



## Profile Assistant or Associate Professor of Theoretical Ecology

**Institute for Biodiversity and Ecosystem Dynamics (IBED), University of Amsterdam (UvA)  
Department of Theoretical and Computational Ecology (TCE)**

The [Institute for Biodiversity and Ecosystem Dynamics \(IBED\)](#) is one of eight research institutes within the [Faculty of Science](#) at the University of Amsterdam. Our scientific research aims at a better understanding of the dynamics of systems at all relevant levels, from genes to ecosystems, using a multi-disciplinary approach where we combine both experimental and theoretical methods. We want to unravel how ecosystems function in all their complexity, and how they change due to natural processes and human activities.

In the [Department of TCE](#) we focus on understanding the complexity of ecological systems by using theoretical and advanced computational approaches. We study individual organisms, populations, species and communities, and their interactions with biotic and abiotic system components. We use data-analytical, inductive approaches and theory-oriented, deductive approaches in order to unravel causal relationships shaping ecological patterns and dynamics.

TCE has three research themes: 1) [Animal Movement Ecology](#), 2) [Biogeography and Macroecology](#), and 3) [Theoretical Population and Community Ecology](#).

In the research group of Theoretical Ecology we focus on ecological patterns and processes related to population and community dynamics, starting from a conceptual basis that asks how the individual-level processes of birth, death, and development determine population growth, distribution, and interactions with the environment. These individual-level processes ultimately determine population increase or decline, stability or instability, persistence or extinction, and the structure of entire communities. By using mathematical modelling, we generate insights into the ecological and evolutionary dynamics of populations and communities. We emphasize the effects of differences among individuals in terms of age, body size, developmental stage, infection status, genotype, or spatial location. We address theory-inspired questions, rather than develop system-specific models. The group utilizes a variety of mathematical models and methods, from stochastic processes, bifurcation theory, matrix algebra, to sensitivity analysis. An important contribution of our research is the development of new analytical and computational methodologies for the analysis of population dynamics, including sensitivity analysis for population projection models and ecological and evolutionary bifurcation analysis for physiologically structured models. Our research is not taxonomically restricted, and includes plants, animals, and humans.

The Theoretical Population and Community Ecology group currently consists of the following permanent staff members:

- André de Roos (full professor, ERC Advanced laureate), who uses physiologically structured population models to study the effect of ontogenetic development on population and community dynamics and the feedback of these dynamics on individual development.



- Hal Caswell (full professor, ERC Advanced laureate), who uses matrix models to study stochastic processes in demography, including individual stochasticity, demographic stochasticity, and environmental stochasticity.
- Yael Artzy-Randrup (assistant professor), who uses an interdisciplinary approach to address questions at the interface of ecology and evolution, where complex interactions act on multiple levels of organization and at varying time scales (e.g. infectious disease, water governance, tipping points).

In addition, the group currently includes one postdoc and 5 PhD students. [Here](#) you can find more information.

We wish to appoint a promising candidate in the area of theoretical ecology. We will consider early career scientists with at least several years of experience after obtaining their PhD (at Assistant Professor level) as well as established scientists (at Associate Professor level). The Assistant Professor position is a tenure track position.

## Job description

- To pursue biological research within the area of theoretical ecology, leading to publications in leading peer-reviewed journals and contributing to the development of the long-term research strategy of the group, department and IBED;
- to engage fully in the collaborative ethos of the IBED, encouraging and fostering collaborations between academic colleagues of other departments within the IBED, the UvA, and elsewhere in the Netherlands and abroad;
- to successfully acquire funding from national and international sources aimed at developing your own research group;
- to develop, coordinate and teach course(s), especially in theoretical ecology, and supervise projects at BSc and MSc level.

## Requirements

### Research profile

Your research interests are complementary to the current research areas within the Theoretical Ecology group. These could concern the modelling of spatial population processes, the modelling of individual-level life cycle processes to explain population dynamics, or the modelling of evolutionary and eco-evolutionary dynamics of populations and species. Methods employed could range from agent-based models to structured population models. Note, however, that these are examples and other fields of research or methods within theoretical ecology will certainly be considered.



Preferably, you develop ecological theory that is applicable across a range of different systems and you investigate how different levels of organization within and among individuals, populations, and communities can be linked from an ecological and evolutionary perspective. You are a scientist who is open-minded to working with various systems, you have access to scientific networks that can provide experimental data. You have a vision on how empirical data can be used and/or implemented into models, and on how hypotheses arising from model output can be tested experimentally.

### **Education**

You are experienced in teaching courses and in developing course material.

TCE teaches cutting-edge, quantitative methods for theory development, modelling and big data analysis. We are involved in education in the educational programs of BSc Biology, MSc Ecology and Evolution, BSc Future Planet Studies, and MSc Future Planet Ecosystem Science. On average, IBED staff contribute 30-40% of their time to education, including lecturing and supervising of BSc and MSc students.

Your key educational responsibilities will include:

- Coordinate and teach course(s) at BSc and MSc level
- Develop course material on theoretical ecology
- Supervise BSc and MSc projects

### **Qualifications**

You have the right qualifications if you are a creative and inspiring scientist who can identify new directions, implement plans and motivate people, with a clear vision on how to take up the challenges and enhance new opportunities for teaching and research.

You need to have:

- A PhD in (theoretical) ecology, biology or equivalent field;
- a personal research plan that supports and enhances the group's research strategy;
- a publication record in high quality international journals;
- a track record of high quality teaching at undergraduate and (depending on experience) postgraduate levels with experience in developing and disseminating successful learning approaches;
- a recognized position in international networks;
- the capability to generate external funding for research projects, and to develop and lead research projects.

We would like you to have:

- A record of, and commitment to, securing grant funding from government departments, research councils and charities and managing these projects to successful completion;
- the ability to attract and successfully supervise doctoral students;
- relevant administrative experience;
- an open mind to work with various systems;
- a critical, open, constructive and enthusiastic personality.