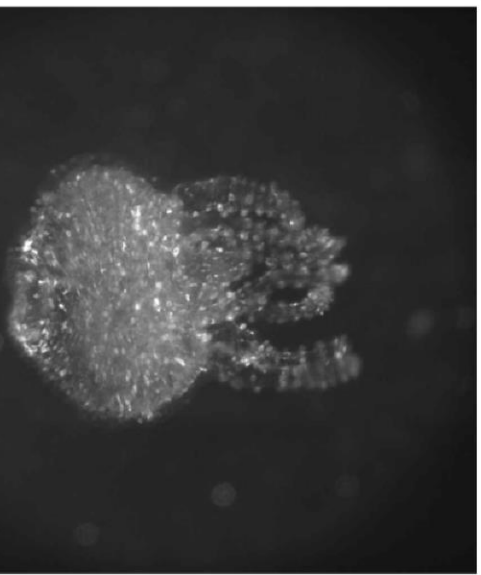


# The mind of a cnidarian

Breaking the neural code in *Hydra vulgaris*

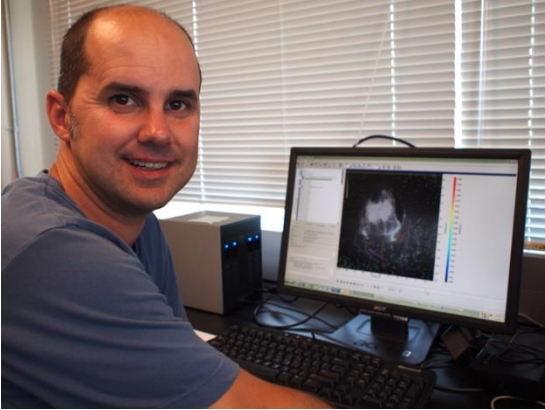
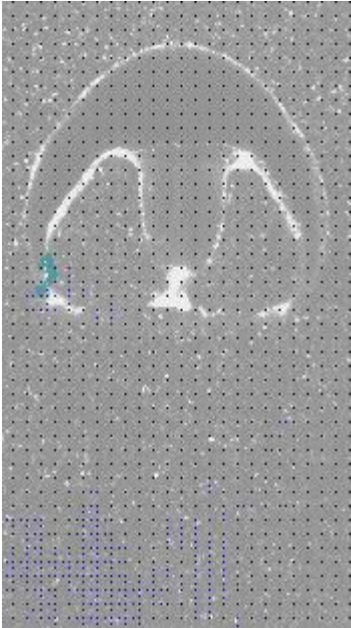


Rafael Yuste  
MRC 306  
rafaelyuste@columbia.edu

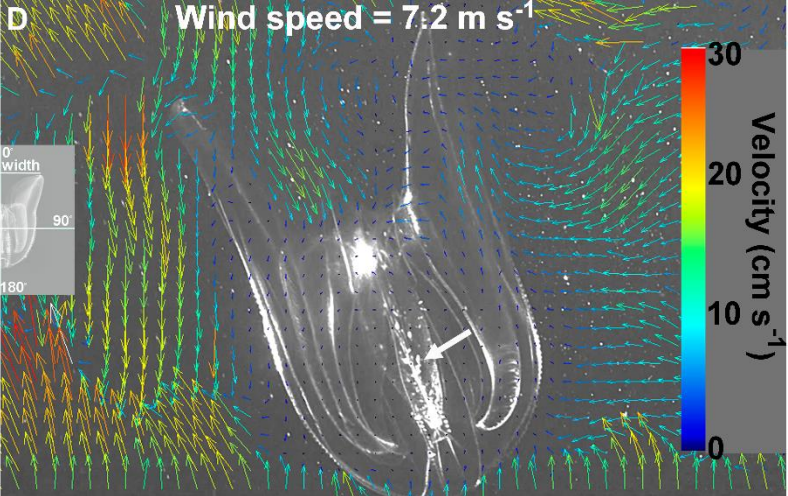
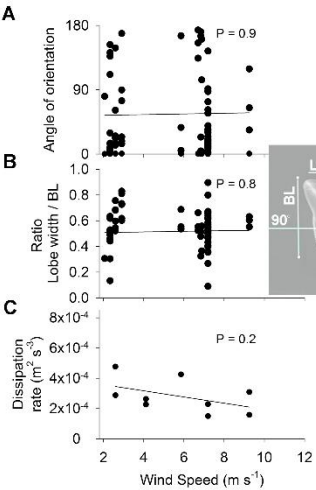
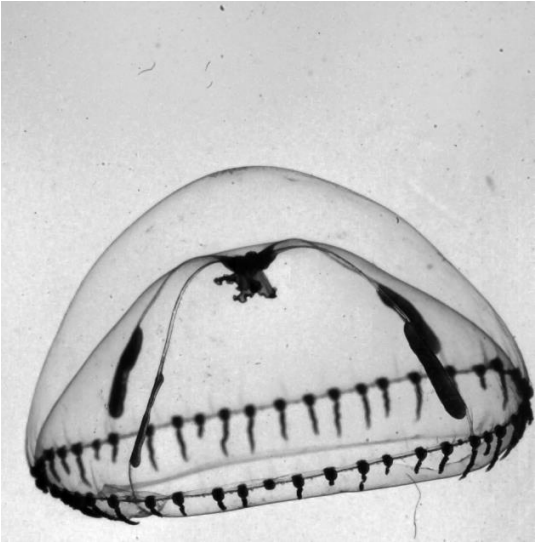
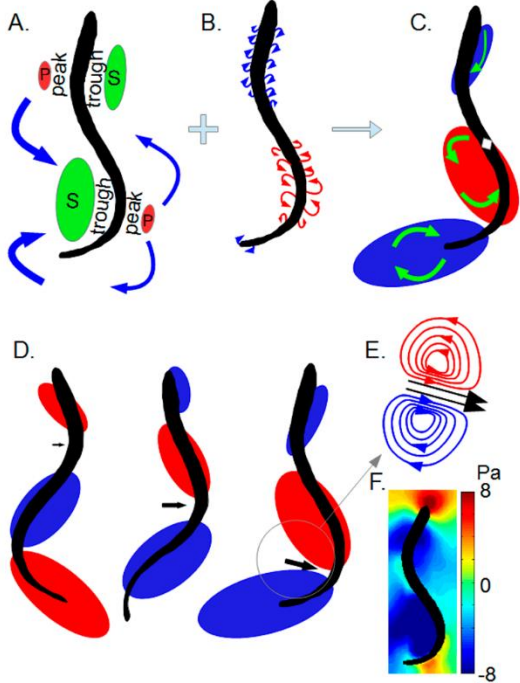


# Animal-Fluid Interactions

Use high-speed imaging and fluid analysis to quantify how animals function in fluid environments



Sean Colin, Rowe 301  
scolin@rwu.edu



# NXR and Pancreas Development

National Xenopus Resource



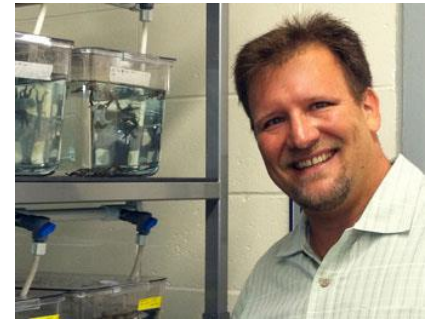
[www.mbl.edu/xenopus](http://www.mbl.edu/xenopus)  
[xenopus@mbl.edu](mailto:xenopus@mbl.edu)

- Maintain and distribute *X. laevis* and *X. tropicalis*

- Research Facility Service

- Workshops

*genome editing*  
*advanced imaging*  
*bioinformatics*



Marko Horb  
Rowe 413 and Loeb G12  
[mhorb@mbl.edu](mailto:mhorb@mbl.edu)



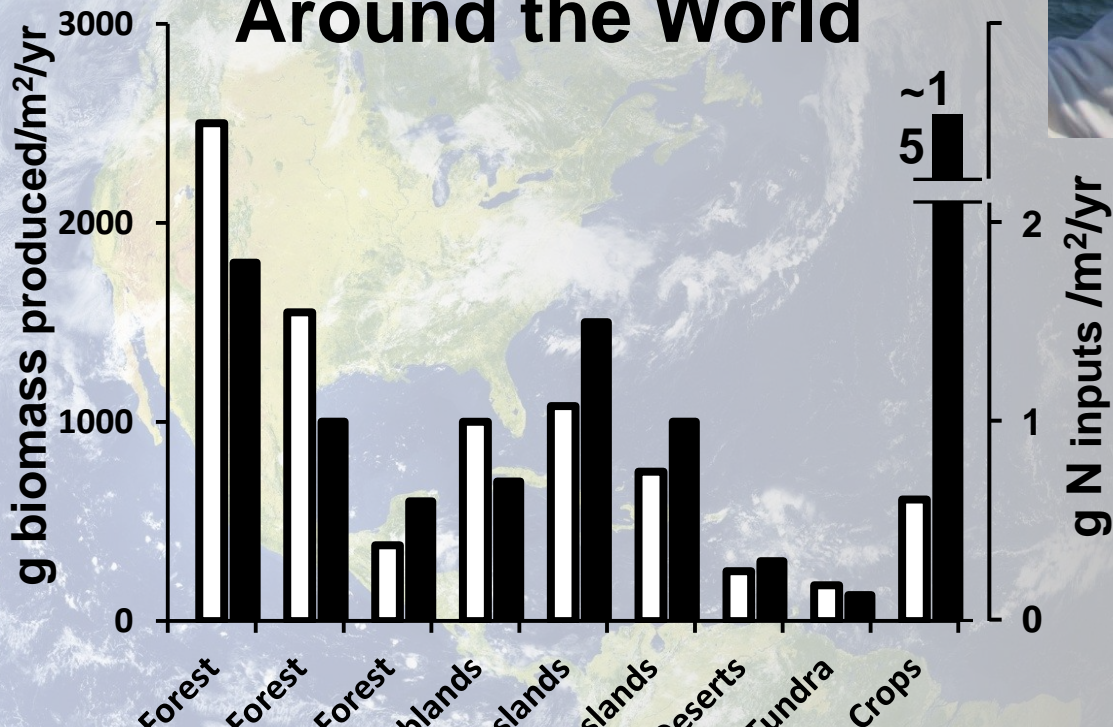
- Develop new models of human disease using CRISPR-Cas

- Pancreatic beta cell GRN

- Directed differentiation of pancreatic beta cells



# Plant Production in Terrestrial Ecosystems Around the World



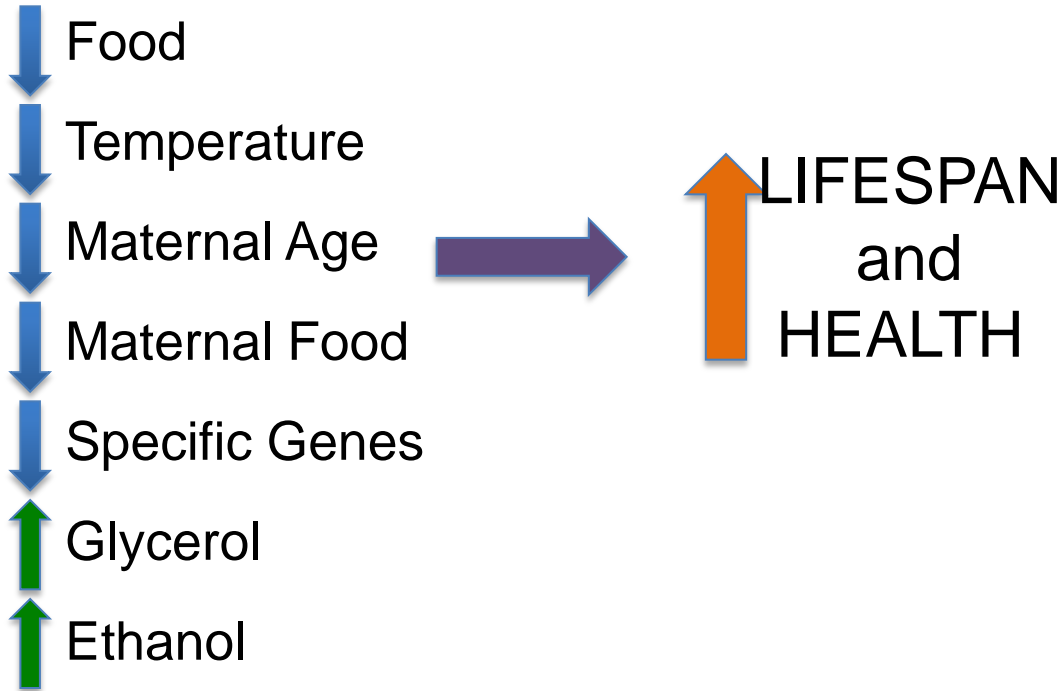
Ed Rastetter  
Starr 234  
erastetter@mbi.edu

**Natural Ecosystems:**  
700-1400 g biomass  
produced per g N  
input to the  
ecosystem

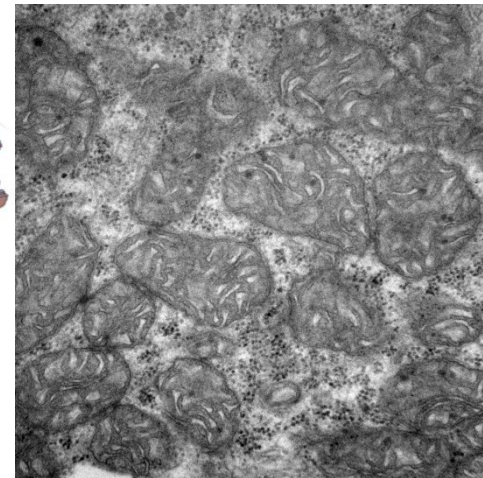
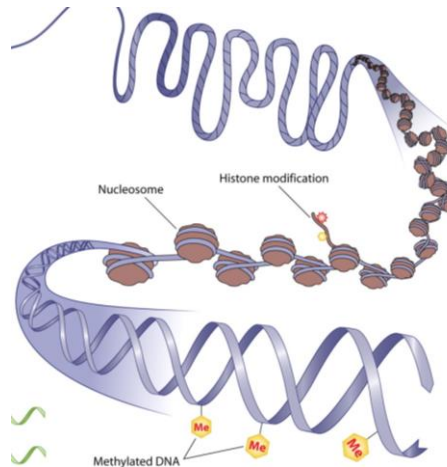
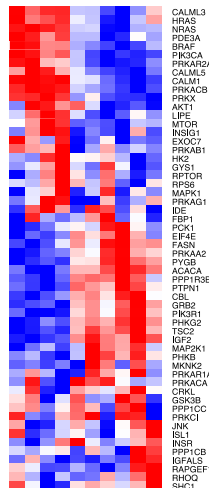
**Crop Ecosystems:**  
~40 g biomass  
produced per g N  
input to the  
ecosystem

# Maternal effects and aging

## Rotifers as a model system



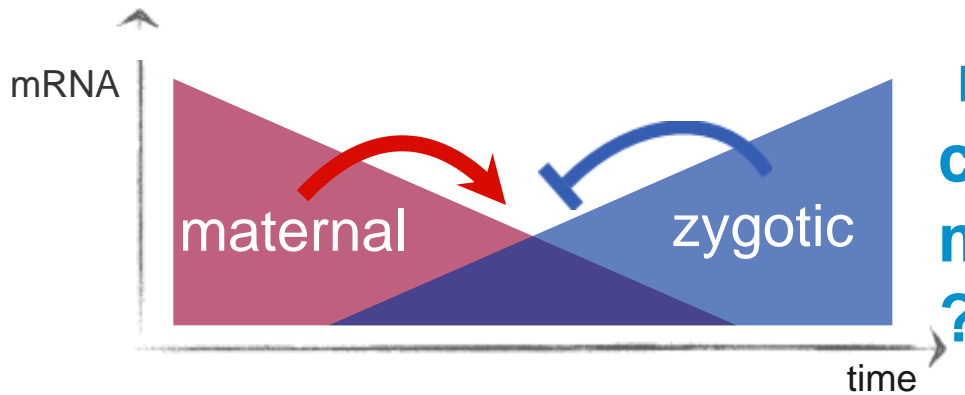
Kristin Gribble  
MBL  
Lillie 319





# Deciphering the regulatory code during the maternal to zygotic transition

**Nanog**  
**Oct4**  
**SoxB1**  
**?**



**miR-430**  
**codon optimality**  
**m6A**  
**?**



**Antonio Giraldez**  
Yale University  
Rowe 211

	U	C	A	G	
U	UUU   Phe	UCU   Ser	UAU   Tyr	UGU   Cys	U
	UUC   Phe	UCC   Ser	UAC   Tyr	UGC   Cys	C
	UUA   Leu	UCA   Ser	UAA   Stop	UGA   Stop	A
	UUG   Leu	UCG   Ser	UAG   Stop	UGG   Trp	G
C	CUU   Leu	CCU   Pro	CAU   His	CGU   Arg	U
	CUC   Leu	CCC   Pro	CAC   His	CGC   Arg	C
	CUA   Leu	CCA   Pro	CAA   Gln	CGA   Arg	A
	CUG   Leu	CCG   Pro	CAG   Gln	CGG   Arg	G
A	AUU   Ile	ACU   Thr	AAU   Asn	AGU   Ser	U
	AUC   Ile	ACC   Thr	AAC   Asn	AGC   Ser	C
	AUA   Ile	ACA   Thr	AAA   Lys	AGA   Arg	A
	AUG   Met	ACG   Thr	AAG   Lys	AGG   Arg	G
G	GUU   Val	GCU   Ala	GAU   Asp	GGU   Gly	U
	GUC   Val	GCC   Ala	GAC   Asp	GGC   Gly	C
	GUA   Val	GCA   Ala	GAA   Glu	GGA   Gly	A
	GUG   Val	GCG   Ala	GAG   Glu	GGG   Gly	G

**Destabilizing**      **Stabilizing codon**

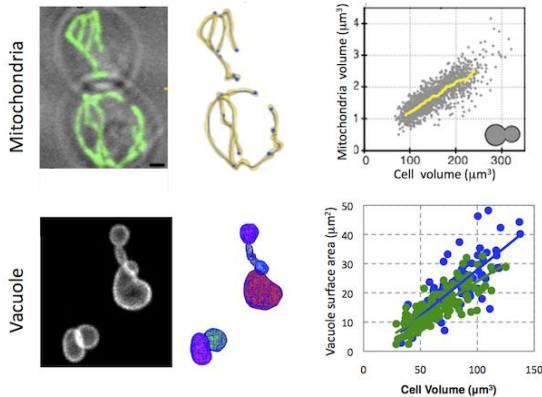
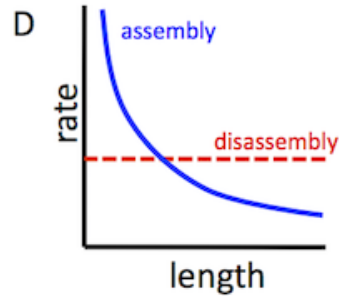
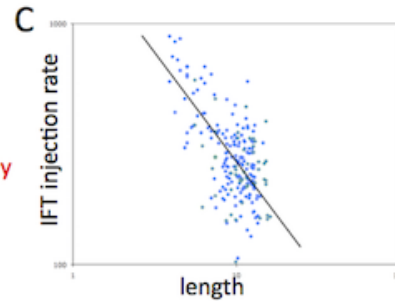
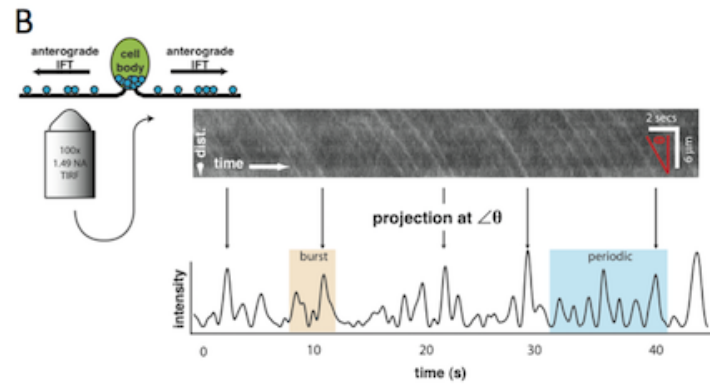
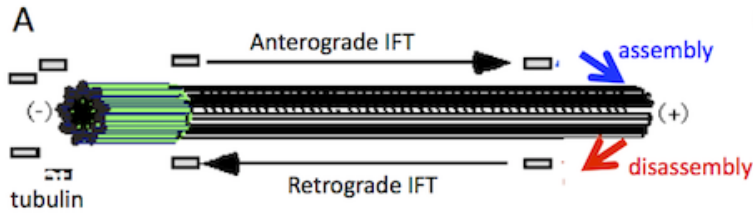
**- Identify the codon optimality code across species**

Lee and Bonneau et al., (Giraldez Lab) Nature (2013)  
Leichsenring et al., (Driever Lab) Science (2013)  
Vasenthaw et al (Schier lab) Nature (2010)  
Zhang et al., (Liu lab) Genome Research (2014)

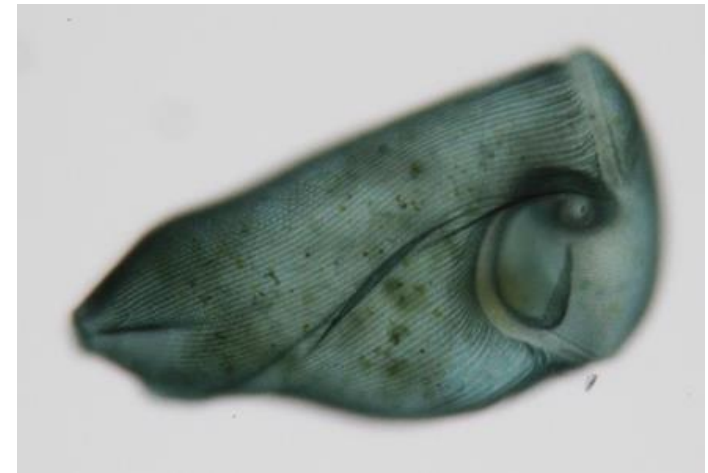
Giraldez et al., (Schier Lab) Science (2005), (2006)  
Bazzini et al., (Giraldez Lab) Science (2012), EMBO 2012  
Ferg et al (Mueller Lab) Embo J, (2007)  
Aanes et al (Aleström lab) Genome Research (2011)

# Cell Geometry

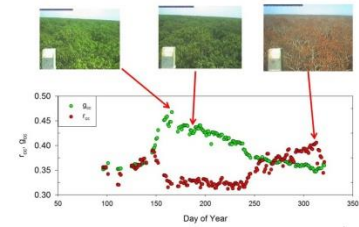
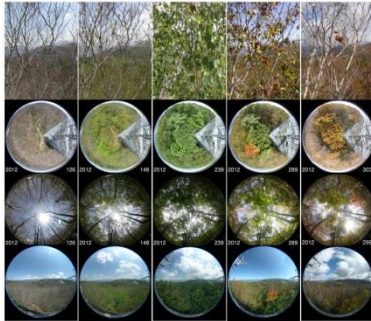
Organelle size and cellular morphogenesis



Wallace Marshall  
3<sup>rd</sup> floor Loeb bldg  
Wallace.ucsf@gmail.com

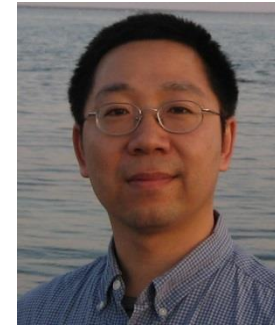


# Imaging plants and quantifying ecosystem productivity



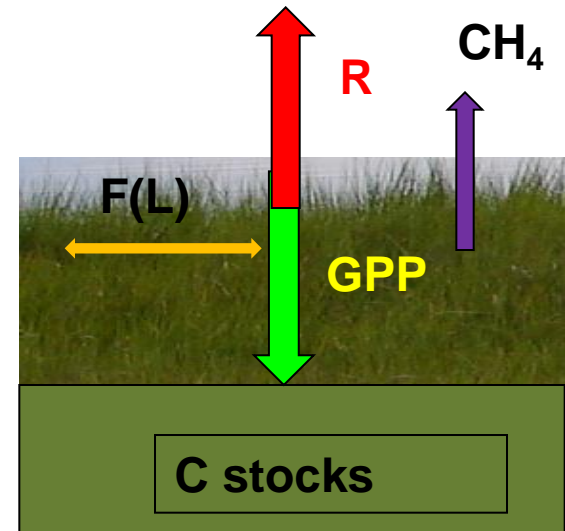
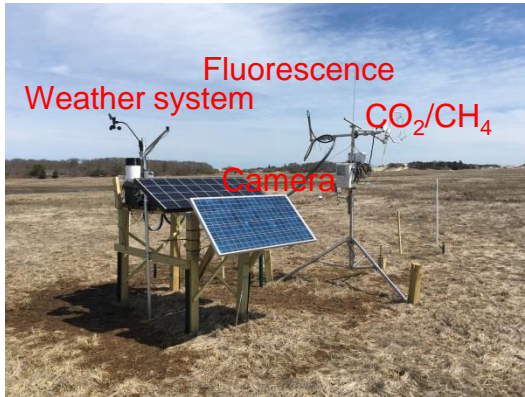
visible | infrared Guanter et al. 2010

Solar induced fluorescence



Jim Tang  
Starr 317  
jtang@mbi.edu

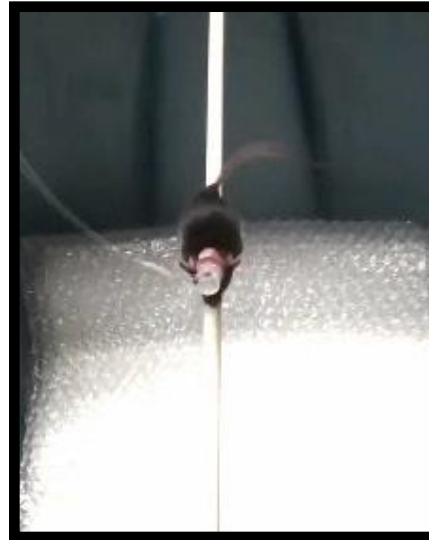
Tang et al. 2016



Coastal "blue" carbon, to mitigate climate change

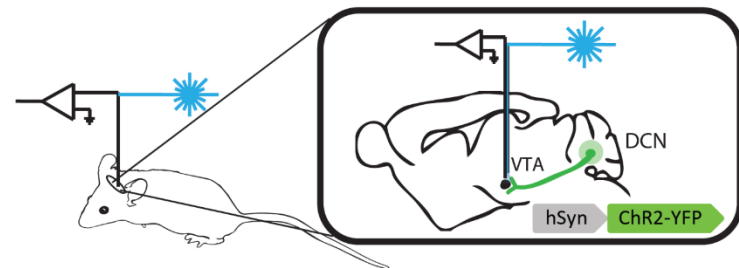
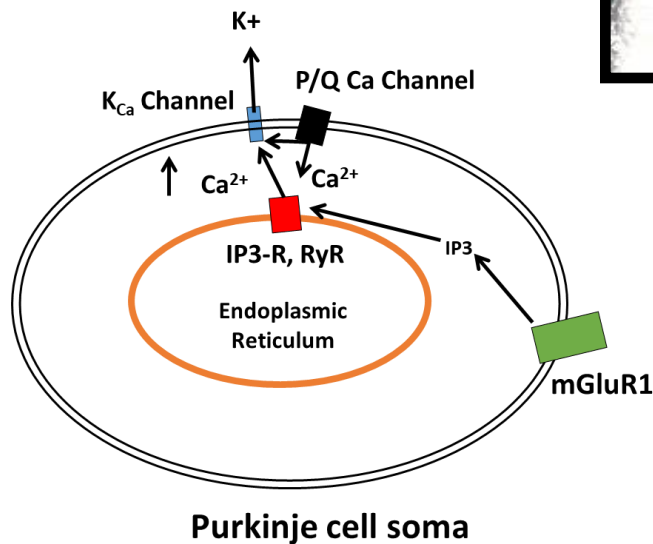


# Motor & non-motor functions of the cerebellum



Kamran Khodakhah  
Grass Labs Rowe 223  
& Rowe 215

k.khodakhah@Einstein.yu.edu

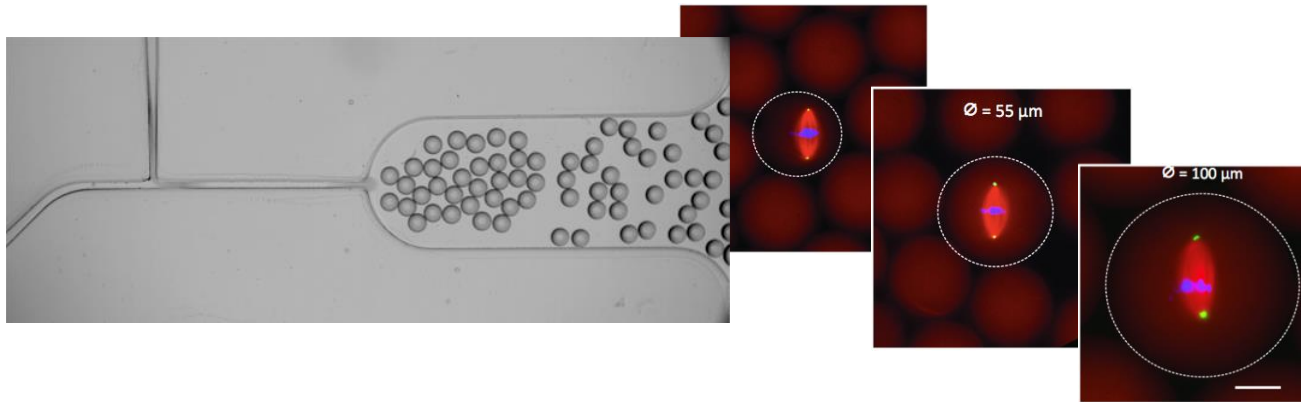


# Microsystems for Model Systems

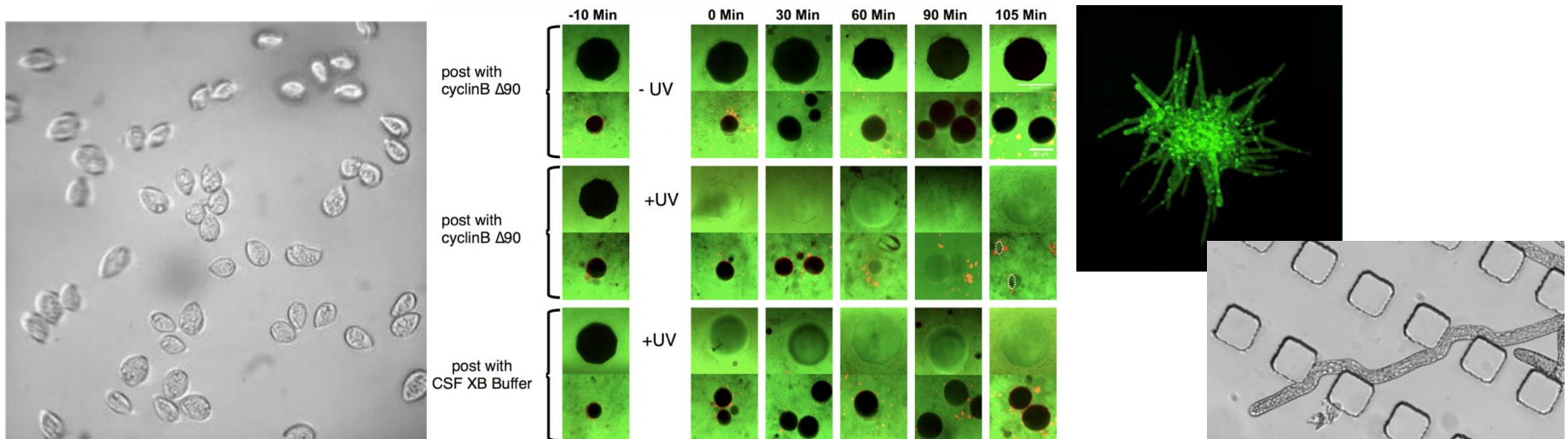
Microfabrication for growth and spatiotemporal patterning of cellular and subcellular events



**John Oakey**  
Lillie 225-226  
joakey@uwyo.edu



Hazel, et al., Science, 2013



# Cephalopod lab rats

Light-based genetic tools and genome editing



Eric Edsinger  
Lillie 316 - edsinger@mbl.edu  
**NOW HIRING! HFSP Postdoc**

Entire Neural Circuits: Adaptive Color System

1

2

3

Imaging system

1

Visual Input



2

Neural Processing



3

Color Output

Injected mRNAs into  
1 cell at 2-cell stage

48 hours

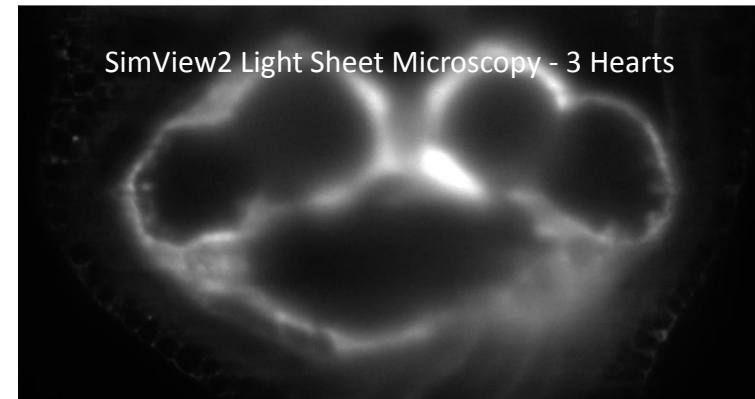
Frog H2B

Frog Utrophin

10 days

Pax6 CRISPR KO

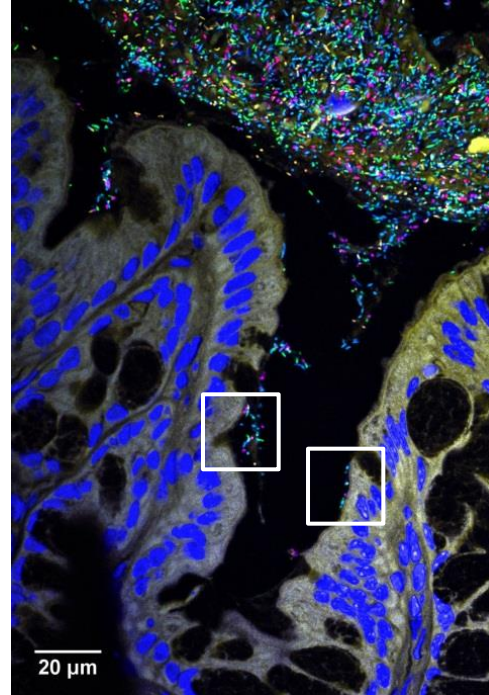
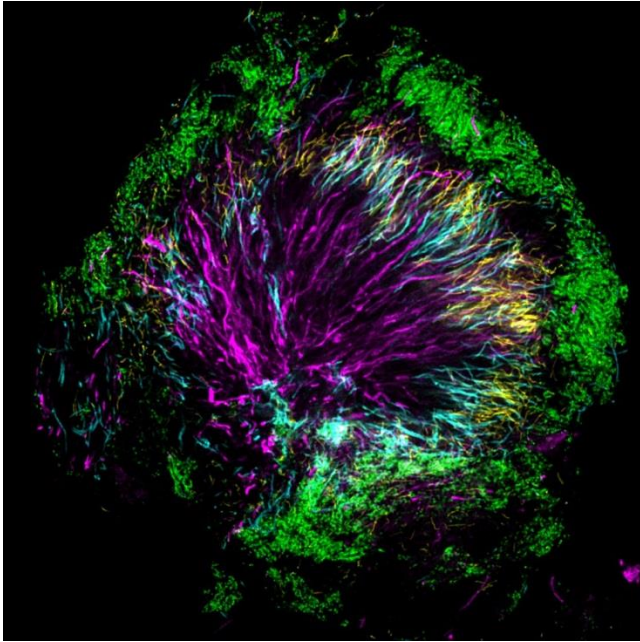
SimView2 Light Sheet Microscopy - 3 Hearts



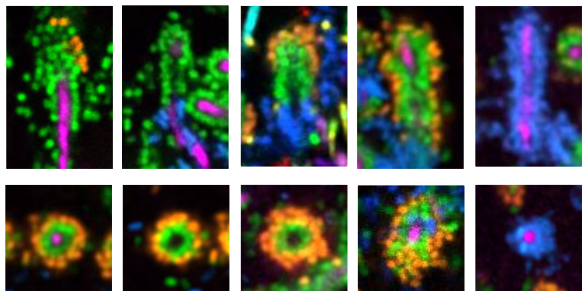


# Microbial Communities

Micron-scale spatial organization and genomics



Jessica Mark Welch  
Lillie 304  
jmarkwelch@mbi.edu



*Corynebacterium*  
*Streptococcus*  
*Porphyromonas*  
*Leptotrichia*  
*Fusobacterium*  
*Haemophilus*

