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UC San Diego
Cognitive Science

Is Pleased to Announce Faculty Candidate Seminar

Brian Duistersmais

The Threat Displays of Animals

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If you are a social animal, it is likely that you can recognize when another animal appears threatening. Humans puff out their chest, throw out their arms, and shout. Similarly, many animals inflate their size, bare their teeth, and may even bluff charge their targets. This complex behavior often occurs to defend territories or mates, deter would be attackers, and ultimately, assert dominance. Despite the universality of this behavioral expression, we lack a comprehensive understanding of the common structure of animal threats and potential similarities in relevant, underlying neural circuits. We thus compare threat displays across the animal kingdom and find that they are stereotyped across species and, when compared to recent findings regarding the neural control of threats by fruit flies, may be mediated by similar neurological systems. Considering additional findings regarding the non-trivial sensory influence on fly threats and the multi-motor nature of threat expression, we further ask if historical and commonly used terms in behavioral neuroscience, like “reflex”, “fixed action pattern”, and “command neuron”, are sufficient to describe threat expressions. We determine that these concepts contain vast definitional complexities and reiterate that such terms may be inefficient and imprecise when undefined or universally applied. However, these ruminations appear to also contribute to a deeper understanding of animal behavior at large and make more precise our attempts to describe it. Given the self-evident relevance of fruit fly threat displays to human social interactions, we believe continued efforts like these, that apply the findings and semantics of animal neuroscience to ever higher realms of animal cognition, will connect our understanding of neurons and basic animal movement, to complex state-dependent animal expressions, and ultimately, shed light on what it is to be a social animal.

Brian Duistermars grew up on a dairy farm in San Jacinto, CA, graduated from San Jacinto High School, received a bachelor’s degree in Cell, Molecular, and Developmental Biology from UC Riverside, and a Ph.D. in Cell, Molecular, and Integrative Physiology from UCLA. As a post-doc at Caltech, he discovered and characterized a set of neurons in the fly brain that specifically mediate threat displays, an aggressive behavior expressed throughout the animal kingdom. Since completing his post-doc, he has thrived as a Visiting Assistant Professor of Biology at the W.M Keck Science Department at Claremont McKenna, Scripps, and Pitzer Colleges. There he has taught lab courses in molecular biology and a suite of neuroscience lab and lecture courses.