



CoCo Seminar Series Spring 2024

Lessons from Life Itself: Relational Models of Complexity and Self-Organization

Dr. Pedro Márquez-Zacarías
Omidyar Postdoctoral Fellow, Santa Fe Institute

Wednesday February 7, 2024 12:00-1:00pm EST
Hybrid (EB-T1 & Zoom; meeting link available on
<http://coco.binghamton.edu/>)



In this talk we will approach the nature of complex living systems from a relational perspective, with a theoretical framework known as relational biology. First, we will note some epistemological problems regarding the practice of what we call complexity science and biology. Complexity science has matured within the last couple of decades despite lacking a clear definition of what makes a system “complex”. Similarly, biology lacks a definition of what makes a system “alive”. Although many regard these questions as philosophical ones without practical implications, we will argue that, on the contrary, these are central questions to answer in order to make real progress. We will proceed by making a formal distinction between simple fractionable systems and complex non-fractionable ones. This will lead us to formulate models of living systems with important properties such as organizational closure, self-organization, complexity, and anticipation. We will show how living systems, at every level of organization, exhibit these properties, and we will suggest that many social phenomena show similar behaviors. Finally, we will discuss some standing problems in biology, such as the origin of life and evolutionary transitions, where relational biology could give us a path forward.

Dr. Pedro Márquez-Zacarías studied biomedical sciences at the School of Medicine in the National Autonomous University of Mexico (UNAM), where he did research in biochemistry, immunology, virology, and microbial ecology. Then, he got his Ph.D. in Quantitative Biosciences at Georgia Tech, where he studied evolutionary transitions and theoretical biology in the group of Prof. William Ratcliff. He is now an Omidyar Complexity Fellow at the Santa Fe Institute where he studies the nature of complexity and self-organization in living systems.

For more information, contact Hiroki Sayama (sayama@binghamton.edu).

<http://coco.binghamton.edu/>