

SICB 2025 in Review: *Bumblebee Gobies, Rubber Mallets, and Resilience*

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Overview of the Society and Its Mission

This year, the Society of Integrative and Comparative Biology conference was held in Atlanta, Georgia, from January 3rd to January 7th. According to Quinn (1979), the Society of Integrative and Comparative Biology began as the American Society of Zoologists in 1902. The change occurred as the organization expanded, increasingly taking on other aspects of biology. This integrative approach is a massive part of the beginnings of society as well. It was started with the merger of the Central Naturalists and the American Morphological Society and aims to include as many specialties within the field of Biology as possible. The Society of Integrative and Comparative Biology (SICB) aims to make organismal biology accessible to all and to further research in the field. One way it aims to do so is through its fully open-access journal, the *Journal of Integrative Organismal Biology*. In terms of inclusivity, SICB has devised an innovative plan to increase the number of underrepresented group members within the society (Wilga, Nishiguchi, & Tsukimura, 2017).

The Society of Integrative and Comparative Biology is not only interested in increasing the number of underrepresented group members but also in creating a space for them in a fun, welcoming way. Looking just at the conference held in Atlanta, Georgia, this January, the workshops ranged from an eDNA workshop to sessions on how to disrupt division and create spaces for specific underrepresented groups.

Poster Presentation: Bumblebee Gobies and Prey Detection

In addition to the workshops, the conference featured many interesting speakers and poster presentations. In a personal interview, Dr. Schwalbe (Schwalbe, M. Personal communication, August 28, 2025) described the talk and two posters presented by her lab at the 2025 SICB conference. The first poster, Bumblebee gobies using vision and their reduced lateral line canal system to find prey, was solo presented by Shrija Chhetri '24. Chhetri had graduated the semester before, having done her senior thesis on this project. The poster examined Bumblebee gobies' lateral line systems and their importance in prey detection (Chhetri, 2025). The lateral line system is a sensory system found in fish and some amphibians. Specifically, it is the hair cells within neuromasts that help mediate the fish's responses and detect disturbances.

The lateral line system is specifically helpful in prey detection and predator avoidance. The lab examined how prey-detection ability differed between light and dark conditions in Bumblebee gobies with their lateral systems intact versus those with a gentamicin-ablated lateral line system. To do so, the researchers used fluorescent microscopy to visualize the lateral line system and confirm that it had been successfully disabled. Then they recorded the feeding behavior of adult bumblebee gobies on live brine shrimp. The Schwalbe Lab found interesting results when examining the gobies' behavior more closely. For example, they had found that in the light, the gobies typically attacked the front of the shrimp's heads, but in the dark, they typically attacked the body of the brine shrimp. However, it is essential to note that there was variation in reaction distance and angle between individuals. Interestingly, the gobies with intact lateral line systems had similar striking distances in the light and the dark. However, in those with their lateral line systems disabled, the gobies had a greater striking distance in the light than in the dark. The Schwalbe Lab also found that the prey could detect two times its body length. As the primary finding, they found that feeding by the gobies was significantly reduced in fish with lateral line ablations, especially in the dark.

Poster Presentation: Silver Hatchetfish and Jumping Performance

The second poster, presented by Jeremy Levin and Hriday Kapoor (2025), was titled The Role of Vision and the Lateral Line System in the Jumping Behavior of Silver Hatchetfish. The poster looked again at the lateral line system, but in relation to Silver Hatchetfish. Similar to the Bumblebee goby poster, they sought to turn off the lateral line system in some of the fish and used fluorescent microscopy to confirm that it was successfully disabled. After turning off the lateral line systems in the fish, they conducted behavioral tests in light and dark conditions with both intact and impaired fish. The two studies differed in the behaviors they focused on. The Bumblebee gobies study focused on feeding behavior, while the Hatchetfish study looked at startle responses. To do so, Levin and Kapoor would use a rubber mallet to hit the tank counter, placing the fish precisely at a 1 cm height each time. The figure below shows the tank setup.

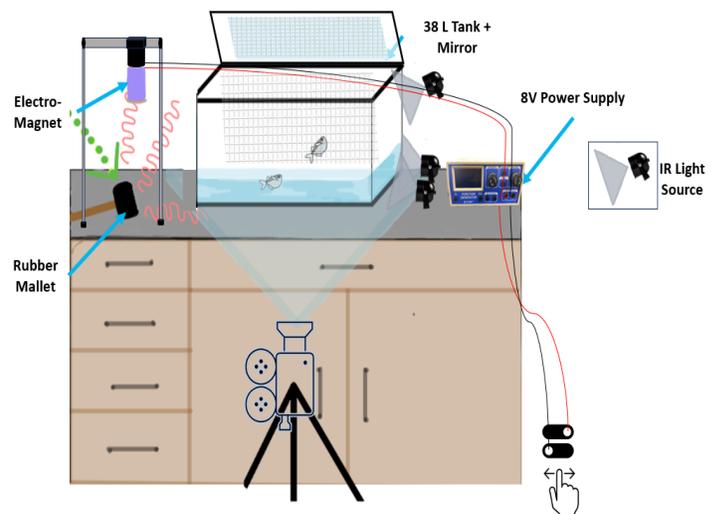


Figure 1. As shown in the image above, the following apparatus shows how the jumping performance of the silver hatchetfish is measured,

They observed the height of the jump, the number of jumps, the duration of jumps, as well as the number of c-starts performed by the fish. C-starts are a type of rapid escape response in which fish curve their bodies into a C shape to thrust forward and escape potential threats more quickly (Schwalbe, M. Personal communication, August 28, 2025). As for the results of this study, they found that the Hatchetfish that had their lateral line disabled made smaller jumps and performed them for a shorter amount of time in both the light and dark conditions. However, the Hatchetfish with disabled lateral lines performed more c-starts, and there were no significant differences in the number of jumps performed by the fish between the four conditions. The poster took first place at the conference for best student poster by an Undergraduate in the division of Neurobiology, Neuroethology, and Sensory Biology (Schwalbe, M. Personal communication, August 28, 2025).

Talk Presentation: Bluegill Sunfish and Flow Navigation

The talk presented by Dr. Schwalbe was titled Bluegills are stable in horizontal cross-flow vortices without their visual or lateral line systems (Schwalbe, M. Personal communication, August 28, 2025). In the interview with Dr. Schwalbe, she explained that the talk covered a study conducted in the lab examining how well Bluegill Sunfish navigate unexpected flow patterns when their vision and lateral line systems are disrupted (Schwalbe, M. Personal communication, August 28, 2025). To test this, the lab placed the fish in tanks with low and high flow speed tanks. As in the previous studies, they used light and dark to account for vision and intact and disabled lateral line systems. They continued using high-speed cameras to capture the movement of the fish across various conditions. They had found that the fish can recover from cross-flow vortices relatively well across conditions.

Implications, Technological Potential, and Future Research

The research presented and ongoing in the Schwalbe lab demonstrates the resilience of fish, as seen in their [study](#) with Bluegills. It also shows the systems at play that allow these fish to develop their skills in prey and predator detection, and how they enable the fish to operate at optimal levels. This research into lateral line systems can also aid the development of new technology. Namely, one being the ability of the fish to regenerate their lateral line system over the course of days after being disabled. The lateral line system, as stated above, consists of hair cells, which we also possess and use for hearing; however, our hair cells cannot regenerate. More research into this capability of the fish and their lateral line systems could yield many important findings. Moreover, the research being done by the Schwalbe Lab is focused on many different types of fish and lateral line systems, allowing the lab to understand the capabilities of the system not only in one model organism but across species.

The lab is expected to have a publication or two with SICB coming out in the following year (Schwalbe, M. Personal communication, August 28, 2025). Overall, the 2025 SICB conference was a highly productive and exciting endeavor for the lab. And as a perfect ending to another conference, the lab had gone out to the Georgia Aquarium to celebrate (Schwalbe, M. Personal communication, August 28, 2025).

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