



IEEE ISBI 2022

International Symposium on Biomedical Imaging

28-31 March 2022, ITC Royal Bengal, Kolkata, India

ISBI 2022 SYMPOSIUM PROGRAM

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IEEE ISBI 2022 Program

2022 IEEE International Symposium on Biomedical Imaging
March 28 - 31, 2022
Kolkata, India



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Welcome Letter

Dear Colleagues,

On behalf of the Organizing Committee, we extend a warm welcome to the Nineteenth IEEE International Symposium on Biomedical Imaging. ISBI 2022. This is organized jointly by the IEEE Signal Processing Society and the IEEE Engineering in Medicine and Biology Society.

This year ISBI is being held in a hybrid mode for the first time since the COVID-19 pandemic started. Although a fully physical mode was our desirable format as per the initial plan, the evolving pandemic situation required that we take a cautious approach and conduct the conference in a hybrid mode. We warmly welcome all attendees to ISBI and appreciate those who decided to attend onsite. We hope our hybrid mode will provide an engaging program for all attendees.

A unique feature of ISBI this year are three major changes to the review process implemented to improve the quality of reviews and accepted papers. First, CMT was used for paper management system and organizing the overall review process. Secondly, the Toronto paper matching system was employed to ensure knowledgeable experts were assigned to review appropriate papers. Finally, a double-blind review process was followed to help focus the paper review and selection process exclusively on the quality of contributions. We received 785 original submissions (four-page full papers and one-page abstracts) from 33 countries in six continents. The review process was very competitive and in the end, the technical program included 96 orals (around 13%), 213 posters (around 30%), 42 1-page abstract presentations and 5 special sessions.

The overall program includes **5 plenary talks** by leading scientists/researchers on very exciting topics and innovations. These include Dr Krishna Ella (awarded Padma Bhushan, one of India's highest civilian award, for the introduction of Covaxin vaccine in the fight against Covid-19) who will talk about the Role of AI and imaging in vaccine research. Other exciting talks will be by Dr. Elisa Konofagou and Dr. Harish Potani on Imaging and treatment of cancer and tumors; Prof. Alison Noble on Simplifying ultrasound and Prof. Nassir Navab on the role of Machine learning and AR for interventions, all of whom are leading experts in their fields.

There will be six exciting special sessions on cutting edge imaging technologies including Clinical Applications of Photoacoustic Imaging, Deep Learning / AI in Medical Imaging Standards, and Neuroimaging for Neuroscience. There will be 6 keynotes delivered in special sessions by Profs. Daniel Alexander, Vince Calhoun, Yonina Eldar, Sushmita Mitra, Rakesh Mullick and Dr. Ron Summers covering a wide spectrum of subjects such as model based imaging and deep learning with models and an industry perspective on precision medicine.

We have six tutorials ranging across widely ranging topics such as photoacoustic imaging, graph signal processing, and federated learning. ISBI 2022 will also host six Challenges on analysis of CT, histological and optical images for a variety of problems.

This year, we are also piloting the Conflux Virtual Platform for ISBI with many custom features that will enhance the user experience of the virtual attendees, including, a calendar-based and searchable program schedule, personalized dashboards, and online zoom networking.

IEEE ISBI supports diversity in science and engineering. Our committee represents 10 countries on six continents, includes students and senior scientists alike, with almost half our members being women. This year we will also have the Women in Imaging session along with student and women networking events. Finally, we will be hosting an Industry Expo, where our generous patrons of the biomedical imaging industry would be exhibiting their technologies on site.

Such a diverse program in the challenging hybrid setting would not have been possible without the active participation of a large organizing committee. We are especially thankful to the program chairs, Suyash Awate and Tanveer Syeda-Mahmood for assembling a high quality technical program, to the local organizing chairs Debdeep Sheet and Arun Thittai for ensuring a smooth hybrid immersive experience through local arrangements in coordination with the CONFlux platform organized by Brianna Orr. Thanks also goes to all the plenary, tutorial, challenge, special session, clinical day and other session chairs for assembling a comprehensive satellite program.



We are thankful to the many student volunteers led by Anupam Borthakur, Raj Ghosh and Tushar Sakorikar who carried out many of the day-to-day updates to website and other local logistics. Finally, we thank the 39 Associate Editors and 426 Reviewers who spent numerous hours ensuring that ISBI 2022 is a successful and exciting symposium.

We look forward to seeing you all at the ISBI 2022 conference, where we expect to learn about the latest and exciting developments in the field of biomedical imaging.

Welcome!

Jayanthi Sivaswamy

IIIT Hyderabad

IEEE ISBI 2022 General Chair

Andrew Laine

Columbia University

IEEE ISBI 2022 General Chair



ISBI 2022 Organizing Committee

General Chairs

Jayanthi Sivaswamy, International Institute of Information Technology Hyderabad, India
Andrew Laine, Columbia University, USA

Program Chairs

Suyash P. Awate, Indian Institute of Technology Bombay, India
Tanveer F. Syeda-Mahmood, IBM Almaden Research Center, USA

Local Organizing Chairs

Debdoot Sheet, Indian Institute of Technology Kharagpur, India
Arun K. Thittai, Indian Institute of Technology Madras, India

Plenary and Keynotes Chairs

Ananda S. Chowdhury, Jadavpur University, Kolkata, India
Jayavardhana Gubbi, TCS-Research, India

Challenges

Jayasree Chakraborty, Memorial Sloan Kettering Cancer Center, USA
Amit Sethi, Indian Institute of Technology Bombay, India

Tutorials

Ajit Rajwade, Indian Institute of Technology Bombay, India
Anubha Gupta, Indraprastha Institute of Information Technology Delhi, India

Special Sessions

Shadi Albarqouni, Helmholtz AI, Helmholtz Center Munich, Germany
Sailesh Conjeti, Siemens Healthineers, Germany

Clinical Events

Madhura Ingalkar, Symbiosis International University, India
Brojeshwar Bhowmick, TCS-Research, India

Young Professional and Student Activities

Himanshu Shekhar, Indian Institute of Technology Gandhinagar, India
Karla P. Mercado-Shekhar, Indian Institute of Technology Gandhinagar, India

Women in Imaging

Tripti Swarnkar, ITER-SOA, Bhubaneswar, India
Deepti R. Bathula, Indian Institute of Technology Ropar, India

International Relations

Subhamoy Mandal, Maxer Endoscopy, Germany
Martha Zequera-Díaz, Pontificia Universidad Javeriana, Columbia

Finance

Hardik J. Pandya, Indian Institute of Science Bangalore, India

Social and Cultural

Nirmalya Ghosh, Indian Institute of Technology Kharagpur, India

Industry Relations and Sponsorship

Anil K. Sao, Indian Institute of Technology Bhilai, India
Mahesh R. Panicker, Indian Institute of Technology Palakkad, India

Student and YP Volunteers

Anupam Borthakur, Indian Institute of Technology Kharagpur
Raj Krishan Ghosh, Indian Institute of Technology Kharagpur
Tushar Sakorikar, Indian Institute of Science Bangalore.



ISBI Steering Committee

Chair

Roberto Lavarello

Voting Members

Arrate Muñoz Barrutia

Philippe Ciuciu

Purang Abolmaesumi

Andrew Laine

Alejandro Frangi

Marleen DeBruijne

ISBI Associate Editors

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Wenjia Bai

Kayhan Batmanghelich

Marleen de Bruijne

Hao Chen

Zhaolin Chen

Albert Chung

Bipul Das

Marvin Doyley

Shireen Elhabian

Jeffrey Fessler

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Alejandro Frangi

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Guido Gerig

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Mathews Jacob

Anand Joshi

Shantanu Joshi

Jayashree Kalpathy-Cramer

Ali Kamen

Sajan Lingala

Dwarikanath Mahapatra

Mehdi Moradi

Kensaku Mori

Lipeng Ning

Ipek Oguz

Alison Pouch

Yogesh Rathi

Daniel Razansky

Mirabela Rusu

Chandra Sekhar Seelamantula

Dattesh Shanbhag

Tolga Tasdizen

Archana Venkataraman

Hongzhi Wang

Ross Whitaker

Long Xie

Gary Zhang

Awards Committee

Jeffrey A. Fessler

Alejandro F Frangi

Marleen de Bruijne



General Information

Symposium Badges

Badges should be worn by all symposium participants while in the symposium areas. Badges validate your registration and may be utilized to validate admission to sessions, tutorials, welcome reception, etc. Badges can be obtained at the registration area.. The name you provided for registration will be the name that appears on your badge.

CONFlux Platform

ISBI will take place as a hybrid event. All registered attendees will receive login credentials for the CONFlux virtual platform by March 27 at 8:00 AM IST. The Zoom links to join live sessions will be available on the platform. You will also be able to access on-demand content for all lecture and poster presentations. The platform will be open through April 28, 2022.

Poster Sessions

Poster sessions will take place virtually via Zoom. Speakers will receive a Zoom link which they must join during their poster session time slot. There will be a breakout room set up for each poster presenter. Attendees can switch between breakout rooms to ask questions.

Below are the Poster Session Times

Tuesday, March 29	15:45:00 – 17:15:00
Wednesday, March 30	09:45:00 – 11:15:00
Wednesday, March 30	15:45:00 – 17:15:00
Thursday, March 31	09:45:00 – 11:15:00
Thursday, March 31	15:45:00 – 17:15:00

Photo Policy

Attendance at, or participation in, this conference constitutes consent to the use and distribution by IEEE of the attendees' image or voice for informational, publicity, promotional and/or reporting purposes in print or electronic communications media. No flash photography will be used. Video recording by participants and other attendees during any portion of the conference is not allowed without special prior written permission of IEEE. Photographs of copyrighted PowerPoint or other slides are for personal use only and are not to be reproduced or distributed. Do not photograph any such images that are labeled as confidential and/or proprietary.



Event Conduct and Safety Statement

IEEE believes that science, technology, and engineering are fundamental human activities, for which openness, international collaboration, and the free flow of talent and ideas are essential. Its meetings, conferences, and other events seek to enable engaging, thought-provoking conversations that support IEEE's core mission of advancing technology for humanity. Accordingly, IEEE is committed to providing a safe, productive, and welcoming environment to all participants, including staff and vendors, at IEEE-related events.

IEEE has no tolerance for discrimination, harassment, or bullying in any form at IEEE-related events. All participants have the right to pursue shared interests without harassment or discrimination in an environment that supports diversity and inclusion. Participants are expected to adhere to these principles and respect the rights of others. IEEE seeks to provide a secure environment at its events. Participants should report any behavior inconsistent with the principles outlined here, to on site staff, security or venue personnel, or to eventconduct@ieee.org.

Editor Notes

The 18th IEEE International Symposium on Biomedical Imaging of the IEEE Engineering in Medicine and Biology Society and Signal Processing Society hosted an electronic paper submission process for the symposium. It was the responsibility of the submitting author to ensure the document was viewable and without errors that would prevent the conference from including the paper in the digital Proceedings.

All conference papers were peer-reviewed for all contributed and invited papers.



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More than 230B patient images stored

Plenary Speakers



Elisa E. Konofagou, PhD

Robert and Margaret Hariri Professor of Biomedical Engineering and Radiology (Physics), Columbia University, New York, USA

Title: Elasticity Imaging for Guidance of Chemotherapeutic and Thermal Ablation Treatment of Tumors

Biography: Elisa Konofagou is the Robert and Margaret Hariri Professor of Biomedical Engineering and Professor Radiology as well as Director of the Ultrasound and Elasticity Imaging Laboratory at Columbia University in New York City. Her main interests are in the development of novel elasticity imaging techniques and therapeutic ultrasound methods and more notably focused ultrasound in the brain for drug delivery and

stimulation, myocardial elastography, electromechanical and pulse wave imaging, harmonic motion imaging with several clinical collaborations in the Columbia Presbyterian Medical Center and elsewhere. Elisa is an Elected Fellow of the American Institute of Biological and Medical Engineering, a member of the IEEE in Engineering in Medicine and Biology, IEEE in Ultrasonics, Ferroelectrics and Frequency Control Society, the Acoustical Society of America and the American Institute of Ultrasound in Medicine. She has co-authored over 240 published articles in the aforementioned fields. Prof. Konofagou is also a technical committee member of the Acoustical Society of America, the International Society of Therapeutic Ultrasound, the IEEE Engineering in Medicine and Biology conference (EMBC), the IEEE International Ultrasonics Symposium and the American Association of Physicists in Medicine (AAPM). Elisa serves as Associate Editor in the journals of IEEE Transactions in Ultrasonics, Ferroelectrics and Frequency Control, Ultrasonic Imaging and Medical Physics, and is the recipient of awards such as the CAREER award by the National Science Foundation (NSF), the Nagy award by the National Institutes of Health (NIH) and the IEEE-EMBS Technological Achievement Award as well as additional recognitions by the American Heart Association, the Acoustical Society of America, the American Institute of Ultrasound in Medicine, the American Association of Physicists in Medicine, the Wallace H. Coulter foundation, the Bodossaki foundation, the Society of Photo-optical Instrumentation Engineers (SPIE) and the Radiological Society of North America (RSNA).



Alison Noble, PhD

Technikos Professor of Biomedical Engineering, University of Oxford, UK

Title: Reflections on Simplifying Ultrasound

Biography: Professor Alison Noble FRS is currently the Technikos Professor in Biomedical Engineering, at the University of Oxford, UK and former Director of the Oxford Institute of Biomedical Engineering (2012-16) and a former Associate Head of the Mathematical, Physical and Life Sciences Division (2016-19).

Alison's research focuses on ultrasound imaging, and computational analysis of images, motivated by unmet clinical needs in high income and global healthcare settings. She received the UK Royal Society Gabor Medal for her inter-disciplinary research contributions in 2019, and the same year received the MICCAI Society Enduring Impact award. She is a current European Research Council Advanced Grant holder, and has held or currently holds grants from the UKRI, NIHR, Wellcome Trust, NIH, and the Bill and Melinda Gates Foundation. She has supervised 71 graduated PhD students (19 women), and has a sustained track record of mentoring early career researchers at Oxford and on national schemes.

Alison serves on numerous national and international advisory boards. She served on the MICCAI Society board for a decade and is a former President of the MICCAI Society (2013-5). She is an active Fellow of the UK Royal Academy of Engineering and of the Royal Society, and received an OBE for services to science and engineering in the Queen's Birthday Honours list in June 2013.





Nassir Navab, PhD
Professor and Director of the Laboratories for Computer Aided Medical Procedures at Technical University of Munich (TUM)
Adjunct Professor, Johns Hopkins University
Director of Medical Augmented Reality Summer School Series at Balgrist Hospital, Zurich

Title: Robotic Imaging, Machine Learning and Augmented Reality for Computer Assisted Interventions

Biography: Nassir Navab is a full professor and director of the Laboratories for Computer Aided Medical Procedures (CAMP: <http://campar.in.tum.de>) at Technical University of Munich (TUM) and an Adjunct Professor at Johns Hopkins University (<http://camp.lcsr.jhu.edu/>). He is also the director of Medical Augmented Reality (<http://medicaugmentedreality.org/>) summer school series at Balgrist Hospital in Zurich. In 2001, while acting as distinguished member of technical staff at Siemens Corporate Research (SCR) in Princeton, he received the prestigious Siemens Inventor of the Year Award for the body of his work in interventional imaging. He also received the SMIT Technology Award in 2010 and IEEE ISMAR 10 Years Lasting Impact Award in 2015. He had received his PhD from INRIA and University of Paris XI in France and enjoyed two years of postdoctoral fellowship at MIT Media Laboratory before joining SCR in 1994. He is Fellow of the MICCAI Society and acted on its board of directors from 2007 to 2012 and from 2014 to 2017. He has been one of the founders of and is serving on the Steering Committee of the IEEE Symposium on Mixed and Augmented Reality since 2001. He is the author of hundreds of peer reviewed scientific papers and 51 granted US and over 80 international patents. He served as General Chair for MICCAI 2015, ISMAR 2001, 2005 and 2014. He is a founding board member of IPCAI 2010-2021 and Area Chair for ICCV 2022 and ECCV 2020. He is on the editorial board and advisory board of many international journals including IEEE TMI and MedIA. He is proud of his PhD students, who have received over 50 prestigious awards including MICCAI young investigator awards in 2007, 2009, 2010, 2012, 2015, 2016, 2017 and 2018 and best paper awards at IEEE ISMAR 2005 and 2017, MICCAI MedIA 2016 MICCAI IJCARS 2016 and 2019, IBM best paper award at VEOC-ICCV 2009, IPMI Erbsmann award in 2007 and best poster in 2019, and IPCAI best paper awards in 2014 and 2020. As of September 21, 2021, his papers have received over 44700 citations and enjoy an h-index of 95.



Krishna Ella, PhD
Chairman and Managing Director, Bharat Biotech International Ltd

Title: Role of AI and Imaging in Vaccine Research

Biography

Dr. Krishna Ella is the Chairman & Managing Director of Bharat Biotech International Limited, which he incorporated in 1996. A gold medalist at University, Dr. Ella worked as a research faculty at the Medical University of South Carolina, Charleston after earning his Ph.D. from the University of Wisconsin-Madison. A research scientist in Molecular Biology, Dr. Ella strongly believes that innovative technology in vaccine development is essential to solve public healthcare problems caused by infectious diseases. Under Dr. Ella's leadership, Bharat Biotech has grown to become a global leader in innovative vaccine. A serial entrepreneur with a passion for innovative ideas, Dr. Ella has also ventured into veterinary vaccines, food processing, and developing biotechnology infrastructure in the country. Dr. Ella is also involved in shaping India's science education and policy through his association with several committees such as: Scientific Advisory Committee to the Union Cabinet, CSIR Governing Council, CCMB Governing Council, Research Council for CSIR National Laboratories, Board of Visitors – Global Health Institute, University of Wisconsin-Madison. Several awards have been conferred on Dr. Ella including the ET Now Special Recognition for Healthcare Industry Award, J R D Tata—Best Entrepreneur of the Year Award, Marico Innovation Award and University of Southern California—Asia-Pacific Leadership Award. (Biography and image taken from: https://www.bharatbiotech.com/founder_profile.html). Dr. Ella was recently awarded **Padma Bhushan**, the third highest civilian award given by the Government of India to an individual for a distinguished service of a high order. This was for the timely production and roll out of Covaxin vaccine in India and worldwide by Bharath Biotech.





Harish Poptani, PhD
Chair, Centre for Preclinical Imaging, University of Liverpool

Title: Role of Quantitative Imaging in Assessing Treatment Response in Cancer and Regenerative Medicine

Biography: Professor Poptani's research lab has been developing quantitative magnetic resonance imaging (MRI) and spectroscopy (MRS) methods for cancer diagnosis and monitoring early treatment response in patients as well as in rodent models of cancer. His research group has also been involved in the development of multi-modal imaging technologies for evaluating the safety and efficacy of regenerative medicine therapies including stem cell and macrophage therapy with applications to kidney and liver diseases. Besides developing cutting edge multi-modal preclinical imaging methods at the Centre for Preclinical Imaging, which he is the chair of, Professor Poptani has active clinical research projects focusing on head and neck cancer as well as on brain tumours. Professor Poptani's talk will illustrate the utility of different metabolic and physiological imaging markers to assess response to novel therapeutics in cancer and regenerative medicine. Professor Poptani has published over 140 papers in international journals of repute and was recently awarded the prestigious Senior Fellow Award by the International Society for Magnetic Resonance in Medicine.





Health and life sciences

Technologies powered by the intelligent edge are driving the next wave in health, lab, and life sciences innovation: AI-powered diagnostic tools, connected labs, and real-time data analytics driven by distributed computing. These technologies combined with the digitization of health records result in vast amounts of data requiring new computing solutions that bring more intelligence to the applications, systems, and tools within the health and life sciences segments.

Healthcare entities of all sizes and types must deploy technologies that can manage this flood of data and put it to use. Intel® technologies are accelerating the development of intelligent and connected solutions that analyze vast amounts of available device and application data. In collaboration with our ecosystem of partners, these technologies can support better patient outcomes, faster scientific discoveries, and streamlined clinical and lab workflows for health providers and researchers.

HEALTH SOLUTION KEYWORDS

Smart healthcare, health science, population health, patient experience, point of care, patient engagement, clinical decision making, nuclear medicine, COVID-19, healthcare, intelligent care, connected healthcare, clinician experience, patient care, health IT, distributed care, remote care, patient monitors, surgical robots, connected patient, telehealth, telecare, remote monitoring, chronic care management, smart hospital, telemedicine, medical imaging, diagnostics

LAB AND LIFE SCIENCES KEYWORDS

Life science, laboratory, pharma drug discovery, pharmaceutical, biopharmaceutical manufacturing, biopharma manufacturing, clinical trials, precision medicine, genomics, omics, digital pathology, COVID-19, lab automation, clinical lab automation

HEALTH AND LIFE SCIENCES TECHNOLOGY KEYWORDS

Edge computing, data interoperability, digital transformation, data privacy, security, 5G, 5G network, artificial intelligence, AI, robotics, computer vision, medical imaging, enterprise imaging, data stewardship, edge compute, IoT, internet of things, internet of medical things, IoMT, connected devices, interoperability, privacy



Keynote Speakers



Yonina Eldar
Weizmann Institute of Science, Israel

Title: Imaging: From Compressed Sensing to Model-based Deep Learning

Biography: Yonina Eldar is a Professor in the Department of Mathematics and Computer Science, Weizmann Institute of Science, Rehovot, Israel, where she heads the center for biomedical engineering. She was previously a Professor in the Department of Electrical Engineering at the Technion, where she held the Edwards Chair in Engineering. She is also a Visiting Professor at MIT, a Visiting Scientist at the Broad Institute, and an Adjunct Professor at Duke University and was a Visiting Professor at Stanford. She received the B.Sc. degree in physics and the B.Sc. degree in electrical engineering both from Tel-Aviv University (TAU), Tel-Aviv, Israel, in 1995 and 1996, respectively, and the Ph.D. degree in electrical engineering and computer science from the Massachusetts Institute of Technology (MIT), Cambridge, in 2002. She is a member of the Israel Academy of Sciences and Humanities, an IEEE Fellow and a EURASIP Fellow. She has received many awards for excellence in research and teaching, including the IEEE Signal Processing Society Technical Achievement Award (2013), the IEEE/AESS Fred Nathanson Memorial Radar Award (2014) and the IEEE Kiyo Tomiyasu Award (2016). She was a Horev Fellow of the Leaders in Science and Technology program at the Technion and an Alon Fellow. She received the Michael Bruno Memorial Award from the Rothschild Foundation, the Weizmann Prize for Exact Sciences, the Wolf Foundation Krill Prize for Excellence in Scientific Research, the Henry Taub Prize for Excellence in Research (twice), the Hershel Rich Innovation Award (three times), the Award for Women with Distinguished Contributions, the Andre and Bella Meyer Lectureship, the Career Development Chair at the Technion, the Muriel & David Jacknow Award for Excellence in Teaching, and the Technion's Award for Excellence in Teaching (two times). She received several best paper awards and best demo awards together with her research students and colleagues, was selected as one of the 50 most influential women in Israel, and was a member of the Israel Committee for Higher Education. She is the Editor in Chief of Foundations and Trends in Signal Processing and a member of several IEEE Technical Committees and Award Committees.



Sushmita Mitra
Indian Statistical Institute Kolkata, India

Title: Intelligent Biomedical Image Analysis

Biography: Sushmita Mitra is a full professor at the Machine Intelligence Unit (MIU), Indian Statistical Institute, Kolkata. From 1992 to 1994 she was in the RWTH, Aachen, Germany as a DAAD Fellow. She was a Visiting Professor in the Computer Science Departments of the University of Alberta, Edmonton, Canada; Meiji University, Japan; and Aalborg University Esbjerg, Denmark. Dr. Mitra received the National Talent Search Scholarship (1978-1983) from NCERT, India, the University Gold Medal in 1988, the IEEE TNN Outstanding Paper Award in 1994 for her pioneering work in neuro-fuzzy computing, the CIMPA-INRIA-UNESCO Fellowship in 1996, and Fulbright-Nehru Senior Research Fellowship in 2018-2020. She was the INAE Chair Professor during 2018-2020. Dr. Mitra has been awarded the prestigious J. C. Bose National Fellowship, 2021.

Dr. Mitra is the author of the books "Neuro-Fuzzy Pattern Recognition: Methods in Soft Computing" and "Data Mining: Multimedia, Soft Computing, and Bioinformatics" published by John Wiley, and "Introduction to Machine Learning and Bioinformatics", Chapman & Hall/CRC Press, beside a host of other edited books. Dr. Mitra has guest edited special issues of several journals, is an Associate Editor of "IEEE/ACM Trans. on Computational Biology and Bioinformatics", "Information Sciences", "Neurocomputing", "Fundamenta Informatica", "Computers in Biology and Medicine", SN Computer Sciences and is a Founding Associate Editor of "Wiley Interdisciplinary Reviews: Data Mining and Knowledge Discovery (WIRE DMKD)". She has more than 150 research publications in referred international journals. According to the Stanford List, Dr. Mitra is ranked among the top 2% scientists worldwide in the domain of Artificial Intelligence and Image Processing.



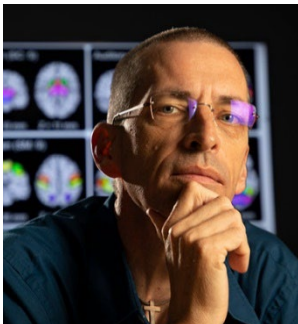
Dr. Mitra is a Fellow of the IEEE, The World Academy of Sciences (TWAS), Indian National Science Academy (INSA), International Association for Pattern Recognition (IAPR), and Fellow of the Indian National Academy of Engineering (INAE) and The National Academy of Sciences, India (NASI). She is an IEEE CIS Distinguished Lecturer, Member of Inter-Academy Panel Panel for Women in STEMM, and the current Chair, IEEE Kolkata Section. She has visited more than 30 countries as a Plenary/Invited Speaker or an academic visitor. She served in the capacity of Program Chair, Tutorial Chair, and as member of programme committees of many international conferences. Her current research interests include data science, pattern recognition, soft computing, medical image processing, and Bioinformatics.



Daniel Alexander
University College London, UK

Title: Model-based Imaging and Image-based Modelling

Biography: Daniel Alexander is the Director of the UCL Centre for Medical Image Computing (CMIC) at University College London (UCL) and Professor of Imaging Science in UCL's Department of Computer Science. His expertise is in computational modelling, machine learning, imaging and image analysis. He has a BA in Mathematics from the University of Oxford (1993), an MSc in Computer Science from UCL (1994), and a PhD in Computer Science from UCL (1998). He has worked as a post-doc at the University of Pennsylvania until 2000 when he returned to London to take up an academic position. He became full professor in 2009, Director of CMIC in 2015, and senior fellow of the ISMRM in 2017.



Vince D. Calhoun
Georgia State University, Georgia Institute of Technology, and Emory University

Title: The Multiscale Chronnectome in the Human Brain: Capturing Time-resolved Networks at Different Time Scales

Biography: Dr. Calhoun is founding director of the tri-institutional Center for Translational Research in Neuroimaging and Data Science (TReNDS) where he holds appointments at Georgia State, Georgia Tech and Emory. He is the author of more than 950 full journal articles. His work includes the development of flexible methods to analyze neuroimaging data including blind source separation, deep learning, multimodal fusion and genomics, neuroinformatics tools. Dr. Calhoun is a fellow of the Institute of Electrical and Electronic Engineers, The American Association for the Advancement of Science, The American Institute of Biomedical and Medical Engineers, The American College of Neuropsychopharmacology, The Organization for Human Brain Mapping (OHBM) and the International Society of Magnetic Resonance in Medicine. He currently serves on the IEEE BISP Technical Committee and is also a member of IEEE Data Science Initiative Steering Committee as well as the IEEE Brain Technical Committee.





Rakesh Mullick
GE Healthcare, India

Title: Enabling Precision AI in Healthcare: An Industry Perspective

Biography: Rakesh Mullick is the Chief Scientist in the Advanced Technology Group, Edison AI, as part of GE Healthcare Digital Platform and Solutions. As AI methods make deepening inroads into the healthcare eco-system, Rakesh leads the way working closely with GE Healthcare Advanced Technology Strategy & Product teams to co-create analytics solutions for numerous problems enabling autonomous multi-modal and upstream AI solutions for clinical decision support, image synthesis, signal analysis, quantitative imaging, and accelerated workflows supporting the vision of precision health.

Rakesh has filed over 50 patents, an author on over 120 Journal and Conference Papers, recipient of multiple awards in GE, and an invited speaker to multiple forums. He is a Six Sigma Black Belt and certified TRIZ practitioner. Prior to joining GE, Rakesh was a Research Fellow at the Diagnostic Radiology Department, Clinical Center, National Institutes of Health (NIH) (1999-2000) and Senior Scientist at the Center for Information enhanced Medicine (CieMed), a Joint Research Collaboration between National University of Singapore, Johns Hopkins University, NIH and Intel Corporation. Rakesh obtained his Ph.D. from the Graphics, Visualization and Usability (GVU) Center at Georgia Institute of Technology, Atlanta, GA, USA and his B.S. in Electrical Engineering from the University of Rochester, NY, USA.



Ronald Summers
National Institutes of Health, USA

Title: Challenges and Opportunities for AI in Abdominal Radiology

Biography: Ronald M. Summers, M.D., Ph.D. is a tenured Senior Investigator and Staff Radiologist in the Radiology and Imaging Sciences Department at the NIH Clinical Center in Bethesda, MD. He is a Fellow of the Society of Abdominal Radiologists and of the American Institute for Medical and Biological Engineering. His awards include the Presidential Early Career Award for Scientists and Engineers, the NIH Director's Award, and the NIH Clinical Center Director's Award. He is a member of the editorial boards of the Journal of Medical Imaging, Radiology: Artificial Intelligence and Academic Radiology and a past member of the editorial board of Radiology. He was Co-Chair of the 2018 and 2019 SPIE Medical Imaging conferences and Program Co-Chair of the 2018 IEEE ISBI symposium. He has co-authored over 500 journal, review and conference proceedings articles and is a co-inventor on 14 patents. His research interests include abdominal imaging, large radiology image databases, and artificial intelligence.

Radiology. He was Co-Chair of the 2018 and 2019 SPIE Medical Imaging conferences and Program Co-Chair of the 2018 IEEE ISBI symposium. He has co-authored over 500 journal, review and conference proceedings articles and is a co-inventor on 14 patents. His research interests include abdominal imaging, large radiology image databases, and artificial intelligence.





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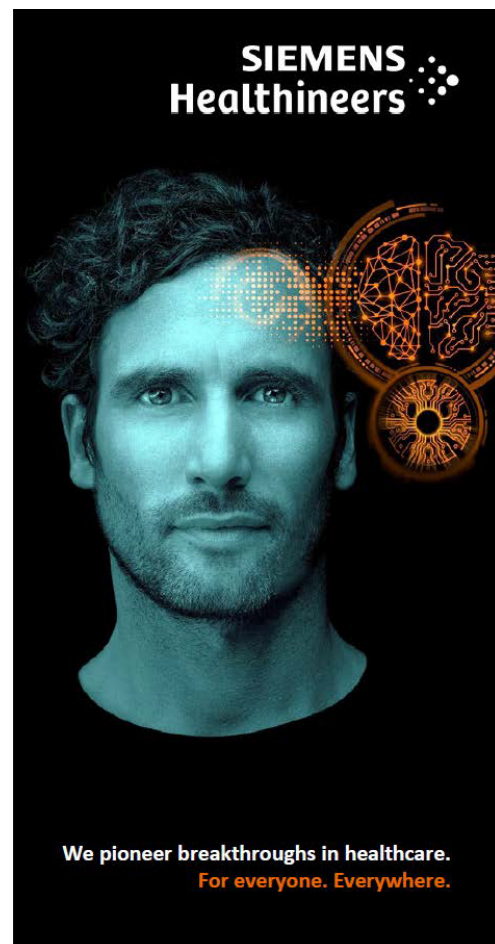
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Clinical Day Program

Medical imaging plays a major role in the clinical decision-making process in oncology. Until recently, that role has been limited to radiological diagnosis and staging. However, quantitative markers have been shown to be relevant for grading and genotyping of the tumor. These markers can be derived from routine clinical images non-invasively, as a set of intensity and texture based features generally termed Radiomics. Radiomic features have illustrated an impact not only in pathological and genotypic diagnosis of the tumor, but also in radiation treatment planning, understanding effects of chemotherapy etc., paving its way to become a critical entity in oncology. The main purpose of the workshop is to provide a stimulating environment for an in-depth discussion to understand the clinical and research problems to find future relevant solutions in radiomics workflow and its clinical translation.



Dr. Suyash Mohan

**Perelman School of Medicine at the University of Pennsylvania
USA**

Biography: Dr. Mohan is a physician-scientist with a research focus on clinical and translational applications of advanced neuroimaging techniques in the development of noninvasive imaging-based biomarkers for assessing brain tumor metabolism and response to therapy. His current NIH/NCI funded clinical trial is utilizing synergy of advanced metabolic imaging, computational modelling, with interdisciplinary collaborations and industrial partnership to transform the treatment of patients with brain tumors. Dr. Mohan is the recipient of numerous awards and honors and has been the brand ambassador for societies like the International Society for Magnetic Resonance in Medicine (ISMRM) and the American Society of Neuroradiology

(ASNR). He was awarded the 2018 Anne G. Osborn ASNR Outreach Professorship to South Africa and will be the RSNA International Visiting Professor to Kazakhstan in 2022. Dr. Mohan is a passionate educator and was the recipient of the Wallace T. Miller Teaching Award for Teaching Excellence in 2013, and then the '2015 Teaching Award', for 'Excellence in Teaching' at the University of Pennsylvania. Most recently, he was awarded the Association of University Radiologists (AUR), 2019 Outstanding Teacher Award. Dr. Mohan has made important scientific contributions and has published over 125 peer-reviewed articles, numerous book chapters, presented over 200 abstracts in national and international meetings, and has delivered over 300 lectures locally, nationally, and internationally. Dr. Mohan has had a number of roles in national organizations, particularly the American Society of Neuroradiology (ASNR) and the Radiological Society of North America (RSNA), and was recently appointed as the Assistant Editor for Radiographics. He has focused interest in advancing neuro-oncologic imaging and research, teaching and education, academic mentoring of trainees and junior faculty, as well as in multidisciplinary collaborations.

Abstract: Glioblastoma is the most common and most aggressive form of primary brain tumor in adults. Despite aggressive multimodal treatment, its prognosis remains poor. Conventional imaging is limited in delineating the full extent of this extremely infiltrative tumor, and 'what we cannot see is what we cannot treat'. In this talk we will discuss some of the newer advances that we have seen in the field of neuro-oncologic imaging, specifically for precision diagnostics, review novel imaging based biomarkers and see how these techniques are playing an increasingly meaningful role in informing clinical care and clinical trials.

Machine learning (ML) integrated with these neuro-oncologic imaging techniques has introduced new perspectives in precision diagnostics, through radiomics and radiogenomics. In this talk, we will also review practical computational perspectives of some of these radiomic based noninvasive-in-vivo biomarkers for allowing personalized treatments for these brain tumor patients and discuss future directions.





Dr. Satish Viswanath
Case Western Reserve University
USA

Radiomics and AI: Considerations for Clinical Applications & Precision Medicine

Abstract: Developing artificial intelligence (AI) schemes to assist the clinician towards enabling precision medicine requires “unlocking” embedded information captured by different data modalities, in an intuitive and generalizable fashion. The research in my group focuses on developing novel computational imaging features (termed “radiomic” features) together with histology or molecular data for disease characterization and treatment response evaluation in vivo. Towards this, we have designed unique tools that can capture biologically relevant and clinically intuitive measurements from routinely

acquired imaging (MRI, CT, PET) or digitized images of tissue specimens. In addition to developing approaches to ensure these models generalize to new unseen data, we have also evaluated their repeatability across imaging parameters and reproducibility across institution- or scanner-specific variations. Problems being addressed by us include: (a) predicting response to treatment to identify optimal therapeutic pathways, as well as (b) evaluating therapeutic response to guide follow-up procedures; in the context of colorectal cancers and digestive diseases.



Dr. Rakesh K Gupta, MD
Fortis Memorial Research
India

Radiomics in Brain Tumors

Biography: Dr. Rakesh Gupta is the Head and Director of Radiology and Imaging in Fortis Memorial Research Institute, Gurgaon, India. He is a neuroradiologist with more than 36 years of experience in clinical neuroimaging and research related to neuroscience studies. He has been involved in teaching and research, and has helped develop various software for clinical applications in neuroscience. He is on the editorial board of AJNR, JMIR and Neuroradiology and has been awarded fellowships of ISMRM, National Science Academy, and Academy of Medical Science (India). He has published more than 475 papers in the peer-reviewed international and national journals, and has mentored 15 PhDs and several MD and DM students.

Abstract: Brain tumours are highly heterogeneous and carry poor prognosis and rank among the top 10 causes of cancer deaths. MRI is a routinely performed for patients who are suspected of brain tumours and is the main stay in its diagnosis and treatment response assessment. A number of advanced MRI techniques like diffusion-based imaging, perfusion imaging and MR spectroscopy are now routinely used in the evaluation of brain tumours. The application of radiomics has been initiated in clinical oncology due to its ability to analyse the combination of numerous quantitative features provides the possibility to unravel the underlying pathophysiology that is hard to be perceived by radiologists’ eyes and avoid subjective misreading. The general workflow of radiomics involves several discrete steps: imaging, segmentation, feature extraction, feature selection, machine learning, and validation. In this presentation, we intend to demonstrate the possible role of radiomics in brain tumor and how it may support in clinical decision making in overall management of the disease in future. The current challenges associated with radiomics will also be discussed.



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[A boy reads one of the 650,000+ books made accessible to people with print disability under the Sugamya Pustakalaya program, a joint effort between TCS Research, Daisy Forum of India, and National Institute for Empowerment of Persons with Visual Disabilities, Government of India.]



Tutorials

Photoacoustic Imaging: Principles, Systems, and Applications

Presenter: Chulhong Kim, Pohang University of Science and Technology, South Korea

Monday, March 28

08:00:00 AM – 11:45:00 AM IST

Abstract: Optical visualization deep within biological tissues is challenged by the significant amount of light scattering. Existing optical imaging methods, e.g. confocal or two-photon microscopy, optical coherence tomography, and diffuse optical tomography, suffer from either a shallow imaging depth (i.e., ~ 1 mm) or poor spatial resolution. Alternatively, conventional medical imaging modalities, such as magnetic resonance imaging, X-ray computed tomography, ultrasound imaging, and nuclear imaging, have been intensively investigated and widely used in clinics. However, none of these can envisage what our eyes can see because these modalities do not use the optical spectrum as a contrast mechanism. Photoacoustic imaging (PAI) is capable of overcoming these limitations by delivering high-resolution optical contrast from depths of many millimeters to centimeters in highly scattering living tissues.

PAI has been extensively explored for biological and medical applications during the last decade. The physical effect is based on energy transduction from light to sound, equivalent to the conversion of lightning into thunder in our daily life. Upon viewing a flash of lightning, one can hear the thunder arriving a few seconds later. If multiple observers (i.e., at least three) listen to the thunder at different locations, the exact origin of the lightning can be calculated by considering the temporal delays with a simple triangulation method. PAI adapts a similar reconstruction method to form multidimensional (i.e., 1-, 2-, or 3-D) images of biological tissues. More importantly, because both scattered and unscattered light can generate photoacoustic (PA) waves, the imaging depth of PAI can be greatly enhanced in biological tissues up to more than 5 cm. The spatial resolution of PAI is mainly determined by the acoustic detection parameters, and thus it is not directly affected by light scattering and can maintain high resolution in deep tissues. Extensive advances in laser, computer, and ultrasound technologies have facilitated development of PAI imaging systems throughout the 1990s with the first non-invasive structural and functional images acquired in 2003 from brains of living mice. Since then, PAI has gained tremendous popularity as a new and powerful addition to the arsenal of biological and medical imaging modalities.

Preclinical applications of PAI have rapidly developed with imaging scanners, both experimental and commercial, found in many laboratories around the globe. PAI has been applied to image (1) single cells in vivo, (2) vascular and lymphatic networks, (3) angiogenesis, (4) oxygen saturation of hemoglobin in micro blood vessels, (5) blood flows, (6) metabolic rates, (7) functional brain activity, (8) drug delivery and treatment responses, (9) molecular targeting with biomarkers and contrast agents, and (10) gene expressions. Current clinical explorations mainly focus on imaging breast and melanoma cancers and guiding sentinel node biopsy for breast cancer staging. However, significant expansion of potential clinical applications is expected in the near future, including (1) prostate, thyroid, head and neck cancer imaging; (2) diagnosis of peripheral- and cardio-vascular disease; (3) monitoring early responses of neoadjuvant therapy; (4) functional human neuroimaging; (5) gastrointestinal tract imaging using endoscopic probes; (6) intravascular imaging using catheters; (7) monitoring of arthritis and inflammation; (8) label-free histology; and (9) in vivo flow cytometry.

Self-supervised Learning: Overview and Application to Medical Imaging

Presenters: Pavan Annangi, GE Global Research, India; Deepa Anand GE Healthcare, India; Hemant Kumar Aggarwal, Wipro GE Healthcare, India; Hariharan Ravishankar, GE Healthcare, India; Rahul Venkataramani, GE Global Research, India

Monday, March 28

08:00:00 AM – 11:45:00 AM IST

Abstract: Supervised learning has achieved tremendous progress making it the ubiquitous tool of choice in nearly all learning applications. However, the success of supervised learning largely depends on the quantity and quality of labelled datasets, which is prohibitively expensive in healthcare settings. A recent technique, termed 'self-supervised learning' (SSL) aims to exploit the vast amounts of relatively inexpensive unlabeled data to learn



meaningful representations that reduce the annotation burden. Self-supervised learning is a form of unsupervised learning that extracts latent information encoded inside the input dataset to train a neural network for the end task. Self-supervised learning relies on input dataset to obtain the target for the training loss estimation (self-supervision). Self-supervision is particularly relevant for researchers from the medical community for several reasons including: 1) cost and feasibility of annotating large datasets 2) limitations of transfer learning – (data type (2D+t, 3D), data distribution shift (grayscale images limited to anatomies), problem types (segmentation, reconstruction). Through this special session, we will attempt to introduce self-supervised learning, popular architectures and successful use case particularly in the medical imaging domain. The initial successes in self-supervised learning followed a template of designing pretext tasks (tasks with labels derived from data itself, e.g., colorization, jigsaw etc.) followed by utilizing the learnt representations on the downstream task of interest. However, in recent years, these methods have largely been replaced by contrastive learning and regularization-based methods (virtual target embeddings, high entropy embedding vectors). In this talk, we will review the most popular methods to perform self-supervised learning and its applications. Despite the obvious need for SSL, the application of self-supervised learning poses a challenge due to the differences in problem type. We will discuss methods developed in-house to extend the SSL techniques to classification and segmentation use-cases. The subsequent section of the talk would focus on Self Supervised techniques for compressed sensing (CS) problems. The classical CS-based methods rely only on noisy and undersampled measurements to reconstruct the fully sampled image. These methods exploit the imaging physics to reconstruct a data-consistent image utilizing an iterative algorithm but are comparatively slow. Model-based deep learning methods combine the power of classical CS-based methods and deep learning. These methods are extended for SSL using Ensembled Stein Unbiased Risk Estimator (ENSURE) that can approximate the projected mean-square-error (MSE) as true MSE. We will also discuss some of the empirical rules that have aided in our experiments on training SSL methods.

Quantitative functional and molecular contrast imaging

Presenters: Simona Turco and Massimo Mischi, Eindhoven University of Technology, Netherlands

Monday, March 28

02:15:00 PM – 06:00:00 PM IST

Abstract: Since the time it was introduced for invasive measurement of blood flow and volumes in the central circulation, the use of indicators has experienced tremendous advances. In particular, the possibility of combining indicators with fast-developing imaging solutions has opened up an entirely new spectrum of possibilities for minimally invasive, contrast-enhanced imaging. Dedicated indicators, referred to as contrast agents, have been developed for the different imaging modalities, starting from iodine for X-ray (and computed tomography) imaging, to radionuclides for nuclear imaging, up to paramagnetic agents for magnetic resonance imaging and microbubbles for ultrasound imaging. Besides their qualitative use, often limited by subjective and complex interpretation of the images, advanced methods for quantitative interpretation of contrast-enhanced images and videos have shown an exceptional growth in the past decades. Since the introduction of the first indicators, accuracy and complexity of the adopted models have shown terrific development, supported by increasing computing capabilities. Several models have been developed to interpret the transport kinetics of the different contrast agents in the vascular bed, also including complex effects in relation to vascular permeability and contrast extravascular leakage. The establishment of these quantitative methods in clinical practice is nowadays showing progress, based on extensive clinical validation, and many quantitative applications have already evidenced clinical value. Assessment of myocardial perfusion and characterization of the microvascular architecture are clinical applications where analysis of the contrast kinetics by advanced modeling has opened important diagnostic perspectives, especially in cardiology and oncology. This tutorial provides a comprehensive overview of all the pharmacokinetic models adopted for quantitative interpretation of contrast-enhanced imaging, discussing the related technical/methodological aspects in relation to their practical use. All the imaging technologies are treated, including ultrasound (US), magnetic resonance imaging (MRI), X-ray and computed tomography (CT), and nuclear imaging. Problems related to calibration of the imaging system and accuracy of the estimated physiological parameters are also discussed. The broad spectrum of diagnostic possibilities provided by quantitative contrast-enhanced imaging is presented with a focus on cardiology and oncology. Novel developments in the area of quantitative molecular imaging are also presented along with their potential clinical applications.

Graph Signal Processing Opens New Perspectives for Human Brain Imaging

Presenters: Maria Giulia Preti, EPFL, Switzerland and Thomas Bolton, Centre Hospitalier Universitaire Vaudois (CHUV), Switzerland

Monday, March 28

02:15:00 PM – 06:00:00 PM IST

Abstract: State-of-the-art magnetic resonance imaging (MRI) provides unprecedented opportunities to study brain structure (anatomy) and function (physiology). Based on such data, graph representations can be built where nodes are associated to brain regions and edge weights to strengths of structural or functional connections. In particular, structural graphs capture major physical white matter pathways, while functional graphs map out statistical interdependencies between pairs of regional activity traces. Network analysis of these graphs has revealed emergent system-level properties of brain structure or function, such as efficiency of communication and modular organization. In this tutorial, graph signal processing (GSP) will be presented as a novel framework to integrate brain structure, contained in the structural graph, with brain function, characterized by activity traces that can be considered as time-dependent graph signals. Such a perspective allows to define novel meaningful graph-filtering operations of brain activity that take into account the anatomical backbone. In particular, we will show how activity can be analyzed in terms of being coupled versus decoupled with respect to brain structure. This method has recently showed for the first time how regions organized in terms of their structure-function coupling form a macrostructural gradient with behavioural relevance, spanning from lower level functions (primary sensory, motor) to higher-level cognitive domains (memory, emotion). In addition, we will also describe how the derived structure-function relationships can be considered more in depth, in terms of their temporal dynamic properties, and at the finer-grained scale of individual sub-networks. From the methodological perspective, the well-known Fourier phase randomization method to generate surrogate data can also be adapted to this new setting. We will show how to generate surrogate data of graph signals in this way, which allows a non-parametric evaluation of the statistical significance of the observed measures.

From U-Net to Transformers: Navigating through key advances in Medical Image Segmentation

Presenters: Vishal Patel and Jeya Maria Jose Valanarasu, Johns Hopkins University, USA

Monday, March 28

05:00:00 PM – 08:30:00 PM

Abstract: Medical image segmentation plays a pivotal role in computer-aided diagnosis systems which are helpful in making clinical decisions. Segmenting a region of interest like an organ or lesion from a medical image or a scan is critical as it contains details like the volume, shape and location of the region of interest. Recently, the state of the art methods for medical image segmentation for most modalities like magnetic resonance imaging (MRI), computed tomography (CT) and ultrasound (US) are based on deep learning. These deep learning based methods proposed for medical image segmentation help in aiding radiologists for making fast and labor-less annotations. In this Tutorial, we will go through the key advances in both convolution networks till transformers and understand why and how these advances have impacted medical image segmentation. **CNN Based Methods:** The introduction of U-Net in 2015 caused a revolution in medical image segmentation as it surpassed the previous segmentation methods by a large margin and was easy to train for specific tasks. U-Net used an encoder-decoder based architecture using convolutional neural networks that takes in a 2D image as input and outputs the segmentation map. Later, 3D U-Net was proposed for volumetric segmentation. Following that, a lot of methods were proposed improving the key architecture of U-Net/3D U-Net. U-Net++ was proposed using nested and dense skip connection for further reducing the semantic gap between the feature maps of the encoder and decoder. UNet3+ proposed using full-scale skip connections where skip connections are made between different scales. V-Net proposes processing the input volumes slice-wise and uses volumetric convolutions instead. KiU-Net combines feature maps of both under-complete and overcomplete deep networks such that the network learns to segment both small and large segmentation masks effectively. nnU-Net shows how just tuning U-Net properly can achieve a good performance. **Transformer Based Methods:** TransUNET proposed a methodology for multi-organ segmentation by using a transformer as an additional layer in the bottleneck of a U-Net architecture. It encodes tokenized image patches from a convolution neural network (CNN) feature map as the input sequence for extracting global contexts. Medical Transformer introduces a transformer-based gated axial attention mechanism for 2D medical image segmentation to train transformers in the low data regime. UNETR introduces a transformer based method for 3D volumetric segmentation. Multi-Compound Transformer (MCTrans) incorporates rich feature learning and semantic

structure mining into a unified framework embedding the multi-scale convolutional features as a sequence of tokens, and performing intra- and inter-scale self-attention, rather than single-scale attention in previous works. Swin TransUNet uses a shifted window and window attention to extract hierarchical features from the input image.

Federated Learning in Medical Imaging

Presenters: Jayashree Kalpathy-Cramer, Massachusetts General Hospital, USA; Holger Roth and Michael Zephyr, NVIDIA, USA

Monday, March 28

05:00:00 PM – 08:30:00 PM

Abstract: Artificial Intelligence (AI) and machine learning (ML) are transformative technologies for healthcare. They are being used across the healthcare spectrum from improvement of image acquisitions to workflows, diagnosis and detection and assessment of response. Recent technical advances in deep learning have come about due to a confluence of advances in hardware, computational algorithms and access to large amounts of (annotated) data. These algorithms have demonstrated extraordinary performance for the analysis of biomedical imaging data including in radiology, pathology, ophthalmology and oncology. Despite such success, deep learning algorithms in medical imaging have also been shown to be brittle and not work as well on data that is different from what they were trained on. Data heterogeneity can arise due to differences in image acquisition, patient populations, geography and disease prevalence and presentations. Such heterogeneity poses challenges for building robust algorithms. One way to address this challenge is to ensure that the training dataset is diverse and representative, ideally from multi-institutional data sources. However, in healthcare access to such large amounts of multi-institutional data can be challenging due to concerns around patient privacy and data sharing, regulatory affairs and technical considerations around data movement, replication and storage. Recently distributed learning approaches such as federated learning have been proposed to address some of these challenges. Federated learning allows for learning from multi-institutional datasets with the need for data sharing. In classical federated learning, data reside in a consortium of sites, each with compute capabilities. Model architectures and common data elements are agreed to ahead of time. Training occurs in rounds where each site (client) trains a model locally and updates the model weights to a central server. The central server performs the aggregation of model weights and sends an updated model down to all clients. This process continues until convergence is achieved. Federated learning has shown to improve global and local model performances. Other configurations to federated learning including split learning, swarm learning and cyclical weight transfer.

In this tutorial, we will begin with a very brief review of the literature around some of the successes of machine learning for biomedical imaging, describe some of the challenges including brittleness and generalizability, and highlight the need for federated learning. We will then review in detail the various aspects of a modular federated learning pipeline including trainers, secure communication and aggregation. This will be followed by hands-on activities to set up and evaluate federated learning on public datasets. The talks and the tutorial will be delivered by Dr. Jayashree Kalpathy (MGH/Harvard medical school, Dr. Holger Roth and Michael Zephyr (NVIDIA). We will be using the open-source MONAI infrastructure for the hands-on portion. Project MONAI is a freely available, community-supported, PyTorch-based framework for deep learning in healthcare imaging. It provides domain-optimized foundational capabilities for developing healthcare imaging training workflows in a native PyTorch paradigm and has been downloaded over 90,000 times. Dr. Kalpathy-Cramer is on the steering committee for Project MONAI and Dr. Kalpathy-Cramer and Dr. Roth co-lead the federated learning working group within Project MONAI.

Challenges

Endoscopic computer vision challenges 2.0

Monday, March 28

02:15:00 PM – 03:15:00 PM IST

Abstract: Computer aided systems can help to guide both expert and trainee endoscopists to obtain consistent high quality surveillance and detect, localize and segment widely known cancer precursor lesion, “polyps”. While deep learning has been successfully applied in the medical imaging, generalization is still an open problem. Generalizability issue of deep learning models need to be clearly defined and tackled to build more reliable technology for clinical translation. Inspired by the enthusiasm of participants on our previous challenges, this year we put forward a 2.0 version of two sub-challenges (Endoscopy artefact detection) EAD 2.0 and (Polyp generalization) PolypGen 2.0.

Both the sub-challenges consists of multi-center and diverse population datasets with tasks for both detection and segmentation but focus on assessing generalizability of algorithms. In this challenge, we aim to add more sequence/video data and multimodality data from different centers. The participants will be evaluated on both standard and generalization metrics presented in our previous challenges. However, unlike previous challenges in 2.0 we will benchmark methods on larger test-set comprising of mostly video sequences as in the real-world clinical scenario.

Organizers:

- Sharib Ali (Department of Engineering Science, University of Oxford, Oxford, UK)
- Noha Ghatwary (Computer Engineering Department, Arab Academy for Science and Technology, Egypt)

CoNIC: Colon Nuclei Identification and Counting Challenge

Monday, March 28

02:15:00 PM – 03:15:00 PM IST

Abstract: Nuclear segmentation, classification and quantification within Haematoxylin & Eosin stained histology images enables the extraction of interpretable cell-based features that can be used in downstream explainable models in computational pathology (CPath). To help drive forward research and innovation for automatic nuclei recognition in CPath, we organise the Colon Nuclei Identification and Counting (CoNIC) Challenge. The challenge requires researchers to develop algorithms that perform segmentation, classification and counting of 6 different types of nuclei within the current largest known publicly available nuclei-level dataset in CPath, containing around half a million labelled nuclei.

Organizers:

- Simon Graham (University of Warwick, United Kingdom)
- Mostafa Jahanifar (University of Warwick, United Kingdom)
- Quoc Dang Vu (University of Warwick, United Kingdom)
- Giorgos Hadjigeorgiou (University of Warwick, United Kingdom)
- Thomas Leech (University of Warwick, United Kingdom)
- David Snead (University Hospitals Coventry and Warwickshire, United Kingdom)
- Shan Raza (University of Warwick, United Kingdom)
- Fayyaz Minhas (University of Warwick, United Kingdom)

Nasir Rajpoot (University of Warwick, United Kingdom)



AIROGS: Artificial Intelligence for RObust Glaucoma Screening Challenge

Monday, March 28

03:30:00 PM – 04:30:00 PM IST

Abstract: Glaucoma is a leading cause of irreversible blindness and impaired vision. Early detection of this disease can avoid visual impairment, which could be facilitated through glaucoma screening. Glaucomatous patients can be identified with the use of color fundus photography (CFP). The analysis of CFP images performed by human experts, however, is a highly costly procedure. Artificial intelligence (AI) could increase the cost-effectiveness of glaucoma screening, by reducing the need for this manual labor. AI approaches for glaucoma detection from CFP have been proposed and promising at-the-lab performances have been reported. However, large performance drops often occur when AI solutions are applied in real-world settings. Unexpected out-of-distribution data and bad quality images are major causes for this performance drop. To initiate the development of solutions that are robust to real-world scenarios, we propose the Artificial Intelligence for RObust Glaucoma Screening (AIROGS) challenge, for which we provide a large screening dataset with around 114,000 images from about 60,000 patients. We split the data in a training set with about 102,000 gradable images (from referable and non-referable glaucomatous eyes) and a closed test set with approximately 12,000 (both gradable and ungradable) images. To encourage the development of methodologies with inherent robustness mechanisms, we do not include ungradable data in the training data. To test robustness, we will evaluate the ability of solutions to distinguish gradable from ungradable images. Furthermore, glaucoma screening performance will be assessed by considering the detection performance of referable glaucoma in gradable data.

Organizers:

- Coen de Vente (Quantitative Healthcare Analysis (QurAI) Group, Informatics Institute, Universiteit van Amsterdam, Amsterdam, Noord-Holland, Netherlands; Department of Biomedical Engineering and Physics, Amsterdam UMC Locatie AMC, Amsterdam, Noord-Holland, Netherlands; Diagnostic Image Analysis Group (DIAG), Department of Radiology and Nuclear Medicine, Radboudumc, Nijmegen, Gelderland, Netherlands)
- Koenraad A. Vermeer (Rotterdam Ophthalmic Institute, Rotterdam Eye Hospital, Rotterdam, Netherlands)
- Nicolas Jaccard (Project Orbis International Inc., New York, United States)
- Bram van Ginneken (Diagnostic Image Analysis Group (DIAG), Department of Radiology and Nuclear Medicine, Radboudumc, Nijmegen, Gelderland, Netherlands)
- Hans G. Lemij (Rotterdam Ophthalmic Institute, Rotterdam Eye Hospital, Rotterdam, Netherlands)
- Clara I. Sánchez (Quantitative Healthcare Analysis (QurAI) Group, Informatics Institute, Universiteit van Amsterdam, Amsterdam, Noord-Holland, Netherlands; Department of Biomedical Engineering and Physics, Amsterdam UMC Locatie AMC, Amsterdam, Noord-Holland, Netherlands)

BRIGHT Challenge: BReast tumor Image classification on Gigapixel Histopathological images

Monday, March 28

03:30:00 PM – 04:30:00 PM IST

Abstract: The aim of the BRIGHT challenge is to provide an opportunity for the development, testing and evaluation of Artificial Intelligence (AI) models for automatic breast tumor subtyping of frequent lesions along with rare pathologies, by using clinical Hematoxylin & Eosin (H&E) stained gigapixel Whole-Slide Images (WSIs). To this end, a large annotated cohort of WSIs, which includes Noncancerous (Pathological Benign, Usual Ductal Hyperplasia), Precancerous (Flat Epithelia Atypia, Atypical Ductal Hyperplasia) and Cancerous (Ductal Carcinoma in Situ, Invasive Carcinoma) categories, will be available. BRIGHT is the first breast tumor subtyping challenge that includes atypical lesions and consists of more than 550 annotated WSIs across a wide spectrum of tumor subtypes. The Challenge includes two tasks: (1) WSI classification into three classes as per cancer risk, and (b) WSI classification into six fine-grained lesion subtypes.

Organizers:

- Pushpak Pati (IBM Research – Zurich, Switzerland)
- Guillaume Jaume (IBM Research – Zurich, Switzerland)
- Nadia Brancati (National Research Council of Italy, ICAR-CNR, Naples, Italy)
- Henning Mueller (ES-SO, Valais, Switzerland)



- Daniel Riccio (National Research Council of Italy, ICAR-CNR, Naples, Italy)
- Giuseppe DePietro (National Research Council of Italy, ICAR-CNR, Naples, Italy)
- Antonio Foncubierta (IBM Research – Zurich, Switzerland)
- Moshiko Raboh (IBM Research – Zurich, Switzerland)
- Anna Maria Anniciello (National Cancer Institute – IRCCS – Fondazione Pascale, Naples, Italy)
- Giosuè Scognamiglia (National Cancer Institute – IRCCS – Fondazione Pascale, Naples, Italy)
- Florinda Feroce (National Cancer Institute – IRCCS – Fondazione Pascale, Naples, Italy)
- Maria Frucci (IBM Research – Zurich, Switzerland)
- Maria Gabrani (IBM Research – Zurich, Switzerland)

KNIGHT Challenge: Kidney clinical Notes and Imaging to Guide and Help personalize Treatment and biomarkers discovery

Monday, March 28

06:15:00 PM – 07:15:00 PM IST

Abstract: The aim of the KNIGHT challenge is to facilitate the development of Artificial Intelligence (AI) models for automatic preoperative prediction of risk class for patients with renal masses identified in clinical Computed Tomography (CT) imaging of the kidneys. The dataset, we name the Kidney Classification (KiC) dataset, is based on the 2021 Kidney and Kidney Tumor Segmentation challenge (KiTS) and extended to include additional CT phases and clinical information, as well as risk classification labels, deduced from postoperative pathology results. Some of the clinical information will also be available for inference. The patients are classified into five risk groups in accordance with American Urological Association (AUA) guidelines. These groups can be divided into two classes based on the follow-up treatment. The challenge consists of three tasks: (1) binary patient classification as per the follow-up treatment, (2) fine-grained classification into five risk groups and (3) discovery of prognostic biomarkers.

Organizers:

- Moshiko Raboh (IBM Research – Haifa, Israel)
- Alex Golts (IBM Research – Haifa, Israel)
- Nicholas Heller (University of Minnesota, Minneapolis, United States)
- Resha Tejpal (University of Minnesota, Minneapolis, United States)
- Nour Abdallah (Cleveland Clinic, Ohio, United States)
- Tarik Benidir (Cleveland Clinic, Ohio, United States)
- Steven Campbell (Cleveland Clinic, Ohio, United States)
- Erick Remer (Cleveland Clinic, Ohio, United States)
- Antonio Foncubierta (IBM Research – Zurich, Switzerland)
- Maria Gabrani (IBM Research – Zurich, Switzerland)
- Henning Mueller (HES-SO, Valais, Switzerland)
- Efrat Hexter (IBM Research – Haifa, Israel)
- Simona Rabinovici-Cohen (IBM Research – Haifa, Israel)
- Yoel Shoshan (IBM Research – Haifa, Israel)
- Christopher Weight (Cleveland Clinic, Ohio, United States)
- Michal Rosen-Zvi (IBM Research – Haifa, Israel, The Hebrew University, Jerusalem, Israel)



BRAin Tumor Sequence REGistration Challenge (BraTS-Reg): Establishing Correspondence between Pre-Operative and Follow-up MRI
Monday, March 28
07:30:00 PM – 08:30:00 PM IST

Abstract: Registration of Magnetic Resonance Imaging (MRI) scans containing pathologies is challenging due to tissue appearance changes, and still an unsolved problem. We organize the first Brain Tumor Sequence Registration (BraTS-Reg) challenge, focusing on estimating correspondences between baseline pre-operative and follow up scans of the same patient diagnosed with a brain glioma. The BraTS-Reg challenge intends to establish a benchmark environment for deformable registration algorithms. The dataset associated with this challenge comprises de-identified multi-institutional multi-parametric MRI (mpMRI) data, curated for each scan's size and resolution, according to a common anatomical template. The clinical experts of our team have generated extensive annotations of landmarks points within the scans. The “training data” along with these ground truth annotations will be released to participants to design their registration methods, whereas annotations of the “validation” and “test” data will be withheld by the organizers and used to evaluate the containerized algorithms of the participants. We will conduct the quantitative evaluation of the submitted algorithms using several metrics, such as Median Absolute Error and Robustness.

Organizers:

- Bhakti Baheti (University of Pennsylvania)
- Diana Waldmannstetter (University of Zurich and Technical University of Munich)
- Satrajit Chakrabarty (Washington University in Saint Louis)
- Hamed Akbari (University of Pennsylvania)
- Michel Bilello (University of Pennsylvania)
- Benedikt Wiestler (Technical University of Munich)
- Syed Abidi (Washington University in Saint Louis)
- Mina Mousa (Washington University in Saint Louis)
- Evan Calabrese (University of California San Francisco)
- Jeffrey Rudie (University of California San Francisco)
- Javier Villanueva-Meyer (University of California San Francisco)
- Daniel S. Marcus (Washington University in Saint Louis)
- Christos Davatzikos (University of Pennsylvania)
- Aristeidis Sotiras (Washington University in Saint Louis)
- Bjoern Menze (University of Zurich and Technical University of Munich)
- Spyridon Bakas (University of Pennsylvania)



Special Sessions

Various special sessions have been organized throughout ISBI 2022 on special topics of interest to the ISBI community.

Women in Imaging Session: EMERGING TRENDS AND STANDARDS IN AI

Tuesday, March 29

10:30:00 AM – 02:00:00 PM IST

Organizers:

- Dr Tripti Swarnkar, Siksha 'O' Anusandhan
- Dr. Deepti Bathula, Indian Institute of Technology Ropar
- Aparna Kanakatte, Tata Consultancy Services
- Dr. Sohini RoyChoudhury, FourthBrain.ai

Speakers:

- Prof. Sushmita Mitra, Indian Statistical Institute
- Prof. Yonina C. Eldar, Weizmann Institute of Science
- Dr Rajiv Raman, Senior Consultant at Department of Vitreoretinal services, Sankara Nethralaya

Recent research trends have been focused on integrating AI methods into telehealth, and medical imaging domains. While healthcare in the midst of a pandemic can be challenging yet critical, ongoing efforts ranging from Digital twinning for testing medical procedures to ocular injectable implants are targeted to improve the overall quality of life for patients. This workshop aims to highlight the recent trends, standardization procedures and current hurdles to transform medical products from research to production phases. Our mission is to foster stronger collaborations between academic and industrial sectors through knowledge dissemination and networking opportunities.

This session welcomes both men and women working in the field of Medical and Biomedical Imaging. Academic and Industrial researchers at all levels are encouraged to attend the special session. This event is a forum that brings together faculty, academic researchers, industrial experts and students by providing an opportunity to share ideas and connect over mutual shared interests in the field of biomedical imaging while raising visibility of female researchers and professionals. This forum is meant to bridge the gap between students and professionals in academia and industry by mutual sharing of experiences and career advice for female researchers.

Neuroimaging for Neuroscience and Neurology

Tuesday, March 29

05:30:00 PM – 07:00:00 PM IST

Chair:

- Natasha Lepore (University of Southern California, USA)

Speakers:

- Prof. Daniel Alexander, University College London
- Prof. Vincent Calhoun, Georgia State University, Georgia Institute of Technology, and Emory University

Neuroimaging has played a significant role in the understanding of the brain and the early detection of a number of neurological pathologies. In the recent past, a combination of classical modelling and data-driven deep learning has resulted in interesting outcomes. The methods are applicable in both structural and functional understanding of the brain. This session focuses on some of the recent advances in model-based imaging and image-based modelling towards better understanding of the function and metabolism. The speakers will shed light on the recent developments in the area and where the field is headed.



Point-of-Care Technologies for Meeting Global Healthcare
Wednesday, March 30
08:00:00 AM – 09:30:00 AM IST

Organizers:

- Dr. Viswanath P Sudarshan, Tata Consultancy Services Research
- Dr. Subhamoy Mandal, Maxer Endoscopy GmbH

Speakers:

- Prof. Aydogan Ozcan – UCLA
- Dr. Michal Sofka – Hyperfine
- Dr. Arjun Arunachalam – Voxelgrids
- Dr. Shyamvasudeva Rao – Forus Health
- Dr. Prakash Kamaraj – Forus Health

Technological improvements coupled with advances in computational imaging have revolutionized healthcare at unprecedented rate. The emphasis on point-of-care (POC) devices is ever growing, and over time it has been emerging as an effective tool to address global health challenges. Together with conventional portable technologies such as wearable sensors and mobile-phone devices, bedside tomographic imaging modalities are also becoming a reality. Portable and bedside tomographic imaging modalities are critical for several scenarios such as diagnosis of stroke and can potentially be used for early detection of neurodegenerative and orthopaedic diseases.

Translational and Clinical Applications of Photoacoustic Imaging
Wednesday, March 30
05:30:00 PM – 07:00:00 PM IST

Organizers:

- Prof. Chulhong Kim, Pohang University of Science and Technology
- Dr. Subhamoy Mandal, Erbe Vision GmbH
- Dr. Mayanglambam Suheshkumar Singh, Indian Institute of Science Education and Research, Thiruvananthapuram

Speakers:

- Prof. Muyinatu Lediju Bell, Johns Hopkins University
- Dr. XL Dean Ben, ETH Zurich
- Dr. Sanhita Sinharay, Indian Institute of Science
- Dr. Mayanglambam Suheshkumar Singh, Indian Institute of Science Education and Research, Thiruvananthapuram

Photoacoustics (PA) is an emerging new hybrid bioimaging modality which combines acoustical detection and EM absorption contrast. PA imaging not only provides structural but also functional information of biological tissues. Multi-Spectral PA imaging is capable of high resolution three dimensional (3D) visualizations of molecular probes located deep in scattering living tissues, with resolution and speed representative of ultrasound. This method can simultaneously deliver anatomical, functional and molecular information with both high resolution and penetration capabilities. PA imaging and sensing technologies have allowed investigators to probe hypoxia, monitor blood glucose level and nutrition gradients, visualize fat metabolism, as well as study cell viability, proliferation and drug response potentials. Thus PA has already been established as a useful tool for preclinical experiments, and is being increasingly used for clinical measurements/trials in human subjects. In the special session we would like to showcase the technological innovations that will be instrumental in aiding the translation of the powerful and promising PA technology from the laboratory to clinical practice – and allow us to ‘hear the molecules’ in action. Further, we will highlight selected works on basic physical and engineering advancements in the field which has enabled translational and clinical applications of photoacoustic imaging.



Biomedical imaging for equitable deep learning, regulatory science and clinical research
Thursday, March 31
05:30:00 PM – 07:00:00 PM

Organizers:

- Dr. Pratik Shah, PhD, Massachusetts Institute of Technology

Speakers:

- Dr. Jenna Lester, MD, University of California, San Francisco
- Dr. Jana G. Delfino, PhD, US Food and Drug Administration
- Dr. Vinay Pai, PhD, US Food and Drug Administration
- Dr. Pratik Shah, PhD, Massachusetts Institute of Technology

This session is suitable for ISBI community members interested in modern topics in acquisition of medical images and their real-world clinical applications in computer vision, deep learning, regulatory science and challenges such as bias and inequity and emerging regulatory framework. Topics include digital image processing, deep learning, tissue structure and anatomy, uncertainty estimations and statistical modeling. In addition, newer concepts in using regulatory science methods for Software as a Medical Device (SaMD), and equity and fairness for benchmarking data and models for medical imaging will also be covered. While few of these topics have been previously offered at ISBI, we did not find a consolidated session bringing together diverse communities of clinical imaging, deep learning, regulatory science and fairness. We propose that these topics will be of significant interest to the biomedical imaging researchers and industry, and speakers are from communities that do not traditionally attend ISBI. This session will also focus on diversity and inclusion of patients and data often under-represented in medical imaging research.

Clinical and Translational Medicine

Tuesday, March 29
05:30:00 PM – 07:00:00 PM IST

Chair:

- Jayavardhana Gubbi, Tata Consultancy Services Research, India

Speakers:

- Dr. Ronald Summers, National Institutes of Health
- Dr. Rakesh Mullick, GE Healthcare India

Translational medicine is an interdisciplinary area in biomedical engineering that focuses on taking research that happens in the lab to practice in the real-world. It involves three phases where the translation happens from bench to bedside, bedside to patient and finally patient to practice. There appears to be a significant gap in this area and the success rate in moving research from bench to practice is less than desired. In the context of ISBI conference, it is important to study the role medical imaging can play in translational medicine. The speakers will put forth their views on what could lead to better translation of medical imaging methods and algorithms to practice.



Technical Program

The program is listed in India Standard Time (IST) / UTC+05:30.

Monday, March 28

3/28/2022

Tutorial: Photoacoustic Imaging: Principles, Systems, and Applications

08:00:00 AM – 11:45:00 AM

Presenter: Chulhong Kim, Pohang University of Science and Technology, South Korea
Bengal Stateroom 1

3/28/2022

Clinical Day

08:00:00 AM – 11:45:00 AM

Bengal Stateroom 4

08:00:00 AM

Clinical Talk: 'Newer' Neuro-oncologic Imaging Techniques: Potential and Limitations

Dr. Suyash Mohan

09:15:00 AM

Clinical Talk

Radiomics and AI: Considerations for Clinical Applications & Precision Medicine

Dr. Satish Viswanath

10:45:00 AM

Clinical Talk

Radiomics in Brain Tumors

Dr. Rakesh K Gupta, MD

3/28/2022

Tutorial: Self-supervised Learning: Overview and Application to Medical Imaging

08:00:00 AM – 11:45:00 AM

Presenters: Pavan Annangi, GE Global Research, India; Deepa Anand GE Healthcare, India; Hemant Kumar Aggarwal, Wipro GE Healthcare, India; Hariharan Ravishankar, GE Healthcare, India; Rahul Venkataramani, GE Global Research, India
Bengal Stateroom 2

3/28/2022

Coffee Break

10:15:00 AM – 10:45:00 AM

3/28/2022

Lunch Break

12:30:00 PM – 02:00:00 PM

3/28/2022

Networking Session: Lunch with Leaders (Onsite Only)

Bengal Stateroom 2

12:30:00 PM – 02:00:00 PM

3/28/2022

Tutorial: Quantitative functional and molecular contrast imaging

02:15:00 PM – 06:00:00 PM

Presenters: Simona Turco and Massimo Mischi, Eindhoven University of Technology, Netherlands
Bengal Stateroom 5

3/28/2022

Tutorial: Graph Signal Processing Opens New Perspectives for Human Brain Imaging

02:15:00 PM – 06:00:00 PM

Presenters: Maria Giulia Preti, EPFL, Switzerland and Thomas Bolton, Centre Hospitalier Universitaire Vaudois (CHUV), Switzerland
Bengal Stateroom 2

3/28/2022

Challenge: Endoscopic computer vision challenges 2.0

02:15:00 PM – 03:15:00 PM

Bengal Stateroom 1

3/28/2022

Challenge: CoNIC: Colon Nuclei Identification and Counting Challenge

02:15:00 PM – 03:15:00 PM

Bengal Stateroom 4

3/28/2022

Challenge: AIROGS: Artificial Intelligence for ROBust Glaucoma Screening Challenge

03:30:00 PM – 04:30:00 PM

Bengal Stateroom 4



3/28/2022

**Challenge: BRIGHT Challenge: BReast tumor
Image classification on Gigapixel**

HisTopathological images

03:30:00 PM – 04:30:00 PM

Bengal Stateroom 1

3/28/2022

Coffee Break

04:30:00 PM – 05:00:00 PM

3/28/2022

**Tutorial: From U-Net to Transformers: Navigating
through key advances in Medical Image
Segmentation**

05:30:00 PM – 08:00:00 PM

Presenters: Vishal Patel and Jeya Maria Jose
Valanarasu, Johns Hopkins University, USA

Bengal Stateroom 1

3/28/2022

Tutorial: Federated Learning in Medical Imaging

05:30:00 PM – 08:00:00 PM

Presenters: Jayashree Kalpathy-Cramer,
Massachusetts General Hospital, USA; Holger Roth
and Michael Zephyr, NVIDIA, USA

Bengal Stateroom 4

3/28/2022

**Challenge: KNIGHT Challenge: Kidney clinical
Notes and Imaging to Guide and Help
personalize Treatment and biomarkers discovery**

06:15:00 PM – 07:15:00 PM

Bengal Stateroom 2

3/28/2022

ISBI Welcome Dinner

07:00:00 PM – 10:00:00 PM

3/28/2022

**Challenge: BRAin Tumor Sequence REGistration
Challenge (BraTS-Reg): Establishing
Correspondence between Pre-Operative and
Follow-up MRI**

07:30:00 PM – 08:30:00 PM

Bengal Stateroom 2



Tuesday, March 29

3/29/2022

Opening Remarks & Plenary

08:30:00 AM – 10:00:00 AM

Bengal Stateroom 5

Chair: Arun K. Thittai (Indian Institute of Technology Madras, India)

ELASTICITY IMAGING FOR GUIDANCE OF CHEMOTHERAPEUTIC AND THERMAL ABLATION TREATMENT OF TUMORS

Elisa E. Konofagou

Robert and Margaret Hariri Professor of Biomedical Engineering and Radiology (Physics), Columbia University, New York, USA

3/29/2022

Coffee Break

10:00:00 AM – 10:30:00 AM

3/29/2022

Computer Aided Diagnosis - I

10:30:00 AM - 12:00:00 PM

Bengal Stateroom 5

Session Type: Oral

Chairs: Anuj Srivastava (Florida State University, USA) & Bipul Das (GE HealthCare, India)

10:30:00 AM

TWO-STAGE TOPOLOGICAL REFINEMENT NETWORK FOR RETINAL ARTERY/VEIN CLASSIFICATION

Shichen Luo (University of New South Wales); Zhan Heng (University of New South Wales); Maurice Pagnucco (UNSW); Yang Song (University of New South Wales)*

10:45:00 AM

A NEUROPATHOLOGICAL HUB IDENTIFICATION FOR ALZHEIMER'S DISEASE VIA JOINT ANALYSIS OF TOPOLOGICAL STRUCTURE AND NEUROPATHOLOGICAL BURDEN

Defu Yang (University of North Carolina at Chapel Hill); Wenchao Li (Hangzhou Dianzi University); Jingwen Zhang (Wake Forest University); Hui Shen (Zhejiang Lab); Minghan Chen (Wake Forest University); Wentao Zhu (Zhejiang Lab); Guorong Wu (University of North Carolina)*

11:00:00 AM

AN EFFICIENT ANCHOR-FREE UNIVERSAL LESION DETECTION IN CT-SCANS

Manu Sheoran (TCS Research); Meghal Dani (TCS Research); Monika Sharma (TCS Research, India); Lovekesh Vig (Innovation Labs, Tata Consultancy Services Limited)*

11:15:00 AM

LADEN: LESION-AWARE ADVERSARIAL DEEP NETWORK FOR THE GRADING OF MACULAR DISEASES USING COLOR FUNDUS IMAGES

*Ravi Kamble (AIRA MATRIX); Aman Srivastava (Aira Matrix Pvt Ltd); Nitin Singhal (AIRAMATRIX PVT. LTD.)**

11:30:00 AM

PREDICTING KNEE OSTEOARTHRITIS PROGRESSION FROM STRUCTURAL MRI USING DEEP LEARNING

Egor Panfilov (University of Oulu); Simo Saarakkala (University of Oulu, Finland); Miika T Nieminen (University of Oulu); Aleksei Tiulpin (Aalto University)*

11:45:00 AM

ANOMALY DETECTION VIA CONTEXT AND LOCAL FEATURE MATCHING

Antanas Kascenas (Canon Medical Research Europe); Rory M Young (University of Glasgow); Bjoern Sand Jensen (University of Glasgow); Nicolas Pugeault (University of Glasgow); Alison Q O'Neil (Canon Medical Research Europe)*

3/29/2022

Cellular Imaging and Analysis

10:30:00 AM - 12:00:00 PM

Bengal Stateroom 2

Session Type: Oral

Chairs: K.V.S. Hari (Indian Institute of Science, India) & Hu Han (Chinese Academy of Sciences, China)

10:30:00 AM

EARLY PREDICTION OF BLASTOCYST DEVELOPMENT VIA TIME-LAPSE VIDEO ANALYSIS

*Xiang Xie (Sun Yat-sen University); Pengxiang Yan (Sun Yat-sen University); Fang-Ying Chen (the first affiliated hospital of Sun Yat-sen University); Feng Gao (the Sixth Affiliated Hospital, Sun Yat-sen University); Qingyun Mai (the first affiliated hospital of Sun Yat-sen University); Guanbin Li (Sun Yat-sen University)**



10:45:00 AM

ADVANCED DEEP NETWORKS FOR 3D MITOCHONDRIA INSTANCE SEGMENTATION

Mingxing Li (University of Science and Technology of China); Chang Chen (Huawei Noah's Ark Lab); Xiaoyu Liu (University of Science and Technology of China); Wei Huang (University of Science and Technology of China); Yueyi Zhang (University of Science and Technology of China); Zhiwei Xiong (University of Science and Technology of China)*

11:00:00 AM

WEAKLY SUPERVISED NUCLEI SEGMENTATION VIA INSTANCE LEARNING

Weizhen Liu (ShanghaiTech University)*; Qian He (ShanghaiTech University); Xuming He (ShanghaiTech University)

11:15:00 AM

FAST PARTICLE PICKING FOR CRYO-ELECTRON TOMOGRAPHY USING ONE-STAGE DETECTION

Wu Shiyu (National Laboratory of Pattern Recognition, Institute of Automation, Chinese Academy of Sciences); Guole Liu (School of Artificial Intelligence, University of Chinese Academy of Sciences); Ge Yang (National Laboratory of Pattern Recognition, Institute of Automation, Chinese Academy of Sciences)*

11:30:00 AM

DENOISEREG: UNSUPERVISED JOINT DENOISING AND REGISTRATION OF TIME-LAPSE LIVE CELL MICROSCOPY IMAGES USING DEEP LEARNING

Kerem Celikay (Biomedical Computer Vision Group)*; Vadim O. Chagin (Russian Academy of Sciences, St. Petersburg); M. Cristina Cardoso (Technical University of Darmstadt); Karl Rohr (University of Heidelberg, DKFZ)

11:45:00 AM

GORDA: GRAPH-BASED ORIENTATION DISTRIBUTION ANALYSIS OF SLISCATTEROMETRY PATTERNS OF NERVE FIBRES

Esteban Vaca (Forschungszentrum Jülich)*; Miriam Menzel (Forschungszentrum Jülich GmbH); Katrin Amunts (Forschungszentrum Jülich); Markus Axer (Institute of Neuroscience and Medicine (INM-1)); Timo Dickscheid (Forschungszentrum Jülich)

3/29/2022

Deep Learning - I

10:30:00 AM - 12:00:00 PM

Bengal Stateroom 4

Session Type: Oral

Chairs: Saiprasad Ravishankar (Michigan State University, USA) & Hrishikesh Deshpande (Philips Innovative Technologies, Germany)

10:30:00 AM

SPHERICAL TRANSFORMER FOR QUALITY ASSESSMENT OF PEDIATRIC CORTICAL SURFACES

Jiale Cheng (South China University of Technology)*; Xin Zhang (South China University of Technology); Fenqiang Zhao (University of North Carolina at Chapel Hill); Zhengwang Wu (UNC-Chapel Hill); Ya Wang (University of North Carolina at Chapel Hill); Ying Huang (Northwestern Polytechnical University); Weili Lin (UNC Chapel Hill); Li Wang (UNC); Gang Li (University of North Carolina at Chapel Hill)

10:45:00 AM

TGNET: A TASK-GUIDED NETWORK ARCHITECTURE FOR MULTI-ORGAN AND TUMOUR SEGMENTATION FROM PARTIALLY LABELLED DATASETS

Hao Wu (UNSW); Shuchao Pang (University of New South Wales)*; Arcot Sowmya (UNSW)

11:00:00 AM

SEMANTIC-AWARE TEMPORAL CHANNEL-WISE ATTENTION FOR CARDIAC FUNCTION ASSESSMENT

Guanqi Chen (The University of Hong Kong); Guanbin Li (Sun Yat-sen University)*

11:15:00 AM

MULTI-SCALE BIDIRECTIONAL ENHANCEMENT NETWORK FOR 3D DENTAL MODEL SEGMENTATION

Zigang Li (Nanjing University of Science and Technology); Tingting Liu (Nanjing University of Science and Technology); Jun Wang (Shanghai University); Changdong Zhang (School of Mechanical Engineering, Nanjing University of Science and Technology, Nanjing, China); Xiuyi Jia (Nanjing University of Science and Technology)*



11:30:00 AM

**SPA-RESUNET: STRIP POOLING ATTENTION
RESUNET FOR MULTI-CLASS SEGMENTATION
OF VERTEBRAE AND INTERVERTEBRAL DISCS**

Chuanpu Li (Southern Medical University); Tianbao Liu (Southern Medical University); Zeli Ze Chen (Southern Medical University); Shumao Pang (Southern Medical University); Liming Zhong (School of Biomedical Engineering, Southern Medical University); qianjin feng (southern medical University); Wei Yang (Southern Medical University)*

11:45:00 AM

**TOWARDS GENERALIZATION OF MEDICAL
IMAGING AI MODELS: SHARPNESS-AWARE
MINIMIZERS AND BEYOND**

Deepa Anand (GE Healthcare); Rohan Patil (GE Healthcare); Utkarsh Agrawal (GE Healthcare); Rahul Venkataramani (GE Global Research); Hariharan Ravishankar (GE Healthcare)*; Prasad Sudhakar (GE Healthcare)

3/29/2022

**Special Session: Women in Imaging: EMERGING
TRENDS AND STANDARDS IN AI**

10:30:00 AM - 12:00:00 PM

Bengal Stateroom 1

Session Type: Special Session

INTELLIGENT BIOMEDICAL IMAGE ANALYSIS

Sushmita Mitra (Indian Statistical Institute)

**IMAGING: FROM COMPRESSED SENSING TO
MODEL-BASED DEEP LEARNING**

Yonina C. Eldar (Weizmann Institute of Science)

3/29/2022

Networking: Women-In-Imaging

12:00:00 PM - 02:00:00 PM

Bengal Stateroom 1

Session Type: Networking

3/29/2022

Lunch Break

12:30:00 PM - 02:00:00 PM

3/29/2022

**Young-Professional Activity: Speed Networking
(Onsite Only)**

02:15:00 PM - 03:30:00 PM

Bengal Stateroom 2

Session Type: Young Professional

3/29/2022

Brain Imaging

03:45:00 PM - 05:15:00 PM

Poster Hall

Session Type: Poster

**LONGITUDINAL WHOLE-BRAIN FUNCTIONAL
NETWORK CHANGE PATTERNS OVER A TWO-
YEAR PERIOD IN THE ABCD DATA**

Rekha Saha (Georgia State University)*; Debbrata Kumar Saha (Georgia Institute of Technology); Md Abdur Rahaman (Georgia Institute of Technology); Zening Fu (Georgia State University); Vince Calhoun (TReNDS)

**ACTIVATE INDEX: AN INTEGRATED INDEX TO
REVEAL DISRUPTED BRAIN NETWORK
ORGANIZATIONS OF MAJOR DEPRESSIVE
DISORDER PATIENTS**

Yu Fu (Zhejiang University); Yanyan Huang (Zhejiang University); Meng Niu (Lanzhou University); Le Xue (Zhejiang University); Shunjie Dong (Zhejiang University); Shunlin Guo (Lanzhou University); Junqiang Lei (Lanzhou University); Cheng Zhuo (Zhejiang University)*

**BRAINVIZ: WEB-BASED DATA-DRIVEN
CLINICAL DECISION SUPPORT**

Bradley T Baker (Tri-Institutional Center for Translational Research in Neuroimaging and Data Science (TReNDS))*; Mustafa S Salman (Georgia Institute of Technology); Maria Misiura (Tri-Institutional Center for Translational Research in Neuroimaging and Data Science (TReNDS)); Jeremy Bockholt (Tri-Institutional Center for Translational Research in Neuroimaging and Data Science (TReNDS)); Eric Verner (Tri-Institutional Center for Translational Research in Neuroimaging and Data Science (TReNDS)); Vince Calhoun (TReNDS)

**FIBERNEAT: UNSUPERVISED STREAMLINE
FILTERING IN LATENT SPACE**

Bramsh Q Chandio (INDIANA UNIVERSITY)*; Tamoghna Chattopadhyay (University of Southern California); Conor Owens-Walton (University of Southern California); Julio Villalon-Reina (Imaging Genetics Center); Leila Nabulsi (University of Southern California); Sophia Thomopoulos (Imaging Genetics Center, University of Southern California); Eleftherios Garyfallidis (Indiana University); Paul Thompson (Imaging Genetics Center)



EXPLICITLY NONLINEAR DYNAMIC FUNCTIONAL NETWORK CONNECTIVITY IN RESTING STATE FMRI DATA

Sara Motlaghian (Translational Research in Neuroimaging and Data Science (TReNDS))*; Vince Calhoun (TReNDS)

A NOVEL METHOD TO PRESERVE SCALE-FREE PROPERTY FOR THE INFERENCE OF DYNAMIC EFFECTIVE CONNECTIVITY NETWORKS FROM FMRI

Li Zhang (Shenzhen University)*; Gan Huang (Shenzhen University); Zhen Liang (Shenzhen University); Linling Li (Shenzhen University); Zhi-Guo Zhang (Nil)

WHEN FNIRS MEETS FMRI TO COMPLEMENT CEREBELLAR EXPLORATION

Giulia Rocco (Université Côte d'Azur)*; Stephen Ramanoël (Université Côte d'Azur); Christophe Habas (CHNO des Quinze-Vingts); Angelo Arleo (Sorbonne Université); Olivier Meste (Université Côte d'Azur); Marie-Noëlle Magnié-Mauro (CHU Pasteur Nice, Université Côte d'Azur); Jerome Lebrun (CNRS)

MODEL AND PREDICT AGE AND SEX IN HEALTHY SUBJECTS USING BRAIN WHITE MATTER FEATURES: A DEEP LEARNING APPROACH

Hao He (University of electronic science and technology of china)*; Fan Zhang (Harvard Medical School); Steve Pieper (ISOMICS); Nikos Makris (Harvard Medical School); Yogesh Rath (Harvard Medical School); William M Wells (Harvard Medical School / Brigham and Women's Hospital); Lauren O'Donnell (Harvard University)

3/29/2022

Modality Imaging

03:45:00 PM - 05:15:00 PM

Poster Hall

Session Type: Poster

IN DEFENSE OF KALMAN FILTERING FOR POLYP TRACKING FROM COLONOSCOPY VIDEOS

David S Butler (University of Adelaide); Yuan Zhang (University of Adelaide); Tim Chen (University of Adelaide); Seon Ho Shin (Lyell McEwin Hospital); Rajvinder Singh (University of Adelaide); Gustavo Carneiro (University of Adelaide)*

PET ARTERIAL INPUT FUNCTION ESTIMATION USING MACHINE LEARNING

Rajat Vashistha (The University of Queensland)*; Viktor Vegh (The University of Queensland); David Reutens (The University of Queensland)

SCHEME AND DATASET FOR EVALUATING COMPUTER-AIDED POLYP DETECTION SYSTEM IN COLONOSCOPY

Leyu Yao (Shanghai Jiao Tong University); Fan He (Shanghai Jiao Tong University); Xiaofeng Wang (Tong Ren Hospital Shanghai Jiao Tong University School of Medicine); Lu Zhou (Shanghai Tongren Hospital); HaiXia Peng (TongRen Hospital, Shanghai Jiaotong University); Xiaolin Huang (Shanghai Jiao Tong University)*

INVERTIBLE AC-FLOW: DIRECT ATTENUATION CORRECTION OF PET IMAGES WITHOUT CT OR MR IMAGES

Bo Wang (Zhejiang University); Lijun Lu (Southern Medical University); Huafeng Liu (Zhejiang University)*

REPRODUCIBILITY AND EVOLUTION OF DIFFUSION MRI MEASUREMENTS WITHIN THE CERVICAL SPINAL CORD IN MULTIPLE SCLEROSIS

Haykel Snoussi (University of Texas Health Science Center at San Antonio)*; Benoit Combes (Inria); Olivier Commowick (INRIA); Elise Bannier (University Hospital of Rennes, Neuroinfo platform); Anne Kerbrat (University Hospital of Rennes, Neurology); Julien Cohen-Adad (NeuroPoly Lab, Institute of Biomedical Engineering, Polytechnique Montreal); Christian Barillot (IRISA); Emmanuel Caruyer (CNRS)

LEARNING TO JOINTLY SEGMENT THE LIVER ANATOMY FROM INCOMPLETE ANNOTATIONS

Omar Ali (Guerbet, Inria, Inserm)*; Alexandre Bône (Institut du Cerveau et de la Moelle épinière); Eric Vibert (Paul Brousse Hospital, APHP); Irene E Vignon-Clementel (INRIA); Marc-Michel Rohe (Guerbet)

LFANET: TRANSFORMING 3T SINGLE-SHELL TO 7T MULTI-SHELL DMRI USING DEEP LEARNING BASED LEAPFROG AND ATTENTION

Ranjeet Ranjan Jha (INDIAN INSTITUTE OF TECHNOLOGY MANDI)*; Sudhir Pathak (University of Pittsburgh); Walter Schneider (University of Pittsburgh); B. V. Rathish Kumar (IIT Kanpur); Arnav Bhavsar (IIT Mandi); Aditya Nigam (IIT Mandi)



MULTI-TASKING DSSD ARCHITECTURE FOR LAPAROSCOPIC CHOLECYSTECTOMY SURGICAL ASSISTANCE SYSTEMS

Sai Pradeep Chakka (IIITB); Neelam Sinha (IIIT Bangalore)*

SINGLE-CELL TRACKING WITH COMPTON PET: AN IN SILICO FEASIBILITY STUDY

Satyajit Ghosh (IIT BOMBAY); Pragya Das (IIT BOMBAY)*

ROBUST LOW RANK MICROANEURYSM CLASSIFICATION IN FUNDUS IMAGES

*Renuka Acharya (IIT Bhubaneswar); Niladri B Puan (IIT Bhubaneswar)**

OUT-OF-DISTRIBUTION DETECTION IN DERMATOLOGY USING INPUT PERTURBATION AND SUBSET SCANNING

Hannah H Kim (Duke University); Girmaw Abebe Tadesse (IBM); Celia Cintas (IBM Research Africa); Skyler D Speakman (IBM Research); Kush R Varshney (IBM Research)*

SIMUT - A SOFTWARE SYSTEM FOR SIMULATION OF SCANNING ERRORS IN COMPUTED TOMOGRAPHY

*Chang-Chieh Cheng (National Yang Ming Chiao Tung University)**

SEMI-SUPERVISED CORONARY VESSELS SEGMENTATION FROM INVASIVE CORONARY ANGIOGRAPHY WITH CONNECTIVITY-PRESERVING LOSS FUNCTION

Haorui He (University of Oxford); Abhirup Banerjee (University of Oxford); Marcel Beetz (University of Oxford); Robin Choudhury (University of Oxford); Vicente Grau (University of Oxford)*

IMAGE-BASED IN SITU CALIBRATION OF AN X-RAY MICROTOMOSYNTHESIS SCANNER OF HISTOPATHOLOGY SAMPLES

*Piroz Bahar (National Heart, Lung, and Blood Institute)**

DATA-CONSISTENT NON-CARTESIAN DEEP SUBSPACE LEARNING FOR EFFICIENT DYNAMIC MR IMAGE RECONSTRUCTION

Zihao Chen (University of California, Los Angeles); Yuhua Chen (University of California, Los Angeles); Yibin Xie (Cedars-Sinai Medical Center); Debiao Li (Cedars-Sinai Medical Center); Anthony G Christodoulou (Cedars-Sinai Medical Center)*

IDEAL-OBSERVER COMPUTATION WITH ANTHROPOMORPHIC PHANTOMS USING MARKOV CHAIN MONTE CARLO

*Md Ashequr Rahman (Washington University in St. Louis); Zitong Yu (Washington University in St. Louis); Abhinav K. Jha (Washington University in St. Louis)**

BAND SELECTIVE VOLTERRA FILTER FOR NONLINEAR ULTRASOUND IMAGING

Abhishek Sahoo (University of Minnesota); Emad Ebbini (University of Minnesota)*

DL-UCT: A DEEP LEARNING FRAMEWORK FOR ULTRASOUND COMPUTED TOMOGRAPHY

Sumukha Prasad (The Pennsylvania State University); Mohamed Almekkawy (Pennsylvania State University)*

ESTIMATION OF ELASTIC AND VISCOELASTIC MODULI OF ARTERIAL WALLS USING SHEAR WAVE ELASTOGRAPHY

Tuhin Roy (North Carolina State University); Murthy Guddati (North Carolina State University)*

3/29/2022

Image Acquisition & Reconstruction

03:45:00 PM - 05:15:00 PM

Poster Hall

Session Type: Poster

TOWARDS IMPROVED ROBUSTNESS OF LOW-DOSE CT PERFUSION IMAGING VIA JOINT ESTIMATION OF STRUCTURAL CT AND FUNCTIONAL CBF IMAGES

Viswanath Pamulakanty Sudarshan (TCS Research); Vartika Sengar (TCS Research); Pavan Kumar Reddy K (TCS Innovation Labs); Jayavardhana Gubbi (TCS Research); Arpan Pal (Tata Consultancy Services)*

RECONSTRUCTION OF RESTING STATE FMRI USING LSTM VARIATIONAL AUTO-ENCODER ON SUBCORTICAL SURFACE TO DETECT EPILEPSY

Yunan Wu (Northwestern University); Pierre Besson (Aix Marseille Université); Emanuel A Azcona (Northwestern University); S. Kathleen Bandt (Northwestern University); Todd Parrish (Northwestern University); Aggelos Katsaggelos (Northwestern University)*



CONVOLUTIONAL ANALYSIS OPERATOR LEARNING BY END-TO-END TRAINING OF ITERATIVE NEURAL NETWORKS

Andreas Kofler (Physikalisch-Technische Bundesanstalt, Berlin and Braunschweig)*; Christian Wald (Charité - Universitätsmedizin Berlin); Tobias Schaeffter (Physikalisch-Technische Bundesanstalt); Markus Haltmeier (University of Innsbruck); Christoph Kolbitsch (Physikalisch-Technische Bundesanstalt)

FROM SUPERVISED TO UNSUPERVISED HARMONIZATION OF DIFFUSION MRI ACQUISITIONS

Leon Weninger (RWTH Aachen University)*; Mushawar Ahmad (RWTH Aachen University); Dorit Merhof (RWTH Aachen University)

SINOGRAM UPSAMPLING USING PRIMAL-DUAL UNET FOR UNDERSAMPLED CT AND RADIAL MRI RECONSTRUCTION

Philipp Ernst (Otto von Guericke University Magdeburg); Soumick Chatterjee (Otto von Guericke University Magdeburg)*; Georg Rose (Otto von Guericke University Magdeburg); Oliver Speck (Otto von Guericke University Magdeburg); Andreas Nurnberger (Magdeburg University)

MC-PDNET: DEEP UNROLLED NEURAL NETWORK FOR MULTI-CONTRAST MR IMAGE RECONSTRUCTION FROM UNDERSAMPLED K-SPACE DATA

Kumari Pooja (CEA Paris Saclay); Zaccharie Ramzi (CEA Paris Saclay); Chaithya G G R (CEA Paris Saclay); Philippe Ciuciu (Inria-CEA MIND team (CEA/NeuroSpin))*

TOWARDS PATIENT SPECIFIC RECONSTRUCTION USING PERCEPTION-AWARE CNN AND PLANNING CT AS PRIOR

Suhita Ghosh (Otto von Guericke University); Philipp Ernst (Otto von Guericke University Magdeburg)*; Georg Rose (Otto von Guericke University Magdeburg); Andreas Nurnberger (Magdeburg University); Sebastian Stober (Otto von Guericke University)

LOCALLY STRUCTURED LOW-RANK MR IMAGE RECONSTRUCTION USING SUBMATRIX CONSTRAINTS

Xi Chen (University of Oxford)*; Wenchuan Wu (University of Oxford); Mark Chiew (University of Oxford)

UNIVERSAL GENERATIVE MODELING FOR CALIBRATION-FREE PARALLEL MR IMAGING

Wanqing Zhu (Nanchang University); Bing Guan (Nanchang University); Shanshan Wang (Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences); Zhang Minghui (Nanchang University); Qiegen Liu (Nanchang University)*

LESION DETECTABILITY AND CONTRAST ENHANCEMENT WITH BEAM MULTIPLY AND SUM BEAMFORMING FOR NON-STEERED PLANE WAVE ULTRASOUND IMAGING

Madhavanunni A N (Indian Institute of Technology Palakkad)*; Mahesh Raveendranatha Panicker (Indian Institute of Technology Palakkad)

DISTRIBUTED MEMORY-EFFICIENT PHYSICS-GUIDED DEEP LEARNING RECONSTRUCTION FOR LARGE-SCALE 3D NON-CARTESIAN MRI

Chi Zhang (University of Minnesota); Davide Piccini (Siemens Healthcare AG); Omer B Demirel (University of Minnesota); Gabriele Bonanno (Advanced Clinical Imaging Technology, Siemens Healthcare AG); Burhaneddin Yaman (University of Minnesota); Matthias Stuber (Lausanne University Hospital (CHUV)); Steen Moeller (University of Minnesota); Mehmet Akcakaya (University of Minnesota)*

CONDITIONAL DIFFUSION MODELS FOR INVERSE MR IMAGE RECOVERY

Mahmut Yurt (Stanford University)*; Batu Ozturkler (Stanford University); Ridvan Yesiloglu (Stanford University); John Pauly (Stanford University); Kavin Setsompop (Stanford University); Akshay S Chaudhari (Stanford University)

TO WHAT EXTENT CAN PLUG-AND-PLAY METHODS OUTPERFORM NEURAL NETWORKS ALONE IN LOW-DOSE CT RECONSTRUCTION

Qifan Xu (University of California, Los Angeles)*; Ke Sheng (UCLA); Dan Ruan (University of California, Los Angeles); Qihui Lyu (UCLA)

IMPROVED MODEL BASED DEEP LEARNING USING MONOTONE OPERATOR LEARNING (MOL)

Aniket Pramanik (University of Iowa)*; Mathews Jacob (University of Iowa)

DEEP UNROLLING FOR MAGNETIC RESONANCE FINGERPRINTING

Dongdong Chen (University of Edinburgh)*; Mike Davies (University of Edinburgh); Mohammad Golbabaee (University of Bath)



THEIA: BLEED-THROUGH ESTIMATION WITH INTERACTION TERMS AND CONVOLUTIONAL KERNELS

Najib Ishaq (Self); Nicholas Schaub (National Center for the Advancement of Translational Science, National Institutes of Health); Nathan Hotelling (NIH)*

OPTIMAL KOTZ DISTRIBUTION HYPERPARAMETERS FOR INFOMAX AFFINITY *Rogers F Silva (TReNDS Center)**

PURECOMB: POISSON UNBIASED RISK ESTIMATOR BASED ENSEMBLE OF SELF-SUPERVISED DEEP DENOISERS FOR CLINICAL BONE SCAN IMAGE

Hanvit Kim (Electronics and Telecommunications Research Institute); Si Young Yie (Seoul National University); Se Young Chun (Seoul National University); Jae Sung Lee (Seoul National University)*

DOMAIN GENERALIZATION IN RESTORATION OF CATARACT FUNDUS IMAGES VIA HIGH-FREQUENCY COMPONENTS

Haofeng Liu (Southern University of Science and Technology); Heng Li (Southern University of Science and Technology); Mingyang Ou (Southern University of Science and Technology); Yitian Zhao (Cixi Institute of Biomedical Engineering, Ningbo Institute of Industrial Technology, Chinese Academy of Sciences); Yan Hu (Southern University of Science and Technology); Jiang Liu (Southern University of Science and Technology)*

LOW-DOSE CT DENOISING VIA NEURAL ARCHITECTURE SEARCH

*Zexin Lu (Sichuan University); Wenjun Xia (Sichuan University); Yongqiang Huang (Sichuan University); Mingzheng Hou (Sichuan University); hu chen (Sichuan University); Hongming Shan (Fudan University); Yi Zhang (Sichuan University)**

STRUCTURAL-MR INFORMED QSM RECONSTRUCTION USING DEEP IMAGE PRIOR

Pavan Kumar Reddy K (TCS Innovation Labs); Viswanath Pamulakanty Sudarshan (TCS Research); Jayavardhana Gubbi (TCS Research); Arpan Pal (Tata Consultancy Services)*

SPATIAL POSITION ESTIMATION METHOD FOR 3D ULTRASOUND RECONSTRUCTION BASED ON HYBRID TRANSFORMERS

Guochen Ning (Tsinghua University); Hanying Liang (Tsinghua University); Lei Zhou (Tsinghua*

University); Xinran Zhang (Tsinghua Univ.); Hongen Liao (Tsinghua University)

3/29/2022

Image segmentation - I

03:45:00 PM - 05:15:00 PM

Poster Hall

Session Type: Poster

AORTIC ARCH ANATOMY CHARACTERIZATION FROM MRA: A CNN-BASED SEGMENTATION APPROACH

Mounir Lahlouh (Université Reims Champagne-Ardenne); Yasmina CHENOUNE (ESME Sudria); Raphaël Blanc (Fondation Ophtalmologique Adolphe de Rothschild); Jérôme Szweczyk (UPMC); Nicolas Passat (Université Reims Champagne-Ardenne)*

A HYBRID MULTI-OBJECT SEGMENTATION FRAMEWORK WITH MODEL-BASED B-SPLINES FOR MICROBIAL SINGLE CELL ANALYSIS

Karina Ruzaeva (RWTH Aachen); Katharina Nöh (FZ Juelich); Benjamin Berkels ()*

TUNING A DISTANCE-PREDICTION-BASED CELL SEGMENTATION

Tim Scherr (Karlsruhe Institute of Technology); Katharina Löffler (Karlsruhe Institute of Technology); Marcel Schilling (Karlsruhe Institute of Technology); Oliver Neumann (Karlsruhe Institute of Technology); Ralf Mikut (Karlsruhe Institute of Technology)*

A METHOD TO REMOVE SIZE BIAS IN SUB-CORTICAL STRUCTURE SEGMENTATION

Mythri V (International Institute of Information Technology, Hyderabad); Alphin Thottupattu (International Institute of Information Technology Hyderabad); Naren Akash R J (International Institute of Information Technology Hyderabad); Jayanthi Sivaswamy (International Institute of Information Technology Hyderabad)*

SHAPE-CONSISTENT GENERATIVE ADVERSARIAL NETWORKS FOR MULTI-MODAL MEDICAL SEGMENTATION MAPS

Leo Segre (Tel Aviv University); Or Hirschorn (Tel Aviv University); Dvir Ginzburg (Tel Aviv University); Dan Raviv (Tel Aviv University)*

COUNTERFACTUAL EXPLAINABLE GASTROINTESTINAL AND COLONOSCOPY IMAGE SEGMENTATION

Divij Singh (Indian Institute of Technology (BHU) Varanasi); Ayush Somani (UiT The Arctic University of Norway); Alexander Horsch (UiT The Arctic*



University of Norway); Dilip K Prasad (UiT The Arctic University of Norway)

MULTI-CLASS CT SEGMENTATION OF ABDOMINAL AORTIC ANEURYSM INCLUDING THROMBOTIC MASSES AND CALCIFICATION

Rostislav UI Epifanov (NSU)*; Yana Fedotova (NSU); Evgeniya Amelina (Novosibirsk State University); Daniil V Parshin (Lavrentyev Institute of Hydrodynamics SB RAS, Novosibirsk State University); Nikita Nikitin (Medical Center "Avicenna"); Leonid Kurdyukov (Novosibirsk State Medical University); Irina Popova (Meshalkin National Medical Research Center); Andrey Karpenko (Meshalkin National Medical Research Center); Rustam Mullyadzhanov (Novosibirsk State University)

SEGMENTATION OF ORGANS-AT-RISK FROM CT AND MR IMAGES OF THE HEAD AND NECK: BASELINE RESULTS

Gasper Podobnik (Faculty of Electrical Engineering, University of Ljubljana)*; Bulat Ibragimov (University of Copenhagen); Primož Strojani (Institute of Oncology Ljubljana); Primož Peterlin (Institute of Oncology Ljubljana); Tomaz Vrtovec (University of Ljubljana)

SYNTHETIC MAGNETIC RESONANCE IMAGES FOR DOMAIN ADAPTATION: APPLICATION TO FETAL BRAIN TISSUE SEGMENTATION

Priscille de Dumast (University of Lausanne (UNIL))*; Hamza Kebiri (University of Lausanne (UNIL)); Kelly M Payette (University Children's Hospital Zurich); Andras Jakab (University Children's Hospital Zurich); Hélène Lajous (University of Lausanne (UNIL)); Meritxell Bach Cuadra (University of Lausanne)

PSEUDO-LABEL REFINEMENT USING SUPERPIXELS FOR SEMI-SUPERVISED BRAIN TUMOUR SEGMENTATION

Bethany H Thompson (Canon Medical Research Europe Ltd)*; Jeremy Voisey (Canon Medical Research Europe Ltd); gaetano di-caterina (University of strathclyde)

FOCAL ATTENTION NETWORKS: OPTIMISING ATTENTION FOR BIOMEDICAL IMAGE SEGMENTATION

Michael Yeung (University of Cambridge)*; Leonardo Rundo (University of Cambridge); Evis Sala (University of Cambridge); Carola-Bibiane B Schönlieb (Cambridge University); Guang Yang (Imperial College London)

FIRST TRIMESTER VIDEO SALIENCY PREDICTION USING CLSTMU-NET WITH STOCHASTIC AUGMENTATION

Elizaveta Savochkina (University of Oxford)*; Lok hin Lee (University of Oxford); He Zhao (University of Oxford); Lior Drukker (University of Oxford); Aris Papageorgiou (University of Oxford); Alison Noble (University of Oxford)

BOUNDING BOX BASED WEAKLY SUPERVISED DEEP CONVOLUTIONAL NEURAL NETWORK FOR MEDICAL IMAGE SEGMENTATION USING AN UNCERTAINTY GUIDED AND SPATIALLY CONSTRAINED LOSS

Golnar K. Mahani (University of Nottingham)*; Ruizhe Li (University of Nottingham); Nikos Evangelou (University of Nottingham); Stamatios Sotiropoulos (University of Nottingham); Paul Morgan (University of Nottingham); Andrew French (University of Nottingham); Xin Chen (University of Nottingham)

ANOMALY DETECTION IN EM IMAGES - A ZERO-SHOT LEARNING APPROACH

Gayathri Mahalingam (Allen Institute); Tong Jiao (University of Washington); Casey Schneider-Mizell (Allen Institute); Agnes Bodor (Allen institute); Russel M Torres (Allen Institute); Marc Takeno (Allen Institute); Joann Buchanan (Allen Institute); Dan Bumbarger (Allen Institute); Wenjing Yin (Microsoft); Derrick Brittain (Allen Institute); Clay Reid (Allen Institute); Nuno DaCosta (Allen Institute)*

REALISTIC-SHAPE BACTERIAL BIOFILM SIMULATOR FOR DEEP LEARNING-BASED 3D SINGLE-CELL SEGMENTATION

Tanjin Taher Toma (University of Virginia)*; Yuexuan Wu (Florida State University); Jie Wang (University of Virginia); Anuj Srivastava (Florida State University); Andreas Gahlmann (University of Virginia); Scott Acton (University of Virginia)

A DEEP LEARNING PIPELINE FOR SEGMENTATION OF PROTEUS MIRABILIS COLONY PATTERNS

Anjali Doshi (Columbia University); Marian Shaw (Columbia University); Ruxandra Tonea (Columbia University); Rosalia A Minyety (Columbia University); Soonhee Moon (Columbia University); Andrew Laine (Columbia University); Jia Guo (Columbia University); Tal Danino (Columbia University)*



JOINT ATTENTION FOR MEDICAL IMAGE SEGMENTATION

Mo Zhang (Peking University)*; Bin Dong (Peking University); Quanzheng Li (Massachusetts General Hospital and Harvard Medical School)

CATS: COMPLEMENTARY CNN AND TRANSFORMER ENCODERS FOR SEGMENTATION

Hao Li (Vanderbilt University)*; Dewei Hu (Vanderbilt University); Han Liu (Vanderbilt University); Jiacheng Wang (Vanderbilt University); Ipek Oguz (Vanderbilt University)

IMPROVING AUTOMATED LUNG SEGMENTATION IN CT IMAGES BY ADDING ANOMALIES ADJACENT TO THE PLEURA

Azael Sousa (IC-UNICAMP)*; Ilan F Silva (IC-UNICAMP); Noemi Maritza Lapa Romero (Universidade Federal Rio Grande do Sul); Rachel Zerbini (FCM-UNICAMP); Fabiano Reis (FCM-UNICAMP); Joao Luiz Dihi Comba (UFRGS); Alexandre Xavier Falcao (IC-UNICAMP)

3/29/2022

Coffee Break

04:30:00 PM - 05:00:00 PM

3/29/2022

Image Acquisition and Reconstruction - I
05:30:00 PM - 07:00:00 PM

Bengal Stateroom 5

Session Type: Oral

Chairs: Alin Achim (University of Bristol, UK) & Andrew Laine (Columbia University, USA)

05:30:00 PM

A PLUG-AND-PLAY APPROACH TO MULTIPARAMETRIC QUANTITATIVE MRI: IMAGE RECONSTRUCTION USING PRE-TRAINED DEEP DENOISERS

Ketan Fatania (University of Bath)*; Carolin M. A. Pirkel (Technical University of Munich); Marion Menzel (GE Global Research); Peter M Hall (University of Bath); Mohammad Golbabaee (University of Bath)

05:45:00 PM

HYBRID LEARNING OF NON-CARTESIAN K-SPACE TRAJECTORY AND MR IMAGE RECONSTRUCTION NETWORKS

Chaithya G G R (CEA Paris Saclay); Zaccharie Ramzi (CEA Paris Saclay); Philippe Ciuciu (Inria-CEA MIND team (CEA/NeuroSpin))*

06:00:00 PM

MICROWAVE BREAST IMAGING VIA DEEP LEARNING

Michele Ambrosanio (University of Naples Parthenope)*; Maria Maddalena Autorino (University of Naples Parthenope); Stefano Franceschini (University Parthenope); Fabio Basile (University of Naples Parthenope); Vito Pascazio ()

06:15:00 PM

LONDON-MRI: ADAPTIVE LOCAL NEIGHBORHOOD-BASED NETWORKS FOR MR IMAGE RECONSTRUCTION FROM UNDERSAMPLED DATA

Shijun Liang (michigan state University)*; Ashwin Sreevatsa (University of michigan); Anish Lahiri (University of michigan); Saiprasad Ravishankar (Michigan State University)

06:30:00 PM

JOINT ALIGNMENT AND RECONSTRUCTION OF MULTISLICE DYNAMIC MRI USING VARIATIONAL MANIFOLD LEARNING

Qing Zou (University of Iowa)*; Abdul Haseeb Ahmed (Philips HealthCare); Prashant Nagpal (University of Wisconsin-Madison); Sarv Priya (University of Iowa); Rolf F Schulte (GE Global Research); Mathews Jacob (University of Iowa)

06:45:00 PM

LEVERAGING MULTI-VISIT INFORMATION FOR MAGNETIC RESONANCE IMAGERECONSTRUCTION: PILOT STUDY ON A COHORT OF GLIOBLASTOMA SUBJECTS

Youssef Beauferris (University of calgary)*; Roberto Souza (University of Calgary); Mike Lasby (University of Calgary)

3/29/2022

Image Segmentation

05:30:00 PM - 07:00:00 PM

Bengal Stateroom 2

Session Type: Oral

Chairs: Albert C. S. Chung (Hong Kong University of Science and Technology, China) & Jean-Christophe Olivo-Marin (Institut Pasteur, France)

05:30:00 PM

UNSUPERVISED ENSEMBLE DISTILLATION FOR MULTI-ORGAN SEGMENTATION

Lefei Zhang (Shanghai Jiao Tong University); Shixiang Feng (Shanghai Jiao Tong University); Yu Wang (Shanghai Jiao Tong University); Yan-Feng Wang (Cooperative medianet innovation center of Shanghai Jiao Tong University); Ya Zhang (Cooperative Medianet Innovation Center, Shanghai)



Jiao Tong University)*; Xin Chen (Huawei Inc.); Qi Tian (Huawei Cloud & AI)

05:45:00 PM

WEAKLY-SUPERVISED LESION SEGMENTATION WITH SELF-GUIDANCE BY CT INTENSITY CLUSTERING

Xueyu Zhu (Sun Yat-sen University); Andy J Ma (Sun Yat-sen University)*

06:00:00 PM

TOPOLOGY-AWARE LEARNING FOR VOLUMETRIC CEREBROVASCULAR SEGMENTATION

Subhashis Banerjee (Uppsala University)*; Dimitrios Toumpanakis (Uppsala University); Ashis Kumar Dhara (National Institute of Technology Durgapur); Johan Wikström (Uppsala University); Robin Strand (Uppsala University)

06:15:00 PM

DISENTANGLEMENT ENABLES CROSS-DOMAIN HIPPOCAMPUS SEGMENTATION

John Orlando Kalkhof (TU Darmstadt)*; Camila Gonzalez (Technische Universität Darmstadt); Anirban Mukhopadhyay (TU Darmstadt)

06:30:00 PM

NUDF: NEURAL UNSIGNED DISTANCE FIELDS FOR HIGH RESOLUTION 3D MEDICAL IMAGE SEGMENTATION

Kristine Sørensen (Technical University of Denmark)*; Oscar Camara (Universitat Pompeu Fabra); Ole de Backer (Rigshospitalet, Region Hovedstaden); Klaus Kofoed (Rigshospitalet); Rasmus R. Paulsen (DTU Compute)

06:45:00 PM

IMPROVING THE AUTOMATIC SEGMENTATION OF ELONGATED ORGANS USING GEOMETRICAL PRIORS

Rebeca Vétel (Telecom Paris, Guertbet)*; Alexandre Bône (Institut du Cerveau et de la Moelle épinière); Marie-Pierre Vullierme (Paris University); Marc-Michel Rohé (Guertbet); Pietro Gori (Télécom Paris); Isabelle Bloch (Télécom Paris)

3/29/2022

Brain Imaging

05:30:00 PM - 07:00:00 PM

Bengal Stateroom 4

Session Type: Oral

Chairs: Gopikrishna Deshpande (Auburn University, USA) & Hayit Greenspan (Tel Aviv University, Israel)

05:30:00 PM

SUPWMA: CONSISTENT AND EFFICIENT TRACTOGRAPHY PARCELLATION OF SUPERFICIAL WHITE MATTER WITH DEEP LEARNING

Tengfei Xue (University of Sydney)*; Fan Zhang (Harvard Medical School); Chaoyi Zhang (University of Sydney); Yuqian Chen (The University of Sydney); Yang Song (University of New South Wales); Nikos Makris (Harvard Medical School); Yogesh Rath (Harvard Medical School); Weidong Cai (University of Sydney); Lauren O'Donnell (Harvard University)

05:45:00 PM

SINGLE SIDEBAND MODULATION AS A TOOL TO IMPROVE FUNCTIONAL CONNECTIVITY ESTIMATION

Ashkan faghiri (TReNDS)*; Tulay Adali (n/a); Vince Calhoun (TReNDS)

06:00:00 PM

BRAIN SOURCE LOCALIZATION BY ALTERNATING PROJECTION

Amir Adler (Braude College of Engineering & MIT, McGovern Institute)*; Mati Wax (Technion); Dimitrios Pantazis (Massachusetts Institute of Technology)

06:15:00 PM

COLLABORATIVE LEARNING OF IMAGES AND GEOMETRICS FOR PREDICTING ISOCITRATE DEHYDROGENASE STATUS OF GLIOMA

Yiran Wei (University of Cambridge); Chao Li (University of Cambridge)*; Xi Chen (University of Bath); Carola-Bibiane B Schönlieb (Cambridge University); Stephen J. Price (University of Cambridge)

06:30:00 PM

OMNI-SUPERVISED DOMAIN ADVERSARIAL TRAINING FOR WHITE MATTER HYPERINTENSITY SEGMENTATION IN THE UK BIOBANK

Vaanathi Sundaresan (Harvard Medical School)*; Nicola K Dinsdale (University of Oxford); Mark Jenkinson (University of Oxford); Ludovica Griffanti (University of Oxford)

06:45:00 PM

A CONVOLUTIONAL WASSERSTEIN DISTANCE FOR TRACTOGRAPHY EVALUATION: COMPLEMENTARITY STUDY TO STATE-OF-THE-ART MEASURES

Thomas Durantel (IRISA - Empenn)*; Olivier Commowick (INRIA); Julie Coloigner (IRISA)



3/29/2022

Special Session: Neuroimaging for Neuroscience and Neurology

05:30:00 PM - 07:00:00 PM

Bengal Stateroom 1

Session Type: Special Session

Chair: Natasha Lepore (University of Southern California, USA)

MODEL-BASED IMAGING AND IMAGE-BASED MODELLING

Prof. Daniel Alexander (University College London)

THE MULTISCALE CHRONNECTOME IN THE HUMAN BRAIN: CAPTURING TIME-RESOLVED NETWORKS AT DIFFERENT TIME SCALES

Prof. Vincent Calhoun (Georgia State University, Georgia Institute of Technology, and Emory University)

3/29/2022

Onsite Dinner

07:00:00 PM - 10:00:00 PM

Bengal Stateroom 2

Session Type: Social

3/29/2022

Young Professional Activity: Grant Writing

07:00:00 PM - 07:55:00 PM

Bengal Stateroom 2

3/29/2022

Plenary

08:00:00 PM - 09:00:00 PM

Bengal Stateroom 5

Chair: Jayanthi Sivaswamy (International Institute of Information Technology Hyderabad, India)

REFLECTIONS ON SIMPLIFYING ULTRASOUND

Alison Noble

Technikos Professor of Biomedical Engineering, University of Oxford, UK



Wednesday, March 30

3/30/2022

Biomedical Applications

08:00:00 AM - 09:30:00 AM

Bengal Stateroom 5

Session Type: Oral

Chairs: Ayman El-Baz (University of Louisville, USA) & Jayavardhana Gubbi (Tata Consultancy Services Research, India)

08:00:00 AM

ELASTICITY QUANTIFICATION USING AN EMPIRICAL RELATIONSHIP BETWEEN SINGLE TRANSDUCER –HARMONIC MOTION IMAGING-DERIVED DISPLACEMENT VERSUS OSCILLATION FREQUENCY

Murad Hossain (Columbia University); Elisa Konofagou (Columbia University)*

08:15:00 AM

MEASUREMENT OF MUCOCILIARY TRANSPORT: NOVEL APPLICATION OF POSITRON EMISSION TOMOGRAPHY

*Carley Stewart (University of Iowa); Brianna Barber (University of Iowa); Nicholas Gansemer (University of Iowa); Susan Walsh (University of Iowa); Michael Acevedo (University of Iowa); Vamsidhar Akurathi (University of Iowa); Darpan Pandey (University of Iowa); Alejandro Comellas (University of Iowa); Thaddeus Wadas (University of Iowa); David Dick (University of Iowa); John Sunderland (University of Iowa); David Stoltz (University of Iowa); Michael Welsh (University of Iowa); Mahmoud Abou Alaiwa (University of Iowa)**

08:30:00 AM

A FEASIBILITY STUDY OF MOTION COMPENSATION FOR CARDIAC GATED SPECT IMAGES USING A CASCADED NETWORK

Álvaro Belloso (Illinois Institute of Technology); Xirang Zhang (Illinois Institute of Technology); Yongyi Yang (Illinois Institute of Technology); Miles Wernick (IIT); Hendrik Pretorius (Radiology Dept, UMass Medical School); Michael King (Radiology Dept, UMass Medical School)*

08:45:00 AM

LA-NET: LUNG ADENOCARCINOMA CLASSIFICATION WITH ASSISTANTS FROM LUNG NODULE CLASSIFICATION AND POSITIONAL INFORMATION

Mancheng Meng (ShanghaiTech University); Mianxin Liu (ShanghaiTech University); Xianjie Zhang (Shanghai United Imaging Intelligence);*

Yuxuan Liu (Southern Medical University); Xiran Cai (ShanghaiTech University); Yaozong Gao (Shanghai United Imaging Intelligence); Xiang S Zhou (United Imaging Intelligence); Dinggang Shen (United Imaging Intelligence)

09:00:00 AM

FPL-UDA: FILTERED PSEUDO LABEL-BASED UNSUPERVISED CROSS-MODALITY ADAPTATION FOR VESTIBULAR SCHWANNOMA SEGMENTATION

Jianghao Wu (University of Electronic Science and Technology of China); Ran Gu (University of Electronic Science and Technology of China); Guiming Dong (University of Electronic Science and Technology of China); Guotai Wang (University of Electronic Science and Technology of China); Shaoting Zhang (SenseTime Research)*

09:15:00 AM

CLASSIFICATION OF MICROSCOPIC IMAGES OF UNSTAINED SKIN SAMPLES USING DEEP LEARNING APPROACH

Rajitha KV (MIT, Manipal Academy of Higher Education); Sowmya Bhat C (Manipal Institute of Technology); Prakash Peralam Yegneswaran (KMC, Manipal); Raghavendra Rao (KMC, Manipal); Keerthana Prasad (SOIS)*

3/30/2022

Image Acquisition & Reconstruction - II

08:00:00 AM - 09:30:00 AM

Bengal Stateroom 2

Session Type: Oral

Chairs: Roberto Lavarello (Pontificia Universidad Católica del Perú, Peru) & Saiprasad Ravishankar (Michigan State University, USA)

08:00:00 AM

SIMULTANEOUS IMAGING OF ULTRASONIC BACKSCATTER AND ATTENUATION COEFFICIENTS FOR LIVER STEATOSIS DETECTION IN A MURINE ANIMAL MODEL

José A Timaná (Pontificia Universidad Católica del Perú); Hector Chahuara (Pontificia Universidad Católica del Perú); Lokesh Basavarajappa (University of Texas at Dallas); Adrian Basarab (IRIT); Kenneth Hoyt (University of Texas at Dallas); Roberto Lavarello (Pontificia Universidad Católica del Perú)*



08:15:00 AM

TDM-STARGAN: STARGAN USING TIME DIFFERENCE MAP TO GENERATE DYNAMIC CONTRAST-ENHANCED MRI FROM ULTRAFAST DYNAMIC CONTRAST-ENHANCED
*YoungTack Oh (SungKyunKwan Univ.)**

08:30:00 AM

DYNAMIC CARDIAC MRI RECONSTRUCTION USING COMBINED TENSOR NUCLEAR NORM AND CASORATI MATRIX NUCLEAR NORM REGULARIZATIONS
*Yinghao Zhang (Harbin Institute of Technology); Yue Hu (Harbin Institute of Technology)**

08:45:00 AM

LIVER-BUDA-SAGE: SIMULTANEOUS WHOLE LIVER T2 AND T2* MAPPING IN ONE BREATH-HOLD
Zijing Zhang (Zhejiang University); Huihui Ye (Zhejiang University); Maosen Li (Cooperative Medianet Innovation Center, Shanghai Jiao Tong University); Huafeng Liu (Zhejiang University); Berkin Bilgic (Harvard Medical School)*

09:00:00 AM

UNSUPERVISED PET RECONSTRUCTION FROM A BAYESIAN PERSPECTIVE
*Chenyu Shen (Sichuan University); Wenjun Xia (Sichuan University); Hongwei Ye (Minfound Medical Systems Co. Ltd.); Mingzheng Hou (Sichuan University); hu chen (Sichuan University); Yan Liu (Sichuan University); Jiliu Zhou (Chengdu University of Information Technology); Yi Zhang (Sichuan University)**

09:15:00 AM

EXTENDING THE CAPABILITY OF LINEAR ARRAY ULTRASOUND PROBE TO CONCAVE ARRAY USING LOW-COST ACOUSTIC LENS FOR HIGH FRAME RATE FOCUSED IMAGING
PISHARODY HARIKRISHNAN GOPALAKRISHNAN (INDIAN INSTITUTE OF TECHNOLOGY PALAKKAD); Mahesh Raveendranatha Panicker (Indian Institute of Technology Palakkad)*

3/30/2022

Deep Learning - II

08:00:00 AM - 09:30:00 AM

Bengal Stateroom 4

Session Type: Oral

Chairs: Massimo Mischi (Eindhoven University of Technology, Netherlands) & Hao Chen (Hong Kong University of Science and Technology, China)

08:00:00 AM

FEDSLD: FEDERATED LEARNING WITH SHARED LABEL DISTRIBUTION FOR MEDICAL IMAGE CLASSIFICATION
*Jun Luo (University of Pittsburgh); Shandong Wu (Department of Radiology, Biomedical Informatics, and Bioengineering, University of Pittsburgh)**

08:15:00 AM

SS-3DCAPSNET: SELF-SUPERVISED 3D CAPSULE NETWORKS FOR MEDICAL SEGMENTATION ON LESS LABELED DATA
Minh Q Tran (University of Arkansas); Loi Vinh Ly (Cyberlogitec Vietnam); Binh-Son Hua (VinAI Research); Ngan Le (University of Arkansas)*

08:30:00 AM

DYNAMIC IMAGING USING MOTION-COMPENSATED SMOOTHNESS REGULARIZATION ON MANIFOLDS (MOCO-STORM)
Qing Zou (University of Iowa); Luis Torres (University of Wisconsin at Madison); Sean Fain (University of Iowa); Mathews Jacob (University of Iowa)*

08:45:00 AM

LIGHTSEG: EFFICIENT YET EFFECTIVE MEDICAL IMAGE SEGMENTATION
*Most Husne Jahan (Ryerson University); Abdullah Al Zubaer Imran (Stanford University)**

09:00:00 AM

SEMI-SUPERVISED DEEP EXPECTATION-MAXIMIZATION FOR LOW-DOSE PET-CT
Vatsala Sharma (Indian Institute of Technology (IIT) Bombay); Ansh Khurana (Google); Sriram Yenamandra (Georgia Institute of Technology); Suyash P. Awate (Indian Institute of Technology (IIT) Bombay)*

09:15:00 AM

LEVERAGING CLINICALLY RELEVANT BIOMETRIC CONSTRAINTS TO SUPERVISE A DEEP LEARNING MODEL FOR THE ACCURATE CALIPER PLACEMENT TO OBTAIN SONOGRAPHIC MEASUREMENTS OF THE FETAL BRAIN
Hari Shankar (Origin Health India, Bangalore); Adithya Narayan (Origin Health India, Bangalore); Shefali Jain (Bangalore Fetal Medicine Center); Divya Singh (Prime Imaging and Prenatal Diagnostics); Pooja Punjani Vyas (Jaslok Hospital & Research Center); Nivedita Hegde (Kasturba Medical College, Manipal Academy of Higher Education); Purbayan Kar (Jalpaiguri Government



Engineering College); Abhi Navinkumar Lad (Origin Health India, Bangalore); Jens Thang (Origin Health Pte. Ltd.); Jagruthi Atada (Origin Health India, Bangalore); Duy Nguyen (Origin Health India, Bangalore); Roopa P S (Kasturba Medical College, Manipal Academy of Higher Education); Akhila Vasudeva (Kasturba Medical College, Manipal Academy of Higher Education); Prathima Radhakrishnan (Bangalore Fetal Medicine Center); Sripad Krishna Devalla (Origin Health Pte. Ltd.)*

3/30/2022

Special Session: Point-of-Care Technologies for Meeting Global Healthcare
08:00:00 AM - 09:30:00 AM
 Bengal Stateroom 1
Session Type: Special Session

MOBILE MICROSCOPY, SENSING AND DIAGNOSTICS FOR POINT-OF-CARE MEDICINE AND GLOBAL HEALTH
 Aydogan Ozcan (UCLA)

DEEP LEARNING IMAGING PIPELINE IN A LOW-FIELD PORTABLE MRI
 Michal Sofka (Hyperfine)

LIGHTWEIGHT, ULTRA-FAST, NEXT-GENERATION MAGNETIC RESONANCE IMAGING SCANNERS
 Arjun Arunachalam (Voxelgrids)

CLINICAL IMPACT OF BIOMEDICAL IMAGING DEVICES IN THE AFFORDABLE DEVICES DOMAIN
 Shyam Vasudevarao, Prakash Kamraj (Forus Health)

3/30/2022

Biomedical applications
09:45:00 AM - 11:15:00 AM
 Poster Hall
Session Type: Poster

MAXIMIZING UNAMBIGUOUS VELOCITY RANGE IN PHASE-CONTRAST MRI WITH MULTIPOINT ENCODING
 Shen Zhao (The Ohio State University)*; Rizwan Ahmad (The Ohio State University); Lee Potter (The Ohio State University)

AUTOMATED MEASUREMENTS OF MITRAL AND TRICUSPID ANNULAR DIMENSIONS IN CARDIOVASCULAR MAGNETIC RESONANCE

Ricardo A Gonzales (University of Oxford); Jérôme Lamy (Yale); Felicia Seemann (Lund University); Einar Heiberg (Lund University); Dana Peters (Yale)*

IN-BED HUMAN POSE ESTIMATION FROM UNSEEN AND PRIVACY-PRESERVING IMAGE DOMAINS

Ting Cao (CSIRO(Data61)); Mohammad Ali Armin (CSIRO(Data61)); SIMON DENMAN (Queensland University of Technology, Australia); Lars Petersson (Data61/CSIRO); David Ahmedt-Aristizabal (CSIRO(Data61))*

GRAM STAIN BACTERIA CLASSIFICATION MODEL BASED ON CONVOLUTION NEURAL NETWORKS

Shwetha V (Manipal Institute of technology)*; Keerthana Prasad (SOIS); Chiranjay Mukhopadhyay (KMC); Barnini banerjee (KMC)

PARALLEL SINOGRAM AND IMAGE FRAMEWORK WITH CO-TRAINING STRATEGY FOR METAL ARTIFACT REDUCTION IN TOOTH CT IMAGES

Yan Hu (University of New South Wales)*; Yongsheng Pan (ShanghaiTech University); Yang Song (University of New South Wales); Erik Meijering (University of New South Wales); Zhiming Cui (HKU); Yue Zhao (Chongqing University of Posts and telecommunications); Zhongxiang Ding (Affiliated Hangzhou First People's Hospital, Cancer Center, Zhejiang University School of Medicine); Min Zhu (Shanghai Jiaotong University); Dinggang Shen (ShanghaiTech University)

ROBUST CELL DETECTION WITH IMAGE AUGMENTATION TARGETING CHALLENGES IN IMMUNOHISTOCHEMISTRY IMAGE ANALYSIS
 Qinle Ba (Roche)*; Xingwei Wang (Roche); Jungwon Kim (Roche); Jim Martin (Roche)

MULTI-VIEW FUSION CONVOLUTIONAL NEURAL NETWORK FOR AUTOMATIC LANDMARK LOCATION ON SPINAL X-RAYS

Kailai Zhang (Department of Electronic Engineering, Tsinghua University)*; Nanfang Xu (Department of Orthopaedics, Peking University Third Hospital); Ji Wu (Tsinghua Univ.)

NEW ORDINAL REGRESSION FOR SEVERITY GRADING IN FUNDUS IMAGES

Takafumi Sakura (The University of Tokyo)*; Yusuke Kondo (The University of Tokyo); Hidenori Takahashi (Jichi Medical University)



A MULTI-SCALE SELF-ATTENTION NETWORK TO DISCRIMINATE PULMONARY NODULES

Alejandra Moreno (Universidad Industrial de Santander (UIS)); Andrea Rueda (Pontificia Universidad Javeriana); Fabio Martinez (UIS)*

DETECTING THE 3D MORPHOLOGY OF CELL CYTONEMES USING SKELETONIZATION (1 PAGE)

Philippe Lemieux (UQAM)*; Basile Rambaud (UDM); Joël Lefebvre (UQAM); Sebastien Carreno (UDM)

STRUCTURE-PRESERVING GRAPH KERNEL FOR BRAIN NETWORK CLASSIFICATION

Jun Yu (Lehigh University); Zhaoming Kong (Lehigh University)*; Aditya Kendre (Cumberland Valley High School); Hao Peng (Beihang University); Carl Yang (Emory University); Lichao Sun (Lehigh University); Alex Leow (University of Illinois at Chicago); Lifang He (Lehigh University)

3/30/2022

Deep learning - I

09:45:00 AM - 11:15:00 AM

Poster Hall

Session Type: Poster

AUGMENTING KNOWLEDGE DISTILLATION WITH PEER-TO-PEER MUTUAL LEARNING FOR MODEL COMPRESSION

Usma Niyaz Bhat (IIT Ropar, Punjab)*; Deepti Bathula (Indian Institute of Technology Ropar)

SELF-ENSEMBLE DISTILLATION USING MEAN TEACHERS WITH LONG & SHORT MEMORY

Nilanjan Chattopadhyay (AIRAMATRIX PVT. LTD.); Geetank Raipuria (AIRAMATRIX PVT. LTD.); Nitin Singhal (AIRAMATRIX PVT. LTD.)*

TRANSFER LEARNING FOR FUNDUS IMAGE QUALITY ASSESSMENT USING DISCRIMINATING PATCHES

Ammu R (IIITB)*; Neelam Sinha (IIIT Bangalore)

INFLUENTIAL PROTOTYPICAL NETWORKS FOR FEW SHOT LEARNING: A DERMATOLOGICAL CASE STUDY

Ranjana Roy Chowdhury (IIT Ropar)*; Deepti Bathula (Indian Institute of Technology Ropar)

MULTI-TASK LEARNING WITH CONTEXT-ORIENTED SELF-ATTENTION FOR BREAST ULTRASOUND IMAGE CLASSIFICATION AND SEGMENTATION

Meng Xu (Utah State University)*; Kuan Huang (Baylor College of Medicine); Xiaojun Qi (USU)

SPATIALLY PRESERVING FLATTENING FOR LOCATION-AWARE CLASSIFICATION OF FINDINGS IN CHEST X-RAYS

Neha Srivathsa (Stanford University); Razi Mahmood (UC Berkeley); Tanveer Syeda-Mahmood (IBM Research)*

ENSEMBLE LEARNING AND TENSOR REGULARIZATION FOR CONE-BEAM COMPUTED TOMOGRAPHY-BASED PELVIC ORGAN SEGMENTATION

Hanyue Zhou (UCLA); Minsong Cao (University of California, Los Angeles); Martin Ma (University of California, Los Angeles); Yugang Min (University of California, Los Angeles); Stephanie Yoon (University of California, Los Angeles); Amar Kishan (University of California, Los Angeles); Dan Ruan (University of California, Los Angeles)*

ATTENTION-BASED DEEP MULTIPLE INSTANCE LEARNING WITH ADAPTIVE INSTANCE SAMPLING

Aliasghar Tarkhan (University of Washington)*; Trung Kien Nguyen (Genentech); Noah Simon (University of Washington); Thomas Bengtsson (Genentech, Inc.); Paolo Ocampo (Genentech); Jian Dai (Genentech)

INTRACRANIAL VESSEL WALL SEGMENTATION WITH DEEP LEARNING USING A NOVEL TIERED LOSS FUNCTION TO INCORPORATE CLASS INCLUSION

Hanyue Zhou (UCLA); Jiayu Xiao (USC); Debiao Li (Cedars-Sinai Medical Center); Zhaoyang Fan (USC); Dan Ruan (University of California, Los Angeles)*

APPLICATIONS IN BIOMEDICAL IMAGE PROCESSING FIELD: PROSTATE CONTOUR DETECTION IN ULTRASOUND IMAGES BASED ON IMPROVED PRINCIPAL CURVE-BASED & ENHANCED NEURAL NETWORK-BASED METHOD

Tao Peng (University of Texas Southwestern Medical Center)*; Wu Yi yun (Jiang Su Province Hospital of CM); Jing Cai (The Hong Kong Polytechnic University)

DISENTANGLED REPRESENTATION OF LONGITUDINAL B-AMYLOID FOR AD VIA SEQUENTIAL GRAPH VARIATIONAL AUTOENCODER WITH SUPERVISION

Fan Yang (University of Texas at Arlington)*; Guorong Wu (University of North Carolina); Won Hwa Kim (POSTECH)



A NOVEL DEEP LEARNING ARCHITECTURE BY INTEGRATING VISUAL SIMULTANEOUS LOCALIZATION AND MAPPING (VSLAM) INTO CNN FOR REAL-TIME SURGICAL VIDEO ANALYSIS

*Ella Lan (The Harker School)**

PAY ATTENTION FOR COVID-19 DETECTION USING EFFICIENT CONVOLUTION

Most Husne Jahan (Ryerson University); Abdullah Al Zubaer Imran (Stanford University)*

DENTAL RESTORATION USING A MULTI-RESOLUTION DEEP LEARNING APPROACH

Olivier OL Lessard (Polytechnique Montreal); François Guibault (Polytechnique Montreal); Farida Cheriet (Polytechnique); Julia Keren (Kerenor)*

3/30/2022

Deep learning -II

09:45:00 AM - 11:15:00 AM

Poster Hall

Session Type: Poster

MED-TEX: TRANSFER AND EXPLAIN KNOWLEDGE WITH LESS DATA FROM PRETRAINED MEDICAL IMAGING MODELS

Thanh Nguyen-Duc (Monash University); He Zhao (Monash University); Jianfei Cai (Monash University); Dinh Phung (Monash University)*

LEARNING LEFT MAIN BIFURCATION SHAPE FEATURES WITH AN AUTOENCODER

Nanway Chen (UNSW); Ramtin Gharlegghi (UNSW); Arcot Sowmya (UNSW); Susann Beier (UNSW)*

A MACHINE LEARNING FRAMEWORK FOR FULLY AUTOMATIC 3D FETAL CARDIAC ULTRASOUND EVALUATION

Manna E Philip (University of New South Wales); Ana Ferreira (University of New South Wales); Aishani Tomar (University of New South Wales); Sparsh Chawla (University of New South Wales); Alec Welsh (University of New South Wales); Gordon N Stevenson (University of New South Wales); Arcot Sowmya (UNSW)*

RETINAL VESSEL SEGMENTATION WITH VAE RECONSTRUCTION AND MULTI-SCALE CONTEXT EXTRACTOR

weijin xu (Beijing University of Posts and Telecommunications); Huihua Yang (Guilin University Of Electronic Technology); Mingying Zhang (China Electronics Standardization Institute); Xipeng Pan (School of Computer Science and Information Security, Guilin University of Electronic*

Technology); Wentao Liu (Beijing University of Posts and Telecommunications); Songlin Yan (Beijing University of Posts and Telecommunications)

DSTUNET: UNET WITH EFFICIENT DENSE SWIN TRANSFORMER PATHWAY FOR MEDICAL IMAGE SEGMENTATION

Zhuotong Cai (Xian Jiaotong University); Jingmin Xin (Xi'an Jiaotong University); Peiwen Shi (Xi'an Jiaotong University); Jiayi Wu (Xi'an Jiaotong University); Nanning Zheng (Xi'an Jiaotong University)*

TRANS-RESNET: INTEGRATING TRANSFORMERS AND CNNs FOR ALZHEIMER'S DISEASE CLASSIFICATION

Chao Li (Institute of Automation, Chinese Academy of Sciences); Yue Cui (Institute of Automation, Chinese Academy of Sciences); Luo Na (CASIA); Yong Liu (Brainnetome Center, Institute of Automation, Chinese Academy of Sciences); Pierrick Bourgeat (CSIRO); Jurgen Fripp (Australian e-Health Research Centre); Tianzi Jiang ("Institute of Automation, Chinese Academy of Sciences")*

SELF SUPERVISED LESION RECOGNITION FOR BREAST ULTRASOUND DIAGNOSIS

Yuanfan Guo (SJTU); Canqian Yang (Shanghai Jiao Tong University); Tiancheng Lin (Shanghai Jiao Tong University); Chunxiao Li (Shanghai General Hospital, Shanghai Jiao Tong University School of Medicine); Yi Xu (Shanghai Jiao Tong University); Rui Zhang (Shanghai Jiao Tong University); Rong Wu (Shanghai General Hospital, Shanghai Jiao Tong University School of Medicine)*

FASTER R-CNN FOR IPSC-DERIVED MESENCHYMAL STROMAL CELLS SENESCENT DETECTION FROM BRIGHT-FIELD MICROSCOPY

*MingZhu Li (Shenzhen University); Liangge He (Shenzhen University); Xinglie Wang (Shenzhen University); tianfu Wang (Shenzhen University); guanghui Yue (Shenzhen University); Guangqian Zhou (Shenzhen University); Baiying Lei (Shenzhen University)**

SUPERPIXEL INPAINTING FOR SELF-SUPERVISED SKIN LESION SEGMENTATION FROM DERMOSCOPIC IMAGES

*Zhonghua Wang (Southern University of Science and Technology); Junyan Lyu (Southern University of Science and Technology); Wenhao Luo (Southern University of Science and Technology); Xiaoying Tang (Southern University of Science and Technology)**



**ENHANCING NON-MASS BREAST
ULTRASOUND CANCER CLASSIFICATION WITH
KNOWLEDGE TRANSFER**

Yangrun Hu (Shanghai Jiao Tong University);
Yuanfan Guo (SJTU); Fan Zhang (Shanghai
General Hospital, Shanghai Jiao Tong University
School of Medicine); Mingda Wang (Shanghai Jiao
Tong University); Tiancheng Lin (Shanghai Jiao
Tong University); Yi Xu (Shanghai Jiao Tong
University)*; Rong Wu (Shanghai General Hospital,
Shanghai Jiao Tong University School of Medicine)

**SEMI-SUPERVISED DOMAIN GENERALIZATION
FOR MEDICAL IMAGE ANALYSIS**

Ruipeng Zhang (Cooperative Medianet Innovation
Center, Shanghai Jiao Tong University); Qinwei Xu
(Cooperative Medianet Innovation Center, Shanghai
Jiao Tong University); Chaoqin Huang (Shanghai
Jiao Tong University); Ya Zhang (Cooperative
Medianet Innovation Center, Shanghai Jiao Tong
University)*; Yan-Feng Wang (Cooperative medianet
innovation center of Shanghai Jiao Tong University)

**SCRIBBLE-SUPERVISED CELL SEGMENTATION
USING MULTISCALE CONTRASTIVE
REGULARIZATION**

Hyunjic Oh (Korea University); Kanggeun Lee
(UNIST); Won-Ki Jeong (Korea University)*

**LOW-DOSE COMPUTED TOMOGRAPHY
RECONSTRUCTION WITHOUT LEARNING DATA:
PERFORMANCE IMPROVEMENT BY
EXPLOITING JOINT CORRELATION BETWEEN
ADJACENT SLICES**

Kyung-Su Kim (SMC (Samsung Medical Center),
SKKU-MED (School of Medicine, Sungkyunkwan
University))*; Chae Yeon Lim (Samsung Medical-
Center); Myung Jin Chung (Samsung Medical
Center)

**CAPNEXT: UNIFYING CAPSULE AND RESNEXT
FOR MEDICAL IMAGE SEGMENTATION**

Thanh Minh Huynh (VinBrain)*; Chanh D Tr Nguyen
(VinBrain); Khoa Nguyen (VinBrain); Trung Bui
(Individual); QUOC HUNG TRUONG (VINBRAIN)

**ADVERSARIAL CONTRASTIVE FOURIER
DOMAIN ADAPTATION FOR POLYP
SEGMENTATION**

Ta Duc Huy (Vinbrain)*; Huyen Hoang (Vinbrain);
Chanh D Tr Nguyen (VinBrain); Soan T. M. Duong
(Le Quy Don Technical University); Trung Bui
(Individual); QUOC HUNG TRUONG (VINBRAIN)

3/30/2022

Multimodal fusion

09:45:00 AM - 11:15:00 AM

Poster Hall

Session Type: Poster

**A NOVEL MULTI-FOCUS FUSION NETWORK
FOR RETINAL MICROSURGERY**

Xinyi Zhou (Southern University of Science and
Technology); Luoying Hao (Southern University of
Science and Technology); Qiushi Nie (Southern
University of Science and Technology); Yingquan
Zhou (Southern University of Science and
Technology); Lihui Wang (Guangdong Academy of
Sciences); Yan Hu (Southern University of Science
and Technology)*; Jiang Liu (Southern University of
Science and Technology)

**A LESS SUPERVISED AUTOMATIC
DELINEATION METHOD FOR INTRACRANIAL
GERM CELL TUMOR RADIOTHERAPY TARGETS**

Xianyu Wang (Tsinghua University)*; Shuai Liu
(Beijing Tiantan Hospital); Ne Yang (Tsinghua
University); Guochen Ning (Tsinghua University);
Longfei Ma (Tsinghua University); Hui Zhang
(Tsinghua University); Hongen Liao (Tsinghua
University)

**MULTI-MODAL LEARNING USING PHYSICIANS
DIAGNOSTICS FOR OPTICAL COHERENCE
TOMOGRAPHY CLASSIFICATION**

Yash-ye K Logan (Georgia Institute of
Technology)*; Kiran Kokilepersaud (Georgia Institute
of Technology); Gukyeong Kwon (Amazon);
Ghassan AlRegib (Georgia Institute of Technology);
Charles Wykoff (Retina Consultants of Texas);
Hannah Yu (Retina Consultants of Texas)

**A LEARNING FRAMEWORK FOR MULTIMODAL
ACTIVE SUBSPACES IN THE BRAIN**

Ishaan Batta (Georgia Institute of Technology)*;
Anees Abrol (TReNDS); Zening Fu (Georgia State
University); Vince Calhoun (TReNDS)

**PREDICTING BRAIN AMYLOIDOSIS WITH PLASMA
B-AMYLOID42/40 AND MRI-BASED
MORPHOMETRY FEATURES**

Jianfeng Wu (Arizona State University)*; Yi Su
(Banner Alzheimer's Institute); Paul Thompson
(Imaging Genetics Center); Eric M. Reiman (Banner
Alzheimer's Institute and Banner Good Samaritan
PET Center); Richard Caselli (Mayo Clinic); Kewei
Chen (Banner Alzheimer's Institute and Banner
Good Samaritan PET Center); Yalin Wang (Arizona
State University)



A RIEMANNIAN FRAMEWORK FOR FUNCTIONAL CLUSTERING OF WHOLE BRAIN WHITE MATTER FIBERS

Yi Zhao (Harbin Institute of Technology, Shenzhen); Jingyong Su (Harbin Institute of Technology, Shenzhen)*; Zhipeng Yang (Chengdu University of Information Technology); Zhaohua Ding (Vanderbilt University)

ASSOCIATION BETWEEN THE ORAL MICROBIOME AND BRAIN RESTING STATE FUNCTIONAL NETWORK CONNECTIVITY IN SCHIZOPHRENIA

Dongdong Lin (GSU)*; Zening Fu (Georgia State University); Jingyu Liu (Georgia State University); Nora Bizzozero (University of New Mexico); Juan Bustillo (University of New Mexico); Kent Hutchison (University of Colorado); Yuhui Du (Georgia State University); Godfrey Pearlson (Olin Center); Vince Calhoun (TReNDS)

BRIDGING NATURALISTIC STIMULI, EYE MOVEMENT AND BRAIN ACTIVITY VIA CCA AND LOCALITY PRESERVING PROJECTION

Changhe Li (Northwestern Polytechnical University)*; Jiaxing Gao (Northwestern Polytechnical University); Zhibin He (Northwestern Polytechnical University); Songyao Zhang (Northwestern Polytechnical University); Wei YaoNai (Northwestern Polytechnical University); Lei Du (Northwestern Polytechnical University); Lei Guo (NWPU, China); Junwei Han (NWPU, China); Shu Zhang (Northwestern Polytechnical University); Tuo Zhang (Northwestern Polytechnical University)

3/30/2022

Coffee Break

10:45:00 AM - 11:15:00 AM

3/30/2022

Plenary

11:30:00 AM - 12:30:00 PM

Bengal Stateroom 5

Chair: Debodoot Sheet (Indian Institute of Technology Kharagpur, India)

ROBOTIC IMAGING, MACHINE LEARNING AND AUGMENTED REALITY FOR COMPUTER ASSISTED INTERVENTIONS

Nassir Navab

Professor and Director of the Laboratories for Computer Aided Medical Procedures at Technical University of Munich (TUM)

3/30/2022

Young-Professional Activity: Manuscript Writing

12:30:00 PM - 02:00:00 PM

Bengal Stateroom 2

3/30/2022

Lunch Break

12:30:00 PM - 02:00:00 PM

3/30/2022

Young-Professional Activity: Imaging Careers

02:00:00 PM - 03:30:00 PM

Bengal Stateroom 4

3/30/2022

Microscopy & Cellular Imaging

03:45:00 PM - 05:15:00 PM

Poster Hall

Session Type: Poster

SUBTYPE-SPECIFIC SPATIAL DESCRIPTORS OF TUMOR-IMMUNE MICROENVIRONMENT ARE PROGNOSTIC OF SURVIVAL IN LUNG ADENOCARCINOMA

Saarthak Kapse (Stony Brook University); Luke Torre-Healy (Stony Brook University); Richard Moffitt (Stony Brook University); Rajarsi Gupta (Stony Brook University); Prateek Prasanna (Stony Brook University)*

ARTIFACT IDENTIFICATION IN HISTOPATHOLOGY IMAGES USING FEW SHOT LEARNING

Nazim Shaikh (Roche)*; Yao Nie (Roche Diagnostic Solution); Kamil Wasag (.)

LEARNING WITH LESS LABELS IN DIGITAL PATHOLOGY VIA SCRIBBLE SUPERVISION FROM NATURAL IMAGES

EU WERN TEH (University of Guelph)*; Graham Taylor (University of Guelph)

TOWARDS MEASURING DOMAIN SHIFT IN HISTOPATHOLOGICAL STAIN TRANSLATION IN AN UNSUPERVISED MANNER

Zeeshan Nisar (University of Strasbourg)*; Jelica VASILJEVIC (University of Strasbourg); Pierre Gançarski (University of Strasbourg); Thomas Lampert (University of Strasbourg)

SEMI-SUPERVISED SEGMENTATION OF MITOCHONDRIA FROM ELECTRON MICROSCOPY IMAGES USING SPATIAL CONTINUITY

*Yunpeng Xiao (School of artificial intelligence, Chinese Academy of Sciences); Youpeng Zhao (Institute of Automation, Chinese Academy of Sciences); Ge Yang (National Laboratory of Pattern Recognition, Institute of Automation, Chinese Academy of Sciences)**

QUANTIFYING NEWLY APPEARING REPLICATION FOCI IN CELL NUCLEI BASED ON 3D NON-RIGID REGISTRATION

Qi Gao (Heidelberg University); Vadim O. Chagin (Russian Academy of Sciences); M. Cristina Cardoso (Technical University of Darmstadt); Karl Rohr (University of Heidelberg, DKFZ)*

DEEP NEURAL NETWORK FOR COMBINED PARTICLE TRACKING AND COLOCALIZATION ANALYSIS IN TWO-CHANNEL MICROSCOPY IMAGES

Roman Spilger (Heidelberg University); Ji Young Lee (University of Heidelberg); Ralf Bartenschlager (University of Heidelberg); Karl Rohr (University of Heidelberg, DKFZ)*

DEEP NEURAL NETWORK FOR 3D PARTICLE DETECTION IN 3D FLUORESCENCE MICROSCOPY IMAGES VIA DENSITY MAP REGRESSION

Roman Spilger (Heidelberg University); Vadim O. Chagin (Institute of Cytology, Russian Academy of Sciences, St. Petersburg); Charlotte Bold (Heidelberg University); Lothar Schermelleh (University of Oxford); Ulrike Müller (Heidelberg University); M. Cristina Cardoso (Technische Universität Darmstadt); Karl Rohr (University of Heidelberg, DKFZ)*

NON-CONVEX CELL EPITHELIAL MODELING UNVEILS CELLULAR INTERACTIONS

Elise Laruelle (IBENS); Auguste Genovesio (École Normale Supérieure)*

MOTION CORRECTION IN CORONARY ULTRASOUND LOCALIZATION MICROSCOPY

Zulma Sandoval (Physics for Medicine Paris); Oscar Demeulenaere (Physics for Medicine Paris); Philippe Mateo (Physics for Medicine Paris); Michael Tanter (Physics for Medicine Paris); Clement Papadacci (Physics for Medicine Paris); Mathieu Pernot (Physics for Medicine Paris)*

FROM CHAIRS TO BRAINS: CUSTOMIZING OPTICAL FLOW FOR SURGICAL ACTIVITY LOCALIZATION

Markus Philipp (Karlsruhe Institute of Technology / Carl Zeiss Meditec AG); Neal Bacher (University of Stuttgart / Carl Zeiss Meditec); Stefan Saur (Carl Zeiss Meditec AG); Franziska Mathis-Ullrich (Institute for Anthropomatics and Robotics, Karlsruhe Institute of Technology); Andrés Bruhn (University of Stuttgart)*

ROBUST PLANT CELL TRACKING IN FLUORESCENCE MICROSCOPY 3D+T SERIES

Petit Manuel (Inria); Grégoire Malandain (INRIA); Christophe Godin (INRIA Virtual Plants); Guillaume Cerutti (INRIA Virtual Plants)*

3/30/2022

Deep learning - III

03:45:00 PM - 05:15:00 PM

Poster Hall

Session Type: Poster

FEATURE GRADIENT FLOW FOR INTERPRETING DEEP NEURAL NETWORKS IN HEAD AND NECK CANCER PREDICTION

Yinzhu Jin (University of Virginia); Jonathan Garneau (University of Virginia); P. Thomas Fletcher (University of Virginia)*

CLASS-BASED ATTENTION MECHANISM FOR CHEST RADIOGRAPH MULTI-LABEL CATEGORIZATION

*David Sriker (Tel Aviv University); Hayit Greenspan (Tel Aviv University); Jacob Goldberger (Bar-Ilan University)**

ADAPTATION OF A MULTI-SITE NETWORK TO A NEW CLINICAL SITE VIA BATCH-NORMALIZATION SIMILARITY

Shira Kasten Serlin (Tel Aviv University); Jacob Goldberger (Bar-Ilan University); Hayit Greenspan (Tel Aviv University)*

FEW-SHOT IMAGE SEGMENTATION FOR CROSS-INSTITUTION MALE PELVIC ORGANS USING REGISTRATION-ASSISTED PROTOTYPICAL LEARNING

Yiwen Li (University of Oxford); Yunguan Fu (University College London); Qianye Yang (University College London); Zhe Min (University College London); Wen Yan (City University of Hong Kong); Henkjan Huisman (Radboudumc); Dean Barratt (University College London); Victor Adrian Prisacariu (University of Oxford); Yipeng Hu (University College London)*



**GENERATION OF 12-LEAD
ELECTROCARDIOGRAM WITH SUBJECT-
SPECIFIC, IMAGE-DERIVED CHARACTERISTICS
USING A CONDITIONAL VARIATIONAL
AUTOENCODER**

Yuling Sang (University of Oxford); Marcel Beetz (University of Oxford); Vicente Grau (University of Oxford)*

**AUTOMATED DCIS IDENTIFICATION FROM
MULTIPLEX IMMUNOHISTOCHEMISTRY USING
GENERATIVE ADVERSARIAL NETWORKS**

Faranak Sobhani (Institute of Cancer Research); Azam Hamidinekoo (Institute of Cancer Research (ICR)); Allison Hall (Duke University); Iorraine King (Duke University); Jeffrey Marks (Duke University); Carlo Maley (Arizona Cancer and Evolution Center); Hugo Horlings (nki.nl); Shelley Hwang (Duke University); Yinyin Yuan (Institute for Cancer Research)*

**DEEP SEMI-SUPERVISED ACTIVE LEARNING
FOR KNEE OSTEOARTHRITIS SEVERITY
GRADING**

Abu Mohammed Raisuddin (University of Oulu); Huy Hoang Nguyen (University of Oulu); Aleksei Tiulpin (Aalto University)*

**MRI FIELD STRENGTH PREDICTS ALZHEIMER'S
DISEASE: A CASE EXAMPLE OF BIAS IN THE
ADNI DATA SET**

Elina Thibeau-Sutre (Paris Brain Institute); Baptiste Couvy-Duchesne (Paris Brain Institute); Didier Dormont (APHP); Olivier Colliot (ARAMIS Lab / ICM); Ninon Burgos (CNRS - Paris Brain Institute)*

**SIAMESE-GAP NETWORK FOR EARLY
DETECTION OF KNEE OSTEOARTHRITIS**

*Zhe WANG (University of Orleans); Aladine Chetouani (Université d'Orléans, France); Didier Hans (Geneva University Hospital); Eric Lespessailles (Hospital of Orleans); Rachid Jennane (University of Orleans)**

**SAVGAN: SELF-ATTENTION BASED
GENERATION OF TUMOUR ON CHIP VIDEOS**

Sandeep Manandhar (ENS); Irina Veith (Institut Curie); Maria Carla PARRINI (Institut Curie); Auguste Genovesio (École Normale Supérieure)*

**UNSUPERVISED ANOMALY DETECTION IN 3D
BRAIN MRI USING DEEP LEARNING WITH
IMPURED TRAINING DATA**

Finn Behrendt (Hamburg University of Technology); Marcel Bengs (Hamburg University of Technology); Frederik Rogge (Hamburg University of*

Technology); Julia Krüger (jung diagnostics GmbH); Roland Opfer (jung diagnostics GmbH); Alexander Schlaefer (Hamburg University of Technology)

**INFLUENCE BASED RE-WEIGHING FOR
LABELING NOISE IN MEDICAL IMAGING**

*Joschka Braun (Covera Health); Micha H Kornreich (Covera Health); JinHyeong Park (Covera Health); Jayashri Pawar (Covera Health); James Browning (Covera Health); Richard J Herzog (Covera Health); Benjamin Odry (Covera Health); Li Zhang (coverahealth)**

**SELF-SEMANTIC CONTOUR ADAPTATION FOR
CROSS MODALITY BRAIN TUMOR
SEGMENTATION**

Xiaofeng Liu (MGH and Harvard Medical School); Fangxu Xing (Massachusetts General Hospital / Harvard Medical School); El Fakhri Georges (MGH); Jonghye Woo (Massachusetts General Hospital / Harvard Medical School)*

**A CONTRASTIVE LEARNING-BASED
APPROACH TO MEASURE SPATIAL COUPLING
AMONG BRAIN NETWORKS: A SCHIZOPHRENIA
STUDY**

Reihaneh Hassanzadeh (GSU); Vince Calhoun (TReNDS)*

**CHARACTERIZATION OF AI MODEL
CONFIGURATIONS**

Peter Bajcsy (NIST); Daniel Gao (NIST); Michael Majurski (NIST); Walid Keyrouz (NIST)*

3/30/2022

Statistical Models and Methods

03:45:00 PM - 05:15:00 PM

Poster Hall

Session Type: Poster

**LEADERS: LEARNABLE DEEP RADIAL
SUBSAMPLING FOR MRI RECONSTRUCTION**

*Zhiwen Wang (Sichuan University); Bowen Li (Sichuan University); Wenjun Xia (Sichuan University); Chenyu Shen (Sichuan University); Mingzheng Hou (Sichuan University); hu chen (Sichuan University); Yan Liu (Sichuan University); Jiliu Zhou (Chengdu University of Information Technology); Yi Zhang (Sichuan University)**

**GRAPH-BASED SMALL BOWEL PATH
TRACKING WITH CYLINDRICAL CONSTRAINTS**

Seungyeon Shin (National Institutes of Health); Sungwon Lee (National Institutes of Health); Ronald Summers (NIH)*



HIERARCHICAL BRAIN EMBEDDING USING EXPLAINABLE GRAPH LEARNING

Haoteng Tang (University of Pittsburgh); Lei Guo (University of Pittsburgh); Xiyao Fu (University of Pittsburgh); Benjamin Z Qu (Mission San Jose High School); Paul Thompson (Imaging Genetics Center); Heng Huang (University of Pittsburgh); Liang Zhan (University of Pittsburgh)*

NAVIER-STOKES-BASED REGULARIZATION FOR 4D FLOW MRI SUPER-RESOLUTION

Sébastien Levilly (University Hospital Center of Nantes)*; Saïd MOUSSAOUI (Ecole Centrale Nantes); Jean-Michel SERFATY (University Hospital Center of Nantes)

DATA DRIVEN ESTIMATION OF COVID-19 PROGNOSIS

Rajendra Nagar (Indian Institute of Technology Jodhpur); Deepak Mishra (IIT Jodhpur)*; Harshit Sharma (Indian Institute Of Technology, Jodhpur)

ROBUST AND UNCERTAINTY-AWARE VAE (R-VAE) FOR ONE-CLASS CLASSIFICATION

Renuka Sharma (IITB)*; Suyash P. Awate (Indian Institute of Technology (IIT) Bombay)

IMBALANCED CELL-CYCLE CLASSIFICATION USING WGAN-DIV AND MIXUP

Priyanka Rana (UNSW)*; Arcot Sowmya (UNSW); Erik Meijering (University of New South Wales); Yang Song (University of New South Wales)

LESION SPECIFIC RADIOMICS ANALYSIS SHOWS PROMISING RESULTS FOR EARLY STAGE EFFICACY ASSESSMENT ON METASTATIC LESIONS

Martin Gueuning (Radiomics)*; Carlos Meca (Radiomics); Mariaelena Occhipinti (Radiomics); Sean Walsh (Radiomics); Wim Vow (Radiomics); Michael Lahn (iOnctura)

TOWARDS REDUCING ALEATORIC UNCERTAINTY FOR MEDICAL IMAGING TASKS

Abhishek Singh Sambyal (Indian Institute of Technology Ropar)*; Deepti Bathula (Indian Institute of Technology Ropar); Narayanan C Krishnan (IIT Palakkad)

TOWARDS EFFICIENT FMRI DATA RE-USE: CAN WE RUN BETWEEN-GROUP ANALYSES WITH DATASETS PROCESSED DIFFERENTLY?

Xavier Rolland (Univ Rennes, Inria, CNRS, Inserm)*; Pierre Maurel (Univ Rennes, Inria, CNRS, Inserm); Camille Maumet (Inria, Univ Rennes, CNRS, Inserm)

3/30/2022

Statistical Models and Methods II

03:45:00 PM - 05:15:00 PM

Poster Hall

Session Type: Poster

CT SUPER-RESOLUTION WITH A DIFFUSION PROBABILISTIC MODEL

Trevor Chan (University of Pennsylvania)*

AMD CLASSIFICATION BASED ON ADVERSARIAL DOMAIN ADAPTATION WITH CENTER LOSS

Shengzhu Yang (Beijing Institute of Technology); Xi Zhang (Beijing Institute of Technology); He Zhao (Beijing Institute of Technology); Huiqi Li (Beijing Institute of Technology)*; Hanruo Liu (Beijing Tongren Hospital, Capital Medical University ; School of Information and Electronics, Beijing Institute of Technology); Ningli Wang (Beijing Institute of Ophthalmology)

PERIPAPILLARY ATROPHY SEGMENTATION BASED ON ASM LOSS

mengxuan li (Beijing Institute of Technology); He Zhao (Beijing Institute of Technology); Jie Xu (Beijing Tongren Hospital); Huiqi Li (Beijing Institute of Technology)*

RE-RANKING STRATEGIES IN CROSS-MODALITY MICROSCOPY RETRIEVAL

Elisabeth Wetzer (Centre for Image Analysis, Department of Information Technology, Uppsala University, Sweden)*; Eva Breznik (Uppsala University); Joakim Lindblad (Centre for Image Analysis, Department of Information Technology, Uppsala University, Sweden); Natasa Sladoje (Centre for Image Analysis, Department of Information Technology, Uppsala University, Sweden)

A NONLINEAR HIERARCHICAL MODEL FOR LONGITUDINAL DATA ON MANIFOLDS

Martin Hanik (Freie Universität Berlin)*; Hans-Christian Hege (Zuse Institute Berlin); Christoph von Tycowicz (Zuse Institute Berlin)

DECENTRALIZED SPATIALLY CONSTRAINED SOURCE-BASED MORPHOMETRY

Debbrata Kumar Saha (Georgia Institute of Technology)*; Rogers F Silva (TReNDS Center); Bradley T Baker (Center for Translational Research in Neuroimaging and Data Science); Vince Calhoun (TReNDS)



STRUCTURAL BRAIN ATROPHY PREDICT SYMPTOM SEVERITY IN SCHIZOPHRENIA BASED ON GENERALIZED ADDITIVE MODELS

Meng Wang (Brainnetome Center and National Laboratory of Pattern Recognition, Institute of Automation, Chinese Academy of Sciences; School of Artificial Intelligence, University of Chinese Academy of Sciences); Lingzhong Fan (Brainnetome Center, Institute of Automation, Chinese Academy of Sciences); Bing Liu (Beijing Normal University)*

AN UNSUPERVISED APPROACH TO DETECT MICROGLIA TIP IN VOLUMETRIC FLUORESCENCE IMAGING DATA

Mengfan Wang (Virginia Tech)*; Kathleen Whiting (Uniformed Services University); Fritz W Lischka (Uniformed services University); Zygmunt Galdzicki (USUHS); Guoqiang Yu (Virginia Tech)

STATISTICAL COUPLING BETWEEN TIME POINT-PROCESSES

Samuel Kubler (Institut Pasteur)*; Jean-Christophe Olivo-Marin (Institut Pasteur); Thibault Lagache (Institut Pasteur)

A TOOLKIT FOR ANALYZING 3D ARCHITECTURE IN THE RENAL PAPILLA

Haoju Leng (Vanderbilt University)*; Min Yang (Vanderbilt University Medical Center); Haichun Yang (Vanderbilt University Medical Center); Mark Caestecker (Vanderbilt University Medical Center); Yuankai Huo (Vanderbilt University)

3/30/2022

Coffee Break

04:30:00 PM - 05:00:00 PM

3/30/2022

Multimodality Fusion

05:30:00 PM - 07:00:00 PM

Bengal Stateroom 5

Session Type: Oral

Chairs: Pamela Guevara (Universidad de Concepción, Chile) & Alin Achim (University of Bristol, UK)

05:30:00 PM

INDICATION AS PRIOR KNOWLEDGE FOR MULTIMODAL DISEASE CLASSIFICATION IN CHEST RADIOGRAPHS WITH TRANSFORMERS

Grzegorz Jacenków (The University of Edinburgh)*; Alison Q O'Neil (Canon Medical Research Europe); Sotirios Tsaftaris (The University of Edinburgh)

05:45:00 PM

COMBINED GENERATION OF ELECTROCARDIOGRAM AND CARDIAC ANATOMY MODELS USING MULTI-MODAL VARIATIONAL AUTOENCODERS

Marcel Beetz (University of Oxford)*; Abhirup Banerjee (University of Oxford); Yuling Sang (University of Oxford); Vicente Grau (University of Oxford)

06:00:00 PM

COROLLA: AN EFFICIENT MULTI-MODALITY FUSION FRAMEWORK WITH SUPERVISED CONTRASTIVE LEARNING FOR GLAUCOMA GRADING

Zhiyuan Cai (Southern University of Science and Technology); Li Lin (Southern University of Science and Technology; The University of Hong Kong); He Huaqing (Southern University of Science and Technology); Xiaoying Tang (Southern University of Science and Technology)*

06:15:00 PM

MULTI-SCALE CONTEXT-GUIDED LUMBAR SPINE DISEASE IDENTIFICATION WITH COARSE-TO-FINE LOCALIZATION AND CLASSIFICATION

Zifan Chen (Peking University)*; Jie Zhao (Peking University); Hao Yu (Peking University); Zhang Yue (Peking University); Li Zhang (Peking University)

06:30:00 PM

INTERPRETABLE GRAPH CONVOLUTIONAL NETWORK OF MULTI-MODALITY BRAIN IMAGING FOR ALZHEIMER'S DISEASE DIAGNOSIS

Houliang Zhou (Lehigh University)*; Lifang He (Lehigh University); Yu Zhang (Lehigh University, BIOE); Li Shen (University of Pennsylvania); Brian Y Chen (Lehigh University)

06:45:00 PM

INVESTIGATING THE EFFECT OF TAU DEPOSITION AND APOE ON HIPPOCAMPAL MORPHOMETRY IN ALZHEIMER'S DISEASE: A FEDERATED CHOW TEST MODEL

Jianfeng Wu (Arizona State University)*; Yi Su (Banner Alzheimer's Institute); Eric M. Reiman (Banner Alzheimer's Institute and Banner Good Samaritan PET Center); Richard Caselli (Mayo Clinic); Kewei Chen (Banner Alzheimer's Institute and Banner Good Samaritan PET Center); Paul Thompson (Imaging Genetics Center); Junwen Wang (Mayo Clinic); Yalin Wang (Arizona State University)

3/30/2022

Microscopy Image Analysis

05:30:00 PM - 07:00:00 PM

Bengal Stateroom 2

Session Type: Oral

Chairs: Rakesh Mullick (GE John F. Welch Technology Center, India) & Se Young Chun (Seoul National University, South Korea)

05:30:00 PM

DEEP SEMI-SUPERVISED METRIC LEARNING WITH DUAL ALIGNMENT FOR CERVICAL CANCER CELL DETECTION

Zhizhong Chai (ImsightMed); Luyang Luo (The Chinese University of Hong Kong); huangjing Lin (Imsight AI Research Lab); Hao Chen (The Hong Kong University of Science and Technology); anjia han (Department of Pathology, The first affiliated Hospital, Sun Yat-sen University); Pheng-Ann Heng (The Chinese University of Hong Kong)*

05:45:00 PM

3D IMAGE SUPER-RESOLUTION BY FLUOROPHORE FLUCTUATIONS AND MA-TIRF MICROSCOPY RECONSTRUCTION (3D-COLORME)

Vasiliki Stergiopoulou (I3S/CNRS/INRIA/UCA); Luca Calatroni (CNRS, UCA, INRIA); Sébastien Schaub (LBDV, IMEV, CNRS); Laure Blanc-Feraud (I3S Laboratory)*

06:00:00 PM

SPATIAL ANALYSIS FOR HISTOPATHOLOGY: A STATISTICAL APPROACH

Suvadip Mukherjee (Institut Pasteur); Vannary Meas-Yedid (Institut Pasteur); Marc Bokobza (Arts et Métiers ParisTech); Thibault Lagache (Institut Pasteur); Alexandre Corthay (University of Oslo); Jean-Christophe Olivo-Marin (Institut Pasteur Olivo-Marin)*

06:15:00 PM

MS-GWNN: MULTI-SCALE GRAPH WAVELET NEURAL NETWORK FOR BREAST CANCER DIAGNOSIS

Mo Zhang (Peking University); Bin Dong (Peking University); Quanzheng Li (Massachusetts General Hospital and Harvard Medical School)*

06:30:00 PM

VISUAL ATTENTION ANALYSIS OF PATHOLOGISTS EXAMINING WHOLE SLIDE IMAGES OF PROSTATE CANCER

Souradeep Chakraborty (Stony Brook University); Ke Ma (Stony Brook University); Rajarsi Gupta (Stony Brook University); Beatrice Knudsen*

(University of Utah); Gregory Zelinsky (Stony Brook University); Joel Saltz (Stony Brook University); Dimitris Samaras (Stony Brook University)

06:45:00 PM

MAG: A SIMPLE LEARNING-BASED PATIENT-LEVEL AGGREGATION METHOD FOR DETECTING MICROSATELLITE INSTABILITY FROM WHOLE-SLIDE IMAGES

*Kaifeng Pang (Nanjing University); Zuhayr Asad (Vanderbilt University); Shilin Zhao (Vanderbilt University); Yuankai Huo (Vanderbilt University)**

3/30/2022

Statistical Models & Methods

05:30:00 PM - 07:00:00 PM

Bengal Stateroom 4

Session Type: Oral

Chairs: Hayit Greenspan (Tel Aviv University, Israel) & Simona Turco (Eindhoven MedTech Innovation Center, Netherlands)

05:30:00 PM

RIEMANNIAN METRIC LEARNING FOR PROGRESSION MODELING OF LONGITUDINAL DATASETS

Benoit Sauty (INRIA); Stanley Durrleman (INRIA)*

05:45:00 PM

BAYESIAN OPTIMIZATION USING HAMILTONIAN DYNAMICS FOR SPARSE ARTIFICIAL NEURAL NETWORKS

Mohamed Fakhfakh (University of Toulouse, INP); Bassem Bouaziz (University of Sfax, Tunisia); Faiez Gargouri (Miracl); Lotfi Chaari (University of Toulouse, INP)*

06:00:00 PM

IDENTIFICATION OF DIFFUSIVE STATES IN TRACKING APPLICATIONS USING UNSUPERVISED DEEP LEARNING METHODS

Hélène Kabbech (Erasmus MC - University Medical Center Rotterdam); Ihor Smal (Erasmus MC - University Medical Center Rotterdam)*

06:15:00 PM

CHARACTERIZING CELL POPULATIONS USING STATISTICAL SHAPE MODES

Ximu Deng (Florida State University); Anuj Srivastava (Florida State University); Rituparna Sarkar (Institut Pasteur); Elisabeth Labruyere (Institut Pasteur); Jean-Christophe Olivo-Marin (Institut Pasteur Olivo-Marin)*



06:30:00 PM

INVESTIGATING FUNCTIONAL BRAIN NETWORK ABNORMALITIES VIA DIFFERENTIAL COVARIANCE TRAJECTORY ANALYSIS AND SCAN STATISTICS

Anita Sinha (University of Wisconsin-Madison)*;
Ronak Mehta (University of Wisconsin-Madison);
Veena Nair (University of Wisconsin-Madison);
Rasmus Birn (University of Wisconsin - Madison);
Vikas Singh (University of Wisconsin Madison);
Vivek Prabhakaran (School of Medicine and Public Health, University of Wisconsin-Madison)

06:45:00 PM

MANIFOLD LEARNING IN DETECTING THE TRANSITIONS OF DYNAMIC FUNCTIONAL CONNECTIVITIES BOOSTS BRAIN STATE-SPECIFIC RECOGNITION

Tingting Dan (South China University of Technology); Zhuobin Huang (South China University of Technology); Hongmin Cai (South China University of Technology)*; Guorong Wu (UNC-CH)

3/30/2022

Special Session: Translational and Clinical Applications of Photoacoustic Imaging

05:30:00 PM - 07:00:00 PM

Bengal Stateroom 1

Session Type: Special Session

LISTENING TO THE SOUND OF LIGHT TO GUIDE SURGERIES

Prof. Muyinatu Lediju Bell (Johns Hopkins University)

SUPER-RESOLUTION IMAGING WITH LOCALIZATION OPTOACOUSTIC TOMOGRAPHY (LOT)

Dr. XL Dean Ben (ETH Zurich)

TALK #3

Dr. Sanhita Sinharay (Indian Institute of Science)

PHOTOACOUSTIC MICROSCOPY APPROACHING THE REGIME OF PHOTOACOUSTIC TOMOGRAPHY: A VALIDATION STUDY

Dr. Mayanglambam Suheshkumar Singh (Indian Institute of Science Education and Research)

INDUSTRY TALK

Jithin Jose (Fujifilm VisualSonics)

3/30/2022

Onsite Dinner

07:00:00 PM - 10:00:00 PM

Bengal Stateroom 2

Session Type: Social

3/30/2022

Awards

07:30:00 PM - 07:55:00 PM

Bengal Stateroom 5

3/30/2022

Plenary

08:00:00 PM - 09:00:00 PM

Bengal Stateroom 5

Chair: Ananda S. Chowdhury (Jadavpur University, India)

ROLE OF AI AND IMAGING IN VACCINE RESEARCH

Krishna Ella

Chairman and Managing Director, Bharat Biotech International Ltd



Thursday, March 31

3/31/2022

Retinal Imaging

08:00:00 AM - 09:30:00 AM

Bengal Stateroom 5

Session Type: Oral

Chairs: Hao Chen (Hong Kong University of Science and Technology, China) & Pratik Shah (Massachusetts Institute of Technology, USA)

08:00:00 AM

A LABEL UNCERTAINTY-GUIDED MULTI-STREAM MODEL FOR DISEASE SCREENING

Chi Liu (State Key Laboratory of Ophthalmology, Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangzhou, China); Zongyuan Ge (Monash); Mingguang He (Centre for Eye Research Australia); Xiaotong Han (State Key Laboratory of Ophthalmology, Zhongshan Ophthalmic Center, Sun Yat-sen University, Guangzhou, China)*

08:15:00 AM

ANOMALY DETECTION IN RETINAL IMAGES USING MULTI-SCALE DEEP FEATURE SPARSE CODING

Sourya Dipta Das (Jadavpur University)*; Saikat Dutta (IIT Madras); Nisarg A Shah (Indian Institute of Technology, Jodhpur); Dwarikanath Mahapatra (Inception Institute of Artificial Intelligence); Zongyuan Ge (Monash)

08:30:00 AM

SAA: SCALE-AWARE ATTENTION BLOCK FOR MULTI-LESION SEGMENTATION OF FUNDUS IMAGES

Wang Bo (Nankai University); Tao Li (Nankai University); Xinhui Liu (Nankai University); Kai Wang (Nankai University)*

08:45:00 AM

FACTORIZED CONVOLUTION WITH SPECTRAL NORMALIZATION FOR FUNDUS SCREENING

Na Zeng (Southern University of Science and Technology)*; Ming Zeng (Southern University of Science and Technology); Jiansheng Fang (Harbin Institute of Technology); Jiang Liu (Southern University of Science and Technology)

09:00:00 AM

DIFFERENTIABLE PROJECTION FROM OPTICAL COHERENCE TOMOGRAPHY B-SCAN WITHOUT RETINAL LAYER SEGMENTATION SUPERVISION

Dingyi Rong (Shanghai Jiao Tong University); Jiancheng Yang (Shanghai Jiao Tong University); BiLian Ke (Shanghai General Hospital)*; Bingbing Ni (Shanghai Jiao Tong University)

09:15:00 AM

BILATERAL-VIT FOR ROBUST FOVEA LOCALIZATION

Sifan Song (University of Liverpool based in Xi'an Jiaotong-Liverpool University)*; Kang Dang (Voxelcloud Inc); Qinji Yu (Shanghai Jiao Tong University); Zilong Wang (Voxelcloud); Frans Coenen (University of Liverpool); Jionglong Su (Xi'an Jiaotong-Liverpool University); xiaowei ding (Shanghai Jiao Tong University)

3/31/2022

Clinical Decision Support

08:00:00 AM - 09:30:00 AM

Bengal Stateroom 2

Session Type: Oral

Chairs: Jayavardhana Gubbi (Tata Consultancy Services Research, India) & Jayasree Chakraborty (Memorial Sloan Kettering Cancer Center, USA)

08:00:00 AM

COORDINATE TRANSFORMER NETWORK FOR PREDICTION OF PSEUDOMONAS AERUGINOSA'S DRUG RESISTANCE

WEI XIONG (Shenzhen University)*; Kaiwei Yu (Southern University of Science and Technology); Yuming Cai (Southern University of Science and Technology); Liang Yang (Southern University of Science and Technology); Baiying Lei (Shenzhen University)

08:15:00 AM

MASK-FREE RADIOTHERAPY DOSE PREDICTION VIA MULTI-TASK LEARNING

Zhengyang Jiao (Sichuan University); Xingchen Peng (Department of Biotherapy, Cancer Center, West China Hospital, Sichuan University); jianghong xiao (West China Hospital, Sichuan University); Xi Wu (Chengdu University of Information Technology); Jiliu Zhou (Sichuan University); Yan Wang (Sichuan University)*

08:30:00 AM

TWO-PHASE PROGRESSIVE DEEP TRANSFER LEARNING FOR CERVICAL CANCER DOSE MAP PREDICTION

Jie Zeng (Sichuan University); Xingchen Peng (Department of Biotherapy, Cancer Center, West China Hospital, Sichuan University); jianghong xiao (West China Hospital, Sichuan University); Chongyang Cao (Sichuan University); chen zu



(JD.COM); Xi Wu (Chengdu University of Information Technology); Jiliu Zhou (Sichuan University); Yan Wang (Sichuan University)*

08:45:00 AM

CEREBROVASCULAR LANDMARK DETECTION UNDER ANATOMICAL VARIATIONS

Zimeng Tan (Tsinghua University)*; Jianjiang Feng (Tsinghua University); LU wangsheng (UnionStrong (Beijing) Technology Co.Ltd, Beijing); Yin Yin (UnionStrong (Beijing) Technology Co.Ltd); Guangming Yang (Union Strong Tech. Co. Ltd.); Jie Zhou (Tsinghua University)

09:00:00 AM

WEAKLY SUPERVISED MULTIMODAL 30-DAY ALL-CAUSE MORTALITY PREDICTION FOR PULMONARY EMBOLISM PATIENTS

Noa Cahan (Tel Aviv University)*

09:15:00 AM

CLIMAT: CLINICALLY-INSPIRED MULTI-AGENT TRANSFORMERS FOR KNEE OSTEOARTHRITIS TRAJECTORY FORECASTING

Huy Hoang Nguyen (University of Oulu)*; Simo Saarakkala (University of Oulu, Finland); Matthew B. Blaschko (KU Leuven); Aleksei Tiulpin (Aalto University)

3/31/2022

Computer Aided Diagnosis - II

08:00:00 AM - 09:30:00 AM

Bengal Stateroom 4

Session Type: Oral

Chairs: Li Cheng (University of Alberta, Canada) & Satish Viswanath (Case Western Reserve University, USA)

08:00:00 AM

SYMMETRIC LOSS FOR OUT-OF-DISTRIBUTION SKIN LESION DETECTION

Xuan Li (McGill University)*; Christian Desrosiers (ETS, Canada); Xue Liu (McGill University)

08:15:00 AM

BRAIN CANCER SURVIVAL PREDICTION ON TREATMENT-NAIVE MRI USING DEEP ANCHOR ATTENTION LEARNING WITH VISION TRANSFORMER

Xuan Xu (Stony Brook University)*; Prateek Prasanna (Stony Brook University)

08:30:00 AM

AUTOMATED CAD SYSTEM FOR INTERMEDIATE UVEITIS GRADING USING OPTICAL COHERENCE TOMOGRAPHY IMAGES

Sayed Haggag (Electronics and Communication Eng. Dept., Faculty of Engineering, Mansoura University, Egypt); Fahmi Khalifa (University of Louisville); Hisham A Abdeltawab (University of Louisville); Ahmed Elnakib (Mansoura University); Harpal Sandhu (Department of Ophthalmology, School of Medicine, University of Louisville, KY); Mohammed Ghazal (Abu Dhabi University); Ashraf Sewelam (Mansoura University); Mohamed Mohamed (Faculty of Engineering); Ayman El-Baz (University of Louisville)*

08:45:00 AM

EDDIE-TRANSFORMER: ENRICHED DISEASE EMBEDDING TRANSFORMER FOR X-RAY REPORT GENERATION

Hoang Tran Nhat Nguyen (University of Alberta)*; Dong Nie (UNC); Taivanbat Badamdorj (University of Alberta); Yujie Liu (University of North Carolina at Chapel Hill); Jason Truong (University of Alberta); Li Cheng (ECE dept., University of Alberta)

09:00:00 AM

EMT-NET: EFFICIENT MULTITASK NETWORK FOR COMPUTER-AIDED DIAGNOSIS OF BREAST CANCER

Jiaqiao Shi (University of Idaho); Aleksandar Vakanski (University of Idaho); Min Xian (University of Idaho)*; Jianrui Ding (Harbin Institute of Technology); Chunping Ning (The Affiliated Hospital of Qingdao University)

09:15:00 AM

DECOUPLE-COUPLE NETWORK FOR DRUG-RESISTANT EGFR MUTATION SUBTYPE PREDICTION WITH LUNG CANCER CT IMAGES

Yongbei Zhu (Beihang University, Beijing); Liusu Wang (Beijing Advanced Innovation Center for Big Data-Based Precision Medicine, School of Medicine and Engineering, Beihang University, Beijing, China); He Yu (Department of Respiratory and Critical Care Medicine, West China Hospital, Sichuan University, Chengdu, China); Meili Liu (Beijing Advanced Innovation Center for Big Data-Based Precision Medicine, School of Medicine and Engineering, Beihang University, Beijing, China); Mingyu Zhang (Beijing Advanced Innovation Center for Big Data-Based Precision Medicine, School of Medicine and Engineering, Beihang University, Beijing, China); Weimin Li (the West China Hospital of Sichuan University); Shuo Wang (Beijing Advanced Innovation Center for Big Data-Based Precision Medicine, School of Medicine, Beihang University); Jie Tian (CAS Key Laboratory of Molecular Imaging, Institute of Automation, Chinese Academy of Sciences, Beijing, China)*



3/31/2022

Image Synthesis and Enhancement

08:00:00 AM - 09:30:00 AM

Bengal Stateroom 1

Session Type: Oral

Chairs: Yongyi Yang (Illinois Institute of Technology, USA) & Gopikrishna Deshpande (Auburn University, USA)

08:00:00 AM

AN IMPROVED DEEP LEARNING FRAMEWORK FOR MR-TO-CT IMAGE SYNTHESIS WITH A NEW HYBRID OBJECTIVE FUNCTION

Sui Paul Ang (University of Wollongong); Son Lam Phung (University of Wollongong); Matthew Field (University of New South Wales); Mark Schira (University of Wollongong)*

08:15:00 AM

RECONSTRUCTION OF STANDARD-DOSE PET FROM LOW-DOSE PET VIA DUAL-FREQUENCY SUPERVISION AND GLOBAL AGGREGATION MODULE

Caiwen Jiang (ShanghaiTech University); Yongsheng Pan (Northwestern Polytechnical University); Zhiming Cui (HKU); Dinggang Shen (ShanghaiTech University)*

08:30:00 AM

BREAK: BRONCHI RECONSTRUCTION BY GEODESIC TRANSFORMATION AND SKELETON EMBEDDING

*Weihaio Yu (Shanghai Jiao Tong University); Hao Zheng (Shanghai Jiao Tong University); Minghui Zhang (Shanghai Jiao Tong University); Hanxiao Zhang (Institute of Medical Robotics, Shanghai Jiao Tong University); Jiayuan Sun (Shanghai Chest Hospital); Jie Yang (Shanghai Jiao Tong University)**

08:45:00 AM

ACCESSIBLE, AFFORDABLE AND LOW-RISK LUNGS HEALTH MONITORING IN COVID-19: DEEP CASCADE RECONSTRUCTION FROM DEGRADED LR-ULDCT

Jignesh S. Bhatt (IIIT Vadodara); Swati Rai (IIITV); Sarat Kumar Patra (IIIT Vadodara)*

09:00:00 AM

ATTENTION-BASED NOISE PRIOR NETWORK FOR MAGNETIC RESONANCE IMAGE DENOISING

HAZIQUE AETESAM (INDIAN INSTITUTE OF TECHNOLOGY-PATNA); Suman Kumar Maji (IIT Patna)*

09:15:00 AM

QUANTUM DENOISING-BASED SUPER-RESOLUTION ALGORITHM APPLIED TO DENTAL TOMOGRAPHY IMAGES

Sayantan Dutta (Institut de Recherche en Informatique de Toulouse, UMR CNRS 5505, Université de Toulouse); Nwigbo Kenule Tuador (Institut de Recherche en Informatique de Toulouse, UMR CNRS 5505, Université de Toulouse); Jerome Michetti (Institut de Recherche en Informatique de Toulouse, UMR CNRS 5505, Université de Toulouse); Bertrand Georgeot (Laboratoire de Physique Théorique, Université de Toulouse, CNRS, UPS, France); Duong Hung Pham (IRIT); Adrian Basarab (IRIT); Denis Kouame (IRIT)*

3/31/2022

Computer-aided diagnosis - I

09:45:00 AM - 11:15:00 AM

Poster Hall

Session Type: Poster

IMBALANCED HISTOPATHOLOGY IMAGE CLASSIFICATION USING DEEP FEATURE GRAPH ATTENTION NETWORK

Cong Cong (University of New South Wales); Yixing Yang (University of New South Wales); Sidong Liu (Australian Institute of Health Innovation, Macquarie University); Maurice Pagnucco (UNSW); Yang Song (University of New South Wales)*

AN EFFICIENT APPROACH FOR TUBERCULOSIS DIAGNOSIS ON CHEST X-RAY

Vu Hoang (VinBrain); Hoang Nguyen Ngoc (VinBrain JSC); Trung Bui Huu (Independent Researcher); QUOC HUNG TRUONG (VINBRAIN); Thanh Minh Huynh (VinBrain); Duong Nguyen Van (VinBrain); Trang Nguyen Vu Minh (VinBrain); Cong Cung Van (National Lung Hospital)*

CATEGORY SEPARATION FOR WEAKLY SUPERVISED MULTI-CLASS CELL COUNTING

Jiatong Cai (Westlake University); Chenglu Zhu (Westlake University); Pingyi Chen (Westlake University); Shichuan Zhang (Westlake University); Honglin Li (Westlake University); YUXUAN SUN (Westlake University); Lin Yang (Westlake University)*

CCAT-NET: A NOVEL TRANSFORMER BASED SEMI-SUPERVISED FRAMEWORK FOR COVID-19 LUNG LESION SEGMENTATION

Mingyang Liu (Henan Institute of Advanced Technology, Zhengzhou University, Zhengzhou 450052, P.R. China); Li Xiao (Chinese Academy of Science); Huiqin Jiang (Zhengzhou University);*



Qing He (Institute of Computing Technology, Chinese Academy of Sciences)

LESION2VOID: UNSUPERVISED ANOMALY DETECTION IN FUNDUS IMAGES

Yijin Huang (Southern University of Science and Technology); Weikai Huang (Southern University of Science and Technology); Wenhao Luo (Southern University of Science and Technology); Xiaoying Tang (Southern University of Science and Technology)*

VIEW-DISENTANGLED TRANSFORMER FOR BRAIN LESION DETECTION

Haofeng Li (Shenzhen Research Institute of Big Data, The Chinese University of Hong Kong (Shenzhen))*; Junjia Huang (Sun Yat-Sen University); Guanbin Li (Sun Yat-sen University); Zhou Liu (Cancer Hospital & Shenzhen Hospital, Chinese Academy of Medical Sciences); zhong yihong (Cancer Hospital & Shenzhen Hospital, Chinese Academy of Medical Sciences); Yingying Chen (Cancer Hospital & Shenzhen Hospital, Chinese Academy of Medical Sciences); wang yunfei (Cancer Hospital & Shenzhen Hospital, Chinese Academy of Medical Sciences); Xiang Wan (Shenzhen Research Institute of Big Data, the Chinese University of Hong Kong (Shenzhen))

A LUNG-PARENCHYMA-CONTRAST HYBRID NETWORK FOR EGFR GENE MUTATION PREDICTION IN LUNG CANCER

Meili Liu (Beijing Advanced Innovation Center for Big Data-Based Precision Medicine, School of Medicine and Engineering, Beihang University, Beijing, China); Shuo Wang (Beijing Advanced Innovation Center for Big Data-Based Precision Medicine, School of Medicine, Beihang University); He Yu (Department of Respiratory and Critical Care Medicine, West China Hospital, Sichuan University, Chengdu, China); Yongbei Zhu (Beihang University, Beijing); Liusu Wang (Beijing Advanced Innovation Center for Big Data-Based Precision Medicine, School of Medicine and Engineering, Beihang University, Beijing, China); Mingyu Zhang (Beijing Advanced Innovation Center for Big Data-Based Precision Medicine, School of Medicine and Engineering, Beihang University, Beijing, China); Zhangjie Wu (Beihang University); Xiaohu Li (Department of Radiology, First Affiliated Hospital, Anhui Medical University, Hefei, China); Weimin Li (the West China Hospital of Sichuan University); Jie Tian (CAS Key Laboratory of Molecular Imaging, Institute of Automation, Chinese Academy of Sciences, Beijing, China)*

TRIAGENET: A MULTI-AGENT DIAGNOSIS NETWORK FOR IMBALANCED DATA

Weixiang Chen (Tsinghua University); Jie Zhou (Tsinghua University); Feng Jianjiang (Tsinghua University, China)*

FUZZY STRUCTURAL BROAD LEARNING FOR BREAST CANCER CLASSIFICATION

Tianhong Quan (Shantou University); Ye Yuan (Shantou University); Youyi Song (The Hong Kong Polytechnic University); Teng Zhou (Shantou University)*; Jing Qin (The Hong Kong Polytechnic University)

WEAKLY SUPERVISED LEARNING FOR CELL RECOGNITION IN IMMUNOHISTOCHEMICAL CYTOPLASM STAINING IMAGES

Shichuan Zhang (Westlake University)*; Chenglu Zhu (Westlake University); Honglin Li (Westlake University); Jiatong Cai (Westlake University); Lin Yang (Westlake University)

UNSUPERVISED RETINAL LESION DETECTION BY LEARNING TO RESTORE CORRUPTED FUNDUS IMAGES

Hao Liu (Shanghai Jiao Tong University)*; Yuchen Du (Shanghai Jiao Tong University); Chengyang An (Shanghai Jiao Tong University); Lisheng Wang (Shanghai Jiao Tong University)

WEAKLY SUPERVISED CLASSIFICATION USING MULTI-LEVEL INSTANCE-AWARE OPTIMIZATION ON CERVICAL CYTOLOGIC IMAGE

Chenglu Zhu (Westlake University); YUXUAN SUN (Westlake University); Honglin Li (Westlake University); Can Cui (Westlake University); Shichuan Zhang (Westlake University); Jiatong Cai (Westlake University); Lin Yang (Westlake University)*

3/31/2022

Image segmentation - II

09:45:00 AM - 11:15:00 AM

Poster Hall

Session Type: Poster

HYBRID ATTENTIVE UNET FOR SEGMENTATION OF LOWER LEG MUSCLES AND BONES FROM MRI SCANS FOR MUSCULOSKELETAL RESEARCH

Jiayi Zhu (University of New South Wales; Neuroscience Research Australia)*; Bart Bolsterlee (NeuRA); Brian V. Y. Chow (Neuroscience Research Australia); Yang Song (University of New South Wales); Erik Meijering (University of New South Wales)

SEGTRANSVAE: HYBRID CNN - TRANSFORMER WITH REGULARIZATION FOR MEDICAL IMAGE SEGMENTATION

Quan Dung Pham (VinBrain)*; Hai Nguyen (VinBrain); Nam Phuong Nguyen (VinBrain); Khoa Nguyen (VinBrain); Chanh D Tr Nguyen (VinBrain); Trung Bui (Individual); QUOC HUNG TRUONG (VINBRAIN)

LOCATION-GUIDED COARSE-TO-FINE NETWORK FOR WHOLE HEART SEGMENTATION

xiang zhang (Northwest University of China)*; Xiao Zhang (Northwest University); Hangzai Luo (Northwest University of China); Sheng Zhong (Northwest University); Lei Tang (Xi'an Microelectronics Technology Institute)

CEUSEGNET: A CROSS-MODALITY LESION SEGMENTATION NETWORK FOR CONTRAST-ENHANCED ULTRASOUND

Zheling Meng (CAS Key Laboratory of Molecular Imaging, Institute of Automation, Chinese Academy of Sciences, Beijing, China)*; Yangyang Zhu (Lanzhou University); Jie Tian (CAS Key Laboratory of Molecular Imaging, Institute of Automation, Chinese Academy of Sciences, Beijing, China); Fang Nie (Lanzhou University); Kun Wang (CAS Key Laboratory of Molecular Imaging, Institute of Automation, Chinese Academy of Sciences, Beijing, China)

COUPLING DEEP DEFORMABLE REGISTRATION WITH CONTEXTUAL REFINEMENT FOR SEMI-SUPERVISED MEDICAL IMAGE SEGMENTATION

Ziyang Li (Dalian University Of Technology); Zi Li (Dalian University of Technology); Xin Fan (Dalian University of Technology)*; Risheng Liu (Dalian University of Technology); Zhongxuan Luo (DALIAN UNIVERSITY OF TECHNOLOGY)

RETINAL VESSEL SEGMENTATION WITH PIXEL-WISE ADAPTIVE FILTERS

Mingxing Li (University of Science and Technology of China); Shenglong Zhou (University of Science and Technology of China); Chang Chen (Huawei Noah's Ark Lab); Yueyi Zhang (University of Science and Technology of China)*; Dong Liu (University of Science and Technology of China); Zhiwei Xiong (University of Science and Technology of China)

SEGMENTATION OF MULTIPLE MYELOMA CELLS USING FEATURE SELECTION PYRAMID NETWORK AND SEMANTIC CASCADE MASK RCNN

xinyun qiu (Shenzhen University); Haijun Lei (Shenzhen University); Hai Xie (Shenzhen University); Baiying Lei (Shenzhen University)*

EFFECTIVE 3D BOUNDARY LEARNING VIA A NONLOCAL DEFORMABLE NETWORK

Yueyun Liu (Tianjin University); Yu Wang (Alibaba)*; Yuping Duan (Tianjin University)

DUPLEX CONTEXTUAL RELATION NETWORK FOR POLYP SEGMENTATION

Zijin Yin (Beijing University of Posts and Telecommunications); Kongming Liang (Beijing University of Posts and Telecommunications)*; Zhanyu Ma (Beijing University of Posts and Telecommunications); Jun Guo (Beijing University of Posts and Telecommunications)

CA-MT: A SELF-ENSEMBLING MODEL FOR SEMI-SUPERVISED CARDIAC SEGMENTATION WITH ELLIPTICAL DESCRIPTOR BASED CONTOUR-AWARE

An Xu (Donghua University)*; Shaoyu Wang (Donghua University); Shaoping Ye (Donghua University); Jingyi Fan (Donghua University); xiujin shi (Donghua University); Xiaoling Xia (Donghua University)

EG-TRANS3DUNET: A SINGLE-STAGED TRANSFORMER-BASED MODEL FOR ACCURATE VERTEBRAE SEGMENTATION FROM SPINAL CT IMAGES

Xin You (Shanghai JiaoTong University)*; Yun Gu (Shanghai Jiao Tong University); Jie Yang (Shanghai Jiao Tong University); Yingying Liu (Medtronic Technology Center); Steve Lu (Medtronic Technology Center); Xin Tang (Medtronic Technology Center)

A FEATURE REGULARIZATION BASED META-LEARNING FRAMEWORK FOR GENERALIZING PROSTATE MRI SEGMENTATION

Wang Hui (Beijing University of Posts and Telecommunications); Zheng Zhang (Beijing University of Posts and Telecommunications); Bo Zhang (Beijing University of Posts and Telecommunications)*; Yue Mi (Peking University First Hospital); Jingyun Wu (Peking University First Hospital); Haiwen Huang (Peking University First Hospital); Zibo Ma (Beijing University of Posts and Telecommunications); Wendong Wang (Beijing University of Posts and Telecommunications)



CROSS-LEVEL CONTRASTIVE LEARNING AND CONSISTENCY CONSTRAINT FOR SEMI-SUPERVISED MEDICAL IMAGE SEGMENTATION

Xinkai Zhao (Sun Yat-sen University); Chaowei Fang (Xidian University)*; De-Jun Fan (Sun Yat-sen University); Xutao Lin (The Sixth Affiliated Hospital of Sun Yat-sen University); Feng Gao (the Sixth Affiliated Hospital, Sun Yat-sen University); Guanbin Li (Sun Yat-sen University)

RAPID MODEL TRANSFER FOR MEDICAL IMAGE SEGMENTATION VIA ITERATIVE HUMAN-IN-THE-LOOP UPDATE: FROM LABELLED PUBLIC TO UNLABELLED CLINICAL DATASETS FOR MULTI-ORGAN SEGMENTATION IN CT

Wenao Ma (The Chinese University of Hong Kong)*; shuang zheng (Jilin University); Lei Zhang (Jilin University); huimao zhang (Jilin University); DOU QI (The Chinese University of Hong Kong)

3/31/2022

Image Synthesis and Enhancement
09:45:00 AM - 11:15:00 AM

Poster Hall

Session Type: Poster

GAN-BASED REALISTIC GASTROINTESTINAL POLYP IMAGE SYNTHESIS

Ataher Sams (Bangladesh University of Engineering and Technology)*; Homaira Huda Shomee (BRAC University)

DEEP NON-LINEAR EMBEDDING DEFORMATION NETWORK FOR CROSS-MODAL BRAIN MRI SYNTHESIS

yang lin (Chinese Academy of Sciences)*; Hu Han (Institute of Computing Technology, Chinese Academy of Sciences); S. Kevin Zhou (USTC)

SEMI-SUPERVISED PSEUDO-HEALTHY IMAGE SYNTHESIS VIA CONFIDENCE AUGMENTATION

Yuanqi Du (George Mason University)*; Quan Quan (Institute of Computing Technology, Chinese Academy of Sciences); Hu Han (Institute of Computing Technology, Chinese Academy of Sciences); S. Kevin Zhou (USTC)

SINGLE VOLUME LUNG BIOMECHANICS FROM CHEST COMPUTED TOMOGRAPHY USING A MODE PRESERVING GENERATIVE ADVERSARIAL NETWORK

Muhammad Faizyab Ali Chaudhary (University of Iowa)*; Sarah Gerard (Harvard Medical School); Di Wang (University of Iowa); Gary E Christensen (Iowa); Christopher Cooper (University of California Los Angeles); Joyce Schroeder (University of Utah);

Eric Hoffman (University of Iowa); Joseph Reinhardt (University of Iowa)

SAMPLE ALIGNMENT FOR IMAGE-TO-IMAGE TRANSLATION BASED MEDICAL DOMAIN ADAPTATION

Heng Li (Southern University of Science and Technology)*; Haofeng Liu (Southern University of Science and Technology); Xiaoxuan Wang (Southern University of Science and Technology); Chenlang Yi (Southern University of Science and Technology); Hao Chen (The Chinese University of Hong Kong); Yan Hu (Southern University of Science and Technology); Jiang Liu (Southern University of Science and Technology)

ADVERSARIAL RESIDUAL TRANSFORMERS FOR MULTI-MODAL MEDICAL IMAGESYNTHESIS

Onat Dalmaz (Bilkent University)*; Mahmut Yurt (Stanford University); Tolga Cukur (Bilkent University)

NEURAL RADIANCE PROJECTION

Ngoc Huy Pham (Talosis); Tran Minh Quan (VinUniversity)*

SUPER-RESOLUTION IMAGING WITH LOCALIZATION OPTOACOUSTIC TOMOGRAPHY (LOT)

Xose-Luis Dean Ben (ETH Zurich/University of Zurich)*

3/31/2022

Medical image analysis
09:45:00 AM - 11:15:00 AM

Poster Hall

Session Type: Poster

FEATURE FUSION FOR SEGMENTATION AND CLASSIFICATION OF SKIN LESIONS

Zhang Yue (Peking University)*; Zifan Chen (Peking University); Hao Yu (Peking University); Xinyu Yao (PEKING UNIVERSITY FIRST HOSPITAL); HONGFENG LI (Peking University)

DEEP HIERARCHICAL MULTIPLE INSTANCE LEARNING FOR WHOLE SLIDE IMAGE CLASSIFICATION

Yuanpin Zhou (Sun Yat-sen University); Yao Lu (Sun Yat-sen University)*



**LOW-SHOT EARLY GASTRIC CANCER
DIAGNOSTIC MODEL DRIVEN BY
UNSUPERVISED FEATURES**

Lixin Gong (College of Medicine and Biological Information Engineering School, Northeastern University); Hongping Zhou (Endoscopy Center and Endoscopy Research Institute, Zhongshan Hospital of Fudan University); Di Dong (CAS Key Laboratory of Molecular Imaging, Institute of Automation, Chinese Academy of Sciences); Hao Hu (Endoscopy Center and Endoscopy Research Institute, Zhongshan Hospital); Jie Tian (CAS Key Laboratory of Molecular Imaging, Institute of Automation, Chinese Academy of Sciences, Beijing, China)*

**MPTGAN: A MULTIMODAL PRIOR-BASED
TRIPLE-BRANCH NETWORK FOR FAST
PROSTATE MRI RECONSTRUCTION**

Shuo Yan (Beijing University of Post and Telecommunications); Zheng Zhang (Beijing University of Posts and Telecommunications); Bo Zhang (Beijing University of Posts and Telecommunications)*; Yue Mi (Peking University First Hospital); Jingyun Wu (Peking University First Hospital); Haiwen Huang (Peking University First Hospital); Xirong Que (Beijing University of Posts and Telecommunications); Wendong Wang (Beijing University of Posts and Telecommunications)

**UNSUPERVISED DOMAIN ADAPTATION FOR
CROSS-MODALITY RETINAL VESSEL
SEGMENTATION VIA DISENTANGLING
REPRESENTATION STYLE TRANSFER AND
COLLABORATIVE CONSISTENCY LEARNING**

Linkai Peng (Department of Electrical and Electronic Engineering, Southern University of Science and Technology); Li Lin (Southern University of Science and Technology; The University of Hong Kong); Pujin Cheng (Southern University of Science and Technology); Ziqi Huang (Department of Electrical and Electronic Engineering, Southern University of Science and Technology); Xiaoying Tang (Southern University of Science and Technology)*

**A RESOURCE-EFFICIENT DEEP LEARNING
FRAMEWORK FOR LOW-DOSE BRAIN PET
IMAGE RECONSTRUCTION AND ANALYSIS**

Yu Fu (Zhejiang University); Shunjie Dong (Zhejiang University); Yi Liao (Zhejiang University); Le Xue (Zhejiang University); Yuanfan Xu (Hangzhou Universal Medical Imaging Diagnostic Center); Feng Li (Hangzhou Universal Medical Imaging Diagnostic Center); Qianqian Yang (Zhejiang University); Tianbai Yu (Zhejiang University); Mei Tian (Zhejiang University); Cheng Zhuo (Zhejiang University)*

**DUAL ENCODING FUSION FOR ATYPICAL LUNG
NODULE SEGMENTATION**

Weixin Xu (Chongqing University)*; Yun Xing (University of Alberta); Yuting Lu (Chongqing University); Jingkai Lin (Chongqing University); Xiaohong Zhang (Chongqing University)

**GLOBAL-LOCAL ATTENTION NETWORK FOR
WEAKLY SUPERVISED CERVICAL CYTOLOGY
ROI ANALYSIS**

Jun Shi (Hefei University of Technology)*; Kun Wu (Hefei University of Technology); Yushan Zheng (Beihang University); Yuxin He (Hefei University of Technology); Jun Li (Beihang University); Zhiguo Jiang (Beijing University); Lanlan Yu (Motic (Xiamen) Medical Diagnostic Systems Co. Ltd.)

**AN EXCEEDINGLY SIMPLE CONSISTENCY
REGULARIZATION METHOD FOR SEMI-
SUPERVISED MEDICAL IMAGE SEGMENTATION**

Hritam Basak (Jadavpur University)*; Rajarshi Bhattacharya (Department of Electrical Engineering, Jadavpur University); Rukhshanda Hussain (Jadavpur University); Agniv Chatterjee (Jadavpur University)

**INCREMENTAL LEARNING FOR A FLEXIBLE
CAD SYSTEM DESIGN**

Prathyusha Akundi (International Institute of Information and Technology Hyderabad (IIITH))*; Jayanthi Sivaswamy (International Institute of Information Technology Hyderabad)

**GADOLINIUM-FREE CROHN'S DISEASE
ASSESSMENT FROM MAGNETIC RESONANCE
ENTEROGRAPHY DATA**

Yaniv Ziselman (Technion)*; Moti Freiman (Technion - Israel Institute of Technology); Faten Haj ali Shinnawi (Hillel Yaffe Medical center); Mary Louise Greer (The Hospital for Sick Children, University of Toronto); Gili Focht (Shaare Zedek Medical Center, The Hebrew University of Jerusalem); Dan Turner (Shaare Zedek Medical Center, Juliet Keidan Institute of Paediatric Gastroenterology and Nutrition, The Hebrew University of Jerusalem, Jerusalem, Israel)

**AUTOMATIC CEPHALOMETRIC LANDMARK
DETECTION ON X-RAY IMAGES USING OBJECT
DETECTION**

Cheng Ho King (National Chung Cheng University)*



G-RMOS: GPU-ACCELERATED RIEMANNIAN METRIC OPTIMIZATION ON SURFACES

Jo Jeong Won (Pusan National University); Jin Kyu Gahm (Pusan National University)*

3/31/2022

Coffee Break

10:45:00 AM - 11:15:00 AM

3/31/2022

Plenary

11:30:00 AM - 12:30:00 PM

Bengal Stateroom 5

Chair: Ananda S. Chowdhury (Jadavpur University, India)

ROLE OF QUANTITATIVE IMAGING IN ASSESSING TREATMENT RESPONSE IN CANCER AND REGENERATIVE MEDICINE

Harish Poptani

Chair, Centre for Preclinical Imaging, University of Liverpool

3/31/2022

Lunch Break

12:30:00 PM - 02:00:00 PM

3/31/2022

Young-Professional Activity: Lunch with Leaders (Onsite Only)

12:30:00 PM - 02:00:00 PM

Bengal Stateroom 2

3/31/2022

Image Registration

03:45:00 PM - 05:15:00 PM

Poster Hall

Session Type: Poster

HYBRID ATLAS BUILDING WITH DEEP REGISTRATION PRIORS

Nian Wu (East China Normal University)*; Jian Wang (University of Virginia); Miaomiao Zhang (University of Virginia); Yaxin Peng (Department of Mathematics, School of Science, Shanghai University); Guixu Zhang (East China Normal University); Chaomin Shen (East China Normal University)

DESIGN AND FABRICATION OF 3D-PRINTED OVARIAN MOLD FOR HUBMAP

Olivia F Sandvold (University of Pennsylvania)*; Kate da Silva (California State University Fullerton); Alison Pouch (UPenn); James Gee (University of

Pennsylvania); Sarah Johnston (University of Pennsylvania); Kathleen O'Neill (University of Pennsylvania); Junhyong Kim (University of Pennsylvania)

IMAGE-BASED GEOMETRIC CALIBRATION OF A HYBRID CT SYSTEM WITH A FLAT PHOTON-COUNTING DETECTOR INSERT IN A STANDARD CT SCANNER

Dakota H King (Imaging Physics Laboratory, National Heart, Lung, and Blood Institute, National Institutes of Health)*

FUSION-BASED MULTIMODAL MEDICAL IMAGE REGISTRATION COMBINING INTER-MODALITY METRIC AND DISENTANGLEMENT

Yu Ji (Shandong University); Zhenyu Zhu (Shandong University); Ying Wei (Shandong University)*

MULTI-MODAL UNSUPERVISED BRAIN IMAGE REGISTRATION USING EDGE MAPS

Vasiliki Sideri-Lampretsa (Technische Universität München)*; Georgios Kaissis (Technische Universität München); Daniel Rueckert (Technische Universität München)

EFFICIENT Diffeomorphic Image REGISTRATION USING MULTI-SCALE DUAL-PHASED LEARNING.

Ankita P Joshi (University of Georgia, Athens); Yi Hong (Shanghai Jiao Tong University)*

BIDMIR: BI-DIRECTIONAL MEDICAL IMAGE REGISTRATION WITH SYMMETRIC ATTENTION AND CYCLIC CONSISTENCY REGULARIZATION

Xiaoru Gao (Shanghai Jiao Tong University); Rong Tao (Shanghai Jiao Tong University); Guoyan Zheng (Shanghai Jiao Tong University)*

A DEEP RESIDUAL LEARNING IMPLEMENTATION OF METAMORPHOSIS

Matthis Maillard (Télécom Paris)*; Anton François (Université de Paris); Joan Glaunès (Université Paris 5); Isabelle Bloch (Télécom Paris); Pietro Gori (Télécom Paris)

BREATHING-COMPENSATED NEURAL NETWORKS FOR REAL TIME C-ARM POSE ESTIMATION IN LUNG CT-FLUOROSCOPY REGISTRATION

Brian Lee (Philips Research North America)*; Ayushi Sinha (Philips Research North America); Nicole Varble (Philips Research North America); William Pritchard (NIH); John W. Karanian (NIH); Bradford J



Wood (National Institutes of Health); Torre Bydlon (Philips Cambridge Innovation Labs)

A META-LEARNING APPROACH FOR MEDICAL IMAGE REGISTRATION

Heejung Park (DGIST); Gyeongmin Lee (DGIST); SOOPIL KIM (DGIST); Ga Hyung Ryu (Department of Ophthalmology, Yeungnam University College of Medicine); Areum Jeong (Department of Ophthalmology, Yeungnam University College of Medicine); Min Sagong (Department of Ophthalmology, Yeungnam University College of Medicine); Sanghyun Park (DGIST)*

EVALUATION AND TESTING COMPONENTS IN MONAI IMPLEMENTATION OF DEEP LEARNING-BASED REGISTRATION

Yiwen Li (University of Oxford)*; Yipeng Hu (University College London); Tom Vercauteren (King's College London); Wenqi Li (NVIDIA)

3/31/2022

Medical image analysis

03:45:00 PM - 05:15:00 PM

Poster Hall

Session Type: Poster

LONG-RANGE 3D SELF-ATTENTION FOR MRI PROSTATE SEGMENTATION

Federico Pollastri (Università degli Studi di Modena e Reggio Emilia); Marco Cipriano (Università degli Studi di Modena e Reggio Emilia); Federico Bolelli (Università degli Studi di Modena e Reggio Emilia)*; Costantino Grana (University of Modena and Reggio Emilia)

DEEP LEARNING-BASED DIFFUSION MRI ANALYSIS SOFTWARE

Yoshitaka Masutani (Hiroshima City University)*

DPE-BOTNET : DUAL POSITION ENCODING BOTTLENECK TRANSFORMER NETWORK FOR SKIN LESION CLASSIFICATION

Katsuhiro Nakai (Yamaguchi University)*; Xian-Hua Han (Yamaguchi University)

MULTI-PLANAR T2W MRI FOR AN IMPROVED PROSTATE CANCER LESION CLASSIFICATION

Alvaro F Quilez (University of Stavanger)*; Ketil Oppedal (University of Stavanger); Trygve Eftestøl (University of Stavanger); Morten Goodwin (University of Agder); Svein Reidar Kjosavik (Stavanger University Hospital)

DEMONSTRATING THE RISK OF IMBALANCED DATASETS IN CHEST X-RAY IMAGE-BASED

DIAGNOSTICS BY PROTOTYPICAL RELEVANCE PROPAGATION

Srishti Gautam (UiT The Arctic University of Norway)*; Marina M.-C. Höhne (TU Berlin); Stine Hansen (UiT The Arctic University of Norway); Robert Jenssen (UiT - The Arctic University of Norway); Michael C. Kampffmeyer (UiT The Arctic University of Norway)

CONTRASTING AXIAL T2W MRI FOR PROSTATE CANCER TRIAGE: A SELF-SUPERVISED LEARNING APPROACH

Alvaro F Quilez (University of Stavanger)*; Ketil Oppedal (University of Stavanger); Trygve Eftestøl (University of Stavanger); Svein Reidar Kjosavik (Stavanger University Hospital); Morten Goodwin (University of Agder)

MULTI-CLASS BRAIN TUMOR SEGMENTATION VIA 3D AND 2D NEURAL NETWORKS

Sergey Pnev (NSU)*; Vladimir Groza (NSU); Bair Tuchinov (Novosibirsk State University); Evgeniya Amelina (Novosibirsk State University); Evgeniy N Pavlovskiy (Novosibirsk State University); Nikolay Y Tolstokulakov (Novosibirsk State University); Mihail Amelin (Novosibirsk State University); Sergey Golushko (Novosibirsk State University); Andrey Letyagin (Research Institute of Clinical and Experimental Lymphology, Branch of IC&G SBRAS)

END-TO-END FIRST TRIMESTER FETAL ULTRASOUND VIDEO AUTOMATED CRL AND NT SEGMENTATION.

Robail Yasrab (University of Oxford)*; Zeyu Fu (University of Oxford); Lior Drukker (University of Oxford); Lok hin Lee (University of Oxford); He Zhao (University of Oxford); Aris Papageorgiou (University of Oxford); Alison Noble (University of Oxford)

AUTOMATED RETINAL IMAGING ANALYSIS FOR ALZHEIMER'S DISEASE SCREENING

Oana M. Dumitrascu (Department of Neurology, Mayo Clinic); Wenhui Zhu (Arizona State University)*; Peijie Qiu (Washington University in St. Louis, St. Louis); Keshav Nandakumar (Arizona State University); Yalin Wang (Arizona State University)

FACILE PREDICTION OF NEUTROPHIL ACTIVATION STATE FROM MICROSCOPY IMAGES: A NEW DATASET AND COMPARATIVE DEEP LEARNING APPROACHES

Wei Liao (MIT)*; Ching-Yun Ko (MIT); Lily Weng (UCSD); Luca Daniel (Massachusetts Institute of Technology)



Technology); Joel Voldman (Massachusetts Institute of Technology)

DUAL ATTENTION-BASED MULTI-INSTANCE LEARNING FOR REFERABLE DIABETIC RETINOPATHY

Wenhui Zhu (Arizona State University)*; Peijie Qiu (Washington University in St. Louis, St. Louis); Oana M Dumitrascu (Department of Neurology, Mayo Clinic); Yalin Wang (Arizona State University)

TRANSFORMER GRAPH NETWORK FOR CORONARY PLAQUE LOCALIZATION IN CCTA

Mario Viti (Centrale Supélec Centre vision numérique INRIA)*; Hugues Talbot (Université Paris-Saclay); Nicolas Gogin (GE Healthcare)

CELL INSTANCE SEGMENTATION USING Z-STACKS IN DIGITAL CYTOLOGY

Alexandre Bouyssoux (Institut Pasteur)*; Riadh Fezzani (VitaDX International); Jean-christophe Olivo-Marin (Institut Pasteur)

3/31/2022

Computer-aided diagnosis - II

03:45:00 PM - 05:15:00 PM

Poster Hall

Session Type: Poster

SEMI-SUPERVISED TUMOR RESPONSE GRADE CLASSIFICATION FROM HISTOLOGY IMAGES OF COLORECTAL LIVER METASTASES

Mohamed El Amine Elforaici (Polytechnique Montréal); Emmanuel Montagnon (Centre Hospitalier Université Montréal); Feyrel Azzi (Centre Hospitalier Université Montréal); Dominique Trudel (Centre Hospitalier Université Montréal); Bich Nguyen (Centre Hospitalier Université Montréal); Simon Turcotte (Centre Hospitalier Université Montréal); An Tang (Centre Hospitalier Université Montréal); Samuel Kadoury (Polytechnique Montréal)*

EVALUATION OF AN AUTOMATED METHOD TO DETECT MISSED FOCAL LIVER FINDINGS IN SINGLE-PHASE CT IMAGES OF THE ABDOMEN

Pedro L Esquinas Fernandez (IBM Watson Health)*; Yen-Fu Luo (IBM Watson Health); Parisa Farzam (IBM Watson Health); Tyler Baldwin (IBM Research); Moshiko Raboh (IBM Research); Thomas Binder (DeepMove); Arkadiusz Sitek (Sano Centre for Computational Medicine); Omid Sakhi (IBM Watson Health); Yi-Qing Wang (IBM Watson Health Imaging); Sameer Suman (IBM Watson Health); Giovanni Palma (IBM Watson Health Imaging); Paul

Dufort (IBM Watson Health Imaging); Benedikt Graf (IBM Watson Health Imaging)

CHARACTERIZATION OF ISUP ≥ 2 PROSTATE CANCER AT MULTIPARAMETRIC MRI: DEVELOPMENT AND ASSESSMENT OF THE ACCURACY OF A ZONE-SPECIFIC COMPUTER-AIDED DIAGNOSIS SYSTEM IN AN EXTERNAL DATASET

Tristan Jaouen (INSERM)*; Rémi Souchon (INSERM); Olivier Rouvière (Hospices Civils de Lyon, Département de Radiologie, INSERM); Florian Di Franco (Hospices Civils de Lyon, Département de Radiologie); Au Hoang Dinh (INSERM); Audrey Duran (CREATIS); Paul-Cezar Moldovan (Hospices Civils de Lyon, Département d'Urologie); Flavie Bratan (Centre Hospitalier Saint-Joseph Saint-Luc, Département d'Imagerie Diagnostique et Interventionnelle); Alain Ruffion (Hospices Civils de Lyon, Département d'Urologie); Marc Colombel (Hospices Civils de Lyon, Département d'Urologie); Sébastien Crouzet (Hospices Civils de Lyon, Département d'Urologie, INSERM); Christelle Gonindard-Melodelima (Université Grenoble Alpes, Laboratoire d'écologie Alpine)

PERFUSION IMAGING IN DEEP PROSTATE CANCER DETECTION FROM MP-MRI: CAN WE TAKE ADVANTAGE OF IT?

Audrey Duran (CREATIS)*; Gaspard Dussert (CREATIS); Carole Lartzien (CREATIS)

PNEUMONIA DETECTION WITH SEMANTIC SIMILARITY SCORES

Rahil Gholamipoorfar (HHU)*; Nima Rafiee (Heinrich Heine University); Markus Kollmann (HHU)

LUNG CANCER IDENTIFICATION VIA DEEP LEARNING: A MULTI-STAGE WORKFLOW

Irene Canavesi (Politecnico di Milano)*; Eleonora D'Arnese (Politecnico di Milano); Sara S.C. Caramaschi (Politecnico di Milano); Marco Domenico Santambrogio (Politecnico di Milano)

ON THE IMPACT OF SELF-SUPERVISED LEARNING IN SKIN CANCER DIAGNOSIS

Maria R Verdelho (Institute for Systems and Robotics, Instituto Superior Técnico, Lisboa, Portugal)*; Catarina Barata (Institute for Systems and Robotics, Instituto Superior Técnico)

DIABETIC RETINOPATHY DIAGNOSTIC CAD SYSTEM USING 3D-OCT HIGHER ORDER SPATIAL APPEARANCE MODEL

Mohamed Elsharkawy (University of Louisville)*; Ahmed Sharafeldein (University of Louisville);



Ahmed Soliman (University of Louisville); Fahmi Khalifa (University of Louisville); Mohammed Ghazal (Abu Dhabi University); Eman El Daydamony (Mansoura University); Ahmed Atwan (Mansoura University); Harpal Sandhu (Department of Ophthalmology, School of Medicine, University of Louisville, KY); Ayman S El-Baz (University of Louisville)

SHARP-GAN: SHARPNESS LOSS REGULARIZED GAN FOR HISTOPATHOLOGY IMAGE SYNTHESIS

Sujata Butte (University of Idaho); Haotian Wang (University of Idaho); Min Xian (University of Idaho)*; Aleksandar Vakanski (University of Idaho)

ADVIT: VISION TRANSFORMER ON MULTI-MODALITY PET IMAGES FOR ALZHEIMER DISEASE DIAGNOSIS

Xin Xing (University of Kentucky)*; Gongbo Liang (Eastern Kentucky University); Yu Zhang (University of Kentucky); Subash Khanal (University of Kentucky); Ai-Ling Lin (University of Missouri); Nathan Jacobs (University of Kentucky)

3/31/2022

Classification

03:45:00 PM - 05:15:00 PM

Poster Hall

Session Type: Poster

DEEP FUSION OF ULTRASOUND VIDEOS FOR FUROSEMIDE CLASSIFICATION

Safwan Wshah (University of Vermont)*; Beilei Xu (University of Rochester); Jason Bates (University of Vermont); Katelin Morrisette (University of Vermont Medical Center)

UNCERTAINTY-AWARE DEEP ENSEMBLE MODEL FOR TARGETED ULTRASOUND-GUIDED PROSTATE BIOPSY

Fahimeh Fooladgar (University of British Columbia)*; Minh Nguyen Nhat To (University of British Columbia); Golar Javadi (University of British Columbia); Samareh Samadi (University of British Columbia); Sharareh Bayat (University of British Columbia); Samira Sojoudi (University of British Columbia); Walid Eshumani (University of British Columbia); Antonio Hurtado-coll (VGH); Silvia Chang (VCH); Peter Black (Vancouver Prostate Centre); Parvin Mousavi (Queen's University); Purang Abolmaesumi (The Univ. of British Columbia)

ADDFORMER: ALZHEIMER'S DISEASE DETECTION FROM STRUCTURAL MRI USING FUSION TRANSFORMER

Rafsanjany Kushol (University of Alberta)*; Abbas Masoumzadeh (University of Alberta); Dong Huo (University of Alberta); Sanjay Kalra (University of Alberta); Herbert Yang (University of Alberta)

ADDITIVE ANGULAR MARGIN LOSS AND MODEL SCALING NETWORK FOR OPTIMISED COLITIS SCORING

Ziang Xu (University of Oxford)*; Sharib Ali (University of Oxford); James East (University of Oxford); Jens Rittscher (Oxford)

IMPROVED HISTOLOGY IMAGE CLASSIFICATION UNDER LABEL NOISE VIA FEATURE AGGREGATING MEMORY BANKS

Nikhil C Kurian (Indian Institute of Technology Bombay)*; Varsha S (Indian Institute of Technology Bombay); Akshay Bajpai (Indian Institute of Technology Bombay); Sunil M Patel (Nvidia); Amit Sethi (Indian Institute of Technology Bombay)

PREDICTION OF COGNITIVE SCORES BY MOVIE-WATCHING FMRI CONNECTIVITY AND EYE MOVEMENT VIA SPECTRAL GRAPH CONVOLUTIONS

Jiaxing Gao (Northwestern Polytechnical University)*; Changhe Li (Northwestern Polytechnical University); Zhibin He (Northwestern Polytechnical University); Wei YaoNai (Northwestern Polytechnical University); Lei Guo (NWPU, China); Junwei Han (NWPU, China); Shu Zhang (Northwestern Polytechnical University); Tuo Zhang (Northwestern Polytechnical University)

A METHOD OF WEAK-SUPERVISED MORPHOLOGY CLASSIFICATION FOR IMPRINT CYTOLOGY OF BREAST CANCER

Shigeto Seno (Osaka University)*; Yukito Nagano (Osaka University); Tomonori Tanei (Osaka University); Yoshiaki Sota (Osaka University); Hideo Matsuda (Osaka University)

MSRT: MULTI-SCALE SPATIAL REGULARIZATION TRANSFORMER FOR MULTI-LABEL CLASSIFICATION IN CALCANEUS RADIOGRAPH

Yuxuan Mu (Beijing Institute of Technology); He Zhao (Beijing Institute of Technology); Jia Guo (Beijing Institute of Technology); Huiqi Li (Beijing Institute of Technology)*

**IMPROVING HUMAN SPERM HEAD
MORPHOLOGY CLASSIFICATION WITH
UNSUPERVISED ANATOMICAL FEATURE
DISTILLATION**

YeJia Zhang (University of Notre Dame); Jingjing Zhang (First Affiliated Hospital of Anhui Medical University); Zha Xiaomin (Affiliated Hospital of Anhui Medical University); Zhou yiru (First Affiliated Hospital of Anhui Medical University); Yunxia Cao (Anhui Medical University); Danny Z Chen (University of Notre Dame)*

**ENHANCED MOTOR IMAGERY-BASED EEG
CLASSIFICATION USING A DISCRIMINATIVE
GRAPH FOURIER SUBSPACE**

Maliheh Miri (Yazd University); vahid abootalebi (yazd University); Hamid Behjat (Lund University)*

3/31/2022

**Special Session: Biomedical imaging for
equitable deep learning, regulatory science and
clinical research**

05:30:00 PM - 07:00:00 PM

Bengal Stateroom 5

Session Type: Special Session

ACHIEVING EQUITY IN AI

Jenna Lester (University of California San Francisco)

AI/ML-ENABLED MEDICAL DEVICES

Jana Delfino (United States Food and Drug Administration)

DIGITAL HEALTH AT DHCOE

Vinay Pai (United States Food and Drug Administration)

**EQUITABLE DEEP LEARNING FOR
REGULATORY SCIENCE AND CLINICAL
RESEARCH FOR IMPROVING HEALTH
OUTCOMES IN PATIENTS**

Pratik Shah (Massachusetts Institute of Technology)

3/31/2022

**Special Session: Clinical and Translational
Medicine**

05:30:00 PM - 07:00:00 PM

Bengal Stateroom 2

Session Type: Special Session

Chair: Jayavardhana Gubbi, Tata Consultancy
Services Research, India

**CHALLENGES AND OPPORTUNITIES FOR AI IN
ABDOMINAL RADIOLOGY**

Dr. Ronald Summers (National Institutes of Health)

**ENABLING PRECISION AI IN HEALTHCARE: AN
INDUSTRY PERSPECTIVE**

Dr. Rakesh Mullick (GE Healthcare India)

3/31/2022

Closing Remarks & ISBI 2022 Presentation

07:00:00 PM - 07:15:00 PM

Bengal Stateroom 5



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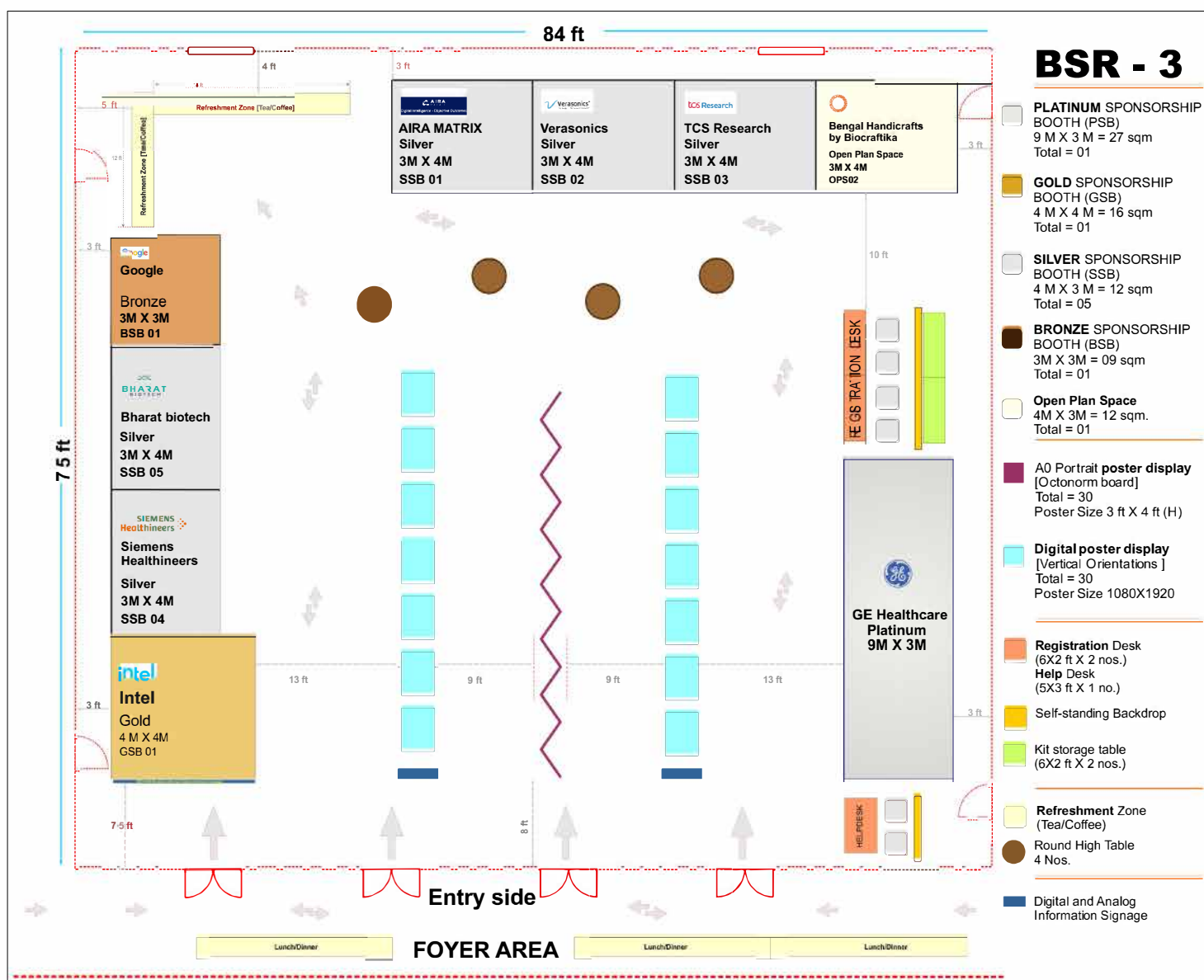
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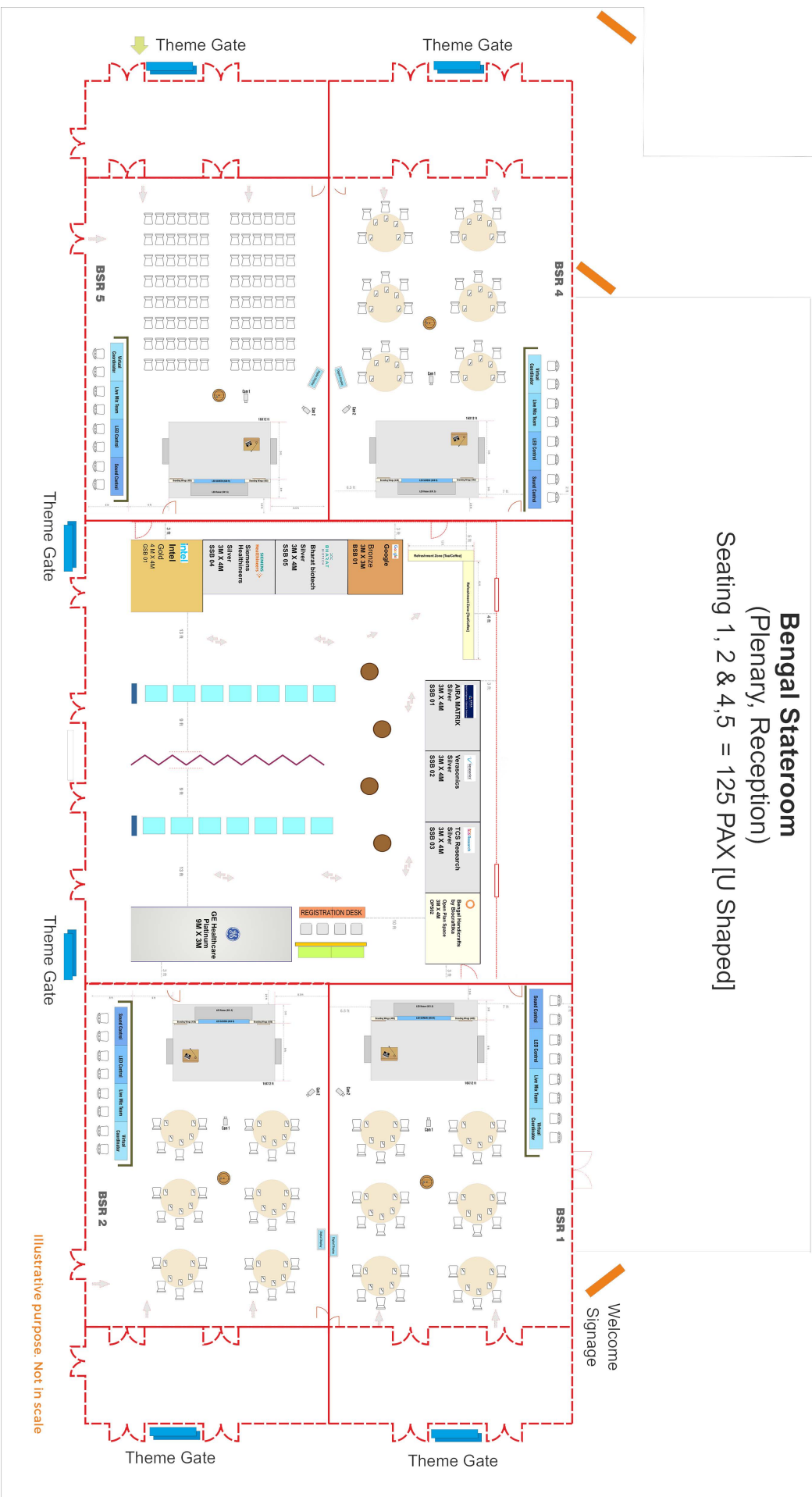
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Submission deadline: 27 Oct 2022
Notification: 19 Jan 2023
Camera ready: 23 Feb 2023

1-page abstracts

Submission deadline: 26 Jan 2023
Notification: 09 Feb 2023

Pitch competition

Submission deadline: 26 Jan 2023
Notification: 09 Feb 2023

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