
C O M P A R I S O N S

ZINE

CARL R. WOESE INSTITUTE FOR GENOMIC BIOLOGY
UNIVERSITY OF ILLINOIS URBANA CHAMPAIGN

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This zine is a window into the creative minds that are at work at the Carl R. Woese Institute for Genomic Biology. As an interdisciplinary science institute, we approach science with a wide angle lens, utilizing scientific processes from chemistry to anthropology to answer questions about, DNA the building blocks of our universe. As part of our scientific mission we take on the responsibility of communicating our work with the same vigour that we approach bench science. This zine is a part of our Art of Science initiative; we asked scientists and IGB community members to submit written and pictorial work that deals with the broad theme of comparisons. The submissions included look at science communication and artistic expressions of comparison from a variety of perspectives. We hope you enjoy!

IF YOU HAVE QUESTIONS OR YOU WOULD LIKE TO SUBMIT WORK IN THE FUTURE PLEASE CONTACT:
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The Board Game; A Comparison of Science Outreach: Scientists and Pre-School Kids

"What's your favorite microbe?"

The kids stared at me blankly.

"OK, does anyone know what a microbe is?"

One girl squished her thumb and index finger together to suggest something very, very small.

"Bingo!" I said, snatching onto this fragment as I tried to engage my pre-school audience with the workings of genomics and health.

This was back in April when I had the privilege of volunteering at IGB's largest science outreach event, the World of Genomics, held this year at the National Academy of Sciences (NAS) in Washington, D.C. Families from all over the city came, bringing with them an obvious interest in science and a desire to learn something new. It was insanely fun but exhausting, as I had to stretch my communications skills and imagination in ways that only the energy, curiosity, and questions of young children can demand.

My friends and I on the IGB team knew that we might have a challenge at World of Genomics, but we also felt well-equipped.

We wanted to use the event to introduce children and their parents to the importance of mobile DNA—bits of DNA that can be picked up from the environment or from another organism to encode a novel function in the bearer. Unlike DNA that is inherited, passed down from one generation to the next, mobile DNA can be acquired even within the same generation. Next generation sequencing has shown that mobile DNA elements are

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Featured
theme:

INFECTION
GENOMICS
FOR ONE
HEALTH
(IGOH)

widespread, found in organisms from every domain of life. But they are especially common in microbes. We are only now beginning to grasp how profoundly mobile DNA impacts microbial functions including antibiotic resistance and infectious disease, as well as a microbe's evolution. The integration of mobile DNA into evolutionary theory is, in fact, one of the key concepts that underpins our work in the Infection Genomics for One Health (IGOH) research theme at the IGB, and



Image: World of Genomics (WOG), at the National Academy of Sciences (NAS) in Washington, D.C.

though the subject is technical and specific, we wanted to share our enthusiasm for the field and to help build awareness of its importance to humanity.

But how would you do this with young kids who have no background in genomics or biology and probably just want to play?

Perhaps playing into our gaming culture combined with the explosion in superhero movies (The Avengers: Endgame had just hit the theaters), we decided to try designing a game of our own that featured microbes that had their own superpowers or kryptonite and could gain

or lose such through mobile DNA.

Most of my past experience with SciComm has involved explaining my science to other researchers and those familiar with my study system, and I did not know much about designing card games for children. But I had tremendous help from the IGB Science Outreach Team headed by Dr. Courtney Fenlon as well as IGOH's theme leader Dr. Rachel Whitaker and many of the theme members, especially my own supervisor Dr. Katy Heath.

Here is how I tackled the project:

1. Asked myself, *"What do I want the public to take away from this game?"*
2. Tried to think of simple ways to illustrate the core supporting concepts.
3. Asked other theme members to help identify superpowers and kryptonite of their favorite microbe and/or mobile DNA.
4. Got IGB's graphic designer Jillian Nickell to bring the microbes to life.
5. Arranged lab brainstorming parties to sketch out stories that would fit the game.
6. Attended SciComm workshops to listen and learn with the game in mind.

The result was a visual and fun activity that required a bit of strategy and really worked. Kids and parents seemed to love it as our booth at World of Genomics was always busy, often with lineups, and many families returned to play the game again and again.

But in meeting them and demonstrating the game, I realized that the key part of the design process is one that envelopes all the steps. That's to think all the time about why you love a field of study and why you want to share it.

I think that it's not so important in science outreach to

get facts to stick or teach a lesson. What seems more impactful and potentially enduring is making human connections, letting people see how much you enjoy your field and how someone can have fun studying, as in my case, microbes. If you can share the excitement and inspire curiosity, it works a bit like mobile DNA encoding new ideas within kids and parents, motivating them to ask their own questions, to learn from their own base of knowledge, and to observe the world around them in a new light.

So after my first awkward encounters, I dropped the

“What’s your favorite microbe?”

*“I love the one that **helps corals grow**”*

*“I like the one that **helps you break down food**”*

*“I like the one that **makes mice attracted to cats**”*

“What’s your favorite microbe?” introduction and instead just launched into playing the game. I found it easier to pose the question at the end, by which time almost everyone had an answer to *“What’s your favorite microbe?”* Many chose the microbe that won the game, but others said things like *“I love the one that helps corals grow”* (*Symbiodinium* spp.), *“I like the one that helps you break down food”* (*Bacteroides* spp.), and *“I like the one that makes mice attracted to cats”* (*Toxoplasma gondii*).



Symbiodinium spp.



Bacteroides spp.



Toxoplasma gondii

Inevitably, some kids asked me the same question, giving me another chance to share my interest and enthusiasm.

WHERE SCIENCE MEETS SOCIETY



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