Module name	**Individual-based ecology and modelling**
Module number	CMS-TRK-EM5
Senior Lecturer	Prof. Dr. Uta Berger uta.berger@tu-dresden.de
Qualification objectives	Students are fundamentally familiar with the dynamics of complex, ecological systems and the associated creation of spatial structures. Students can use essential modelling tools and are capable of autonomously developing simple simulation models, experimenting, evaluating and interpreting them, including with the help of the R statistical software. They are capable of capturing uncertainties and assessing the suitability and quality of models for the particular application. They can understand, assess and integrate scientific literature on the topic into their own modelling. They can also understand complex individual or agent-based models and put them into practice for research issues, particularly in animal ecology and forestry science.
Contents	The module includes theoretical concepts of individual-based ecology, general principles of modelling, principles of individual-based and agent-based modelling, development and implementation of individual or agent-based simulation models, conducting simulation experiments and analysing the results to understand complex ecological systems. The module also features powerful, easy-to-learn software platforms such as NetLogo, R or Python.
Forms of teaching and learning	The module includes lectures of 1 SWS, exercises of 3 SWS and self-study. The teaching language of lectures and exercises may be German or English and will be specifically determined by the teacher at the beginning of each semester and announced in the usual manner.
Eligibility for participation	Basic knowledge of data analysis with R and applied statistics at bachelor's level is required.

Usability	In the Masters Course Computational Modeling and Simulation, the module is an optional module in the Track Computational Environmental Science and Engineering, to be selected in accordance with Annex 2 to the Specific Examination Regulations. The module cannot be chosen in the Master's Course Computational Modeling and Simulation if this or a module with substantially the same content from a Course with which the entry conditions under § 3 of the Studienordnung have been met has already been completed. The module provides the pre-requisites for the modules it designates under the pre-requisites for participation.
Conditions for the award of credits	Credits are awarded when the module test is passed. The module test consists of a complex performance of 60 hours. The language of the test will be English.
Credits and marks	The module allows 5 credit points to be obtained. The module score corresponds to the test performance score.
Frequency of the module	The module is offered every winter semester.
Workload	The total workload is 150 hours.
Duration of the module	The module covers 1 semester.