

Accelerated Protein Evolution in Microbial Systems
CNSI-UCSB, 1601 Elings Hall
April 16th – 18th, 2019
AGENDA

Tuesday 04/16

All day ➤ out of town attendee arrivals

7:00 pm ➤ DINNER, Outpost, Kimpton Goodland, Goleta

Wednesday 04/17

9:00 am ➤ Introduction, David Valentine, UCSB

9:15 – 10:30 am ➤ **SESSION I: *Diversity-Generating Retroelements ... part 1***

Jeff Miller – UC Los Angeles – “Diversity-generating retroelements in phage, microbes, and microbiomes”

Partho Ghosh – UC San Diego – “Mechanisms underlying selective infidelity”

10:30 am ➤ COFFEE BREAK

11:00 am – 12:00 pm ➤ **DISCUSSION I: *Detection of Rapid Genomic Variation***

12:00 pm ➤ LUNCH

1:30 pm – 2:30 pm ➤ **SESSION II: *Diversity-Generating Retroelements ... part 2***

Blair Paul – UC Santa Barbara – “Localized hypervariation generated by defined and undefined processes in microbial genomes”

Diego Arambula – Center for Disease Control and Prevention – “Regulation of Retroelement Guided Protein Diversification in *Legionella pneumophila*”

2:30 pm ➤ COFFEE BREAK

3:00 pm – 4:00 pm ➤ **DISCUSSION II: *Remaining Questions on DGR mechanism***

4:00 pm – 4:30 pm ➤ **LIGHTNING TALKS I**

7:00 pm ➤ DINNER, Bouchon, Downtown Santa Barbara

Thursday 04/18

9:00 – 10:30 am > **SESSION III: *Protein Evolution in Viruses & Cellular Symbioses***

Forest Rohwer – San Diego State University – “DGRs, BAM and the Origin of the Immune System”

Lizzy Wilbanks – UC Santa Barbara – “Everything isn't everywhere: strain-resolved metagenomics and the biogeography of wild bacterial symbiosis”

10:30 am > COFFEE BREAK

11:00 am – 12:00 pm > **DISCUSSION III: *Model Symbiont Systems and Experiments***

12:00 pm > LUNCH

1:30 pm – 2:30 pm > **SESSION IV: *Hypervariable Proteins and their Horizontal Exchange***

Michelle O’Malley – UC Santa Barbara – “Horizontal Gene Transfer in the Rumen Microbiome”

Chris Hayes – UC Santa Barbara – “Polymorphic toxin-immunity modules: divergence, convergence and horizontal gene transfer”

2:30 pm > COFFEE BREAK

3:00 pm – 4:00 pm > **DISCUSSION IV: *Observable Variation, but Unknown Mechanisms***

4:00 pm – 4:30 pm > **LIGHTNING TALKS II**

4:30 pm – 5:00 pm > Closing Remarks, David Valentine, UCSB

7:00 pm > DINNER, Due Lune, Santa Barbara waterfront

MEETING GOALS

- i) **Initiate a Review Article:** *develop a synthesis of phenomena that link patterns of genomic hypervariation to specific genetic mechanisms in Bacteria, Archaea, or viruses.*
- ii) **Build Teams to Coauthor Proposal(s):** *Identify promising model systems for the study of accelerated evolution and emergent symbiotic phenotype(s) that are tied to host interaction.*
- iii) **Future Research Prospect:** *What tools are needed to advance the field and what systems need to be developed? Outline current assays of variation in situ vs ex situ.*

Discuss new molecular and computational methods to detect hypervariation in environmental samples, under enrichment/isolation, and through experiment with wild type vs transgenic strains. Consider approaches to study phenotypes resulting from hypervariation.

- iv) **Future Research Prospect:** *What critical gaps exist in our understanding of genome hypervariation and accelerated protein evolution?*