



Interface of Mathematical Models and Experimental Biology:  
Role of the Microvasculature  
Scottsdale, Ariz. • September 11–14, 2019

**TENTATIVE PROGRAM**

*M-modeler*                      *E-experimentalist*  
<sup>AP</sup> Assistant Professor            <sup>PD</sup> Postdoctoral fellow  
*\*confirmed speaker*            <sup>M</sup> Minority  
<sup>W</sup> Woman

**WEDNESDAY, SEPTEMBER 11, 2019**

6:00PM – 6:15PM            Welcome

6:15PM – 7:15PM            **Keynote Lecture**  
\*Fitz-Roy Curry, Univ. of California, Davis  
Using mathematical models to understand what we observe: from the microscope to the telescope

7:15PM – 8:30PM            Opening Reception

**THURSDAY, SEPTEMBER 12, 2019**

**8:00AM – 10:00AM            Symposium 1**  
**Flow in microvascular networks**  
Chairs: \*Tim Secomb, Univ. of Arizona and Trainee TBD

8:00AM – 8:30AM            Russell T Carr, Univ. of New Hampshire – M  
Nonlinearity in Microvessel Networks: Multiple Solutions and Spontaneous Oscillations

8:30AM – 9:00AM            \*Nicolas Smith, Univ. of Auckland – M  
Measurement and Modelling of the Coronary Circulation: Experiment to Computation

9:00AM – 9:30AM            TBD – Trainee – E

9:30AM – 10:00AM            \*Virginia Huxley<sup>W</sup>, Univ. of Missouri – E  
One size fails to fit all: Sex influences the modeling of flux from microvascular networks

10:00AM – 10:15AM            Coffee Break

**10:15AM – 12:15PM            Symposium 2**  
**Oxygen transport to tissue**  
Chairs: \*Alan Weinstein, Cornell Univ. and \*Jefferson Frisbee, Univ. of Western Ontario



10:15AM – 10:45AM	*Dan Goldman, Univ. of Western Ontario – M Multi-Scale Modeling of Skeletal Muscle Oxygen Transport Using Arteriolar and Venular Networks Reconstructed from Experimental Data
10:45AM – 11:15AM	*Tuhin Roy <sup>AP</sup> , Mayo Clinic – M Effect of Pulmonary Flow Heterogeneity on Oxygen Uptake and Delivery
11:15AM – 11:45AM	TBD
11:45AM – 12:15PM	*Daniel Hirai <sup>AP</sup> , Purdue Univ. –E Muscle oxygen transport in health and disease: innovative approaches, novel insights
12:15PM – 2:00PM	Lunch – to be provided
<b>2:00PM – 4:00PM</b>	<b>Symposium 3</b> <b>Myocardial microcirculation</b> Chairs: *Dan Beard, Univ. of Michigan and Trainee TBD
2:00PM – 2:30PM	*Brian Carlson <sup>AP</sup> , Univ. of Michigan – M Multi-scale modeling of supply-demand matching in myocardial oxygen delivery
2:30PM – 3:00PM	*Jonathan Mynard, Univ. of Melbourne – M Towards a coronary microscope: Insights into the microvasculature through the lens of macro-haemodynamics
3:00PM – 3:30PM	TBD – Trainee – E
3:30PM – 4:00PM	* David Gutterman, Medical College of Wisconsin – E Central role of the microcirculation in the etiology of heart disease
<b>4:00PM – 5:00PM</b>	<b>Trainee Career Workshop</b> <b>Careers in theoretical modeling and quantitative analysis of physiological systems</b> Chairs: *Paola Causin <sup>W,AP</sup> , Univ. of Milan, and Trainee TBD
4:00PM	*Marissa Renardy <sup>W, PD</sup> , Univ. of Michigan – M Navigating biological research as an early-career mathematician
4:20PM	*Adebowale Adebisi <sup>M</sup> , Univ. of Tennessee – E Microvasculature and how I got here
<b>5:15PM – 7:00PM</b>	<b>Poster Session 1 and Social Activity</b>



**FRIDAY, SEPTEMBER 13, 2019**

- 8:00AM – 10:00AM**      **Symposium 4**  
**Structural adaptation and angiogenesis in microcirculatory pathways**  
Chairs: \*Shayn Pierce-Cottler<sup>W</sup>, Univ. of Virginia
- 8:00AM – 8:30AM      \*Shayn Pierce-Cottler<sup>W</sup>, Univ. of Virginia – M  
Agent-based Modeling of multi-cell niches in health and disease
- 8:30AM – 9:00AM      Trainee TBD – M
- 9:00AM – 9:30AM      \*Feilim Mac Gabhann, Johns Hopkins Univ. – E  
Mathematical models of non-drug therapies in angiogenesis
- 9:30AM – 10:00AM      \*W. Lee Murfee<sup>AP</sup>, Univ. of Florida – E  
A Systems Biology View for Discovering Cell Dynamics During  
Microvascular Network Growth
- 10:00AM – 10:15AM      Coffee Break
- 10:15AM – 12:15PM**      **Symposium 5**  
**Cancer tissue microcirculation**  
Chairs: \*Daniel Heller, Weill Cornell Medical College and Trainee TBD
- 10:15AM – 10:45AM      \*Amanda Randles<sup>W,AP</sup>, Duke Univ. – M  
Development and Application of Computational Models of Fluid-Structure-  
Interaction Dynamics in the Microvasculature
- 10:45AM – 11:15AM      \*Vittorio Christini, Univ. of Texas – M  
Emerging Mechanistic Biomarkers of Cancer Chemo-Radiation and  
Immunotherapy from Mathematical Bio-Physics
- 11:15AM – 11:45AM      Trainee TBD – E
- 11:45AM – 12:15PM      \*Lance Munn, Harvard Univ. – E  
Mechanobiological control of vascular function
- 12:15PM – 2:00PM      Lunch – to be provided
- 2:00PM – 4:00PM**      **Symposium 6**  
Renal microcirculation  
Chairs: \*Anita Layton<sup>W</sup>, Univ. of Waterloo and Trainee TBD
- 2:00PM – 2:30PM      \*Bruce Gardiner, Murdoch Univ. – M  
Renal oxygenation during diuresis
- 2:30PM – 3:00PM      \*Jessica Leete<sup>W,PD</sup>, Duke Univ. – M  
Triple whammy: anti-hypertensive drugs, non-steroidal anti-inflammatory  
agents, and acute kidney injury



- 3:00PM – 3:30PM \*Dmitry Postnov<sup>PD</sup>, Boston Univ. – M  
Renal microcirculation from structure to dynamics
- 3:30PM – 4:00PM \*Jennifer Sullivan, Augusta Univ. – E  
Pericytes Protect Against Renal Ischemia-Reperfusion Injury, via Sex-Specific Mechanism
- 5:15PM – 7:00PM Poster Session 2 and Social Activity**

**SATURDAY, SEPTEMBER 14, 2019**

- 8:00AM – 10:00AM Symposium 7  
Retinal microcirculation**  
Chairs: \*Julia Arciero<sup>W</sup>, Indiana Univ.-Purdue Univ. Indianapolis, and Trainee TBD
- 8:00AM – 8:30AM \*Giovanna Guidoboni, Univ. of Missouri – M  
Ocular blood flow: A delicate balance of pressures
- 8:30AM – 9:00AM \*Brendan Fry<sup>AP</sup>, Metropolitan State Univ., Denver - M  
Modeling blood flow regulation and oxygen transport in the retinal microcirculation
- 9:00AM – 9:30AM Trainee TBD – E
- 9:30AM – 10:00AM \*Alon Harris, Indiana Univ. – E  
Understanding risk factors in Glaucoma using mathematical modeling
- 10:00AM – 10:15AM Awards Ceremony**
- 10:15AM – 10:30AM Coffee Break**
- 10:30AM – 12:30PM **Symposium 8  
Brain microcirculation**  
\*Jessica A. Filosa<sup>W,AP</sup>, Augusta Univ. and Trainee TBD
- 10:30AM – 11:00AM \*Franca Schmid<sup>W,PD</sup>, Univ. of Zürich – M  
Blood flow modelling in realistic microvascular networks focusing on layer-specificity in topology and perfusion
- 11:00AM – 11:30AM Trainee TBD – E
- 11:30AM – 12:00PM \*Jessica A. Filosa<sup>W,AP</sup>, Augusta Univ. – E  
Flow/pressure evoke parenchymal arteriole tone in brain slices from cardiovascular compromise mice
- 12:00PM – 12:30PM \*Sava Sakadzic<sup>AP</sup>, Harvard Univ. – E  
Imaging cerebral microvascular structure, oxygen concentration and blood flow in animal models



**12:30PM – 12:45PM      Conference Concluding Statements**

Chair: \*Thomas Pannabecker, Univ. of Arizona

\*Tim Secomb, Univ. of Arizona

\*Alan Weinstein, Weill Medical College of Cornell

**12:45PM                      Conference Concludes**

Co-Chairs

Thomas Pannabecker, Univ. of Arizona

Alan Weinstein, Weill Medical College of Cornell

Organizing committee:

Julia Arciero<sup>W</sup>, Indiana Univ., Purdue Univ. Indianapolis

Dan Beard, Univ. of Michigan

Paola Causin<sup>W, AP</sup>, Univ. of Milan

Aurélie Edwards<sup>W</sup>, Boston Univ.

Jefferson Frisbee, Univ. of Western Ontario

Anita Layton<sup>W</sup>, Univ. of Waterloo

Tim Secomb, Univ. of Arizona

Women, ethnic minorities, junior investigators/faculty (assistant professor), postdoctoral fellows:

Women:

Julia Arciero, Indiana Univ., Purdue Univ. Indianapolis

Paola Causin, Univ. of Milan

Aurélie Edwards, Boston Univ.

Jessica A. Filosa<sup>W, AP</sup>, Augusta Univ.

Virginia Huxley, Univ. of Missouri

Denise Kirschner, Univ. of Michigan

Anita Layton, Univ. of Waterloo

Shayn Pierce-Cottler, Univ. of Virginia

Amanda Randles, Duke Univ.

Franca Schmid, Univ. of Zürich

Assistant professors:

Brian Carlson, Univ. of Michigan

Paola Causin, Univ. of Milan

Jessica A. Filosa<sup>W, AP</sup>, Augusta Univ.

Brendan Fry, Metropolitan State Univ.

W. Lee Murfee, Tulane Univ.

Amanda Randles, Duke Univ.

Tuhin Roy, Mayo Clinic

Sava Sakadzic, Harvard Univ.

Postdoctoral fellows:

Mason McClatchey, Vanderbilt Univ.

Franca Schmid, Univ. of Zürich