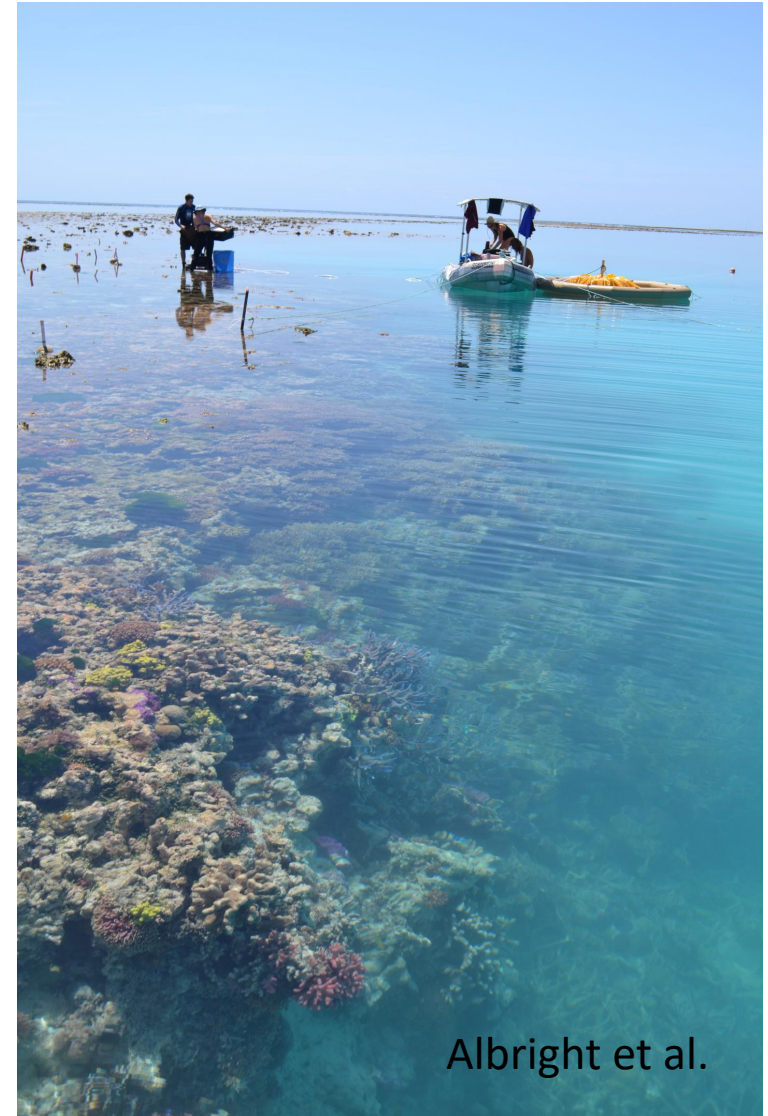
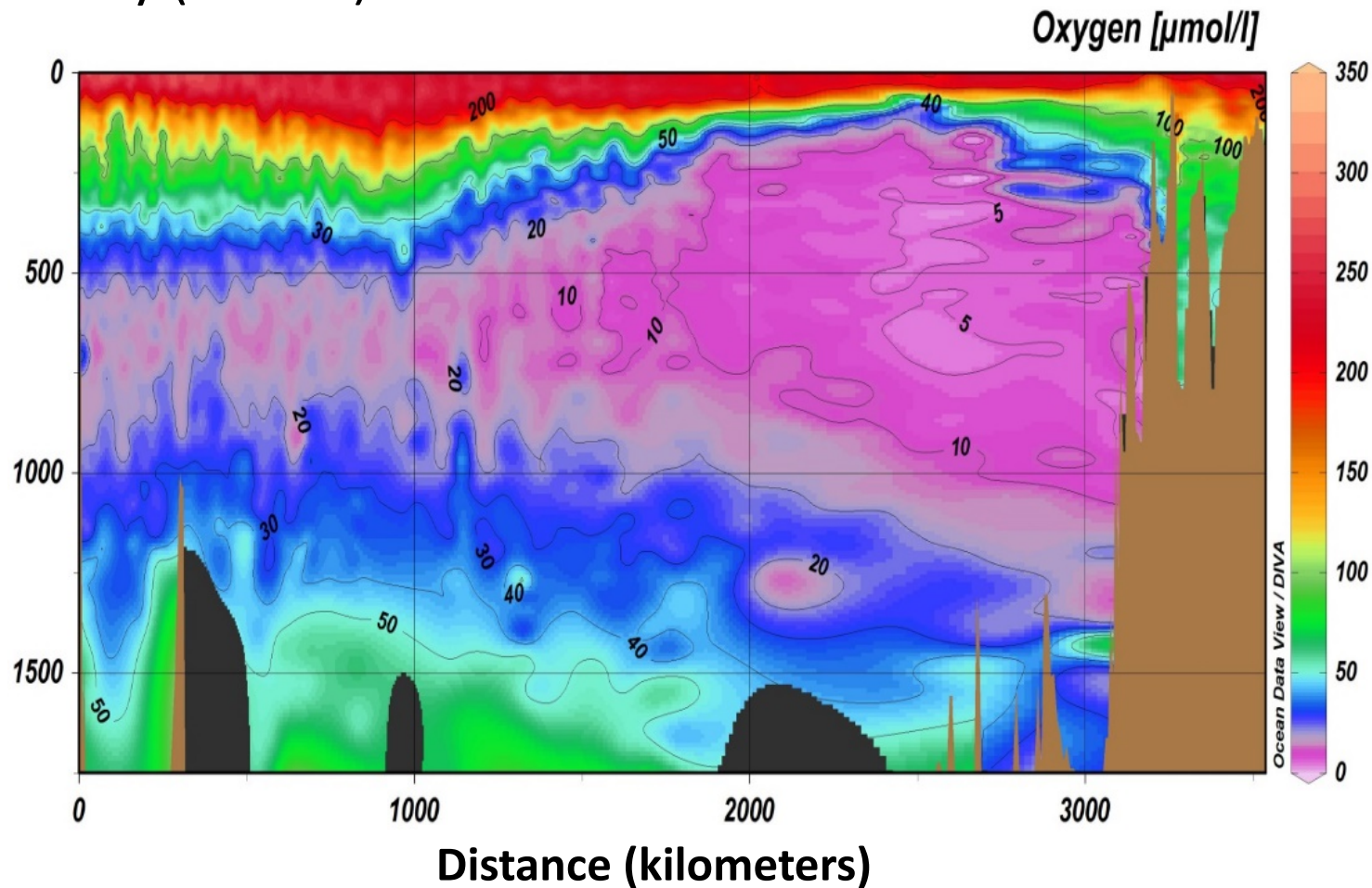


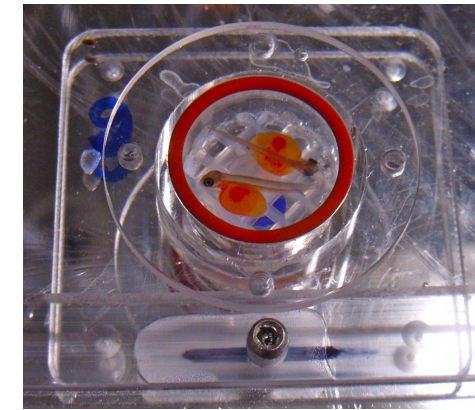
New developments in field and laboratory experimental approaches

Jim Barry (MBARI)

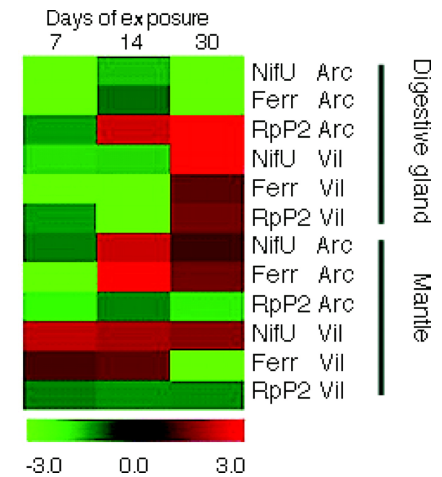


Recent Measurements and approaches

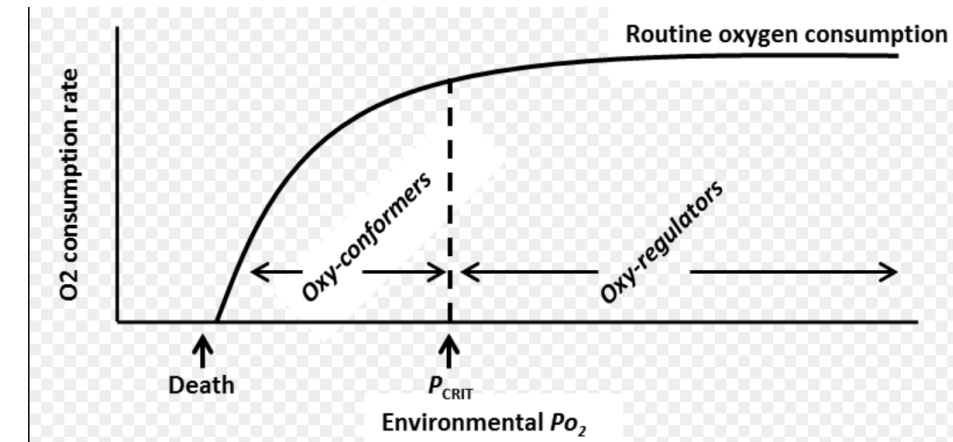
- Performance – survival, growth, metabolism
 - Energy allocation (Frieder et al – oyster larvae)
 - Predation rate, behavior, etc.
 - Effect of temporal and spatial variability on ...
 - Acclimation – Adaptation
 - Manzello (reef monitoring + genomics)
 - Hofmann (transgenerational effects in kelp beds)
- Omics
 - Genomics (Shore-Maggio et al. – corals in CO2 vent gradient)
 - Transcriptomics (Bowen et al – bivalve response)
 - Metabolomics (Trigg et al – crab larvae response to OAH)
 - Lipidomics (McElhany – crab zoea)
- Calcification
 - Ultrastructural response to OAH (Koho et al. – foraminifera)
- Community structure
 - Nguyen et al. – benthic nematodes
- Larval growth / survival
 - Brewster et al. – Menidia growth under variable CO2
 - Boch et al. - Abalone larval development under variable OAHT
- Metabolism
 - Community respiration / calcification
 - Metabolic rate
 - DMSP Catabolism (Posman et al. mesocosms)
 - Auditory neurobiology of fishes (dorsay et al.)
 - Net Community organic C production (NCP), NCC (calcification)
- Environmental exposure metrics – how can we define exposure (Chan et al.)



Ou et al. 2015
Salmon Resp.



Collin et al. 2010
omics



Field studies

Natural gradients

CO2 vents

Kurosawa – et al – algal photosynthesis

Shore – Maggio – coral calcification

Latitude / Spatial Variation

Gallo e tal. – GOC fishes – O₂, T

Ross et al. – coral calcification rates – west australia

Utrecht et al. – oyster calcification v omega

Manzello – bleaching – genomics

Courtney ...Andersson – modeling, calcification

Field experiments

FOCE studies

Ant-FOCE

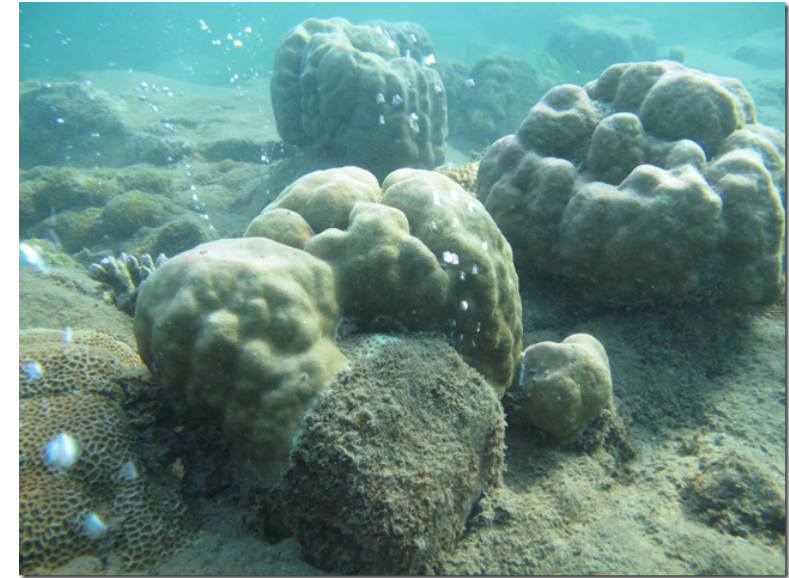
Med, Monterey

Lagoon CO₂ enrichments

Albright – coral community calcification (TA reduction)

Open Ocean Mesocosms (Kiel)

CO₂-vent



Ant-FOCE



Laboratory approaches

Mesocosms

Multifactor control of experimental conditions

MOATS (McElhany)

Upwelling simulator (Barry)

CO2 Control System (Drown et al.)

Carbonate Parameter control (DIC, TA); (Gimenez et al)

Thermal bloc, pCO2 control (Chambers et al)

Flumes – flow plus pH or T control

Coral Calcification vs. T (Australia; Schoepf)

Corals vs pCO2 (Doo et al.)

Jar incubations

Deep sea corals Calcification / feeding (Gomez ... Cordes)

Acclimation and adaptation

Epigenetic inheritance

Hofmann et al, Dam et al, Schwemmer et al.

Genetic inheritance

Hacker et al. Menidia

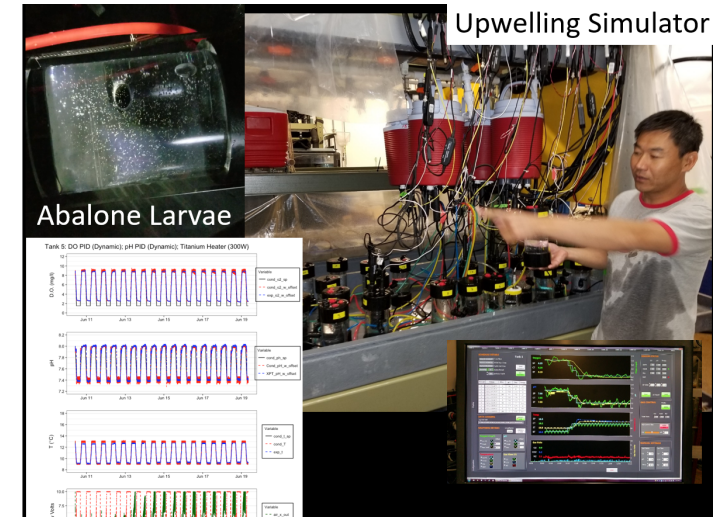
Modeling

Seagrass abundance – Zimmerman et al

Physiological scope (p-crit) of squid – Birk et al.



OAMS at OSU



Upwelling Simulator



Abalone Larvae

