



CoCo Seminar Series Fall 2026

Interactions, Role Systems, and Open-Ended Evolution

Dr. Shane Dicks

Symetra / Portland State University

Wednesday October 28, 2026 12:15-1:15pm EDT

Fully Online (on Zoom; meeting link available on
<http://coco.binghamton.edu/>)



Evolutionary systems in biological, economic, and social domains continuously generate novel kinds of individuals and interactions that integrate into increasingly complex systems. I present a framework that explains this capacity in terms of roles and role systems. A role categorizes individuals by their pattern of interactions, and a role system is the set of roles together with the interactions among them. Each role poses a distinct adaptive problem to its occupants, a problem set by the other roles in the system. A novel role therefore alters selection pressures for existing roles and may create occupiable positions for further novel roles. I describe the Feature-Interaction-Role (FIR) model, an agent-based implementation in which agent features are defined purely by the fitness consequences of the interactions they afford, so that novel features and interactions emerge at runtime rather than being drawn from a small, fixed set of predefined interaction types. Across more than 1,700 simulation runs I identify five distinct qualitative patterns, namely development, stasis, successive dominance, punctuated equilibria, and collapse, and I observe different patterns emerging from identical feature networks and parameter settings. I relate these results to the criteria for open-ended evolution developed in the Artificial Life literature.

Shane Dicks completed his PhD in Systems Science at Portland State University. He holds a bachelor's degree in International Relations and Public Policy from James Madison College at Michigan State University. His interest in complex systems developed out of questions about how social and economic organization emerges without centralized design, which led him to systems science and artificial life as frameworks for studying these questions computationally. His dissertation research investigates role proliferation, the process by which novel roles in evolving systems create niches for further novelty, generating increasingly complex role systems. Shane's broader interest is in how this kind of framework might eventually inform approaches to organizational effectiveness, policy design, and economic development.

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