

Preface

This is an exciting time for robotics. Governments across the world have recently announced major robotics programs such as the National Robotics Initiative, the DARPA Robotics Challenge in the U.S., and the European Commission's euRobotics initiative. The demand for industrial automation is more than ever. Companies like Google and Amazon have made significant robotics investments. There is considerable start-up activity around robotics. New, more capable platforms ranging from legged robots to aerial vehicles are being developed at a rapid pace. In this environment, developing algorithms for robots (and automation systems in general) so that they can operate in complex and unstructured environments has become crucial. These algorithms have applications beyond physical robotic and sensing systems as they are used for scientific inquiry in other disciplines such as biology and neurosciences.

The Workshop on Algorithmic Foundations of Robotics (WAFR) is the premier venue which showcases cutting-edge research in algorithmic robotics. The eleventh WAFR, which was held at Boğaziçi University in Istanbul, Turkey continued this tradition. We received 83 very strong submissions. Each submission was assigned to three members of the Program Committee (PC) which was composed of the leading researchers in the field. Each PC member provided a review. After a discussion phase open to the entire PC, and the collection of additional reviews as needed, 42 papers were selected for presentation at the workshop. WAFR took place during August 3–5, 2014.

This volume of Springer Tracts in Advanced Robotics contains extended versions of these papers. These contributions highlight the cutting-edge research in classical robotics problems (e.g., manipulation, motion, path, multi-robot, and kinodynamic planning), geometric and topological computation in robotics as well as novel applications such as informative path planning, active sensing, and surgical planning. About half of the accepted papers have been forwarded for further review for dedicated special issues of the International Journal of Robotics Research and IEEE Transactions on Automation Science and Engineering.

In addition to paper presentations, WAFR 2014 featured three invited speakers: Vijay Kumar gave a seminar on “Aerial Robot Swarms.” Çağatay Başdoğan's topic

was “Haptic Role Exchange and Negotiations for Human Robot Interaction.” Oussama Khatib focused on “Working with the New Robots.”

We owe many thanks to all the authors for submitting such high quality work, all the PC members and auxiliary reviewers for all of their hard work, and all WAFR participants for making WAFR 2014 a success. We would like to express our gratitude to Boğaziçi University’s Faculty of Engineering for the venue with breathtaking views, and University of Minnesota’s Department of Computer Science and Engineering for their support. Finally, we gratefully acknowledge travel support by the United States National Science Foundation for student participants.

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