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Information Processing in Medical Imaging

20th International Conference, IPMI 2007
Kerkrade, The Netherlands, July 2-6, 2007
Proceedings

Springer

Volume Editors

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Preface

The 20th International Conference on Information Processing in Medical Imaging (IPMI) was held during July 2–6, 2007, at Rolduc Abbey, located in Kerkrade in the south of the Netherlands. Following the highly successful IPMI in Glenwood Springs in the Rocky Mountains, Colorado, USA (2005), the conference was the latest in a series of biennial scientific meetings where new developments in acquisition, analysis, and use of medical images are presented. IPMI is one of the longest running conferences in medical imaging. It was started in 1969 by a group of young scientists working in nuclear medicine. With a few iterations the conference expanded to other areas and became established as an important meeting for in-depth discussion of new methodological developments in medical imaging. Nowadays it is widely recognized as one of the most exciting and influential conferences in its field.

At IPMI meetings a wide variety of topics are covered by a relatively small selection of papers presented in single-track sessions. This year, there were 210 manuscripts submitted to the conference. Of these papers, 26 were accepted for oral presentation, and 37 papers were accepted as posters. Papers were carefully judged by three reviewers and two paper selection committee members, with emphasis on originality, methodological development, scientific rigor, and relevance. Selection of papers was difficult, but using the rankings and detailed comments of the reviewers we were able to make a great selection in an objective way. Unfortunately, due to the large number of submissions, it was inevitable that many high-quality papers did not make it into the final program.

One of the key goals of IPMI is to encourage participation of the most promising and talented young researchers in the field, allowing them to explore new ideas with some of the leading researchers in this area. Also this year, active involvement was stimulated by preparation of the sessions in small study groups, in which each conference attendee participated. After reading the papers of their session, the study group members met to discuss the papers before they were presented, and to formulate questions and comments to kick off the discussions. The prestigious Erbsmann award for first time IPMI presenters added an extra stimulus for young researchers to be actively involved in the meeting. Of the accepted papers, 37 were from first time presenters, and 18 of the 26 oral presentations were given by candidates for the prize.

This year we also had a keynote lecture. We were very honored that Freek Beekman from the University Medical Center Utrecht accepted our invitation to present an overview of exciting ongoing research in "high resolution radionuclide imaging". Image acquisition and reconstruction have traditionally been topics that were well represented at earlier IPMIs, before image analysis became the dominant topic. In fact, the speaker who is now a world-leading authority in this field, was attending and contributing to IPMI in his younger years. Therefore we

were very pleased that Freek's stimulating lecture brought the innovative recent advances in this area to the attention of the IPMI audience.

IPMI has many traditions and we made every effort we could to maintain its character. The most important tradition is allocation of sufficient time for presentations to allow speakers to give a detailed explanation of their work and to have time for in-depth and lively discussions without time constraints. It has happened that debates have gone on for hours. With the risk of ruining a carefully scheduled program we instructed the session chairs never to cut off a discussion. We strongly believe that it is this unique format that makes IPMI such a remarkable forum for the interchange of ideas in medical imaging..

IPMI is typically situated in a relatively small and sometimes remote location. This year, IPMI was set in a historical location: the abbey Rolduc is a most impressive historical abbey complex that has served as a monastery, where culture, religion and science have gone hand in hand since the 12th century. Since 1970, the major part of the abbey complex has been converted into a unique historical conference venue with modern meeting, lodging and catering facilities. This made Rolduc the perfect setting for the highly informal atmosphere that makes IPMI such a special event. All attendees were housed inside the abbey complex, and the availability of a bar with late opening hours in the abbey basement guaranteed continued scientific, and under the influence of the original Rolduc beer, increasingly non-scientific discussions. On Wednesday afternoon, attendees could explore the beautiful surroundings of Valkenburg on foot, enjoying some of the steepest (and rarest) hills that the Netherlands has to offer. Also, a visit to the beautiful town of Maastricht was organized. Later that evening, everyone joined together for the conference dinner in the magnificent Kasteel Oost, on the river banks of the Geul in Valkenburg. On Thursday, the traditional football (soccer) match, US against "the rest of the world", was played on the Rolduc soccer field. At the time of writing the outcome is still uncertain, but it is expected that the Europeans will continue to dominate this remarkable series of games, with or without impartial refereeing.

In these proceedings all IPMI 2007 papers are published in the order in which they were presented at the meeting. We hope that these papers will form an invaluable source of information for participants, and a reminder of the great conference we had. For those who did not attend the meeting these proceedings provide an excellent overview of some of the best research in medical imaging today. We are already looking forward to IPMI 2009. Use www.ipmi-conference.com to stay informed.

May 2007

Nico Karssemeijer
Boudewijn Lelieveldt

Acknowledgements

The organization of the 20th IPMI conference was only possible due to the efforts and contributions of several organizations and individuals. First of all, the organizers would like to thank the reviewers for providing so many high-quality reviews within a limited time frame. Thanks to these reviews, we were able to make a fair selection of the best papers for the final program. We express our gratitude to the Paper Selection Committee members, who each took on the duty of reading close to 60 papers and the corresponding reviews, and traveling to the Netherlands for the paper selection meeting. Wiro, Christian, Daniel, and Milan, many thanks! We would also like to thank previous IPMI organizers Chris Taylor and Gary Christensen for sharing their experiences with us, and Hans Reiber for his support of the IPMI 2007 organizers.

We are very grateful to Simone Meeuwsen for handling the registrations and other administrative tasks and express our gratitude to Simon Jackson for his assistance with the web-based CAWS conference management system. We also gratefully acknowledge Ilse Brouns from Rolduc for her enthusiasm and constructive brainstorming on the optimal way to set up Rolduc for a meeting like IPMI. Last but not least, we extend our gratitude to the students and post-docs from Nijmegen and Leiden, who were our hands and feet during the conference: they covered quite some distance running around with microphones during the discussions. Finally, we are grateful to the following organizations for their generous financial support:

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François Erbsmann Prizewinners

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**, GuyâĂŹs Hospital, London, UK *D. Atkinson, D.L.G. Hill, P.N.R. Stoyle, P.E. Summers, S.F. Keevil: An auto-focus 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. PÂt'elÂt'egrini-Issac, H. Benali: Estimation of the hemodyamic response function in event-related functional MRI: directed acyclic graphs for a general Bayesian inference framework.*

2005 (Colorado, USA) **Duygu Tosun**, Electrical and Computer Engineering, Johns Hopkins University, USA. *T. Duygu, J.L. Prince: Cortical surface alignment using geometry driven multispectral optical flow.*

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