

COVER FEATURES

28 **Computational Photography—The Next Big Step**

GUEST EDITOR'S INTRODUCTION

Oliver Bimber

Computational photography extends digital photography by providing the capability to record much more information and by offering the possibility of processing this information afterward.

30 **Computational Cameras: Redefining the Image**

Shree K. Nayar

Computational cameras use unconventional optics and software to produce new forms of visual information, including wide field-of-view images, high dynamic range images, multispectral images, and depth images. Using a controllable optical system to form the image and a programmable light source as the camera's flash can further enhance the capabilities of these cameras.

40 **The Moment Camera**

Michael F. Cohen and Richard Szeliski

Future cameras will let us "capture the moment," not just the instant when the shutter opens. The moment camera will gather significantly more data than is needed for a single image. This data, coupled with automated and user-assisted algorithms, will provide powerful new paradigms for image making.

46 **Light Fields and Computational Imaging**

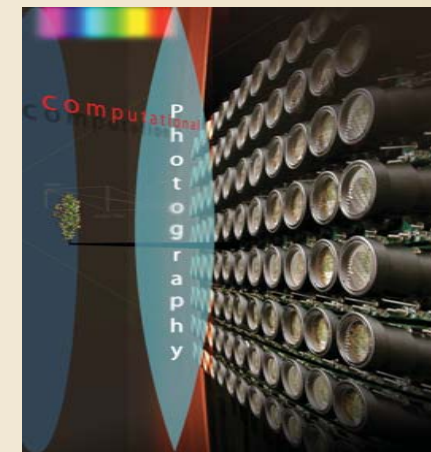
Marc Levoy

A survey of the theory and practice of light field imaging emphasizes the devices researchers in computer graphics and computer vision have built to capture light fields photographically and the techniques they have developed to compute novel images from them.

57 **Virtual Cinematography: Relighting through Computation**

Paul Debevec

Recording how scenes transform incident illumination into radiant light is an active topic in computational photography. Such techniques are making it possible to create virtual images of a person or place from new viewpoints and in any form of illumination.



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Flagship Publication
of the
IEEE Computer Society