Soft Living Active and Adaptive Matter

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Internal structure of honey bee swarms for mechanical stability and division of labor

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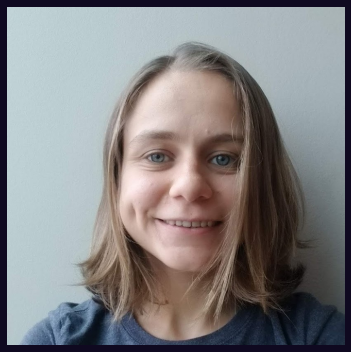
Abstract:

The western honey bee (*Apis mellifera*) is a domesticated pollinator famous for living in highly social colonies. In the spring, thousands of worker bees and a queen fly from their hive in search of a new home. They self-assemble into a swarm that hangs from a tree branch for several days. We reconstruct the non-isotropic arrangement of worker bees inside swarms made up of 3000 - 8000 bees using x-ray computed tomography. Some bees are stationary and hang from the attachment board or link their bodies into hanging chains to support the swarm structure. The remaining bees use the chains as pathways to walk around the swarm, potentially to feed the queen or communicate with one another. The top layers of bees bear more weight per bee than the remainder of the swarm, suggesting that bees are optimizing for additional factors besides weight distribution. Despite not having a clear leader, honey bees are able to organize into a swarm that protects the queen and remains stable until scout bees locate a new hive.

Date:
7/19/2021

Time:
9:00 AM-10:15 AM (PT)

About the speaker:



Dr. Olga Shishkov is an interdisciplinary engineer and scientist focusing on experimental investigations of collective behavior of insects. Currently she is a postdoctoral fellow at the University of Colorado Boulder.

She received her PhD in mechanical engineering at Georgia Tech, where she investigated black soldier fly larvae as an active material, and her undergraduate and master's in mechanical engineering at Cooper Union. She is active in the soft matter community as managing editor and writer at Softbites.org and student representative of the American Physical Society's Division of Soft Matter.

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