

PREFACE

The Twenty-Fifth Annual International Solid Freeform Fabrication (SFF) Symposium – An Additive Manufacturing Conference, held at The University of Texas in Austin on August 4-6, 2014, was attended by 334 researchers from 16 countries. This is a significant increase from the record-setting 2013 attendance of 218, over 50% growth in one year. The organizers are pleased that 90 of the attendees were students, representing 27% of the audience. The number of oral and poster presentations increased as well, from 118 in 2013 to 196 this year. In anticipation of the increase, the conference organizers relocated the meeting from the University of Texas Thompson Conference Center, the venue for the meeting's first 24 years. The AT&T Executive Education and Conference Center was able to handle the increased number of attendees.

The meeting consisted of plenary and parallel technical sessions. To celebrate the 25th anniversary of the conference, the morning plenary sessions on the first two days were given over to looking back at the first 25 years of additive manufacturing and looking forward to the next 25 years, respectively. The Monday morning session was an inventor's forum with talks by the technology inventors/founders: Chuck Hull (vat polymerization), Michael Cima (Binder Jetting), Lisa Crump (Material Extrusion) and Carl Deckard (Powder Bed Fusion). The session was opened by Harris Marcus, founder of the SFF Symposium, who gave a brief history of the conference. Terry Wohlers followed with perspectives on the origins of additive manufacturing. Terry deserves special credit for giving his entire presentation the way we did presentations 25 years ago: completely using 35 mm slides which were produced and archived by him in the 1980s-1990s. For a significant number of attendees, this was the first time they had seen a 35 mm presentation. The Tuesday morning plenary session was a series of short presentations contrasting how we did research 25 years ago with how we do research today. The topic areas and speakers were Process Development (Phill Dickens, Then; Brent Stucker, Now), Computational Methods (Rich Crawford, Then; Jack Beuth, Now), Materials (Gideon Levy, Then, Tom Starr, Now), Design (David Rosen, Then, Carolyn Seepersad, Now). Gideon Levy then chaired a short panel on the subject of the next 25 years of additive manufacturing to transition from the past and present to the future. While these presentations do not have associated papers in this conference Proceedings, the organizers have arranged for many of the presentations themselves to be included in the flash drive. These appear in the folder "Plenary Presentations".

Tuesday evening, Hod Lipson gave an outstanding plenary presentation on the future of additive manufacturing. This was followed by the International Digital Sculpture and Engineered Forms Exhibit, curated by Mary Visser of Southwestern University. The art show included digital art by 20 digital artists from around the world. Also shown were 10 engineered pieces that have an artistic quality. The attendees were invited to enjoy the pieces and to consider the amorphous interface between art and engineering.

This year's best oral presentation was entitled, "A Survey of Sensing and Control Systems for Machine and Process Monitoring of Directed-Energy, Metal-Based Additive Manufacturing", authored by **E.W. Reutzel** and **A.R. Nassar** from Pennsylvania State University. Selection is based on the overall quality of the paper, the presentation and discussion at the meeting, the significance of the work and the manuscript submitted to the proceedings. Selected from 171 oral presentations, the associated manuscript appears on Page 309. The best poster presentation selected from 25 posters was given by **Y. Bai** and **C.B. Williams** from Virginia Polytechnic Institute and State University. Titled, "An Exploration of Binder Jetting of Copper", the paper is included in the Proceedings on Page 793.

Posters are judged based on the quality and organization of the poster as well as the discussion of the poster by the author during the poster session.

The recipient of the International Outstanding Young Researcher in Freeform and Additive Manufacturing Award was **Dr. Adam T. Clare** from The University of Nottingham. **Dr. Joseph Beaman** won the International Freeform and Additive Manufacturing Excellence (FAME) Award. He holds the Earnest F. Gloyna Regents Chair in Engineering at The University of Texas at Austin.

There are 114 papers in the conference proceedings. The proceedings papers are stored individually on a flash drive in pdf format by sequential order in the proceedings, including the first author last name. The Table of Contents file and Author-Attendee file have links to all the papers. We have sequentially numbered the pages of the papers to facilitate citation. Manuscripts for this and all preceding SFF Symposia are available for free download at the Lab for Freeform Fabrication website: <http://utwired.engr.utexas.edu/lff/symposium/proceedingsArchive/toc.cfm>.

The editors would like to extend a warm “Thank You” to Rosalie Foster for her detailed handling of the logistics of the meeting, as well as her excellent performance as registrar during the meeting. We would like to thank the Organizing Committee, the session chairs, the attendees for their enthusiastic participation, and the speakers both for their significant contribution to the meeting and for the relatively prompt delivery of the manuscripts comprising this volume. We look forward to the continued close cooperation of the additive manufacturing community in organizing the Symposium. We also want to thank the Office of Naval Research (N00014-14-1-0691) and the National Science Foundation (CMMI-1433422) for supporting this meeting financially. The meeting was co-organized by The University of Connecticut at Storrs, and the Mechanical Engineering Department/Lab for Freeform Fabrication under the aegis of the Advanced Manufacturing and Design Center at The University of Texas at Austin.

The editors.