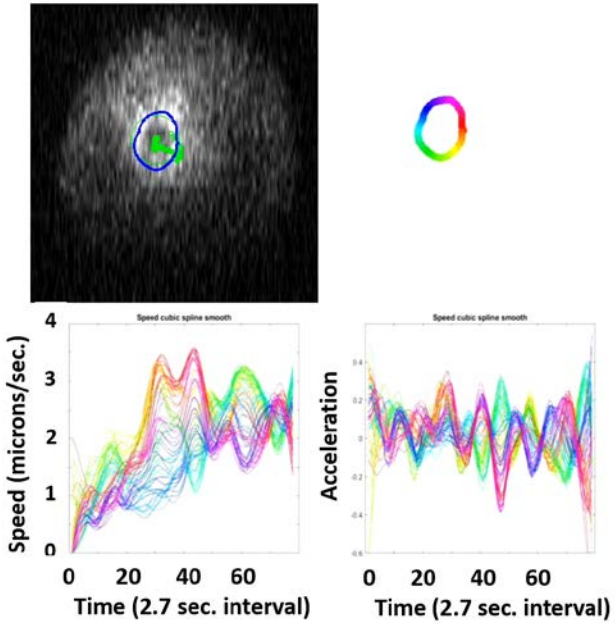
THE UNIVERSITY of NORTH CAROLINA at CHAPEL HILL

MARINE BIOLOGICAL LABORATORY WOODS HOLE

Amy Shaub Maddox: Mechanisms of cell shape change and contractility

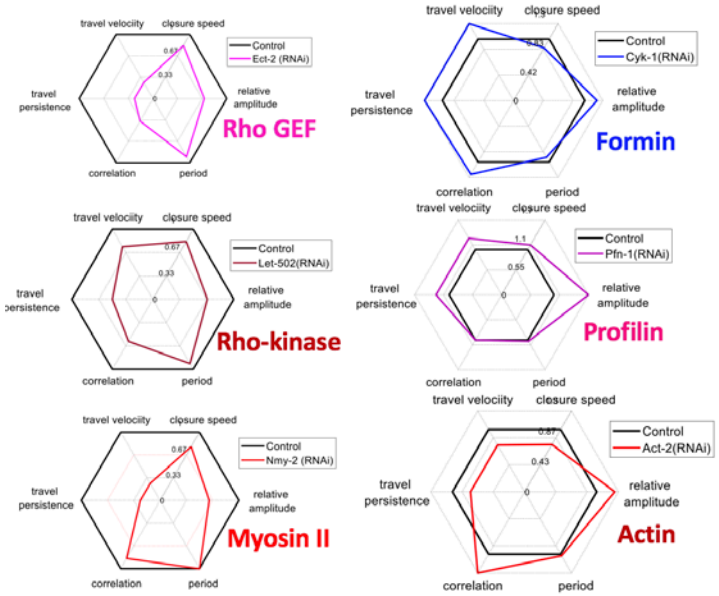


Cytokinesis / Cleavage

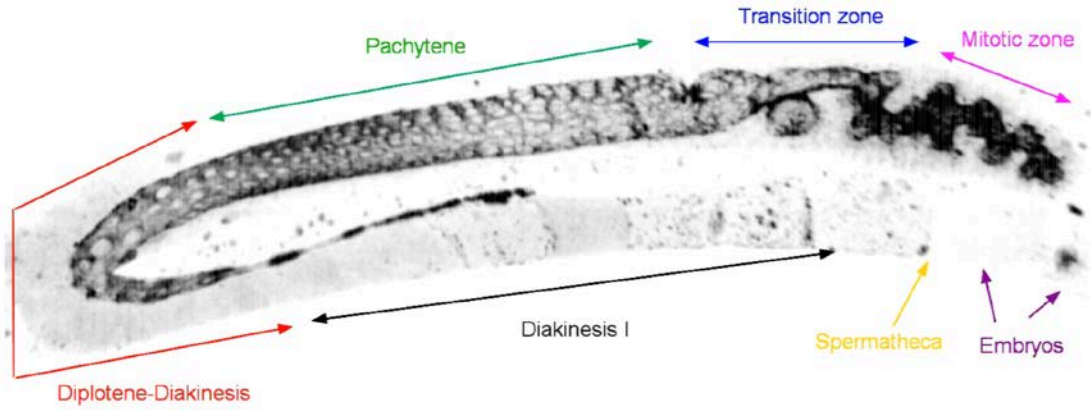




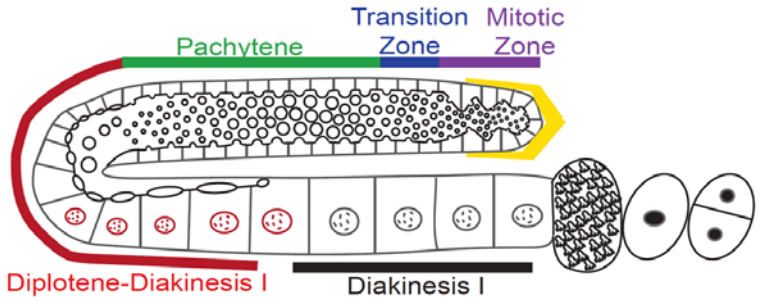
Dynamic rings exhibit speed oscillations (time-delayed negative feedback!)



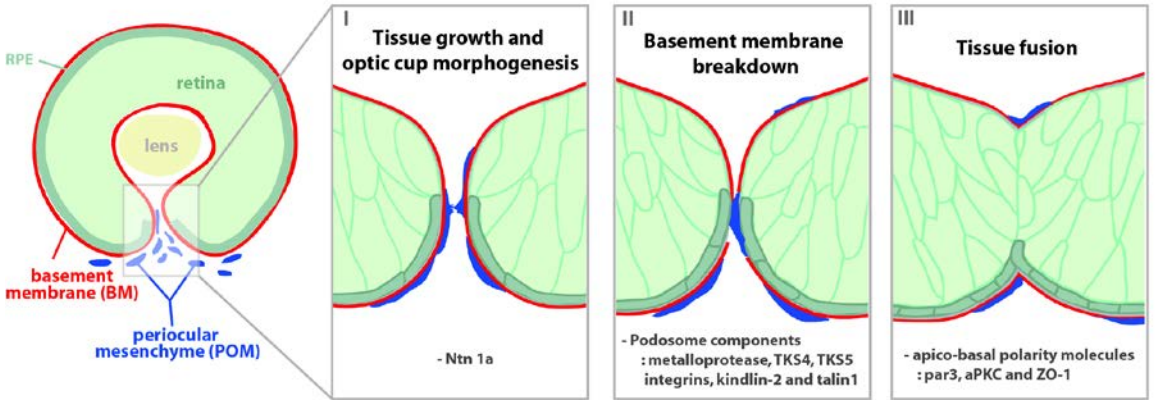
Germline Intercellular Bridges



Stable rings contain “contractile” proteins (specialized contractile regulation (inhibition?))

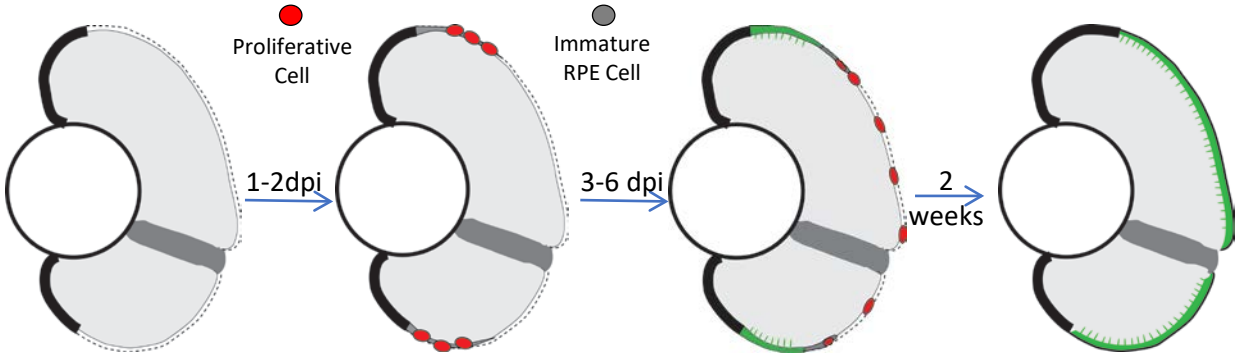


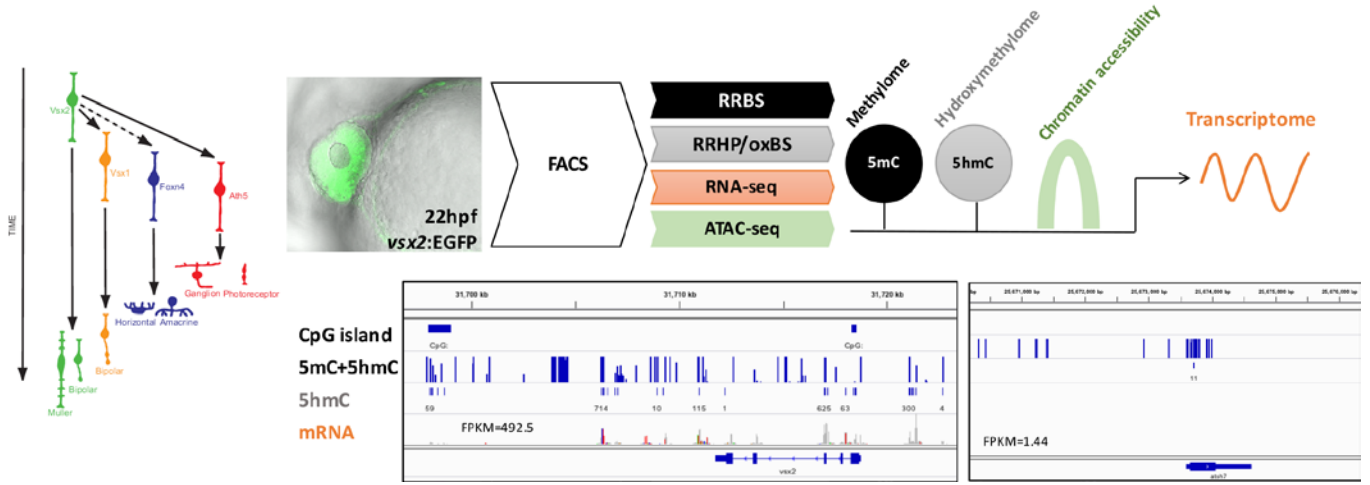
Jeff Gross
grossjm@pitt.edu



Optic cup morphogenesis and choroid fissure closure

RPE regeneration





Retinal development and regeneration

Germline-to-embryo transition

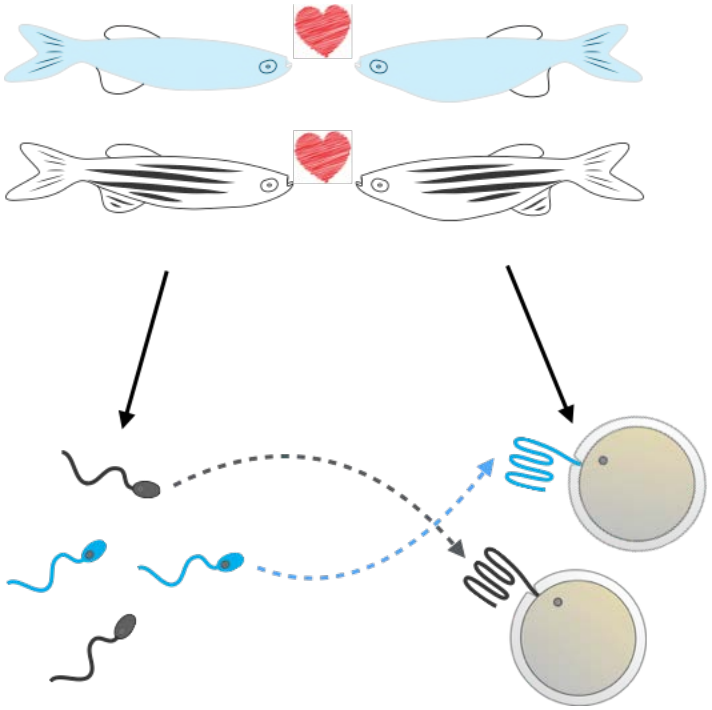
Fertilization

Short proteins

Translation

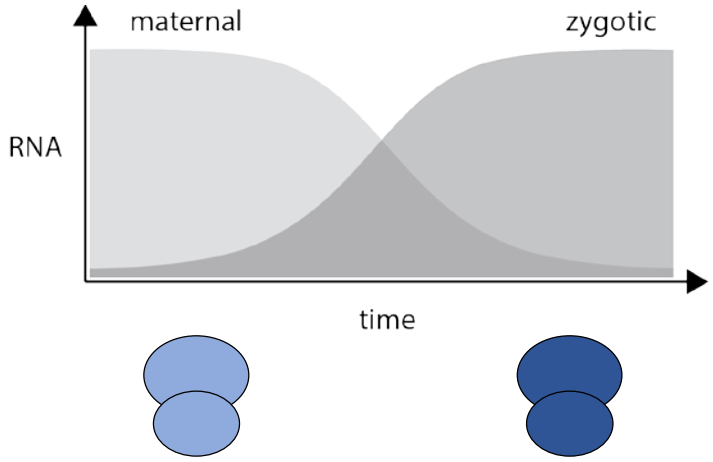
Bouncer, the gate-keeper of the oocyte

Toddler makes gastrulating cells move



Herberg et al., bioRxiv





maternal **zygotic**

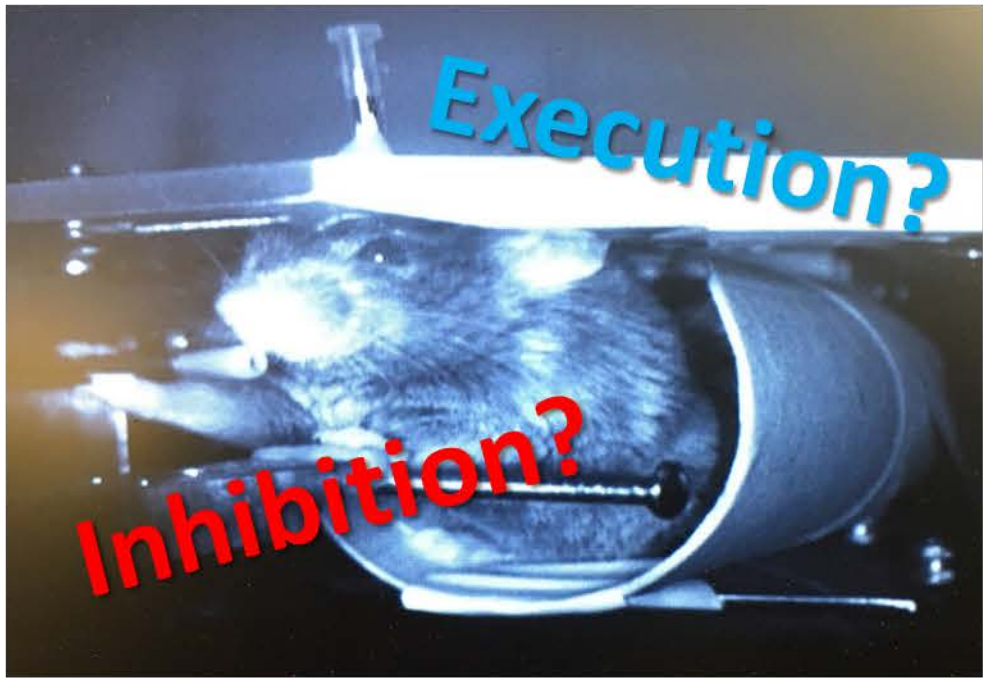
ribosomes

Andrea (Andi) Pauli

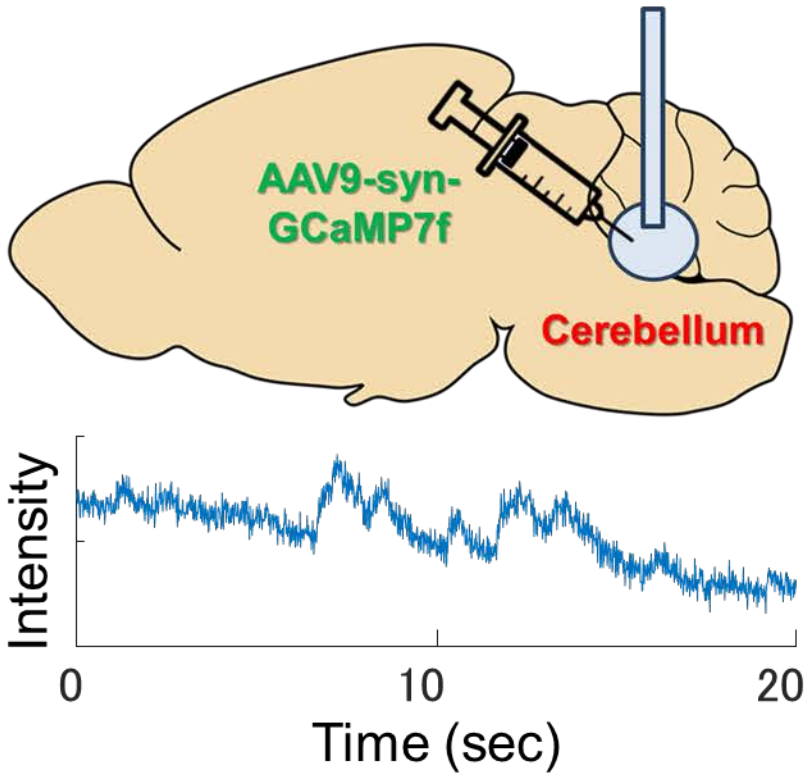
Lillie 118

IMP, Vienna, Austria

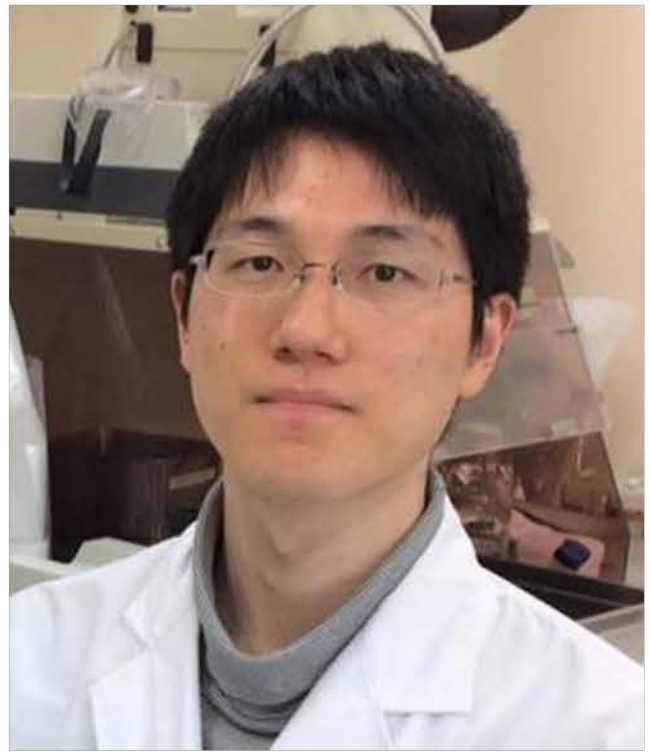
How does our brain control behavioral inhibition?



Behavioral inhibition task
of head-restrained mouse



Fiber photometry recording
from **the Cerebellum**



Junichi Yoshida
Grass Lab., Rowe 201
jun.y.neurosci@gmail.com

What the heck is Trichoplax?

Trichoplax adherens, Schultz, 1883

treese@mbl.edu

dan Rohksahr

Disk shaped marine animal- crawls on ventral cilia -finds and eats algae.. World-wide warm oceans

---

Only 6 cell types. No digestive track- Feeds externally NO NERVOUS SYSTEM

---

98 genes, 11,514 MB

87% homologs in other animals

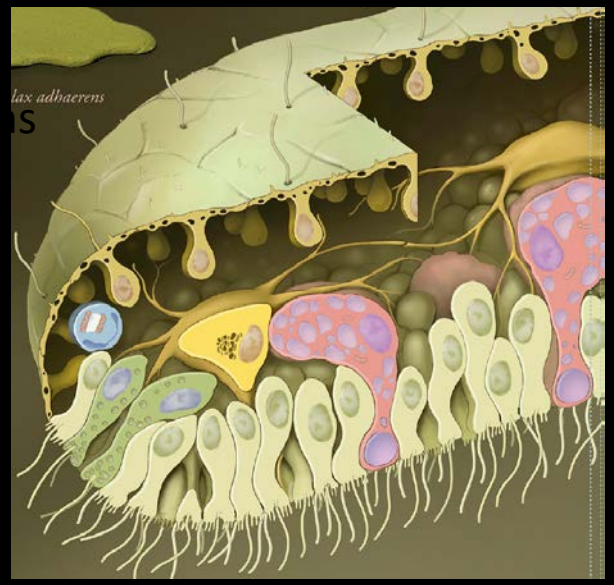
83% shared between Cnidaria and Bilaterians.

Tationa Mayorove

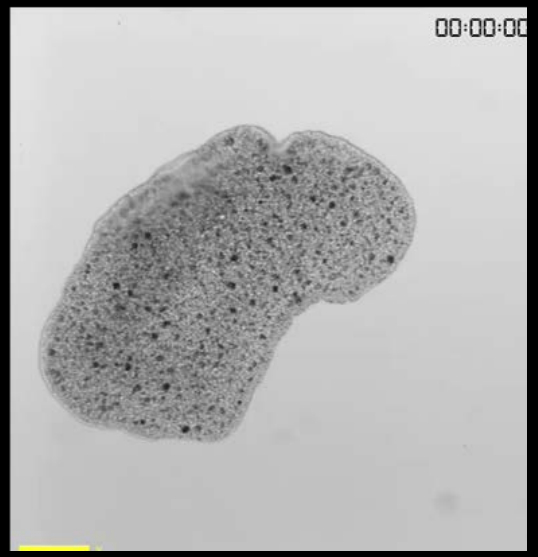
Carolyn Smith

Tom Reese

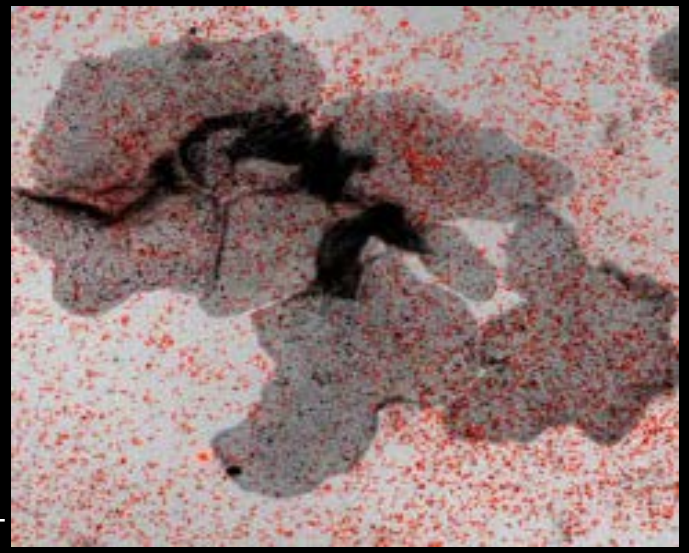
Two types of secretory cells in Trix



Spritzing Endomorphin-2 induces reversible pauses



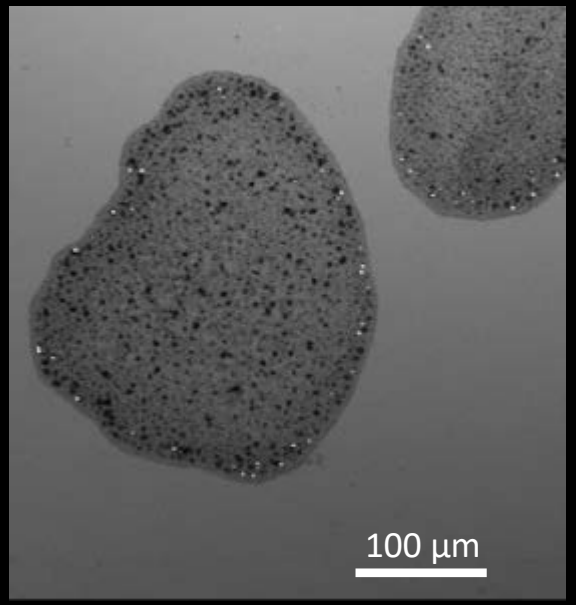
Trix pauses over algae and bombs them with its lipophil cells

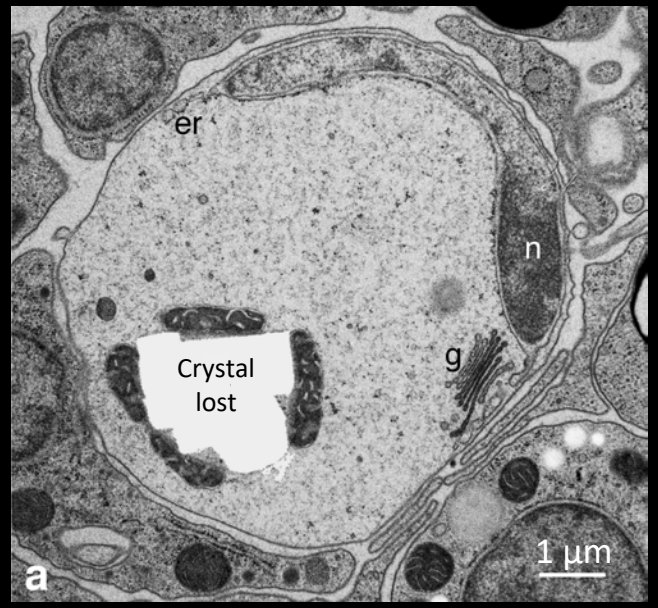


Trichoplax on agar laid over a clump \of algae crawl to ward the algae.



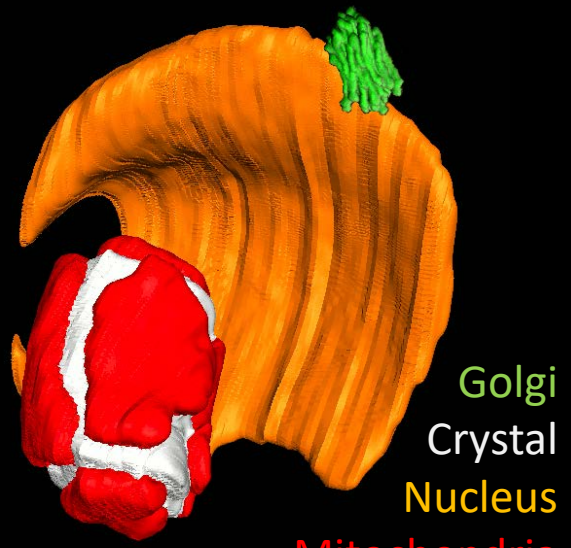
What do tiny crystals in Trichoplax tell us about its lifestyle and origin?



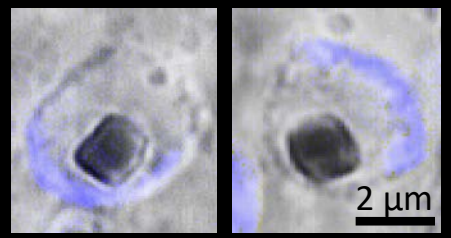


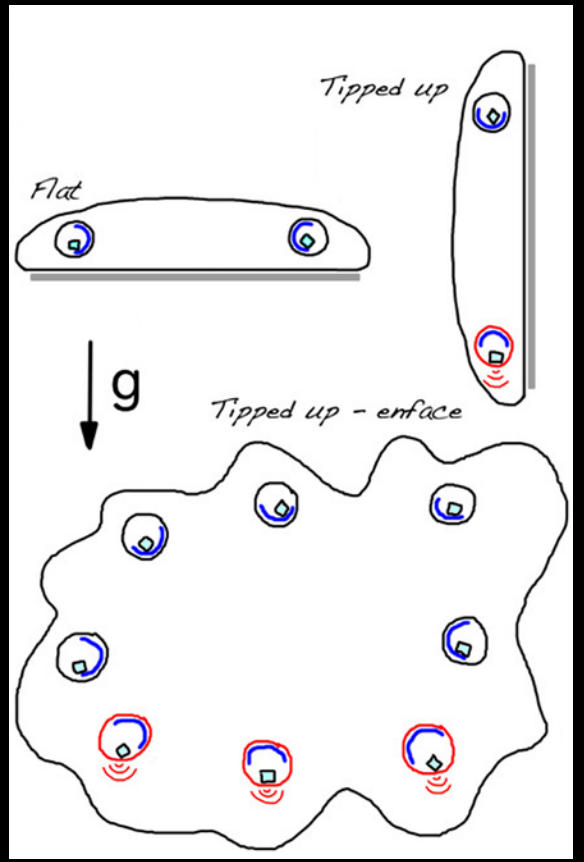
Crystals cells might be selectively activated depending on orientation of the animal. A large number of crystal cells (>100) compensates for the absence of a nervous system.

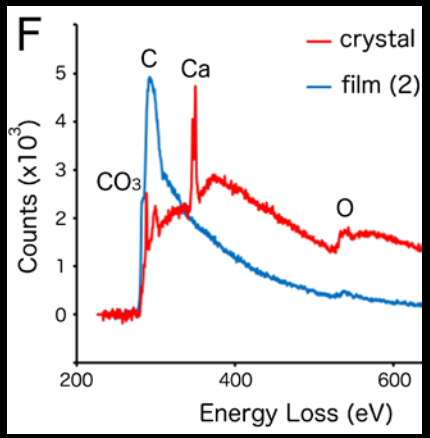
Since crystals do not contain Mg, the mineral is most likely **aragonite**. This suggests that crystals might have evolved in a Trichoplax ancestor 700 MA years ago, when Trichoplax is thought to emerge.

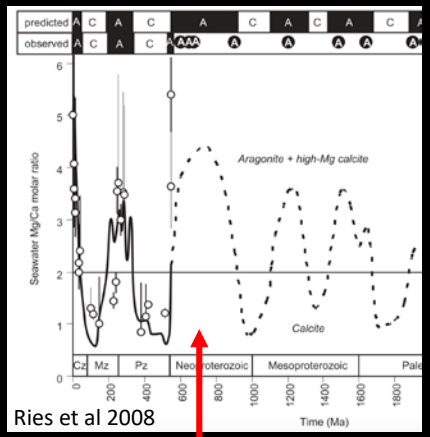


Crystals fall down in tipped animals, and to touch the down side of the crystal cell, at either the nuclear cup or plasma membrane.









Ries et al 2008

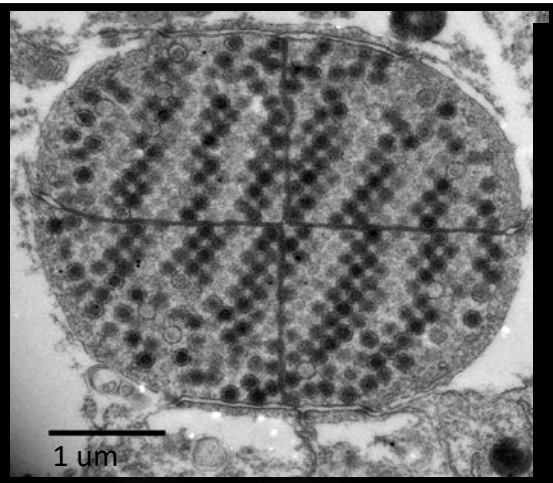
Mantis Shrimp Brains & Behavior



@DrKateFeller
www.Katefeller.com



Neuroethology







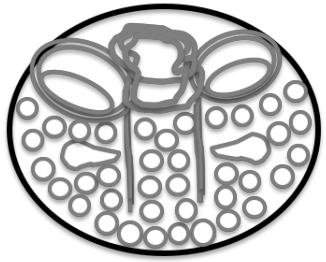
Visual ecology

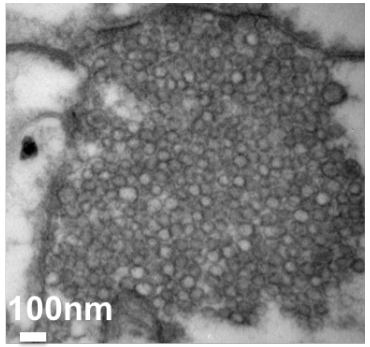
Making Heads or Tails of Regeneration using an Annelid model.

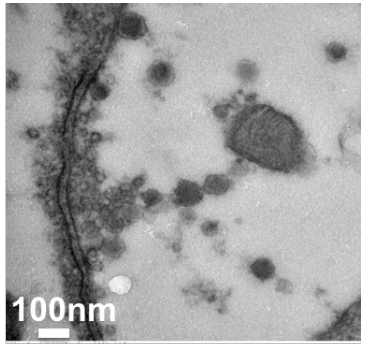


Lumbriculus variegatus

Posterior Regenerating System



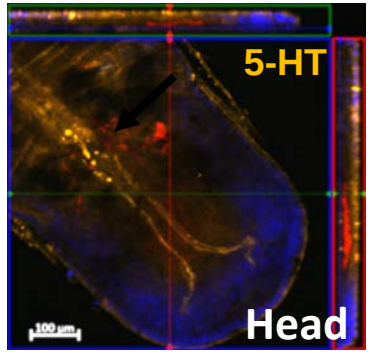






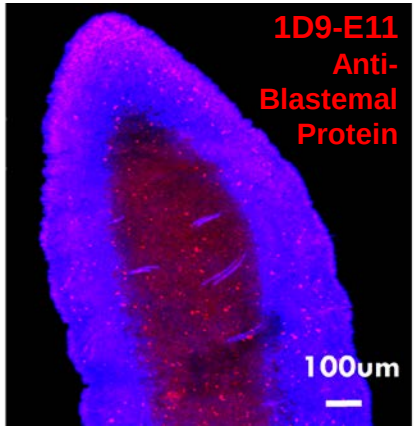
Veronica Martinez-Acosta
MRC 306
vgmartin@uiwtx.edu

24hrs Post - Amputation



U.S.ARMY

1wk Post - Amputation



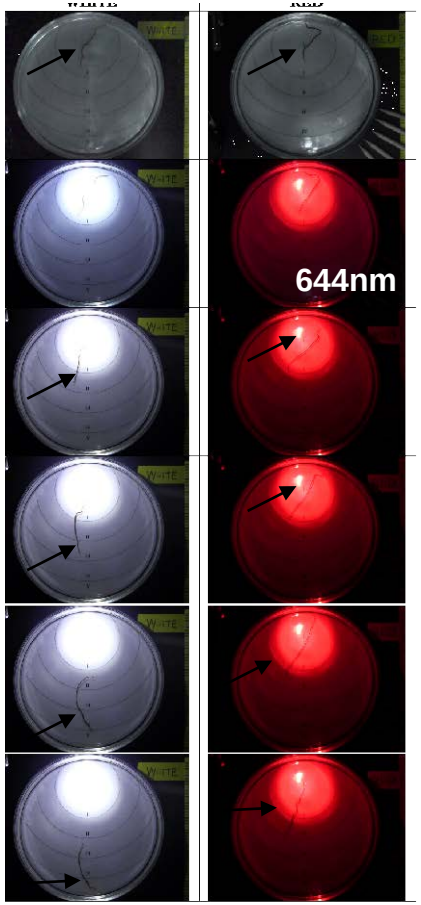
>*L. variegatus* beta-catenin consensus sequence (5' - 3')

AGTCGTCACGCGATCATGAATTCCCCGCAAATGATCGCCGCTCTCATTCGTGCGA
TGAACAATACGACCGATCCGGAGACGACTCGATGCACCGCCGGAACACTTCACA
ATCTCTCGCATCACCGTCAAGGTCTTCTCGCCATTTTCAAATCCGGTGGAATCCCA
GCCCTGGTCCGGCTGTTGAGTTCGTCGATTGAATCGGTTCTCTTTTACGCCATCAC
TACTCTGCATAATTTGCTTCTGCATCAAGAAGGAGCCAAGATGGCGGTTCACCTC
GCGGGCGGACTACAAAAAATGGTGGCCTTGCTACCTCGAAACAACGTCAAATTC
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GACCGTTGTTCAACTTCTGGCTTCCAATGACATCAACATCGTCACATGTTCAGCTG
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GGTGGGAGGAGTCGAGGCCTTGGTCCGCACCGTTCTCCAGGCCGGAGACCGAG
AGGATATCACGGAACCAGCTGTGTGTGC

Marine Biological Laboratory
THE UNIVERSITY OF CHICAGO

NSF

Lights off
0 sec.
15 sec.
30 sec.
45 sec.
60 sec.



SUNY Downstate Medical Center

150 YEARS OF MEDICAL EDUCATION 1860-2010

A Diverse Legacy, A Bright Future

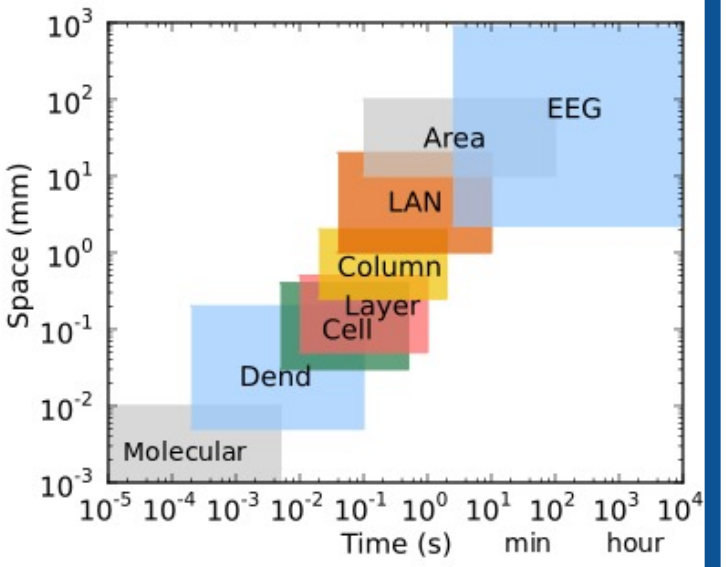
Kings County Hospital Center Established 1831

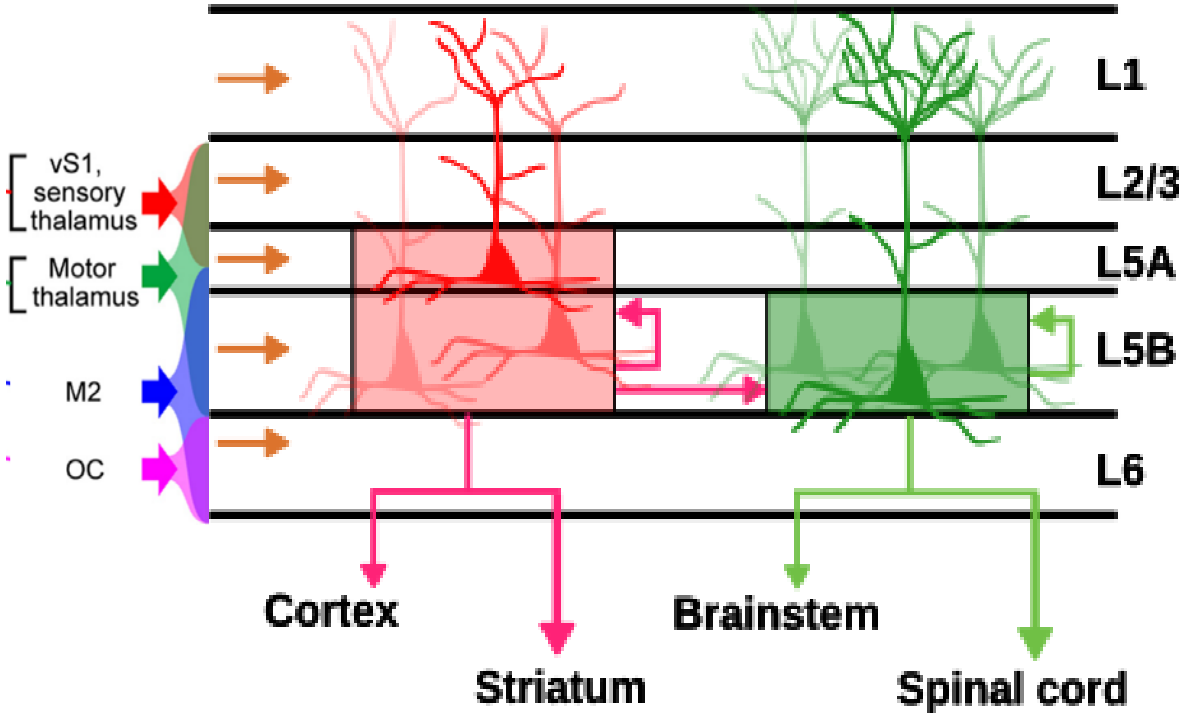
Multiscale modeling

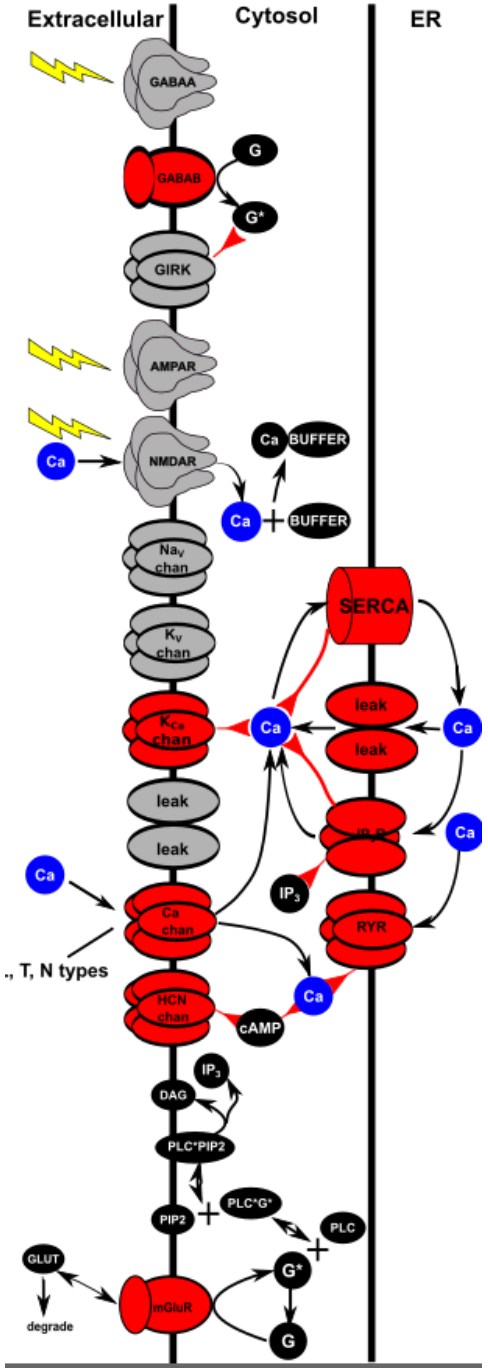
Computational Neuroscience

bill.lytton@downstate.edu

web: neuron.yale.edu, netpyne.org



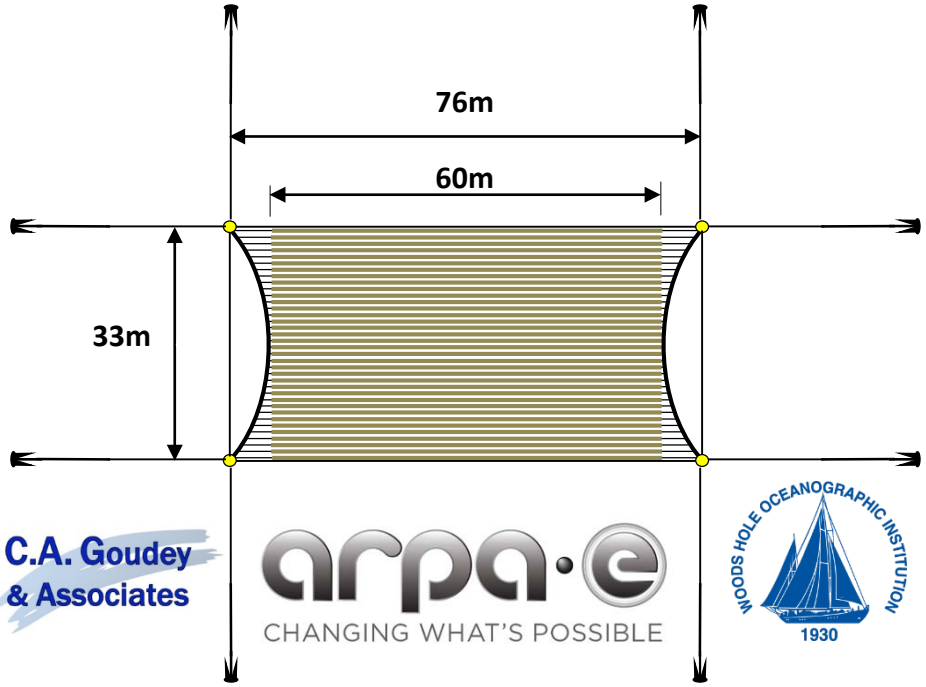




1. Tropical seaweed cultivation and harvesting

Loretta Roberson
Marine Biological Laboratory
lroberson@mbl.edu

Basic cell has 60 growlines at 0.5 m spacing yielding 3,600 m of grow length.

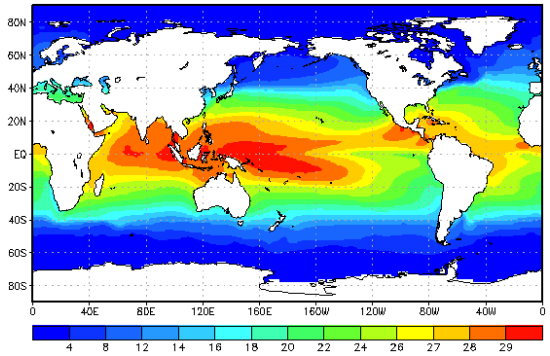


C.A. Goudey & Associates

arpa·e
CHANGING WHAT'S POSSIBLE

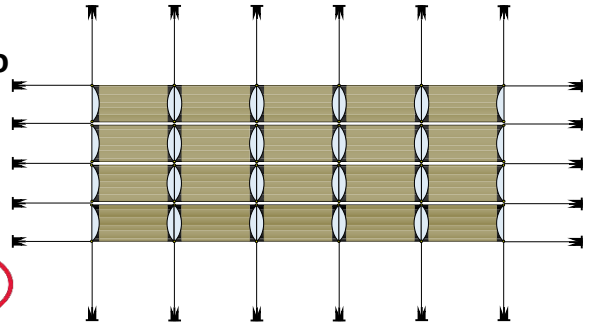
WOODS HOLE OCEANOGRAPHIC INSTITUTION
1930





Global seawater temperature averages

Over 400 of these 5 x 4 arrays could fit in a test area in Puerto Rico yielding 28,800 km of growline or 1 million WMT of annual *Eucheuma* production.



UCONN STAMFORD

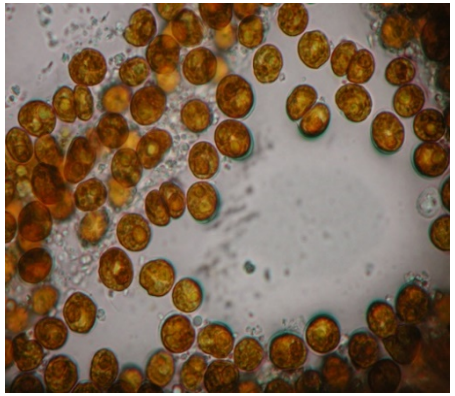
DUPONT

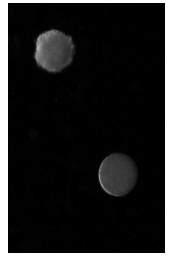


2. Impact of temperature changes on coral physiology









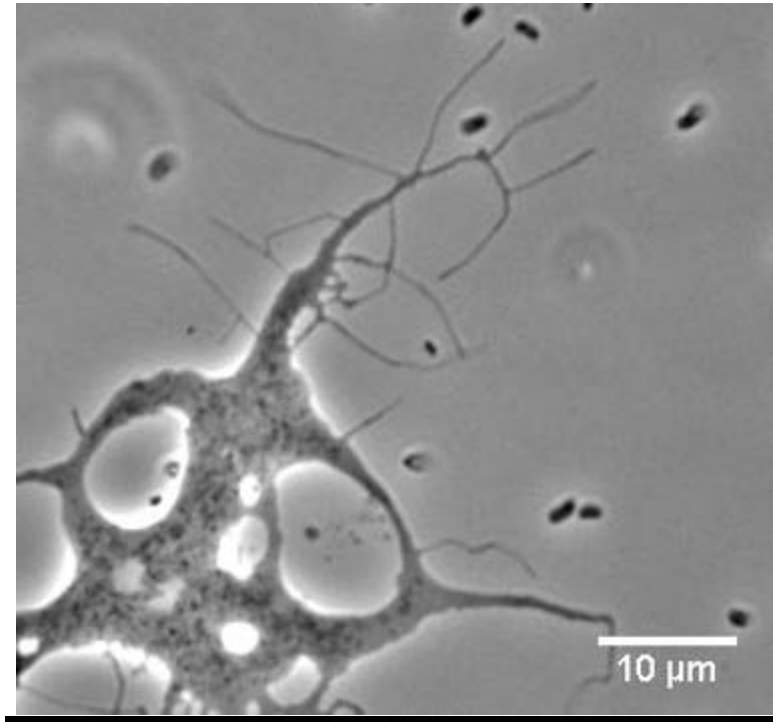


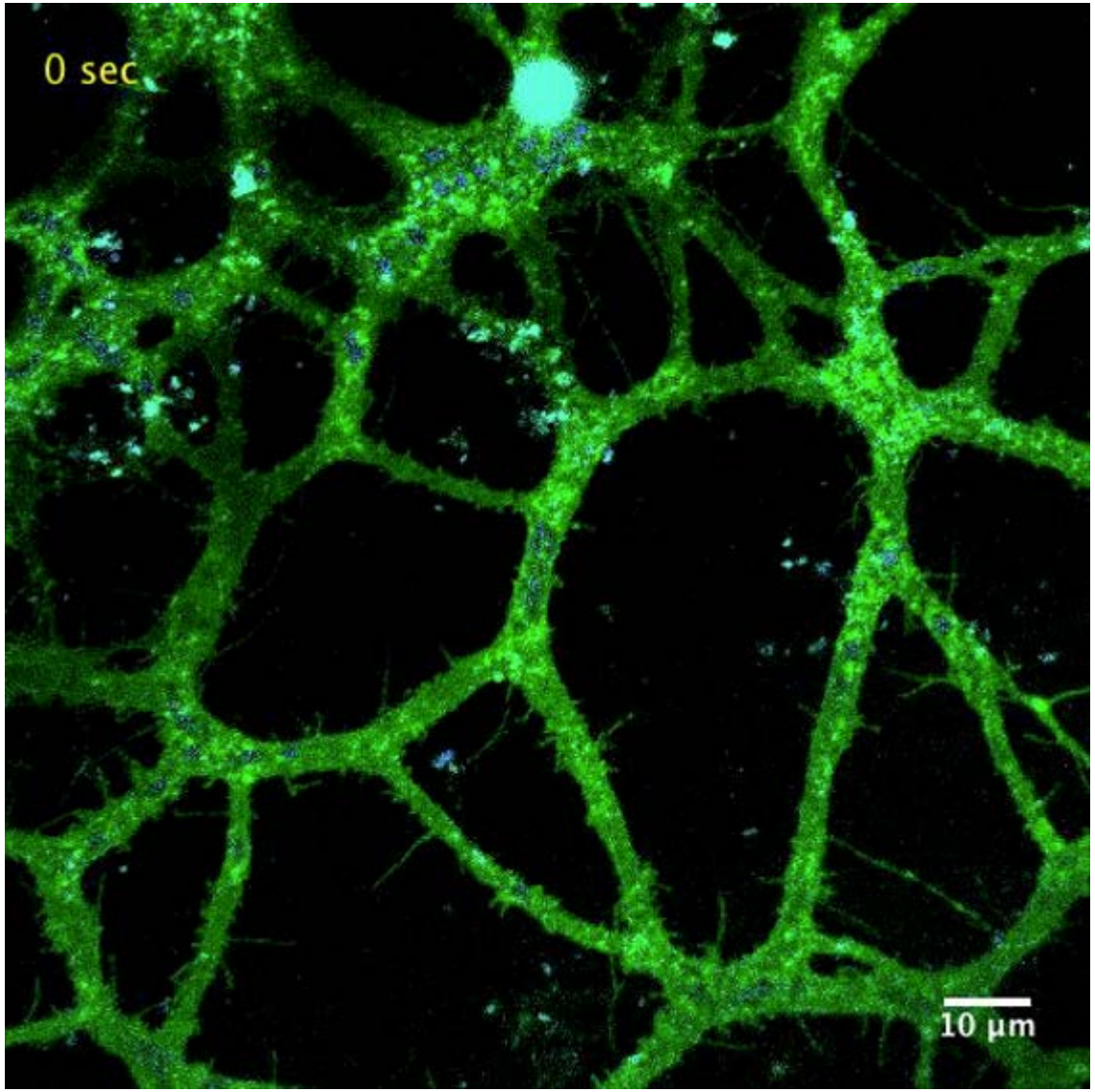




Cytoskeletal evolution of a multinucleate Rhizarian amoeba

New ingredients (genes) or new recipes (mechanisms)?

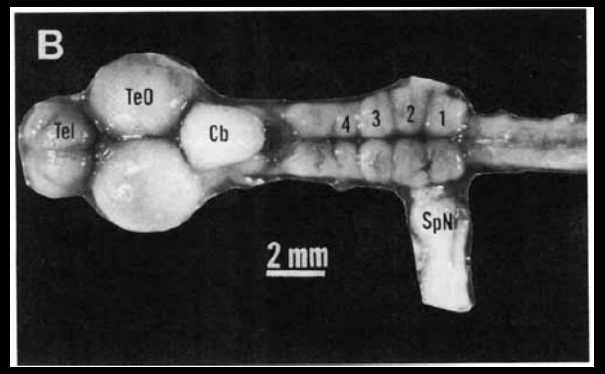


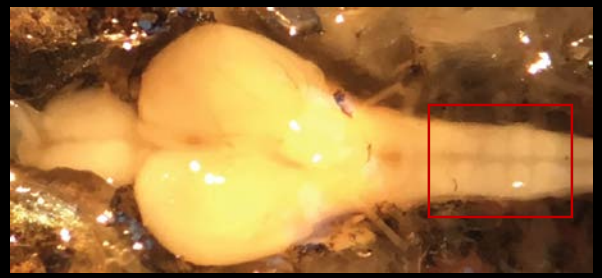


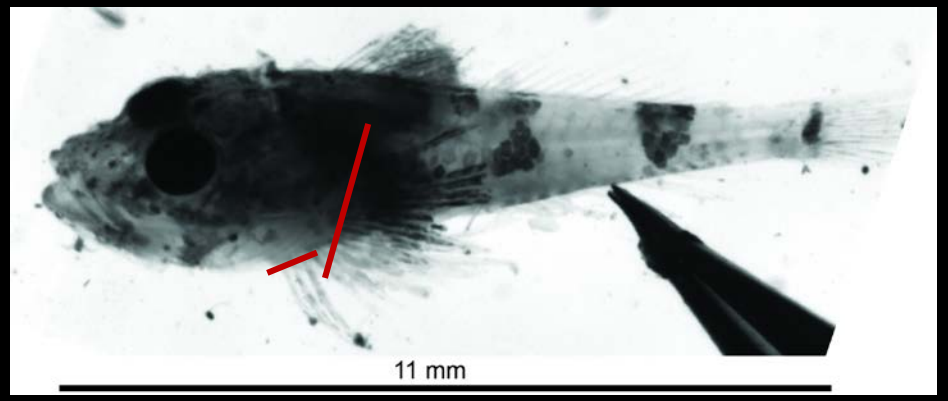
Scott C. Dawson and Sarah Guest (UC Davis)

What are the molecular mechanisms involved in evolutionary trait gain in vertebrates?









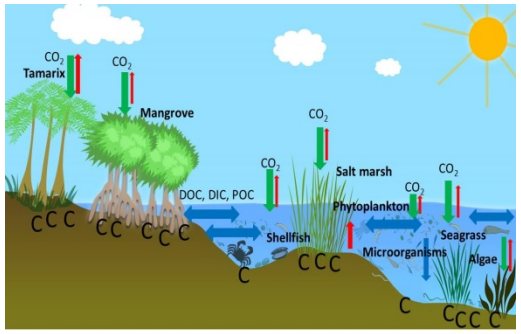
Aim 1: Identify which genes are differentially expressed at the anatomical locations of novel skeletal and neural traits

Aim 2: Develop methods to functionally test the role of individual genes in novel sea robin traits

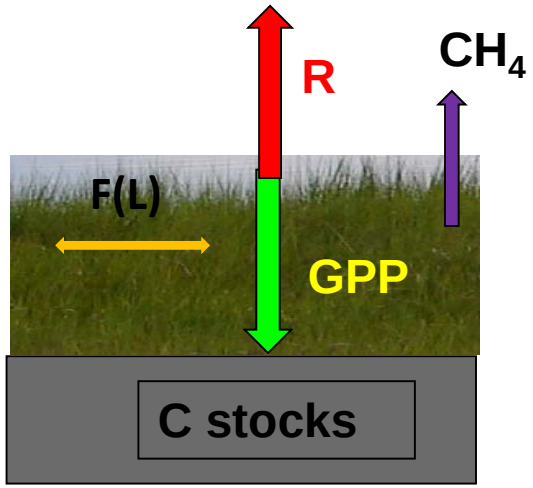
Amy Herbert
Grass Fellow
Rowe 201
herbert6@stanford.edu

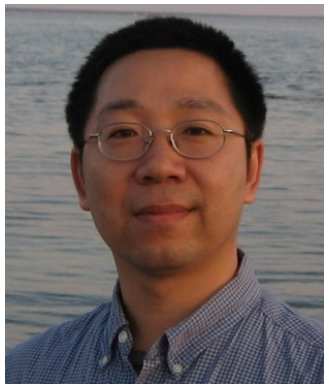


Quantifying coastal "blue" carbon to offset climate change

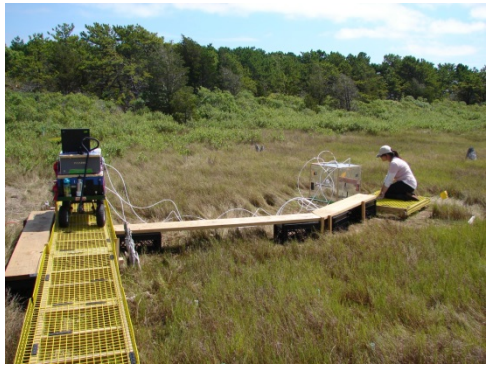


Coastal ecosystems have strong ability to store carbon (Tang et al. 2018)



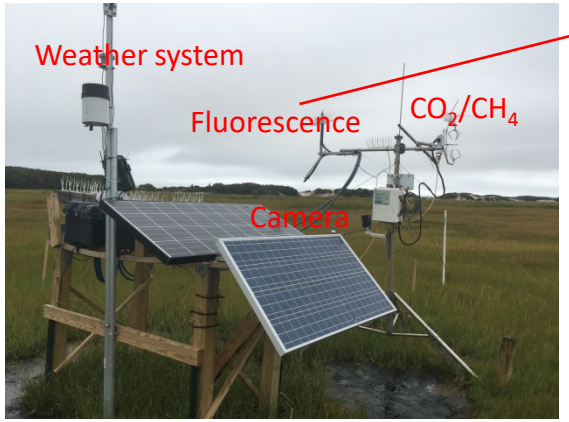


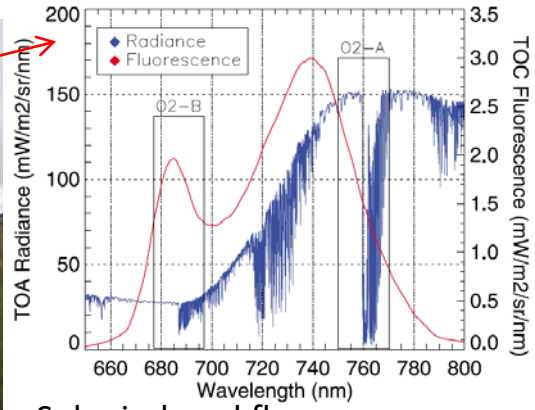
Jim Tang
Starr 317
jtang@mbl.edu





Applying the concept to evaluating the carbon benefit of coastal restoration.

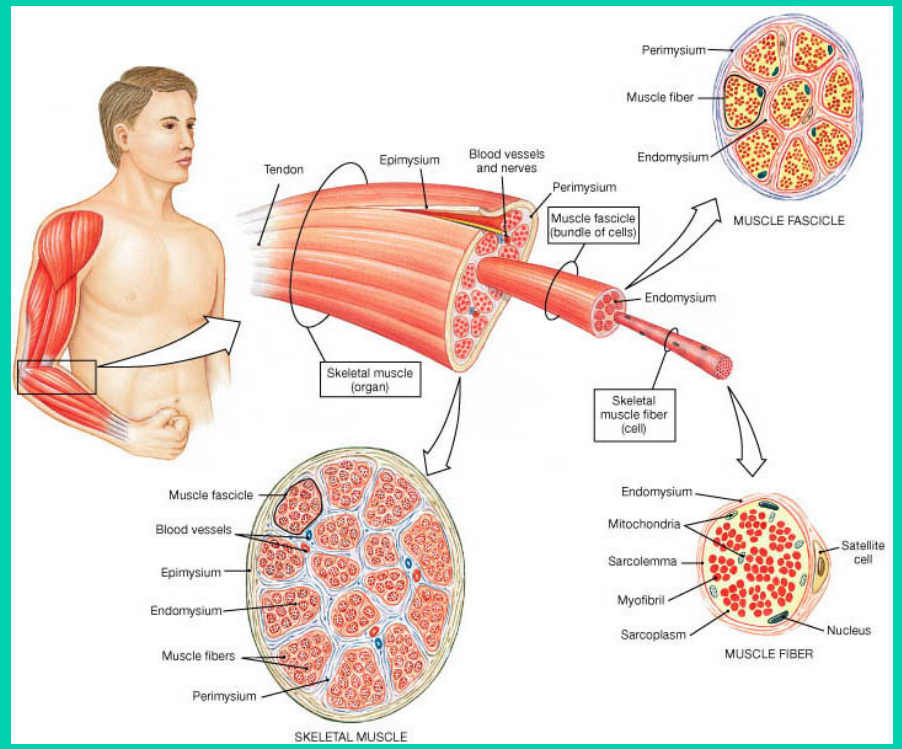




Solar induced fluorescence, a proxy of photosynthesis



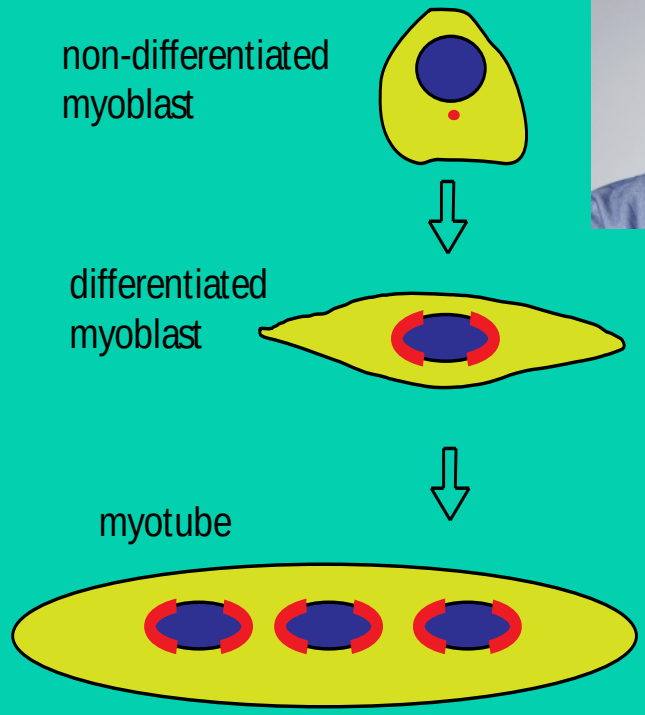
A role for cell anisotropy on nucleus-cytoskeleton connections

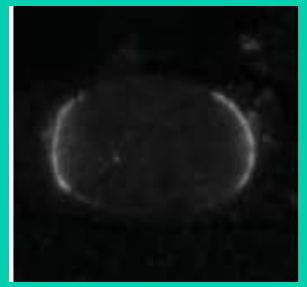


Human Skeletal Muscle cells

- Multinucleated
- Nuclei in specific positions

A.



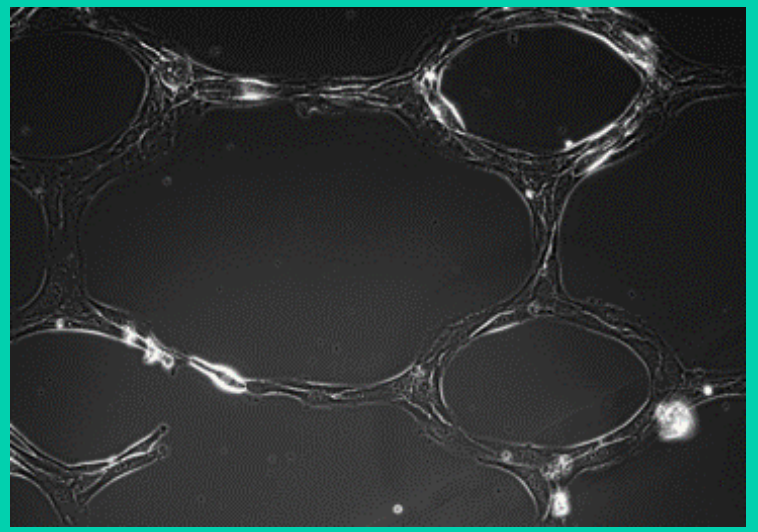




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- **Does myoblast and myotube cell anisotropy affects nuclear anisotropy?**



Manipulate cell shape *a la carte*