

22nd of September 2016
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#LAMG16

Lake Arrowhead Microbial Genomics Conference

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My personal summary



Background

The last five days I spent with the greatest microbiome researchers at the UCLA conference center at Lake Arrowhead. The days were full with talks, poster presentations, meeting people, eating too much of the finest food and comforting my own little family. Below I am summarizing the memories that impressed me the most.

My favorite quote, copied from twitter:

Holly Bik @hollybik Sep 19

JMW:Current human microbiome methods are akin to bulldozing a hectare of coral reef & trying to detect clownfish/anemone association #LAMG16

(JMW = Jessica Mark Welch)

Summary:

Early this year - when I had just found out that I am going to get a fellowship to do research in the labs of Stephanie Carlson and Jonathan Eisen in California - I looked online for good conferences that I could attend. I found this 'Microbial Genomics' Meeting at Lake Arrowhead. I had not heard about it before but it looked interesting. Although I thought it was a bit expensive, I applied to go there. Only later I found out that Jonathan is one of the main organizers. And only this week I found out that it was the greatest conference that I had ever attended (or organized or presented at). Although my background is in population genetics, conservation biology, and the ecology and evolution of freshwater fishes; my heart beats for the little bugs that colonize vertebrates and make out 99% of us all!

The presentations I liked best:

I learned a lot. Besides descriptive stories of the bacterial composition and function in different environments, I also found out more about their change throughout time, how they grow and compete with each other. Their distribution can often be described by niche theory or population genetic calculations. These are principles that I am familiar with from my vertebrate biology background. I was fascinated by the research of Julia Oh and Elaine Hsao who study bacterial communities and their dynamics on humans, especially associated with acne or dermatitis.

<https://www.jax.org/research-and-faculty/faculty/julia-oh>

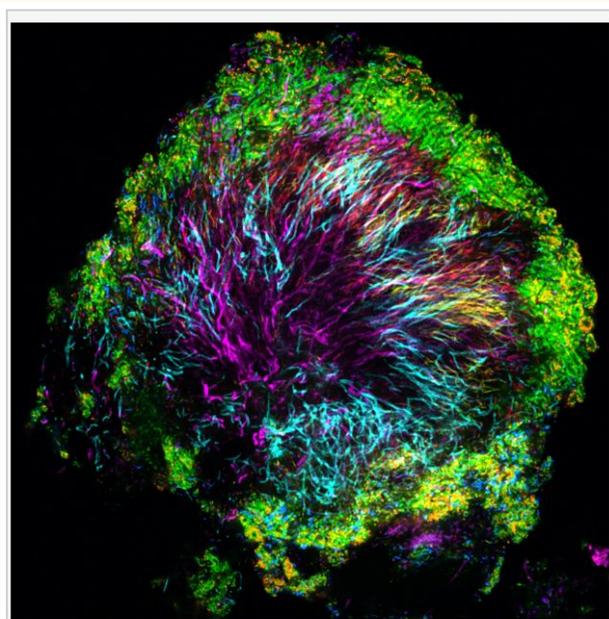
<http://poo.caltech.edu/>

Tami Liebermann rocked my boat when she elaborated on the population genetics of bacterial species in association with human diseases on single hosts that can be replicated across hosts. I thought nothing could top that talk.

http://almlab.mit.edu/tami_lieberman.html

However, I had not heard the talk of Jessica Mark Welch yet. Her lab uses the most amazing imaging techniques to show which bacteria go with each other and how they are assembled spatially. Most microbial genomicists are taking a most complete sample, homogenize it, mix everything up and then try to sequence everything in this cocktail. Jessica compared this to bulldozing a hectare of coral reef, mixing everything up and then trying to find or describe a clown fish - anemone association. Her lab works mostly with plaque of teeth. They sample a little piece of plaque and then use differently colored probes that bind to the different, known bacteria on this substrate. With microscopes they can figure out where these differently colored bacteria are. They slice the plaque up and infer the three-dimensional structure of plaque bacteria. Her pictures blew me away!

<http://www.mbl.edu/jbpc/staff/markwelch/>



The "hedgehog" consortium in dental plaque. Image credit: Jessica Mark Welch

During our little hike one afternoon I learned that they started working on this project 10 years ago!

I had been dreaming about probing candidate bacteria on my whitefish and trout eggs that I found in Swiss rivers and lakes in 2010. I will not give up on this idea... let's keep in touch.

The first night, after we arrived late and most people had already had dinner, I met Elizabeth Hénaff in the dark. By chance I found an amazing person just that evening, with Texan roots. We chatted for a long time and I actually missed most of the drama when my hotel roommate left me because my husband was waiting on the couch with my hungry boy that wanted to be nursed... Anyways, Elizabeth gave her talk on Wednesday. I was hanging on her lips. It felt like one of those super awesome National Geographic TV shows. She is working on sediment samples in a sludge in the middle of New York. This is called a superfund - a place that is heavily polluted by humans. Elizabeth works together with a biohacker lab (GEN SPACE) that does the wet lab analyses for her. Her and her group's research might hold the key for bioremediation. Check this cool stuff out on their website:

<http://www.bkbioreactor.com/>

Really, you MUST click on this link. It is just too great.

Their research also involves a lot of citizen science. Her graphs looked too nice. She said she used all the software from the Huttenhower lab (<https://huttenhower.sph.harvard.edu/>). I used it before but did not manage to end up with such nice figures. She admitted later that they hired some awesome graphics designer to pimp up their figures...

The last talk I would like to mention here was by Rachel Dutton. She uses cheese rinds as an experimental system. She is so excited about her system. Almost as excited as I am about my fish eggs. Cheeses, as well as fish eggs, provide a great number of replicates, are reproducible, easily accessible, manipulable, and we know when the system starts. I still think my eggs are unbeatable because they actually contain a real vertebrate host... Rachel's went on and showed us many of her awesome results how they created bacterial cheese communities *in vitro* and used it to study bacterial functions.

<http://www.theduttonlab.com/>

There were many more great people giving talks and presenting posters. Nevertheless, my post has to come to an end for today. As Jonathan said, this was a career-changing conference for me and I just spent a wonderful 5 days in the woods. Check out this website if you want to read more about the other talks:

<http://microbe.net/category/meetings-and-conference-reports/>

My experiences as a mother scientist:

I was a bit disappointed that I was the only scientist bringing her (or his) family to this beautiful place at the lake. One of the organizers, Ashlee Earl, brought her unborn. However I am not sure if this counts. Perhaps it does. I am still nursing and my four year old wants me to bring her to bed every night. Not long ago I brought my family far away from home to a new country. I feel responsible for their lives and well-being. They are supporting me and I am supporting them. I wish more parents would bring their partners and children to conferences to make it an even more complete experience.