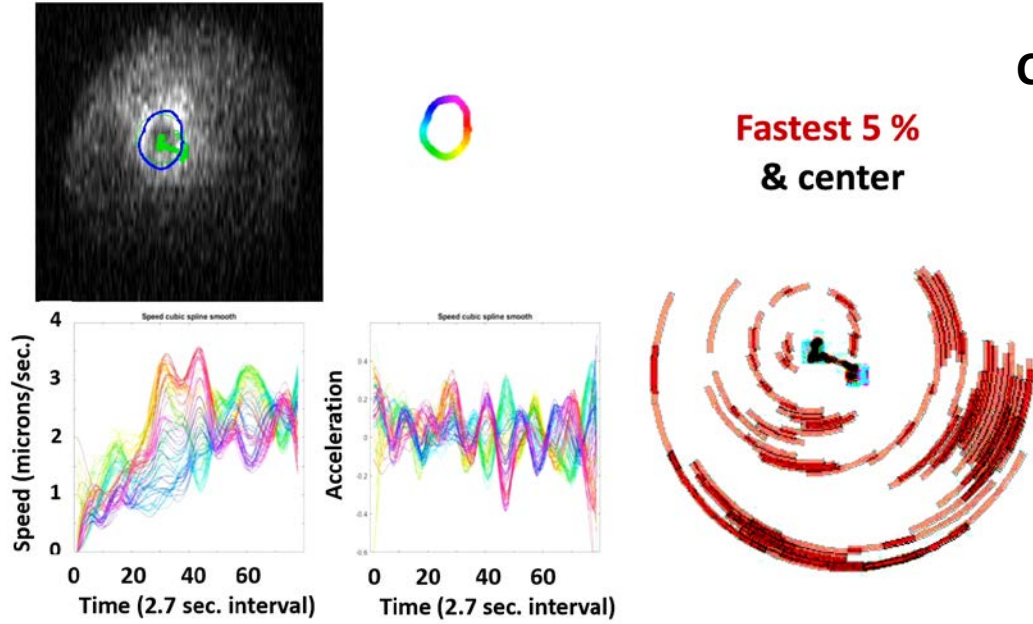




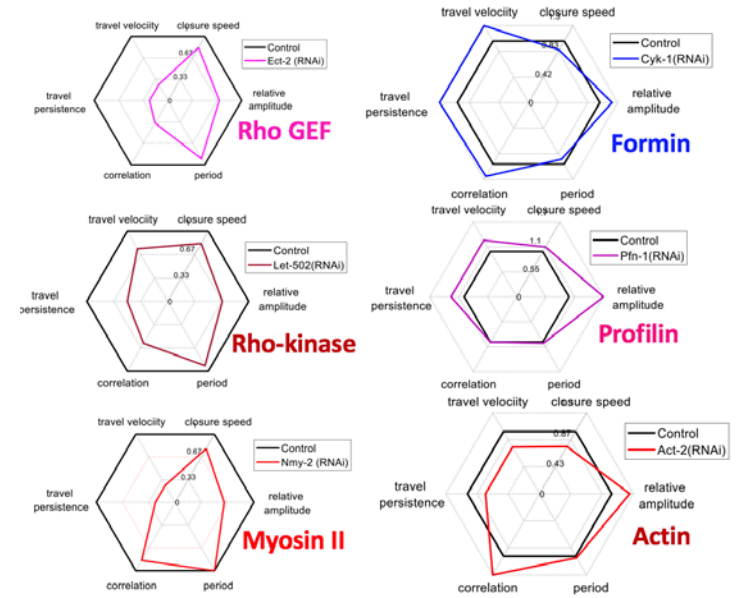
Amy Shaub Maddox: Mechanisms of cell shape change and contractility



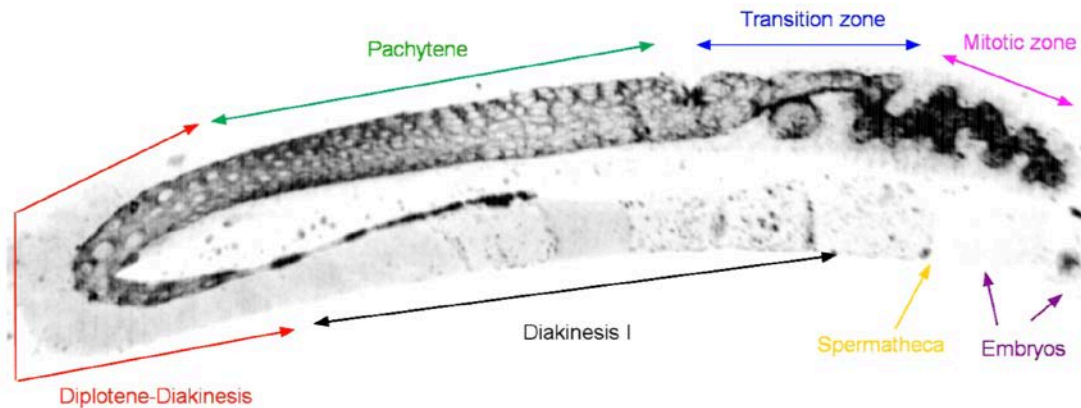
Cytokinesis / Cleavage



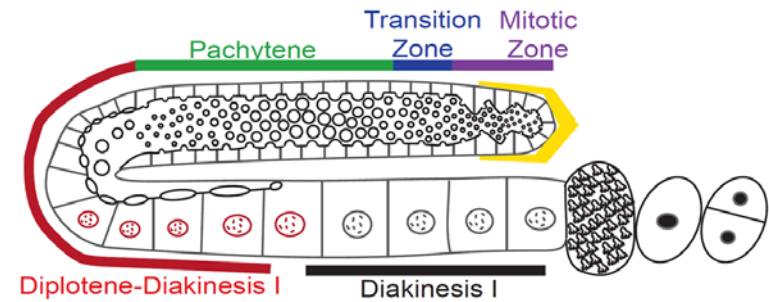
Dynamic rings exhibit speed oscillations (time-delayed negative feedback!)

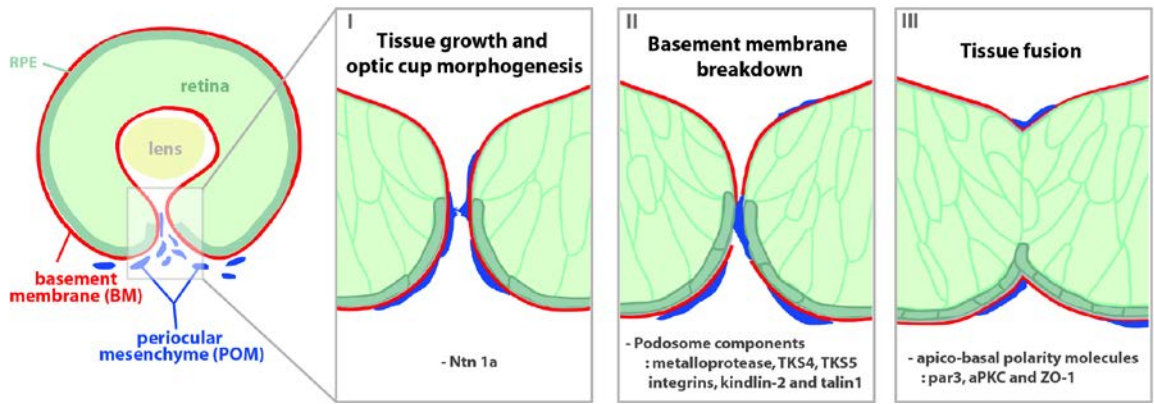


Germline Intercellular Bridges



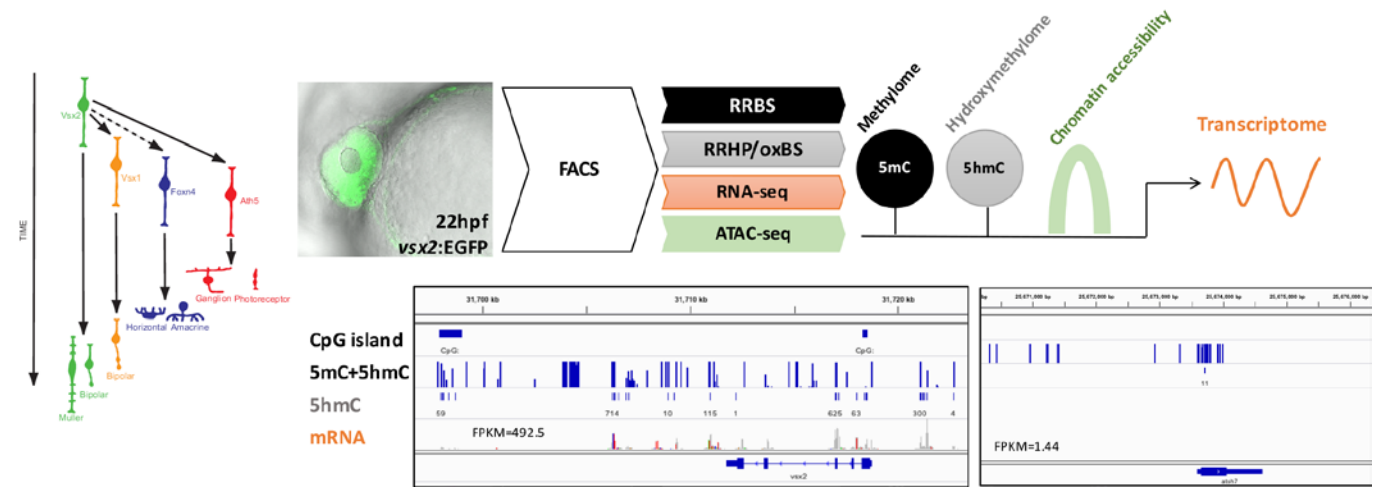
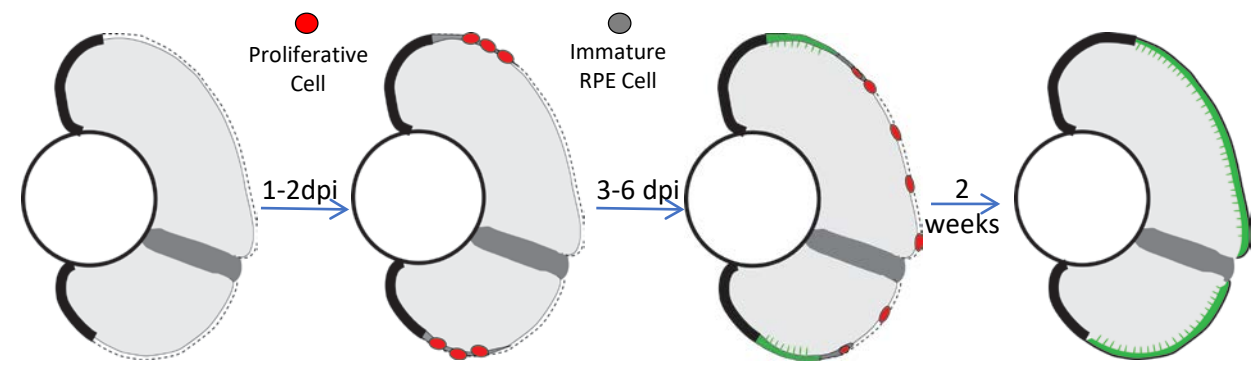
Stable rings contain "contractile" proteins (specialized contractile regulation (inhibition?))





Optic cup morphogenesis and choroid fissure closure

RPE regeneration



Retinal development and regeneration

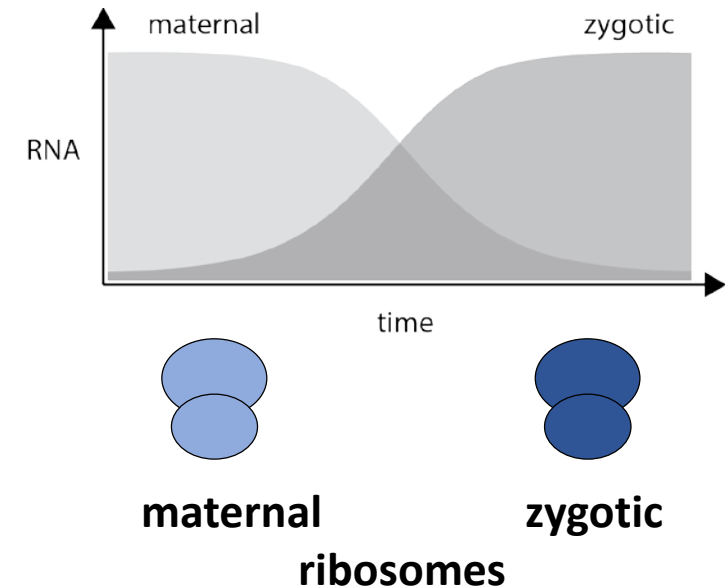
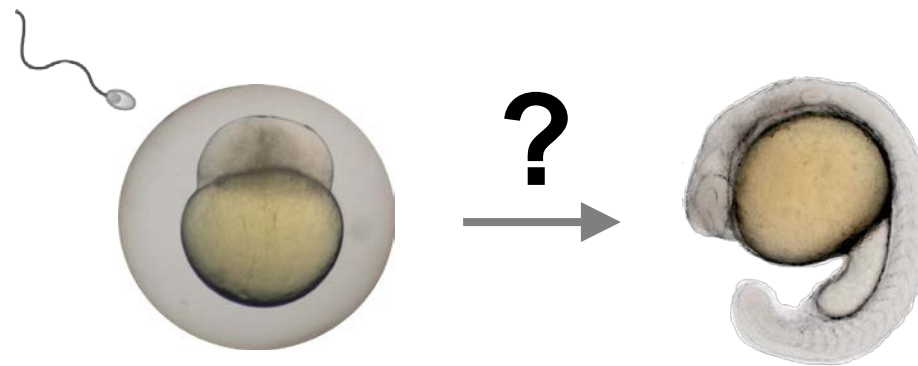
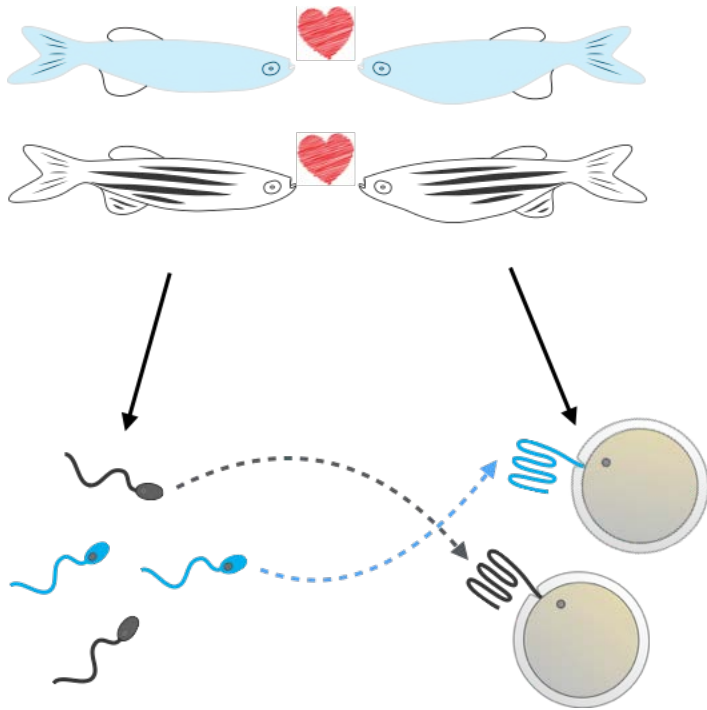
Germline-to-embryo transition

Fertilization

Short proteins

Translation

Bouncer, the gate-keeper of the oocyte **Toddler** makes gastrulating cells move



Andrea (Andi) Pauli

Lillie 118

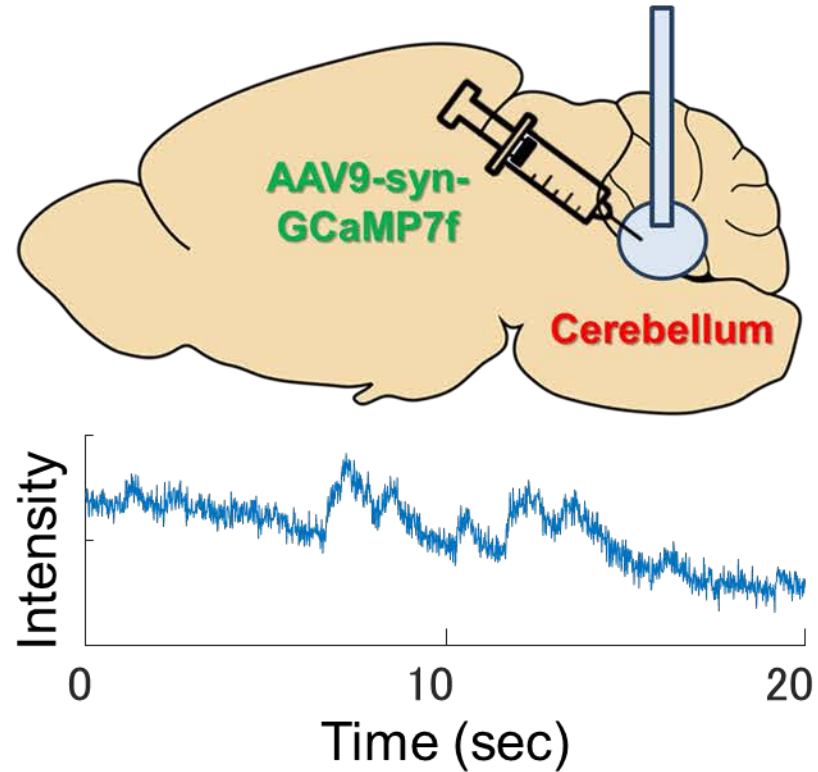
IMP, Vienna, Austria

Herberg et al., bioRxiv

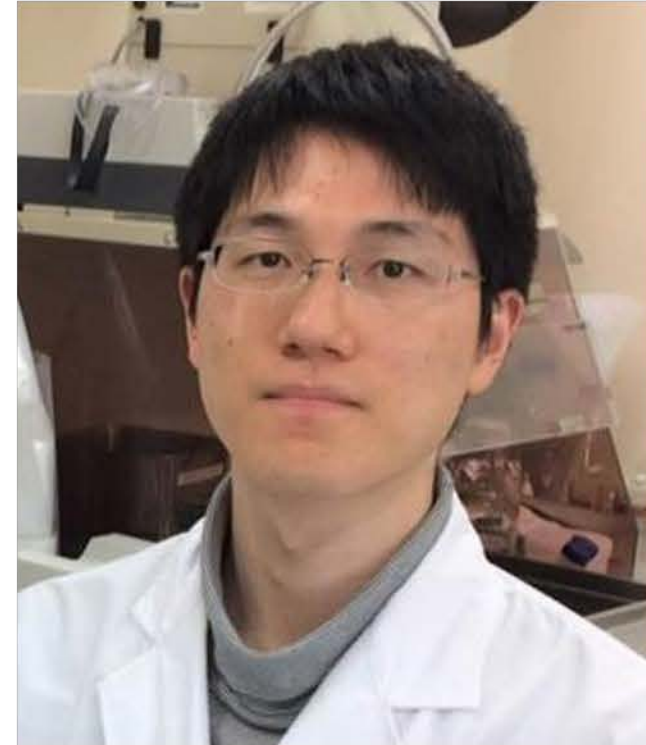
How does our brain control behavioral inhibition?



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?

dan Rohsahr

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

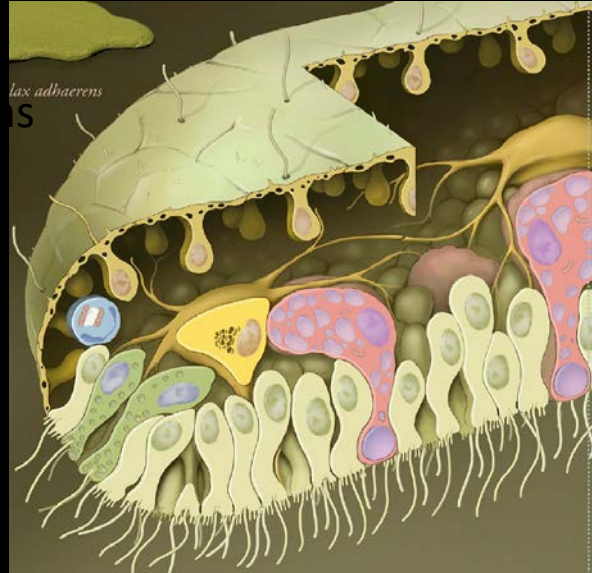
98 genes,
11,514 MB
87% homologs
in other animals
83% shared
between *Cnidaria*
and *Bilaterians*.

Tatiana Mayorova
Carolyn Smith
Tom Reese

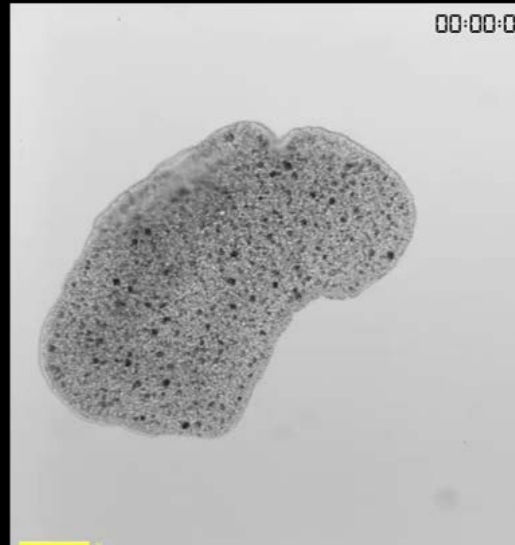
Trichoplax adherens, Schultz, 1883

treeese@mbl.edu

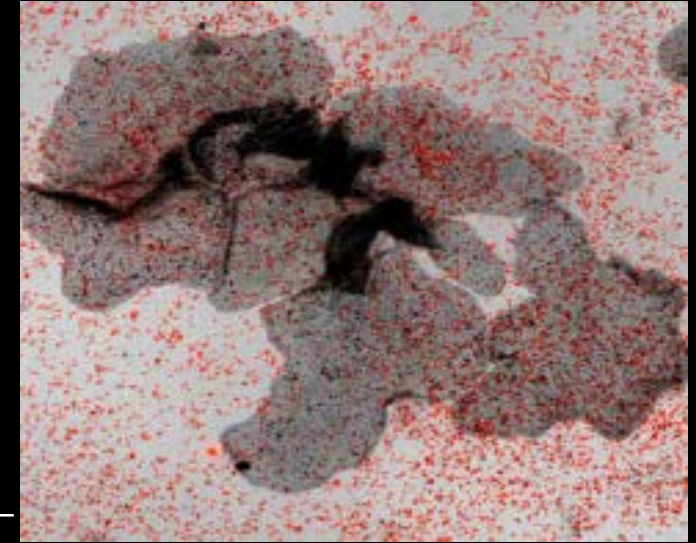
Two types of secretory cells in Trix



Spritzing Endomorphin-2
induces reversible pauses



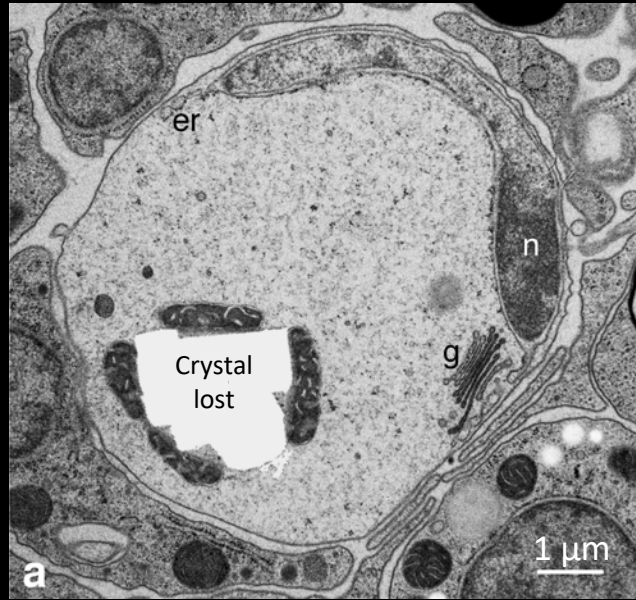
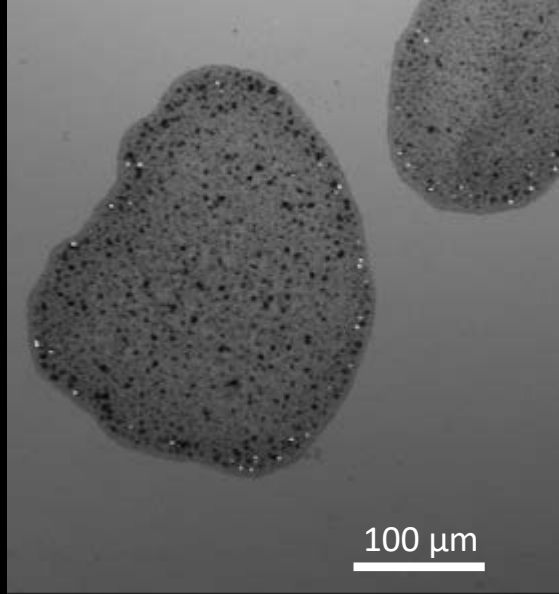
Trix pauses over algae and
bombs them with its lipophil cells



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

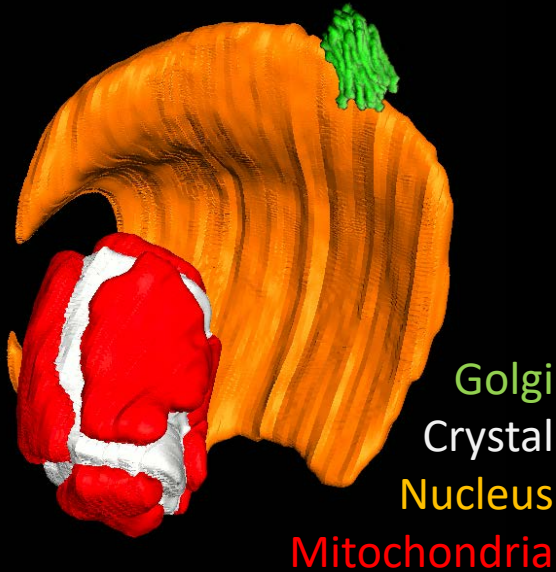


What do tiny crystals in Trichoplax tell us about its lifestyle and origin?

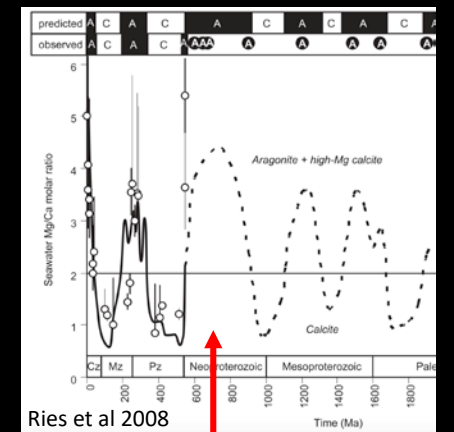
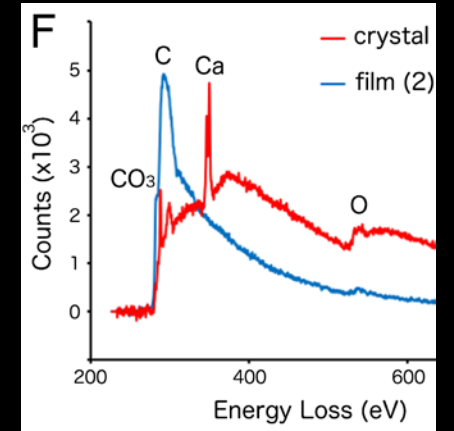
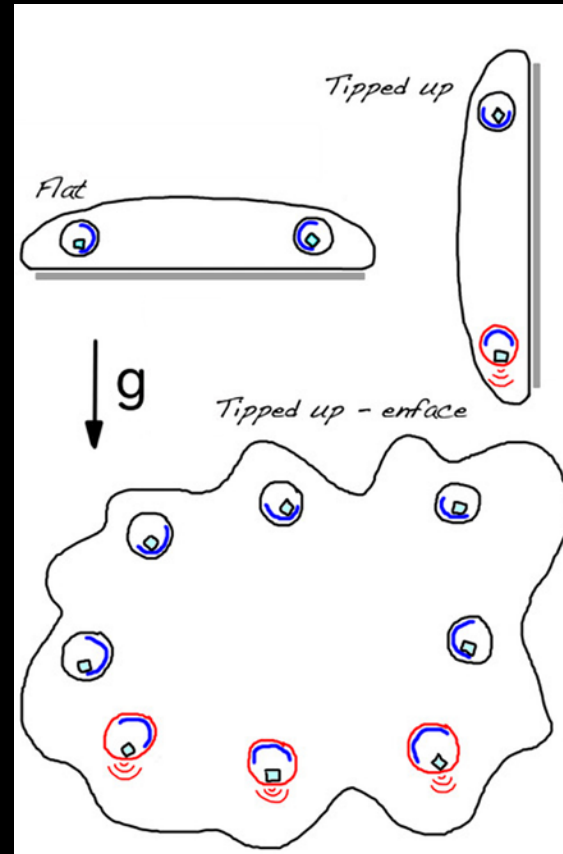
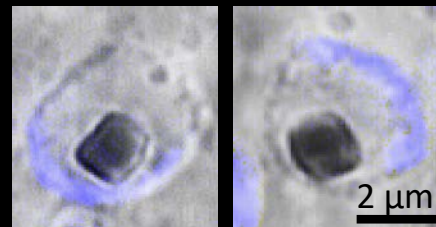


Crystals cells might be selectively activated depending on orientation of the animal. A large number of crystal cells (>100) compensates for the absence of a nervous system.

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

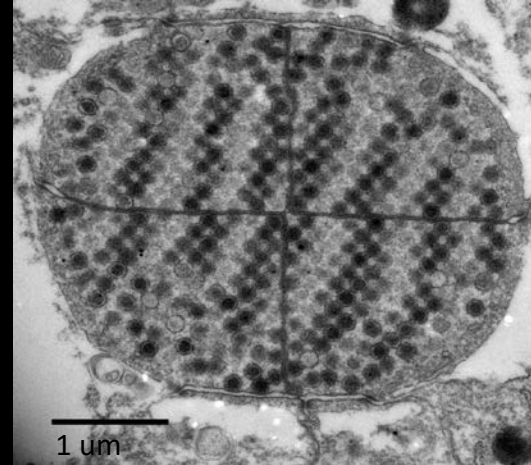
Mantis Shrimp Brains & Behavior



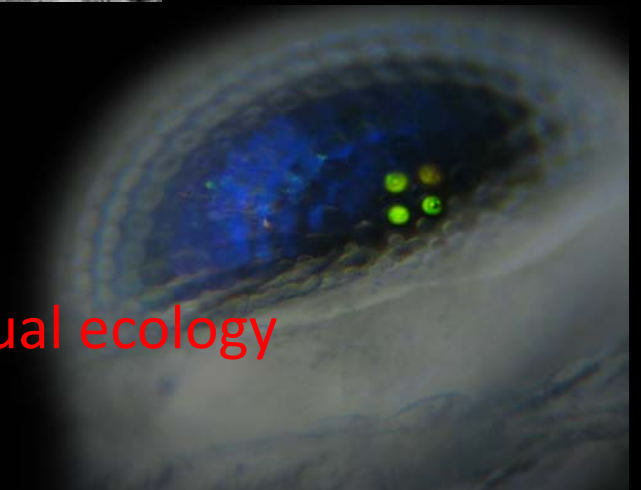
 @DrKateFeller
www.Katefeller.com



Neuroethology



Visual ecology





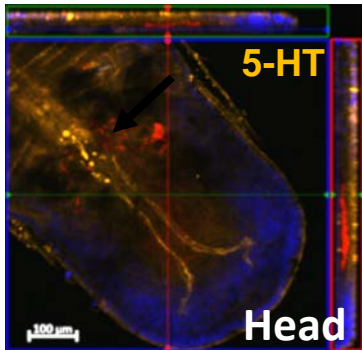
Lumbricus variegatus

Making Heads or Tails of Regeneration using an Annelid model.

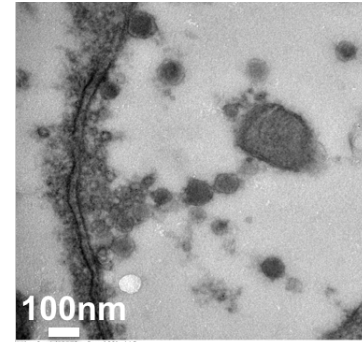
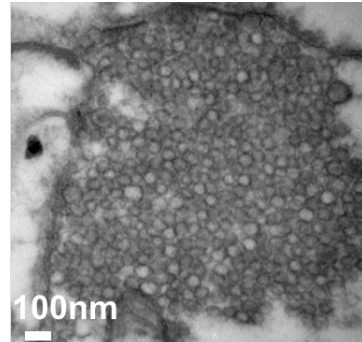
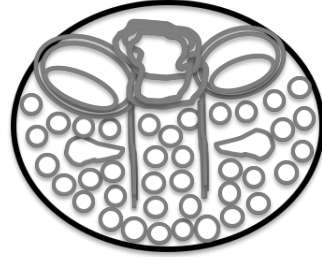


Veronica Martinez-Acosta
MRC 306
vgmartin@uiwtx.edu

24hrs Post - Amputation



Posterior Regenerating System

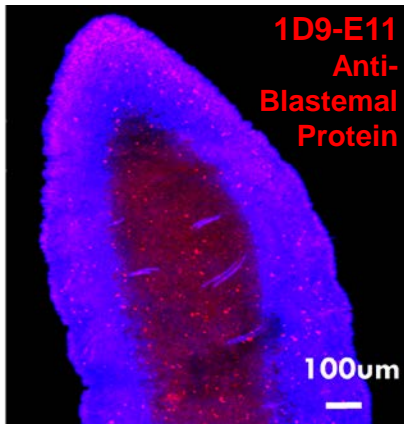


>*L. variegatus* beta-catenin consensus sequence (5' - 3')

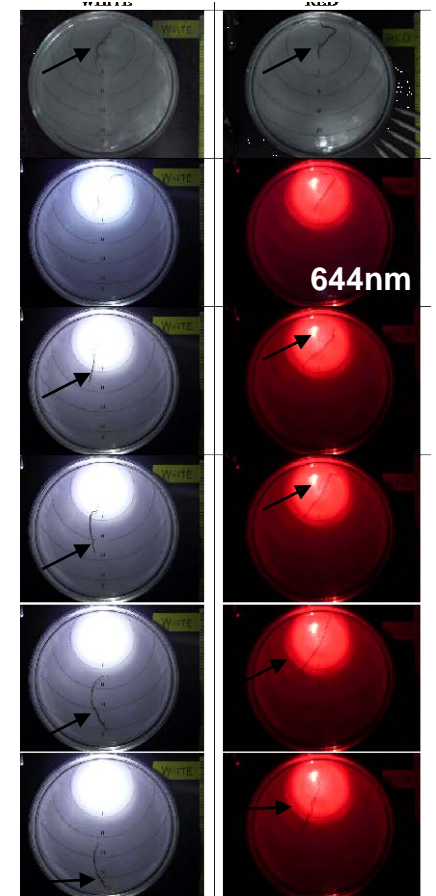
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```

1wk Post - Amputation



Lights off



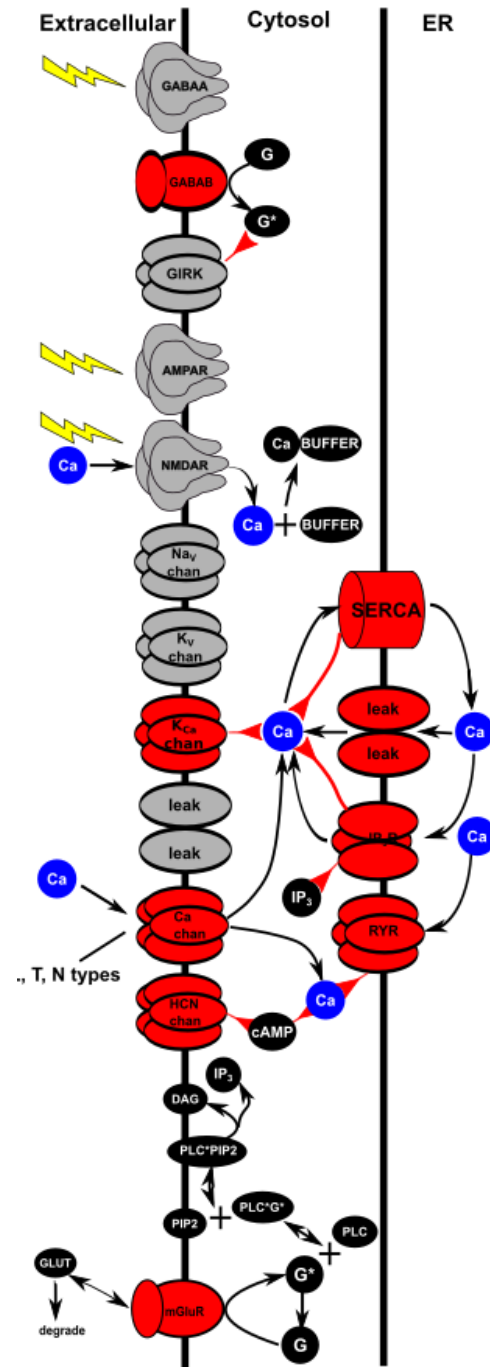
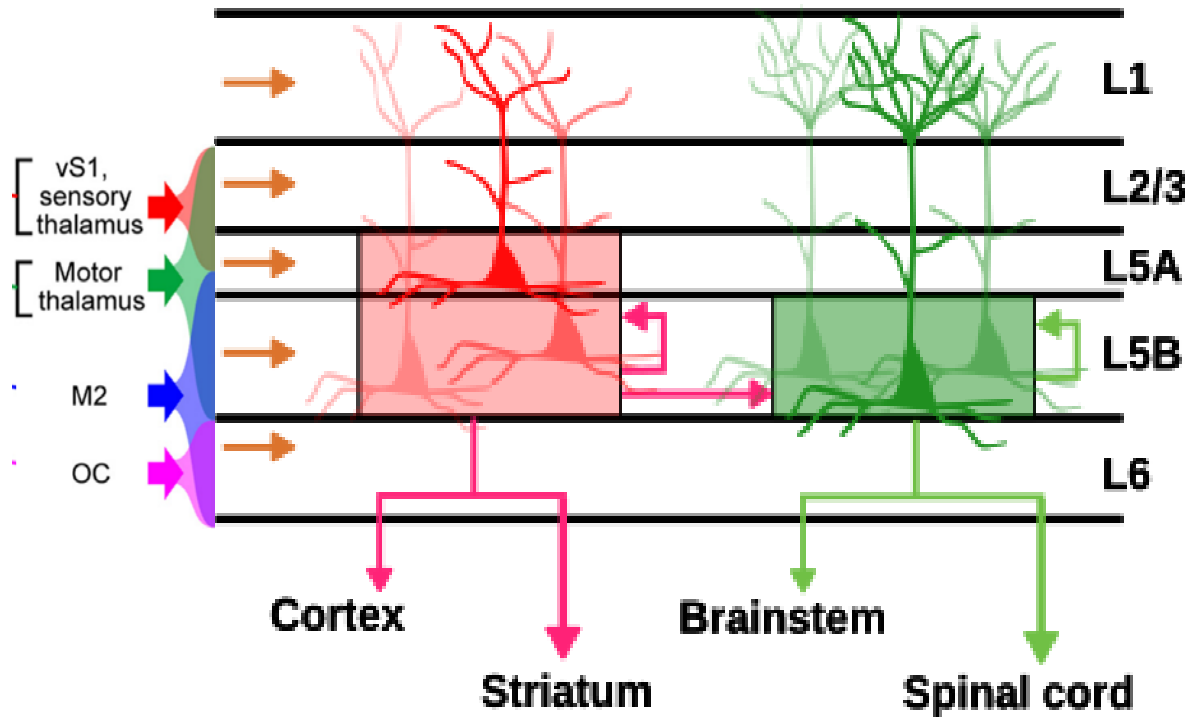
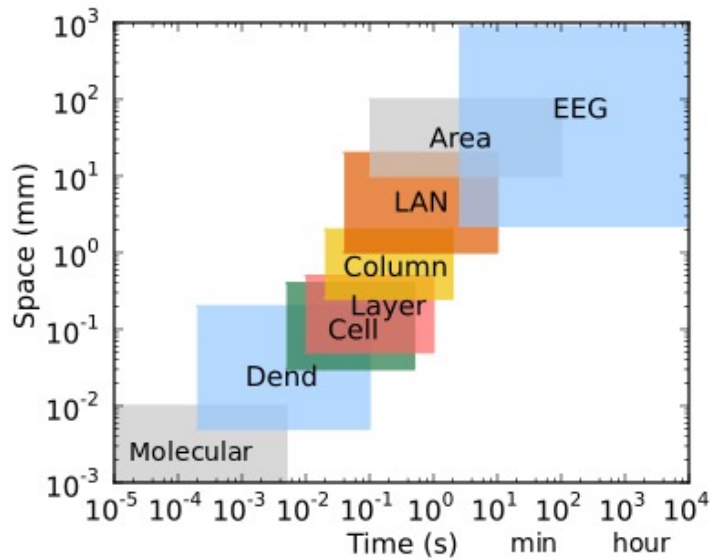


Multiscale modeling

Computational Neuroscience

bill.lytton@downstate.edu

web: neuron.yale.edu, netpyne.org



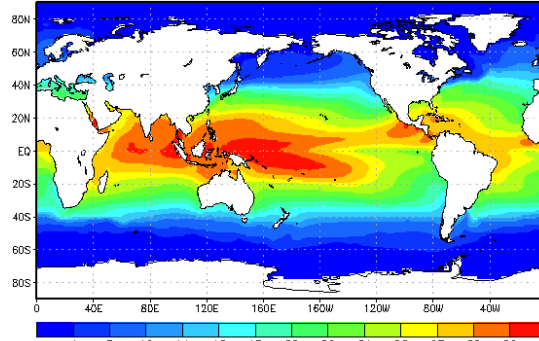
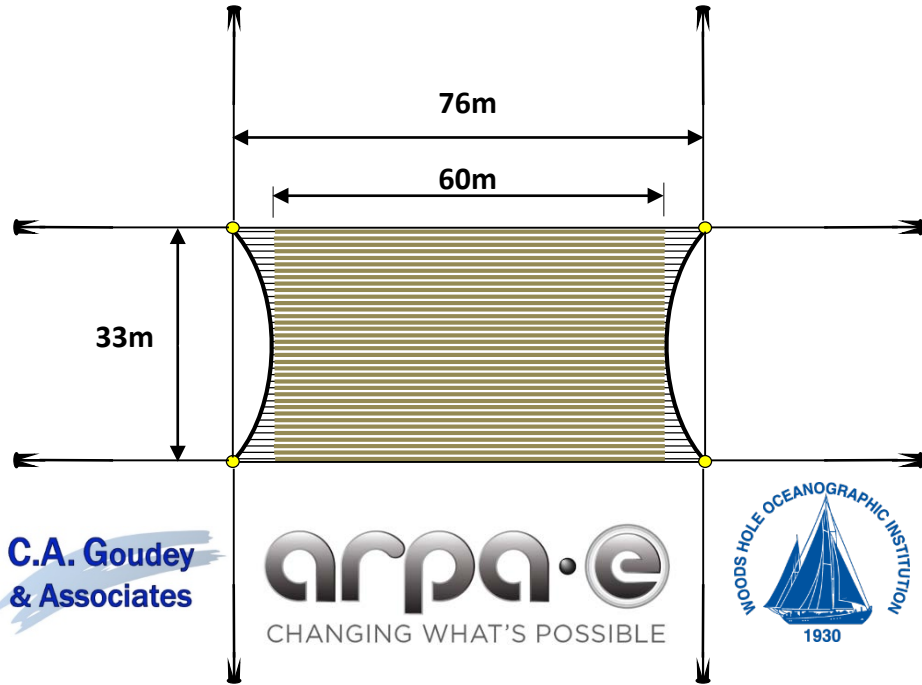
1. Tropical seaweed cultivation and harvesting

Loretta Roberson
Marine Biological Laboratory
lroberson@mbledu

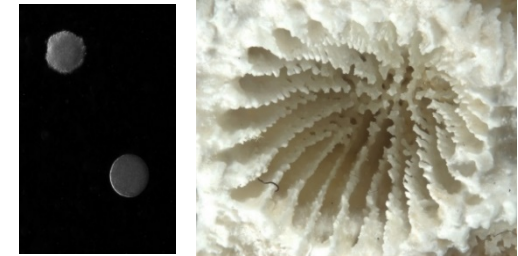
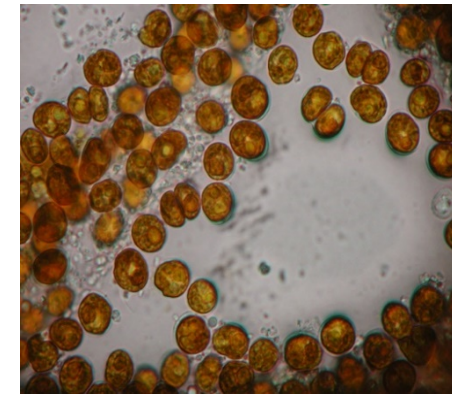
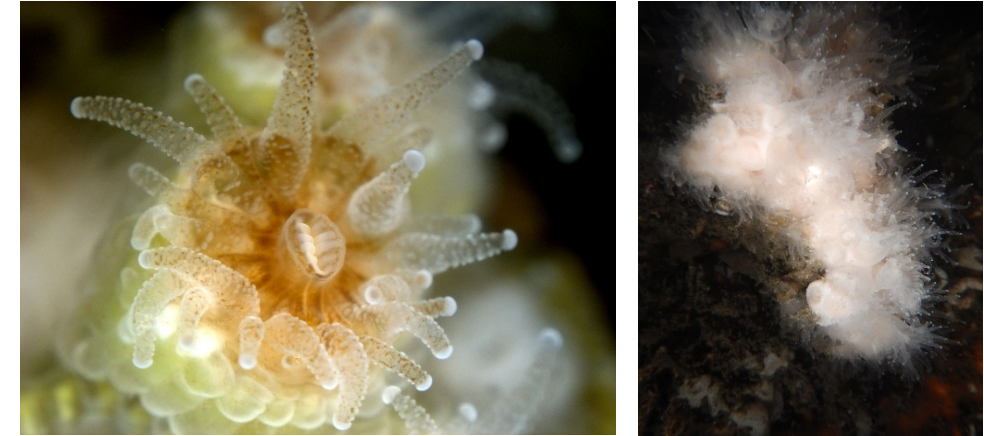


2. Impact of temperature changes on coral physiology

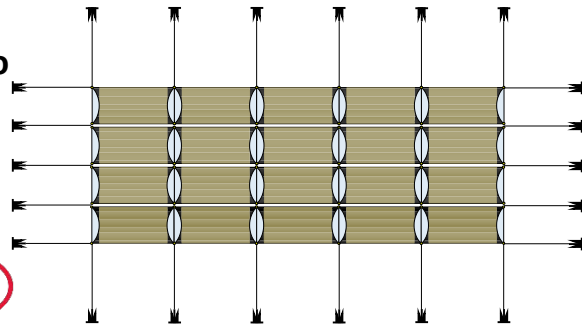
Basic cell has 60 growlines at 0.5 m spacing yielding 3,600 m of grow length.



Global seawater temperature averages

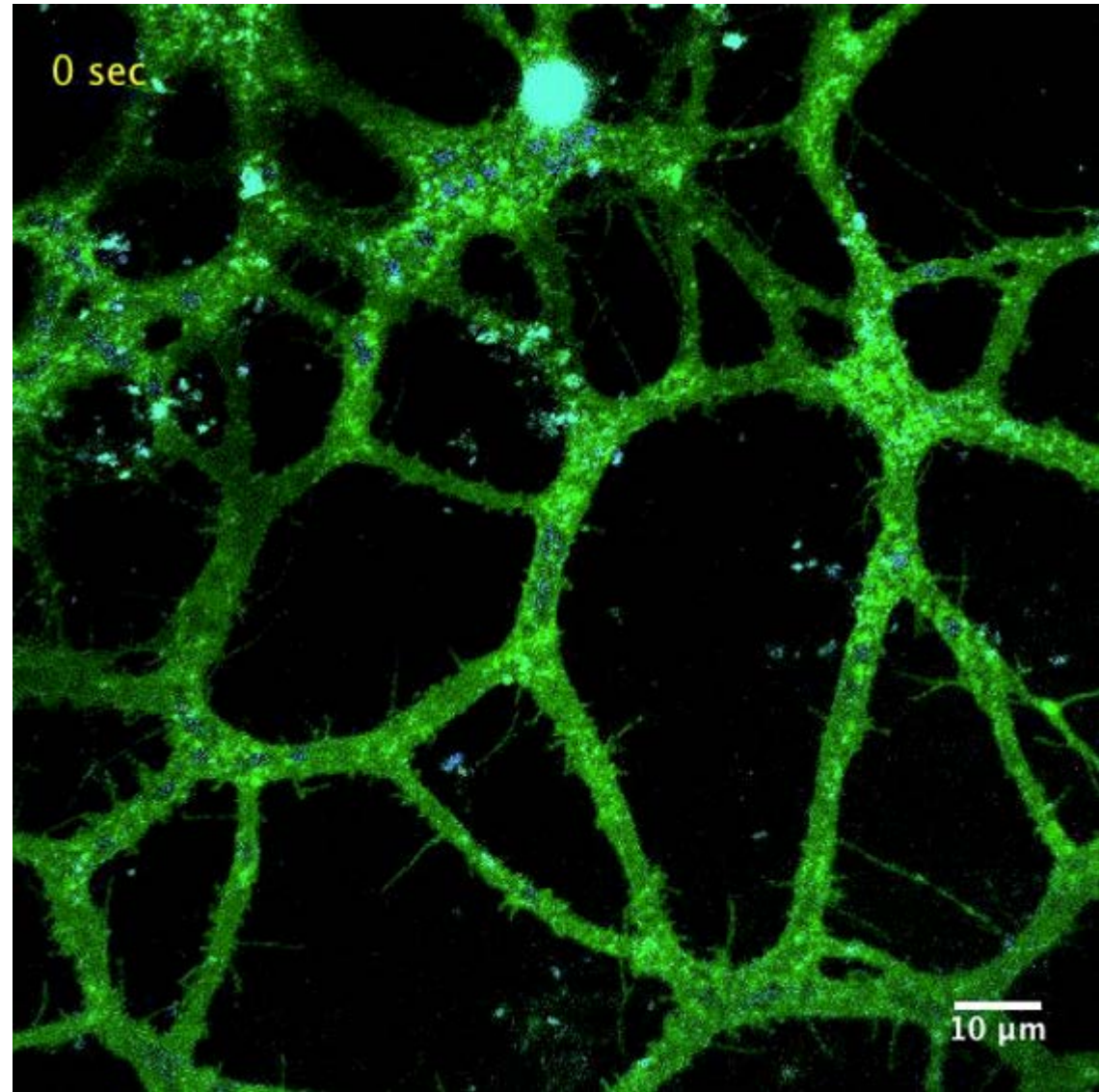
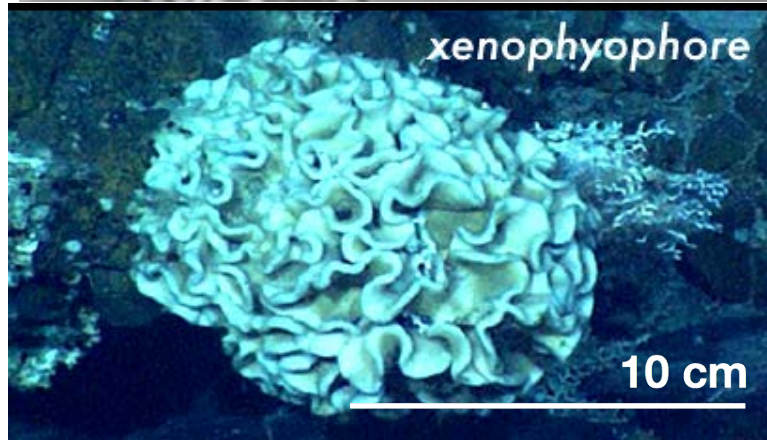
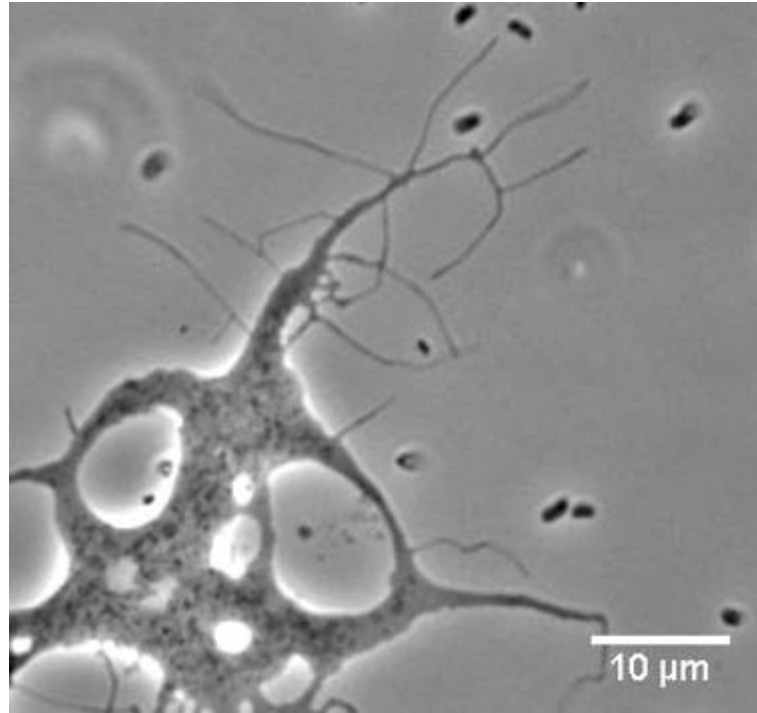


Over 400 of these 5 x 4 arrays could fit in a test area in Puerto Rico yielding 28,800 km of growline or 1 million WMT of annual *Eucheuma* production.



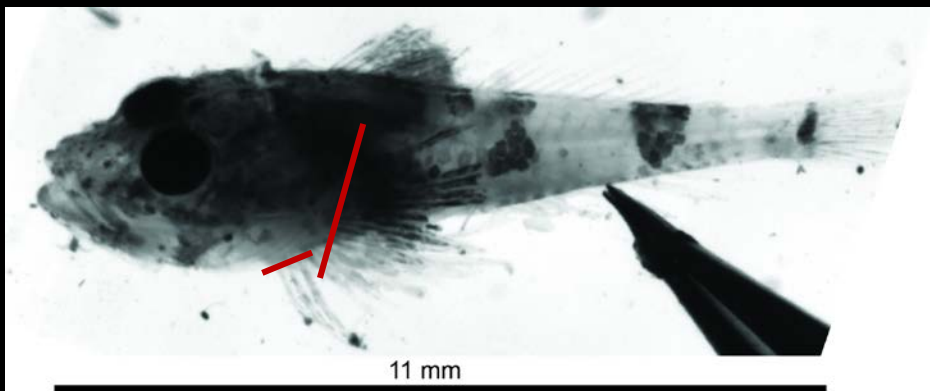
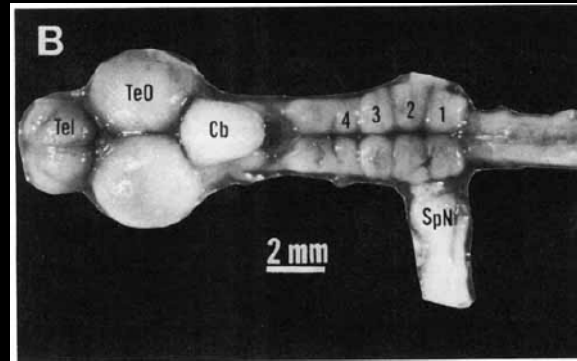
Cytoskeletal evolution of a multinucleate Rhizarian amoeba

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

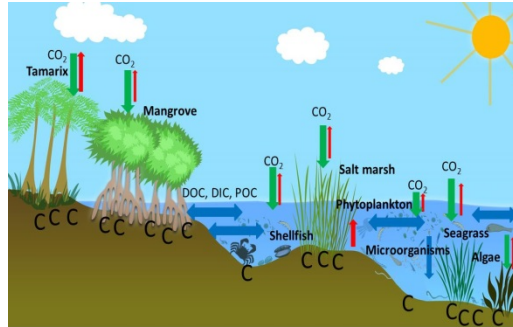
Aim 2: Develop methods to functionally test the role of individual genes in novel sea robin traits

Amy Herbert
Grass Fellow
Rowe 201

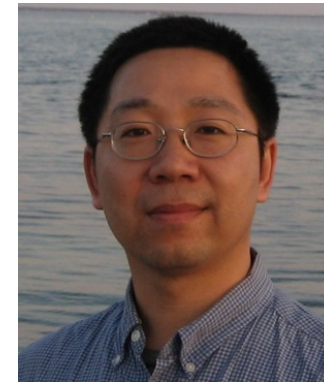
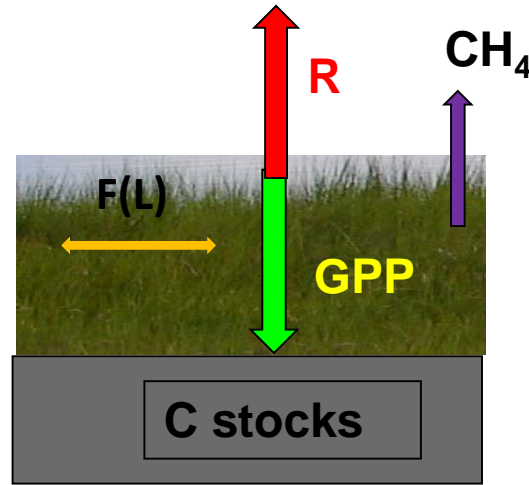
herbert6@stanford.edu



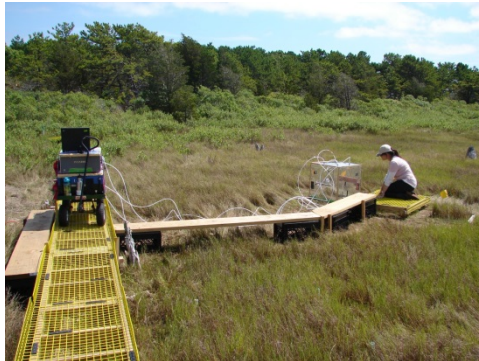
Quantifying coastal "blue" carbon to offset climate change



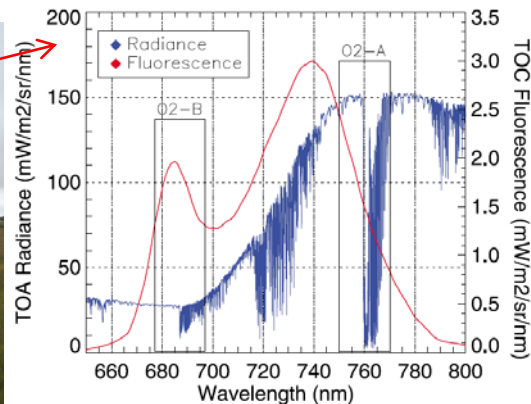
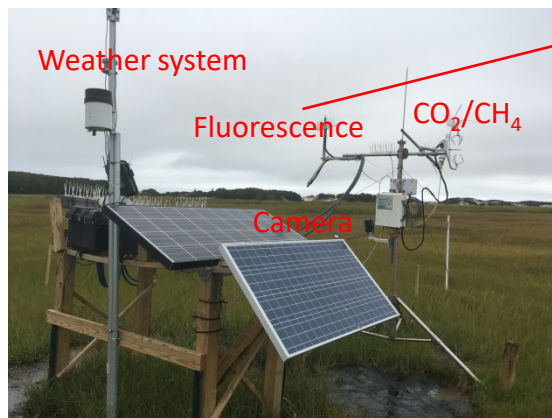
Coastal ecosystems have strong ability to store carbon (Tang et al. 2018)



Jim Tang
 Starr 317
 jtang@mbi.edu



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



Solar induced fluorescence, a proxy of photosynthesis

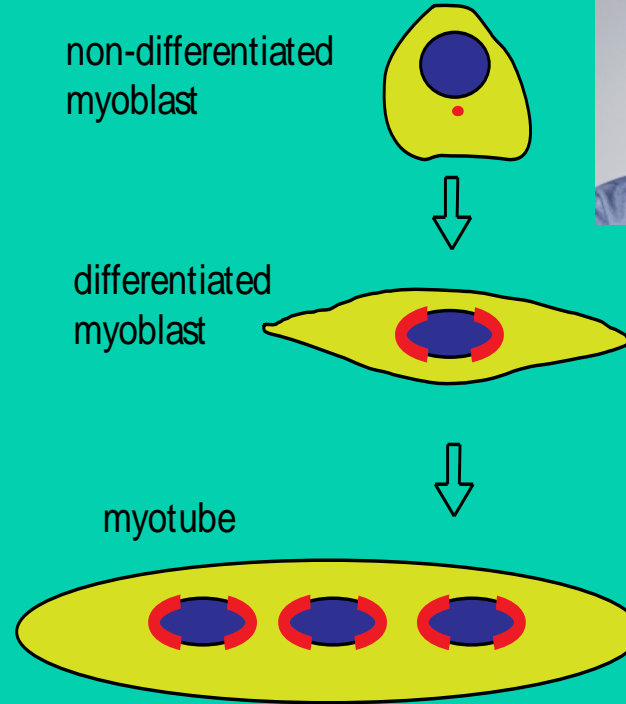


A role for cell anisotropy on nucleus-cytoskeleton connections

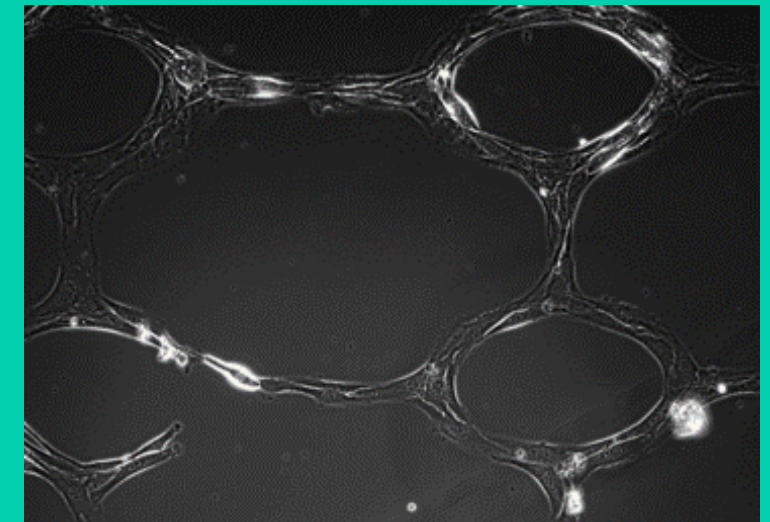


Edgar R. Gomes

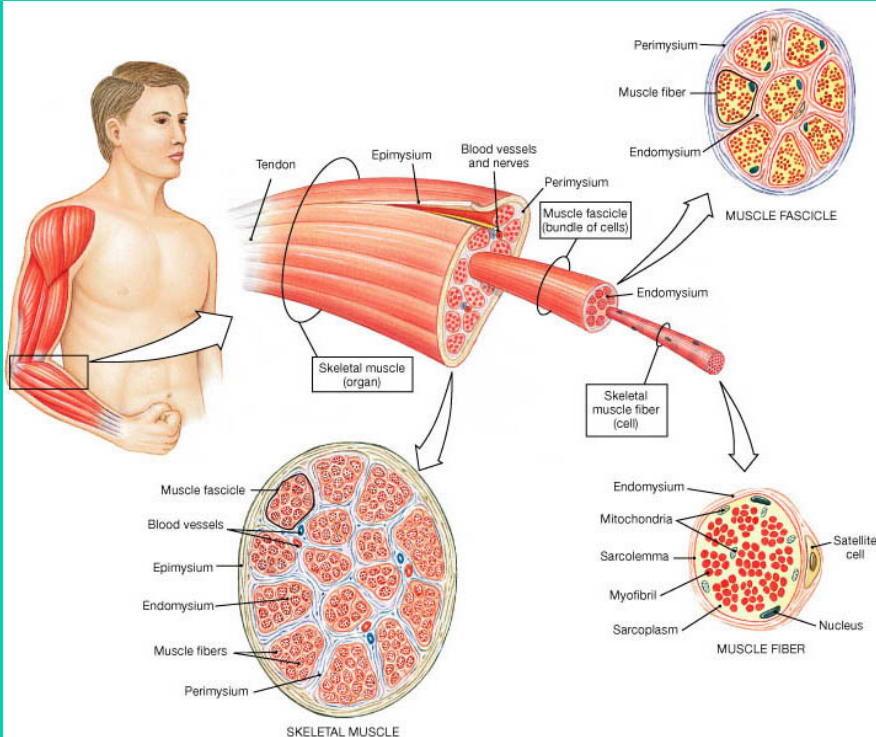
A.



• Does myoblast and myotube cell anisotropy affects nuclear anisotropy?



Manipulate cell shape *a la carte*



Human Skeletal Muscle cells

- Multinucleated
- Nuclei in specific positions