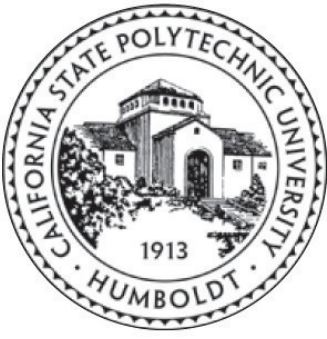




DEPARTMENT OF MATHEMATICS & DATA SCIENCE
Fall 2026 MATH & DATA SCIENCE Colloquium Series

Theory for Modeling Tradeoff Decisions: A Mathematically Unsatisfying but Useful Approach

Dr. Steve Railsback

**Department of Mathematics & Data Science
Cal Poly Humboldt**

Classical optimization theory is useful for modeling how an organism makes tradeoff decisions, such as when to forage in productive but risky habitat vs. in safe but unproductive habitat. But that theory is not useful for modeling a population of interacting organisms, because the decision of each individual affects the options and payoffs available to the other individuals so there is no optimal solution. We have been developing and testing theory for tradeoff decisions in realistically complex contexts for over 25 years, mostly for use in **individual-based fish population models**. I will present our “**state- and prediction-based theory**”, explain why it is unsatisfying as traditional mathematical ecology, and illustrate the many ways we have shown it useful for producing realistic behavior at both the individual and population levels. Finally, I will offer a few thoughts on how we teach **mathematical ecology**.

Steve Railsback is a consulting environmental scientist and adjunct professor of mathematics at Cal Poly Humboldt. Originally trained as an environmental engineer, his career has evolved from river management to fish population modeling to individual-based modeling and ecology. He co-authored the first monograph and first textbook on individual-based modeling, and maintains the “EcoModel” web site (<https://www.humboldt.edu/ecological-modeling>), which provides publications, student projects, and the “InSTREAM” family of salmonid models.

THURSDAY
Sep. 24, 2026

4:00 PM
BSS302

FOR MORE INFO GO TO <https://math.humboldt.edu/get-involved/mathematics-colloquium>

**We cordially invite you to the PRE-COLLOQUIUM TEA in BSS#312
at 3:30 PM**