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# Medical Image Computing and Computer-Assisted Intervention – MICCAI 2013

16th International Conference  
Nagoya, Japan, September 22-26, 2013  
Proceedings, Part II



Springer

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# Preface

The 16th International Conference on Medical Image Computing and Computer Assisted Intervention, MICCAI 2013, was held in Nagoya, Japan during September 22–26, 2013 at Toyoda Auditorium, Nagoya University. The conference was held on a university campus, unlike the past three conferences. Toyoda Auditorium is memorable for all Nagoya University students, because entrance and graduation ceremonies are held in it during cherry-blossom season. Since MICCAI is the premier conference in the field of medical image computing and computer assisted surgery, it was our great honor to host it. Nagoya University has more than 50 years of history in medical image processing, which was initiated by Prof. Jun-ichiro Toriwaki. Nagoya also is famous for transportation and aerospace industries that utilize many robotics technologies. These robots are also manufactured in the Nagoya area and have become indispensable in current medical interventions.

This is the second time that the MICCAI conference has been held in Japan; the 5th MICCAI was held in Tokyo in 2002, which was the first MICCAI in Asia or Oceania. In MICCAI 2002, 184 papers were accepted among 321 submissions, and the conference included five satellite half-day tutorials. Since then, MICCAI has become a much larger event and typically includes 250 accepted papers from 800 submissions and 30 satellite events. At MICCAI 2013, 262 papers were accepted from 798 submissions; 34 satellite events (workshops, challenges, tutorials) were accepted.

The Program Committee (PC) of MICCAI 2013 was comprised of 101 members coordinated by a program chair and two program co-chairs from three countries. Each of the 798 papers was assigned to one primary and two secondary PC members. The primary member knew the identity of the authors, but the secondary ones did not. Each PC member had five to ten papers as the primary member and another ten to twenty as the secondary member, according to their expertise and the subject matter of the paper. The primary PC member assigned three or more external reviewers to each paper. 835 external reviewers provided 2794 reviews (359 words on average per review): 3.5 reviews per paper. At this stage, 76 papers, which failed to receive sufficient support from the external reviews, were rejected without further consideration. The authors of the remaining 722 papers were given the opportunity to rebut the anonymous reviews, based on which discussions among the reviewers took place. Finally, two secondary members independently provided meta-reviews by taking all input (the reviews, rebuttal, discussion, and the paper itself) into account to make an acceptance or rejection recommendation. For a few papers that had only two external reviews, the secondary members provided detailed reviews in addition to the meta-reviews.

A two-day PC meeting was held in Tokyo with 32 of its members. Prior to the meeting, the initial acceptance of 198 papers was decided, because they were ranked high by the external reviewers as well as two secondary PC members. 362 papers were rejected because they did not receive enough support from the reviewers or the two secondary members. Each of the remaining 162 borderline papers was considered in the following three-phase decision process.

- First stage: Six groups of five or six PC members ranked the 162 papers to select the best 36 papers for acceptance and rejected the lowest 72 papers.
- Second stage: A different set of groups selected the best 18 papers for acceptance from the remaining 54 papers and rejected 18 papers.
- Third stage: The program chair and the co-chairs selected an additional ten papers from the remaining 18 papers by considering the topics, the institutional variety, and the quality.

262 papers were finally accepted, for a 32.8% acceptance rate. The PC members also selected a set of papers suitable for oral presentation, from which the program chair and co-chairs finally decided a list of 37 oral papers by taking the variety of topics as well as the suitability for oral presentation into account. During all the review processes, possible conflicts of interests were carefully monitored and avoided as far as possible. The geographic and keyword distributions of the accepted papers are summarized in the figures.

All accepted papers were presented during three poster sessions. Oral papers were further presented during six single-track plenary oral sessions. We are greatly indebted to the reviewers and the PC members for their extraordinary efforts of careful evaluations of the submissions within a very short time frame.

In addition to the three days of the MICCAI main conference, the annual MICCAI event hosted satellite workshops, tutorials, and challenges that were organized on the day before and after the main conference. This year's call for submissions for workshops and tutorials recorded 30 workshop / challenge proposals (including four half-day proposals) and seven tutorial proposals (also including four half-day proposals). These proposals were independently reviewed by the workshop, tutorial and challenge chair teams, headed by Hongen Liao (Tsinghua University), Pierre Jannin (University of Rennes 1), Simon Warfield (Harvard Medical School), and Akinobu Shimizu (Tokyo University of Agriculture and Technology).

In the review process for the proposals for these events, we emphasized the following points. The workshop proposals were reviewed under criteria that addressed whether the workshop emphasized an open problem addressed in the MICCAI community. Tutorial proposals were reviewed based on whether they provided educational material for training new professionals in the field, including students, clinicians, and new researchers. Also, we emphasized tutorials that focused on existing sub-disciplines of MICCAI with known material, approaches, and open problems. Challenge proposals were reviewed based on whether they were interactive and encouraged problem solving. Although all of the workshop proposals were very strong, the workshop chairs selected 22 workshops (including three half-day workshops), six tutorials (including four half-day tutorials), and

six challenges (including one half-day challenge and one challenge included in the workshop). We thank the workshop, tutorial, and challenge chairs for their hard work organizing such a comprehensive and unique program.

The highlights of the MICCAI 2013 events were the keynote lectures by Dr. Atsushi Miyawaki (Riken) and Prof. Toshio Fukuda (Meijo University). Dr. Miyawaki's talk focused on new imaging technology that enables us to cruise inside a cell. Prof. Fukuda discussed simulation-based medicine for intravascular surgery. We believe these two talks provided deep insights into new technologies and highlighted the future and emerging trends in these areas.

A public lecture, which was held on the day before MICCAI's main conference, widely introduced MICCAI to the public. Three distinctive guest speakers show the state-of-the-art technologies in the MICCAI field. Prof. Koji Ikuta presented exciting nano-robotics technologies. Prof. Yoshihiro Muragaki presented technologies for advanced intelligent operating theaters. Prof. Hidefumi Kobatake demonstrated the technologies and medical applications of computational anatomy. This wonderful public lecture was managed by Prof. Ken Masamune (The University of Tokyo.)

The First International Workshop on Medical Imaging and Computer-assisted Intervention (MICI Workshop) was independently organized just after the PC meeting at The University of Tokyo under the support. This workshop shared knowledge among the public audience and PC members who are experts in the MICCAI field.

MICCAI 2013 would not have been possible without the efforts of many people behind the scenes. We thank the Organizing, Executive, and Local Executive Committee members. The Scientific Council of Japan provided great assistance organizing this conference in Japan. The Japan Society of Computer Aided Surgery (JSCAS), headed by Prof. Masaki Kitajima (International University of Wealth and Health), also helped organize it. Prof. Takeyoshi Dohi (Tokyo Denki University) supervised a successful MICCAI meeting as a founders of the MICCAI Society and the general chair of MICCAI 2002. We also thank Prof. Etsuko Kobayashi (The University of Tokyo) and Prof. Takayuki Kitasaka (Aichi Institute of Technology) for handling the financial issues. Dr. Toshiyuki Okada (Osaka University) efficiently organized the review process and compiled the proceedings. Prof. Masahiro Oda (Nagoya University) solved facility management problems. Dr. Takehiro Ando and Dr. Junchen Wang made local arrangements for the PC meeting. Prof. Daniel Rueckert (Imperial College) helped us from the preparation of MICCAI 2013 proposal to actual conference management.

We also thank the MICCAI Secretaries, Janette Wallace, Jackie Williams, and Johanne Langford of the team from Canada. We communicated with them by e-mail around midnight every day (the time difference between Nagoya and Toronto is 11 hours) for advice regarding the conference organization. Without their help, the MICCAI 2013 conference would not have been successful. We thank the MICCAI Board headed by Prof. James Duncan (Yale University) and Prof. Alison Noble (University of Oxford) for trusting us with the organization of the MICCAI 2013 conference. They gave us a lot of freedom and advice.

We also thank our secretaries, Mizuru Suzuki, Kengo Suzuki, and Emi Tanahashi (Inter Group Corp.) for their hard work handling so many requests from attendees. We say a special thanks to Rie Ohashi (Nagoya University), Ai Okano (The University of Tokyo), and Naho Obata (The University of Tokyo). The original MICCAI 2013 logos and banners were sketched by the following four students of the Aichi Institute of Technology: Miki Takahashi, Kaori Suzuki, Hikaru Sekiguchi, and Yuiko Kori.

We appreciate the financial support from the Nagoya Convention and Visitors Bureau, The Murata Science Foundation, and the Daiko Foundation. We are deeply grateful to Nagoya University for allowing us to use the Toyoda Auditorium for MICCAI 2013.

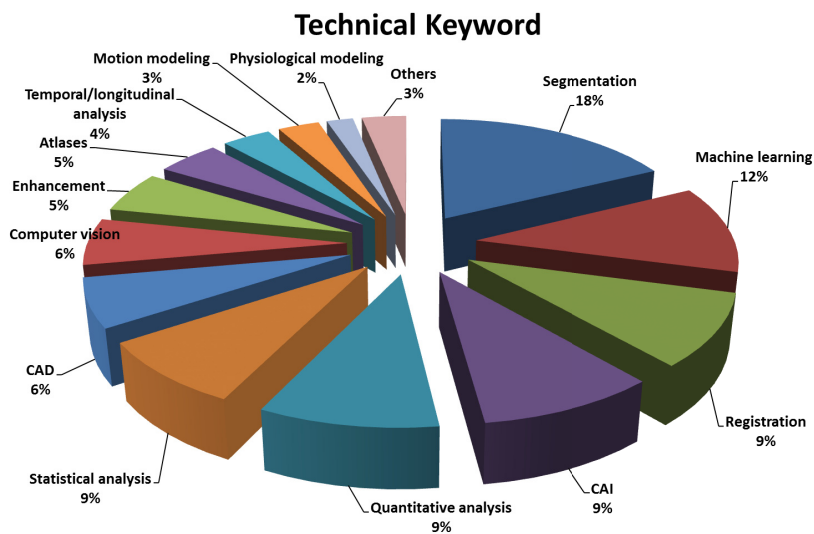
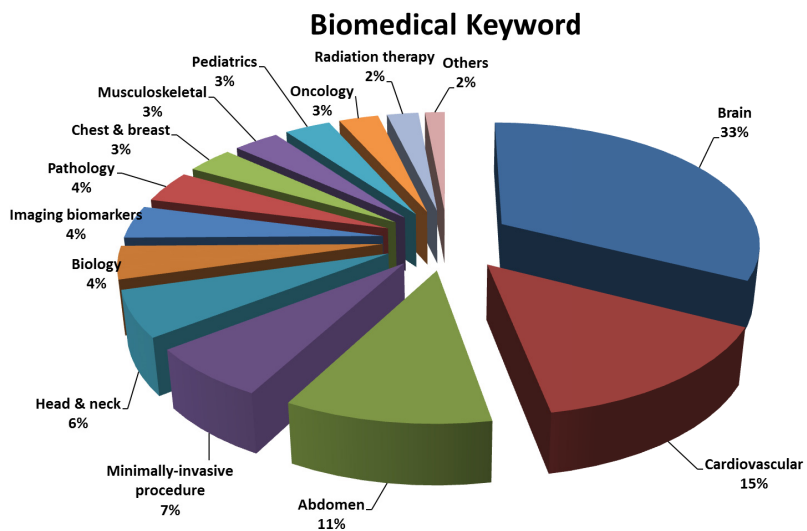
We also deeply thank our sponsors and exhibitors for their financial support.

Our initial proposal for MICCAI 2013 was accepted during MICCAI 2010 in Beijing. Six months later, a huge earthquake devastated North East Japan. Thousands of people lost their lives. We encountered many difficult situations, including the threat of radiation from the Fukushima Nuclear Power Plant. Many people from countries all over the world helped Japan and offered assistance. We are deeply grateful.

The next MICCAI conference will be held during September 14–18, 2014 in Boston, which is the one of the most beautiful cities in the world. It hosted the 1st MICCAI conference in 1998. We are looking forward to seeing all of you in Boston in 2014!

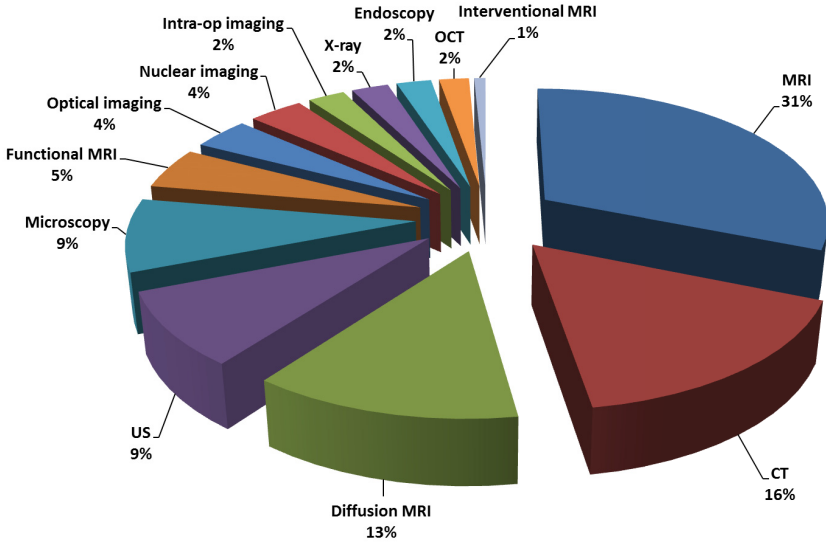
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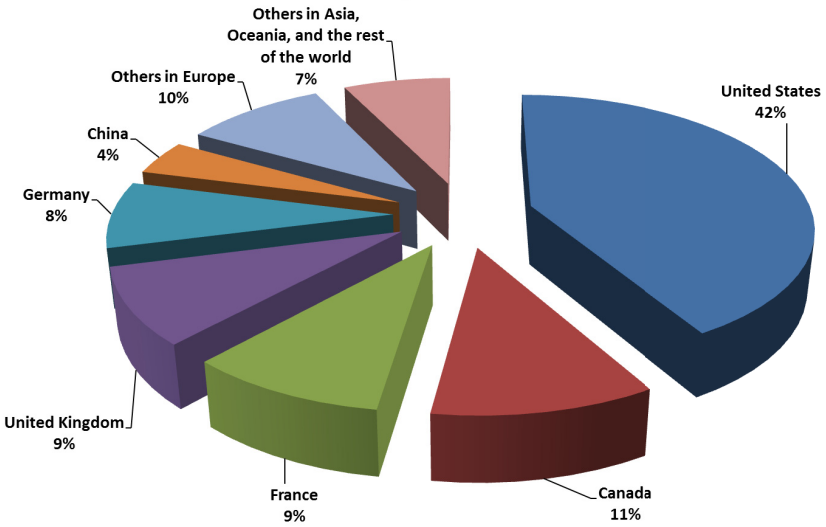




### Imaging Modality Keyword



### Country of First Author



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# Awards Presented at MICCAI 2012, Nice, France

*MICCAI Society Enduring Impact Award:* 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 2012 Enduring Impact Award was presented to *Jerry Prince*, 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 2012, fellowships were awarded to:

- *Alison Noble* (Oxford University, UK)
- *Wiro Niessen* (Erasmus Medical Centre, The Netherlands)
- *Nassir Navab* (Technical University of Munich, Germany)

*Medical Image Analysis Journal Award Sponsored by Elsevier:* *Benoit Scherrer*, for his paper entitled “Super-Resolution Reconstruction to Increase the Spatial Resolution of Diffusion Weighted Images from Orthogonal Anisotropic Acquisitions”, authored by Benoit Scherrer, Ali Gholipour and Simon K. Warfield.

*Best Paper in Computer-Assisted Intervention Systems and Medical Robotics:* *Benjamin Bejar* for his paper entitled “Surgical Gesture Classification from Video Data”, authored by Benjamin Bejar, Luca Zappella, Rene Vidal.

*Young Scientist Publication Impact Award Sponsored by Kitware Inc.:* MICCAI papers by a young scientist from the past 5 years were eligible for this award. It is made to a researcher whose work had an impact on the MICCAI field in terms of citations, secondary citations, subsequent publications, h-index. The 2012 Young Scientist Publication Impact Award was given to *Caroline Brun*: “A Tensor-Based Morphometry Study of Genetic Influences on Brain Structure using a New Fluid Registration Method” authored by C. Brun, N. Lepore, X. Pennec, Y.-Y. Chou, K. McMahon, G.I. de Zubicaray, M. Meredith, M.J. Wright, A.D. Lee, M. Barysheva, A.W. Toga, P.M. Thompson.

*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 2012 MICCAI Young Scientist Awards were given to:

- *Hang Su* for his paper entitled: “Phase Contrast Image Restoration Via Dictionary Representation of Diffraction Patterns”, authored by Hang Su, Zhaozheng Yin, Takeo Kanade, and Seungil Huh

- *Eli Gibson*, for his paper entitled: “Registration Accuracy: How Good is Good Enough? A Statistical Power Calculation Incorporating Image Registration Uncertainty”, authored by Eli Gibson, Aaron Fenster and Aaron D. Ward
- *Stephanie Marchesseau* for her paper entitled: “Cardiac Mechanical Parameter Calibration Based on the Unscented Transform”, authored by Stephanie Marchesseau, Herve Delingette, Maxime Sermesant, Kawal Rhode, Simon G. Duckett, C. Aldo Rinaldi, Reza Razavi, and Nicholas Ayache
- *Roland Kwitt* for his paper entitled: “Recognition in Ultrasound Videos: Where am I?”, authored by Roland Kwitt, Nuno Vasconcelos, Sharif Razaque, and Stephen Aylward
- *Robin Wolz*, for his paper entitled: “Multi-Organ Abdominal CT Segmentation Using Hierarchically Weighted Subject-Specific Atlases”, authored by Robin Wolz, Chengwen Chu, Kazunari Misawa, Kensaku Mori, Daniel Rueckert

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