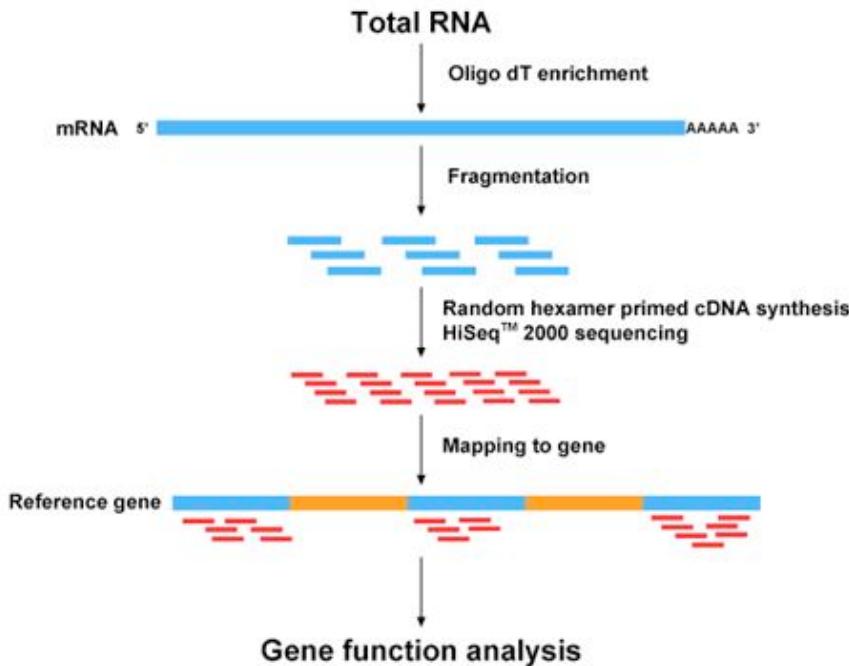


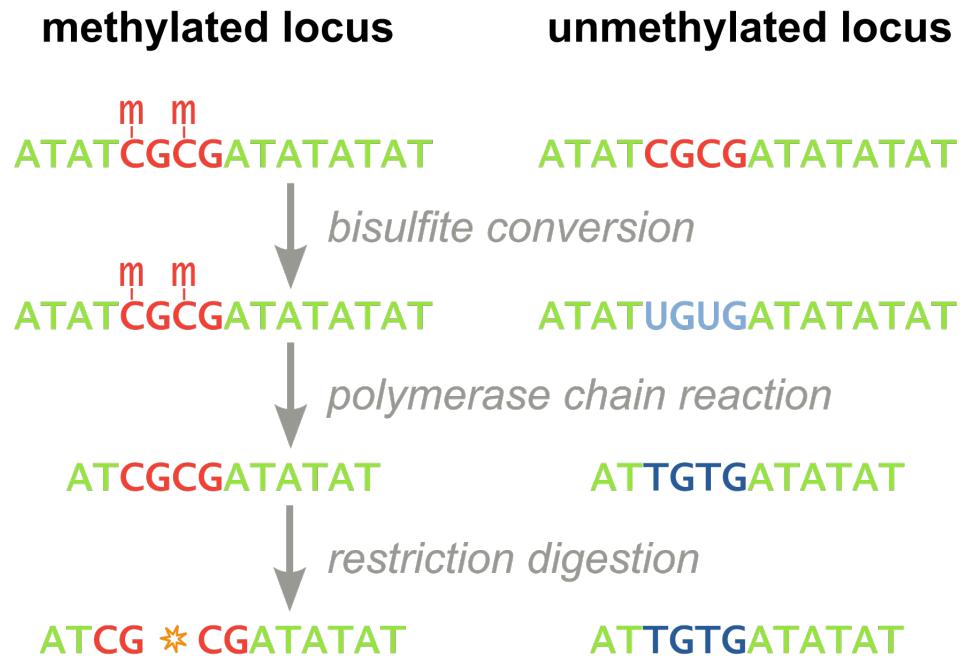
Gene Expression and Conservation.

(Asilomar, September 2016)

RNA-Seq



Bisulfide Sequencing



Short Summary

- 1. Zac Cheviron-** Taking advantage of environmental clines to understand physiological mechanisms of adaptation. Using natural and experimental population to understand a regulatory response.
- 2. Adam Freedman.** Problems and naiveté about transcriptome assembly and analysis
- 3. Steve Palumbi:** *Forensic genomics*, SNP calling
- 4. Jenny Tung:** Overview of statistical analysis of gene expression data. Be careful. Explore your data. Be aware of batch effects, confounders, focus on specific hypotheses
- 5. Nick Wisniewski:** WGCNA. Use excellent online tools, reduce the dimensionality of data.
- 6. Steve Cole.** Beware ontological categories, focus on functional hypothesis and what is actually known in previous controled experiments.
- 7. Christina Richards.** *DNA-methylation and conservation*. A variety of examples from plants, consider different techniques and questions.
- 8. Matteo Pellegrini.** Computational methods for heterogenous samples.

Conceptual Framework: What is the goal of conservation genetics??

To maximize the genetic potential of a population to respond to changing conditions and to minimize the expression of deleterious alleles.

Crandall et al., TREE, 2000

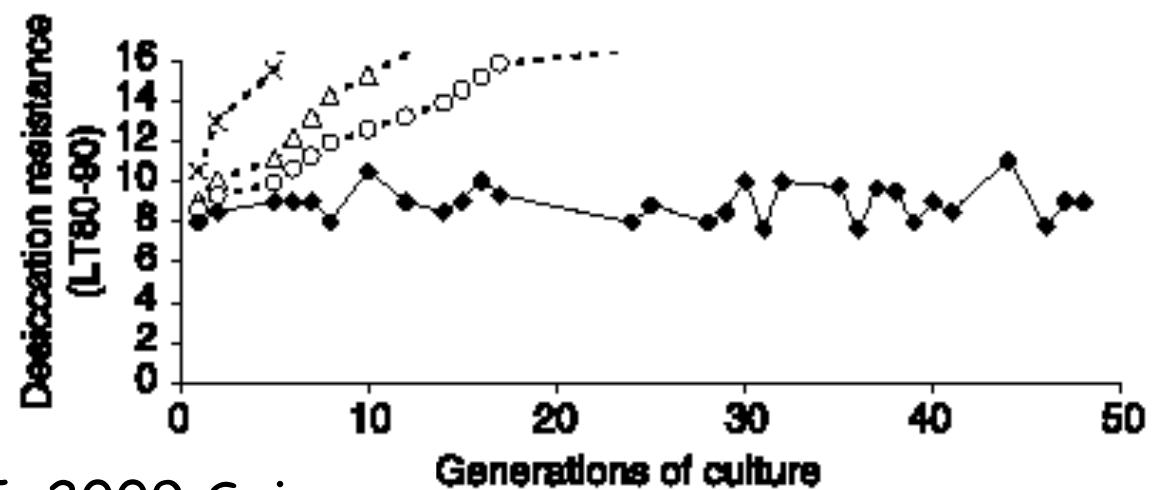
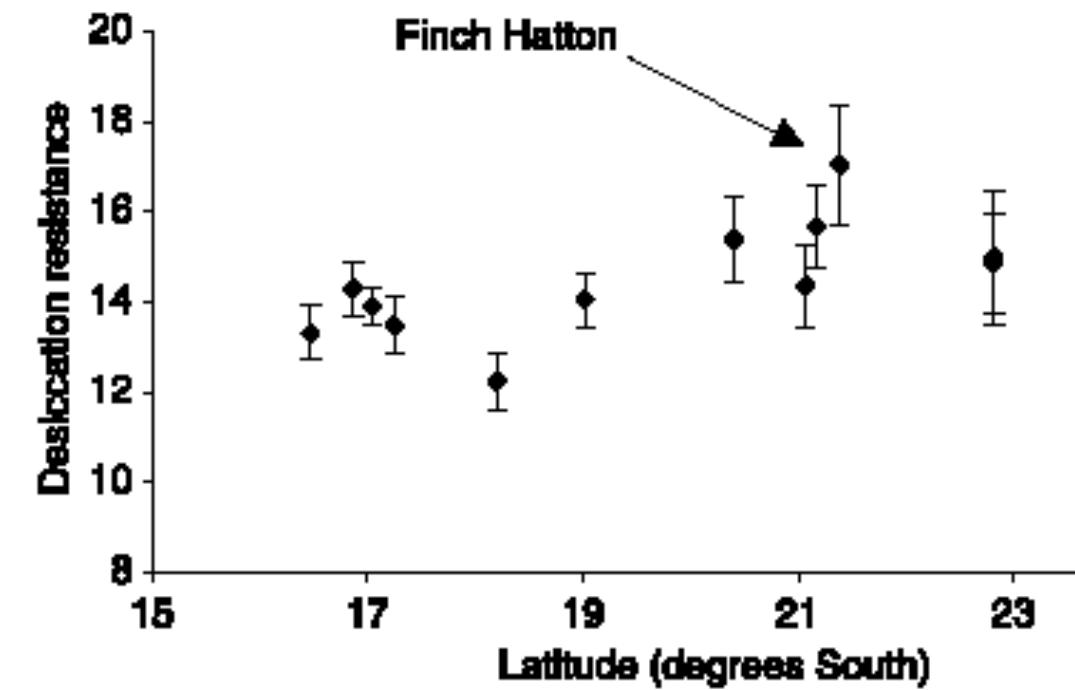
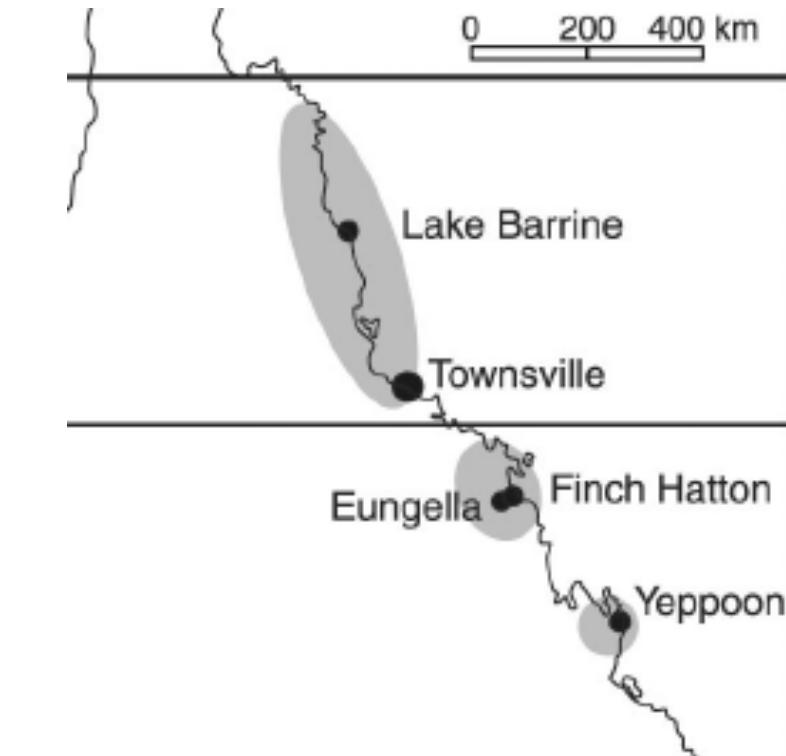
Kohn et al., TREE, 2006

Funk et al., 2012, TREE

McMahon et al., 2014 TREE

Kalalau Valley, Kauai, Hawaii

Direct assessment of adaptive potential



Hoffmann et al., 2003, 2005, 2009 Science

Forensic genomics:

Noah H. Rose, Francois O. Seneca, Stephen R. Palumbi (2016) Gene networks in the wild: identifying transcriptional modules that mediate coral resistance to experimental heat stress. **Genome Biology and Evolution**

Bay RA and SR Palumbi (2015) Rapid acclimation ability mediated by transcriptome changes in reef-building corals. *Genome Biology and Evolution* 7 (6): 1602-1612.

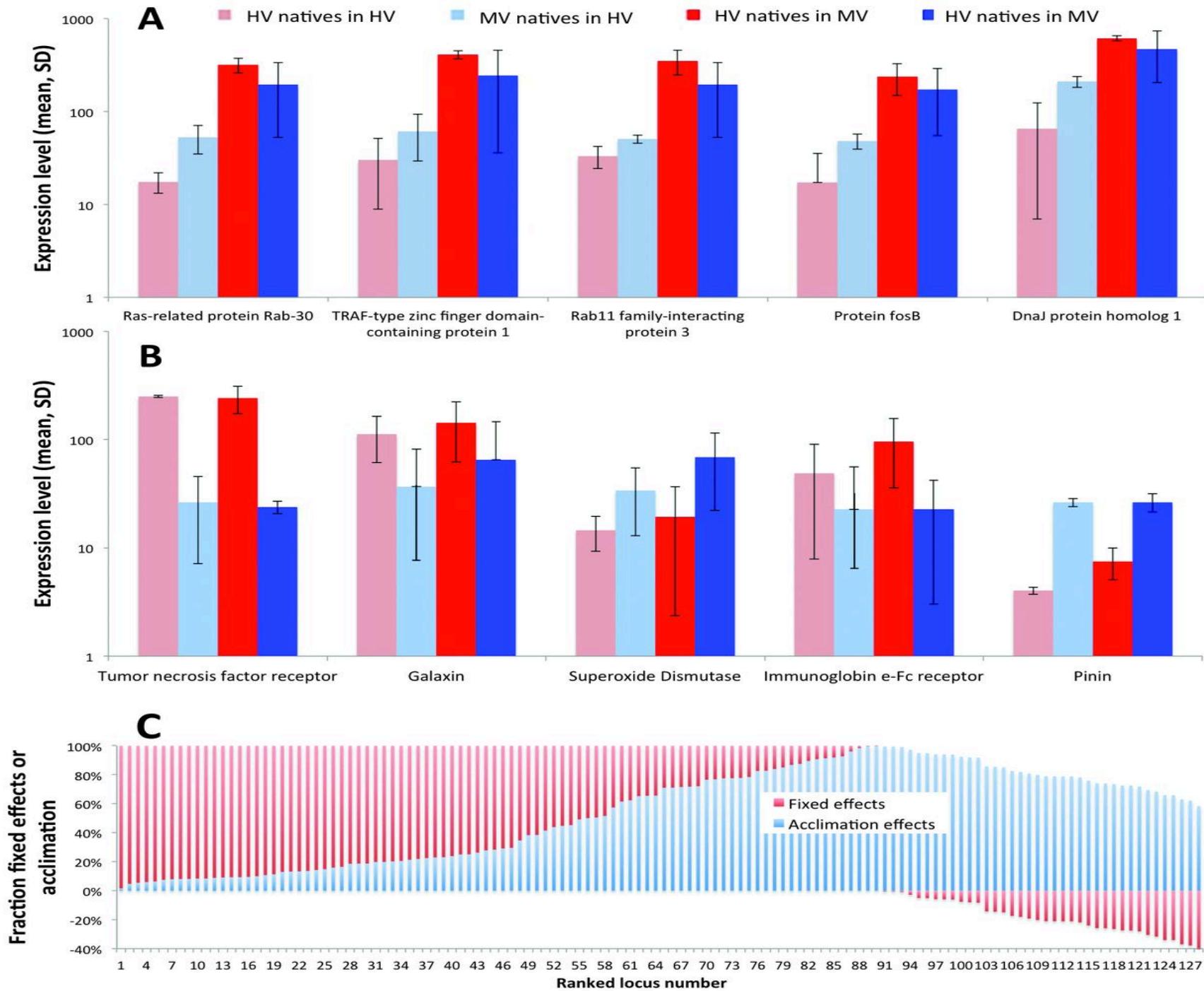
Palumbi, S.R., D.J. Barshis, N. Traylor-Knowles, and R.A. Bay. Mechanisms of reef coral resistance to future climate change. **Science**. doi: 10.1126/science.1251336

Seneca, F.O. and S.R. Palumbi. 2014. The role of transcriptome resilience in resistance of corals to bleaching. **Molecular Ecology**. doi: 10.1111/mec.13125

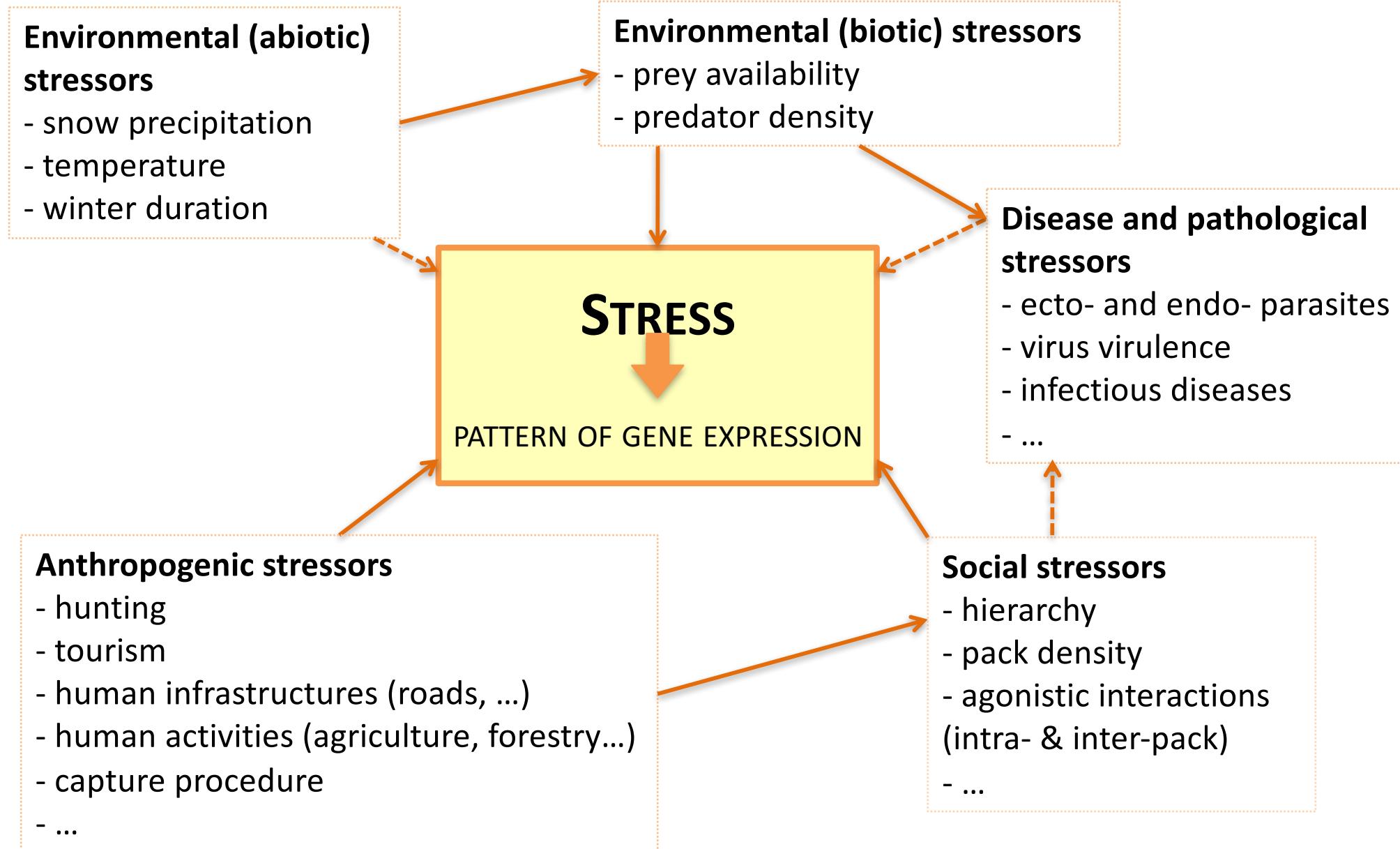
Barshis, D.J., J.T. Ladner, T.A. Oliver, and S.R. Palumbi. 2014. Lineage specific transcriptional profiles of *Symbiodinium* spp. unaltered by heat stress in a coral host. *Molecular Biology and Evolution*. doi: 10.1093/molbev/msu107

Barshis, D. J., J. T. Ladner, T. A. Oliver, F. O. Seneca, N. Traylor-Knowles, and S. R. Palumbi. 2013. Genomic basis for coral resilience to climate change. **Proceedings of the National Academy of Sciences of the United States of America** 110: 1387-92.

Forensic genomics



Stress factors



Questions:

1. What are the limits of epigenetic change?
 - a. How do these limits vary as a function of the stress and the genotype/environment (will epigenetics save us from the effects of climate change).
2. What traits show the greatest response (plasticity) and how best to have that response expressed?
3. How does organisms respond to discrete sudden environmental events (oil spills, pollution, noise, various discrete stressors).
4. Others?

UC Conservation Genomics Consortium

<https://ucconservationgenomics.eeb.ucla.edu/>



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The University of California Conservation Genomics Consortium will apply cutting edge molecular,
computational and analytical techniques to [natural systems](#).



Rachel Meyer



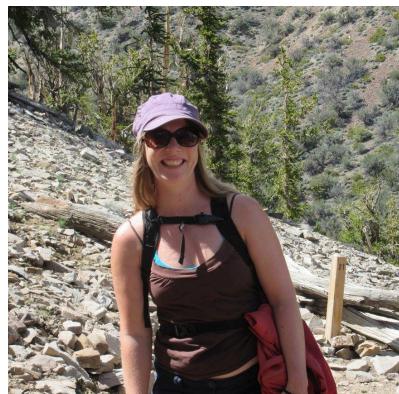
Audra Huffmeyer



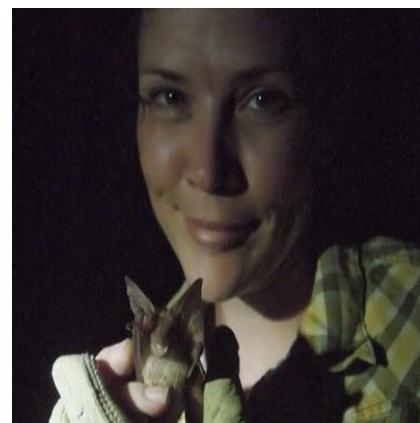
Emily Curd



Annabel Beichman



Alice Mouton



Devaughn Fraser



Tiffany Armenta



Gabriela Pinho



Jenny Tung



Amanda Lea

Friday, September 23:

7:30-9 am. Breakfast. Drop-off luggage and check out.

9-9:15 Survey

9-10 am. Closing statements by Bob Wayne. *Gene expression and conservation.*

10 am. Begin departure to Monterey Bay Aquarium. – facilitated Uber trips, pick up bagged lunches first.

11-11:45am. Early lunch at Monterey Bay Aquarium.
12 noon. Complementary behind the scenes tour.

3 pm. Goodbyes. Estimated return to Asilomar by 3:30 pm for those needing to pick up their luggage.