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# Information Processing in Medical Imaging

19th International Conference, IPMI 2005  
Glenwood Springs, CO, USA, July 10-15, 2005  
Proceedings



Springer

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Library of Congress Control Number: 2005928332

CR Subject Classification (1998): I.4, I.5, I.2.5-6, J.1, I.3

ISSN	0302-9743
ISBN-10	3-540-26545-7 Springer Berlin Heidelberg New York
ISBN-13	978-3-540-26545-0 Springer Berlin Heidelberg New York

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© Springer-Verlag Berlin Heidelberg 2005  
Printed in Germany

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India  
Printed on acid-free paper      SPIN: 11505730      06/3142      5 4 3 2 1 0

# Preface

The nineteenth biennial International Conference on Information Processing in Medical Imaging (IPMI) was held July 11–15, 2005 in Glenwood Springs, CO, USA on the Spring Valley campus of the Colorado Mountain College. Following the successful meeting in beautiful Ambleside in England, this year's conference addressed important recent developments in a broad range of topics related to the acquisition, analysis and application of biomedical images.

Interest in IPMI has been steadily growing over the last decade. This is partially due to the increased number of researchers entering the field of medical imaging as a result of the Whitaker Foundation and the recently formed National Institute of Biomedical Imaging and Bioengineering. This year, there were 245 full manuscripts submitted to the conference which was twice the number submitted in 2003 and almost four times the number of submissions in 2001. Of these papers, 27 were accepted as oral presentations, and 36 excellent submissions that could not be accommodated as oral presentations were presented as posters. Selection of the papers for presentation was a difficult task as we were unable to accommodate many of the excellent papers submitted this year. All accepted manuscripts were allocated 12 pages in these proceedings.

Every effort was made to maintain those traditional features of IPMI that have made this conference a unique and exciting experience since the inaugural meeting in 1969. Papers were presented in single-track sessions, followed by discussions that did not have time limits. Although unlimited discussion ruins carefully planned meal schedules, many participants welcome the rich, detailed descriptions of essential techniques that often emerge from the discussions. For that reason, IPMI is often viewed as a true workshop in contrast to the constrained schedules of most conferences.

The main focus at IPMI has always been to encourage the participation of new investigators, loosely described as students, postdocs, and junior faculty under 35 years of age who are presenting at IPMI for the first time. To broaden participation in the discussion, we continued the "discussion group" idea introduced by Chris Taylor and Alison Noble in 2003. Small groups of new investigators led by Scientific Committee members met before each session to discuss the papers to be presented and formulate questions and comments to be raised during the session. We were lucky to have Carl Jaffe from the National Cancer Institute, to give a plenary talk on recent advances and open problems in cancer imaging research.

The setting and dress have always been casual, which promotes collegiality and an exchange of information unfettered by the usual formalities. This year the conference was held on the Spring Valley campus of the Colorado Mountain College, where attendees stayed together in the university housing. The causal approach helps organizers keep costs low, thus encouraging young investigator

participation. The tradition of carrying on discussion into the evening was continued. We provided bus service to downtown Glenwood Springs where attendees enjoyed the local bars, relaxed in the hot springs, and took strolls through the beautiful downtown area. On Wednesday afternoon, attendees bonded during a 13-mile bike ride along the scenic Colorado River, relaxed in the hot springs, or visited the ski resort town of Aspen. Later that evening, everyone enjoyed a pleasant dinner at the elegant Rivers restaurant, and those who wanted stayed late into the night on the porch overlooking the Roaring Fork River.

IPMI is a unique meeting for which we, the members of the IPMI board, and many other participants hold a true affection. While it was a great deal of work, we were delighted to be given the opportunity to organize this meeting and continue the IPMI tradition. We are looking forward to a more relaxed participation at IPMI 2007 in the Rolduc Abbey in The Netherlands!

July 2005

Gary E. Christensen  
Milan Sonka

# Acknowledgements

The nineteenth IPMI conference was made possible by the efforts of many hard-working individuals and generous organizations. First, the organizers wish to thank the Scientific Committee for their critical reviews that determined the content of the program. We appreciate their detailed and thoughtful comments considering they were asked to review an average of 12 full manuscripts in a little more than 3 weeks' time. We also extend our gratitude to all authors who submitted papers to the conference and our regrets to those we turned down. We are grateful to the members of the Paper Selection Committee who shared with us the difficult task of assimilating the referees' comments and choosing the papers to include in the conference. We greatly appreciate the help, guidance and insights provided by Chris Taylor from his experience with planning the previous IPMI conference.

We thank David Risely for his support of the CAWS Web-based conference administration system that greatly simplified many of the organizational tasks associated with this conference. We gratefully acknowledge the assistance of the Conference and Event Services staff at the Colorado Mountain College, particularly Mary Lehrman and Stephanie Owston who helped coordinate the on-site conference logistics. We would like to thank Kim Sherwood for general administrative support including communication with authors and attendees. We thank Xiujuan Geng, Mona Haeker and Dinesh Kumar for taking time from their research to compile the proceedings.

Finally, we are grateful to the following organizations for their generous financial support:

The Whitaker Foundation

The National Institute of Biomedical Imaging and Bioengineering  
The Obermann Center for Advanced Studies, The University of Iowa  
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College of Engineering, The University of Iowa

## Francois Erbsmann Prize Winners

1987 (Utrecht, The Netherlands): **John M. Gauch**, University of North Carolina, Chapel Hill, NC, USA

*J.M. Gauch, W.R. Oliver, S.M. Pizer: Multiresolution shape descriptions and their applications in medical imaging*

1989 (Berkeley, CA, USA): **Arthur F. Gmitro**, University of Arizona, Tucson, AZ, USA

*A.F. Gmitro, V. Tresp, V. Chen, Y. Snell, G.R. Gindi: Video-rate reconstruction of CT and MR images*

1991 (Wye, Kent, UK): **H. Isil Bozma**, Yale University, New Haven, CT, USA

*H.I. Bozma, J.S. Duncan: Model-based recognition of multiple deformable objects using a game-theoretic framework*

1993 (Flagstaff, AZ, USA): **Jeffrey A. Fessler**, University of Michigan, Ann Arbor, MI, USA

*J.A. Fessler: Tomographic reconstruction using information-weighted spline smoothing*

1995 (Brest, France): **Maurits K. Konings**, University Hospital, Utrecht, The Netherlands

*M.K. Konings, W.P.T.M. Mali, M.A. Viergever: Design of a robust strategy to measure intravascular electrical impedance*

1997 (Poultney, VT, USA): **David Atkinson**, Guy's Hospital, London, UK

*D. Atkinson, D.L.G. Hill, P.N.R. Stoyale, P.E. Summers, S.F. Keevil: An autofocus algorithm for the automatic correction of motion artifacts in MR images*

1999 (Visegrad, Hungary): **Liana M. Lorigo**, Massachusetts Institute of Technology, Cambridge, MA, USA

*L.M. Lorigo, O. Faugeras, W.E.L. Grimson, R. Keriven, R. Kikinis, C.-F. Westin: Co-dimension 2 geodesic active contours for MRA segmentation*

2001 (Davis, CA, USA): **Viktor K. Jirsa**, Florida Atlantic University, FL, USA

*V.K. Jirsa, K.J. Jantzen, A. Fuchs, J.A. Scott Kelso: Neural field dynamics on the folded three-dimensional cortical sheet and its forward EEG and MEG*

2003 (Ambleside, UK): **Guillaume Marrelec**, INSERM, France.

*G. Marrelec, P. Ciuciu, M. Péligrini-Issac, H. Benali: Estimation of the hemodynamic response function in event-related functional MRI: directed acyclic graphs for a general Bayesian inference framework*

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# Table of Contents

## Shape and Population Modeling

A Unified Information-Theoretic Approach to Groupwise Non-rigid Registration and Model Building <i>Carole J. Twining, Tim Cootes, Stephen Marsland, Vladimir Petrovic, Roy Schestowitz, Chris J. Taylor</i> . . . . .	1
Hypothesis Testing with Nonlinear Shape Models <i>Timothy B. Terriberry, Sarang C. Joshi, Guido Gerig</i> . . . . .	15
Extrapolation of Sparse Tensor Fields: Application to the Modeling of Brain Variability <i>Pierre Fillard, Vincent Arsigny, Xavier Pennec, Paul M. Thompson, Nicholas Ayache</i> . . . . .	27
Bayesian Population Modeling of Effective Connectivity <i>Eric R. Cosman, William M. Wells III</i> . . . . .	39

## Diffusion Tensor Imaging and Functional Magnetic Resonance

Fiber Tracking in q-Ball Fields Using Regularized Particle Trajectories <i>Muriel Perrin, Cyril Poupon, Yann Cointepas, Bernard Rieul, Narly Golestani, Christophe Pallier, Denis Rivière, Andre Constantinesco, Denis Le Bihan, Jean-Francois Mangin</i> . . . . .	52
Approximating Anatomical Brain Connectivity with Diffusion Tensor MRI Using Kernel-Based Diffusion Simulations <i>Jun Zhang, Ning Kang, Stephen E. Rose</i> . . . . .	64
Maximum Entropy Spherical Deconvolution for Diffusion MRI <i>Daniel C. Alexander</i> . . . . .	76
From Spatial Regularization to Anatomical Priors in fMRI Analysis <i>Wanmei Ou, Polina Golland</i> . . . . .	88

## Segmentation and Filtering

CLASSIC: Consistent Longitudinal Alignment and Segmentation for Serial Image Computing <i>Zhong Xue, Dinggang Shen, Christos Davatzikos</i> . . . . .	101
--	-----

Robust Active Appearance Model Matching <i>Reinhard Beichel, Horst Bischof, Franz Leberl, Milan Sonka</i> .....	114
Simultaneous Segmentation and Registration of Contrast-Enhanced Breast MRI <i>Xiaohua Chen, Michael Brady, Jonathan Lok-Chuen Lo, Niall Moore</i> .....	126
Multiscale Vessel Enhancing Diffusion in CT Angiography Noise Filtering <i>Rashindra Manniesing, Wiro Niessen</i> .....	138
 <b>Poster Session 1</b>	
Information Fusion in Biomedical Image Analysis: Combination of Data vs. Combination of Interpretations <i>Torsten Rohlfing, Adolf Pfefferbaum, Edith V. Sullivan, Calvin R. Maurer</i> .....	150
Parametric Medial Shape Representation in 3-D via the Poisson Partial Differential Equation with Non-linear Boundary Conditions <i>Paul A. Yushkevich, Hui Zhang, James C. Gee</i> .....	162
Diffeomorphic Nonlinear Transformations: A Local Parametric Approach for Image Registration <i>Ramkrishnan Narayanan, Jeffrey A. Fessler, Hyunjin Park, Charles R. Meyer</i> .....	174
A Framework for Registration, Statistical Characterization and Classification of Cortically Constrained Functional Imaging Data <i>Anand A. Joshi, David W. Shattuck, Paul M. Thompson, Richard M. Leahy</i> .....	186
PET Image Reconstruction: A Robust State Space Approach <i>Huafeng Liu, Yi Tian, Pengcheng Shi</i> .....	197
Multi-dimensional Mutual Information Based Robust Image Registration Using Maximum Distance-Gradient-Magnitude <i>Rui Gan, Albert C.S. Chung</i> .....	210
Tissue Perfusion Diagnostic Classification Using a Spatio-temporal Analysis of Contrast Ultrasound Image Sequences <i>Quentin Williams, J. Alison Noble, Alexander Ehlgen MD, Harald Becher MD</i> .....	222

Topology Preserving Tissue Classification with Fast Marching and Topology Templates <i>Pierre-Louis Bazin, Dzung L. Pham</i> .....	234
Apparent Diffusion Coefficient Approximation and Diffusion Anisotropy Characterization in DWI <i>Yunmei Chen, Weihong Guo, Qingguo Zeng, Xiaolu Yan, Murali Rao, Yijun Liu</i> .....	246
Linearization of Mammograms Using Parameters Derived from Noise Characteristics <i>Nico Karssemeijer, Peter R. Snoeren, Wei Zhang</i> .....	258
Knowledge-Driven Automated Detection of Pleural Plaques and Thickening in High Resolution CT of the Lung <i>Mamatha Rudrapatna, Van Mai, Arcot Sowmya, Peter Wilson</i> .....	270
Fundamental Limits in 3D Landmark Localization <i>Karl Rohr</i> .....	286
Computational Elastography from Standard Ultrasound Image Sequences by Global Trust Region Optimization <i>Jan Kybic, Daniel Smutek</i> .....	299
Representing Diffusion MRI in 5D for Segmentation of White Matter Tracts with a Level Set Method <i>Lisa Jonasson, Patric Hagmann, Xavier Bresson, Jean-Philippe Thiran, Van J. Wedeen</i> .....	311
Automatic Prediction of Myocardial Contractility Improvement in Stress MRI Using Shape Morphometrics with Independent Component Analysis <i>Avan Suinesiaputra, Alejandro F. Frangi, Hildo J. Lamb, Johan H.C. Reiber, Boudewijn P.F. Lelieveldt</i> .....	321
Brain Segmentation with Competitive Level Sets and Fuzzy Control <i>Cybèle Ciofalo, Christian Barillot</i> .....	333
Coupled Shape Distribution-Based Segmentation of Multiple Objects <i>Andrew Litvin, William C. Karl</i> .....	345
Partition-Based Extraction of Cerebral Arteries from CT Angiography with Emphasis on Adaptive Tracking <i>Hackjoon Shim, Il Dong Yun, Kyoung Mu Lee, Sang Uk Lee</i> .....	357

## Small Animal Imaging

Regional Whole Body Fat Quantification in Mice <i>Xenophon Papademetris, Pavel Shkarin, Lawrence H. Staib, Kevin L. Behar</i> .....	369
--	-----

## Surfaces and Segmentation

Surface Matching via Currents <i>Marc Vaillant, Joan Glaunès</i> .....	381
A Genetic Algorithm for the Topology Correction of Cortical Surfaces <i>Florent Ségonne, Eric Grimson, Bruce Fischl</i> .....	393
Simultaneous Segmentation of Multiple Closed Surfaces Using Optimal Graph Searching <i>Kang Li, Steven Millington, Xiaodong Wu, Danny Z. Chen, Milan Sonka</i> .....	406
A Generalized Level Set Formulation of the Mumford-Shah Functional for Brain MR Image Segmentation <i>Lishui Cheng, Jie Yang, Xian Fan, Yuemin Zhu</i> .....	418

## Applications

Integrable Pressure Gradients via Harmonics-Based Orthogonal Projection <i>Yuehuan Wang, Amir A. Amini</i> .....	431
Design of Robust Vascular Tree Matching: Validation on Liver <i>Arnaud Charnoz, Vincent Agnus, Grégoire Malandain, Stéphane Nicolau, Mohamed Tajine, Luc Soler</i> .....	443

## Image Registration

A Novel Parametric Method for Non-rigid Image Registration <i>Anne Cuzol, Pierre Hellier, Etienne Mémín</i> .....	456
Transitive Inverse-Consistent Manifold Registration <i>Xiujuan Geng, Dinesh Kumar, Gary E. Christensen</i> .....	468

Cortical Surface Alignment Using Geometry Driven Multispectral Optical Flow <i>Duygu Tosun, Jerry L. Prince</i> .....	480
Inverse Consistent Mapping in 3D Deformable Image Registration: Its Construction and Statistical Properties <i>Alex Leow, Sung-Cheng Huang, Alex Geng, James Becker, Simon Davis, Arthur Toga, Paul Thompson</i> .....	493
 <b>Poster Session 2</b>	
Robust Nonrigid Multimodal Image Registration Using Local Frequency Maps <i>Bing Jian, Baba C. Vemuri, José L. Marroquin</i> .....	504
Imaging Tumor Microenvironment with Ultrasound <i>Mallika Sridhar, Michael F. Insana</i> .....	516
PDE-Based Three Dimensional Path Planning for Virtual Endoscopy <i>M. Sabry Hassouna, Aly A. Farag</i> .....	529
Elastic Shape Models for Interpolations of Curves in Image Sequences <i>Shantanu H. Joshi, Anuj Srivastava, Washington Mio</i> .....	541
Segmenting and Tracking the Left Ventricle by Learning the Dynamics in Cardiac Images <i>Walter Sun, Müjdat Çetin, Raymond Chan, Vivek Reddy, Godtfred Holmvang, Venkat Chandar, Alan Willsky</i> .....	553
3D Active Shape Models Using Gradient Descent Optimization of Description Length <i>Tobias Heimann, Ivo Wolf, Tomos Williams, Hans-Peter Meinzer</i> ...	566
Capturing Anatomical Shape Variability Using B-Spline Registration <i>Thomas H. Wenckeback, Hans Lamecker, Hans-Christian Hege</i> .....	578
A Riemannian Approach to Diffusion Tensor Images Segmentation <i>Christophe Lenglet, Mikaël Rousson, Rachid Deriche, Olivier Faugeras, Stéphane Lehericy, Kamil Ugurbil</i> .....	591
Coil Sensitivity Estimation for Optimal SNR Reconstruction and Intensity Inhomogeneity Correction in Phased Array MR Imaging <i>Prashanthi Vemuri, Eugene G. Kholmovski, Dennis L. Parker, Brian E. Chapman</i> .....	603

Many Heads Are Better Than One: Jointly Removing Bias from Multiple MRIs Using Nonparametric Maximum Likelihood <i>Erik G. Learned-Miller, Vidit Jain</i> .....	615
Unified Statistical Approach to Cortical Thickness Analysis <i>Moo K. Chung, Steve Robbins, Alan C. Evans</i> .....	627
ZHARP: Three-Dimensional Motion Tracking from a Single Image Plane <i>Khaled Z. Abd-Elmoniem, Matthias Stuber, Nael F. Osman, Jerry L. Prince</i> .....	639
Analysis of Event-Related fMRI Data Using Diffusion Maps <i>Xilin Shen, François G. Meyer</i> .....	652
Automated Detection of Small-Size Pulmonary Nodules Based on Helical CT Images <i>Xiangwei Zhang, Geoffrey McLennan, Eric A. Hoffman, Milan Sonka</i> .....	664
Nonparametric Neighborhood Statistics for MRI Denoising <i>Suyash P. Awate, Ross T. Whitaker</i> .....	677
Construction and Validation of Mean Shape Atlas Templates for Atlas-Based Brain Image Segmentation <i>Qian Wang, Dieter Seghers, Emiliano D'Agostino, Frederik Maes, Dirk Vandermeulen, Paul Suetens, Alexander Hammers</i> .....	689
Multi-figure Anatomical Objects for Shape Statistics <i>Qiong Han, Stephen M. Pizer, Derek Merck, Sarang Joshi, Ja-Yeon Jeong</i> .....	701
The Role of Non-overlap in Image Registration <i>Jonas August, Takeo Kanade</i> .....	713

## Registration and Segmentation

Multimodality Image Registration Using an Extensible Information Metric and High Dimensional Histogramming <i>Jie Zhang, Anand Rangarajan</i> .....	725
Spherical Navigator Registration Using Harmonic Analysis for Prospective Motion Correction <i>Christopher L. Wyatt, Narter Ari, Robert A. Kraft</i> .....	738

Tunneling Descent Level Set Segmentation of Ultrasound Images <i>Zhong Tao, Hemant D. Tagare</i> .....	750
Multi-object Segmentation Using Shape Particles <i>Marleen de Bruijne, Mads Nielsen</i> .....	762
<b>Author Index</b> .....	775