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# Medical Image Computing and Computer-Assisted Intervention – MICCAI 2011

14th International Conference  
Toronto, Canada, September 18-22, 2011  
Proceedings, Part I

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# Preface

The 14th International Conference on Medical Image Computing and Computer Assisted Intervention, MICCAI 2011, was held in Toronto, Canada during September, 18–22, 2011. The venue was the Westin Harbour Castle Hotel and Conference Centre on the waterfront of Lake Ontario in Downtown Toronto, the world’s most ethnically diverse city.

MICCAI is the foremost international scientific event in the field of medical image computing and computer-assisted intervention. The annual conference has a high scientific standard by virtue of the threshold for acceptance, and accordingly MICCAI has built up a track record of attracting leading scientists, engineers and clinicians from a wide range of technical and biomedical disciplines. The year 2011 saw a record 819 paper submissions.

The Program Committee (PC) of MICCAI 2011 comprised 53 members. Each of the 819 papers was assigned to two PC members (a primary and a secondary) according to their expertise and the subject matter of the paper. The primary member knew the identity of the authors, but the secondary one did not. Each PC member had about 17 papers as primary and a further 17 as secondary member. The primary PC member assigned at least three external reviewers to each paper, according to their expertise and the subject matter of the paper. The external reviewers provided double-blind reviews of the papers, and authors were given the opportunity to rebut the anonymous reviews. In cases where reviewer opinions differed significantly and/or the rebuttal made it necessary, the primary member initiated a discussion among the reviewers. The primary member summarized the outcome of the discussion in a short report for the secondary. Finally, the secondary member considered all input (the reviews, rebuttal, discussion, primary’s report, and, almost importantly, the paper itself) and made a recommendation for acceptance or rejection. The secondary PC member did not know the identity of the authors.

A two-day PC meeting was held with 33 of the PC members present. Each paper received fair consideration in a three-phase decision process.

- First stage: Initial acceptance of papers ranked very high by both the reviewers and the secondary PC member. Initial rejection of papers ranked very low by both the reviewers and the secondary PC member.
- Second stage: groups of five to seven PC members ranked the remaining papers and again selected the best papers and rejected the lowest ranking papers.
- Third stage: a different set of groups selected the best papers from the remaining undecided papers and rejected the rest.

The PC finally accepted 251 papers, giving a 30% acceptance rate.

We are greatly indebted to the reviewers and to the members of the PC for their extraordinary efforts assessing and evaluating the submissions within a very short time frame.

In 2011, attendees saw two changes in the way the program was organized. All accepted papers were presented as posters, and a subset of these were also invited for oral presentation, which were organized in clinical themes rather than by methodology as in earlier years. Poster sessions were organized in their traditional technical themes as in the past.

In addition to the main 3-day conference, the annual MICCAI event hosted an increased number of satellite tutorials and workshops, organized on the day before and the day after the main conference. This year's call for submission for tutorials and workshops led to a record 21 workshops and 8 tutorials accepted by a committee headed by Randy Ellis (Queen's University) and Purang Abolmaesumi (University of British Columbia). The tutorials provided a comprehensive overview of many areas in both the MIC and CAI domains, offering a unique educational forum for graduate students and postdoctoral fellows. The workshops presented an opportunity to present research, often in an early stage, to peer groups in a relaxed environment that allowed valuable discussion and feedback. The workshop subjects highlighted topics that were not all fully covered in the main conference, and thus added to the diversity of the MICCAI program.

In reviewing the proposals for these events, emphasis was given to workshop submissions that provided a comprehensive and interactive forum to address an open problem in MICCAI. We also promoted tutorials that related to an existing sub-discipline of MICCAI with known materials, approaches and open problems to help train new professionals in the field. Among the accepted workshops, several focused on emerging trends in the field of multi-modal statistical atlases, advanced computational and biomechanical models, and high-performance computing. MICCAI 2011 also hosted eight tutorials that spanned a wide spectrum of topics in basic and advanced software development for medical image analysis, algorithms for image segmentation, registration and visualization, as well as those highlighting new techniques in image-guided interventions. We would like to thank the Workshop and Tutorial Committee for their hard work in putting together such a comprehensive and unique program.

Two of the highlights of the conference were the keynote lectures by two Canadian scientists. Dafydd (Dave) Williams, physician, astronaut, medical robotics researcher, and recently, Hospital CEO, opened the conference with a presentation that looked at lessons that the health care system and medical researchers could learn from the challenges of space travel. The second keynote was given by Mark Henkleman, Director of the Mouse Imaging Centre, Toronto Centre for Phenogenomics, who spoke about high-throughput small-animal imaging techniques and quantitative statistical analysis methods for mapping phenotypic changes associated with genetic disease models in mice.

MICCAI 2011 would not have been feasible without the efforts of many people behind the scenes. We are particularly indebted to the local Organizing Committee in London and Toronto consisting of Janette Wallace, Johanne Guillemette,

Jackie Williams, Jade Orkin-Fenster, Debbie Lilley, Shuo Li, Perry Radau, and Raphael Ronen. In addition, we are deeply grateful to the Robarts Research Institute, the University of Western Ontario, Sunnybrook Research Institute, and Queen's University for their support in ensuring the success of this meeting, and to the staff at Springer for their continued high standards aimed at maintaining the MICCAI proceedings as the flagship of the LNCS series.

We thank the MICCAI Society Board for trusting us with the mandate to organize this conference, and to the Board and staff members for valuable and continuous advice and support through all phases of the project.

A special word of thanks goes to our sponsors, who generously provided financial support for the conference as a whole as well as for specific activities. This greatly assisted with the overall organization of the meeting, enabled us to continue offering best paper awards in various categories, and provided travel stipends to a significant number of student participants.

It was our great pleasure to welcome the attendees to Toronto for this year's MICCAI conference along with its satellite tutorials and workshops. Next year, the 15<sup>th</sup> International Conference on Medical Image Computing and Computer-Assisted Intervention will be held in Nice, France, October 1–5, 2012. We look forward to seeing you all there.

September 2011

Gabor Fichtinger  
Anne Martel  
Terry Peters

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# Awards Presented at MICCAI 2010, Beijing

## *MICCAI Society “Enduring Impact Award” Sponsored by Philips.*

The Enduring Impact Award is the highest award of the MICCAI Society. It is a career award for continued excellence in the MICCAI research field. The 2010 Enduring Impact Award was presented to Russ Taylor, Johns Hopkins University, USA.

## *MICCAI Society Fellowships*

MICCAI Fellowships are bestowed annually on a small number of senior members of the Society in recognition of substantial scientific contributions to the MICCAI research field and service to the MICCAI community. In 2010, fellowships were awarded to:

James S. Duncan (Yale University, USA)  
Stephen M Pizer (University of North Carolina, USA)  
Jocelyne Troccaz (CNRS, France)

## *MedIA-MICCAI Prizes (Split decision)*

Jihun Hamm, for the article entitled: “GRAM: A Framework for Geodesic Registration on Anatomical Manifolds,” co-authored by: Jihun Hamm, Dong Hye Ye, Ragini Verma, Christos Davatzikos

Samuel Gerber, for the article entitled: “Manifold Modeling for Brain Population Analysis,” co-authored by: Tolga Tasdizen, P. Thomas Fletcher, Sarang Joshi, Ross Whitaker

## *Best Paper in Computer-Assisted Intervention Systems and Medical Robotics, Sponsored by Intuitive Surgical Inc.*

Rogério Richa, for the article entitled: “Robust 3D Visual Tracking for Robotic-Assisted Cardiac Interventions,” co-authored by: Rogério Richa, Antonio P. L. Bo, and Philippe Poignet

## *MICCAI Young Scientist Awards*

The Young Scientist Awards are stimulation prizes awarded for the best first authors of MICCAI contributions in distinct subject areas. The nominees had to be full-time students at a recognized university at, or within, two years prior to submission. The 2010 MICCAI Young Scientist Awards were presented in the following categories to:

Instrument and Patient  
Localization and Tracking

### **Ehsan Dehghan**

“Prostate Brachytherapy Seed Reconstruction Using C-Arm Rotation Measurement and Motion Compensation”

Image Reconstruction and  
Restoration

**Junzhou Huang**

“Efficient MR Image Reconstruction for Compressed MR Imaging”

Modelling and Simulation

**Saša Grbić**

“Complete Valvular Heart Apparatus Model from 4D Cardiac CT”

Quantitative Image  
Analysis

**Rémi Cuingnet**

“Spatially Regularized SVM for the Detection of Brain Areas Associated with Stroke Outcome”

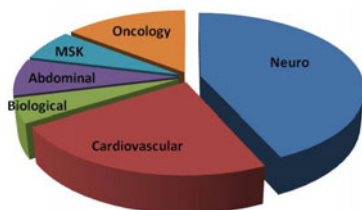
Functional and  
Diffusion-Weighted MRI

**Anthony J. Sherbondy**

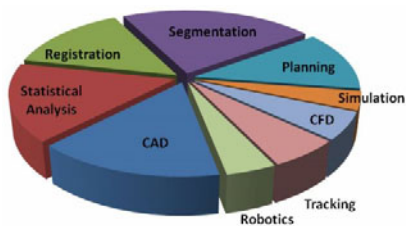
“MicroTrack: An Algorithm for Concurrent Projectome and Microstructure Estimation”

# Accepted MICCAI 2011 Papers

by Clinical Theme:



by Technical Theme:



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