

Postdoctoral researcher position available in population modelling.

Dr Daniel Reuman is recruiting into his lab in the University of Kansas Department of Ecology and Evolutionary Biology (EEB). At least 3 years of funding are available to carry out modelling pertaining to spatial population dynamics and analysis of large spatial population datasets. The postdoc will join an interdisciplinary team consisting of Reuman, three postdocs and one student currently in the Reuman lab, collaborators in EEB and in the Math Department at KU, and collaborators at several institutions in the USA and UK. Funding is from the NSF Mathematical Biology program and the James S McDonnell Foundation.

In many hierarchical dynamical systems, “synchrony” between multiple fluctuating variables, i.e. correlations or other similarities in fluctuations between variables through time, is more important than the individual variables themselves. For instance, a neuron may fire only when its input neurons fire synchronously. Or the electrical grid may crash only when demands of multiple users become synchronized, producing total-usage spikes. Ecosystems can show this type of dependency on synchrony. Ecosystems include multiple trophic levels, with population signals from lower levels often being spatially aggregated to affect higher levels. For instance, a predator is only harmed if its prey are scarce over its whole hunting area. For systems of this type, it is primarily the synchronous components of signals that matter in the average signal that affects the next level – non-synchronous components tend to cancel in the spatial average. Thus synchrony is very important to ecosystems. Synchrony is found in organisms as diverse as mammals and protists, at distances up to thousands of kilometers. Synchrony relates to large-scale outbreaks and shortages and is important in conservation.

In spite of the importance of synchrony in ecology, possible impacts of climate change on synchrony are little studied. Synchrony can also be transmitted through trophic interactions - e.g., a synchronized predator can induce synchrony in its prey. But the extent to which climate-induced changes in synchrony may cascade through species interaction networks via this mechanism, or influence spatial or other branches of ecology, is unknown. The postdoc will perform statistical and/or mathematical population modelling to address these questions, and will investigate connections to extinction risk models and to Taylor’s law, a commonly applied empirical regularity in spatial ecology. The postdoc will be encouraged to develop his/her own projects within the goals of the funding grants.

We seek individuals from biological or physical-science backgrounds with skills and demonstrable interests in modelling and related areas. Experience with stochastic process modelling and Fourier or wavelet approaches is a plus. Experience with population models is a plus, as are computational skills, particularly if applied in a statistical or modelling context. A PhD or ABD in a related field is required. Applicants from underrepresented groups are encouraged.

The University of Kansas (KU) is a major research university with special strength in ecology and evolutionary biology. The EEB department has >40 permanent faculty working in a wide variety of theoretical and empirical areas, with National Research Council and Chronicle of Higher Education rankings in the top 10 in the USA. KU is located in Lawrence, Kansas, about 30 miles from Kansas City. Lawrence is a progressive and cosmopolitan university town with vibrant art, music, and sports scenes that has been ranked among the top ten college towns in the country for liveability.

See <http://www.reumanlab.res.ku.edu/> for further information about the Reuman lab and links to past publications. Email reuman@ku.edu or call 785 864 1542 with questions. A start date during or before autumn 2017 is preferred. To apply, please send a CV, a cover letter of up to two pages, the names and contact information of two references, and one publication to reuman@ku.edu. Review of applications has begun. Position open until filled.