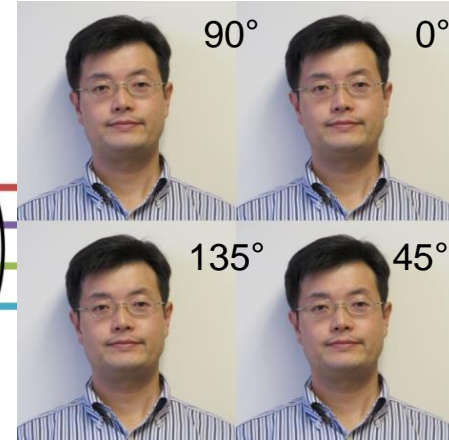
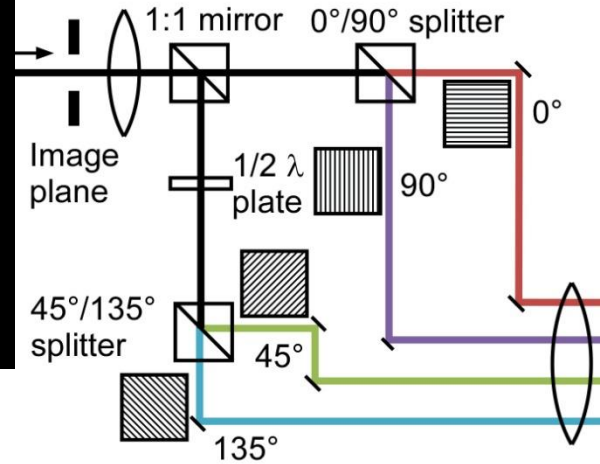
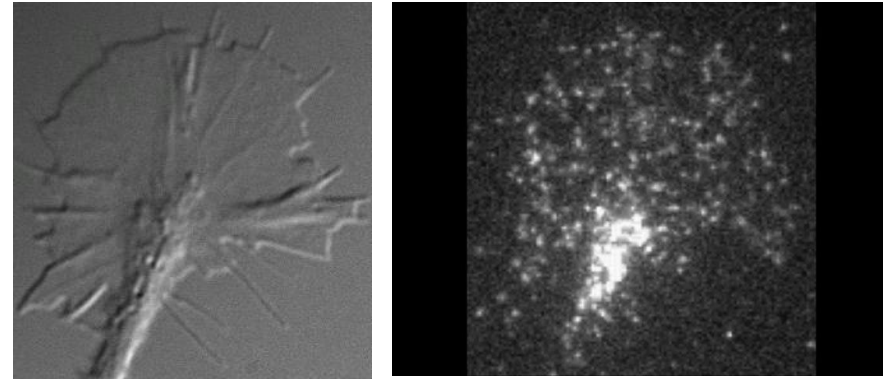


Monitoring structural dynamics of single molecules in living cells

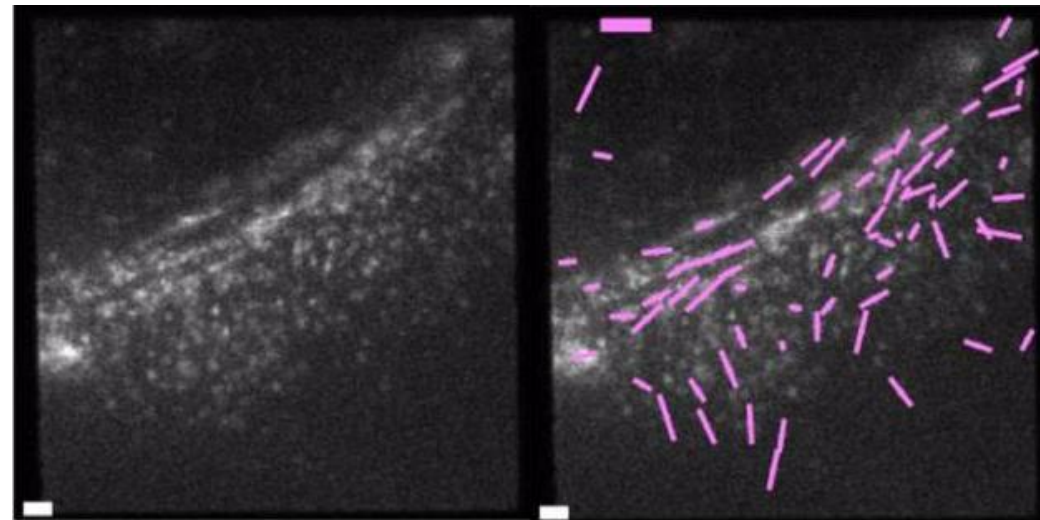
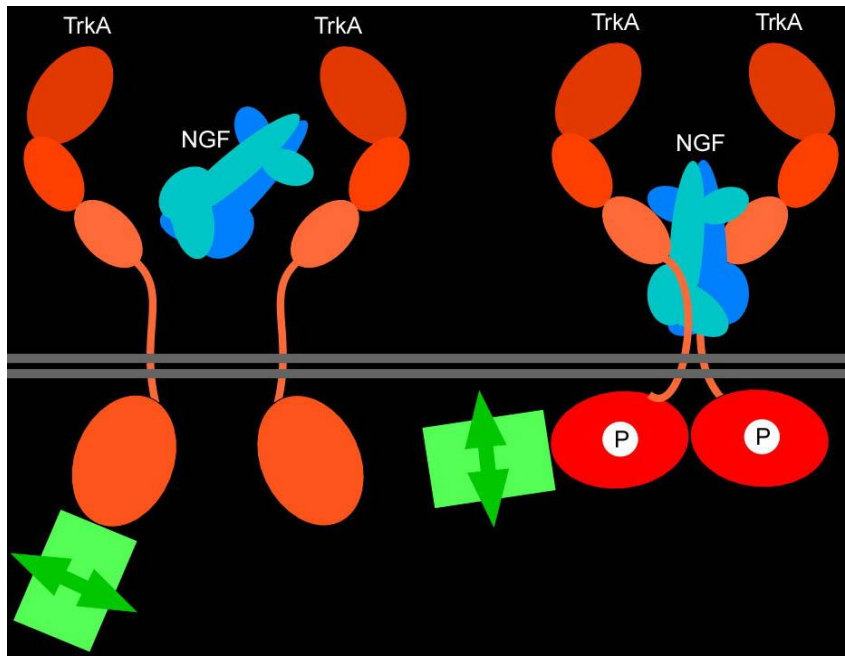
Tomomi Tani (MBL)

ttani@mbi.edu

Lillie 115



Tani et al., *J. Neurosci.* (2005)

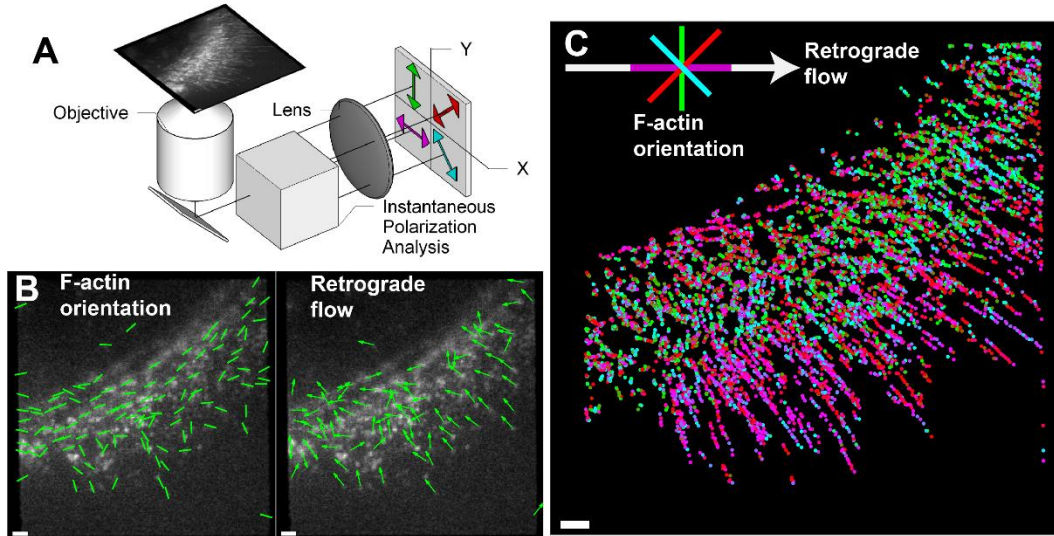


Mehta et al., *PNAS* (2016)

Revealing order in living systems

Multi-dimensional imaging and data driven discovery

Mehta...Tani, PNAS 2016.

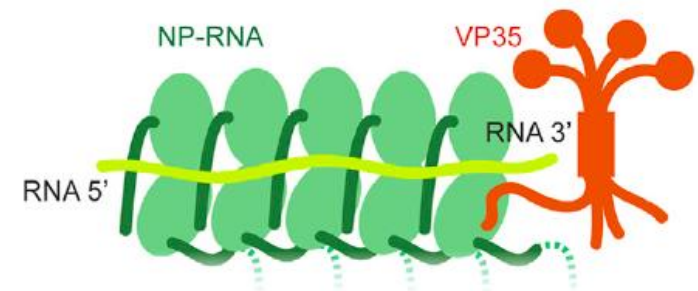
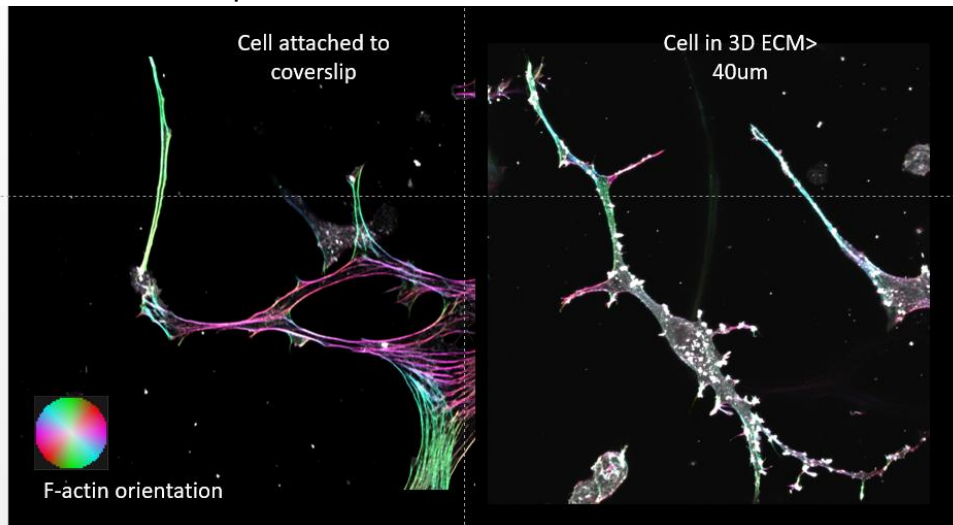


Shalin Mehta, Lillie 110

Present: mshalin@uchicago.edu

Future: shalin.mehta@czbiohub.org

Confocal PolScope



Ebola virus Nucleocapsid

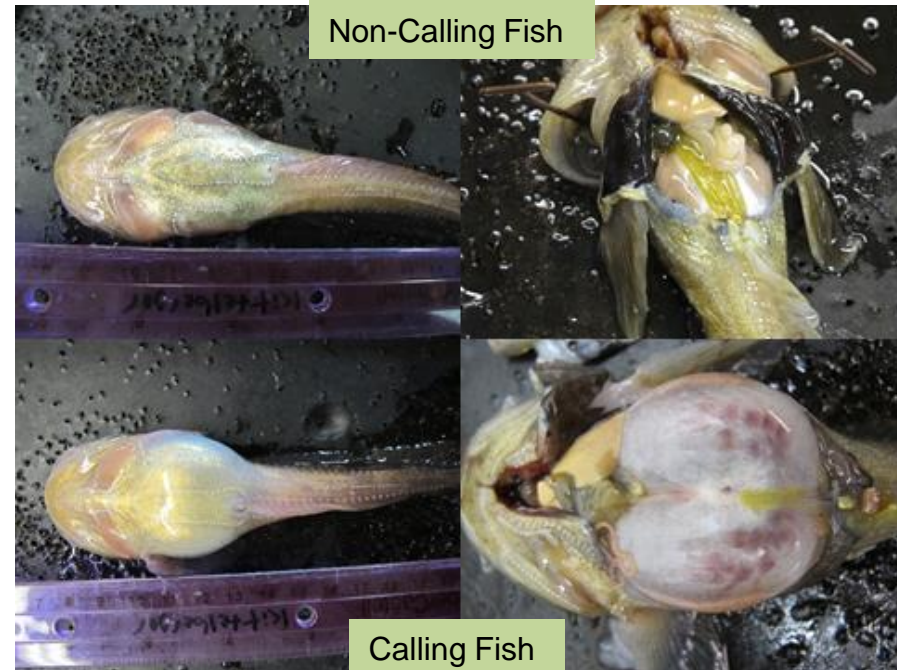
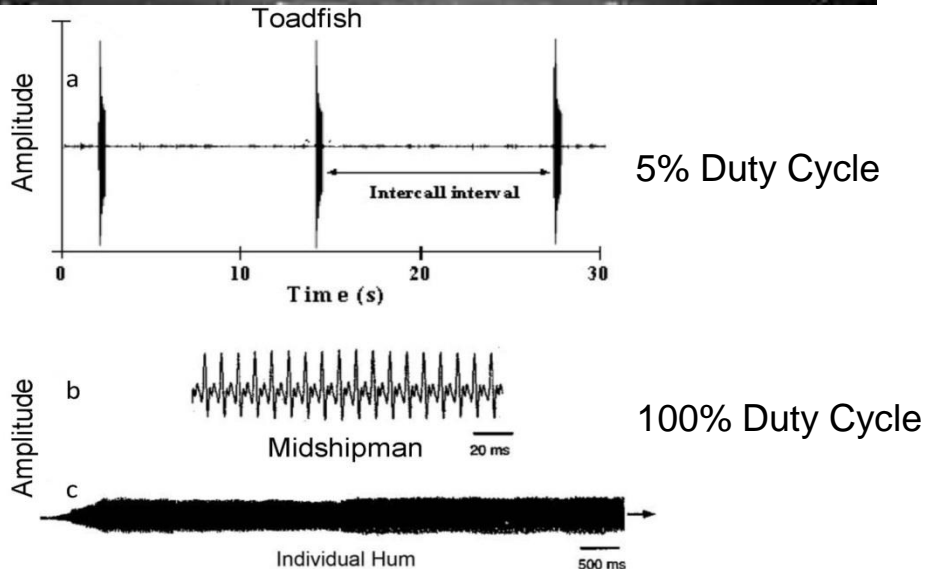
Design and Function of Superfast Muscle in Calling Fish

Larry Rome
Rowe 313
LRome@
SAS.Upenn.edu

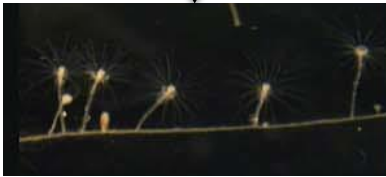
Steve Baylor,
Steve Hollingworth,
Frank Nelson

Matt Kittelberger, Al Mensinger

Courtesy- Andy Bass Cornell University

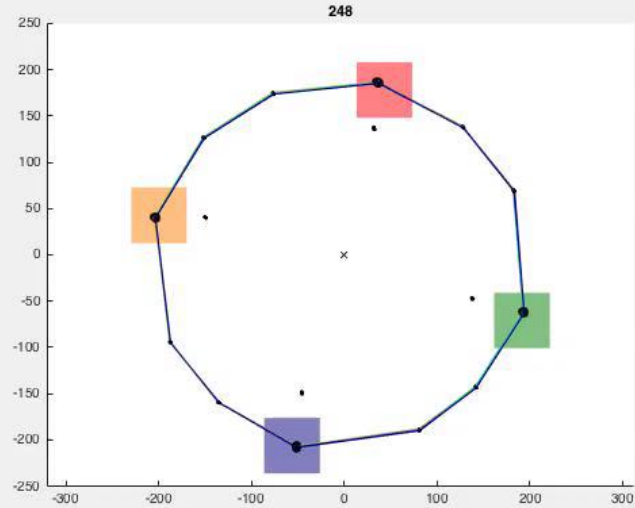


Clytia



Houliston et al., 2010

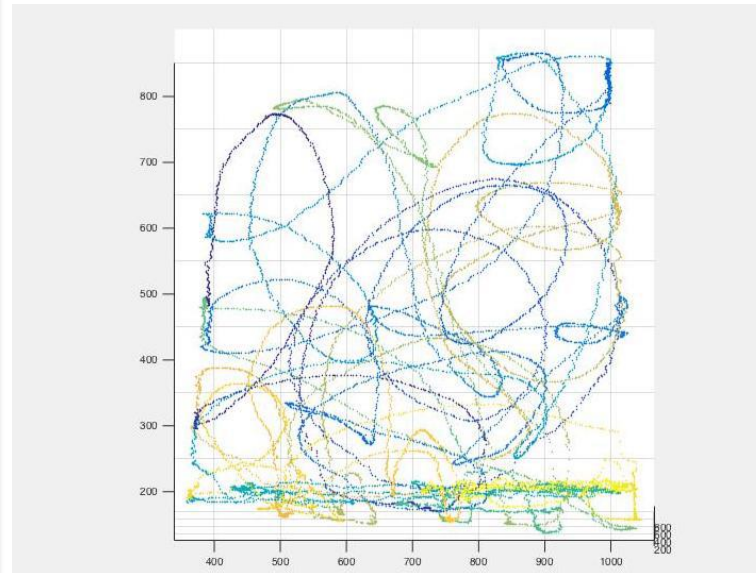
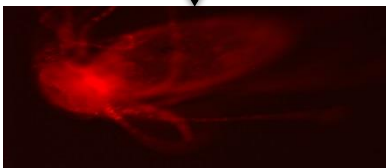
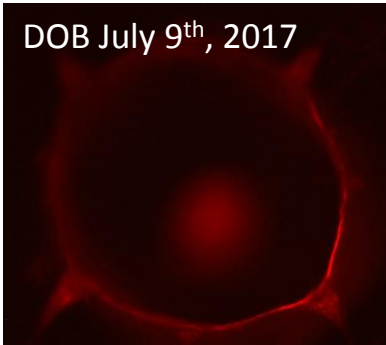
Behavior Analysis



Brady Weissbourd
Caltech
bweissb@gmail.com

Transgenesis

DOB July 9th, 2017

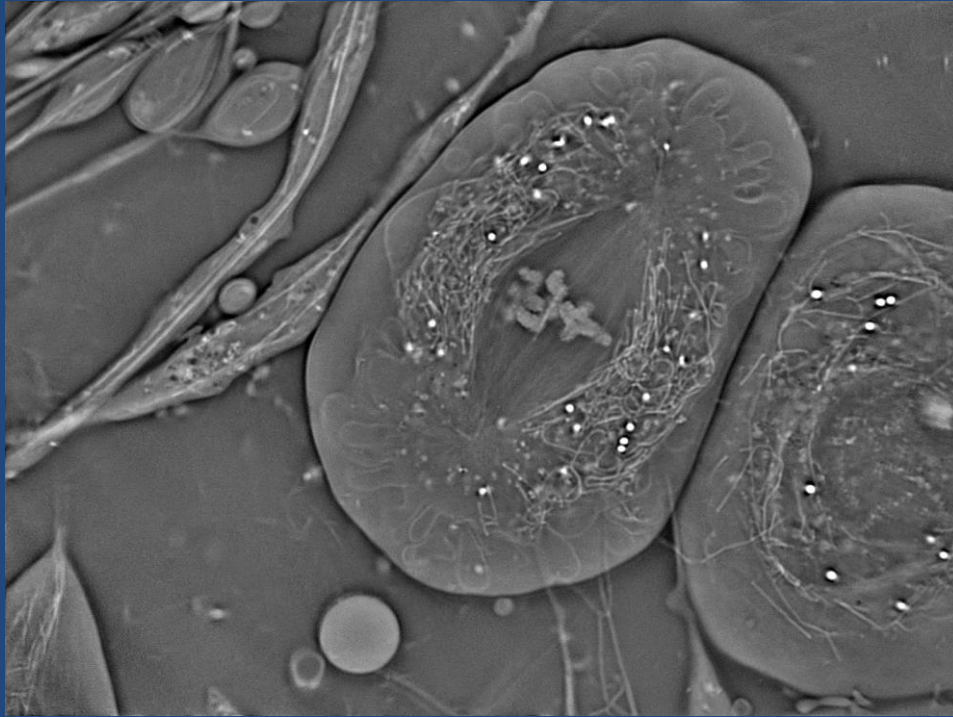


Let's talk!

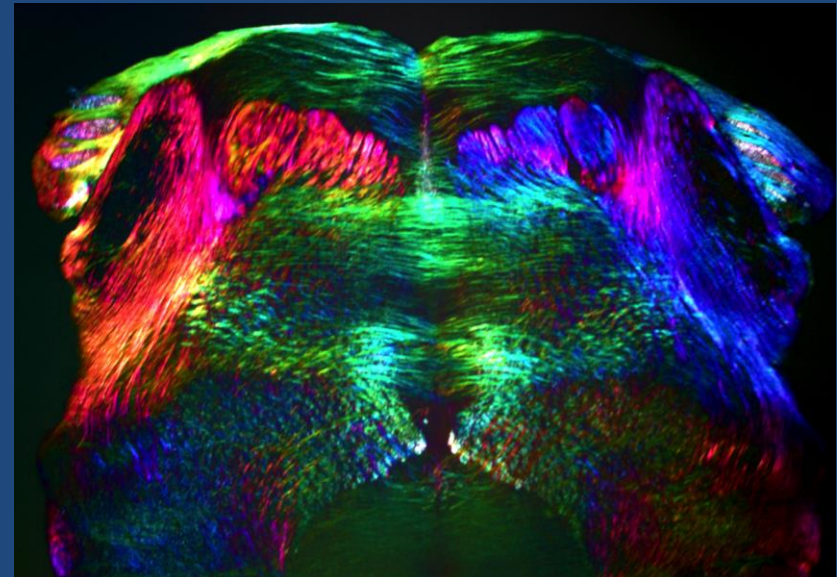
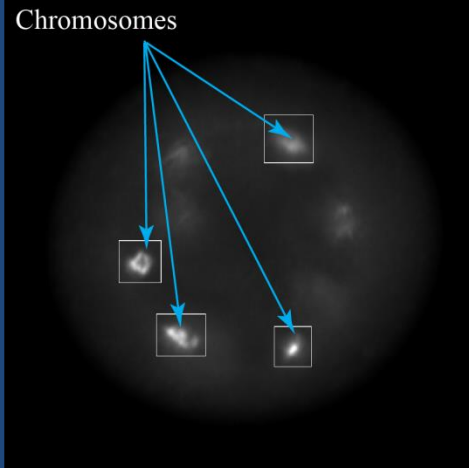
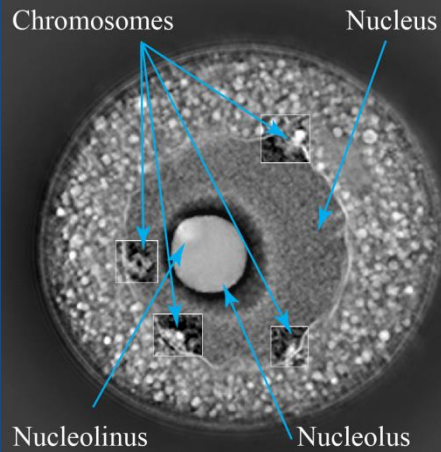
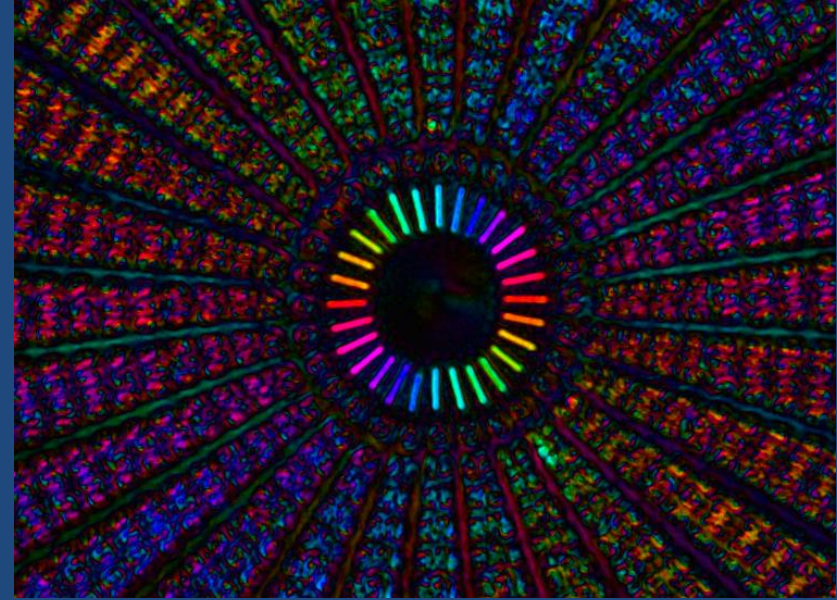
- Jellyfish ecology
- Imaging techniques
- Molecular techniques
- Anyone need to track some plankton?
- Other...

New microscopy techniques invented at the MBL/ Michael Shribak

Orientation-independent DIC

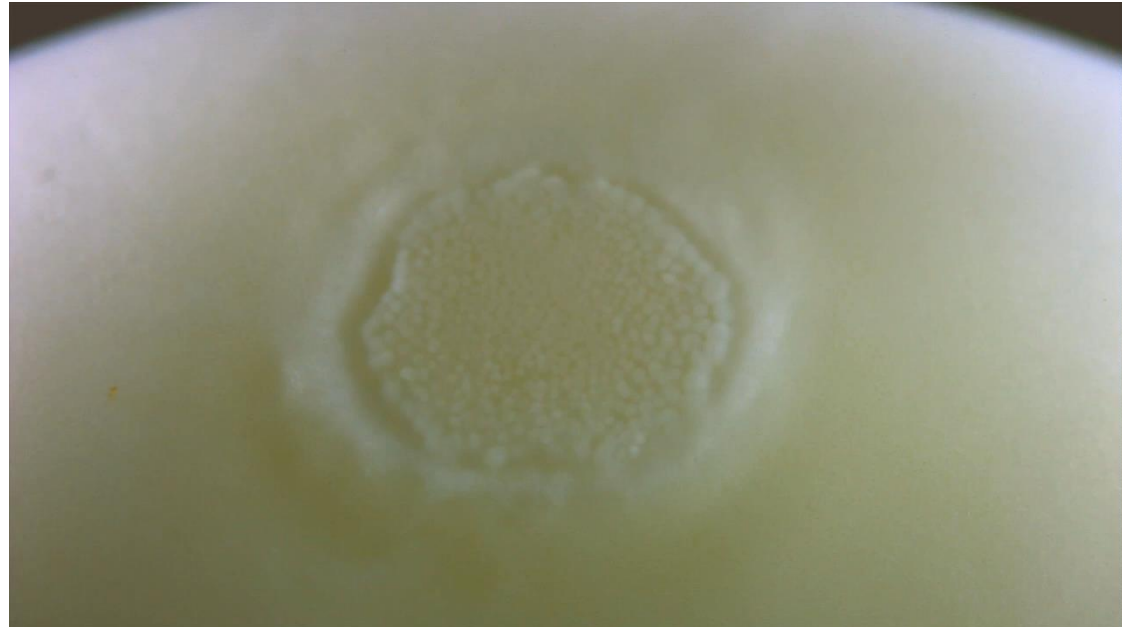


Polychromatic polscope



Origin and evolution of the vertebrate body plan

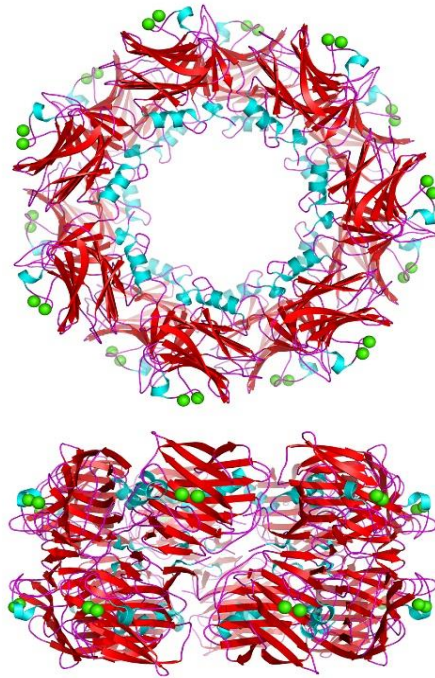
Andrew Gillis, Department of Zoology, University of Cambridge



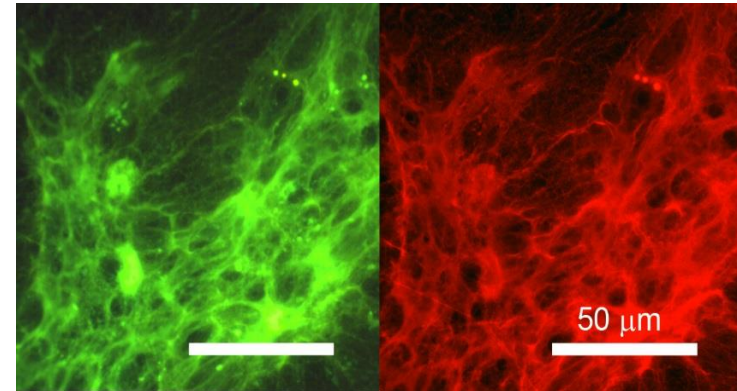
Conserved effector proteins of metazoan immune systems – Peter Armstrong (UC Davis)



the thiol-ester proteins, C3, C4, & C5 of the complement pathway, the α_2 -macroglobulins



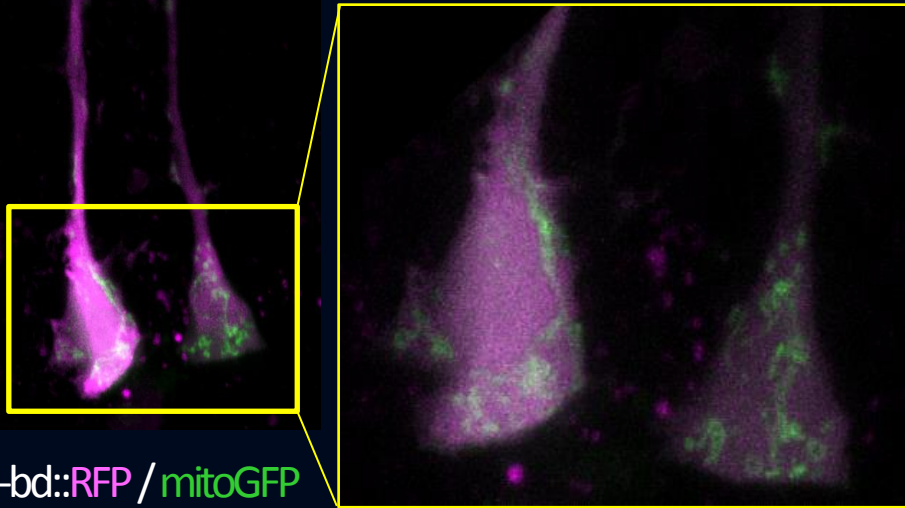
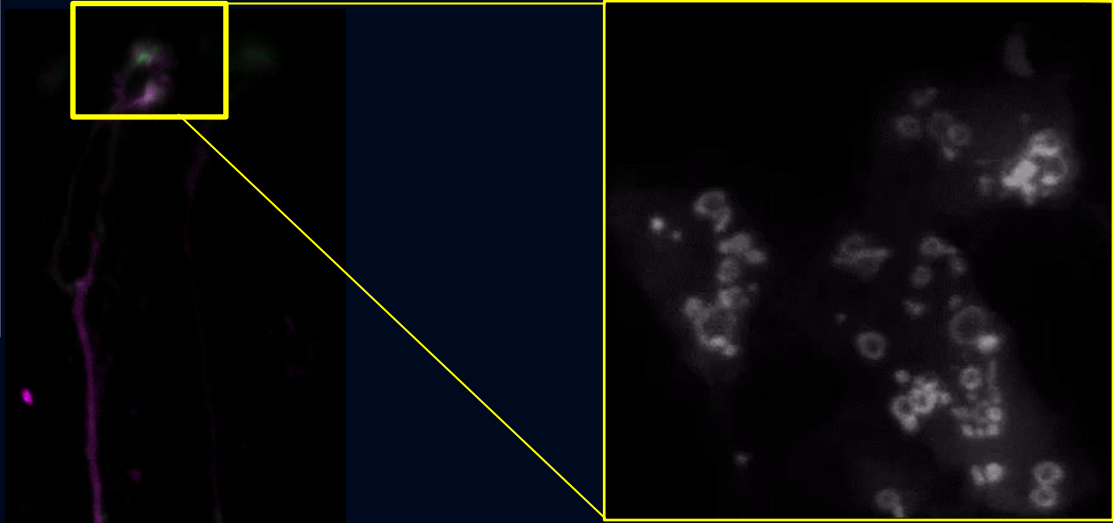
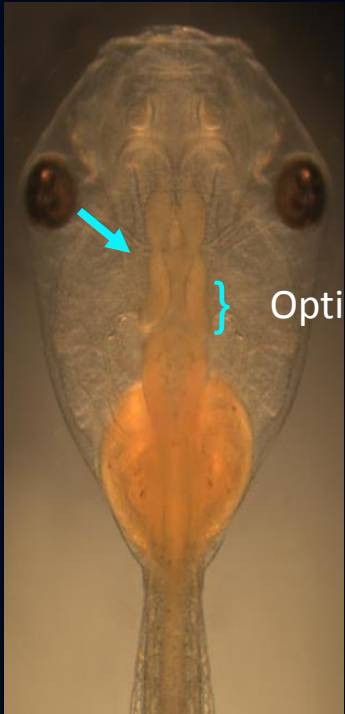
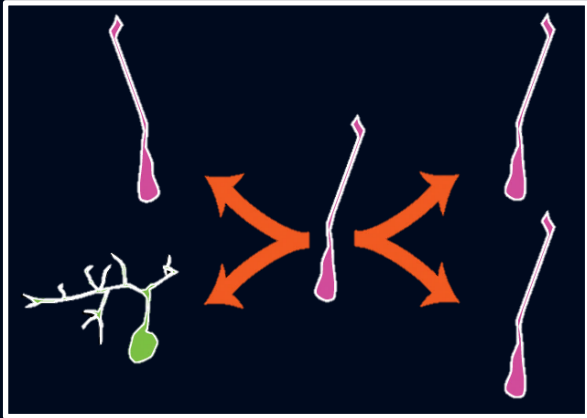
the pentraxins, C-reactive protein (CRP), serum amyloid-P component (SAP)



extracellular blood clot, fibrinogen/thrombin (vertebrates), coagulogen/cotting enzyme (*Limulus*)

Control of Cell Proliferation and Neurogenesis in the Visual System

of Xenopus Tadpoles



pSox2-bd::RFP / mitoGFP



Jen Bestman
Grass lab (201 Rowe)
jebestman@wm.edu
College of William & Mary

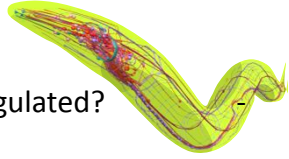
Light sheet imaging of neural responses in living organisms

Dirk Albrecht

Worcester Polytechnic Institute
Neural Systems & Behavior course
dalbrecht@wpi.edu

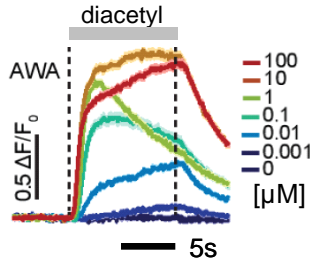
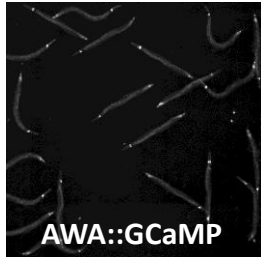


Research interests:



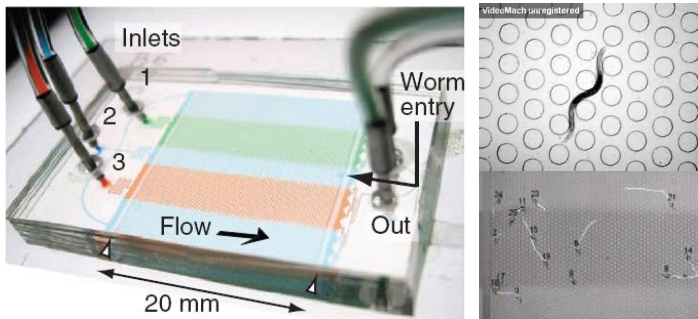
- how is neuronal excitability regulated? hunger, sleep, learning, aging
- how do neural circuits drive behavioral choices? - attention during conflicting stimuli
- worm models of neuropsychiatric disorders
- screening chemical modulators of neural activity

Neural Activity



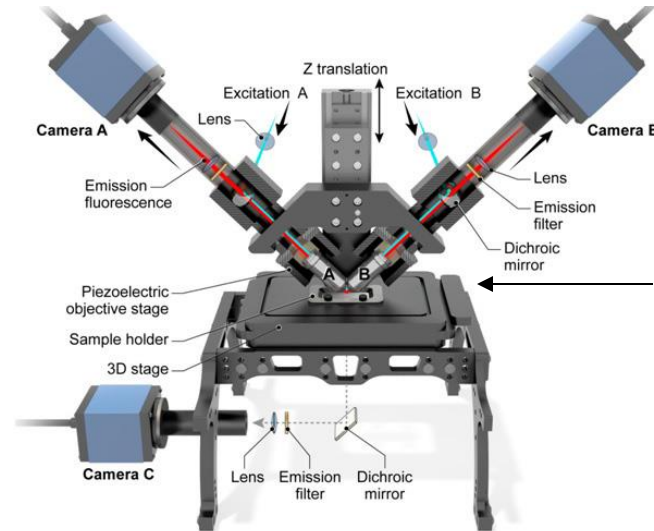
- calcium responses, many animals, many stimuli

Microfluidics & Behavior

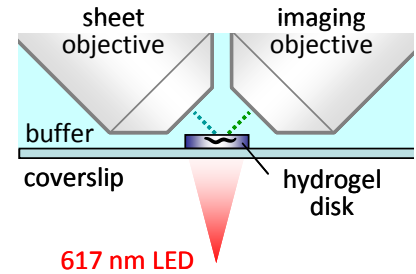


- spatial and temporal chemical patterns

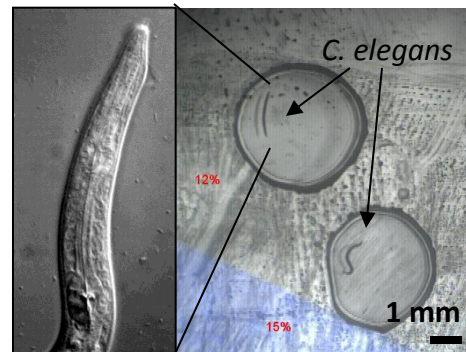
3D Light Sheet Microscopy (Lillie 219)



- less photobleaching than confocal
- isotropic xyz resolution

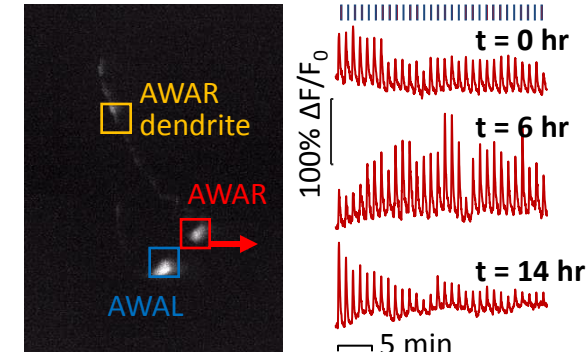


Hydrogel Encapsulation

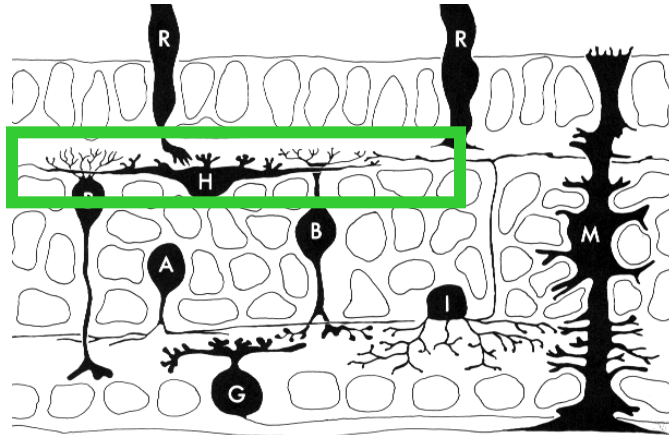


- fast, gentle sample immobilization

Long-term Imaging (hours)

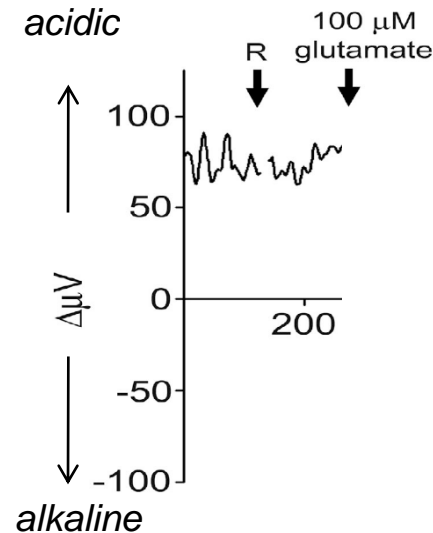
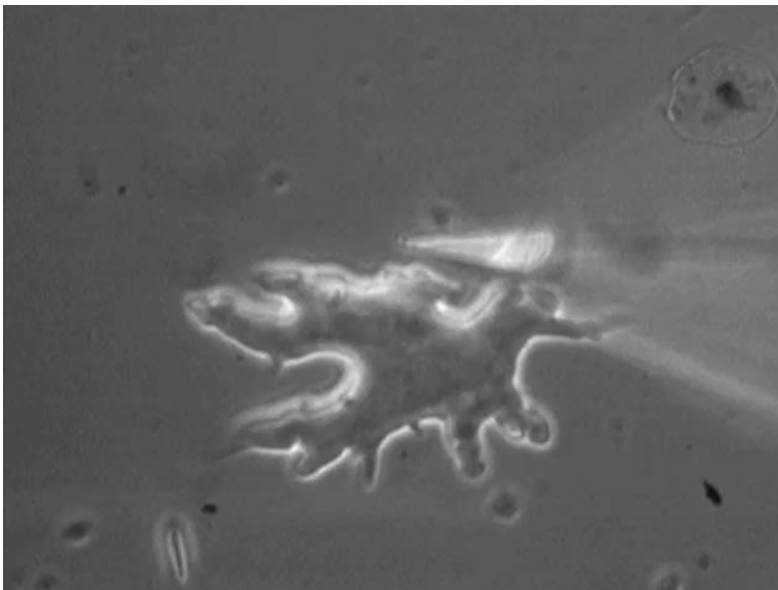


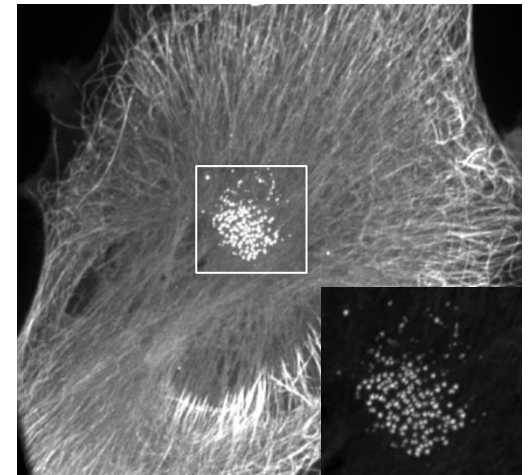
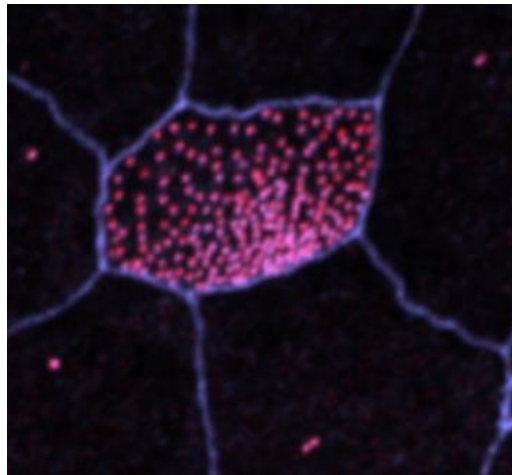
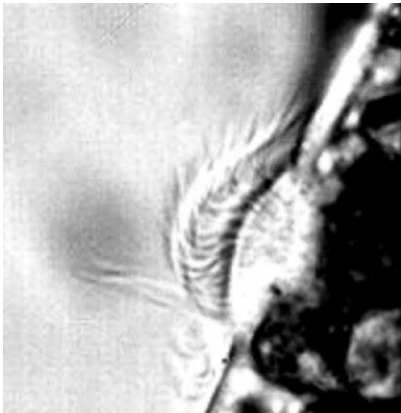
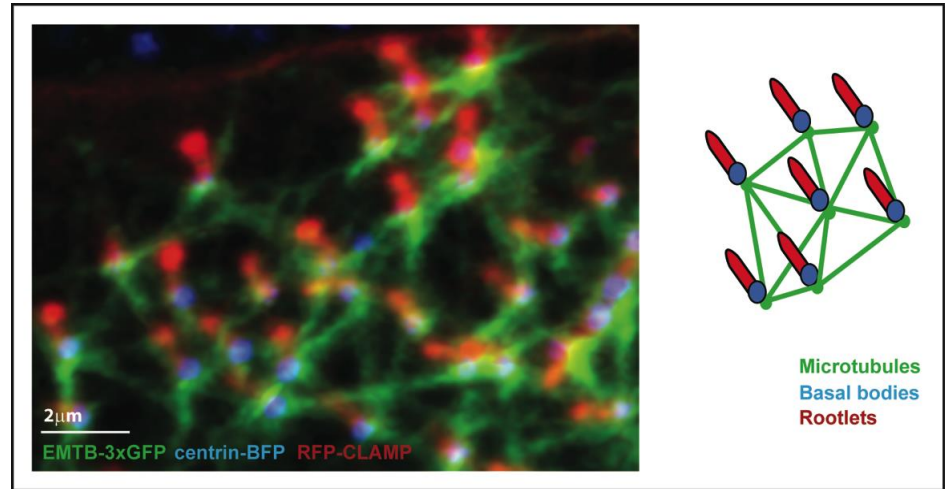
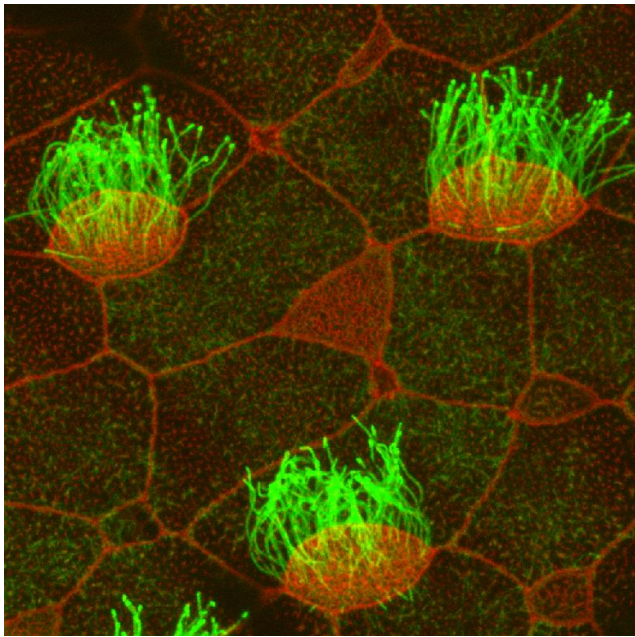
H⁺ flux measurements from retinal cells using ion-selective self-referencing microelectrodes.



Robert Paul Malchow
Rowe 205
paulmalc@uic.edu

Dynamic changes in receptive fields: Importance of Lateral Inhibition

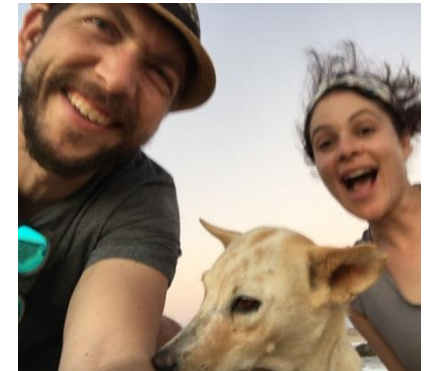
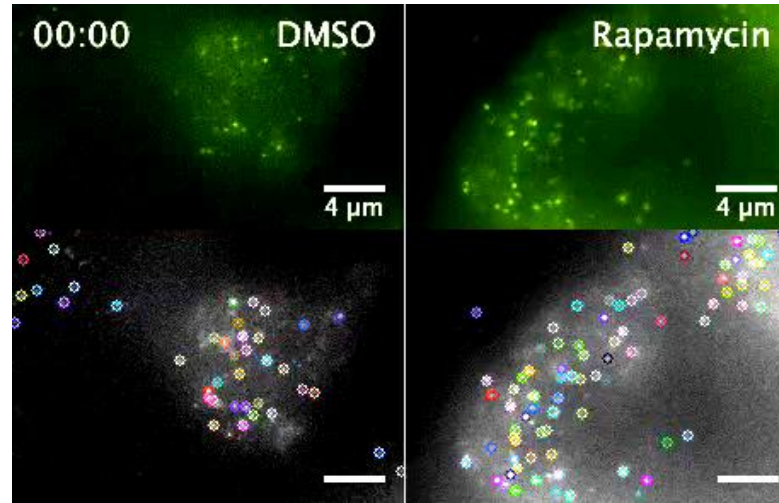
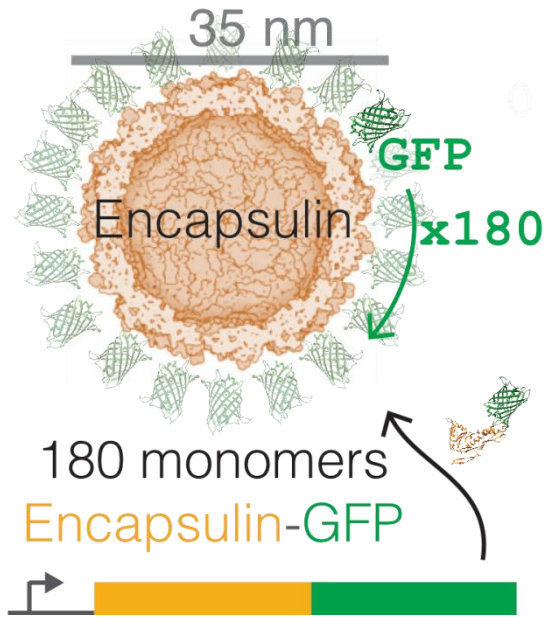




Brian Mitchell PhD
Northwestern University
Feinberg School of Medicine
Cell and Molecular Biology

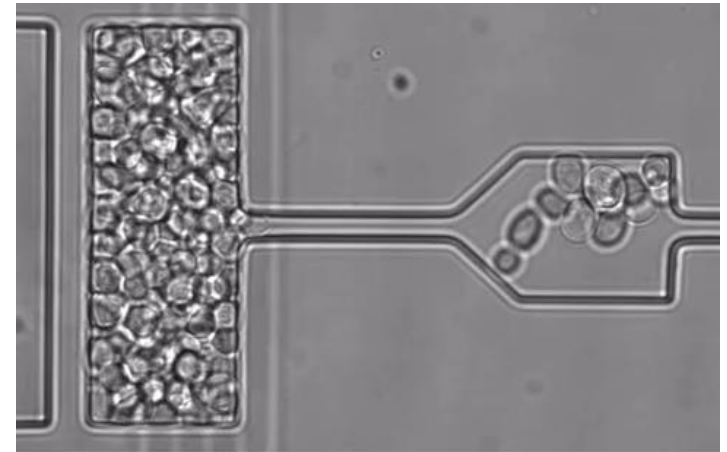
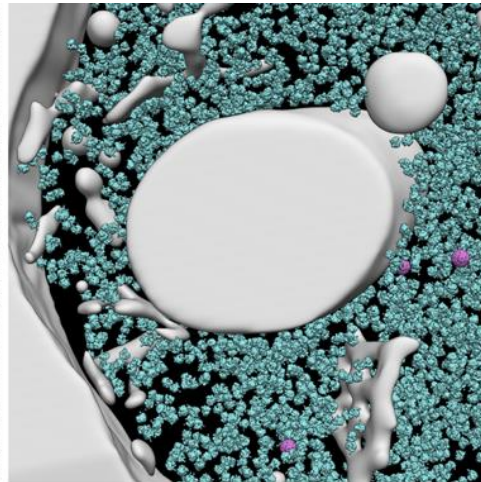
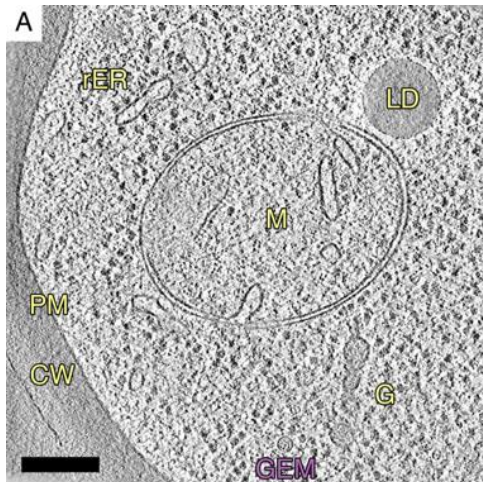
Physical properties of cells

Control of the properties of cells, mechanobiology



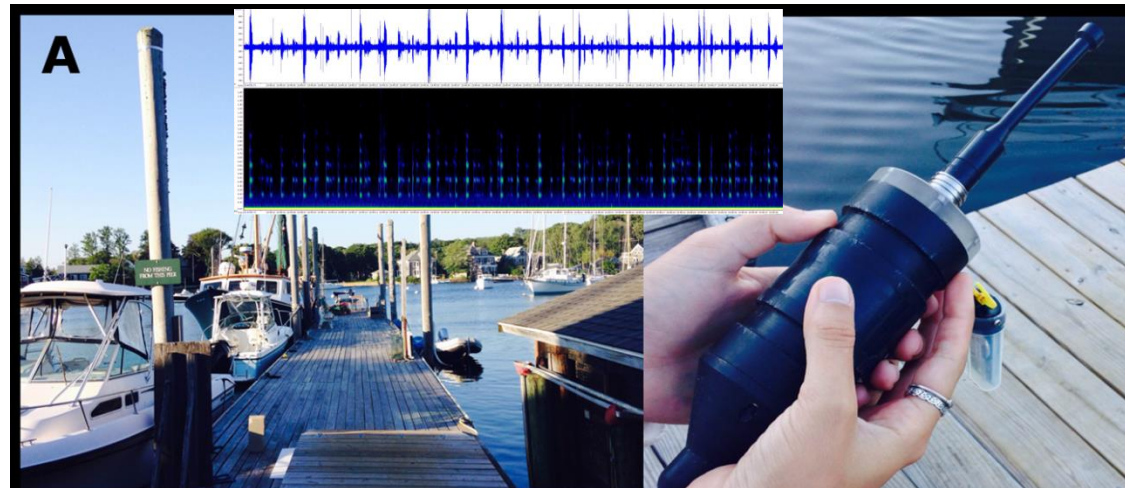
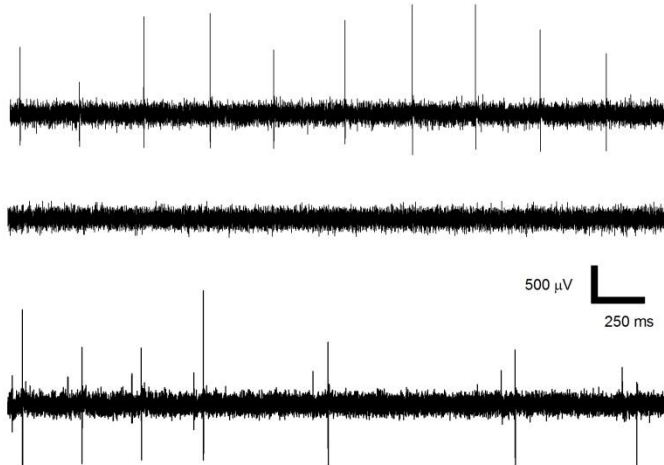
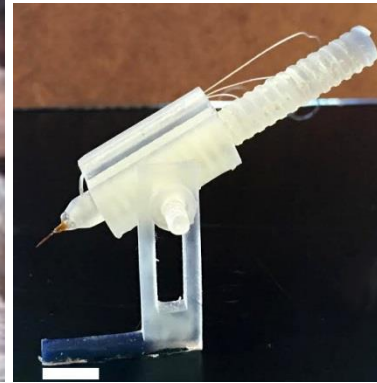
Liam Holt, NYU
Rowe 319

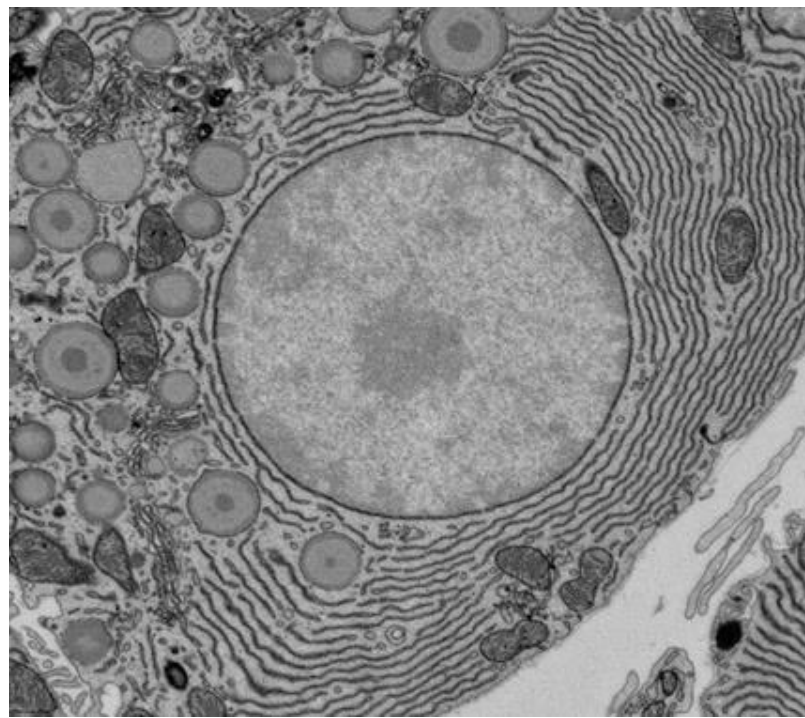
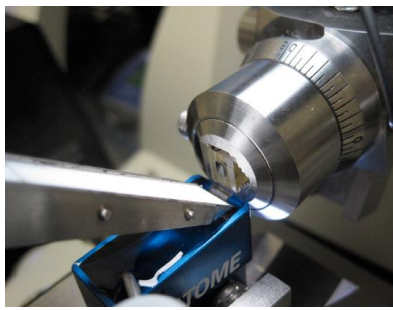
ljholt@gmail.com



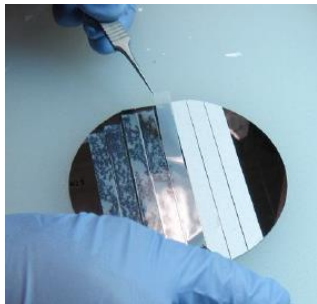
Multi Sensory Integration in fish

Allen Mensinger
Univ. of Minnesota Duluth
MRC 306
amensing@d.umn.edu

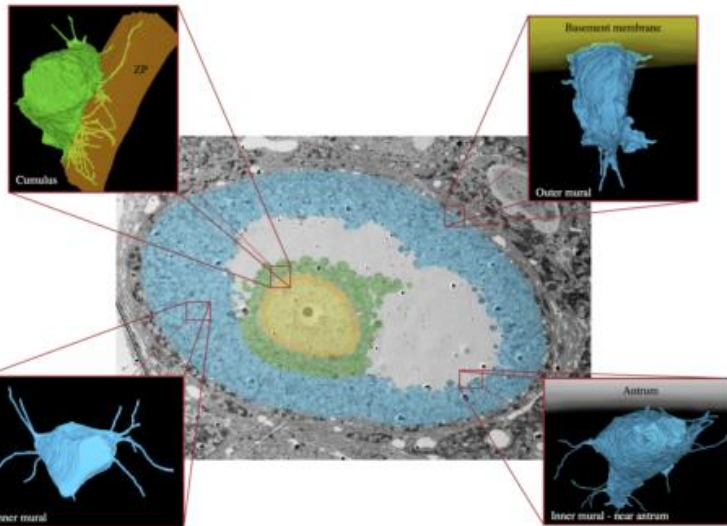
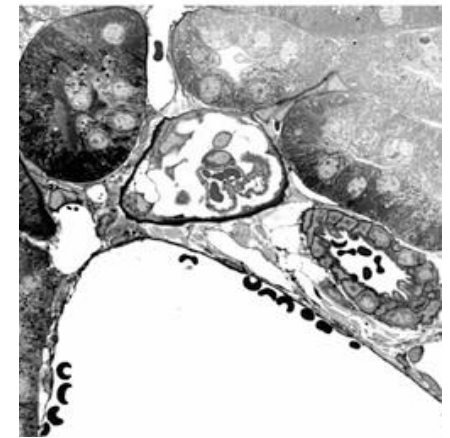




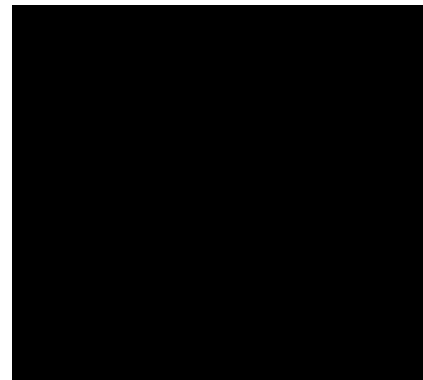
Mark Terasaki
terasaki@uchc.edu



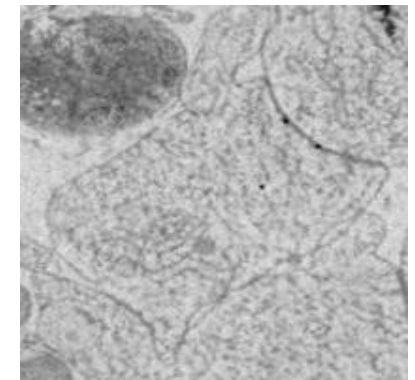
Lichtman lab



Valentina Baena



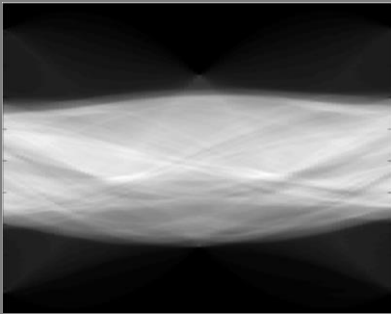
Ninna Shuhaibar



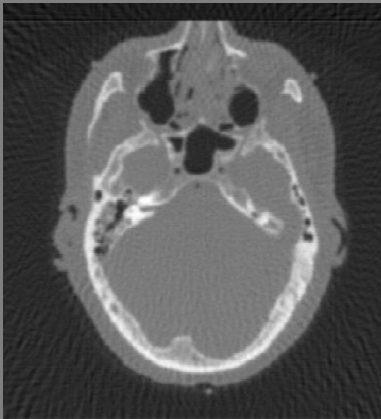
Rachael Norris

I use math implemented on computers to solve multi-view image reconstruction problems in radiology and microscopy.

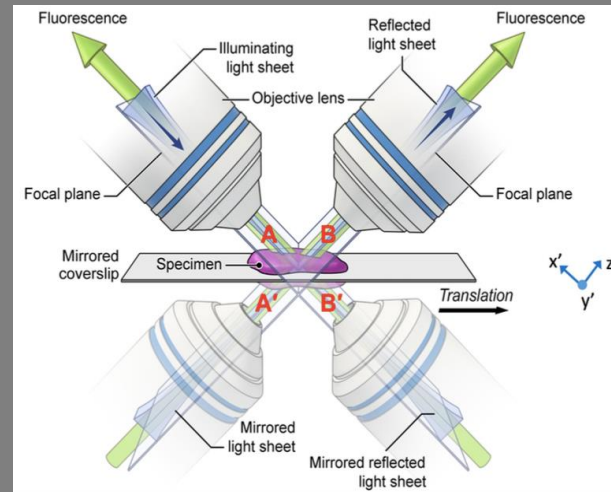
A CT scanner measures this:



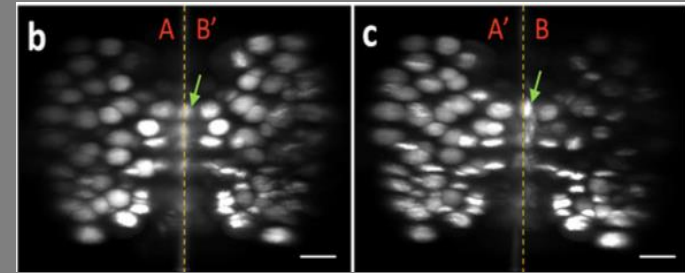
You need mathematical algorithms implemented on computers to get this:



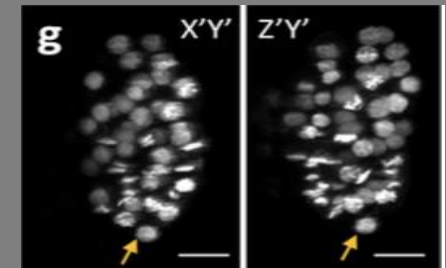
This is a dual-view light sheet microscope with sample grown on a mirror.



It measures four views at once and captures light over nearly 4π . But views are anisotropic and contaminated by epifluorescence

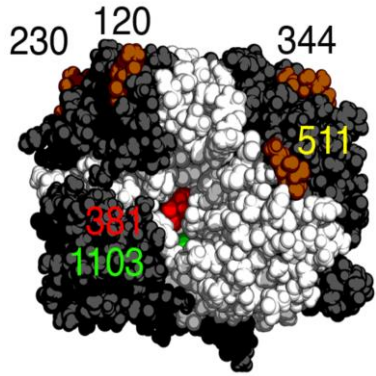


With math and algorithms inspired by CT, we reconstructed clean, isotropic images:

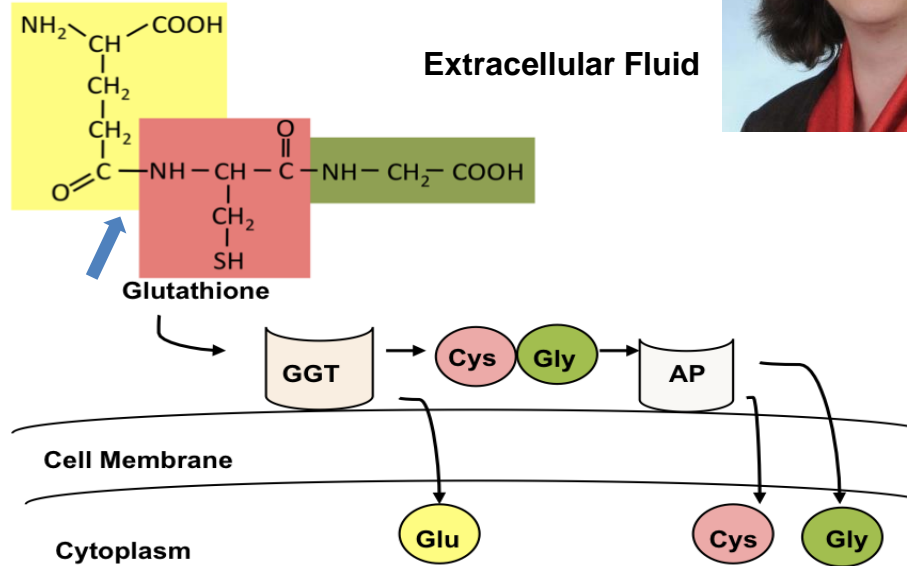


FUNCTION OF GAMMA-GLUTAMYL TRANSPEPTIDASE (GGT1) IN XENOPUS TROPICALIS

Structure of GGT1



Enzymatic Activity of GGT1



Marie Hanigan
 Dept of Cell Biology
 University of
 Oklahoma
 Health Sciences Center

NXR 4th Floor Rowe

Human Kidney stained for GGT1



G, glomeruli
 P, proximal tubules
 D, distal tubules

GGT1 KO in Xenopus Tropicalis



72 hr post fertilization.
 May have interfered with gastrulation