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Biology Major Awarded Prestigious Research Fellowship



Brooke Koebele '19

May 15, 2017

BLOOMINGTON, Ill.— Brooke Koebele '19 has been awarded a prestigious American Society for Microbiology (ASM) Undergraduate Research Fellowship to determine variations between related members of bacteriophages, or viruses that infect and replicate within bacteria.

A native of Wheeler, Ill., Koebele's award includes a \$4,000 stipend for 10 weeks of full-time employment in research and \$2,000 for travel to attend and present her research at the ASM Microbe Meeting next summer in Atlanta. Richard Alvey, visiting assistant professor of biology at Illinois Wesleyan, will mentor and advise Koebele's work.

A [biology](#) major, Koebele's project is entitled "Determination of Host Range Variation between Highly Related Members of a Novel Cluster of *Rhodobacter capsulatus* Bacteriophages." The enormous number and diversity of bacteriophages (or "phages") means they play an important role in nearly every ecosystem, yet scientists don't know much about they evolved or how different phage populations are related to each other. Illinois Wesleyan students isolate bacteriophages from local soil, extract DNA from the phages, then sequence and analyze the phage genomes within their biology undergraduate programs as part of SEA-PHAGES (Science Education Alliance-Phage Hunters Advancing Genomics and Evolutionary Science), which is jointly administered by the University of Pittsburgh and the Howard Hughes Medical Institute's Science Education division.

Koebele said her study involves two different phages previously discovered by IWU students – "Oceanus" and "Dormio."

"These two viruses are almost identical in their DNA sequence, but Dormio has 14 genes that Oceanus does not have," Koebele explained. "Dormio is able to infect a different host, or different type of bacteria, that Oceanus cannot. We believe that one or more of the 14 genes present in Dormio's genome is the reason for this difference." This summer Koebele will utilize several different biological techniques, such as in-host homologous recombination, polymerase chain reaction, and cloning, to determine which of Dormio's 14 genes is the reason for the variation in host range.

At Illinois Wesleyan Koebele is a teaching assistant for the SEA-PHAGES lab and for microbiology courses, a general chemistry tutor, and a lifeguard at the Shirk Center. She is a member of Titan Catholic spiritual student organization and the intramural volleyball team.

The ASM Undergraduate Research Fellowship is aimed at highly competitive students who wish to pursue graduate careers in microbiology. After graduation from Illinois Wesleyan, Koebele plans a career as a physician. She is on the M.D./Ph.D. track in hopes of broadening her understanding of the microbial disease process, host-pathogen interactions, and the mechanisms of immunity. "An ideal career path is one where I can help others through controlling infectious disease," she said. "This fellowship will give me the platform I need to begin my research career."