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WARMLY WELCOME ALL TO A TALK BY

Alan C. Love

(University of Minnesota)

Physics, Genetics, and Investigative Reasoning in Developmental Biology: Blurring Epistemic and Pragmatic Justifications of Knowledge-How

3.00 PM | Friday Nov 18 | Raynor Library Beaumier Suite BC

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Abstract: Approaches to understanding ontogeny that involve physical factors, such as fluid flow or mechanical deformation, have intrigued biologists for more than a century. Although physical explanations never disappeared, they were eclipsed toward the end of the 20th century due to advances in molecular genetic approaches that transformed developmental biology. Despite this eclipse, there has been a resurgence of work on physical forces in development. What accounts for this resurgence? I argue that a major factor is the use of physical approaches for investigative rather than explanatory reasoning. The capacity of experimental practice to manipulate physical forces surgically, on par with standard genetic approaches, is relatively new even though the explanatory potential of physical approaches to understanding ontogeny has not changed dramatically. Investigative knowledge is *knowledge-how*, whereas theoretical explanations are *knowledge-that*. The evaluative knowledge characteristic of molecular genetics and recently achieved in physical approaches is justified by successful experimental manipulations that are not typically formulated propositionally. Despite this seeming pragmatic justification, there is still a role for evidence in establishing knowledge-how within these investigative contexts. This blurring of epistemic and pragmatic justifications for knowledge-how illuminates both why developmental biologists now countenance research into physical forces and why it is invisible to most philosophical conceptions of how the sciences operate.