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# Retinal Oximeter for Deriving *In Vivo* Oxygen Saturation

*Device for determining in vivo oxygen saturation in the retina via multiple simultaneous measurements in a single image.*

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**Field**
Diabetic Retinopathy Assessment

Oximetry

**Technology**
Spectroscopic Imaging

**Stage of Development**
Prototype device developed. Both *in vitro* and *in vivo* performance demonstrated.

System appears to be in a position to seek marketing approval by the FDA as a Class II medical device.

**Status**
Seeking development, manufacturing & licensing partner.

## BACKGROUND

An estimated 700,000 individuals are affected by incurable eye diseases resulting in blindness each year. Most of these cases can be attributed to age-related macular degeneration, diabetic retinopathy, and retinis pigmentosa. Current treatment options are focused on preventing or slowing down further vision loss. Currently, there is no treatment option which is curative for these diseases.

Various studies have indicated that early detection and monitoring of at-risk eye disease patients can lead to more successful response to treatments, and thus reduced risk of visual loss.

## TECHNOLOGY OVERVIEW

The present invention from the Catholic University of America, is an advance on current technologies for measuring retinal oxygen levels, which play a vital role in the pathophysiologies leading to vision loss.

This new, non-invasive method for indirectly assessing oxygen delivery in the body is a multi-aperture system capable of capturing identical images of the human fundus at eighteen different spectral bands in a single snapshot. When interfaced with a fundus camera, this device can acquire spectroscopic sensitive images of the retina vessel from which oxygen saturation in the retina can be calculated *in vivo*.

## STAGE OF DEVELOPMENT

Prototype device developed. Both *in vitro* and *in vivo* performance demonstrated.

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## LICENSING OPPORTUNITIES

The Catholic University of America is seeking a development, manufacturing and licensing partner.

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## INVENTORS


**Jessica C. Ramella-Roman Ph.D.**
Assistant Professor Biomedical Engineering

Biography in Brief
Jessica Ramella-Roman's research is in the field of Biomedical Optics, the study of light interacting with biological media. Her main interests are polarized light imagi and modeling, spectroscopic diagnostic of skin lesions and Port-wine stains and opti fiber instrumentation

Education
Ph.D., Electrical Engineering, Oregon Health and Science University, 2004
M.S., Electrical Engineering, Oregon Health and Science University, 2004
Laurea, Electrical Engineering, Universita di Pavia, Italy, 1993

**Scott A. Mathews, Ph.D.**
Assistant Professor Electrical Engineering and Computer Science

Biography in Brief
Scott Mathews has been doing research and development work in the private sector past 15 years, including work on solid state radiation imaging systems, optical data s systems, and laser micro-fabrication of microelectronic and microfluidic structures.

Education
Ph.D., Materials Engineering, University of Maryland, 2001
M.S., Materials Engineering, University of Maryland, 1993
B.S., Physics, University of Maryland, 1988

**Mark Mirotznik**
Associate Professor Electrical Engineering and Computer Science

Biography in Brief
Mark Mirotznik's research interests include computational electromagnetics and optics, nano- and micro-scale photonic devices, bioelectromagnetics and biomedical instrumentation. He has published more than 90 peer-reviewed journal and conference papers in these areas.

Education
Ph.D., Biomedical Engineering, University of Pennsylvania, 1992
M.S., Electrical Engineering, University of Pennsylvania, 1991
M.S., Biomedical Engineering, University of Pennsylvania, 1991
B.S., Electrical Engineering, Bradley University, 1988