J. Georgii, I. Ludwig, E. Taghizadeh, K. Izadpanah, T. Lange, Fraunhofer MEVIS, Bremen; Univ. of Bremen; Univ. Hospital, Freiburg (DE) [ISCAS-LE-85]

4D-CT assessment of carpal kinematics after replacing the scaphoid by a patient specific prosthesis
P. Honigmann, M. Haefeli, J. Rueegg, M. G. de Roo, J. G. Oonk, G. J. Strijkers, J. G. Dobbe, S. D. Strackee, G. J. Streekstra, Kantonsspital Baselland, Liestal; Hospital Graubünden, Chur; Medartis AG, Basel (CH); Univ. of Amsterdam (NL) [ISCAS-LE-110]

Wednesday, June 24, 2020

16:45-17:45 Surgical Instrumentation and Robotics

Session Chairs: Kevin Cleary, PhD (US), Tim C. Lüth, PhD (DE)
Technical Chair: Yannick Krieger, MSc (DE)

Automatic synthesis of an adaptive compliant forceps for safe manipulation in minimally invasive surgery
Y. Sun, D. Zhang, T. C. Lueth, Technical Univ. of Munich, Garching (DE) [ISCAS-LE-59]

Design of a novel dexterous continuum manipulator for medical application using compliant rolling-contact joint
D. Zhang, Y. Sun, T. C. Lueth, Technical Univ. of Munich, Garching (DE) [ISCAS-LE-91]

Robotic electromagnetic and optical navigation bronchoscopy
L. Gruionu, C. Constantinescu, C. Ciobirca, A. Soimu Iacob, A. Udristoiu, A. Saftoiu, G. Gruionu, Univ. of Craiova (RO); Restore Surgical LLC, Arlington (US) [ISCAS-LE-125]

Design and modeling of pneumatic tracheal intubation actuator
Z. Liang, H. Miao, X. Wang, X. Zhu, T. Pan, Q. Cao, Shanghai Jiao Tong Univ. (CN) [ISCAS-LE-165]

A handheld flexible manipulator system for frontal sinus surgery
S. Coemert, R. Roth, G. Strauss, P.M. Schmitz, T. C. Lueth, Technical Univ. Munich, Garching; IRDC GmbH Leipzig (DE) [ISCAS-LE-20-00049]

Wednesday, June 24, 2020

17:45-18:45 Robot-assisted Image-guided Therapy
Session Chairs: Andreas Melzer, MD (DE), Daniel Ostler, MSc (DE)
Technical Chair: Julian Klodmann, MSc (DE)

A contact state adjustment method to enhance organ motion compensation performance for a bed-type ultrasound diagnostic and therapeutic robot
K. Kobayashi, N. Koizumi, Y. Sasaki, T. Kobayashi, Y. Watanabe, J. Zhou, A. Otsuka, Y. Nishiyama, H. Tsukihara, N. Matsumoto, H. Miyazaki, K. Numata, H. Nagaoka, T. Iwai, H. Iijima, The Univ. of Electro-Communications, Tokyo; The Univ. of Tokyo; Nihon Univ.; National Center for Global Health and Medicine (JP) [ISCAS-LE-20-00071]

A novel, intelligent and navigated robot-assisted biopsy assistance system for minimally invasive radiological interventions
P. Schülein, A. Keller, T. Zimmermann, S. Diehl, M. Vetter, Univ. of Applied Sciences Mannheim; Univ. of Heidelberg (DE) [ISCAS-LE-98]

Development of an integrated robotic dual-arm system for image-guided interventions
J. Berger, J. Keller, M. Unger, L. Landgraf, A. Melzer, Univ. of Leipzig (DE) [ISCAS-LE-148]

Towards 3D-printed, customizable robotic manipulators for minimally invasive surgery
Y.S. Krieger, D. Ostler, K. Rzepka, H. Feussner, D. Wilhelm, T.C. Lueth, Technical Univ. Munich, Garching; Technical Univ. School of Medicine, Munich (DE) [ISCAS-LE-20-00063]

Motion control study based on kinematic and dynamic analysis of a novel minimally invasive surgical robot
Q. Cao, Z. Zhang, P. Wang, Y. Yang, G. He, Y. Wang, Shanghai Jiao Tong Univ., Shanghai (CN) [ISCAS-LE-20-00079]

Robotic hip arthroscopy surgery system with force feedback for teleoperation grinding
Y. Yang, Z. Zhang, P. Wang, Q. Cao, Y. Feng, H. Shi, Shanghai Jiao Tong Univ.; Shanghai Sixth Peoples Hospital (CN) [ISCAS-LE-20-00044]

22nd International Conference on Computer-Aided Diagnosis and Artificial Intelligence (CAD-AI)
Chairman: Hiroyuki Yoshida, PhD (US)

Thursday, June 25, 2020

8:00-9:45 AI for CAD in Brain, Breast and Lung
Session Chairs: Hiroyuki Yoshida, PhD (US), Michael H. Friebe, PhD (DE)
Technical Chair: Rickmer Braren, MD (DE)

Radiomics for estimating the genetic pattern of low-grade glioma
Y. Uchiyama, N. Kishimoto, Kumamoto Univ. (JP) [CAD-LE-44]

A pilot study for transferring deep convolutional neural network pre-trained by local anatomical structures to computer-aided detection
M. Nemoto, Kindai Univ., Wakayama (JP) [CAD-LE-171]

One-stage tumor detection using deep convolutional network for automated breast ultrasound
R. F. Chang, Y. C. Ho, Y. S. Huang, T. Y. Chang Chien, H. Xiang, X. Lin, National Taiwan Univ., Taipei (TW); Sun Yat-sen Univ. Cancer Center, Guangzhou (CN) [CAD-LE-32]

Computer-aided tumor diagnosis based on 3D capsule neural network in automated breast ultrasound
Y. S. Huang, T. Y. Chang Chien, C. H. Lee, X. Lin, H. Xiang, R. F. Chang, National Taiwan Univ., Taipei (TW); Sun Yat-sen Univ. Cancer Center, Guangzhou (CN) [CAD-LE-31]

Multi input deep learning architecture for predicting breast tumor response to chemotherapy using quantitative MR images
M. El Adoui, S. Drisis, M. Benjelloun, Univ. of Mons, Hainaut; Inst. Jules Bordet (BE) [CAD-LE-20-00011]

Logistic regression to predict malignancy of breast tumors using IVIM parameters
M. Statache, B. M. Maris, R. Menghini, A. Cybulski, M. Barillari, G. Zamboni, P. Fiorini, Univ. of Verona; Azienda Ospedaliera Universitaria Integrata (IT) [CAD-LE-116]

3D CADv System with and without CNN: comparison of nodule component measurement accuracy and differentiation in routine clinical practice data
Y. Ohno, K. Aoyagi, A. Yaguchi, Y. Kishida, S. Seki, Y. Ueno, T. Yoshikawa, Fujita Health Univ. School of Medicine, Toyoake; Canon Medical Systems Corporation, Otawara; Toshiba Corporation, Kawasaki; Kobe Univ. (JP) [CAD-LE-70]

Towards convolutional neural network on primary lung tumors to predict histophatological type, distant and lymph node metastasis
P. M. Azevedo-Marques, L. Lima, J. R. Ferreiro Junior, A. Fabro, F. Cipriano, A. Faccio, M. Koenigkam-Santos, Univ. of Sao Paulo, Ribeirão Preto (BR) [CAD-LE-108]

Automatic detection of lung nodules from temporal subtraction images based on residual 3D-CNN with linear multi-shortcuts
H. Kim, Y. Yoshino, H. Lu, T. Aoki, S. Kido, Kyushu Inst. of Technology, Fukuoka; Univ. of Occupational and Environmental Health, Kitakyushu; Osaka Univ. (JP) [CAD-LE-41]

Towards statistical atlas of lung lesions
V. Kovalev, V. Liauchuk, A. Gabrielian, A. Rosenthal, United Inst. of Informatics, Minsk (BY); National Inst. of Allergy and Infectious Diseases, Bethesda (US) [CAD-LE-35]

Thursday, June 25, 2020

10:00-11:00 AI for CAD - Other Organs

Session Chairs: Danail Stoyanov, PhD (GB), Nassir Navab, PhD (DE)
Technical Chair: Georgios Kaissis, MD (DE)

Generative flow for data augmentation in computer-aided detection for CT colonography
J. Näppi, T. Uemura, H. Yoshida, Massachusetts General Hospital, Boston (US) [CAD-LE-192]

Manual versus automatic classification of laryngeal lesions based on vascular patterns in CE+NBI images
N. Esmaeili, A. Illanes, A. Boese, N. Davaris, C. Arens, N. Navab, M. Friebe, Otto-von-Guericke Univ. Magdeburg; Magdeburg Univ. Hospital; Technical Univ. Munich (DE) [CAD-LE-149]

Development of a robust endocytoscopic-image classification method towards the construction of practical CAD system in endocytoscopy - from the viewpoint of generalisation ability for non-specific hospital diagnosis
H. Itoh, Y. Mori, M. Misawa, S. –E. Kudo, K. Hotta, K. Ohtsuka, S. Saito, Y. Saito, H. Ikematsu, Y. Hayashi, M. Oda, K. Mori, Nagoya Univ.; Showa Univ. Northern Yokohama Hospital; Shizuoka Cancer Center; Tokyo Medical and Dental Univ.; Cancer Inst. Hospital of Japanese Foundation for Cancer Research (JP) [CAD-LE-20-00094]

Intrapapillary capillary loop classification in magnification endoscopy: Open dataset and baseline methodology
L. C. Garcia-Peraza-Herrera, M. Everson, L. Lovat, H. –P. Wang, W. L. Wang, R. Haidry, D. Stoyanov, S. Ourselin, T. Vercauteren, Univ. College London, London; Wellcome Trust and EPSRC Centre for Interventional and Surgical Sciences; King's College London (GB); National Taiwan Univ.; I-Shou Univ. Kaohsiung (TW) [CAD-LE-20-00114]

Automated diagnosis of malaria using learned AlexNet
W. Haraguchi, A. Hanafusa, M. Takagi, H. Kato, E. Hayakawa, Saitama Univ. (JP) [CAD-LE-120]

Automatic determination of patient-individual liver segments using neural networks
F. Thielke, G. Chlebus, A. Schenk, H. Meine, Fraunhofer-Inst. für Digitale Medizin, Bremen; Univ. of Bremen (DE) [CAD-LE-20-00062]

Thursday, June 25, 2020

11:00-12:00 Radiomics in Lung, Breast and Brain

Session Chairs: Janne Näppi, MD (US), Ruey-Feng Chang, PhD (TW)
Technical Chair: Georgios Kaissis, MD (DE)

AI-based radiomic approach in high-resolution CT images for differential diagnosis of idiopathic pulmonary fibrosis
P. Azevedo-Marques, E. Dorileo, M. Koenigkam-Santos, A. Todorovic Fabro, Univ. of Sao Paulo, Ribeirão Preto (BR) [CAD-LE-52]

Radiomics for predicting the pathologic complete response of breast cancer to neoadjuvant pharmacotherapy
Y. Uchiyama, N. Wada, Kumamoto Univ. (JP) [CAD-LE-43]

Breast DCE-MRI radiomics: A robust computer-aided system based on reproducible BI-RADS features across the influence of datasets bias and segmentation methods

Y. Guo, M. Qiao, C. Li, S. Suo, F. Cheng, J. Hua, D. Xue J. Xu, Y. Wang, Fudan Univ., Shanghai; Shanghai Cognate Artificial Intelligence Co., Ltd; Shanghai Jiao Tong Univ. School of Medicine (CN) [CAD-LE-20-00012]

U-radiomics combined with hyper-curvature features for predicting survival of patients with idiopathic pulmonary fibrosis
H. Yoshida, T. Uemura, C. Watari, J. Näppi, M. Matsuhiro, N. Niki, H. Kim, Harvard Medical School, Boston, MA (US); Tokushima Univ.; Kyushu Inst. of Technology, Kitakyushu (JP) [CAD-LE-49]

Radiomics for estimating 1p/19q codeletion in brain tumor using magnetic resonance imaging
Y. Uchiyama, N. Hirano, Kumamoto Univ. (JP) [CAD-LE-46]

26th Computed Maxillofacial Imaging Congress (CMI)
Chairs: Christos Angelopoulos, DDS (US), Yoshihiko Hayakawa, PhD (JP)

Thursday, June 25, 2020

12:00-13:15 Dentomaxillofacial Imaging and Surgical Navigation
Session Chairs: Christos Angelopoulos, DDS (US), Yoshihiko Hayakawa, PhD (JP)
Technical Chair: Andreas Fichter, MD (DE)

The machine estimating the contents of dental treatment by the table on which dental instruments placed
S. Oka, K. Nozaki, M. Hayashi, Osaka Univ. (JP) [CMI-LE-198]

Surgical navigation for palate carcinoma resection using a non-invasive 3D-printed reference frame
M. García-Sevilla, D. García-Mato, R. Moreta-Martinez, S. Ochandiano, M. Tousidonis, C. Navarro-Cuéllar, J. Pascau, Univ. Carlos III de Madrid, Leganés Madrid; Hospital General Universitario Gregorio Marañón (ES) [CMI-LE-147]

Workflow for planning, design and additive manufacturing of individual scaffold-like bone replacement structures in maxillofacial surgery
P. Sembdner, S. Holtzhausen, L. Kroschwald, D. Muallah, A. Hutsky, D. Ellmann, A. Schönberg, S. Heinemann, G. Lauer, R. Stelzer, Dresden Univ. of Technology; Univ. Hospital Carl Gustav Carus; Zahntechnik Schönberg, Dresden, Organical CAD/CAM GmbH, Berlin; INNOTERE GmbH, Radebeul (DE) [CMI-LE-156]

Predict surgical planning of orthognathic surgery using machine learning
Y. Sun, J. Tian, Y. Gu, J. Li, J. Van Desel, C. Politis, X. Zhang, Univ. Hospitals Leuven (BE); Tianjin Univ. (CN) [CMI-LE-101]

Correlation between radiographic findings of CBCT in OSA patients and their AHI value
M. ElSaieed, M. Isaac, A. ElSobky, W. Aboelmaaty, Delta Univ. for Science and Technology, Gamasa; Mansoura Univ. (EG); King Saud Bin Abdulaziz Univ., Riyadh (SA) [CMI-LE-117]

Relationship between MDCT contrast to noise ratio and the as low as diagnostically acceptable dose in localization of the inferior alveolar canal
A. Al-Ekrish, R. Hörmann, G. Widmann, King Saud Univ., Riyadh (SA); Medical Univ. of Innsbruck (AT) [CMI-LE-135]

Tooth numbering on dental panoramic radiographs using multiclass detection network
A. Katsumata, C. Muramatsu, T. Morishita, R. Takahashi, T. Hayashi, W. Nishiyama, Y. Ariji, X. Zhou, T. Hara, E. Ariji, H. Fujita, Asahi Univ. School of Dentistry, Mizuho; Gifu Univ.; Media Co. Ltd, Tokyo (JP) [CMI-LE-127]

CARS – Computer Assisted Radiology and Surgery
34th International Congress and Exhibition on Computer Assisted Radiology and Surgery (CARS)
Chairs: Heinz U. Lemke, PhD (DE), Hubertus Feussner, MD (DE)

Thursday, June 25, 2020

14:00-15:45 Innovations in Cardiovascular Intervention Support
Session Chairs: Terry M. Peters, PhD (CA), Mario A. Cypko, PhD (DE)
Technical Chair: Alissa Jell, MD (DE)

Segmentation of echocardiography sequences beating-heart surgical support
R. Ellis, D. Stuart, G. Bisleri, Queen's Univ., Kingston, ON (CA) [CARS-LE-111]

Superficial femoral artery calcification segmentation in CT angiography based on a vessel-calcification spatial and shape-aware network

W. Weng, Y. Ku, Z. Chen, H. Zheng, C. Xu, H. Ding, L. Li, G. Wang, Tsinghua Univ. School of Medicine; Capital Medical Univ., Beijing (CN) [CARS-LE-152]

Evaluation of different target structures for motion compensation during TAVI
D. Bertsche, W. Rottbauer, V. Rasche, I. Vernikouskaya, Ulm Univ. Medical Center (DE) [CARS-LE-151]

Anatomical 3D localization of the ablation catheter tip based on 2D fluoroscopy using U-net
I. Vernikouskaya, T. Dahme, W. Rottbauer, V. Rasche, Ulm Univ. Medical Center (DE) [CARS-LE-80]

Deep Convolutional Neural Networks (CNN) for classification of coronary arteries
S. A. Mahmoudi, X. Lessage, M. Nedoszytko, C. Piussi, S. Mahmoudi,, Univ. of Mons; CHR Hainaut Mons (BE) [CARS-LE-176]

Virtual heart team - A machine intelligence augmented environment for evidence-based and data-driven therapeutic decision making
M. A. Cypko, V. Falk, A. Meyer, German Heart Inst. Berlin (DE) [CARS-LE-201]

Combining visual analytics and case-based reasoning for rupture risk assessment of intracranial aneurysms
L. Spitz, S. Saalfeld, U. Niemann, O. Beuing, B. Neyazi, E. Sandalcioglu, B. Preim, Otto-von-Guericke-Univ. Magdeburg; Univ. Hospital (DE) [CARS-LE-20-00025]

Interactive editing of virtual chordae tendineae for the simulation of the mitral valve in a decision support system
L. Walczak, L. Tautz, M. Neugebauer, J. Georgii, I. Wamala, S. Sündermann, V. Falk, A. Hennemuth, Fraunhofer MEVIS, Bremen; Deutsches Herzzentrum Berlin; Charité - Universitätsmedizin Berlin Campus Virchow-Klinikum (DE) [CARS-LE-20-00038]

3D guidance including shape sensing of a stentgraft system for endovascular aneurysm repair
S. Jäckle, V. Garcia-Vazquez, T. Eixmann, F. Matysiak, F. von Haxthausen, M.M. Sieren, H. Schulz-Hildebrandt, G. Hüttmann, F. Ernst, Fraunhofer MEVIS, Lübeck; Univ. of Lübeck; Univ. Hospital Schleswig-Holstein (DE) [CARS-LE-20-00030]

A simple, realistic walled phantom for intravascular and intracardiac applications
H. Nisar, J. Moore, R. Piazza, E. Maneas, E.C.S. Chen, T.M. Peters, Western Univ., London, ON; Robarts Research Inst. (CN); Univ. of Pisa (IT); Univ. College London (GB) [CARS-LE-20-00088]

Thursday, June 25, 2020

16:00-16:30 Pathology Informatics
Session Chairs: Randy E. Ellis, PhD (CA), Katja Steiger, MD (DE)
Technical Chair: Kevin Yu (DE)

The roles of deep neural network in micro CT for pathological diagnosis: case of lymph node segmentation
T. Ohnishi, A. Teplov, N. Kawata, B. Stueben, P. Ntiamoah, C. Firat, H. Haneishi, M. Hameed, J. Shia, Y. Yagi, Chiba Univ. (JP); Memorial Sloan Kettering Cancer Center, New York (US) [CARS-LE-105]

Detecting breast cancer clusters from mass spectrometry imaging
R. Ellis, R. Theriault, B. Everitt, S. Varma, M. Kaufmann, Queen's Univ., Kingston, ON (CA) [CARS-LE-72]

Classification of post-operative atrial fibrillation using stacked learning and mass spectrometry
R. Ellis, E. Wang, G. Bisleri, M. Kaufmann, Queen's Univ., Kingston, ON (CA) [CARS-LE-107]

34th International Congress and Exhibition on Computer Assisted Radiology (CAR)
Chair: Ulrich Bick, MD (DE)

Thursday, June 25, 2020

16:30-18:00 Imaging Informatics - Advanced Processing
Session Chairs: Thomas Neumuth, PhD (DE), Alexander Schläfer, PhD (DE)
Technical Chair: Regine Hartwig, MSc (DE)

Unsupervised domain adaptation for category prediction in fMRI brain decoding
H. Yamane, A. Kanehira, T. Harada, RIKEN, Tokyo; The Univ. of Tokyo (JP) [CAR-LE-211]

SR-CycleGAN V2: CycleGAN-based unsupervised super-resolution with pixel-shuffling
T. Zheng, H. Oda, T. Moriya, T. Sugino, S. Nakamura, M. Oda, M. Mori, H. Takabatake, H. Natori, K. Mori, Nagoya Univ.; Sapporo-Kosei General Hospital; Sapporo Minami-sanjo Hospital; Keiwakai Nishioka Hospital, Sapporo (JP) [CAR-LE-42]

A study to quantitatively evaluate the development of fetal lung based on transfer learning deep model from ultrasound images
P. Chen, Y. Deng, Y. Chen, Y. Wang, P. He, X. Lv, J. Yu, Fudan Univ., Shanghai; Tongji Univ. School of Medicine (CN) [CAR-LE-20-00040]

TinyLoss: Loss function for tiny image difference evaluation and its application to unpaired non-contrast to contrast abdominal CT estimation
M. Oda, T. Hu, K. K. Kumamaru, S. Aoki, K. Mori, Nagoya Univ.; Juntendo Univ., Tokyo (JP) [CAR-LE-153]

Spatio-temporal deep learning for 4D OCT-guided motion estimation
M. Bengs, N. Gessert, M. Schlüter, A. Schlaefer, Hamburg Univ. of Technology (DE) [CAR-LE-20-00039]

3D Siamese neural networks for matching pulmonary nodules in series of ct scans
X. Rafael-Palou, A. Aubanell, I. Bonavita, M. Ceresa, G. Piella, V. Ribas, M. González Ballester, Eurecat; BCN MedTec; Vall d'Hebron Univ. Hospital; ICREA, Barcelona (ES) [CAR-LE-67]

Language-based translation and prediction of surgical navigation steps for endoscope tracking in minimally-invasive surgery
R. Bieck, K. Heuermann, M. Pirlich, J. Neumann, T. Neumuth, Univ. of Leipzig, Faculty of Medicine (DE) [CAR-LE-20-00054]

RespiTrack: patient specific real-time respiratory tumor motion prediction using magnetic tracking
Y. Özbek, Z. Bardosi, W. Freysinger, Universitätsklinik Innsbruck (AT) [CAR-LE-20-00016]

Friday, June 26, 2020

8:00-9:15 Medical Imaging

Session Chairs: Ulrich Bick, MD (DE), Floris Ernst, PhD (DE)
Technical Chair: Maximilian Baust, PhD (DE)

A 3D Slicer module for calibration of spatially tracked 3D ultrasound probes
F. von Haxthausen, S. Ipsen, H. Schwegmann, R. Bruder, F. Ernst, V. García-Vázquez, Univ. of Lübeck (DE) [CAR-LE-103]

Deep-learning based reconstruction of ultrasound images from raw channel data
H. Strohm, S. Rothlübbers, K. Eickel, M. Günther, Fraunhofer-Inst. for Digital Medicine MEVIS, Bremen (DE) [CAR-LE-20-00029]

Automatic quality measurement of aortic contrast-enhanced CT angiographies for patient-specific dose optimization
M. Fleitmann, R. Pallenberg, K. Soika, H. Handels, A. Bischof, J. Barkhausen, A. Fürschke, J. Gerlach, A.M. Stroth, Univ. of Lübeck; Universitätsklinikum Schleswig-Holstein (DE) [CAR-LE-20-00091]

Single-energy CT-based perfusion imaging in thoracic and abdominal region based on the convolution neural network
Y. Yuasa, T. Shiinoki, K. Fujimoto, H. Tanaka, Yamaguchi Univ., Ube (JP) [CAR-LE-77]

Digital subtraction angiography using semantic segmentation model of deep learning technique to reduce motion artifacts
H. Yamanaka, M. Yamamoto, Y. Okura, R. Hashimoto, H. Kawata, N. Yamamoto, Hiroshima International Univ.; Kurume Univ. Hospital (JP) [CAR-LE-62]

A visual SLAM based bronchoscope tracking scheme for bronchoscopic navigation
C. Wang, M. Oda, Y. Hayashi, B. Villard, T. Kitasaka, H. Takabatake, M. Mori, H. Honma, H. Natori, K. Mori, Nagoya Univ., Graduate School of Information Science; Aichi Kogyo Daigaku; Sapporo Minami Sankyo Hospital; Keiwakai Nishioka Hospital (JP) [CAR-LE-20-00086]

Multimodal registration of US and MRI scans for vascular fetal surgeries
B. Lalande Chatain, E. Monfort, V. Comte, E. Eixarch, M. A. Gonzalez Ballester, M. Ceresa, Univ. Pompeu Fabra; Fetal i+D Fetal Medicine Research Center, Barcelona (ES) [CAR-LE-175]

Friday, June 26, 2020

9:15-10:45 Imaging Informatics – Segmentation (1)

Session Chairs: Akinobu Shimizu, PhD (JP), Luisa F. Sánchez Peralta, PhD (ES)
Technical Chair: Thomas Wendler, PhD (DE)

An application of multi-organ segmentation from thick-slice abdominal CT volumes using transfer learning
C. Shen, M. Oda, H. Roth, H. Oda, Y. Hayashi, K. Misawa, K. Mori, Nagoya Univ.; Aichi Cancer Center, Nagoya; National Inst. of Informatics, Tokyo (JP), NVIDIA, Maryland (US) [CAR-LE-217]

Fast interactive medical image segmentation with weakly-supervised deep learning method
K.B. Girum, G. Crehange, R. Hussain, A. Lalande, Univ. of Bourgogne; Centre Hospitalier Universitaire, Dijon; Centre Georges-Francois Leclerc (FR) [CAR-LE-20-00061]

Label cleansing and propagation for improved segmentation performance using fully convolutional networks
T. Sugino, Y. Suzuki, T. Kin, N. Saito, K. Mori, Y. Nakajima, Tokyo Medical and Dental Univ.; The Univ. of Tokyo; Nagoya Univ. (JP) [CAR-LE-20-00076]

Speckle GAN: a learnable speckle generator to augment training data for ultrasound image processing
L. Bargsten, A. Schlaefer, Technische Universität Hamburg (DE) [CAR-LE-20-00034]

Training of head and neck segmentation networks with shape prior on small datasets
E. Tappeiner, S. Pröll, K. Fritscher, M. Welk, R. Schubert, UMIT - Private Univ. for Health Sciences, Medical Informatics and Technology GmbH, Hall in Tirol (AT) [CAR-LE-20-00107]

DeepSeg: Deep neural network framework for automatic brain tumor segmentation using magnetic resonance flair images
R. A. Zeineldin, M. E. Karar, J. Coburger, C. R. Wirtz, O. Burgert, Hochschule Reutlingen; Ulm Univ. (DE) [CAR-LE-20-00092]

Enhanced registration of ultrasound volumes by segmentation of resection cavity in neurosurgical procedures
L. Canalini, J. Klein, D. Miller, R. Kikinis, Fraunhofer-Inst. für Digitale Medizin MEVIS, Bremen; Univ. Hospital Knappschaftskrankenhaus Bochum (DE); Harvard Medical School (US) [CAR-LE-20-00027]

ADAGSS: Automatic dataset generation for semantic segmentation
B. Maris, L. Palladino, P. Fiorini, Univ. of Verona (IT) [CAR-LE-51]

Friday, June 26, 2020

11:00-12:30 Imaging Informatics – Segmentation (2)

Session Chairs: Alois C. Knoll, PhD (DE), Masahiro Oda, PhD (JP)
Technical Chair: Alexander Lenz, PhD (DE)

Segmentation of cervical intervertebral disks in videofluorography by CNN, multi channelization and feature selection
A. Fujinaka, K. Mekata, H. Takizawa, H. Kudo, Univ. of Tsukuba Daigaku, Ibaraki; Kobe Red Cross Hospital (JP) [CAR-LE-20-00010]

Toward optimal reliable automatic liver and tumor segmentation using convolutional neural network based on 2.5D models
G. Wardhana, H. Naghibi, B. Sirmacek, M. Abayazid, Univ. of Twente, Enschede (NL) [CAR-LE-20-00047]

Liver segmentation from pediatric CT volumes using fully convolutional network with shape regularization by conditional statistical shape model
Y. Tanaka, A. Saito, M. G. Linguraru, A. Shimizu, Tokyo Univ. of Agriculture and Technology (JP); Children's National Health System, Washington (US) [CAR-LE-124]

Virtual cleansing by unpaired image translation of intestines for detecting obstruction
M. Oda, K. Nishio, H. Oda, T. Kitasaka, Y. Tamada, H. Amano, A. Takimoto, K. Chiba, Y. Hayashi, H. Itoh, A. Hinoki, H. Uchida, K. Mori, Nagoya Univ.; Aichi Inst. of Technology, Toyota (JP) [CAR-LE-82]

Unravelling the effect of data augmentation transformations in polyp segmentation
L.F. Sanchez-Peralta, A. Picon, F. M. Sanchez-Margallo, J. B. Pagador, Jesús Usón Minimally Invasive Surgery Centre; Tecnalia Research & Innovation (ES) [CAR-LE-20-00024]

Bladder cancer segmentation from cystoscopic images by encoder-decoder network
A. Umehara, K. Morooka, J. Mutaguchi, S. Kobayashi, S. Miyauchi, R. Kurazume, M. Eto, Kyushu Univ., Fukuoka (JP) [CAR-LE-74]

Simultaneous process of skeleton segmentation and hot-spot extraction in a bone scintigram
M. Hara, A. Saito, J. Kawabe, S. Higashiyama, H. Daisaki, A. Shimizu, Tokyo Univ. of Agriculture and Technology; Osaka City Univ. (JP) [CAR-LE-94]

Whole-body surface muscle recognition efficiently obtained with limited training images using 3D U-Net based on selective voxel patch generation in whole-body CT images
N. Kamiya, A. Oshima, X. Zhou, K. Azuma, H. Kato, T. Hara, T. Miyoshi, M. Matsuo, H. Fujita, Aichi Prefectural Univ., Nagakute; Gifu Univ.; Univ. of Occupational and Environmental Health (JP) [CAR-LE-20-00008]

Automatic fetal structure segmentation in MRI scans: A deep learning approach requiring very few annotated datasets
L. Joskowicz, G. Dudovitch, D. Sourani, L. Ben Sira, D. Ben Bashat, The Hebrew Univ. of Jerusalem; Tel Aviv Sourasky Medical Center (IL) [CAR-LE-47]

Friday, June 26, 2020

14:00-15:00 IHE Surgery / DICOM WG 24 Workshop
Session Chairs: Ron Schilling, PhD (US), Oliver Burgert, PhD (DE)
Technical Chair: Daniel Ostler, MSc (DE)

The knowledge model
R. Schilling, EchoPixel, Inc., Los Altos Hills, CA (US) [224]

Future role of DICOM WG24 and possible interactions with IHE surgery
O. Burgert, Hochschule Reutlingen (DE)

Panel discussion on further work items in IHE and DICOM

13th CARS Clinical Day
Artificial Intelligence in Clinical Practice: Success and Challenges
Chairs: Leonard Berliner, MD (US), Eric vanSonnenberg, MD (US), Hubertus Feussner, MD (DE)

Friday, June 26, 2020

15:00-16:00 Innovative Clinical Investigations
Session Chairs: Leonard Berliner, MD (US), Eric vanSonnenberg, MD (US), Hubertus Feussner, MD (DE)
Technical Chair: Daniel Ostler, MSc (DE)

A convolutional neural network to detect scoliosis treatment in radiographs
L. Gajny, C. Vergari, W. Skalli, Inst. de Biomécanique Humaine Georges Charpak, Arts et Métiers ParisTech, Paris (FR) [CD-LE-20-00015]

Peripheral nerve block support system guided by an ultrasonic image evaluation of needle position alert function
A. Kataoka, A. Hanafusa, M. Takagi, H. Hayashi, Shibaura Inst. of Technology, Saitama; Osaka Minami Medical Center (JP) [CD-LE-87]

A data-driven approach to predicting lethal temperature isotherm in MRI-guided focal cryoablation
P. Moreira, K. Tuncali, C. Tempany, J. Tokuda, Brigham and Women's Hospital; Harvard Medical School Boston (US) [CD-LE-184]

Automatic linear measurements of the fetal brain on MRI scans with deep neural networks
N. Avisdris, B. Yehuda, O. Ben Zvi, D. Link Sourani, L. Ben Sira, L. Joskowicz, D. Ben Bashat, Hebrew Univ. of Jerusalem Faculty of Medicine, Jerusalem; TASMC, Tel Aviv (IL) [CD-LE-30]

Remote interventional support for emergency care application "mobile ultrasound"
M. Kranzfelder, T. Vogel, D. Ostler, D. Wilhelm, H. Friess, H. Feussner, Klinikum Rechts der Isar der TUM, Munich (DE) [CD-LE-220]

22nd IFCARS / SPIE / ISCAS Joint Workshop on the Digital Operating Room (DOR)
Chairs: Yoshihiro Muragaki, MD (JP), Osman M. Ratib, MD (CH), Dirk Wilhelm, MD (DE)

Friday, June 26, 2020

16:15-17:45 Digital Operating Room
Session Chairs: Dirk Wilhelm, MD (DE), Kevin Cleary, PhD (US)
Technical Chair: Lukas Bernhard, MSc (DE)

BPMNSIX.io - a web-based surgical workflow modeling tool with ontology integration
J. Neumann, D. Vogel, T. Neumuth, Leipzig Univ. (DE) [CARS-LE-182]

Joint surgical gesture and surgical task classification with multi-task and multimodal learning
D. Sarikaya, K. A. Guru, J. J. Corso, Univ. of Rennes 1 (FR) [CARS-LE-190]

Surgical gesture classification with motion cues only
D. Sarikaya, P. Jannin, Univ. of Rennes 1 (FR) [CARS-LE-199]

The automated OR report: A realizable and useful application of the cognitive workflow OR?
M. Kähler, T. Vogel, D. Ostler, A. Zapaishchykova, H. Feussner, D. Wilhelm, M. Kranzfelder, Klinikum r.d. Isar of TUM, Munich (DE) [CARS-LE-174]

Integrating autonomously navigating assistance systems into the clinic - guiding principles and the ANTS-OR approach
L. Bernhard, D. Ostler, H. Feussner, D. Wilhelm, Klinikum rechts der Isar der Technischen Universität München (DE) [CARS-LE-20-00041]

Robotics in surgery: Chances, limitations and future applications
D. Wilhelm, D. Ostler, H. Feussner, Klinikum rechts der Isar of TUM, Munich (DE) [CARS-LE-202]

Manual segmentation versus semi-automated segmentation for quantifying vestibular schwannoma volume on MRI
H. McGrath, P. Li, R. Dorent, R. Bradford, S. Saeed, S. Bisdas, S. Ourselin, J. Shapey, T. Vercauteren, King's College London; UCL Ear Inst.; National Hospital for Neurology and Neurosurgery (UK) [CARS -LE-20-00053]

The future of healthcare facilities: A new architectural and systems design approach
C. Amato, O.M. Ratib, Cannon Design, Los Angeles, CA (US); Univ. Hospital of Geneva (CH) [CARS-LE-223]

Friday, June 26, 2020

18:00 CARS Closing Remarks

Hubertus Feussner, MD , Heinz U. Lemke, PhD, Dirk Wilhelm, MD

Supplementary Presentations
Chair: Jana Steger, MSc (DE)

Lectures can be accessed offline

Session: Video-based Instrumentation and Image-guided Therapy

Computer-assisted laparoscopy planning for the surgical repair of hiatal hernia
G. Gruionu, C. Ciobirca, S. Preda, S. Patrascu, A. Udristoiu, A. Soimu Iacob, E. Diaconu, K. Sapalidis, V. Surlin, L. Gruionu; Univ. of Craiova (RO); Aristotle Univ. of Thessaloniki (GR) [ISCAS-LE-195]

Session: Imaging Informatics – Segmentation

Automatic CT image segmentation of maxillary sinus based on VGG network and improved V-Net
J. Xu, S. Wang, Z. Zhou, J. Liu, X. Chen; Shanghai Jiao Tong Univ. (CN) [CAR-LE- 20-00082]

Classification of hepatic hemangiomas and blood vessels from ultrasonography by deep learning
K. Kusahara, N. Koizumi, Y. Nishiyama, T. Imaizumi, R. Saito, S. Yagasaki, N. Matsumoto, M. Ogawa; The Univ. of Electro-Communications, Tokyo; Nihon Univ. (JP) [CAR-LE- 20-00072]

Estimating 3-dimensional liver motion using deep learning and 2-dimensional ultrasound images
S. Yagasaki, N. Koizumi, Y. Nishiyama, R. Kondo, T. Imaizumi, N. Matsumoto, M. Ogawa, K. Numata; The Univ. of Electro-Communications, Tokyo; Nihon Univ.; Yokohama City Univ. Medical Center (JP) [CAR-LE- 20-00070]

Session: Interventional radiology

GPU accelerated radio frequency and microwave ablation for image-guided interventions on a web-framework
P. Mariappan, R. Flanagan; Indian Inst. of Technology Tirupati (IN); NUMA Engineering Servics Ltd, Dundalk (IE) [CD-LE-65]

Session: Integrated Patient Care

CARS for global health: technology-driven mass casualty centers
R.J. Andrews; NASA Ames Research Center, Los Gatos, CA (US) [CD-LE- 169]

Poster Session

CAR / CARS

001 Automatic liver venous tree segmentation from CT for planning of interventional oncology procedures
A. Landreau, Y. Rolland, L. Royer, A. Petit, F. Lalys, Therenva SAS, Rennes (FR) [CAR-PO-178]

002 Static and moving phantom studies for texture analysis in a respiratory gated PET/CT
K. Hanaoka, S. Watanabe, H. Kaida, K. Ishii, Kindai Univ., Osaka (JP) [CAR-PO-100]

003 Development of advanced deep learning DSA method for coronary artery using u-net based model with transfer learning
M. Yamamoto, Y. Okura, H. Yamanaka, H. Kawata, N. Yamamoto, R. Hashimoto, Hiroshima International Univ.; Kurume Univ. Hospital (JP) [CAR-PO-144]

004 Improving the performance of non-contrast to contrast CT image regression by wavelet convolution neural network
T. Hu, M. Oda, Y. Hayashi, Z. Lu, K. K. Kumamaru, S. Aoki, K. Mori, Nagoya Univ.; Juntendo Univ., Tokyo (JP) [CAR-PO-219]

005 Deformable registration of the liver using sparse intraoperative data: incorporating hepatic feature constraints from tracked intraoperative ultrasound
J. Heiselman, W.R. Jarnagin, M.I. Miga, Vanderbilt Univ., Nashville, TN; Memorial Sloan Kettering Cancer Center (US) [CAR-PO-20-00058]

006 Heterogeneous large-scale CT database analysis for mining knowledge of musculoskeletal anatomy
Y. Otake, Y. Hiasa, M. Takao, Y. Tanaka, K. Aida, S. Sato, A. Nishie, N. Sugano, Y. Sato, Nara Inst. of Science and Technology; Osaka Univ.; National Inst. of Informatics, Chiyoda; Kyushu Univ., Fukuoka (JP) [CAR-PO-139]

007 BERT-based few-shot learning for automatic anomaly classification from Japanese multi-institutional CT scan reports
R. Kuwabara, C. Han, K. Murao, S. Satoh, The Univ. of Tokyo (JP) [CAR-PO-208]

008 Neoadjuvant chemotherapy evaluation on 3D breast tumor ultrasonography using deep learning networks
Y.L. Huang, G. T. Jiang, D. R. Chen**,** Tunghai Univ., Taichung; Christian Hospital, Changhua (TW) [CAR-PO-33]

009 Computer assisted segmentation of the knee bones in CT images for orthopaedic surgery planning
A. Mercader, A. Bigdeli, H. Röttinger, T. C. Lueth, Technical Univ. Munich, Garching; Klinikum Süd München (DE) [CAR-PO-20-00095]

010 Cardiac ventricle segmentation from cine MR images of pigs using 3D convolutional neural networks
M. Stephens, K. López-Linares, A. Santos, î Gaitán, J. Ruiz-Cabello, I. Macía, Vicomtech, San Sebastián; Ciberes, Madrid; Universidad Complutense de Madrid; CIC BiomaGUNE, San Sebastián (ES) [CAR-PO-17]

011 Extraction of blood vessel regions in liver from CT volumes using fully convolutional networks for computer assisted liver surgery
K. Mori, Y. Hayashi, C. Shen, T. Igami, M. Nagino, Nagoya Univ. (JP) [CAR-PO-75]

012 Segmentation of the placenta and its vasculature in 3D power doppler ultrasound for TTTS fetal surgery planning
E. Perera-Bel, M. Ceresa, J. Torrents-Barrena, N. Masoller, B. Valenzuela-Alcaraz, E. Gratacós, E. Eixarch, M. î González Ballester, Univ. Pompeu Fabra, Barcelona; Univ. of Barcelona (ES) [CAR-PO-88]

013 An multi-shape loss function with adaptive class balancing for the segmentation of lung structures
D. Gil, G. Torres, Univ. Autónoma de Barcelona (ES) [CAR-PO-150]

014 Pulmonary function evaluation based on time-series analysis of radiographic lung density: A preliminary study
R. Tanaka, I. Matsumoto, M. Tamura, M. Takata, K. Kasahara, N. Ohkura, D. Inoue, Y. Matsuura, Kanazawa Univ.; Kanazawa Univ. Hospital (JP) [CAR-PO-27]

015 Aberration correction in transcranial ultrasound imaging
D. Leonov, N. Kulberg, L. Osipov, S. Skosirev, G. Grigorev, A. Vladzimirskiy, S. Morozov, Research and Practical Clinical Center of Diagnostics and Telemedicine Technologies, Inst. of Electronic Control Computers named after I. S. Bruk, Medical Center of MGTS PJSC, Moscow (RU) [CAR-PO-12]

016 3D Slicer module for semantic segmentation of ultrasound images in prostate biopsy using deep learning techniques
B. Maris, L. Palladino, P. Fiorini, Università degli studi di Verona (IT) [CAR-PO-18]

017 Single-image super-resolution of computed tomography images using a very deep super-resolution network
Y. C. Lu, Y. H. Chou, H. C. Tseng, C. T. Shih, Chung Shan Medical Univ. Hospital, Taichung (TW) [CAR-PO-50]

018 Deep learning-based rotation frequency estimation and NURD correction for IVOCT image data
T. R. Mieling, S. Latus, N. Gessert, M. Lutz, A. Schlaefer, Hamburg Univ. of Technology; Univ. Medical Center Schleswig-Holstein, Kiel (DE) [CAR-PO-113]

019 4D Deep learning for real-time volumetric optical coherence elastography
M. Bengs, M. Neidhardt, S. Latus, M. Schlüter, T. Saathoff, A. Schlaefer, Univ. of Technology Hamburg-Harburg (DE) [CAR-PO-20-00042]

020 Inter-reader variability in breast MRI radiomics
P. Gibbs, M. Fox, A. Bitencourt, C. Saccarelli, I. Daimiel, R. Lo Gullo, K. Pinker-Domenig, Memorial Sloan Kettering Cancer Center, New York (US) [CAR-PO-193]

021 Conventional and ultrasound bronchoscopy with HoloLens
A. Kildahl-Andersen, E. Fagertun Hofstad, H. Sorger, A. Bakke Jensen, H. O. Leira, T. Amundsen, T. Langø, J. G. Skogås, G. Kiss, St.Olavs Hospital, Trondheim; SINTEF Technology and Society; Levanger Hospital, Levanger; Norwegian Univ. of Science and Technology, Trondheim (NO); Tokyo Denki Univ. (JP) [CAR-PO-155]

022 The 3D Pelvic Inclination Correction System (PICS) enhanced: using machine learning for comparable pelvic interpatient image measurements
T. Winklehner, T. Antunovic, C. Betschart, Univ. of Bern; Univ. Hospital Zürich (CH) [CAR-PO-23]

023 Development of home-care support system for home-patient - development and evaluation of medical information sharing system
A. Okawa, T. Umeda, N. Kobayashi, K. Ito, Mie Prefectural College of Nursing, Tsu (JP) [CARS-PO-13]

024 Development of security model for medical image data hidden using digital watermark and steganography technique
T. Umeda, A. Okawa, N. Kobayashi, K. Ito**,** Yokkaichi Nursing & Medical Care Univ. (JP) [CARS-PO-14]

025 Effect assessment of vascular behavior on visibility in vascular virtual handling system for endovascular intervention assistance
T. Shinohara, K. Fukata, N. Nakasako, Kindai Univ., Kinokawa (JP) [CARS-PO-22]

026 Detecting ganglion cells on virtual slide images: Macroscopic masking by superpixel
H. Oda, Y. Tamada, K. Nishio, T. Kitasaka, H. Amano, K. Chiba, A. Hinoki, H. Uchida, M. Oda, K. Mori, Nagoya Univ.; Aichi Inst. of Technology, Toyota (JP) [CARS-PO-38]

027 Purkinje cell somas segmentation in a two-photon microscopic volume of a mouse brain
A. Shimizu, R. Kimizuka, A. Saito, T. Michikawa, A. Miyawaki, H. Yokota, Tokyo Univ. of Agriculture and Technology; RIKEN Center for Advanced Photonics, Biotechnological Optics Research Team, Saitama (JP) [CARS-PO-78]

028 Development of slave device of teleoperation system for catheterization with force feedback - method for measuring the collision force
A. Hanafusa, K. Osada, M. Takagi, Univ., Saitama (JP) [CARS-PO-92]

029 Introduction of an algorithm for landmark segmentation to guide the application of regional anaesthesia with ultrasound imaging
K. Skerl, J. Pinter, M. Stingl, R. Celik, Furtwangen Univ., Villingen-Schwenningen (DE) [CARS-PO-141]

030 3D freehand ultrasound using deep learning for the treatment of peripheral artery disease
T. Leblanc, F. Lalys, L. Royer, A. Lucas, A. Simon, Therenva, Rennes; Univ. de Rennes 1 (FR) [CARS-PO-172]

031 VICTORIA - VIrtual neck Curve and True Ostium Reconstruction of Intracranial Aneurysms
S. Saalfeld, P. Berg, B. Behrendt, S. Voß, O. Beuing, B. Neyazi, B. Preim, Otto-von-Guericke-Univ. Magdeburg; Univ. Hospital Magdeburg (DE) [CARS-PO-20-00050]

ISCAS

032 Constraint-based optimal needle path planning with 3D signed distance field fusion
W. Si, R. Li, J. Guo, Y. Zhang, R. Klein, P. A. Heng, Shenzhen Inst. of Advanced Technology, Chinese Academy of Sciences; People's Hospital; Shenzhen; SIAT, CAS, Shenzhen; Univ. of Hong Kong (CN); Univ. of Bonn (DE) [ISCAS-PO-4]

033 Master-slave selectable control system with multiple connection for locally operated surgical assistant robots in laparoscopy
H. Karino, S. Fukui, T. Kawai, Y. Nishizawa, A. Nishikawa, N. Iwamoto, Y. Horise, K. Masamune, Osaka Inst. of Technology; Osaka Univ.; National Cancer Center Hospital East, Kashiwa; Shinshu Univ.; Tokyo Women’s Medical Univ. (JP) [ISCAS-PO-19]

034 Statistical accuracy evaluation of a zoom-independent calibration target for AR applications using a digital surgical microscope
J. C. Rosenthal, L. Demaret, F.C. Uecker, P. Eisert, Fraunhofer-Inst. fur Nachrichtentechnik Heinrich-Hertz-Inst., Berlin; Charité Berlin, ARRI Medical GmbH, Munich (DE) [ISCAS-PO-58]

035 The distance between the bifurcations of the tumor feeding artery of oral cancer is unlikely to change with head and neck posture changes
T. Ohya, I. Sakuma, K. Yanagida, Y. Hayashi, Y. Yajima, T. Koizumi, K. Mitsudo, Yokohama City Univ. Graduate School of Medicine; The Univ. of Tokyo (JP) [ISCAS-PO-97]

036 Anastomoses in visceral surgery- development of a transluminal system for micro invasive restoration of intestinal patency

J. Steger, S. Ficht, D. Ostler, M. Eblenkamp, D. Wilhelm, Klinikum rechts der Isar, Munich; Technical Univ. of Munich (DE) [ISCAS-PO-99]

037 Automatic image annotation for surgical instrument segmentation
H. Matsuzaki, M. Murata, Y. Watanabe, H. Hasegawa, N. Takeshita, M. Ito, National Cancer Center Hospital East, Kashiwa (JP) [ISCAS-PO-122]

038 In vivo test for evaluation of a 4 DOF robot system for vascular intervention
H. J. Cha, J. Woo, H. S. Song, J. Y. Won, B. J. Yi, Korea Inst. of Machinery and Materials, Daegu; Hanyang Univ., Gyonggi-do;Yonsei Univ., Seoul (KR) [ISCAS-PO-130]

039 Augmented reality for bone fragment positioning during craniosynostosis reconstruction surgery
R. Moreta-Martinez, D. García-Mato, M. García-Sevilla, S. Ochandiano, R. García-Leal, J. A. Calvo-Haro, R. Pérez-Mañanes, J. I. Salmerón, J. Pascau, Univ. Carlos III de Madrid, Leganes Inst. de Investigación Sanitaria Gregorio Marañón, Madrid (ES) [ISCAS-PO-142]

040 Motion analysis of the distal radio-ulnar joint and quantification of the associated methodological error
J. Oonk, I. Dobbe, S. Strackee, G. Strijkers, G. Streekstra, Univ. of Amsterdam (NL) [ISCAS-PO-157]

041 Patient-mounted MRI compatible robot for pain injections
K. Cleary, G. Li, N. Patel, C. Dumoulin, K. Sharma, J. Fritz, I. Iordachita, Children's National Health System, Washington; Johns Hopkins Univ., Baltimore: Cincinnati Childrens Hospital; Pittsburgh (US) [ISCAS-PO-158]

042 Stereo calibration of non-overlapping field of view heterogeneous cameras for calibrating surgical microscope with external tracking camera
R. Hussain, A. Lalande, I. Stefanis, K. Berihu Girum, C. Guigou, D. Fofi, A. Bozorg Grayeli, Univ. de Bourgogne Franche-Comté, Dijon (FR) [ISCAS-PO-161]

043 Virtual Reality exploration of SEEG placement for drug-resistant epilepsy planning
A. Higueras Esteban, M. Ceresa, S. Gomez, M. Sanchez-Fibla, L. Serra, M. A. Gonzalez Ballester,, Univ. Pompeu Fabra; Galgo Medical SL, Barcelona (ES) [ISCAS-PO-166]

044 Augmented reality visualization of MRI-guided presurgical planning
S. de Ribaupierre, D. Kikinov, D. Pur, R. Eagleson, Univ. of Western Ontario, London (CA) [ISCAS-PO-183]

045 Validating automatic performance assessment of virtual temporal bone dissection
S. Sachan, M. Hoy, S. Chan, J. Dort, Univ. of Calgary (CA) [ISCAS-PO-186]

046 Sensor-fusion of IMU and optical tracking for navigation in laparoscopic surgery
R. Hartwig, A. Dorigan, D. Ostler, D. Wilhelm, Technical Univ. of Munich (DE) [ISCAS-PO-194]

047 Process chain for knowledge-based design and dimensioning of motion elements for individualized ankle foot orthoses
L. Mika, S. Holtzhausen, R. Stelzer, Technical Univ. Dresden (DE) [ISCAS-PO-196]

048 Fabrication of an ultrasound and X-ray compatible phantom for image-guided liver interventions with realistic vasculature and fluid flow
E. Maneas, J. Moore, L. Groves, R. Vassallo, A. E. Desjardins, T. M. Peters, E. C. S. Chen, Univ. College London (GB); Western Univ., London, ON (CA) [ISCAS-PO-200]

049 Stereotactic pelvic navigation surgery for recurrent rectal cancer
J. H. Lee, J. M. Kwak, J. Kim, J. M. Choo, S. W. Cho, Korea Univ., Seoul (KR) [ISCAS-PO-210]

050 3D evaluation compared for before and after periacetabular osteotomy using of image matching method
H. Gondo, T. Shimoto, S. Hamai, Y. Nakashima, A. Ishikawa, H. Higaki, Kyushu Sangyo Univ., Fukuoka; Fukuoka Inst. of Technology; Kyushu Univ.; Kyushu Sangyo Univ., Fukuaoka (JP) [ISCAS-PO-213]

~~**051 Single shot C-arm pose estimation using deep learning**~~
~~S. Andreß, H. Esfandiari, M. Herrold, P. Guy, W. Böcker, S. Weidert, A. Hodgson, Univ. Hospital, LMU Munich (DE); Univ. of British Columbia, Vancouver (CA) [ISCAS-PO-221]~~ cancelled

052 The cochlea hydro drive description of a concept for hydraulically operated, automated insertion of electrodes in cochlear implant surgery
T. S. Rau, M.G. Zuniga, R. Salcher, T. Lenarz, Hannover Medical School (DE) [ISCAS-PO-20-00023]

053 Cloud-based three-dimensional pattern analysis and classification of proximal humeral fractures - a feasibility study
D. Baumann, A. Gerber Popp, M. Degen, D. Brodbeck, F. Coigny, T. Suter, E. Schkommodau, Fachhochschule Nordwestschweiz, Muttenz; Schulter Ellbogen Emmental; Kantonsspital Baselland; Univ. of Applied Sciences and Arts Northwestern Switzerland (CH) [ISCAS-PO-20-00033]

054 Modular joint design of preoperative positioning manipulator for laparoscopic minimally invasive surgery robot system
P. Wang, Z. Zhang, G. He, Y. Yang, Q. Cao, Shanghai Jiao Tong Univ. (CN) [ISCAS-PO-20-00045]

055 A novel visual guidance system for assisting during placement of an auditory brainstem implant
M. Regodic, W. Freysinger, Medical Univ. of Innsbruck (AT) [ISCAS-PO-20-00081]

056 Fluoroscopic images-based aiming and targeting system with two line lasers for insertion guidance of interlocking screw
S. Joung, J. Yu, H. Song, C.-W. Park, I. Park, Kyungpook National Univ., Deagu (KR) [ISCAS-PO-20-00021]

~~**057 Assessment framework of novel surgical technology concepts and early designs : applied to fetal minimally invasive surgery**~~
~~A. Javaux, J. Legrand, L. De Catte, R. Devlieger, L. Lewi, J. Deprest, K. Denis, P. Jannin, E. Vander Poorten, Katholieke Univ. Leuven, Heverlee (BE); Univ. of Rennes 1 (FR) [ISCAS-PO-181]~~ cancelled

CAD

058 Proposal for an incremental learning method for CNN-based hepatic tumor CAD development
K. Abe, H. Takeo, Y. Nagai, S. Nawano, Kanagawa Inst. of Technology; National Cancer Center Hospital East, Chiba; International Univ. of Health and Welfare, Tokyo (JP) [CAD-PO-3]

059 Developing high performance CAD for depression by employing image and voice information
S. Wada, Y. Maki, K. Abe, H. Takeo, Y. Nagai, Kanagawa Inst. of Technology; National Cancer Center Hospital East, Chiba (JP) [CAD-PO-7]

060 Developing high performance CAD for depression by integrating multiple classifier systems
Y. Maki, S. Wada, K. Abe, H. Takeo, Y. Nagai, Kanagawa Inst. of Technology; National Cancer Center Hospital East, Chiba (JP) [CAD-PO-8]

061 A preliminary study on creating a ground-truth image for deep learning-based body fat segmentation in MRI using multi-atlas segmentation
M. Takahashi, T. Takenaga, Y. Nomura, S. Hanaoka, M. Nemoto, T. Yoshikawa, N. Hayashi, S. Abe, Ibaraki Prefectural Univ. of Health Sciences, Ami town; The Univ. of Tokyo Hospital; Kindai Univ., Higashiosaka (JP) [CAD-PO-28]

062 Improvement of lung nodule classification performance using gated-dilated networks
M. Tan, M. Al-Shabi, H. K. Lee, Monash Univ. Malaysia, Subang Jaya, Selangor (MY); A*STAR, Singapore (SG) [CAD-PO-39]

063 Automatic detection of cervical and thoracic lesions on FDG-PET/CT by organ specific one-class SVMs
A. Tanaka, M. Nemoto, H. Kaida, Y. Kimura, T. Nagaoka, T. Yamada, K. Ushifusa, K. Hanaoka, K. Kitajima, T. Tsuchitani, K. Ishii,, Kindai Univ., Kinokawa; Kindai Univ. Hospital, Osakasayama; Hyogo College of Medicine, Nishinomiya (JP) [CAD-PO-83]

064 The study of machine learning methods for the lesion differentiation on mammograms
I. Egoshin, D. Pasynkov, A. Kolchev, I. Kliouchkin, O. Pasynkova, V. Shafigulina, Mari State Univ.; Kazan Federal Univ.,Yoshkar-Ola; Kazan State Medical Univ., Kazan (RU) [CAD-PO-104]

065 A generalized image feature generation based on unsupervised deep learning with small scale normal dataset
K. Ushifusa, M. Nemoto, Y. Kimura, T. Nagaoka, T. Yamada, A. Tanaka, N. Hayashi, Kindai Univ., Kinokawa; The Univ. of Tokyo Hospital (JP) [CAD-PO-81]

066 Deep Convolutional Neural Networks (CNN) for mammographic abnormalities detection and segmentation
S. Mahmoudi, F. Giudice, T. Weber, X. Lessage, X. Siebert, S. A. Mahmoudi, Univ. of Mons (BE) [CAD-PO-115]

067 3D-ResNet-GAN for improved electronic cleansing in CT colonography
R. Tachibana, J. Näppi, T. Hironaka, H. Yoshida, National Inst. of Technology, Yamaguchi (JP); Massachusetts General Hospital and Harvard Medical School, Boston (US) [CAD-PO-205]

068 Discrimination of the pulmonary nodules in computed tomography image using homology method
K. Nakane, H. Numasaki, M. Yanagawa, M. Koizumi, H. Yamamoto, N. Tomiyama, Osaka Univ. Graduate School of Medicine and Health Science; Osaka Univ. (JP) [CAD-PO-57]

IPCAI 2020 - 11th International Conference on Information Processing in Computer-Assisted Interventions

Time schedule: Tuesday, June 23, 2020- Overview

15:20-15:30 **Welcome/Opening for IPCAI 2020**

15:30-17:30 **Selected Short Paper Presentations**

17:30-18:00 **IPCAI Town - Social Get-Together / Voting for best short paper presentation**

18:00-19:30 **CARS Opening Ceremony and Keynotes**

19:30-20:30 **Long Abstract Town**

19:30-20:30 **Research Paper Town**

20:30-21:30 **IPCAI Town - Quiz and Social Get-Together**

Time schedule: Wednesday, June 24, 2020- Overview

15:00-16:30 **Selected Long Paper Presentations 1**

16:30-17:00 **IPCAI Town - Social Get-Together / Give us your virtual feedback**

17:00-18:30 **Selected Long Paper Presentations 2**

18:30-19:30 **“Ask me Anything” with the Steering Committee and ACs from academia/industry**

19:30-20:30 **Lessons learnt, Awards and Closing**

Chairs: Parvin Mousavi, PhD (CA), Lena Maier-Hein, PhD (DE), Stefanie Speidel, PhD (DE)

Tuesday-Wednesday, June 23-24, 2020

Research Theme 1: Tracking and Navigation

SciKit-Surgery: Compact Libraries for Surgical Navigation
S. Thompson, T. Dowrick, M. Ahmad, G. Xiao, B. Koo, E. Bonmati, K. Kahl, M.J. Clarkson, Univ. College London (GB) [IPCAI-2]

i3PosNet: Instrument Pose Estimation from X-Ray in temporal bone surgery
D. Kügler, J. Sehring, A. Stefanov, I. Stenin, J. Kristin, T. Klenzner, J. Schipper, A. Mukhopadhyay, Technische Univ. Darmstadt; Universitätsklinikum Düsseldorf (DE) [IPCAI-106]

Learned Optical Flow for Intra-Operative Tracking of the Retinal Fundus
C. S Ravasio, T. Pissas, E. Bloch, B. Flores, S. Jalali, D. Stoyanov, J. M Cardoso, L. Da Cruz, C. Bergeles, King's College London; Univ. College London; Moorfields Eye Hospital NHS Foundation Trust (GB) [IPCAI-91]

Hand-eye Coordination Based Implicit Re-calibration Method for Gaze-tracking on Ultrasound Machines: A Statistical Approach
H. Zhu, S. Salcudean, R. Rohling, Univ. of British Columbia, Vancouver, BC (CA) [IPCAI-145]

Light Modelling and Calibration in Laparoscopy
R. Modrzejewski, T. Collins, A. Hostettler, J. Marescaux, A. Bartoli, Inst. Pascal, Clermont-Ferrand; IRCAD France (FR) [IPCAI-14]

Tracking and Visualization of the Sensing Area for a Tethered Laparoscopic Gamma Probe
B. Huang, Y.-Y. Tsai, J. Cartucho, K. Vyas, D. Tuch, S. Giannarou, D.S. Elson, Imperial College London; Lightpoint Medical Ltd (GB) [IPCAI-102]

Deep Learning Based Anatomical Site Classification for Upper Gastrointestinal Endoscopy
S. Zuo, Q. He, S. Bano, O. F. Ahmad, B. Yang, X. Chen, P. Valdastri, D.Stoyanov, Tianjin Univ.; Tianjin Medical Univ. General Hosp. (CN); Univ. College London; Univ. of Leeds (GB) [IPCAI-36]

Research Theme 2: Surgical Data Science

The Effect of Video Playback Speed on SurgeonÂ Technical Skill Perception
J. D. Kelly, A. Petersen, T. S. Lendvay, T. M. Kowalewski, Univ. of Minnesota, Minneapolis; Seattle Children's Hospital (US) [IPCAI-4

A Robotic 3D Perception System for Operating Room Environment Awareness
Z. Li, A. Shaban, J. G. Simard, D. Rabindran, S. DiMaio, O. Mohareri, Johns Hopkins Univ., Baltimore, MD; Georgia Inst. of Technology; Intuitive Surgical Inc (US); Univ. de Montreal (CA) [IPCAI-68]

Effect of real-time virtual reality-based teaching cues on learning needle passing for robot-assisted minimally invasive surgery: a randomized controlled trial

A. Malpani, S.S. Vedula, H.C. Lin, G.D. Hager, R.H. Taylor, Johns Hopkins Univ., Baltimore, MD; Intuitive Surgical Inc (US) [IPCAI-127]

FetNet: A Recurrent Convolutional Network for Occlusion Identification in Fetoscopic Videos
S. Bano, F. Vasconcelos, E. Vander Poorten, T. Vercauteren, S. Ourselin, J. Deprest, D. Stoyanov, Univ. College London; King's College London (GB); KU Leuven Univ.; Univ. Hospital Leuven (BE) [IPCAI-61]

Automatic Task Recognition in a Flexible Endoscopy Benchtop Training System
V. Bencteux, G. Saibro, E. Shlomovitz, P. Mascagni, A. Hostettler, J. Marescaux, T. Collins, IHU Strasbourg; IRCAD Strasbourg (FR); UHN Toronto (CA) [IPCAI-110]

LRTD: Long-Range Temporal Dependency based Active Learning for Surgical Workflow Recognition
X. Shi, Y. Jin, Q. Dou, P.-A. Heng, The Chinese Univ. of Hong Kong (HK) [IPCAI-27]

Research Theme 3: Interventional Imaging

Automatic Annotation of Hip Anatomy in Fluoroscopy for Robust and Efficient 2D/3D Registration
R. Grupp, M. Unberath, C. Gao, R. Hegeman, R. Murphy, C. Alexander, Y. Otake, B. McArthur, M. Armand, R. Taylor, Johns Hopkins Univ., Baltimore, MD; Auris Health, Inc.; Univ. of Texas at Austin (US); Nara Inst. of Science and Technology (JP) [IPCAI-120]

Light source calibration for multispectral imaging in surgery
L. Ayala, S. Seidlitz, A. Vemuri, S. Wirkert, T. Kirchner, T. Adler, C. Engles, D. Teber, L. Maier-Hein, Deutsches Krebsforschungszentrum, Heidelberg; Städtisches Klinikum Karlsruhe (DE) [IPCAI-30]

Learning from Irregularly Sampled Data for Endomicroscopy Super-resolution: A Comparative Study of Sparse and Dense Approaches
A. B. Szczotka, D. Ismail Shakir, D. Ravi, M. J. Clarkson, S. P. Pereira, T. Vercauteren, Univ. College London; King's College London (GB) [IPCAI-16]

WGAN Domain Adaptation for the Joint Optic Disc-and-Cup Segmentation in Fundus Images
S. Kadambi, Z. Wang, E. Xing, Rice Univ., Houston, TX; Petuum Inc (US) [IPCAI-138]

Acoustic Signal Analysis of Instrument-Tissue Interaction for Minimally Invasive Interventions
D. Ostler, M. Seibold, J. Fuchtmann, N. Samm, H. Feussner, D.F. Wilhelm, N. Navab, Technical Univ. of Munich; Klinikum rechts der Isar der Technischen Univ. München (DE) [IPCAI-32]

Automatic intraoperative Optical Coherence Tomography Positioning
M. Grimm, H. Roodaki, A. Eslami, N. Navab, Technical Univ. of Munich; Carl Zeiss Meditec AG (DE) [IPCAI-80]

Detecting the Occluding Contours of the Uterus to Automatise Augmented Laparoscopy: Score, Loss, Dataset, Evaluation and User-Study
T. Francois, L. Calvet, S. Madad Zadeh, D. Saboul, S. Gasparini, P. Samarakoon, N. Bourdel, A. Bartoli, Inst. Pascal, Aubière; Centre Hospitalier Univ. de Clermont-Ferrand; Be-Studys; Inst. National Polytechnique de Toulouse (FR) [IPCAI-92]

Research Theme 4: Interventional Robotics, Evaluation and Validation

Investigating exploration for deep reinforcement learning of concentric tube robot control
K. Iyengar, G. Dwyer, D. Stoyanov, Univ. College London (GB) [IPCAI-48]

Ultrasound 3D Reconstruction of Malignant Masses in Robotic-Assisted Partial Nephrectomy Using the PAF Rail System: a Comparison Study
C. Wang, C. Komninos, S. Andersen, C. D'Ettorre, G. Dwyer, P. Edwards, A. Stilli, D. Stoyanov, Univ. College London (GB); Univ. of Patras (GR); Stanford Univ. (US) [IPCAI-64]

Leveraging Vision and Kinematics Data to Improve Realism of Biomechanic Soft-tissue Simulation for Robotic Surgery
J. Ying Wu, P. Kazanzides, M. Unberath, Johns Hopkins Univ., Baltimore, MD (US) [IPCAI-96]

Perioperative Margin Detection In Basal Cell Carcinoma Using A Deep Learning Framework: A Feasibility Study
A.M.L. Santilli, A. Jamzad, N.N.Y Janssen, M. Kaufmann, L. Connolly, K. Vanderbeck, A. Wang, D. McKay, J.F. Rudan, G. Fichtinger, Parvin Mousavi, Queen's Univ., Kingston, ON (CA) [IPCAI-21]

Preclinical Evaluation of Ultrasound-Augmented Needle Navigation for Laparoscopic Liver Ablation
X. Liu, W. Plishker, T. D Kane, D. A Geller, L. W Lau, J. T., K. Sharma, R. Shekhar, Children's National Hospital, Washington, DC; IGI Technologies; Univ. of Pittsburgh Medical Center (US) [IPCAI-98]

Pre-clinical evaluation of an image-guided in-situ Raman spectroscopy navigation system for targeted prostate cancer interventions
R. Shams, F. Picot, D. Grajales, G. Sheehy, F. Dallaire, M. Birlea, F. Saad, D. Trudel, C. Menard, F. Leblond, S. Kadoury, Polytechnique Montreal; Centre Hospitalier de L'Univ. de Montreal (CA) [IPCAI-109]

Research Theme 5: Surgical Planning, Simulation and Advanced Intraoperative Visualization

Precise Proximal Femur Fracture Classification for an Interactive Training and Surgical Planning
A. Jimenez-Sanchez , A. Kazi, S. Albarqouni, C. Kirchhoff, P. Biberthaler, N. Navab, S. Kirchhoff, D. Mateus, Univ. Pompeu Fabra, Barcelona (ES); Technical Univ. of Munich; Klinikum rechts der Isar der Technischen Univ. München (DE); Ecole centrale de Nantes (FR) [IPCAI-79]

Dynamic path planning for percutaneous procedures in the abdomen during free breathing
D. Pour Arab, S. Voros, C. Essert, Univ. of Strasbourg, Illkirch; Laboratoire Techniques de l'Ingenierie Medicale et de la Complexite Informatique Mathematiques et Applications Grenoble (FR) [IPCAI-74]

Towards Automatic C-Arm Positioning for Standard Projections in Orthopedic Surgery
L. Kausch, S. Thomas, H. Kunze, M. Privalov, S. Vetter, J. Franke, A. Mahnken, L. Maier-Hein, K. Maier-Hein, Deutsches Krebsforschungszentrum, Heidelberg; Siemens Healthcare GmbH; BG Unfallklinik Ludwigshafen; Universitatsklinikum Giessen und Marburg GmbH (DE) [IPCAI-10]

Estimation of boundary conditions for patient-specific liver simulation during augmented surgery
S. Nikolaev, S. Cotin, Inria, Strasbourg; Inria Centre de Recherche Nancy Grand Est (FR) [IPCAI-60]

Multimodal Mixed Reality Visualisation for Intraoperative Surgical Guidance
J. Cartucho, D. Shapira, H. Ashrafian, S. Giannarou, Imperial College London (GB); Eidgenössische Technische Hochschule Zurich (CH) [IPCAI-5]

Evaluation of a Proposed Marker-Less, Intra-Operative, Augmented Reality Guidance System for Robot-Assisted Laparoscopic Radical Prostatectomy
M. Kalia, P. Mathur, K. Tsang, P. Black, N. Navab, S. Salcudean, Univ. of British Columbia, Vancouver, BC (CA); Technical Univ. of Munich (DE) [IPCAI-124]

Augmented reality simulator for ultrasound-guided percutaneous renal access
Y. Mu, D. Hocking, Z. Tao Wang, G. J. Garvin, R. Eagleson, T. M. Peters, Western Univ., London, ON (CA) [IPCAI-132]

Research Theme 6:Interventional Ultrasound

A deep learning method for real-time intraoperative US image segmentation in prostate brachytherapy
K. Berihu Girum, A. Lalande, R. Hussain, G. Créhange, Univ. de Bourgogne, Dijon; Inst. Curie (FR) [IPCAI-7]

Automatic segmentation of the carotid artery and jugular vein from 2D ultrasound images for 3D vascular reconstruction
L. Groves, B. Vanberlo, N. Veinberg, T. Peters, E. Chen, Western Univ., London, ON (CA) [IPCAI-134]

Quality Invariant Bone Surfaces Segmentation from Ultrasound Using a Local Phase Tensor Guided CNN
P. Wang, M. Vives, V. Patel, I. Hacihaliloglu, Johns Hopkins Univ., Baltimore, MD; Rutgers Robert Wood Johnson Medical School; Rutgers The State Univ. of New Jersey (US) [IPCAI-22]

Bone Shadow Segmentation from Ultrasound Data for Orthopedic Surgery Using GAN
A.Z. Alsinan, V.I. M. Patel, I. Hacihaliloglu, Rutgers The State Univ. of New Jersey, Piscataway, NJ; Johns Hopkins Univ. (US) [IPCAI-12]

Cardiac Point-of-Care to Cart-Based Ultrasound Translation Using Constrained CycleGAN
M. Hossein Jafari, H. Girgis, N. Van Woudenberg, N. Moulson, C. Luong, A. Fung, S. Balthazaar, J. Jue, M. Tsang, P. Nair, K. Gin, R. Rohling, P. Abolmaesumi, T. Tsang, Univ. of British Columbia, Vancouver, BC; Vancouver General Hospital (CA) [IPCAI-72]

Improving Targeting of Prostate Cancer Foci via Information Fusion of MP-MRI and Temporal Enhanced Ultrasound

A. Sedghi, A. Mehrtash, A. Jamzad, A. Amalou, J.T. Kwak, B. Turkbey, P. Choyke, P. Pinto, B. Wood, S. Xu, P. Abolmaesumi, P. Mousavi, Queen's Univ., Kingston, ON; Univ. of British Columbia, Vancouver, BC (CA); NIH, Baltimore, MD (US); Seijong Univ. (KR) [IPCAI-9]

Long Abstracts

Deformation Compensation in Robotically-Assisted Breast Biopsy
V. Groenhuis, E. Tagliabue, M. K. Welleweerd, F.J. Siepel, J. D. Munoz Osorio, B. Maris, D. Dall'Alba, U. Zimmermann, P. Fiorini, S. Stramigioli, Univ. of Twente, Enschede (NL) [IPCAI-142]

Comparison of acoustic rhinometry, rhinomanometry and lattice Boltzmann simulation of nasal air flow
M. Berger, M. Pillei, A. Mehrle, W. Recheis, F. Kral, M. Kraxner, W. Freysinger, Medical Univ. of Innsbruck (AT) [IPCAI-148]

FastPathology: An open-source platform for artificial intelligence-based digital pathology
A. Pedersen, E. Smistad, I. Reinertsen, M. Vallat, SINTEF Digital, Trondheim (NO) [IPCAI-149]

MARIN: an Open Source Mobile Augmented Reality Interactive Neuronavigation System
E. Leger; J. Reyes; S. Drouin, T. Popa, J. A. Hall, D. L. Collins, M. Kersten-Oertel, Concordia University, Montréal, QC (CA) [IPCAI-55]