Lecture Notes in Computer Science **13939**

Founding Editors

Gerhard Goos
Juris Hartmanis

Editorial Board Members

Elisa Bertino, *Purdue University, West Lafayette, IN, USA*
Wen Gao, *Peking University, Beijing, China*
Bernhard Steffen, *TU Dortmund University, Dortmund, Germany*
Moti Yung, *Columbia University, New York, NY, USA*

The series Lecture Notes in Computer Science (LNCS), including its subseries Lecture Notes in Artificial Intelligence (LNAI) and Lecture Notes in Bioinformatics (LNBI), has established itself as a medium for the publication of new developments in computer science and information technology research, teaching, and education.

LNCS enjoys close cooperation with the computer science R & D community, the series counts many renowned academics among its volume editors and paper authors, and collaborates with prestigious societies. Its mission is to serve this international community by providing an invaluable service, mainly focused on the publication of conference and workshop proceedings and postproceedings. LNCS commenced publication in 1973.

Alejandro Frangi · Marleen de Bruijne ·
Demian Wassermann · Nassir Navab
Editors

Information Processing in Medical Imaging

28th International Conference, IPMI 2023
San Carlos de Bariloche, Argentina, June 18–23, 2023
Proceedings

Springer

Editors
Alejandro Frangi
University of Leeds
Leeds, UK

Marleen de Bruijne
University of Copenhagen
Copenhagen, Denmark

Demian Wassermann
Inria Saclay - Île-de-France Research Centre
Palaiseau, France

Nassir Navab
Technical University of Munich Garching
Munich, Bayern, Germany

ISSN 0302-9743 ISSN 1611-3349 (electronic)
Lecture Notes in Computer Science
ISBN 978-3-031-34047-5 ISBN 978-3-031-34048-2 (eBook)
https://doi.org/10.1007/978-3-031-34048-2

© The Editor(s) (if applicable) and The Author(s), under exclusive license
to Springer Nature Switzerland AG 2023

This work is subject to copyright. All rights are reserved by the Publisher, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, reuse of illustrations, recitation, broadcasting, reproduction on microfilms or in any other physical way, and transmission or information storage and retrieval, electronic adaptation, computer software, or by similar or dissimilar methodology now known or hereafter developed.
The use of general descriptive names, registered names, trademarks, service marks, etc. in this publication does not imply, even in the absence of a specific statement, that such names are exempt from the relevant protective laws and regulations and therefore free for general use.
The publisher, the authors, and the editors are safe to assume that the advice and information in this book are believed to be true and accurate at the date of publication. Neither the publisher nor the authors or the editors give a warranty, expressed or implied, with respect to the material contained herein or for any errors or omissions that may have been made. The publisher remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

This Springer imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Preface

The Information Processing in Medical Imaging (IPMI) Conference series has a long-standing history and tradition. Since 1969, the conference took place on either side of the Atlantic and was organised in Asia for the first time in 2019. IPMI 2023 (https://www.ipmi2023.org), the twenty-eighth conference in the series, was the first in Latin America. The conference was held from June 18th to 23rd at Huinid Pioneros Hotel in San Carlos de Bariloche, Argentina.

Through the years, IPMI became a biennial beacon of foundational computational methods for medical imaging. IPMI's distinctive small-audience format enables extensive discussion time for selected oral presentations. The conference has a retreat-like ambience, which promotes a more intimate exchange and building personal and mentoring relationships across generations from our community.

IPMI 2023 featured traditional study groups, small groups of delegates who scrutinise manuscripts before their oral presentation. This leads to thorough debates enriching the authors and broader audience. Historically, discussions on each paper kick-start with early career delegates in each study group to elicit inclusive participation. Thus, every session becomes a forum for sharing, encouraging, and challenging new ideas.

For this year's edition, we received 240 submissions, of which 169 papers went through the double-blind peer review system, being evaluated by at least three reviewers each. Following the reviewing process, each manuscript having at least one weak accept in its reviews was evaluated by two or more members of the Paper Selection Committee and subsequently discussed at the paper selection meeting. Finally, 63 submissions were accepted for publication and presentation at the conference, resulting in a 26.

Three excellent keynote speakers joined us virtually. Gitta Kutyniok (Ludwig Maximilians Universität München), Petar Veličković (DeepMind), and Jong Chul Ye (Korea Advanced Institute of Science & Technology) enlightened us with various talks on the foundations of modern information processing ranging from the mathematics of machine learning to geometric deep learning and diffusion models in inverse problems in imaging.

The François Erbsmann Prize is awarded every edition to a young scientist of age 35 or below, the first author of a paper, giving their first oral presentation at IPMI. The prize was awarded to one of the 18 eligible oral presenters, and awards were given for the best poster presentations.

The IPMI 2023 Organising Team wants to express special gratitude to the Paper Selection Committee and the 186 reviewers, who did an outstanding job reviewing submissions, consolidating decisions, and designing the programme. We thank Albert Chung, Archana Venkataraman, Diana Mateus, Herve Lombaert, Ipek Oguz, Juan Eugenio Iglesias, Kaleem Siddiqi, Kevin Zhou, and Xavier Pennec, who decided on each paper based on the available reviews and thorough committee discussions. We also thank Andreas Maier, Ipek Oguz, and Archana Venkataraman for their leadership in organising the Study Groups and all the study group leaders. We also express our gratitude to Haoran Dou, Azade Farshad, and Yan Xia for their tireless work as Executive

Assistants to the chairs. We are also indebted to Enzo Ferrante and Ariel Curiale for their engagement from its conception in IPMI 2023 and for their support with all the challenges of organising IPMI across the Atlantic. Finally, we are indebted to the team of Dekon Group, particularly to Mustafa Bay, Meltem Çakmak, and Mehmet Eldegez for their organisational support. This conference would not have been possible without the help of such a great team of colleagues. One of the defining priorities throughout the organisation was to maximise diversity across career stages, gender, and geographical spread in our Organising Committee, Paper Selection Committee, Study Groups, and generally wherever possible.

We have been delighted to organise IPMI 2023 and hope that the scientific and social activities programme made this conference an unforgettable experience. We hope that IPMI 2023, surrounded by the Andes mountain range and unique Patagonian lakes and forests, was an event conducive to scientific exchange and collegial sharing and challenging of ideas, which contributed to international cooperation, scientific progress, and understanding, and to nurturing of the next generation of researchers in information processing in medical imaging.

June 2023

Alejandro Frangi
Marleen de Bruijne
Demian Wassermann
Nassir Navab

Organization

General Chairs

Alejandro F. Frangi	University of Leeds, UK – KU Leuven, Belgium
Marleen de Bruijne	Erasmus MC Rotterdam, The Netherlands –University of Copenhagen, Denmark

Program Chairs

Demian Wassermann	Inria Saclay Île-de-France, CEA NeuroSpin, Université Paris-Saclay, France
Nassir Navab	Technische Universitat München, Germany

Local Chairs

Enzo Ferrante	CONICET, Universidad Nacional del Litoral, Argentina
Ariel Curiale	CONICET, Centro Atómico Bariloche, Instituto Balseiro, Argentina

Executive Assistants to Chairs

Haoran Dou	University of Leeds, UK
Azade Farshad	Technische Universitat München, Germany
Yan Xia	University of Leeds, UK

Study Group Chairs

Ipek Oguz	Vanderbilt University, USA
Andreas Maier	University of Erlangen-Nuremberg, Germany
Archana Venkataraman	Boston University, USA

Paper Selection Committee

Archana Venkataraman	Boston University, USA
Diana Mateus	EC Nantes, France
Herve Lombaert	École de Technologie Supérieure, Canada
Ipek Oguz	Vanderbilt University, USA
Juan Eugenio Iglesias	Massachusetts General Hospital & Harvard Medical School, USA
Kaleem Siddiqi	McGill University, Canada
Xavier Pennec	INRIA, France
S. Kevin Zhou	University of Science and Technology of China, China
Albert Chung	University of Exeter, UK

Sponsor's Liaison

Yanwu Xu	Baidu, China

Information Processing In Medical Imaging Board

Christensen, G.	University of Iowa, USA
Chung, A.	University of Exeter, UK
de Bruijne, M.	Erasmus MC Rotterdam, The Netherlands
Duncan, J.S.	Yale University, USA
Frangi, A.F.	University of Leeds, UK – KU Leuven, Belgium
Golland, P.	Massachusetts Institute of Technology, USA
Leahy, R.M.	University of Southern California, USA
Noble, A.J.	Oxford University, UK
Ourselin, S.	King's College London, UK
Pizer, S.M.	University of North Carolina at Chapel Hill, USA
Prince, J.L.	Johns Hopkins University, USA
Sommer, S.	University of Copenhagen, Denmark
Styner, M.	University of North Carolina at Chapel Hill, USA
Szekely, G.	ETH Zürich, Switzerland
Taylor, C.	University of Manchester, UK
Todd-Pokropek, A.	University College London, UK
Wells, W.M. III	Harvard Medical School, USA

Reviewers

Sukesh Adiga Vasudeva
Dawood Al Chanti
Shadi Albarqouni
Daniel Alexander
Michela Antonelli
Alexis Arnaudon
John Ashburner
Aravind Ashok Nair
Suyash Awate
Mohammad Farid Azampour
Ulas Bagci
Monami Banerjee
Mathilde Bateson
Kayhan Batmanghelich
Pierre-Louis Bazin
Benjamin Billot
Sylvain Bouix
Sami Brandt
Katharina Breininger
Anna Calissano
M. Jorge Cardoso
Owen Carmichael
Catie Chang
Hao Chen
Chen Chen
Chao Chen
Xiaoran Chen
Gary Christensen
Moo Chung
Dorin Comaniciu
Tessa Cook
Tim Cootes
Vedrana Dahl
Adrian Dalca
Erik B. Dam
Benoit Dawant
Herve Delingette
Christian Desrosiers
Jose Dolz
James Duncan
Shireen Elhabian
Kjersti Engan
Ertunc Erdil
Shahrooz Faghihroohi
Aasa Feragen
Enzo Ferrante
P. Thomas Fletcher
Vanessa Gonzalez Duque
Mélanie Gaillochet
Mingchen Gao
Sara Garbarino
Harshvardhan Gazula
James Gee
Sarah Gerard
Guido Gerig
Ben Glocker
Polina Golland
Karthik Gopinath
Daniel Grzech
Boris Gutman
Tobias Heimann
Mattias Heinrich
Dewei Hu
Heng Huang
Yuankai Huo
Jana Hutter
Jae Youn Hwang
Amelia Jiménez-Sánchez
Anand Joshi
Sarang Joshi
Bernhard Kainz
Ali Kamen
Anees Kazi
Matthias Keicher
Mahdieh Khanmohammadi
Boklye Kim
Andrew King
Stefan Klein
Ender Konukoglu
Frithjof Kruggel
Holger Kunze
Jan Kybic
Bennett Landman
Hongwei Li
Xiaoxiao Li
Han Li

Chunfeng Lian
Roxane Licandro
Peirong Liu
Mingxia Liu
Pengbo Liu
Xiaofeng Liu
Marco Lorenzi
Andreas Maier
Carsten Marr
Martin Menten
Bjoern Menze
Daniel Moyer
Arrate Munoz Barrutia
Vishwesh Nath
Mads Nielsen
Marc Niethammer
Lipeng Ning
Beatriz Paniagua
Magdalini Paschali
Rasmus Paulsen
Chantal Pellegrini
Tingying Peng
Jens Petersen
Dzung Pham
Louise Piecuch
Steve Pizer
Marco Pizzolato
Kilian Pohl
Jerry Prince
Dou Qi
Chen Qin
Jagath Rajapakse
Laurent Risser
Karl Rohr
Louis Rouillard
Daniel Rueckert
Ario Sadafi
Olivier Salvado
Babak Samari
Mhd Hasan Sarhan
Dustin Scheinost
Julia Schnabel
Thomas Schultz
Ernst Schwartz
Christof Seiler
Raghavendra Selvan
Maxime Sermesant
Wei Shao
Pengcheng Shi
Yonggang Shi
Kuangyu Shi
Ivor Simpson
Ayushi Sinha
Jayanthi Sivaswamy
Lars Smolders
Roger Soberanis-Mukul
Stefan Sommer
Aristeidis Sotiras
Tyler Spears
Jon Sporring
Anuj Srivastava
Martin Styner
Carole Sudre
Tabish Syed
Oriane Thiery
Matthew Toews
Agnieszka Tomczak
Alice Barbara Tumpach
Francois-Xavier Vialard
Clinton Wang
Linwei Wang
Ce Wang
Yalin Wang
Hongzhi Wang
Demian Wassermann
Sandy Wells
Carl-Fredrik Westin
Ross Whitaker
Jonghye Woo
Marcel Worring
Guorong Wu
Yong Xia
Pew-Thian Yap
Chuyang Ye
Yousef Yeganeh
Sean Young
Paul Yushkevich
Ghada Zamzmi
Xiangrui Zeng
Miaomiao Zhang

Gary Zhang
Yubo Zhang
Qingyu Zhao
Guoyan Zheng
Luping Zhou
Xiahai Zhuang
Veronika Zimmer
Maria A. Zuluaga
Reyer Zwiggelaar
Lilla Zöllei

Contents

Biomarkers

Resolving Quantitative MRI Model Degeneracy with Machine Learning via Training Data Distribution Design 3
Michele Guerreri, Sean Epstein, Hojjat Azadbakht, and Hui Zhang

Subtype and Stage Inference with Timescales 15
Alexandra L. Young, Leon M. Aksman, Daniel C. Alexander, Peter A. Wijeratne, and for the Alzheimer's Disease Neuroimaging Initiative

Brain Connectomics

HoloBrain: A Harmonic Holography for Self-organized Brain Function 29
Huan Liu, Tingting Dan, Zhuobin Huang, Defu Yang, Won Hwa Kim, Minjeong Kim, Paul Laurienti, and Guorong Wu

Species-Shared and -Specific Brain Functional Connectomes Revealed by Shared-Unique Variational Autoencoder 41
Li Yang, Songyao Zhang, Weihan Zhang, Jingchao Zhou, Tianyang Zhong, Yaonai Wei, Xi Jiang, Tianming Liu, Junwei Han, Yixuan Yuan, and Tuo Zhang

mSPD-NN: A Geometrically Aware Neural Framework for Biomarker Discovery from Functional Connectomics Manifolds 53
Niharika S. D'Souza and Archana Venkataraman

Computer-Aided Diagnosis/Surgery

Diffusion Model Based Semi-supervised Learning on Brain Hemorrhage Images for Efficient Midline Shift Quantification 69
Shizhan Gong, Cheng Chen, Yuqi Gong, Nga Yan Chan, Wenao Ma, Calvin Hoi-Kwan Mak, Jill Abrigo, and Qi Dou

Don't PANIC: Prototypical Additive Neural Network for Interpretable Classification of Alzheimer's Disease 82
Tom Nuno Wolf, Sebastian Pölsterl, and Christian Wachinger

Filtered Trajectory Recovery: A Continuous Extension to Event-Based Model for Alzheimer's Disease Progression Modeling 95
Jiangchuan Du, Yuan Zhou, and for the Alzheimer's Disease Neuroimaging Initiative

Live Image-Based Neurosurgical Guidance and Roadmap Generation Using Unsupervised Embedding 107
Gary Sarwin, Alessandro Carretta, Victor Staartjes, Matteo Zoli, Diego Mazzatenta, Luca Regli, Carlo Serra, and Ender Konukoglu

Meta-information-Aware Dual-path Transformer for Differential Diagnosis of Multi-type Pancreatic Lesions in Multi-phase CT 119
Bo Zhou, Yingda Xia, Jiawen Yao, Le Lu, Jingren Zhou, Chi Liu, James S. Duncan, and Ling Zhang

MetaViT: Metabolism-Aware Vision Transformer for Differential Diagnosis of Parkinsonism with ^{18}F-FDG PET 132
Lin Zhao, Hexin Dong, Ping Wu, Jiaying Lu, Le Lu, Jingren Zhou, Tianming Liu, Li Zhang, Ling Zhang, Yuxing Tang, and Chuantao Zuo

Multi-task Multi-instance Learning for Jointly Diagnosis and Prognosis of Early-Stage Breast Invasive Carcinoma from Whole-Slide Pathological Images 145
Jianxin Liu, Rongjun Ge, Peng Wan, Qi Zhu, Daoqiang Zhang, and Wei Shao

On Fairness of Medical Image Classification with Multiple Sensitive Attributes via Learning Orthogonal Representations 158
Wenlong Deng, Yuan Zhong, Qi Dou, and Xiaoxiao Li

Pixel-Level Explanation of Multiple Instance Learning Models in Biomedical Single Cell Images 170
Ario Sadafi, Oleksandra Adonkina, Ashkan Khakzar, Peter Lienemann, Rudolf Matthias Hehr, Daniel Rueckert, Nassir Navab, and Carsten Marr

Transient Hemodynamics Prediction Using an Efficient Octree-Based Deep Learning Model 183
Noah Maul, Katharina Zinn, Fabian Wagner, Mareike Thies, Maximilian Rohleder, Laura Pfaff, Markus Kowarschik, Annette Birkhold, and Andreas Maier

Weakly Semi-supervised Detection in Lung Ultrasound Videos 195
Jiahong Ouyang, Li Chen, Gary Y. Li, Naveen Balaraju, Shubham Patil, Courosh Mehanian, Sourabh Kulhare, Rachel Millin, Kenton W. Gregory, Cynthia R. Gregory, Meihua Zhu, David O. Kessler, Laurie Malia, Almaz Dessie, Joni Rabiner, Di Coneybeare, Bo Shopsin, Andrew Hersh, Cristian Madar, Jeffrey Shupp, Laura S. Johnson, Jacob Avila, Kristin Dwyer, Peter Weimersheimer, Balasundar Raju, Jochen Kruecker, and Alvin Chen

sEBM: Scaling Event Based Models to Predict Disease Progression via Implicit Biomarker Selection and Clustering 208
Raghav Tandon, Anna Kirkpatrick, and Cassie S. Mitchell

Domain Adaptation

Source-Free Domain Adaptation for Medical Image Segmentation via Selectively Updated Mean Teacher 225
Ziqi Wen, Xinru Zhang, and Chuyang Ye

UPL-TTA: Uncertainty-Aware Pseudo Label Guided Fully Test Time Adaptation for Fetal Brain Segmentation 237
Jianghao Wu, Ran Gu, Tao Lu, Shaoting Zhang, and Guotai Wang

Unsupervised Adaptation of Polyp Segmentation Models via Coarse-to-Fine Self-Supervision 250
Jiexiang Wang and Chaoqi Chen

Geometric Deep Learning

Edge-Based Graph Neural Networks for Cell-Graph Modeling and Prediction 265
Tai Hasegawa, Helena Arvidsson, Nikolce Tudzarovski, Karl Meinke, Rachael V. Sugars, and Aravind Ashok Nair

Heterogeneous Graph Convolutional Neural Network via Hodge-Laplacian for Brain Functional Data 278
Jinghan Huang, Moo K. Chung, and Anqi Qiu

Modeling the Shape of the Brain Connectome via Deep Neural Networks 291
Haocheng Dai, Martin Bauer, P. Thomas Fletcher, and Sarang Joshi

TetCNN: Convolutional Neural Networks on Tetrahedral Meshes 303
Mohammad Farazi, Zhangsihao Yang, Wenhui Zhu, Peijie Qiu, and Yalin Wang

Groupwise Atlasing

BInGo: Bayesian Intrinsic Groupwise Registration via Explicit Hierarchical Disentanglement 319
Xin Wang, Xinzhe Luo, and Xiahai Zhuang

Learning Probabilistic Piecewise Rigid Atlases of Model Organisms via Generative Deep Networks 332
Amin Nejatbakhsh, Neel Dey, Vivek Venkatachalam, Eviatar Yemini, Liam Paninski, and Erdem Varol

Harmonization/Federated Learning

Harmonizing Flows: Unsupervised MR Harmonization Based on Normalizing Flows 347
Farzad Beizaee, Christian Desrosiers, Gregory A. Lodygensky, and Jose Dolz

Vicinal Feature Statistics Augmentation for Federated 3D Medical Volume Segmentation 360
Yongsong Huang, Wanqing Xie, Mingzhen Li, Mingmei Cheng, Jinzhou Wu, Weixiao Wang, Jane You, and Xiaofeng Liu

Image Synthesis

S2DGAN: Generating Dual-energy CT from Single-energy CT for Real-time Determination of Intracerebral Hemorrhage 375
Caiwen Jiang, Yongsheng Pan, Tianyu Wang, Qing Chen, Junwei Yang, Li Ding, Jiameng Liu, Zhongxiang Ding, and Dinggang Shen

SADM: Sequence-Aware Diffusion Model for Longitudinal Medical Image Generation 388
Jee Seok Yoon, Chenghao Zhang, Heung-Il Suk, Jia Guo, and Xiaoxiao Li

Image Enhancement

An Unsupervised Framework for Joint MRI Super Resolution and Gibbs Artifact Removal 403
Yikang Liu, Eric Z. Chen, Xiao Chen, Terrence Chen, and Shanhui Sun

OTRE: Where Optimal Transport Guided Unpaired Image-to-Image Translation Meets Regularization by Enhancing 415
Wenhui Zhu, Peijie Qiu, Oana M. Dumitrascu, Jacob M. Sobczak, Mohammad Farazi, Zhangsihao Yang, Keshav Nandakumar, and Yalin Wang

Super-Resolution Reconstruction of Fetal Brain MRI with Prior Anatomical Knowledge 428
Shijie Huang, Geng Chen, Kaicong Sun, Zhiming Cui, Xukun Zhang, Peng Xue, Xuan Zhang, He Zhang, and Dinggang Shen

Multimodal Learning

Q2ATransformer: Improving Medical VQA via an Answer Querying Decoder 445
Yunyi Liu, Zhanyu Wang, Dong Xu, and Luping Zhou

Using Multiple Instance Learning to Build Multimodal Representations 457
Peiqi Wang, William M. Wells, Seth Berkowitz, Steven Horng, and Polina Golland

X-TRA: Improving Chest X-ray Tasks with Cross-Modal Retrieval Augmentation 471
Tom van Sonsbeek and Marcel Worring

Optimization

Differentiable Gamma Index-Based Loss Functions: Accelerating Monte-Carlo Radiotherapy Dose Simulation 485
Sonia Martinot, Nikos Komodakis, Maria Vakalopoulou, Norbert Bus, Charlotte Robert, Eric Deutsch, and Nikos Paragios

Scalable Orthonormal Projective NMF via Diversified Stochastic Optimization 497
Abdalla Bani, Sung Min Ha, Pan Xiao, Thomas Earnest, John Lee, and Aristeidis Sotiras

Reconstruction

Deep Physics-Informed Super-Resolution of Cardiac 4D-Flow MRI 511
Fergus Shone, Nishant Ravikumar, Toni Lassila, Michael MacRaild, Yongxing Wang, Zeike A. Taylor, Peter Jimack, Erica Dall'Armellina, and Alejandro F. Frangi

Fast-MC-PET: A Novel Deep Learning-Aided Motion Correction and Reconstruction Framework for Accelerated PET 523
Bo Zhou, Yu-Jung Tsai, Jiazhen Zhang, Xueqi Guo, Huidong Xie, Xiongchao Chen, Tianshun Miao, Yihuan Lu, James S. Duncan, and Chi Liu

MeshDeform: Surface Reconstruction of Subcortical Structures via Human Brain MRI 536
Junjie Zhao, Siyuan Liu, Sahar Ahmad, and Pew-Thian Yap

Neural Implicit k-Space for Binning-Free Non-Cartesian Cardiac MR Imaging 548
Wenqi Huang, Hongwei Bran Li, Jiazhen Pan, Gastao Cruz, Daniel Rueckert, and Kerstin Hammernik

Registration

Geometric Deep Learning for Unsupervised Registration of Diffusion Magnetic Resonance Images 563
Jose J. Bouza, Chun-Hao Yang, and Baba C. Vemuri

MetaMorph: Learning Metamorphic Image Transformation with Appearance Changes 576
Jian Wang, Jiarui Xing, Jason Druzgal, William M. Wells III, and Miaomiao Zhang

NeurEPDiff: Neural Operators to Predict Geodesics in Deformation Spaces 588
Nian Wu and Miaomiao Zhang

Non-rigid Medical Image Registration using Physics-informed Neural Networks 601
Zhe Min, Zachary M. C. Baum, Shaheer U. Saeed, Mark Emberton, Dean C. Barratt, Zeike A. Taylor, and Yipeng Hu

POLAFFINI: Efficient Feature-Based Polyaffine Initialization for Improved Non-linear Image Registration 614
Antoine Legouhy, Ross Callaghan, Hojjat Azadbakht, and Hui Zhang

Segmentation

Better Generalization of White Matter Tract Segmentation to Arbitrary Datasets with Scaled Residual Bootstrap 629
Wan Liu and Chuyang Ye

Bootstrapping Semi-supervised Medical Image Segmentation with Anatomical-Aware Contrastive Distillation 641
Chenyu You, Weicheng Dai, Yifei Min, Lawrence Staib, and James S. Duncan

DTU-Net: Learning Topological Similarity for Curvilinear Structure Segmentation 654
Manxi Lin, Kilian Zepf, Anders Nymark Christensen, Zahra Bashir, Morten Bo Søndergaard Svendsen, Martin Tolsgaard, and Aasa Feragen

HALOS: Hallucination-Free Organ Segmentation After Organ Resection Surgery 667
Anne-Marie Rickmann, Murong Xu, Tom Nuno Wolf, Oksana Kovalenko, and Christian Wachinger

Human-Machine Interactive Tissue Prototype Learning for Label-Efficient Histopathology Image Segmentation 679
Wentao Pan, Jiangpeng Yan, Hanbo Chen, Jiawei Yang, Zhe Xu, Xiu Li, and Jianhua Yao

Improved Segmentation of Deep Sulci in Cortical Gray Matter Using a Deep Learning Framework Incorporating Laplace's Equation 692
Sadhana Ravikumar, Ranjit Ittyerah, Sydney Lim, Long Xie, Sandhitsu Das, Pulkit Khandelwal, Laura E. M. Wisse, Madigan L. Bedard, John L. Robinson, Terry Schuck, Murray Grossman, John Q. Trojanowski, Edward B. Lee, M. Dylan Tisdall, Karthik Prabhakaran, John A. Detre, David J. Irwin, Winifred Trotman, Gabor Mizsei, Emilio Artacho-Pérula, Maria Mercedes Iñiguez de Onzono Martin, Maria del Mar Arroyo Jiménez, Monica Muñoz, Francisco Javier Molina Romero, Maria del Pilar Marcos Rabal, Sandra Cebada-Sánchez, José Carlos Delgado González, Carlos de la Rosa-Prieto, Marta Córcoles Parada, David A. Wolk, Ricardo Insausti, and Paul A. Yushkevich

Med-NCA: Robust and Lightweight Segmentation with Neural Cellular Automata 705
John Kalkhof, Camila González, and Anirban Mukhopadhyay

Mixup-Privacy: A Simple yet Effective Approach for Privacy-Preserving Segmentation 717
Bach Ngoc Kim, Jose Dolz, Pierre-Marc Jodoin, and Christian Desrosiers

Rethinking Boundary Detection in Deep Learning Models for Medical Image Segmentation 730
Yi Lin, Dong Zhang, Xiao Fang, Yufan Chen, Kwang-Ting Cheng, and Hao Chen

Token Sparsification for Faster Medical Image Segmentation 743
Lei Zhou, Huidong Liu, Joseph Bae, Junjun He, Dimitris Samaras, and Prateek Prasanna

blob loss: Instance Imbalance Aware Loss Functions for Semantic Segmentation 755
Florian Kofler, Suprosanna Shit, Ivan Ezhov, Lucas Fidon, Izabela Horvath, Rami Al-Maskari, Hongwei Bran Li, Harsharan Bhatia, Timo Loehr, Marie Piraud, Ali Erturk, Jan Kirschke, Jan C. Peeken, Tom Vercauteren, Claus Zimmer, Benedikt Wiestler, and Bjoern Menze

Self Supervised Learning

Noise2Contrast: Multi-contrast Fusion Enables Self-supervised Tomographic Image Denoising 771
Fabian Wagner, Mareike Thies, Laura Pfaff, Noah Maul, Sabrina Pechmann, Mingxuan Gu, Jonas Utz, Oliver Aust, Daniela Weidner, Georgiana Neag, Stefan Uderhardt, Jang-Hwan Choi, and Andreas Maier

Precise Location Matching Improves Dense Contrastive Learning in Digital Pathology 783
Jingwei Zhang, Saarthak Kapse, Ke Ma, Prateek Prasanna, Maria Vakalopoulou, Joel Saltz, and Dimitris Samaras

Surface Analysis and Segmentation

A Surface-Normal Based Neural Framework for Colonoscopy Reconstruction 797
Shuxian Wang, Yubo Zhang, Sarah K. McGill, Julian G. Rosenman, Jan-Michael Frahm, Soumyadip Sengupta, and Stephen M. Pizer

Hierarchical Geodesic Polynomial Model for Multilevel Analysis of Longitudinal Shape 810
Ye Han, Jared Vicory, Guido Gerig, Patricia Sabin, Hannah Dewey, Silvani Amin, Ana Sulentic, Christian Hertz, Matthew Jolley, Beatriz Paniagua, and James Fishbaugh

Model-Informed Deep Learning for Surface Segmentation in Medical Imaging 822
Xiaodong Wu, Leixin Zhou, Fahim Zaman, Bensheng Qiu, and John M. Buatti

Author Index 835