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**James H. Burge
Oliver W. Föhnle
Ray Williamson**
Editors

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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.

In particular, we are experiencing a steady shift of the center of attention of optics manufacturing research from classically machining processes of glass to materials suited for glass molding processes, e.g. tungsten carbide or silicon carbide.

In 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 only a few years ago. 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, and thankful for the hard and innovative work of the contributing authors, and the support of their organizations.

James H. Burge
Oliver W. Föhnle
Ray Williamson