poorly known examples of adhesive systems that play a role in arachnid predation. Harvestmen (Opiliones) use small amounts of a viscoelastic secretion to capture springtails. Remarkably, this natural 'pressure sensitive adhesive' may generate a high contact area on the nano-patterned omniphobic cuticular surface of the collembolan. This is achieved by the unique and complex microstructure of the setae that deliver the secretion. The shear-thickening behaviour of the glue effectively permits the generation of a high tensile strength to withstand the strong impacts elicited by the struggling prey. Ground spiders (Gnaphosidae) subdue hazardous prey, such as ants and other spiders, by applying sticky silk coming from modified so-called piriform glands. This silk exhibits a high toughness and is discharged from special enlarged spigots that are actived by elevated hemolymph pressure. Daddy-longleg spiders (Pholcidae) may even produce two different types of piriform gland adhesives, one of which is a rapidly drying secretion used in wrap attacks and defense, and another one being a permanently tacky secretion used to build silken web traps. This is achieved by the addition of organic salts that bind water and to keep the proteinaceous secretion hydrated. These observations are not only important for our understanding of the evolution of functional biomaterials, but may also be promising candidates for biomimetic approaches towards the design of novel sustainable high-performance adhesives.

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Field observations provide biological context for interpreting laboratory data: The locomotory performance of Bluegill Sunfish (Lepomis macrochirus) as an example

Field observations of animal behavior are essential for guiding the interpretations of laboratory data in order to ensure that they coincide with biological reality. Knowing how an organism behaves in its natural environment is a necessary first step in bridging the gap between experimental data collected in the controlled, artificial environment of the lab and explaining the adaptive significance of measured traits. Field observations also challenge assumptions about behavioral definitions and the apparent discreteness of behaviors measured in the lab. As part of an

ongoing study in the locomotor performance of Bluegill Sunfish (*Lepomis macrochirus*), we illustrate the role field observations play in contextualizing and expanding interpretations of experimental data and standard assumptions about Bluegill behavior. A comprehensive field study of Lake Waban (Wellesley, MA) and its inhabitants was carried out using underwater cameras, fish finding sonar, and temperature/luminosity loggers to develop a behavioral profile of Bluegill relative to their habitat and interspecific interactions. Although previous experimental work assumed Bluegill adopted locomotor strategies that maximized energy efficiency, field observations demonstrate that swimming performance is driven by a myriad of abiotic and biotic factors. These factors include the need to navigate complex habitats, to flee from predators, to adopt context-specific foraging strategies, to ward off rivals, and to coordinate social interactions. These observations add an extra dimension for understanding why Bluegill adopt particular swimming behaviors and how those behaviors might be adaptively significant at each stage of their life history.

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Four years of community-engaged learning in a summer undergraduate research program: successes and lessons learned

As the pace of technology and globalization increases, there is increasing concern about the scientific literacy of Americans. A scientifically literate public is necessary for developing a workforce that can understand and solve numerous problems facing the world and for improving the welfare of self and others. Poor science literacy is exacerbated by the general failure of scientists to effectively engage with the public. However, scientists rarely have an opportunity to develop and practice the skills and disposition for meaningful public engagement. To address this training gap, we have incorporated community engagement into our 10 week summer undergraduate research program. Our "scientists-in-training" devoted 1-2 hrs per week to translate their research programs into science activities that they shared with youth attending a day camp in a Pittsburgh neighborhood. Attitudes towards community-engagement were assessed using a retrospective post-test. Here, I will summarize the results of four summers, describing learning gains as well as difficulties and limitations.