

# ECCO

Evolution and Climate Change in the Ocean



**How can evolution help predict  
the responses of marine organisms  
to global climate change?**

**How seriously wrong might climate change predictions be  
if evolution is ignored?**

# ECCO Catalytic Meeting

October 1-2, 2009

National Evolutionary Synthesis Center (NESCent), Durham, North Carolina.

## Steering Committee

- Ginger Armbrust (University of Washington)
- Mike Behrenfeld (Oregon State University)
- Sinead Collins (University of Edinburgh)
- Brian Helmuth (University of South Carolina)
- Gretchen Hofmann (UC Santa Barbara)
- David Hutchins (University of Southern California)
- Joel Kingsolver (University of North Carolina)
- David Kirchman (University of Delaware)
- Carol Lee (University of Wisconsin)
- Craig McClain (National Evolutionary Synthesis Center)
- Amy Moran (Clemson University)
- Alison Murray (University of Reno-Nevada)
- Steve Palumbi (Stanford University)
- Robin Waples (National Marine Fisheries Service)

## ECCO Catalina workshop Organizing Committee

- David Hutchins (University of Southern California)
- Gretchen Hofmann (UC Santa Barbara)
- Brian Helmuth (University of South Carolina)
- Amy Moran (Clemson University)



# ECCO Workshop, May 7-10, 2010

University of Southern California  
Wrigley Institute for Environmental Studies  
Catalina Island, California



## Disciplinary breakout groups

Biogeochemistry and biological oceanography  
Ecology and physiology  
Genetics and genomics

## Organismal breakout groups

Algae and microbes  
Invertebrates  
Vertebrates

## Mixed breakout groups

Consensus and implementation

# ECCO Catalina workshop participants

**Ginger Armbrust**

**Farooq Azam**

**Philip Boyd**

**Robert C. Carpenter**

**Emily Carrington**

**Matthew Church**

**Sinead Collins**

**David Conover**

**Suzanne Edmands**

**David Garrison (NSF)**

**Christopher Gobler**

**John Heidelberg**

**Brian Helmuth**

**Gretchen Hofmann**

**Raymond B. Huey**

**David Hutchins**

**Pete Jumars**

**Michael Kearney**

**Raphael Kudela**

**Carol Lee**

**Elena Litchman**

**Charles R. Lovell**

**Craig McClain**

**Amy Moran**

**Margie Mulholland**

**Stephen Palumbi**

**Uta Passow**

**Cathy Pfister**

**David Reznick**

**Kaustuv Roy**

**Tatiana Rynearson**

**Mak Saito**

**Eric Sanford**

**Paul Schmidt**

**Patricia Schulte**

**Deborah Steinberg**

**Philip Taylor (NSF)**

**John Wares**

# I. Barriers to collaboration and communication between fields

- Language (jargon)

- Cultural divides – training, and natural tendency to specialize

- Thinking and working at different spatial and temporal scales in different fields – shaped in part by scaling associated with organisms and systems

- Central* questions to each field are often different – people may have to work outside of central areas in their own fields to come up with transformational questions at interdisciplinary interface



## **II. Priorities and Recommendations**



3. Behavior, physiology, life history, and genetics can all mediate fitness responses to climate change.

**The relative contributions of these responses need to be considered and resolved.**

# III. Specific recommendations

**Targeted fellowships:** creating cross-disciplinary scientists who can link evolutionary biology with marine science

Timing: as soon as possible

Funding: NSF

**Targeted fellowships that would specifically support cross-disciplinary training between marine science and evolutionary biology.**

An example would be newly-graduated biological oceanographer who moved to the laboratory of a theoretical evolutionary biologist interested in marine-related issues, or the reverse. Many ECCO participants were enthusiastic about hosting cross-disciplinary postdocs , and a targeted call from NSF for these positions aimed at both BIO and OCE would be likely to reach recent PhD graduates in both fields.



# E.g.: Specific recommendations

(perhaps relevant to the OA community)

**Meeting:** *Experimental Evolution in the Changing Ocean.*

Timing: summer 2012

Leader: Sinead Collins

A working group to (1) compile and assess existing data on experimental evolution relevant to ocean change, (2) identify priorities for future experimental studies, and (3) enhance communication and collaboration among laboratories working in this area.

## IV. ECCO products and outcomes

- Workshop report (available online soon)
- Website <http://hofmannlab.msi.ucsb.edu/ecco/>
- Oral report to NSF personnel (December 2010)
- Input to upcoming meeting and workshop efforts (e.g, 2012 Oceans in a High CO<sub>2</sub> World)
- Interdisciplinary collaborations between participants (e.g., Uta Passow et al.)
- RCN proposal

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