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The CID number appears on each page of the manuscript. The complete citation is used on the first page, and an abbreviated version on subsequent pages. Numbers in the index correspond to the last two digits of the six-digit CID number.

Contents

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Xue-jun Zhang, Changchun Institute of Optics, Fine Mechanics and Physics (China)

Session Chairs

1 Multiple Surfaces and Freeform Optics
Jessica E. DeGroote Nelson, Optimax Systems, Inc. (United States)

2 Developments in Surface Finishing
Ray Williamson, Ray Williamson Consulting (United States)

3 MRF and Aspheres
Jessica E. DeGroote Nelson, Optimax Systems, Inc. (United States)

4 Surface Shaping
Ray Williamson, Ray Williamson Consulting (United States)

5 Large Asphere Surfacing and Testing I
Steve Jacobs, University of Rochester (United States)

6 Large Asphere Surfacing and Testing II
Ray Williamson, Ray Williamson Consulting (United States)

7 Interferometry
Ray Williamson, Ray Williamson Consulting (United States)

Panel Discussion: Issues with Mid-Frequency Surface Errors for Metrology and Fabrication
James H. Burge, *Panel Moderator* College of Optical Sciences, The University of Arizona (United States)
Leslie L. Deck, Zygo Coproration (United States)
James E. Harvey, CREOL, The College of Optics and Photonics, University of Central Florida (United States)
Jay Kumler, Coastal Optical Systems, Inc. (United States)
Paul E. Murphy, QED Technologies, Inc. (United States)

Introduction

This is an exciting time in the development of optical components. At first glance, optical and optomechanical design, substrate casting, surface finishing, and interferometry may appear to be the legacy base technologies upon which standard components are built, while the new developments are to be found in such disciplines as nonlinear effects, biomimetics, and quantum cryptography. A careful reading of these conference proceedings will show that such a superficial view is in error. Extensions of interferometry through stitching, profiling, numerous nulling methods, and computer-generated holograms have led to orders of magnitude improvements in capabilities for aspheric departure with substantially improved lateral and depth resolution. Breakthroughs in the basic science underlying lapping and polishing promise substantial improvements in both removal rate and surface quality across the spectrum of substrate materials. Surface fabrication, new machine types, geometries, controls, and computational models enable the deterministic realization of formerly unreasonable forms and tolerances. Optomechanical design, coupled with new casting, finishing, and testing methods, is creating new generations of large, lightweight telescopes with sensitivities and resolutions beyond our imaginations of only a few years ago. And, optical design is now closing the modeling gaps between tracing ideal rays, polynomial aberrations, and random scatter with a deeper understanding of the effects of statistical and mid-spatial-frequency form errors and their proper specification.

We're pleased to present these manuscripts, proud of our authors, and thankful for their hard and innovative work, the support of their organizations, and the good offices of SPIE.

James H. Burge
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Ray Williamson