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# Institutional and Epistemic Practices in Systems Biology

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## Abstract

Within academic research universities in the US, there is a growing trend to build infrastructures that facilitate interdisciplinary and collaborative modes of doing science. At the same time, molecular researchers in the life sciences are building frameworks for viewing organisms as complex systems embedded within larger ecosystems, in what some call high-throughput, data-intensive, post-genomic science. One goal of these efforts is to accelerate an understanding of the complexities of biological systems that investigates interactions beyond just genome sequences and DNA. We have been studying systems biologists as they have moved from an independent academic laboratory to a newly built research institute which seeks to be a "transdisciplinary, hyper-collaborative" space for addressing complex problems of relevance to health and society. Our findings analyze how this institutional environment affects the questions that systems biologists in this institute are pursuing. We examine how they bring together perspectives from engineering and the life sciences, to develop tools for studying, quantifying, visualizing, and modeling processes in simple systems, such as viruses. Their goal is to be able to predict virus interactions with and within cells, tissues, and whole organisms. In the process, they are devising new understandings of what constitutes heterogeneity, variation and even the "environment" in biological systems, while grappling with how to develop generalizable models for predicting the outcomes of basic molecular processes. We use our "before and after" ethnographic data to explicitly link changes in institutional organization with both the content of scientific knowledge produced and the practices of its production.

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