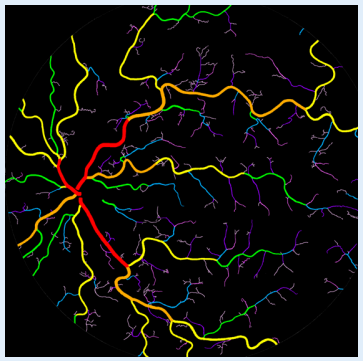
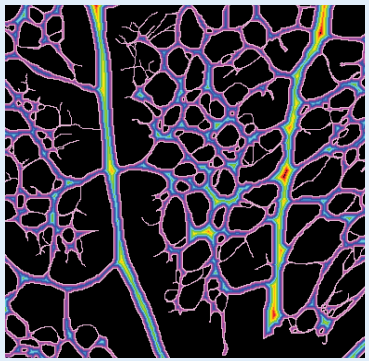
Space Biosciences
NASA AMES RESEARCH CENTER

NASA's Innovative VESsel GENeration Analysis (VESGEN) Software

Arterial Tree



Vascular Network



Vascular Patterning for Research Discovery and Technology Development

Patricia Parsons-Wingerter PhD, NASA
Biomedical Research Engineer, Lead VESGEN Innovator

New Organ Alliance & NASA Vascular Centennial Challenge
Chair, Vascular Imaging, Computational Analysis, Biosensing Committee (ICAB)

VESGEN Patent Pending

New Organ Alliance & NASA Vascular Centennial Challenge

Vascular Imaging, Computational Analysis, Biosensing Committee (ICAB)

Actively recruiting members with vascular imaging and other expertise!

Lisa Carnell, PhD Senior Research Scientist, Human Research Program, NASA
Tissue engineering, biosensing, microvascular remodeling

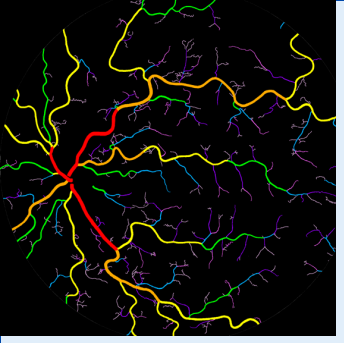
Jennifer Fogarty PhD Chief Scientist, Human Research Program, NASA
Angiogenesis, microvascular remodeling, role of biomarkers

Antony Jeevarajan PhD Deputy Division Chief, Biomedical Research and Environmental Sciences, NASA: Biomedical research, imaging of cell systems in bioreactors for tissue engineering

Krishnan Radhakrishnan MD PhD MPH, Senior Scientist/Epidemiologist, Veteran's Administration, West Haven, CT: Computational and medical analysis of microvascular remodeling in clinical and microscopic images

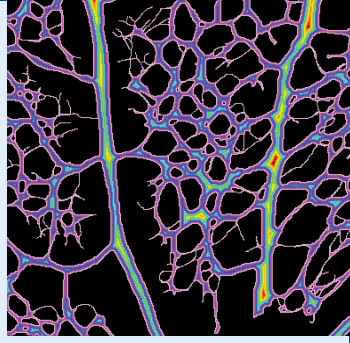
NASA's VESGEN
Vascular Centennial Challenge Collaborators

- David Kao PhD, VESGEN 3D Mapping and Quantification; Visualization
- Hamed Valizadegan PhD, Rodney Martin PhD, Nikunj Oza PhD, AI/Deep Learning for Vascular Image Binarization
- Mary B. Vickerman MS, VESGEN 2D/3D Image Analysis and Java Developer
- Mark Lagatuz MSE, VESGEN Java Developer
- Matthew Murray BS, VESGEN Vascular Analysis Early Career Scientist
- Ann-Sofie Schreurs PhD and Candice Tahimic PhD, Heart Vascular Branching
- Undergraduate Interns: Sneha Ramesh, Marina Predovic, Cassandra Stawicki



VESGEN 2D

Translational Mapping and Quantification of Fractal-Based Vascular Pattern



Human Retina

Mouse Retina

- **Overview of VESGEN applications to vascular mapping and quantification**
- **VESGEN software scheduled for public release by NASA in 2018**

VESGEN Patent Pending

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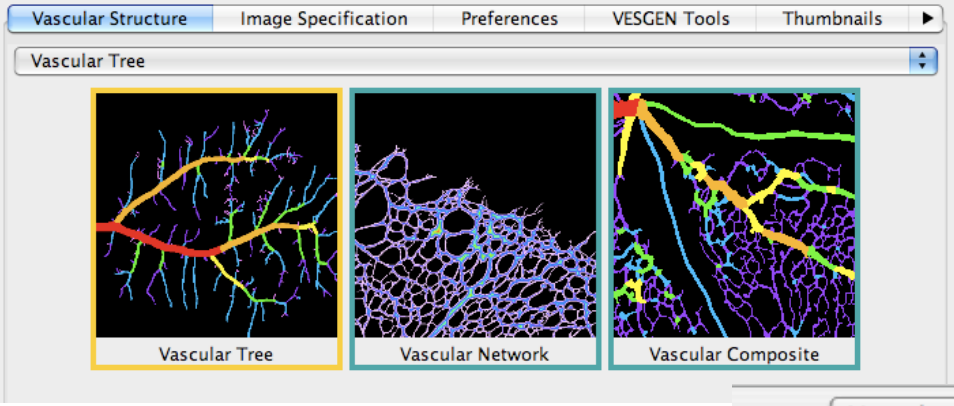
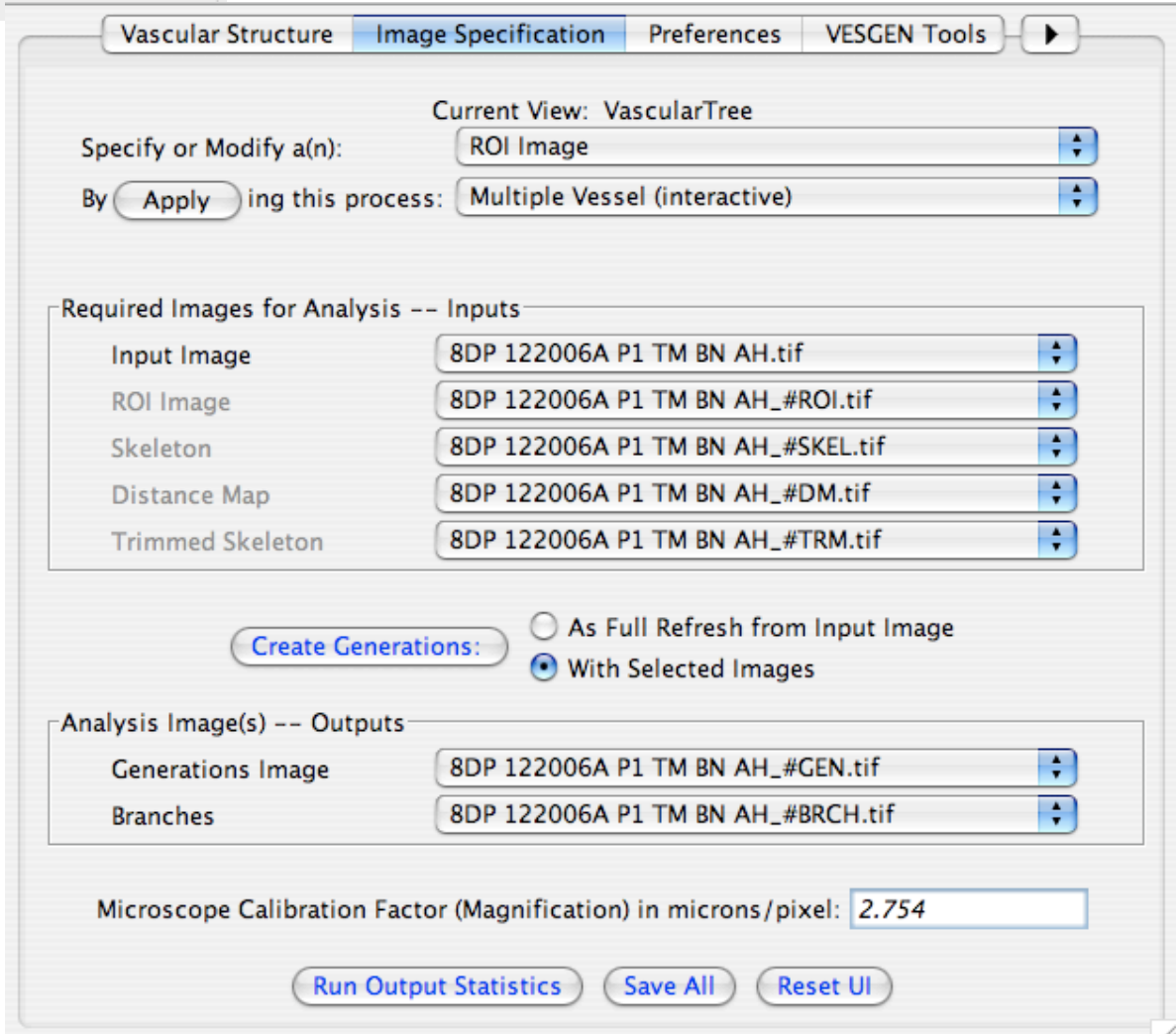
Mature, Beta-Level VESGEN



Panel to specify vessel type

Main panel

- Image specification
- Algorithm selection
- Process initiation

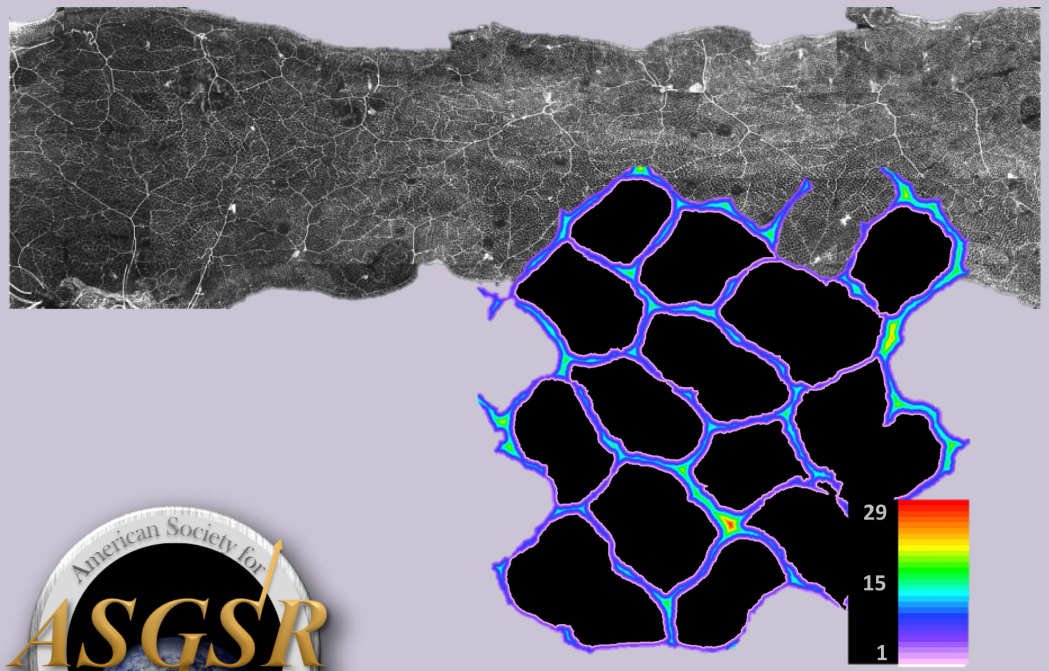


VESGEN Patents Pending

Volume 26, Number 2 October 2012

Gravitational and Space Biology

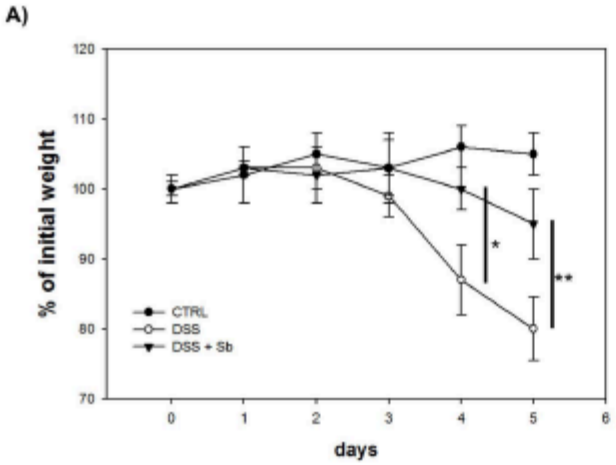
Publication of the American Society for Gravitational and Space Research

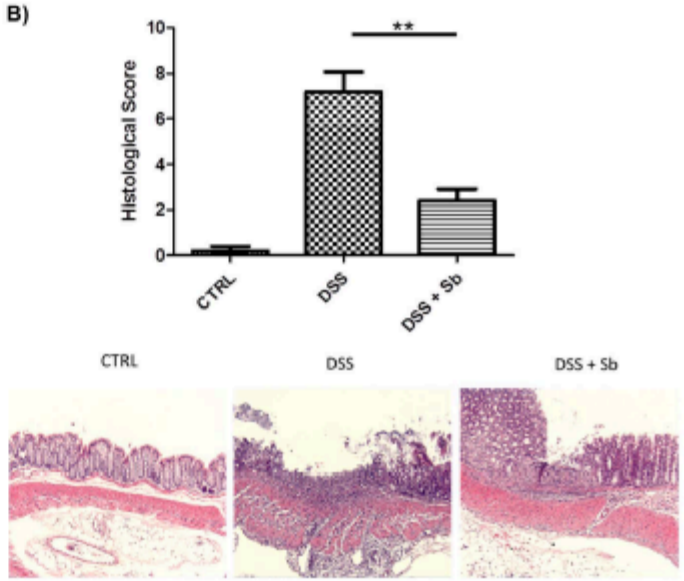


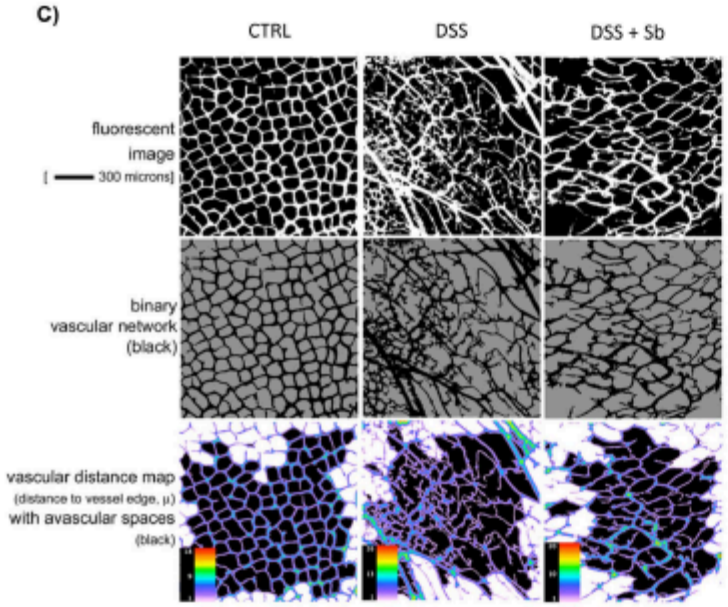
https://www.asgsr.org/index.php/publications

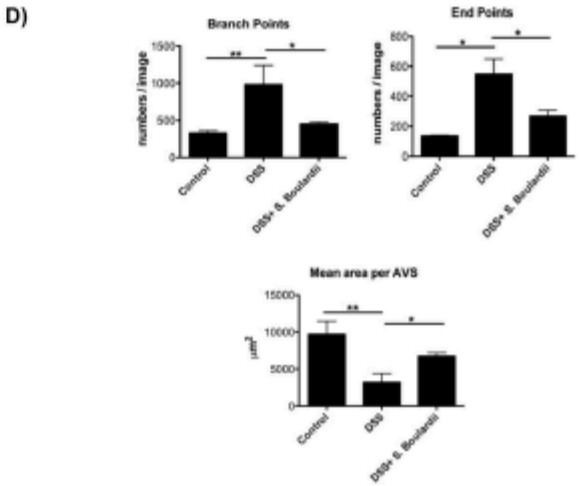
Chen, Reinecker, Parsons, Kelly et al *PlosONE* 2013

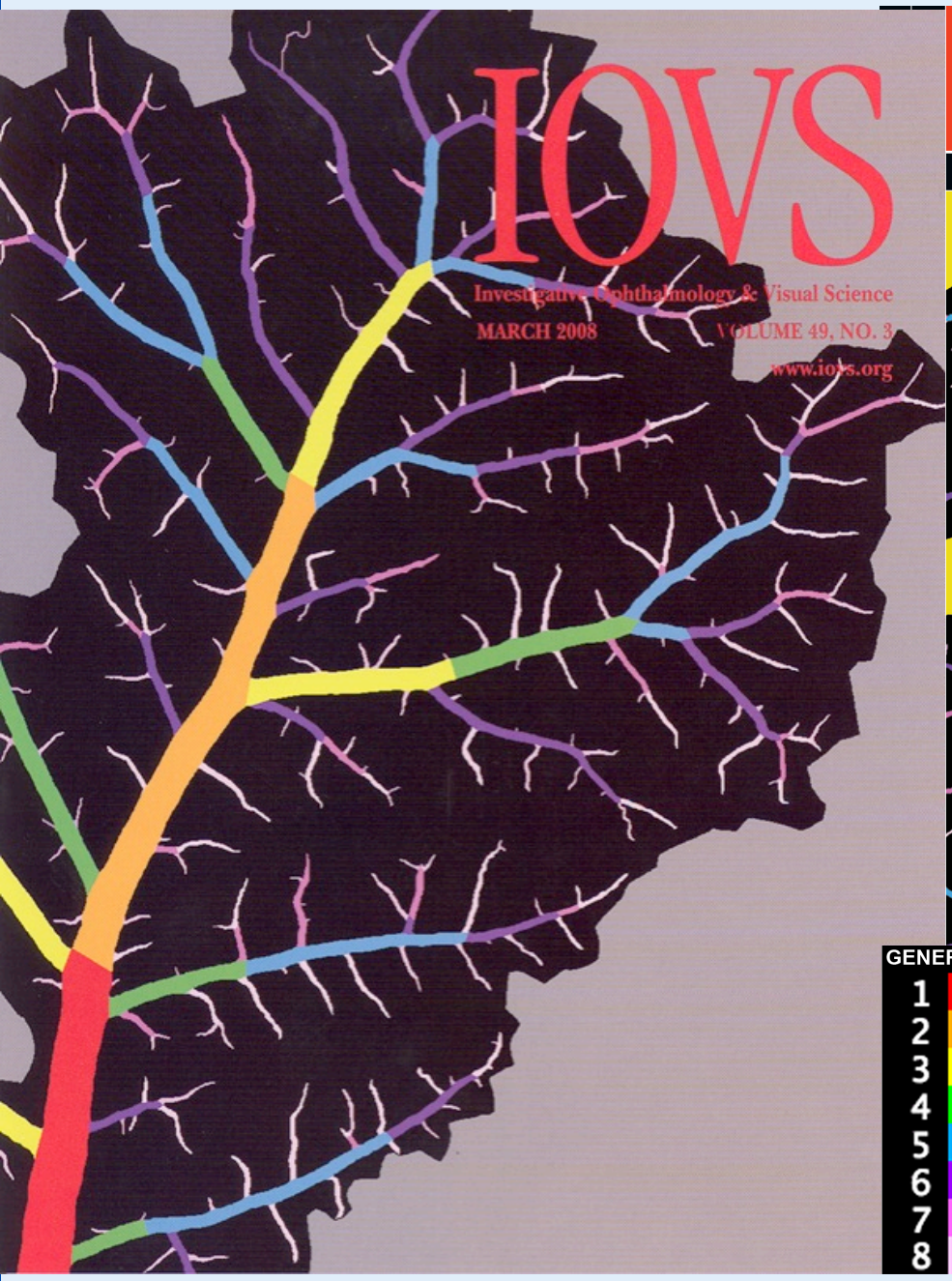
Probiotics on Colonic Angiogenesis







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Investigative Ophthalmology & Visual Science
MARCH 2008
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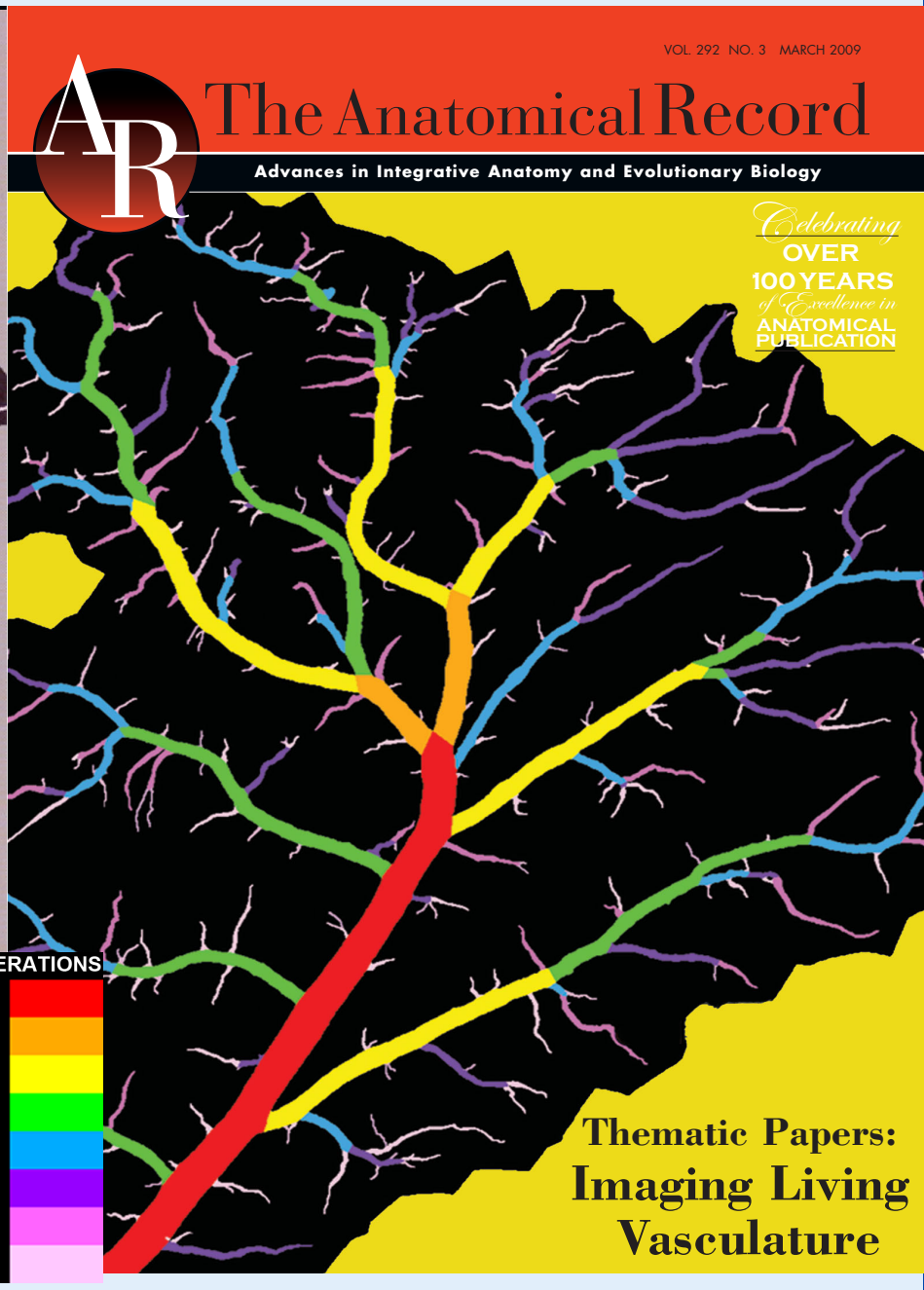
VOL. 292 NO. 3 MARCH 2009
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The Anatomical Record
Advances in Integrative Anatomy and Evolutionary Biology
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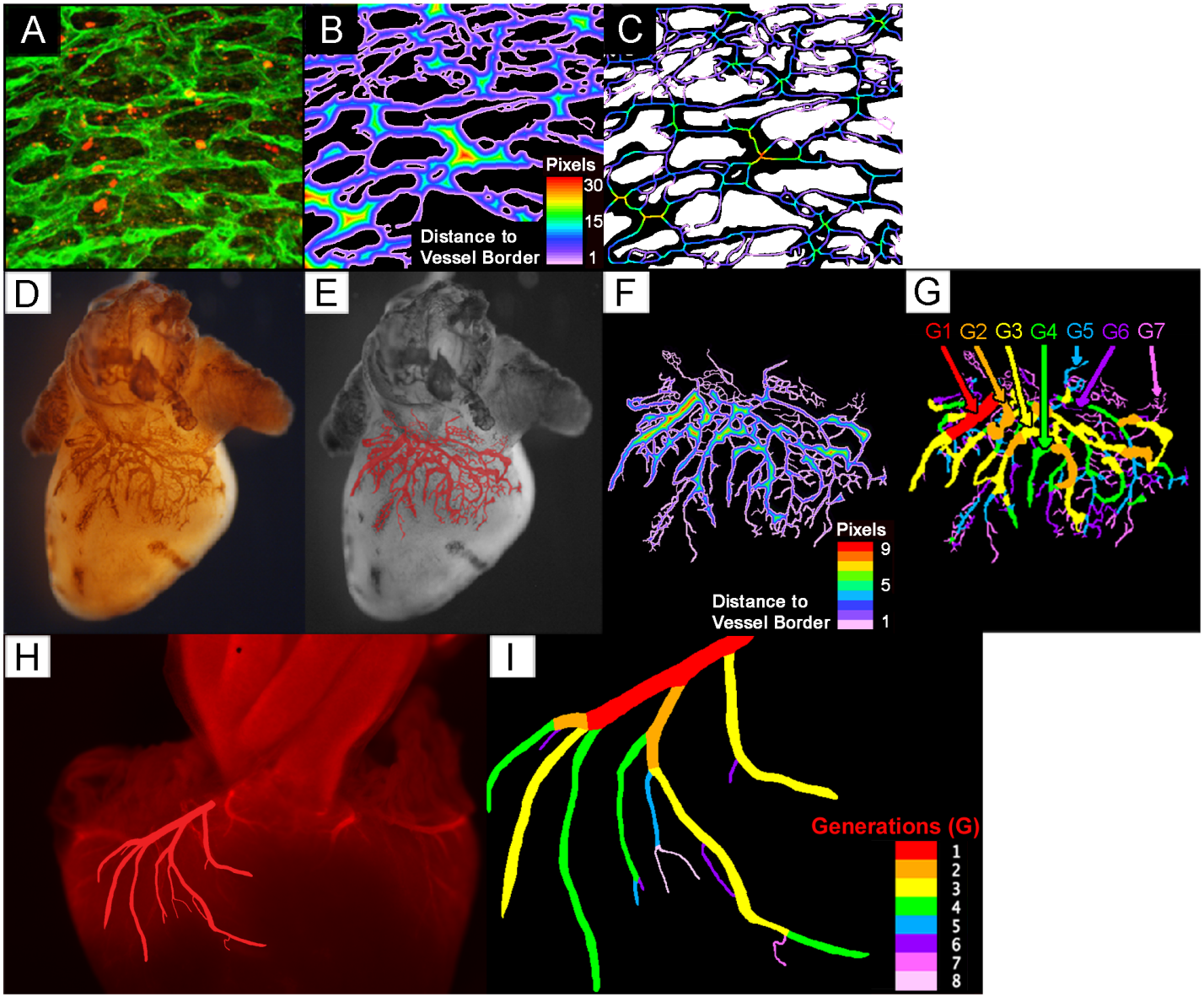
Thematic Papers:
Imaging Living
Vasculature

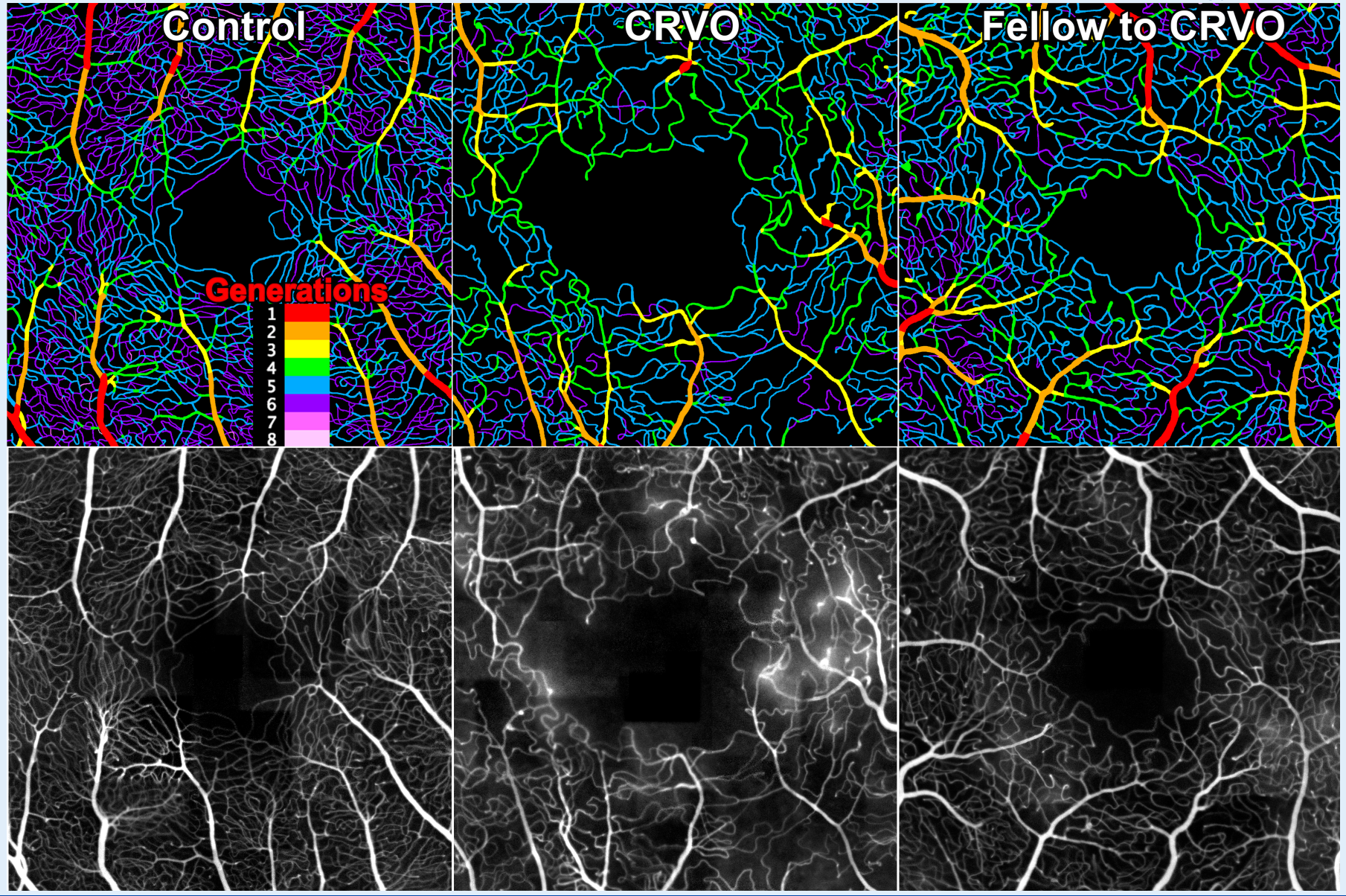
Coronary Vessel Network-to-Tree Transitions



Vickerman et al, VESGEN Review, *Anatomical Record A* 292(3), 2009

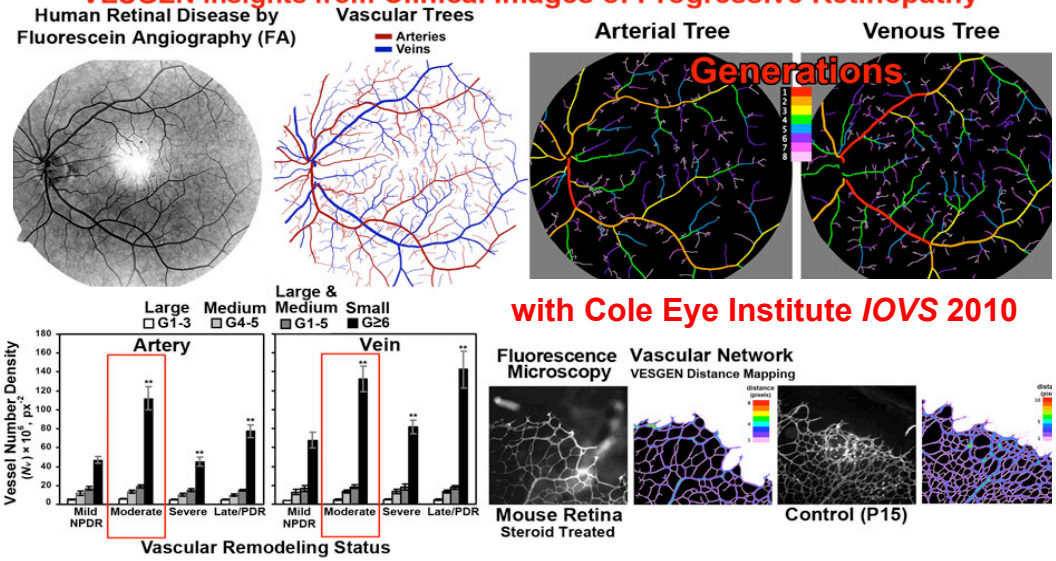
VESGEN mapping of retinal blood vessels for FA-AOSLO and OCT-Angiography

P Parsons with A Pinhas, R Rosen et al, Association for Research in Vision and Ophthalmology, 2014



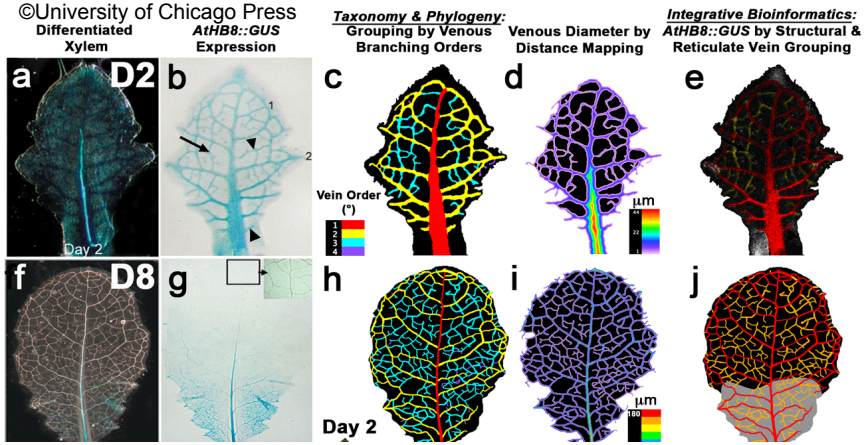
VESGEN: R&D Discovery Tool for Multidisciplinary Collaboration

VESGEN Insights from Clinical Images of Progressive Retinopathy

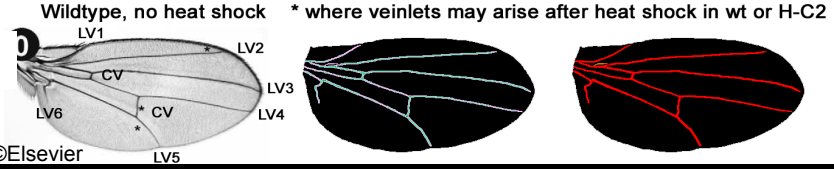


with Cole Eye Institute *IOVS* 2010

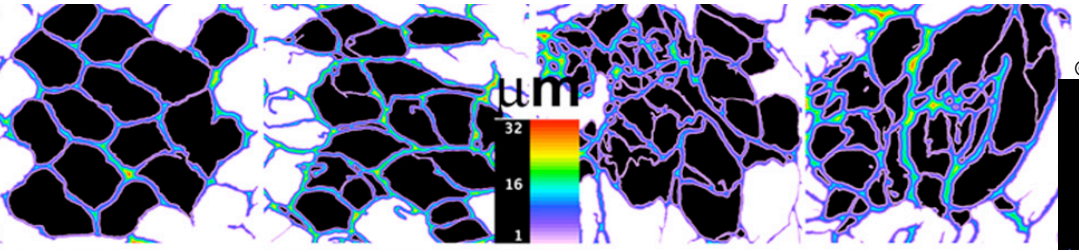
with University of Florida *Grav & Space Res* 2014

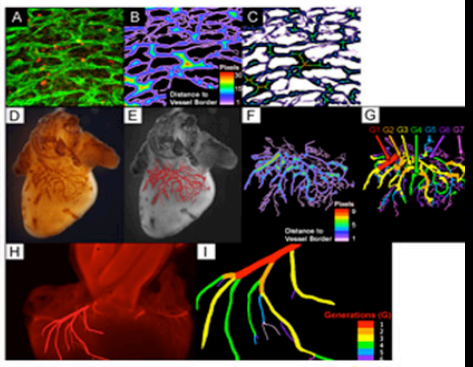


with S Bhattacharya, R Hosamani SCR *ASGSR* 2013

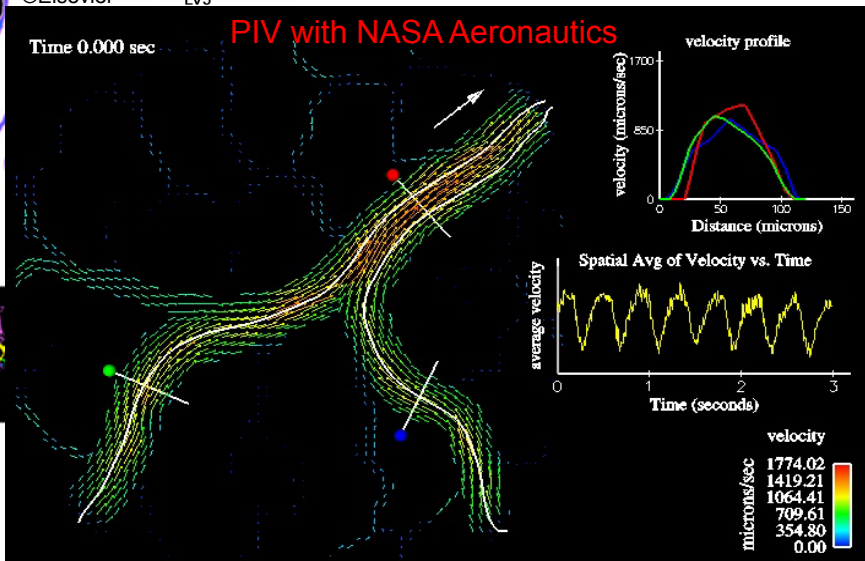


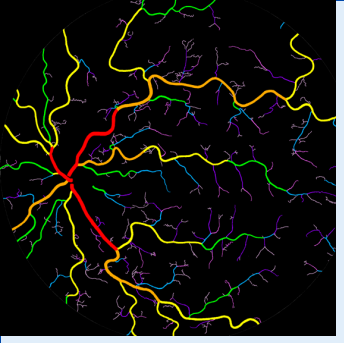
with Harvard Medical School *Grav Space Biol* 2012, PLoS ONE 2013





PIV with NASA Aeronautics





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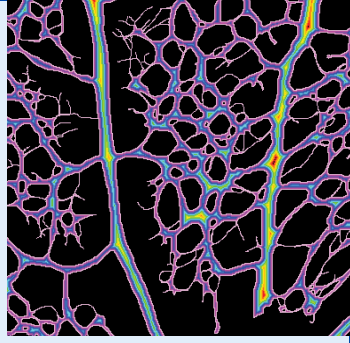

Human Retina

Mouse Retina

- **Summary of VESGEN applications mapping and quantification of vascular trees and networks**
- **VESGEN software scheduled by NASA for public release in 2018**

VESGEN Patent Pending

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