

# Biometric Consortium 2005 Conference

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**Ramkumar Narayanswamy Ph.D**  
*Director of Product and Project Management*  
*CDM Optics, Inc*  
*A OmniVion Tehcnologies company*

4001 Discovery Drive  
Boulder, CO 80303  
Phone: 303.449.5593. ramkumarN@cdm-optics.com

**Topic:** Extending the Imaging Volume of an Iris Recognition System

**Abstract:** Current iris recognition systems have a narrow field of view and a shallow depth of field, mandating considerable user cooperation and training. The subjects must carefully position themselves such that the correct eye is within the field of view, in focus, and is held stationary to avoid motion blur; issues which make the system difficult to use.

Ideal iris imaging systems shall have a large field of view and a large depth of field and operate such that persons can be identified without requiring their active cooperation. Equally important is that these systems are efficient in capturing light, in order to maximize the signal-to-noise at the detector and to enable short exposures (minimal motion blur). Traditional optics cannot provide both light-capturing efficiency (low F/#) and a large depth of field in the same system. So the systems designer using traditional optics is forced into an undesirable either-or situation.

Wavefront Coded imaging is an example of the emerging field of computational imaging, which offer both fast F/# and extended depth of field. The imaging system uses asymmetric-aspheric optics and complementary signal processing. These systems use computation (processing) as an inherent part of image-acquisition, in contrast to traditional systems where image-processing is considered a post-acquisition step.

We will present an iris recognition system that expands the depth of field by a factor of 3x over a traditional imaging system while maintaining the same F/#. We will present an intuitive understanding of the technology, the primary trade-off issues and point out the range of applications that can benefit from Wavefront Coded imaging.

**Biography:** Ramkumar Narayanswamy has over 15 years experience in developing imaging and pattern recognition systems for a wide range of applications including space and medical imaging, biometric and machine vision applications and consumer digital still camera systems. He holds a Ph.D. in Optoelectronics from the University of Colorado and a Masters from the University of Virginia. He is currently the Director of Product and Project Management at CDM Optics, Inc, which is a fully owned subsidiary of Omnivision Technologies Inc (OVTI). He has published 30 articles in peer-reviewed journals and conference publications.