A day in the life of a honeybee scientist

featuring Abigail Chapman
About the subject

Abigail Chapman is a 3rd year PhD student at the University of British Columbia in the Department of Biochemistry and Molecular Biology and the Centre for Blood Research (CBR), under the supervision of Dr. Leonard Foster.

Within the lab, she’s researching how viral infections affect the reproductive ability of honeybee queens. When Abbi is not working with bees, she can usually be found outside — skiing, hiking, biking, or backpacking.

Morning commute to work

I meet Abbi on her Friday commute to work. She’s an avid biker, and like most graduate students, prefers living close to campus to make for flexible work hours. Abbi’s ride takes only ten minutes and is easier when the sun is out like it was today.

Abbi’s lab is a part of the Michael Smith Laboratories, a hub for interdisciplinary biotechnology research. Her bike gets locked up outside the building where it waits for the ride back home.
**The Foster Lab**

The first stop of the day is at her desk in the lab. Here, Abbi analyzes some new data she’s just received —looking for any differences in the proteins expressed in the ovaries of queen bees infected with a virus. Abbi’s bench is adorned in bee-themed items which makes for a very fun spot to join Zoom meetings. This morning, her lab is getting together to give updates on their research projects. The Foster lab is made up of seven Masters and PhD students, two post-doctoral fellows, seven undergraduate students, one high schooler, and several staff members. They are known for work with proteomics (the study of proteins) and host-pathogen interactions.

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**A change of scenery**

After her meeting, Abbi takes us to the Irving K. Barber Learning Centre. We walk through the heart of campus and past several beautiful, original buildings.

Abbi settles down in one of the quiet rooms in the IK Barber with her laptop and notebook. Today she’s planning her summer experiments. Her laptop is open to Google scholar to browse a breadth of peer-reviewed literature and her notebook is scribbled with ideas. She tells me that one of the best things about being a honeybee researcher is that the summertime is always devoted to field work, which is very rare for a biochemist.

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**Rooftop research**

After a short commute back to the lab and a quick outfit change, Abbi and I are on the roof of the Networks Centre for Excellence building at UBC. The Foster lab honeybee team regularly keeps research hives up there along with extra beekeeping equipment. It is conveniently located close to the lab and the 4 hives currently there are thriving.
After double-upping on her purple latex gloves, Abbi opens a colony using her hive tool. In the images above, you can see that all the honeybees are more or less clustered. They do this in the cold winter months to thermoregulate the temperature of the hive. The clear plastic vials are full with honeybees Abbi has sampled by using the vial to tip them off their balance and into the cup. Today, she is sampling from the upper lid because she is looking for any type of honeybee except for the queen, who is almost certainly not going to be on the lid. It was cold today so the bees were extra cranky!

Guard bees will often follow a beekeeper after they’re done working with a hive, using smell to detect and follow intruders. In this image, Abbi had to walk to the other end of the roof before they went away.

Just as we were about to leave the roof, something pretty cute happened. A bee that hadn’t made its way back to the hive yet ended up in Abbi’s palm. After a few photos for the memories, Abbi gently helped the little honeybee back to its hive.

[Abbi] tells me that one of the best things about being a honeybee researcher is that the summertime is always devoted to field work, which is very rare for a biochemist.
Back in the lab, Abbi swaps out one white outfit for another and purple gloves to blue gloves before sitting down at her bench.

She first anesthetizes a honeybee with CO$_2$ and places them in a dish on ice. Abbi is pinching the thorax of the honeybee to hold it in place while a capillary tube breaks into the abdomen to collect hemolymph. Hemolymph is the “blood” of most invertebrates who have open circulatory systems. This is the optimization step and beginning of a new experiment Abbi is doing with her lab mate, Dr. Alison McAfee. They are going to compare the immune responses of worker bees to queens.

Very quickly, Abbi’s work station turns into a classroom. It’s 3:30pm in the afternoon now and Judy Li, a grade 12 student who has been with the Foster lab for a couple years, comes in to assist Abbi with collecting hemolymph. Next week, they will prepare the samples to go on the mass spectrometer, a device that measures different proteins. They’ll do the same with samples collected last summer, where they injected worker bees and queen bees with a virus. They’re hoping to see if there’s a difference in the immune proteins the queen produces after being infected compared to the workers. Once they’ve finished collecting hemolymph from all the bees Abbi sampled from the rooftop colony, they call it a day. After I say goodbye to Abbi, she ends her day with a ride home on her bike.