

Commenced Publication in 1973

Founding and Former Series Editors:

Gerhard Goos, Juris Hartmanis, and Jan van Leeuwen

Editorial Board

David Hutchison

Lancaster University, Lancaster, UK

Takeo Kanade

Carnegie Mellon University, Pittsburgh, PA, USA

Josef Kittler

University of Surrey, Guildford, UK

Jon M. Kleinberg

Cornell University, Ithaca, NY, USA

Friedemann Mattern

ETH Zurich, Zurich, Switzerland

John C. Mitchell

Stanford University, Stanford, CA, USA

Moni Naor

Weizmann Institute of Science, Rehovot, Israel

C. Pandu Rangan

Indian Institute of Technology, Madras, India

Bernhard Steffen

TU Dortmund University, Dortmund, Germany

Demetri Terzopoulos

University of California, Los Angeles, CA, USA

Doug Tygar

University of California, Berkeley, CA, USA

Gerhard Weikum

Max Planck Institute for Informatics, Saarbrücken, Germany


More information about this series at <http://www.springer.com/series/7412>

Maxime Descoteaux · Lena Maier-Hein
Alfred Franz · Pierre Jannin
D. Louis Collins · Simon Duchesne (Eds.)

Medical Image Computing and Computer Assisted Intervention – MICCAI 2017

20th International Conference
Quebec City, QC, Canada, September 11–13, 2017
Proceedings, Part I

Editors

Maxime Descoteaux 
Université de Sherbrooke
Sherbrooke, QC
Canada

Lena Maier-Hein
DKFZ
Heidelberg
Germany

Alfred Franz
Ulm University of Applied Sciences
Ulm
Germany

Pierre Jannin 
Université de Rennes 1
Rennes
France

D. Louis Collins
McGill University
Montreal, QC
Canada

Simon Duchesne
Université Laval
Québec, QC
Canada

ISSN 0302-9743

ISSN 1611-3349 (electronic)

Lecture Notes in Computer Science

ISBN 978-3-319-66181-0

ISBN 978-3-319-66182-7 (eBook)

DOI 10.1007/978-3-319-66182-7

Library of Congress Control Number: 2017951405

LNCS Sublibrary: SL6 – Image Processing, Computer Vision, Pattern Recognition, and Graphics

© Springer International Publishing AG 2017

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, express 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.

Printed on acid-free paper

This Springer imprint is published by Springer Nature

The registered company is Springer International Publishing AG

The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Preface



We are very proud to present the conference proceedings for the 20th Medical Image Computing and Computer Assisted Intervention (MICCAI) conference, which was successfully held at the Quebec City Conference Center, September 11–13, 2017 in Quebec City, Canada. Ce fut un plaisir et une fierté de vous recevoir tous et chacun à Québec, berceau de la culture francophone en Amérique du Nord¹.

The MICCAI 2017 conference, alongside 45 satellite events held on September 10th and 14th, attracted hundreds of world-leading scientists, engineers, and clinicians, involved in medical image processing, medical image formation, and computer assisted medical procedures.

You will find assembled in this three-volume Lecture Notes in Computer Science (LNCS) publication the proceedings for the main conference, selected after a thoughtful, insightful, and diligent double-blind review process, which was organized in several phases, described below.

The preliminary phase of the review process happened before the curtain was raised, so to speak, as the Program Chairs made the decision to move MICCAI towards novel conference management tools of increasingly common use in the computer vision and machine learning community. These included the Conference Managing Toolkit for paper submissions and reviews (<https://cmt.research.microsoft.com>); the Toronto Paper Matching System (<http://torontopapermatching.org/>) for automatic paper assignment to area chairs and reviewers; and Researcher.CC (<http://researcher.cc>) to handle conflicts between authors, area chairs, and reviewers.

¹ It was our pleasure and pride to welcome you each and all to Quebec, the cradle of French-speaking culture in North America.

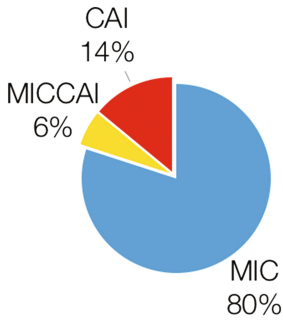


Fig. 1. Incoming manuscript distribution

Phase 1 of the review process of each paper was handled by an area chair and three reviewers. There was a total of 52 area chairs selected with expertise as shown in Fig. 2. Noticeably, 50% were from the Americas, 35% from Europe, and 15% from Asia, with 44% women.

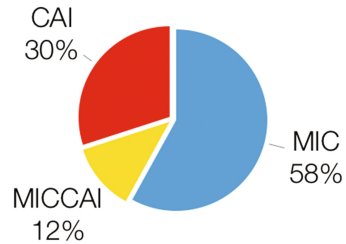


Fig. 2. PC distribution

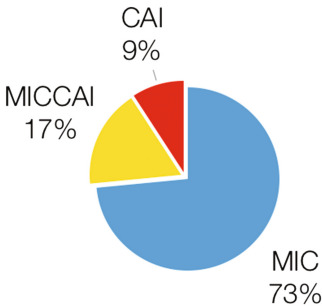


Fig. 3. Reviewer distribution

The first phase consisted in the management of abstracts per se. In total, 800 submissions were received, from over 1,150 intentions to submit. As seen in Fig. 1, of those submissions, 80% were considered as pure Medical Image Computing (MIC), 14% as pure Computer Assisted Intervention (CAI), and 6% as MIC-CAI papers that fitted into both MIC and CAI areas. Of note, 21% papers were submitted by a female first author.

Each area chair had 14 to 20 papers to handle. Each reviewer committed to review from 3 to 6 papers. We had a total of 627 reviewers with expertise as detailed in Fig. 3, and of which 20% were women.

To assign reviewers for each submitted manuscript, we first used the Toronto Paper Matching System to assign each paper with a ranked list of reviewers. Second, area chairs, blinded to authorship, re-ordered and ranked reviewers assigned for each paper. Finally, the Conference Management Toolkit made the final assignment of papers automatically using the Toronto Paper Matching System scores and rankings from area chairs, while balancing the workload among all reviewers.

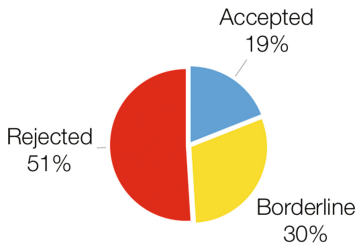


Fig. 4. Phase 1 results

ranking of the same papers. Papers in agreement by both rankings from area chairs (ranked in top 50% or ranked in bottom 50%) were either accepted or rejected accordingly, and the remaining papers categorized as borderline of Phase 2. This process yielded 103 borderline papers, 217 accepted papers, and 471 rejected papers, as shown in Fig. 5.

Finally, the reviews, the area chair rankings, and associated rebuttals were subsequently discussed in person among the Program Committee (PC) members during the MICCAI 2017 PC meeting that took place in Quebec City, Canada, May 10–12, 2017, with 38 out of 52 PC members in attendance. The process led to the acceptance of another 38 papers and the rejection of 65 papers. In total, 255 papers of the 800 submitted papers were accepted, for an overall acceptance rate of 32% (Fig. 6), with 45 accepted papers (18%) by a female first author (164 papers were submitted by a female first author).

For these proceedings, the 255 papers have been organized in 15 groups as follows:

- Volume LNCS 10433 includes Atlas and Surface-Based Techniques (14 manuscripts), Shape and Patch-Based Techniques (11), Registration Techniques (15), Functional Imaging, Connectivity and Brain Parcellation (17), Diffusion Magnetic Resonance Imaging (MRI) & Tensor/Fiber Processing (20), Image Segmentation and Modelling (12).
- Volume LNCS 10434 includes: Optical Imaging (18 manuscripts), Airway and Vessel Analysis (10), Motion and Cardiac Analysis (16), Tumor Processing (9), Planning and Simulation for Medical Interventions (11), Interventional Imaging and Navigation (14), and Medical Image Computing (8).
- Volume LNCS 10435 includes: Feature Extraction and Classification Techniques (23 manuscripts) and Machine Learning in Medical Imaging Computing (56).

Based on the Phase 1 double-blind reviews and rebuttals sent specifically to area chairs, 152 papers were directly accepted and 405 papers were directly rejected, giving the distribution shown in Fig. 4.

Next, the remaining 243 borderline papers went into Phase 2 of the review process. The area chair first ranked the Phase 1 remaining papers and a second area chair performed a

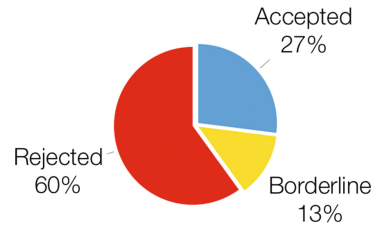


Fig. 5. Phase 2 results

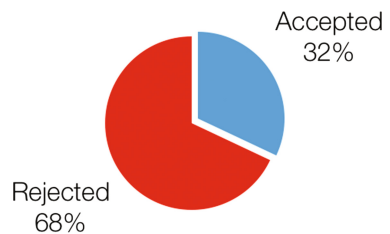


Fig. 6. Final results

In closing, we would like to thank specific individuals who contributed greatly to the success of MICCAI 2017 and the quality of its proceedings. These include the Satellite Events Committee led by Tal Arbel. Her co-chairs were Jorge Cardoso, Parvin Mousavi, Kevin Whittingstall, and Leo Grady; other members of the Organizing Committee including Mallar Chakravarty (social), Mert Sabuncu (MICCAI 2016), Julia Schnabel (MICCAI 2018), and Caroline Worreth and her team of volunteers and professionals; the MICCAI society, for support and insightful comments; and our partners for financial support and their presence on site. We are especially grateful to all members of the PC for their diligent work in helping to prepare the technical program, as well as the reviewers for their support during the entire process. Last but not least, we thank authors, co-authors, students, and supervisors, who toiled away to produce work of exceptional quality that maintains MICCAI as a beacon of *savoir-faire* and expertise not to be missed.

We look forward to seeing you in Granada, Spain – Au plaisir de vous revoir en 2018!

August 2017

Maxime Descoteaux
Lena Maier-Hein
Alfred Franz
Pierre Jannin
D. Louis Collins
Simon Duchesne

Organization

General Chair

Simon Duchesne Université Laval, Québec, Canada

Program Chair

Maxime Descoteaux Université de Sherbrooke, Sherbrooke, Canada

General and Program Co-chair

D. Louis Collins McGill University, Montreal, Canada

Program Co-chairs

Lena Maier-Hein German Cancer Research Center, Heidelberg, Germany
Alfred Franz Ulm University of Applied Sciences, Ulm, Germany
Pierre Jannin Université de Rennes 1, Rennes, France

Satellite Events Chair

Tal Arbel McGill University, Montreal, Canada

Satellite Events Co-chair

Jorge Cardoso (Workshops) University College London, London, UK
Parvin Mousavi Queen's University, Kingston, Canada
(Challenges)
Kevin Whittingstall Université de Sherbrooke, Sherbrooke, Canada
(Tutorials)
Leo Grady (Tutorials) Heartflow, Redwood City, California

Social Chair

Mallar Chakravarty McGill University, Montreal, Canada

Past and Future MICCAI Chairs

Mert Sabuncu Cornell University, Ithaca, USA
(MICCAI 2016)
Julia Schnabel King's College London, London, UK
(MICCAI 2018)

Program Committee

Ismail B. Ayed	Ecoles des Technologies Superieures (ETS) Montreal
Meritxell Bach	Lausanne University and University Hospital
Sylvain Bouix	Brigham and Women's Hospital
Weidong Cai	University of Sydney
Philippe C. Cattin	University of Basel
Elvis Chen	Robarts Research Institute
Jun Cheng	Institute for Infocomm Research
Albert C. Chung	The Hong Kong University of Science and Technology
Marleen de Bruijne	Erasmus MC, The Netherlands/University of Copenhagen, Denmark
Stefanie Demirci	Technical University of Munich
Caroline Essert	University of Strasbourg ICube
Gabor Fichtinger	Queen's University
Alejandro Frangi	University of Sheffield
Stamatia Giannarou	Imperial College London (UCL)
Junzhou Huang	University of Texas at Arlington
Ivana Isgum	University Medical Center Utrecht
Ameet Jain	Philips Corporate Research
Pierre-Marc Jodoin	Université de Sherbrooke
Samuel Kadoury	Polytechnique Montreal
Marta Kersten	Concordia University
Su-Lin Lee	Imperial College London
Shuo Li	Western University
Rui Liao	Siemens Medical Solutions USA
Tianming Liu	University of Giogia
Herve J. Lombaert	Ecoles des Technologies Superieures (ETS) Montreal
Xiongbiao Luo	INSERM
Klaus Maier-Hein	German Cancer Research Center
Diana Mateus	Technische Universität München
Lauren J. O'Donnell	Brigham and Women's Hospital and Harvard Medical School
Ingerid Reinertsen	SINTEF
Tammy Riklin Raviv	Ben Gurion University
Hassan Rivaz	Concordia University
Clarisa Sanchez	Radboud University Medical Center
Benoit Scherrer	Boston Children Hospital Harvard Medical School
Julia A. Schnabel	King's College of London
Li Shen	Indiana University
Amber Simpson	Memorial Sloan Kettering Cancer Center
Stefanie Speidel	Karlsruhe Institute of Technology
Ronald M. Summers	National Institute of Health (NIH)
Raphael Sznitman	University of Bern
Pallavi Tiwari	Case Western Reserve University
Duygu Tosun	University of California San Francisco

Gozde Unal	Istanbul Technical University
Ragini Verma	University of Pennsylvania
Sandrine Voros	INSERM, TIMC-IMAG
Linwei Wang	Rochester Institute of Technology
Qian Wang	Shanghai University
Demian Wassermann	INRIA Sophia Antipolis
Yanwu Xu	Institute for Infocomm Research
Pew-Thian Yap	University of North Carolina at Chapel Hill
Guoyan Zheng	University of Bern
S. Kevin Zhou	Siemens Healthineers Technology Center

Additional Reviewers

Aly A.	Adrian Barbu
John A.	Anton Bardera
Aly Abdelrahim	Christian Barillot
Ehsan Adeli	Adrien Bartoli
Iman Aganj	Christian Baumgartner
Priya Aggarwal	Christoph Baur
Ola Ahmad	Maximilian Baust
Shazia Akbar	Pierre-Louis Bazin
Saad Ullah Akram	Christos Bergeles
Amir Alansary	Olivier Bernard
Jialin Alansary	Boris C. Bernhardt
Shadi Albarqouni	Boris Bernhardt
Daniel C. Alexander	Arnav Bhavsar
Sharib Ali	Marie Bieth
Riza Alp Guler	Emad M. Boctor
Guy Amit	Sebastian Bodenstedt
Elsa Angelini	Hrvoje Bogunovic
John Ashburner	Sethu K. Boopathy Jegathambal
Rahman Attar	Louis Borgeat
Paolo Avesani	Gerda Bortsova
Suyash P. Awate	Frédéric Branchaud-Charron
Dogu Aydogan	Jovan Brankov
Shekoofeh Azizi	Joerg Bredno
Hossein Azizpour	Paul A. Bromiley
Noura Azzabou	Michael S. Brown
Ulas Bagci	Robert Brown
Wenjia Bai	Aurelien Bustin
Spyridon Bakas	Ryan P. Cabeen
Jordan Bano	Jinzheng Cai
Siqi Bao	Yunliang Cai

Xiaohuan Cao	Jwala Dhamala
Tian Cao	Meng Ding
Gustavo Carneiro	Christophe Doignon
Isaac Casm	Jose Dolz
M. Emre Celebi	Pei Dong
Suheyla Cetin	Xiao Dong
Lotfi Chaari	Qi Dou
Vimal Chandran	Simon Drouin
Pierre Chatelain	Karen Drukker
Alessandro Chen	Lei Du
Alvin Chen	Lixin Duan
Antong Chen	Florian Dubost
Chao Chen	Nicolas Duchateau
Geng Chen	James S. Duncan
Hao Chen	Luc Duong
Jiawei Chen	Meng Duong
Terrence Chen	Nicha C. Dvornek
Xiaobo Chen	Ahmet Ekin
Li Cheng	Mohammed S.M. Elbaz
Jie-Zhi Cheng	Erin Elizabeth
Erkang Cheng	Randy E. Ellis
Veronika Cheplygina	Noha El-Zehiry
Gary Christensen	Guray Erus
Daan Christiaens	Juan Eugenio
Chengwen Chu	Pascal Fallavollita
Philippe Cinquin	Mohsen Farzi
Cedric Clouchoux	Aaron Fenster
Toby Collins	Henrique C. Fernandes
Olivier Commowick	Enzo Ferrante
Sailesh Conjeti	Patryk Filipiak
Tim Cootes	James Fishbaugh
Marc-Alexandre Cote	P. Thomas Fletcher
Martin Cousineau	Vladimir S. Fonov
Juan D.	Denis Fortun
Adrian V. Dalca	Moti Freiman
Sune Darkner	Benjamin Frisch
Dhritiman Das	Huazhu Fu
Benoit M. Dawant	Guillermo Gallardo
Benjamin De Leener	Melanie Ganz
Johan Debayle	Yi Gao
Alperen Degirmenci	Mingchen Gao
Herve Delingette	Xieping Gao
Maxime Descoteaux	Zhifan Gao
Nishikant Deshmukh	Amanmeet Garg
Samuel Deslauriers-Gauthier	Mona K. Garvin
Christian Desrosiers	Romane Gauriau

Bao Ge
Guido Gerig
Sara Gharabaghi
Sandesh Ghimire
Ali Gholipour
Gabriel Girard
Mario Valerio V. Giuffrida
Ben Glocker
Michael Goetz
Polina Golland
Alberto Gomez
German Gonzalez
Miguel A. González Ballester
Ali Gooya
Shiri Gordon
Pietro Gori
Matthias Guenther
Yanrong Guo
Anubha Gupta
Benjamin Gutierrez Becker
Boris Gutman
S everine Habert
Ilker Hacihaliloglu
Stathis Hadjidemetriou
Benjamin D. Haeffele
Justin Haldar
Andac Hamamci
Ghassan Hamarneh
Noura Hamze
Rabia Haq
Adam P. Harrison
Hoda Sadat Hashemi
Peter Hastreiter
Charles Hatt
Mohammad Havaei
Dave Hawkes
Lei He
Tiancheng He
Mohamed S. Hefny
Tobias Heimann
Mattias P. Heinrich
Christoph Hennersperger
Carlos Hernandez-Matas
Matt Higger
Byung-Woo Hong
Qingqi Hong
Yi Hong
Nicolas Honnorat
Robert D. Howe
Kai Hu
Yipeng Hu
Heng Huang
Xiaolei Huang
Yawen Huang
Sarfaraz Hussein
Juan E. Iglesias
Laura Igual
Atsushi Imiya
Madhura Ingahalikar
Jiro Inoue
Vamsi Ithapu
Seong Jae
Mayoore S. Jaiswal
Amir Jamaludin
Vincent Jaouen
Uditha L. Jayarathne
Shuiwang Ji
Dongsheng Jiang
Menglin Jiang
Xi Jiang
Xiaoyi Jiang
Dakai Jin
Marie-Pierre Jolly
Anand Joshi
Shantanu Joshi
Leo Juskowicz
Christoph Jud
Bernhard Kainz
Ioannis Kakadiaris
Siva Teja Kakileti
Verena Kaynig-Fittkau
Guillaume Kazmitcheff
Aneurin Kennerley
Erwan Kerrien
April Khademi
Siavash Khallaghi
Bishesh Khanal
Ron Kikinis
Boklye Kim
Edward Kim
Jaeil Kim
Benjamin Kimia

Andrew King
Jan Klein
Stefan Klein
Tobias Kober
Simon Kohl
Ender Konukoglu
Nedialko Krouchev
Frithjof Kruggel
Elizabeth Krupinski
Ashnil Kumar
Prashna Kumar
Punithakumar Kumaradevan
Takio Kurita
Sebastian Kurtek
Roland Kwitt
Jan Kybic
Aymen Laadhari
Alexander Ladikos
ALain Lalande
Pablo Lamata
Bennett A. Landman
Georg Langs
Carole Lartizien
Tobias Lasser
Toni Lassila
Andras Lasso
Matthieu Le
Chen-Yu Lee
Sing Chun Lee
Julien Lefevre
Boudewijn Lelieveldt
Christophe Lenglet
Wee Kheng Leow
Gang Li
Qingyang Li
Rongjian Li
Wenqi Li
Xiaomeng Li
Chunfeng Lian
Jianming Liang
Hongen Liao
Ruizhi Liao
Ben Lin
Jianyu Lin
Fujun Liu
Jianfei Liu
Kefei Liu
Liu Liu
Jundong Liu
Mingxia Liu
Sidong Liu
Nicolas Loménie
Cristian Lorenz
Marco Lorenzi
Nicolas Loy Rodas
Cheng Lu
Le Lu
Jianwen Luo
Zhiming Luo
Kai Ma
Anderson Maciel
Dwarikanath Mahapatra
Gabriel Maicas
Sokratis Makrogiannis
Anand Malpani
Tommaso Mansi
Giovanni Maria
Oge Marques
Stephen Marsland
Anne L. Martel
Gassan Massarweh
Michael McCann
Steven McDonagh
Stephen McKenna
Bjoern H. Menze
Kim Minjeong
Marc Modat
Pim Moeskops
Kelvin Mok
Mehdi Moradi
Rodrigo Moreno
Kensaku Mori
Agata Mosinska
Jayanta Mukhopadhyay
Anirban Mukhopadhyay
Arrate Munoz-Barrutia
Maria Murgasova
Arya Nabavi
Saad Nadeem
Layan Nahlawi
Laurent Najman
Tim Nattkemper

Peter Neher
Dong Ni
Dong Nie
Marc Niethammer
Christophoros Nikou
Lipeng Ning
Alison Noble
Ipek Oguz
Arnau Oliver
Ee Ping Ong
John A. Onofrey
Eliza Orasanu
Felipe Orihuela-Espina
Silas N. Ørting
David Owen
Danielle F. Pace
Blas Pagador
Sharath Pankanti
Xenophon Papademetris
Bartłomiej Papież
Michael Paquette
Sarah Parisot
Nicolas Passat
Gennaro Percannella
Sérgio Pereira
Loic Peter
Igor Peterlik
Jens Petersen
Caroline Petitjean
Simon Pezold
Dzung L. Pham
Pramod K. Pisharady
Stephen Pizer
Rosalie Plantefeve
Josien Pluim
Kilian Pohl
JB Poline
Philippe Poulin
Dipti Prasad
Prateek Prasanna
Marcel Prastawa
Philip Pratt
Bernhard Preim
Raphael Prevost
Jerry L. Prince
Xiaoning Qian
Xiang R.
Frank R.
Mehdi Rahim
Yogesh Rathi
Nishant Ravikumar
Pradeep Reddy Raamana
Xiaojun Regis
Joseph Reinhardt
Islem Rekik
Markus Rempfler
Mauricio Reyes
Gerard R. Ridgway
Nicola Rieke
Laurent Risser
David Robben
Emma Robinson
Antonio Robles-Kelly
Marc-Michel Rohé
Robert Rohling
Karl Rohr
Timo Roine
Eduardo Romero
James C. Ross
Arun Ross
Daniel Rueckert
Daniel Ruijters
Olivier Salvado
Ryan Sanford
Gerard Sanromà
Imari Sato
Peter Savadjiev
Dustin Scheinost
Thomas Schultz
Christof Seiler
Lama Seoud
Abhay Shah
Mahsa Shakeri
Yeqin Shao
Bibo Shi
Chaoyang Shi
Pengcheng Shi
Rakesh Shiradkar
Kaleem Siddiqi
Viviana Siless

Joseph R. Singapogu
Ayushi Sinha
Arkadiusz Sitek
Jayanthi Sivaswamy
Greg Slabaugh
Dirk Smeets
Ahmed Soliman
Stefan Sommer
Yang Song
Lauge Sorensen
Aristeidis Sotiras
Lawrence H. Staib
Aymeric Stamm
Marius Staring
Darko Stern
Danail Stoyanov
Colin Studholme
Martin Styner
Hai Su
Jian Sun
Ganesh Sundaramoorthi
Ali Taalimi
Sylvain Takerkart
Toru Tamaki
Olena Tankyevych
Chris Taylor
Philippe Thevenaz
Paul Thienphrapa
Bertrand Thirion
Zhiqiang Tian
Hamid R. Tizhoosh
Matthew Toews
Olivia Tong
Yubing Tong
Akif Burak Tosun
Daniel Toth
Emanuele Trucco
Sotirios A. Tsafaris
Birkan Tunc
Carole Twining
Tamas Ungi
Martin Urschler
Mustafa Uzunbas
Régis Vaillant
An-An van

Nanda van
Koen Van Leemput
Gijs van Tulder
Theo van Walsum
Gael Varoquaux
Francisco Vasconcelos
Gopalkrishna B. Veni
Tom Vercauteren
Ujjwal Verma
François-Xavier Vialard
Satish Viswanath
Frans Vos
Tomaž Vrtovec
Tao Wan
Zhangyang Wang
Bo Wang
Chaohui Wang
Hongzhi Wang
Hua Wang
Junyan Wang
Lei Wang
Li Wang
Manning Wang
Xiaosong Wang
Zhiyong Wang
Simon K. Warfield
Stijn Wee
Wolfgang Wein
Fr Werner
Rene Werner
Daniel Wesierski
Carl-Fredrik Westin
Ross T. Whitaker
Kevin Whittingstall
Matthias Wilms
Adam Wittek
Paul Wohlhart
Jelmer M. Wolterink
Ken C.L. Wong
Ken Wong
Jonghye Woo
Pengcheng Xi
James J. Xia
Wenfeng Xia
Lei Xiang

Yiming Xiao
Long Xie
Yuanpu Xie
Fuyong Xing
Jing Xiong
Daguang Xu
Yan Xu
Zheng Xu
Zhoubing Xu
Ziyue Xu
Zenglin Xu
Jingwen Yan
Ke Yan
Pingkun Yan
Feng Yang
Guang Yang
Jie Yang
Lin Yang
Xiao Yang
Xing Yang
Jiawen Yao
Jianhua Yao
Chuyang Ye
Jinhua Yu
Weimin Yu
Cheng Yuan
Oliver Zettinig
Yiqiang Zhan
Fan Zhang

Han Zhang
Jie Zhang
Jiong Zhang
Le Zhang
Lichi Zhang
Lin Zhang
Ling Zhang
Miaomiao Zhang
Shu Zhang
Jun Zhang
Yu Zhang
Liang Zhao
Shijie Zhao
Yitian Zhao
Qingyu Zhao
Yinqiang Zheng
Jiayu Zhou
Luping Zhou
Tao Zhou
Xiaofeng Zhu
Weifang Zhu
Xinliang Zhu
Yingying Zhu
Xiahai Zhuang
Aneeq Zia
Stephan Zidowitz
Lilla Zollei
Clement Zotti
Reyer Zwiggelaar

Contents – Part I

Atlas and Surface-Based Techniques

The Active Atlas: Combining 3D Anatomical Models with Texture Detectors.	3
<i>Yuncong Chen, Lauren McElvain, Alex Tolpygo, Daniel Ferrante, Harvey Karten, Partha Mitra, David Kleinfeld, and Yoav Freund</i>	
Exploring Gyral Patterns of Infant Cortical Folding Based on Multi-view Curvature Information.	12
<i>Dingna Duan, Shunren Xia, Yu Meng, Li Wang, Weili Lin, John H. Gilmore, Dinggang Shen, and Gang Li</i>	
Holistic Mapping of Striatum Surfaces in the Laplace-Beltrami Embedding Space	21
<i>Jin Kyu Gahm and Yonggang Shi</i>	
Novel Local Shape-Adaptive Gyrfication Index with Application to Brain Development	31
<i>Ilwoo Lyu, Sun Hyung Kim, Jessica Bullins, John H. Gilmore, and Martin A. Styner</i>	
Joint Sparse and Low-Rank Regularized Multi-Task Multi-Linear Regression for Prediction of Infant Brain Development with Incomplete Data.	40
<i>Ehsan Adeli, Yu Meng, Gang Li, Weili Lin, and Dinggang Shen</i>	
Graph-Constrained Sparse Construction of Longitudinal Diffusion-Weighted Infant Atlases.	49
<i>Jaeil Kim, Geng Chen, Weili Lin, Pew-Thian Yap, and Dinggang Shen</i>	
4D Infant Cortical Surface Atlas Construction Using Spherical Patch-Based Sparse Representation	57
<i>Zhengwang Wu, Gang Li, Yu Meng, Li Wang, Weili Lin, and Dinggang Shen</i>	
Developmental Patterns Based Individualized Parcellation of Infant Cortical Surface	66
<i>Gang Li, Li Wang, Weili Lin, and Dinggang Shen</i>	
Longitudinal Modeling of Multi-modal Image Contrast Reveals Patterns of Early Brain Growth.	75
<i>Avantika Vardhan, James Fishbaugh, Clement Vachet, and Guido Gerig</i>	

Prediction of Brain Network Age and Factors of Delayed Maturation in Very Preterm Infants	84
<i>Colin J. Brown, Kathleen P. Moriarty, Steven P. Miller, Brian G. Booth, Jill G. Zwicker, Ruth E. Grunau, Anne R. Synnes, Vann Chau, and Ghassan Hamarneh</i>	
Falx Cerebri Segmentation via Multi-atlas Boundary Fusion	92
<i>Jeffrey Glaister, Aaron Carass, Dzung L. Pham, John A. Butman, and Jerry L. Prince</i>	
A 3D Femoral Head Coverage Metric for Enhanced Reliability in Diagnosing Hip Dysplasia	100
<i>Niamul Quader, Antony J. Hodgson, Kishore Mulpuri, Anthony Cooper, and Rafeef Abugharbieh</i>	
Learning-Based Multi-atlas Segmentation of the Lungs and Lobes in Proton MR Images	108
<i>Hoileong Lee, Tahreema Matin, Fergus Gleeson, and Vicente Grau</i>	
Unsupervised Discovery of Spatially-Informed Lung Texture Patterns for Pulmonary Emphysema: The MESA COPD Study	116
<i>Jie Yang, Elsa D. Angelini, Pallavi P. Balte, Eric A. Hoffman, John H.M. Austin, Benjamin M. Smith, Jingkuan Song, R. Graham Barr, and Andrew F. Laine</i>	
 Shape and Patch-Based Techniques	
Automatic Landmark Estimation for Adolescent Idiopathic Scoliosis Assessment Using BoostNet	127
<i>Hongbo Wu, Chris Bailey, Parham Rasoulinejad, and Shuo Li</i>	
Nonlinear Statistical Shape Modeling for Ankle Bone Segmentation Using a Novel Kernelized Robust PCA	136
<i>Jingting Ma, Anqi Wang, Feng Lin, Stefan Wesarg, and Marius Erdt</i>	
Adaptable Landmark Localisation: Applying Model Transfer Learning to a Shape Model Matching System	144
<i>C. Lindner, D. Waring, B. Thiruvengkatachari, K. O'Brien, and T.F. Cootes</i>	
Representative Patch-based Active Appearance Models Generated from Small Training Populations	152
<i>Matthias Wilms, Heinz Handels, and Jan Ehrhardt</i>	
Integrating Statistical Prior Knowledge into Convolutional Neural Networks	161
<i>Fausto Milletari, Alex Rothberg, Jimmy Jia, and Michal Sofka</i>	

Statistical Shape Model of Nested Structures Based on the Level Set. 169
Atsushi Saito, Masaki Tsujikawa, Tetsuya Takakuwa, Shigehito Yamada, and Akinobu Shimizu

Locally Adaptive Probabilistic Models for Global Segmentation of Pathological OCT Scans 177
Fabian Rathke, Mattia Desana, and Christoph Schnörr

Learning Deep Features for Automated Placement of Correspondence Points on Ensembles of Complex Shapes 185
Praful Agrawal, Ross T. Whitaker, and Shireen Y. Elhabian

Robust Multi-scale Anatomical Landmark Detection in Incomplete 3D-CT Data 194
Florin C. Ghesu, Bogdan Georgescu, Sasa Grbic, Andreas K. Maier, Joachim Hornegger, and Dorin Comaniciu

Learning and Incorporating Shape Models for Semantic Segmentation. 203
H. Ravishankar, R. Venkataramani, S. Thiruvenkadam, P. Sudhakar, and V. Vaidya

Surface-Wise Texture Patch Analysis of Combined MRI and PET to Detect MRI-Negative Focal Cortical Dysplasia 212
Hosung Kim, Yee-Leng Tan, Seunghyun Lee, Anthony James Barkovich, Duan Xu, and Robert Knowlton

Registration Techniques

Training CNNs for Image Registration from Few Samples with Model-based Data Augmentation 223
Hristina Uzunova, Matthias Wilms, Heinz Handels, and Jan Ehrhardt

Nonrigid Image Registration Using Multi-scale 3D Convolutional Neural Networks. 232
Hessam Sokooti, Bob de Vos, Floris Berendsen, Boudewijn P.F. Lelieveldt, Ivana Išgum, and Marius Staring

Multimodal Image Registration with Deep Context Reinforcement Learning 240
Kai Ma, Jiangping Wang, Vivek Singh, Birgi Tamersoy, Yao-Jen Chang, Andreas Wimmer, and Terrence Chen

Directional Averages for Motion Segmentation in Discontinuity Preserving Image Registration. 249
Christoph Jud, Robin Sandkühler, Nadia Möri, and Philippe C. Cattin

ℓ_2 Similarity Metrics for Diffusion Multi-Compartment Model Images Registration	257
<i>Olivier Commowick, Renaud Hédouin, Emmanuel Caruyer, and Christian Barillot</i>	
SVF-Net: Learning Deformable Image Registration Using Shape Matching	266
<i>Marc-Michel Rohé, Manasi Datar, Tobias Heimann, Maxime Sermesant, and Xavier Pennec</i>	
A Large Deformation Diffeomorphic Approach to Registration of CLARITY Images via Mutual Information	275
<i>Kwame S. Kutton, Nicolas Charon, Michael I. Miller, J. Tilak Ratnanather, Jordan Matelsky, Alexander D. Baden, Kunal Lillaney, Karl Deisseroth, Li Ye, and Joshua T. Vogelstein</i>	
Mixed Metric Random Forest for Dense Correspondence of Cone-Beam Computed Tomography Images.	283
<i>Yuru Pei, Yunai Yi, Gengyu Ma, Yuke Guo, Gui Chen, Tianmin Xu, and Hongbin Zha</i>	
Optimal Transport for Diffeomorphic Registration.	291
<i>Jean Feydy, Benjamin Charlier, François-Xavier Vialard, and Gabriel Peyré</i>	
Deformable Image Registration Based on Similarity-Steered CNN Regression	300
<i>Xiaohuan Cao, Jianhua Yang, Jun Zhang, Dong Nie, Minjeong Kim, Qian Wang, and Dinggang Shen</i>	
Generalised Coherent Point Drift for Group-Wise Registration of Multi-dimensional Point Sets	309
<i>Nishant Ravikumar, Ali Gooya, Alejandro F. Frangi, and Zeike A. Taylor</i>	
Fast Geodesic Regression for Population-Based Image Analysis	317
<i>Yi Hong, Polina Golland, and Miaomiao Zhang</i>	
Deformable Registration of a Preoperative 3D Liver Volume to a Laparoscopy Image Using Contour and Shading Cues.	326
<i>Bongjin Koo, Erol Özgür, Bertrand Le Roy, Emmanuel Buc, and Adrien Bartoli</i>	
Parameter Sensitivity Analysis in Medical Image Registration Algorithms Using Polynomial Chaos Expansions.	335
<i>Gokhan Gunay, Sebastian van der Voort, Manh Ha Luu, Adriaan Moelker, and Stefan Klein</i>	

Robust Non-rigid Registration Through Agent-Based Action Learning. 344
*Julian Krebs, Tommaso Mansi, Hervé Delingette, Li Zhang,
Florin C. Ghesu, Shun Miao, Andreas K. Maier, Nicholas Ayache,
Rui Liao, and Ali Kamen*

Selecting the Optimal Sequence for Deformable Registration of Microscopy
Image Sequences Using Two-Stage MST-based Clustering Algorithm 353
Baidya Nath Saha, Nilanjan Ray, Sara McArdle, and Klaus Ley

Functional Imaging, Connectivity, and Brain Parcellation

Dynamic Regression for Partial Correlation and Causality Analysis
of Functional Brain Networks. 365
Lipeng Ning and Yogesh Rathi

Kernel-Regularized ICA for Computing Functional Topography
from Resting-State fMRI 373
Junyan Wang and Yonggang Shi

N-way Decomposition: Towards Linking Concurrent EEG and fMRI
Analysis During Natural Stimulus 382
*Jinglei Lv, Vinh Thai Nguyen, Johan van der Meer, Michael Breakspear,
and Christine Cong Guo*

Connectome-Based Pattern Learning Predicts Histology and Surgical
Outcome of Epileptogenic Malformations of Cortical Development 390
*Seok-Jun Hong, Boris Bernhardt, Ravnoor Gill, Neda Bernasconi,
and Andrea Bernasconi*

Joint Representation of Connectome-Scale Structural and Functional
Profiles for Identification of Consistent Cortical Landmarks
in Human Brains. 398
Shu Zhang, Xi Jiang, and Tianming Liu

Subject-Specific Structural Parcellations Based on Randomized
AB-divergences 407
*Nicolas Honnorat, Drew Parker, Birkan Tunç, Christos Davatzikos,
and Ragini Verma*

Improving Functional MRI Registration Using Whole-Brain Functional
Correlation Tensors 416
*Yujia Zhou, Pew-Thian Yap, Han Zhang, Lichi Zhang, Qianjin Feng,
and Dinggang Shen*

Multi-way Regression Reveals Backbone of Macaque Structural Brain
Connectivity in Longitudinal Datasets 424
Tuo Zhang, Xiao Li, Lin Zhao, Xintao Hu, Tianming Liu, and Lei Guo

Multimodal Hyper-connectivity Networks for MCI Classification	433
<i>Yang Li, Xinqiang Gao, Biao Jie, Pew-Thian Yap, Minjeong Kim, Chong-Yaw Wee, and Dinggang Shen</i>	
Multi-modal EEG and fMRI Source Estimation Using Sparse Constraints . . .	442
<i>Saman Noorzadeh, Pierre Maurel, Thomas Oberlin, Rémi Gribonval, and Christian Barillot</i>	
Statistical Learning of Spatiotemporal Patterns from Longitudinal Manifold-Valued Networks.	451
<i>I. Koval, J.-B. Schiratti, A. Routier, M. Bacci, O. Colliot, S. Allasonnière, and S. Durrleman</i>	
Population-Shrinkage of Covariance to Estimate Better Brain Functional Connectivity	460
<i>Mehdi Rahim, Bertrand Thirion, and Gaël Varoquaux</i>	
Distance Metric Learning Using Graph Convolutional Networks: Application to Functional Brain Networks	469
<i>Sofia Ira Ktena, Sarah Parisot, Enzo Ferrante, Martin Rajchl, Matthew Lee, Ben Glocker, and Daniel Rueckert</i>	
A Submodular Approach to Create Individualized Parcellations of the Human Brain.	478
<i>Mehraveh Salehi, Amin Karbasi, Dustin Scheinost, and R. Todd Constable</i>	
BrainSync: An Orthogonal Transformation for Synchronization of fMRI Data Across Subjects	486
<i>Anand A. Joshi, Minqi Chong, and Richard M. Leahy</i>	
Supervised Discriminative EEG Brain Source Imaging with Graph Regularization	495
<i>Feng Liu, Rahilsadat Hosseini, Jay Rosenberger, Shouyi Wang, and Jianzhong Su</i>	
Inference and Visualization of Information Flow in the Visual Pathway Using dMRI and EEG	505
<i>Samuel Deslauriers-Gauthier, Jean-Marc Lina, Russell Butler, Pierre-Michel Bernier, Kevin Whittingstall, Rachid Deriche, and Maxime Descoteaux</i>	

**Diffusion Magnetic Resonance Imaging (dMRI)
and Tensor/Fiber Processing**

Evaluating 35 Methods to Generate Structural Connectomes Using Pairwise Classification	515
<i>Dmitry Petrov, Alexander Ivanov, Joshua Faskowitz, Boris Gutman, Daniel Moyer, Julio Villalon, Neda Jahanshad, and Paul Thompson</i>	
Dynamic Field Mapping and Motion Correction Using Interleaved Double Spin-Echo Diffusion MRI	523
<i>Jana Hutter, Daan Christiaens, Maria Deprez, Lucilio Cordero-Grande, Paddy Slator, Anthony Price, Mary Rutherford, and Joseph V. Hajnal</i>	
A Novel Anatomically-Constrained Global Tractography Approach to Monitor Sharp Turns in Gyri	532
<i>Achille Teillac, Justine Beaujoin, Fabrice Poupon, Jean-Francois Mangin, and Cyril Poupon</i>	
Learn to Track: Deep Learning for Tractography.	540
<i>Philippe Poulin, Marc-Alexandre Côté, Jean-Christophe Houde, Laurent Petit, Peter F. Neher, Klaus H. Maier-Hein, Hugo Larochelle, and Maxime Descoteaux</i>	
FiberNET: An Ensemble Deep Learning Framework for Clustering White Matter Fibers	548
<i>Vikash Gupta, Sophia I. Thomopoulos, Faisal M. Rashid, and Paul M. Thompson</i>	
Supra-Threshold Fiber Cluster Statistics for Data-Driven Whole Brain Tractography Analysis	556
<i>Fan Zhang, Weining Wu, Lipeng Ning, Gloria McAnulty, Deborah Waber, Borjan Gagoski, Kiera Sarill, Hesham M. Hamoda, Yang Song, Weidong Cai, Yogesh Rathi, and Lauren J. O'Donnell</i>	
White Matter Fiber Representation Using Continuous Dictionary Learning.	566
<i>Guy Alexandroni, Yana Podolsky, Hayit Greenspan, Tal Remez, Or Litany, Alexander Bronstein, and Raja Giryes</i>	
Fiber Orientation Estimation Guided by a Deep Network.	575
<i>Chuyang Ye and Jerry L. Prince</i>	
FOD Restoration for Enhanced Mapping of White Matter Lesion Connectivity	584
<i>Wei Sun, Lilyana Amezcua, and Yonggang Shi</i>	
Learning-Based Ensemble Average Propagator Estimation	593
<i>Chuyang Ye</i>	

A Sparse Bayesian Learning Algorithm for White Matter Parameter Estimation from Compressed Multi-shell Diffusion MRI	602
<i>Pramod Kumar Pisharady, Stamatiios N. Sotiropoulos, Guillermo Sapiro, and Christophe Lenglet</i>	
Bayesian Image Quality Transfer with CNNs: Exploring Uncertainty in dMRI Super-Resolution	611
<i>Ryutaro Tanno, Daniel E. Worrall, Aurobrata Ghosh, Enrico Kaden, Stamatiios N. Sotiropoulos, Antonio Criminisi, and Daniel C. Alexander</i>	
q -Space Upsampling Using x - q Space Regularization.	620
<i>Geng Chen, Bin Dong, Yong Zhang, Dinggang Shen, and Pew-Thian Yap</i>	
Neighborhood Matching for Curved Domains with Application to Denoising in Diffusion MRI.	629
<i>Geng Chen, Bin Dong, Yong Zhang, Dinggang Shen, and Pew-Thian Yap</i>	
Gray Matter Surface Based Spatial Statistics (GS-BSS) in Diffusion Microstructure	638
<i>Prasanna Parvathaneni, Baxter P. Rogers, Yuankai Huo, Kurt G. Schilling, Allison E. Hainline, Adam W. Anderson, Neil D. Woodward, and Bennett A. Landman</i>	
A Bag-of-Features Approach to Predicting TMS Language Mapping Results from DSI Tractography.	647
<i>Mohammad Khatami, Katrin Sakreida, Georg Neuloh, and Thomas Schultz</i>	
Patient-Specific Skeletal Muscle Fiber Modeling from Structure Tensor Field of Clinical CT Images	656
<i>Yoshito Otake, Futoshi Yokota, Norio Fukuda, Masaki Takao, Shu Takagi, Naoto Yamamura, Lauren J. O'Donnell, Carl-Fredrik Westin, Nobuhiko Sugano, and Yoshinobu Sato</i>	
Revealing Hidden Potentials of the q -Space Signal in Breast Cancer	664
<i>Paul F. Jäger, Sebastian Bickelhaupt, Frederik Bernd Laun, Wolfgang Lederer, Daniel Heidi, Tristan Anselm Kuder, Daniel Paech, David Bonekamp, Alexander Radbruch, Stefan Delorme, Heinz-Peter Schlemmer, Franziska Steudle, and Klaus H. Maier-Hein</i>	
Denoising Moving Heart Wall Fibers Using Cartan Frames	672
<i>Babak Samari, Tristan Aumentado-Armstrong, Gustav Strijkers, Martijn Froeling, and Kaleem Siddiqi</i>	

TBS: Tensor-Based Supervoxels for Unfolding the Heart 681
*Hirohisa Oda, Holger R. Roth, Kanwal K. Bhatia, Masahiro Oda,
 Takayuki Kitasaka, Toshiaki Akita, Julia A. Schnabel, and Kensaku Mori*

Image Segmentation and Modelling

A Fixed-Point Model for Pancreas Segmentation in Abdominal CT Scans . . . 693
*Yuyin Zhou, Lingxi Xie, Wei Shen, Yan Wang, Elliot K. Fishman,
 and Alan L. Yuille*

Semi-supervised Learning for Biomedical Image Segmentation
 via Forest Oriented Super Pixels(Voxels) 702
*Lin Gu, Yinqiang Zheng, Ryoma Bise, Imari Sato, Nobuaki Imanishi,
 and Sadakazu Aiso*

Towards Automatic Semantic Segmentation in Volumetric Ultrasound. 711
*Xin Yang, Lequan Yu, Shengli Li, Xu Wang, Na Wang, Jing Qin,
 Dong Ni, and Pheng-Ann Heng*

Automatic Quality Control of Cardiac MRI Segmentation in Large-Scale
 Population Imaging 720
*Robert Robinson, Vanya V. Valindria, Wenjia Bai, Hideaki Suzuki,
 Paul M. Matthews, Chris Page, Daniel Rueckert, and Ben Glocker*

Towards Image-Guided Pancreas and Biliary Endoscopy:
 Automatic Multi-organ Segmentation on Abdominal CT
 with Dense Dilated Networks 728
*Eli Gibson, Francesco Giganti, Yipeng Hu, Ester Bonmati,
 Steve Bandula, Kurinchi Gurusamy, Brian R. Davidson,
 Stephen P. Pereira, Matthew J. Clarkson, and Dean C. Barratt*

Holistic Segmentation of Intermuscular Adipose Tissues on Thigh MRI. 737
*Jianhua Yao, William Kovacs, Nathan Hsieh, Chia-Ying Liu,
 and Ronald M. Summers*

Spatiotemporal Segmentation and Modeling of the Mitral Valve
 in Real-Time 3D Echocardiographic Images 746
*Alison M. Pouch, Ahmed H. Aly, Eric K. Lai, Natalie Yushkevich,
 Rutger H. Stoffers, Joseph H. Gorman IV, Albert T. Cheung,
 Joseph H. Gorman III, Robert C. Gorman, and Paul A. Yushkevich*

Unbiased Shape Compactness for Segmentation 755
Jose Dolz, Ismail Ben Ayed, and Christian Desrosiers

Joint Reconstruction and Segmentation of 7T-like MR Images
 from 3T MRI Based on Cascaded Convolutional Neural Networks 764
Khosro Bahrami, Islem Rekik, Feng Shi, and Dinggang Shen

Development of a μ CT-based Patient-Specific Model of the Electrically Stimulated Cochlea	773
<i>Ahmet Cakir, Benoit M. Dawant, and Jack H. Noble</i>	
Compresso: Efficient Compression of Segmentation Data for Connectomics	781
<i>Brian Matejek, Daniel Haehn, Fritz Lekschas, Michael Mitzenmacher, and Hanspeter Pfister</i>	
Combining Spatial and Non-spatial Dictionary Learning for Automated Labeling of Intra-ventricular Hemorrhage in Neonatal Brain MRI	789
<i>Mengyuan Liu, Steven P. Miller, Vann Chau, and Colin Studholme</i>	
Author Index	799

Contents – Part II

Optical Imaging

Cell Lineage Tracing in Lens-Free Microscopy Videos	3
<i>Markus Rempfler, Sanjeev Kumar, Valentin Stierle, Philipp Paulitschke, Bjoern Andres, and Bjoern H. Menze</i>	
Separation of Transmitted Light and Scattering Components in Transmitted Microscopy	12
<i>Mihoko Shimano, Ryoma Bise, Yinqiang Zheng, and Imari Sato</i>	
Neuron Segmentation Using Deep Complete Bipartite Networks	21
<i>Jianxu Chen, Sreya Banerjee, Abhinav Grama, Walter J. Scheirer, and Danny Z. Chen</i>	
Cell Encoding for Histopathology Image Classification	30
<i>Xiaoshuang Shi, Fuyong Xing, Yuanpu Xie, Hai Su, and Lin Yang</i>	
Endoscopic Depth Measurement and Super-Spectral-Resolution Imaging	39
<i>Jianyu Lin, Neil T. Clancy, Yang Hu, Ji Qi, Taran Tatla, Danail Stoyanov, Lena Maier-Hein, and Daniel S. Elson</i>	
Computational Immunohistochemistry: Recipes for Standardization of Immunostaining	48
<i>Nuri Murat Arar, Pushpak Pati, Aditya Kashyap, Anna Fomitcheva Khartchenko, Orcun Goksel, Govind V. Kaigala, and Maria Gabrani</i>	
Two-Stream Bidirectional Long Short-Term Memory for Mitosis Event Detection and Stage Localization in Phase-Contrast Microscopy Images.	56
<i>Yunxiang Mao and Zhaozheng Yin</i>	
Refocusing Phase Contrast Microscopy Images.	65
<i>Liang Han and Zhaozheng Yin</i>	
Semi-supervised Segmentation of Optic Cup in Retinal Fundus Images Using Variational Autoencoder	75
<i>Suman Sedai, Dwarikanath Mahapatra, Sajini Hewavitharanage, Stefan Maetschke, and Rahil Garnavi</i>	
QuaSI: Quantile Sparse Image Prior for Spatio-Temporal Denoising of Retinal OCT Data	83
<i>Franziska Schirrmacher, Thomas Köhler, Lennart Husvogt, James G. Fujimoto, Joachim Hornegger, and Andreas K. Maier</i>	

Fast Background Removal Method for 3D Multi-channel Deep Tissue Fluorescence Imaging	92
<i>Chenchen Li, Xiaowei Li, Hongji Cao, He Jiang, Xiaotie Deng, Danny Z. Chen, Lin Yang, and Zhifeng Shao</i>	
Fast Estimation of Haemoglobin Concentration in Tissue Via Wavelet Decomposition	100
<i>Geoffrey Jones, Neil T. Clancy, Xiaofei Du, Maria Robu, Simon Arridge, Daniel S. Elson, and Danail Stoyanov</i>	
Efficient Reconstruction of Holographic Lens-Free Images by Sparse Phase Recovery	109
<i>Benjamin D. Haeffele, Richard Stahl, Geert Vanmeerbeeck, and René Vidal</i>	
Quality Assessment of Retinal Hyperspectral Images Using SURF and Intensity Features	118
<i>Faten M'hiri, Claudia Chevretils, and Jean-Philippe Sylvestre</i>	
Isotropic Reconstruction of 3D Fluorescence Microscopy Images Using Convolutional Neural Networks	126
<i>Martin Weigert, Loic Royer, Florian Jug, and Gene Myers</i>	
Deep Learning for Isotropic Super-Resolution from Non-isotropic 3D Electron Microscopy	135
<i>Larissa Heinrich, John A. Bogovic, and Stephan Saalfeld</i>	
Histological Detection of High-Risk Benign Breast Lesions from Whole Slide Images	144
<i>Akif Burak Tosun, Luong Nguyen, Nathan Ong, Olga Navolotskaia, Gloria Carter, Jeffrey L. Fine, D. Lansing Taylor, and S. Chakra Chennubhotla</i>	
Accurate Correspondence of Cone Photoreceptor Neurons in the Human Eye Using Graph Matching Applied to Longitudinal Adaptive Optics Images	153
<i>Jianfei Liu, HaeWon Jung, and Johnny Tam</i>	
Airway and Vessel Analysis	
Active Learning and Proofreading for Delineation of Curvilinear Structures . . .	165
<i>Agata Mosinska, Jakub Tarnawski, and Pascal Fua</i>	
Tracking the Aortic Lumen Geometry by Optimizing the 3D Orientation of Its Cross-sections	174
<i>Luis Alvarez, Agustín Trujillo, Carmelo Cuenca, Esther González, Julio Esclarín, Luis Gomez, Luis Mazorra, Miguel Alemán-Flores, Pablo G. Tahoces, and José M. Carreira</i>	

BRANCH:Bifurcation Recognition for Airway Navigation based on struCtural cHaracteristics 182
Mali Shen, Stamatia Giannarou, Pallav L. Shah, and Guang-Zhong Yang

Anatomy-Driven Modelling of Spatial Correlation for Regularisation of Arterial Spin Labelling Images 190
David Owen, Andrew Melbourne, Zach Eaton-Rosen, David L. Thomas, Neil Marlow, Jonathan Rohrer, and Sebastien Ourselin

Tracking and Segmentation of the Airways in Chest CT Using a Fully Convolutional Network 198
Qier Meng, Holger R. Roth, Takayuki Kitasaka, Masahiro Oda, Junji Ueno, and Kensaku Mori

Automatic Labeling of Vascular Structures with Topological Constraints via HMM 208
Xingce Wang, Yue Liu, Zhongke Wu, Xiao Mou, Mingquan Zhou, Miguel A. González Ballester, and Chong Zhang

Biomechanical Patient-Specific Model of the Respiratory System Based on 4D CT Scans and Controlled by Personalized Physiological Compliance . . . 216
Matthieu Giroux, Hamid Ladjal, Michael Beuve, and Behzad Shariat

CT Image Enhancement for Feature Detection and Localization 224
Pietro Nardelli, James C. Ross, and Raúl San José Estépar

Information Theoretic Measurement of Blood Flow Complexity in Vessels and Aneurysms: Interlacing Complexity Index 233
Jose M. Pozo, Arjan J. Geers, and Alejandro F. Frangi

Globally-Optimal Anatomical Tree Extraction from 3D Medical Images Using Pictorial Structures and Minimal Paths 242
Zahra Mirikharaji, Mengliu Zhao, and Ghassan Hamarneh

Motion and Cardiac Analysis

Semi-supervised Learning for Network-Based Cardiac MR Image Segmentation 253
Wenjia Bai, Ozan Oktay, Matthew Sinclair, Hideaki Suzuki, Martin Rajchl, Giacomo Tarroni, Ben Glocker, Andrew King, Paul M. Matthews, and Daniel Rueckert

A Localized Statistical Motion Model as a Reproducing Kernel for Non-rigid Image Registration. 261
Christoph Jud, Alina Giger, Robin Sandkühler, and Philippe C. Cattin

Efficient Deformable Motion Correction for 3-D Abdominal MRI
Using Manifold Regression 270
*Xin Chen, Daniel R. Balfour, Paul K. Marsden, Andrew J. Reader,
Claudia Prieto, and Andrew P. King*

Flow Network Based Cardiac Motion Tracking Leveraging Learned
Feature Matching 279
*Nripesh Parajuli, Allen Lu, John C. Stendahl, Maria Zontak,
Nabil Boutagy, Imran Alkhalil, Melissa Eberle, Ben A. Lin,
Matthew O’Donnell, Albert J. Sinusas, and James S. Duncan*

Automatic 3D Cardiovascular MR Segmentation with Densely-Connected
Volumetric ConvNets 287
*Lequan Yu, Jie-Zhi Cheng, Qi Dou, Xin Yang, Hao Chen, Jing Qin,
and Pheng-Ann Heng*

Predicting Slice-to-Volume Transformation in Presence
of Arbitrary Subject Motion 296
*Benjamin Hou, Amir Alansary, Steven McDonagh, Alice Davidson,
Mary Rutherford, Jo V. Hajnal, Daniel Rueckert, Ben Glocker,
and Bernhard Kainz*

Detection and Characterization of the Fetal Heartbeat in Free-hand
Ultrasound Sweeps with Weakly-supervised Two-streams
Convolutional Networks. 305
Yuan Gao and J. Alison Noble

Retrospective Head Motion Estimation in Structural Brain MRI
with 3D CNNs 314
*Juan Eugenio Iglesias, Garikoitz Lerma-Usabiaga,
Luis C. Garcia-Peraza-Herrera, Sara Martinez,
and Pedro M. Paz-Alonso*

Learning-Based Spatiotemporal Regularization and Integration of Tracking
Methods for Regional 4D Cardiac Deformation Analysis 323
*Allen Lu, Maria Zontak, Nripesh Parajuli, John C. Stendahl,
Nabil Boutagy, Melissa Eberle, Imran Alkhalil, Matthew O’Donnell,
Albert J. Sinusas, and James S. Duncan*

Fully Automated Segmentation-Based Respiratory Motion Correction of
Multiplanar Cardiac Magnetic Resonance Images for Large-Scale Datasets. . . 332
*Matthew Sinclair, Wenjia Bai, Esther Puyol-Antón, Ozan Oktay,
Daniel Rueckert, and Andrew P. King*

Temporal HeartNet: Towards Human-Level Automatic Analysis
of Fetal Cardiac Screening Video 341
*Weilin Huang, Christopher P. Bridge, J. Alison Noble,
and Andrew Zisserman*

Longitudinal Analysis Using Personalised 3D Cardiac Models with Population-Based Priors: Application to Paediatric Cardiomyopathies . . .	350
<i>Roch Mollero, Hervé Delingette, Manasi Datar, Tobias Heimann, Jakob A. Hauser, Dilveer Panesar, Alexander Jones, Andrew Taylor, Marcus Kelm, Titus Kuehne, Marcello Chinali, Gabriele Rinelli, Nicholas Ayache, Xavier Pennec, and Maxime Sermesant</i>	
Temporal Interpolation of Abdominal MRIs Acquired During Free-Breathing	359
<i>Neerav Karani, Christine Tanner, Sebastian Kozerke, and Ender Konukoglu</i>	
Intraoperative Organ Motion Models with an Ensemble of Conditional Generative Adversarial Networks	368
<i>Yipeng Hu, Eli Gibson, Tom Vercauteren, Hashim U. Ahmed, Mark Emberton, Caroline M. Moore, J. Alison Noble, and Dean C. Barratt</i>	
<i>CardiacNET</i> : Segmentation of Left Atrium and Proximal Pulmonary Veins from MRI Using Multi-view CNN	377
<i>Aliasghar Mortazi, Rashed Karim, Kawal Rhode, Jeremy Burt, and Ulas Bagci</i>	
Analysis of Periodicity in Video Sequences Through Dynamic Linear Modeling	386
<i>A. Jonathan McLeod, Dante P.I. Capaldi, John S.H. Baxter, Grace Parraga, Xiongbiao Luo, and Terry M. Peters</i>	
Tumor Processing	
Groupwise Registration of MR Brain Images Containing Tumors via Spatially Constrained Low-Rank Based Image Recovery.	397
<i>Zhenyu Tang, Yue Cui, and Bo Jiang</i>	
Deep Correlational Learning for Survival Prediction from Multi-modality Data	406
<i>Jiawen Yao, Xinliang Zhu, Feiyun Zhu, and Junzhou Huang</i>	
Compressed Sensing on Multi-pinhole Collimator SPECT Camera for Sentinel Lymph Node Biopsy	415
<i>Carlo Seppi, Uri Nahum, Peter A. von Niederhäusern, Simon Pezold, Michael Rissi, Stephan K. Haerle, and Philippe C. Cattin</i>	
Personalized Pancreatic Tumor Growth Prediction via Group Learning	424
<i>Ling Zhang, Le Lu, Ronald M. Summers, Electron Kebebew, and Jianhua Yao</i>	

Boundary-Aware Fully Convolutional Network for Brain Tumor Segmentation 433
Haocheng Shen, Ruixuan Wang, Jianguo Zhang, and Stephen J. McKenna

Field Effect Induced Organ Distension (FORge) Features Predicting Biochemical Recurrence from Pre-treatment Prostate MRI 442
Soumya Ghose, Rakesh Shiradkar, Mirabela Rusu, Jhimli Mitra, Rajat Thawani, Michael Feldman, Amar Gupta, Andrei Purysko, Lee Ponsky, and Anant Madabhushi

Multi-label Inductive Matrix Completion for Joint MGMT and IDH1 Status Prediction for Glioma Patients. 450
Lei Chen, Han Zhang, Kim-Han Thung, Luyan Liu, Junfeng Lu, Jinsong Wu, Qian Wang, and Dinggang Shen

Radiographic-Deformation and Textural Heterogeneity (r-DepTH): An Integrated Descriptor for Brain Tumor Prognosis 459
Prateek Prasanna, Jhimli Mitra, Niha Beig, Sasan Partovi, Gagandeep Singh, Marco Pinho, Anant Madabhushi, and Pallavi Tiwari

RADIomic Spatial TexturAl descripTor (RADISTAT): Characterizing Intra-tumoral Heterogeneity for Response and Outcome Prediction 468
Jacob Antunes, Prateek Prasanna, Anant Madabhushi, Pallavi Tiwari, and Satish Viswanath

Planning and Simulation for Medical Interventions

Locally Affine Diffeomorphic Surface Registration for Planning of Metopic Craniosynostosis Surgery. 479
Antonio R. Porras, Beatriz Paniagua, Andinet Enquobahrie, Scott Ensel, Hina Shah, Robert Keating, Gary F. Rogers, and Marius George Linguraru

A Time Saver: Optimization Approach for the Fully Automatic 3D Planning of Forearm Osteotomies 488
Fabio Carrillo, Lazaros Vlachopoulos, Andreas Schweizer, Ladislav Nagy, Jess Snedeker, and Philipp Fürnstahl

DARWIN: Deformable Patient Avatar Representation With Deep Image Network. 497
Vivek Singh, Kai Ma, Birgi Tamersoy, Yao-Jen Chang, Andreas Wimmer, Thomas O'Donnell, and Terrence Chen

Simultaneous Recognition and Pose Estimation of Instruments in Minimally Invasive Surgery	505
<i>Thomas Kurmann, Pablo Marquez Neila, Xiaofei Du, Pascal Fua, Danail Stoyanov, Sebastian Wolf, and Raphael Sznitman</i>	
A Comparative Study of Breast Surface Reconstruction for Aesthetic Outcome Assessment	514
<i>René M. Lacher, Francisco Vasconcelos, David C. Bishop, Norman R. Williams, Mohammed Keshtgar, David J. Hawkes, John H. Hipwell, and Danail Stoyanov</i>	
DejaVu: Intra-operative Simulation for Surgical Gesture Rehearsal	523
<i>Nazim Haouchine, Danail Stoyanov, Frederick Roy, and Stephane Cotin</i>	
An Optimal Control Approach for High Intensity Focused Ultrasound Self-Scanning Treatment Planning	532
<i>Nadia Möri, Laura Gui, Christoph Jud, Orane Lorton, Rares Salomir, and Philippe C. Cattin</i>	
A Mixed-Reality Approach to Radiation-Free Training of C-arm Based Surgery	540
<i>Philipp Stefan, Séverine Habert, Alexander Winkler, Marc Lazarovici, Julian Fürmetz, Ulrich Eck, and Nassir Navab</i>	
Image-Driven Stochastic Identification of Boundary Conditions for Predictive Simulation	548
<i>Igor Peterlik, Nazim Haouchine, Lukáš Ručka, and Stéphane Cotin</i>	
Toward Computer-Assisted Planning for Interstitial Laser Ablation of Malignant Brain Tumors Using a Tubular Continuum Robot	557
<i>Josephine Granna, Arya Nabavi, and Jessica Burgner-Kahrs</i>	
Providing Effective Real-Time Feedback in Simulation-Based Surgical Training	566
<i>Xingjun Ma, Sudanthi Wijewickrema, Yun Zhou, Shuo Zhou, Stephen O’Leary, and James Bailey</i>	
Interventional Imaging and Navigation	
Fully Automatic and Real-Time Catheter Segmentation in X-Ray Fluoroscopy	577
<i>Pierre Ambrosini, Daniel Ruijters, Wiro J. Niessen, Adriaan Moelker, and Theo van Walsum</i>	
Deep Neural Networks Predict Remaining Surgery Duration from Cholecystectomy Videos	586
<i>Ivan Aksamentov, Andru Putra Twinanda, Didier Mutter, Jacques Marescaux, and Nicolas Padoy</i>	

UV Exposed Optical Fibers with Frequency Domain Reflectometry for Device Tracking in Intra-arterial Procedures	594
<i>Francois Parent, Maxime Gerard, Raman Kashyap, and Samuel Kadoury</i>	
Real-Time 3D Ultrasound Reconstruction and Visualization in the Context of Laparoscopy	602
<i>Uditha L. Jayarathne, John Moore, Elvis C.S. Chen, Stephen E. Pautler, and Terry M. Peters</i>	
Improving Needle Detection in 3D Ultrasound Using Orthogonal-Plane Convolutional Networks.	610
<i>Arash Pourtaherian, Farhad Ghazvinian Zanjani, Svitlana Zinger, Nenad Mihajlovic, Gary Ng, Hendrikus Korsten, and Peter de With</i>	
Motion-Compensated Autonomous Scanning for Tumour Localisation Using Intraoperative Ultrasound	619
<i>Lin Zhang, Menglong Ye, Stamatia Giannarou, Philip Pratt, and Guang-Zhong Yang</i>	
Deep Learning for Sensorless 3D Freehand Ultrasound Imaging	628
<i>Raphael Prevost, Mehrdad Salehi, Julian Sprung, Robert Bauer, and Wolfgang Wein</i>	
Ultrasonic Needle Tracking with a Fibre-Optic Ultrasound Transmitter for Guidance of Minimally Invasive Fetal Surgery	637
<i>Wenfeng Xia, Sacha Noimark, Sebastien Ourselin, Simeon J. West, Malcolm C. Finlay, Anna L. David, and Adrien E. Desjardins</i>	
Learning CNNs with Pairwise Domain Adaption for Real-Time 6DoF Ultrasound Transducer Detection and Tracking from X-Ray Images	646
<i>Jiannan Zheng, Shun Miao, and Rui Liao</i>	
An Approach for Needle Based Optical Coherence Elastography Measurements	655
<i>Sarah Latus, Christoph Otte, Matthias Schlüter, Josua Rehra, Kevin Bizon, Hinnerk Schulz-Hildebrandt, Thore Saathoff, Gereon Hüttmann, and Alexander Schlaefer</i>	
Concurrent Segmentation and Localization for Tracking of Surgical Instruments	664
<i>Iro Laina, Nicola Rieke, Christian Rupprecht, Josué Page Vizcaino, Abouzar Eslami, Federico Tombari, and Nassir Navab</i>	
Surgical Soundtracks: Towards Automatic Musical Augmentation of Surgical Procedures	673
<i>Sasan Matinfar, M. Ali Nasseri, Ulrich Eck, Hessam Roodaki, Navid Navab, Chris P. Lohmann, Mathias Maier, and Nassir Navab</i>	

Precise Ultrasound Bone Registration with Learning-Based Segmentation and Speed of Sound Calibration	682
<i>Mehrdad Salehi, Raphael Prevost, José-Luis Moctezuma, Nassir Navab, and Wolfgang Wein</i>	
Convolutional Neural Network and In-Painting Techniques for the Automatic Assessment of Scoliotic Spine Surgery from Biplanar Radiographs.	691
<i>B. Aubert, P.A. Vidal, S. Parent, T. Cresson, C. Vazquez, and J. De Guise</i>	
Medical Image Computing	
A Novel Automatic Segmentation Method to Quantify the Effects of Spinal Cord Injury on Human Thigh Muscles and Adipose Tissue	703
<i>Samineh Mesbah, Ahmed Shalaby, Sean Stills, Ahmed Soliman, Andrea Willhite, Susan Harkema, Enrico Rejc, and Ayman El-baz</i>	
OptiC: Robust and Automatic Spinal Cord Localization on a Large Variety of MRI Data Using a Distance Transform Based Global Optimization	712
<i>Charley Gros, Benjamin De Leener, Sara M. Dupont, Allan R. Martin, Michael G. Fehlings, Rohit Bakshi, Subhash Tummala, Vincent Auclair, Donald G. McLaren, Virginie Callot, Michaël Sdika, and Julien Cohen-Adad</i>	
Joint Craniomaxillofacial Bone Segmentation and Landmark Digitization by Context-Guided Fully Convolutional Networks.	720
<i>Jun Zhang, Mingxia Liu, Li Wang, Si Chen, Peng Yuan, Jianfu Li, Steve Guo-Fang Shen, Zhen Tang, Ken-Chung Chen, James J. Xia, and Dinggang Shen</i>	
Online Statistical Inference for Large-Scale Binary Images.	729
<i>Moo K. Chung, Ying Ji Chuang, and Hourii K. Vorperian</i>	
Short Acquisition Time PET Quantification Using MRI-Based Pharmacokinetic Parameter Synthesis.	737
<i>Catherine J. Scott, Jieqing Jiao, M. Jorge Cardoso, Andrew Melbourne, Enrico De Vita, David L. Thomas, Ninon Burgos, Pawel Markiewicz, Jonathan M. Schott, Brian F. Hutton, and Sébastien Ourselin</i>	
A Variational Approach to Sparse Model Error Estimation in Cardiac Electrophysiological Imaging	745
<i>Sandesh Ghimire, John L. Sapp, Milan Horacek, and Linwei Wang</i>	
Data-Driven Rank Aggregation with Application to Grand Challenges.	754
<i>James Fishbaugh, Marcel Prastawa, Bo Wang, Patrick Reynolds, Stephen Aylward, and Guido Gerig</i>	

Benchmarking Quantitative Imaging Biomarker Measurement Methods Without a Gold Standard	763
<i>Hennadii Madan, Franjo Pernuš, and Žiga Špiclin</i>	
Author Index	773

Contents – Part III

Feature Extraction and Classification Techniques

Deep Multi-task Multi-channel Learning for Joint Classification and Regression of Brain Status	3
<i>Mingxia Liu, Jun Zhang, Ehsan Adeli, and Dinggang Shen</i>	
Nonlinear Feature Space Transformation to Improve the Prediction of MCI to AD Conversion	12
<i>Pin Zhang, Bibo Shi, Charles D. Smith, and Jundong Liu</i>	
Kernel Generalized-Gaussian Mixture Model for Robust Abnormality Detection.	21
<i>Nitin Kumar, Ajit V. Rajwade, Sharat Chandran, and Suyash P. Awate</i>	
Latent Processes Governing Neuroanatomical Change in Aging and Dementia	30
<i>Christian Wachinger, Anna Rieckmann, and Martin Reuter</i>	
A Multi-armed Bandit to Smartly Select a Training Set from Big Medical Data	38
<i>Benjamín Gutiérrez, Loïc Peter, Tassilo Klein, and Christian Wachinger</i>	
Multi-level Multi-task Structured Sparse Learning for Diagnosis of Schizophrenia Disease	46
<i>Mingliang Wang, Xiaoke Hao, Jiashuang Huang, Kangcheng Wang, Xijia Xu, and Daoqiang Zhang</i>	
An Unbiased Penalty for Sparse Classification with Application to Neuroimaging Data	55
<i>Li Zhang, Dana Cobzas, Alan Wilman, and Linglong Kong</i>	
Unsupervised Feature Learning for Endomicroscopy Image Retrieval.	64
<i>Yun Gu, Khushi Vyas, Jie Yang, and Guang-Zhong Yang</i>	
Maximum Mean Discrepancy Based Multiple Kernel Learning for Incomplete Multimodality Neuroimaging Data	72
<i>Xiaofeng Zhu, Kim-Han Thung, Ehsan Adeli, Yu Zhang, and Dinggang Shen</i>	
Liver Tissue Classification in Patients with Hepatocellular Carcinoma by Fusing Structured and Rotationally Invariant Context Representation.	81
<i>John Treilhard, Susanne Smolka, Lawrence Staib, Julius Chapiro, MingDe Lin, Georgy Shakirin, and James S. Duncan</i>	

<p>DOTE: Dual cOnvolutional filTer lEarning for Super-Resolution and Cross-Modality Synthesis in MRI</p> <p><i>Yawen Huang, Ling Shao, and Alejandro F. Frangi</i></p>	89
<p>Supervised Intra-embedding of Fisher Vectors for Histopathology Image Classification</p> <p><i>Yang Song, Hang Chang, Heng Huang, and Weidong Cai</i></p>	99
<p>GSplit LBI: Taming the Procedural Bias in Neuroimaging for Disease Prediction.</p> <p><i>Xinwei Sun, Lingjing Hu, Yuan Yao, and Yizhou Wang</i></p>	107
<p>MRI-Based Surgical Planning for Lumbar Spinal Stenosis</p> <p><i>Gabriele Abbati, Stefan Bauer, Sebastian Winklhofer, Peter J. Schöffler, Ulrike Held, Jakob M. Burgstaller, Johann Steurer, and Joachim M. Buhmann</i></p>	116
<p>Pattern Visualization and Recognition Using Tensor Factorization for Early Differential Diagnosis of Parkinsonism</p> <p><i>Rui Li, Ping Wu, Igor Yakushev, Jian Wang, Sibylle I. Ziegler, Stefan Förster, Sung-Cheng Huang, Markus Schwaiger, Nassir Navab, Chuantao Zuo, and Kuangyu Shi</i></p>	125
<p>Physiological Parameter Estimation from Multispectral Images Unleashed . . .</p> <p><i>Sebastian J. Wirkert, Anant S. Vemuri, Hannes G. Kenngott, Sara Moccia, Michael Götz, Benjamin F.B. Mayer, Klaus H. Maier-Hein, Daniel S. Elson, and Lena Maier-Hein</i></p>	134
<p>Segmentation of Cortical and Subcortical Multiple Sclerosis Lesions Based on Constrained Partial Volume Modeling</p> <p><i>Mário João Fartaria, Alexis Roche, Reto Meuli, Cristina Granziera, Tobias Kober, and Meritxell Bach Cuadra</i></p>	142
<p>Classification of Pancreatic Cysts in Computed Tomography Images Using a Random Forest and Convolutional Neural Network Ensemble.</p> <p><i>Konstantin Dmitriev, Arie E. Kaufman, Ammar A. Javed, Ralph H. Hruban, Elliot K. Fishman, Anne Marie Lennon, and Joel H. Saltz</i></p>	150
<p>Classification of Major Depressive Disorder via Multi-site Weighted LASSO Model</p> <p><i>Dajiang Zhu, Brandalyn C. Riedel, Neda Jahanshad, Nynke A. Groenewold, Dan J. Stein, Ian H. Gotlib, Matthew D. Sacchet, Danai Dima, James H. Cole, Cynthia H.Y. Fu, Henrik Walter, Ilya M. Veer, Thomas Frodl, Lianne Schmaal, Dick J. Veltman, and Paul M. Thompson</i></p>	159

A Multi-atlas Approach to Region of Interest Detection for Medical Image Classification 168
Hongzhi Wang, Mehdi Moradi, Yaniv Gur, Prasanth Prasanna, and Tanveer Syeda-Mahmood

Spectral Graph Convolutions for Population-Based Disease Prediction 177
Sarah Parisot, Sofia Ira Ktena, Enzo Ferrante, Matthew Lee, Ricardo Guerrero Moreno, Ben Glocker, and Daniel Rueckert

Predicting Future Disease Activity and Treatment Responders for Multiple Sclerosis Patients Using a Bag-of-Lesions Brain Representation 186
Andrew Doyle, Doina Precup, Douglas L. Arnold, and Tal Arbel

Sparse Multi-kernel Based Multi-task Learning for Joint Prediction of Clinical Scores and Biomarker Identification in Alzheimer’s Disease 195
Peng Cao, Xiaoli Liu, Jinzhu Yang, Dazhe Zhao, and Osmar Zaiane

Machine Learning in Medical Image Computing

Personalized Diagnosis for Alzheimer’s Disease 205
Yingying Zhu, Minjeong Kim, Xiaofeng Zhu, Jin Yan, Daniel Kaufer, and Guorong Wu

GP-Unet: Lesion Detection from Weak Labels with a 3D Regression Network 214
Florian Dubost, Gerda Bortsova, Hieab Adams, Arfan Ikram, Wiro J. Niessen, Meike Vernooij, and Marleen De Bruijne

Deep Supervision for Pancreatic Cyst Segmentation in Abdominal CT Scans 222
Yuyin Zhou, Lingxi Xie, Elliot K. Fishman, and Alan L. Yuille

Error Corrective Boosting for Learning Fully Convolutional Networks with Limited Data 231
Abhijit Guha Roy, Sailesh Conjeti, Debdoot Sheet, Amin Katouzian, Nassir Navab, and Christian Wachinger

Direct Detection of Pixel-Level Myocardial Infarction Areas via a Deep-Learning Algorithm 240
Chenchu Xu, Lei Xu, Zhifan Gao, Shen Zhao, Heye Zhang, Yanping Zhang, Xiuquan Du, Shu Zhao, Dhanjoo Ghista, and Shuo Li

Skin Disease Recognition Using Deep Saliency Features and Multimodal Learning of Dermoscopy and Clinical Images 250
Zongyuan Ge, Sergey Demyanov, Rajib Chakravorty, Adrian Bowling, and Rahil Garnavi

Boundary Regularized Convolutional Neural Network for Layer Parsing of Breast Anatomy in Automated Whole Breast Ultrasound	259
<i>Cheng Bian, Ran Lee, Yi-Hong Chou, and Jie-Zhi Cheng</i>	
Zoom-in-Net: Deep Mining Lesions for Diabetic Retinopathy Detection.	267
<i>Zhe Wang, Yanxin Yin, Jianping Shi, Wei Fang, Hongsheng Li, and Xiaogang Wang</i>	
Full Quantification of Left Ventricle via Deep Multitask Learning Network Respecting Intra- and Inter-Task Relatedness	276
<i>Wufeng Xue, Andrea Lum, Ashley Mercado, Mark Landis, James Warrington, and Shuo Li</i>	
Scalable Multimodal Convolutional Networks for Brain Tumour Segmentation	285
<i>Lucas Fidon, Wenqi Li, Luis C. Garcia-Peraza-Herrera, Jinendra Ekanayake, Neil Kitchen, Sebastien Ourselin, and Tom Vercauteren</i>	
Pathological OCT Retinal Layer Segmentation Using Branch Residual U-Shape Networks	294
<i>Stefanos Apostolopoulos, Sandro De Zanet, Carlos Ciller, Sebastian Wolf, and Raphael Sznitman</i>	
Quality Assessment of Echocardiographic Cine Using Recurrent Neural Networks: Feasibility on Five Standard View Planes.	302
<i>Amir H. Abdi, Christina Luong, Teresa Tsang, John Jue, Ken Gin, Darwin Yeung, Dale Hawley, Robert Rohling, and Purang Abolmaesumi</i>	
Semi-supervised Deep Learning for Fully Convolutional Networks	311
<i>Christoph Baur, Shadi Albarqouni, and Nassir Navab</i>	
TandemNet: Distilling Knowledge from Medical Images Using Diagnostic Reports as Optional Semantic References.	320
<i>Zizhao Zhang, Pingjun Chen, Manish Sapkota, and Lin Yang</i>	
BRIEFnet: Deep Pancreas Segmentation Using Binary Sparse Convolutions	329
<i>Mattias P. Heinrich and Ozan Oktay</i>	
Supervised Action Classifier: Approaching Landmark Detection as Image Partitioning.	338
<i>Zhoubing Xu, Qiangui Huang, JinHyeong Park, Mingqing Chen, Daguang Xu, Dong Yang, David Liu, and S. Kevin Zhou</i>	
Robust Multi-modal MR Image Synthesis	347
<i>Thomas Joyce, Agisilaos Chartsias, and Sotirios A. Tsaftaris</i>	

Segmentation of Intracranial Arterial Calcification with Deeply Supervised Residual Dropout Networks	356
<i>Gerda Bortsova, Gijs van Tulder, Florian Dubost, Tingying Peng, Nassir Navab, Aad van der Lugt, Daniel Bos, and Marleen De Bruijne</i>	
Clinical Target-Volume Delineation in Prostate Brachytherapy Using Residual Neural Networks.	365
<i>Emran Mohammad Abu Anas, Saman Nouranian, S. Sara Mahdavi, Ingrid Spadinger, William J. Morris, Septimu E. Salcudean, Parvin Mousavi, and Purang Abolmaesumi</i>	
Using Convolutional Neural Networks to Automatically Detect Eye-Blink Artifacts in Magnetoencephalography Without Resorting to Electrooculography	374
<i>Prabhat Garg, Elizabeth Davenport, Gowtham Murugesan, Ben Wagner, Christopher Whitlow, Joseph Maldjian, and Albert Montillo</i>	
Image Super Resolution Using Generative Adversarial Networks and Local Saliency Maps for Retinal Image Analysis	382
<i>Dwarikanath Mahapatra, Behzad Bozorgtabar, Sajini Hewavitharanage, and Rahil Garnavi</i>	
Synergistic Combination of Learned and Hand-Crafted Features for Prostate Lesion Classification in Multiparametric Magnetic Resonance Imaging	391
<i>Davood Karimi and Dan Ruan</i>	
Suggestive Annotation: A Deep Active Learning Framework for Biomedical Image Segmentation	399
<i>Lin Yang, Yizhe Zhang, Jianxu Chen, Siyuan Zhang, and Danny Z. Chen</i>	
Deep Adversarial Networks for Biomedical Image Segmentation Utilizing Unannotated Images.	408
<i>Yizhe Zhang, Lin Yang, Jianxu Chen, Maridel Fredericksen, David P. Hughes, and Danny Z. Chen</i>	
Medical Image Synthesis with Context-Aware Generative Adversarial Networks	417
<i>Dong Nie, Roger Trullo, Jun Lian, Caroline Petitjean, Su Ruan, Qian Wang, and Dinggang Shen</i>	
Joint Detection and Diagnosis of Prostate Cancer in Multi-parametric MRI Based on Multimodal Convolutional Neural Networks	426
<i>Xin Yang, Zhiwei Wang, Chaoyue Liu, Hung Minh Le, Jingyu Chen, Kwang-Ting (Tim) Cheng, and Liang Wang</i>	

SD-Layer: Stain Deconvolutional Layer for CNNs in Medical Microscopic Imaging	435
<i>Rahul Duggal, Anubha Gupta, Ritu Gupta, and Pramit Mallick</i>	
X-Ray In-Depth Decomposition: Revealing the Latent Structures	444
<i>Shadi Albarqouni, Javad Fotouhi, and Nassir Navab</i>	
Fast Prospective Detection of Contrast Inflow in X-ray Angiograms with Convolutional Neural Network and Recurrent Neural Network	453
<i>Hua Ma, Pierre Ambrosini, and Theo van Walsum</i>	
Quantification of Metabolites in Magnetic Resonance Spectroscopic Imaging Using Machine Learning	462
<i>Dhritiman Das, Eduardo Coello, Rolf F. Schulte, and Bjoern H. Menze</i>	
Building Disease Detection Algorithms with Very Small Numbers of Positive Samples	471
<i>Ken C.L. Wong, Alexandros Karargyris, Tanveer Syeda-Mahmood, and Mehdi Moradi</i>	
Hierarchical Multimodal Fusion of Deep-Learned Lesion and Tissue Integrity Features in Brain MRIs for Distinguishing Neuromyelitis Optica from Multiple Sclerosis	480
<i>Youngjin Yoo, Lisa Y.W. Tang, Su-Hyun Kim, Ho Jin Kim, Lisa Eunyoung Lee, David K.B. Li, Shannon Kolind, Anthony Traboulsee, and Roger Tam</i>	
Deep Convolutional Encoder-Decoders for Prostate Cancer Detection and Classification	489
<i>Atilla P. Kiraly, Clement Abi Nader, Ahmet Tuysuzoglu, Robert Grimm, Berthold Kiefer, Noha El-Zehiry, and Ali Kamen</i>	
Deep Image-to-Image Recurrent Network with Shape Basis Learning for Automatic Vertebra Labeling in Large-Scale 3D CT Volumes	498
<i>Dong Yang, Tao Xiong, Daguang Xu, S. Kevin Zhou, Zhoubing Xu, Mingqing Chen, JinHyeong Park, Sasa Grbic, Trac D. Tran, Sang Peter Chin, Dimitris Metaxas, and Dorin Comaniciu</i>	
Automatic Liver Segmentation Using an Adversarial Image-to-Image Network	507
<i>Dong Yang, Daguang Xu, S. Kevin Zhou, Bogdan Georgescu, Mingqing Chen, Sasa Grbic, Dimitris Metaxas, and Dorin Comaniciu</i>	

Transfer Learning for Domain Adaptation in MRI: Application in Brain Lesion Segmentation 516
Mohsen Ghafoorian, Alireza Mehrtaash, Tina Kapur, Nico Karssemeijer, Elena Marchiori, Mehran Pesteie, Charles R.G. Guttman, Frank-Erik de Leeuw, Clare M. Tempamy, Bram van Ginneken, Andriy Fedorov, Purang Abolmaesumi, Bram Platel, and William M. Wells III

Retinal Microaneurysm Detection Using Clinical Report Guided Multi-sieving CNN 525
Ling Dai, Bin Sheng, Qiang Wu, Huating Li, Xuhong Hou, Weiping Jia, and Ruogu Fang

Lesion Detection and Grading of Diabetic Retinopathy via Two-Stages Deep Convolutional Neural Networks 533
Yehui Yang, Tao Li, Wensi Li, Haishan Wu, Wei Fan, and Wensheng Zhang

Hashing with Residual Networks for Image Retrieval 541
Sailesh Conjeti, Abhijit Guha Roy, Amin Katouzian, and Nassir Navab

Deep Multiple Instance Hashing for Scalable Medical Image Retrieval 550
Sailesh Conjeti, Magdalini Paschali, Amin Katouzian, and Nassir Navab

Accurate Pulmonary Nodule Detection in Computed Tomography Images Using Deep Convolutional Neural Networks. 559
Jia Ding, Aoxue Li, Zhiqiang Hu, and Liwei Wang

Discriminative Localization in CNNs for Weakly-Supervised Segmentation of Pulmonary Nodules 568
Xinyang Feng, Jie Yang, Andrew F. Laine, and Elsa D. Angelini

Liver Lesion Detection Based on Two-Stage Saliency Model with Modified Sparse Autoencoder. 577
Yixuan Yuan, Max Q.-H. Meng, Wenjian Qin, and Lei Xing

Manifold Learning of COPD 586
Felix J.S. Bragman, Jamie R. McClelland, Joseph Jacob, John R. Hurst, and David J. Hawkes

Hybrid Mass Detection in Breast MRI Combining Unsupervised Saliency Analysis and Deep Learning. 594
Guy Amit, Omer Hadad, Sharon Alpert, Tal Thusty, Yaniv Gur, Rami Ben-Ari, and Sharbell Hashoul

Deep Multi-instance Networks with Sparse Label Assignment for Whole Mammogram Classification. 603
Wentao Zhu, Qi Lou, Yeeleng Scott Vang, and Xiaohui Xie

Segmentation-Free Kidney Localization and Volume Estimation
Using Aggregated Orthogonal Decision CNNs 612
*Mohammad Arafat Hussain, Alborz Amir-Khalili, Ghassan Hamarneh,
and Rafeef Abugharbieh*

Progressive and Multi-path Holistically Nested Neural Networks
for Pathological Lung Segmentation from CT Images 621
*Adam P. Harrison, Ziyue Xu, Kevin George, Le Lu, Ronald M. Summers,
and Daniel J. Mollura*

Automated Pulmonary Nodule Detection via 3D ConvNets
with Online Sample Filtering and Hybrid-Loss Residual Learning 630
*Qi Dou, Hao Chen, Yueming Jin, Huangjing Lin, Jing Qin,
and Pheng-Ann Heng*

CASED: Curriculum Adaptive Sampling for Extreme Data Imbalance 639
*Andrew Jesson, Nicolas Guizard, Sina Hamidi Ghalehjegh,
Damien Goblot, Florian Soudan, and Nicolas Chapados*

Intra-perinodular Textural Transition (Ipris): A 3D Descriptor for Nodule
Diagnosis on Lung CT 647
Mehdi Alilou, Mahdi Orooji, and Anant Madabhushi

Transferable Multi-model Ensemble for Benign-Malignant Lung Nodule
Classification on Chest CT. 656
*Yutong Xie, Yong Xia, Jianpeng Zhang, David Dagan Feng,
Michael Fulham, and Weidong Cai*

Deep Reinforcement Learning for Active Breast Lesion Detection
from DCE-MRI 665
*Gabriel Maicas, Gustavo Carneiro, Andrew P. Bradley,
Jacinto C. Nascimento, and Ian Reid*

Pancreas Segmentation in MRI Using Graph-Based Decision Fusion
on Convolutional Neural Networks 674
Jinzheng Cai, Le Lu, Yuanpu Xie, Fuyong Xing, and Lin Yang

Modeling Cognitive Trends in Preclinical Alzheimer’s Disease (AD)
via Distributions over Permutations 683
Gregory Plumb, Lindsay Clark, Sterling C. Johnson, and Vikas Singh

Does Manual Delineation only Provide the Side Information
in CT Prostate Segmentation?. 692
Yinghuan Shi, Wanqi Yang, Yang Gao, and Dinggang Shen

Author Index 701