

Preface

In October 2009, we helped organize a workshop entitled “Impact of Control: Past, Present, Future,” in Berchtesgaden, Germany. Our co-organizers were Martin Buss and Patrick Dewilde of the Technical University of Munich and Gary Balas of the University of Minnesota. The principal sponsors of the workshop were the IEEE Control Systems Society, the Institute of Advanced Study (IAS) and the Cognitive Technical Systems (CoTeSyS) program at the Technical University of Munich, the German Federal Research Agency (Deutsche Forschungs-Gemeinschaft), and the U.S. National Science Foundation.

At the conclusion of the workshop, there was consensus among the participants that the presentations and discussions needed to be documented in the form of a report. In taking up this challenge, our original intent was to compile a report based entirely on the workshop proceedings. As we reflected on the “impact” theme, however, our plans for the report expanded. Thus, in addition to including sections derived from the workshop sessions, we decided to showcase, in the form of two-page flyers, a number of examples of recent successes and future opportunities for control. Our solicitations to the controls community to contribute “success stories” and “grand challenges” resulted in numerous responses, of which 40-plus are included in Parts 2 and 4 here. Other material was also added that was not directly reflected in the workshop agenda.

All told, this report is the result of well over 50 contributors from across the globe, representing numerous theoretical and application areas of control science and engineering. We have been delighted by the interest shown in this project by the contributors and are grateful for their efforts. A special thanks to the lead authors for the sections in Parts 1 and 3, who graciously undertook multiple rounds of revisions at our behest: Kishan Baheti, Ken Butts, Eduardo Camacho, Ian Craig, Munther Dahleh, Frank Doyle, Luigi Glielmo, Sandra Hirche, Christian Philippe, Mark Spong, and Greg Stewart.

The leadership of Gary Balas, Martin Buss, and Patrick Dewilde for the workshop was instrumental to its success and thus paved the way for this report. Kishan Baheti of the U.S. National Science Foundation and Alkis Konstantellos of the European Commission repeatedly emphasized to us the importance of this report for the controls community and gave us guidance on various occasions; without their continued encouragement, this report would have been a much less ambitious undertaking. We would also like to acknowledge the generous support of the Institute for Advanced Study at the Technische Universität München, which was crucial for the organization of the workshop and the preparation of this report.

Our thanks are also due to Barb Field, who copyedited and compiled the report, to Lindsay Fend of Waldbillig & Besteman, who was responsible for the design and production of the flyers, and to Judy Scharmann of Conference Catalysts, who set up the website for the report.

The first editor is grateful for the support provided to him by Honeywell for this project. The second editor is grateful to IAS for sponsoring her sabbatical, during which the workshop was conceived and held.

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