



2nd Interdisciplinary and International Short Course on Ecological Modelling



Nelson Mandela African Institution for Science and Technology, Arusha, Tanzania

The Nelson Mandela African Institution of Science and Technology (NM-AIST), together with our partners from Rhodes University, South Africa, and the University of Applied Sciences Hamburg, Germany, is hosting a Short Course on Ecological Modelling in the frame of our new Centre of Excellence in Research, Agricultural advancement, Teaching Excellence and Sustainability (CREATES).

The short course will take place from **January 20th until January 23th, 2021**, and will cover a range of possible ecological topics that can be modelled. The course will provide information on the theory behind models, conceptual ideas, and on designing your own model. Topics will include invasive species spread, population ecology modelling, agent-based modelling and novel software, technologies and thinking pathways will be discussed. The selected **45 participants** are expected to come from Tanzania in general, from NM-AIST and from the Africa region at large.





Details about the course:

The host, CREATES in NM-AIST, will provide free lunch, dinner and teas for all course days. In addition, shuttle transfer from your place of accommodation to the course site at NM-AIST will be provided.

Registration fees:

- Participants from NM-AIST are free of charge
- Participants from Tanzania shall pay 100 \$US
- Participants from the African region (outside of Tanzania) shall pay 150 \$US

Further, all participants are required to pay for their own travels and accommodation.

How to apply:

Please send an email to: felixn@nm-aist.ac.tz

Attach an updated CV and a letter of motivation why you think you should participate in this course and how it will help your current / future research activities.

Send these documents no later than **December 14th, 2020**.



Agenda

2nd Interdisciplinary and International

Short Course on Ecological Modelling

Nelson Mandela African Institution for Science and Technology, Arusha, Tanzania

Wednesday, 20 January 2021 Introduction & working with models

08:30	Welcome & objectives	Karen, Ulfia, Thomas
09:00	Self-introduction (including modelling interests)	all delegates
10:00	Why ecological modelling and workshop outline	Karen
10:30	Tea break	
11:00	Working with models	Karen, Ulfia
11:30	Modelling lifecycle	Ulfia, Karen
12:30	Lunch	
13:30	From concept to simulation (case study Predator-Prey)	Thomas
15:00	Tea break	
15:30	Defining your own research question (as the first step in the modelling process)	all
16:30	Wrap-up of day 1	all
19:00	Dinner	

Thursday, 21 January 2021 Sharpening the question & different ecological models

08:30	Conceptual modelling I	all
10:30	Tea break	
11:00	Conceptual modelling II	all
12:30	Lunch	



Thursday, 21 January 2021 (continued)

13:30	Conceptual modelling III	all
15:00	Tea break	
15:30	Model implementation I	Karen, Thomas
16:30	Wrap-up of day 2 (including discussion of evening NetLogo assignment)	all
19:00	Dinner	

Friday, 22 January 2021

Multi-agent modelling and simulation

08:30	Model implementation II (starting with looking at overnight assignment)	all
10:30	Tea break	
11:00	Model implementation III	all
12:30	Lunch	
13:30	Result analysis	Thomas, Karen
15:00	Tea break	
15:30	Finalization of own conceptual model	all
19:00	Dinner	

Saturday, 23 January 2021

Analysis of results

08:30	Running your own model	all
10:30	Tea break	
11:00	Model runs and interpretation	all
12:30	Lunch	
13:30	Result analysis	Thomas, Karen
14:00	Final discussion	
15:00	Closure of workshop & Tea break	

Prerequisites for workshop participants:

- Bring your own computer
- Please come with your own research question. You will achieve much more from this event if you can apply the methods directly to your own research.
- If possible, please install NetLogo prior to the workshop (free download: <https://ccl.northwestern.edu/netlogo/>)
- Some of the results and visualization will be shown in the program R. Therefore, we recommend installing the R application (<https://www.r-project.org/>) and RStudio (<https://www.rstudio.com/products/RStudio/#Desktop>) free of charge.

Lecturers

Prof Karen Bradshaw, PhD, Dept. of Computer Science, Rhodes University, South Africa
(k.bradshaw@ru.ac.za)

Prof Dr Thomas Clemen, Dept. of Computer Science, Hamburg University of Applied Sciences, Germany (thomas.clemen@haw-hamburg.de)

Ulfia Lenfers, MSc, Dept. of Computer Science, Hamburg University of Applied Sciences, Germany (ulfia.lenfers@haw-hamburg.de)

SHORT COURSE ON ECOLOGICAL MODELLING January 20th - January 23th, 2021

INSTRUCTORS:

Thomas Clemen (Prof Dr)

Thomas Clemen is a full Professor of Computer Science at Hamburg University of Applied Sciences, Germany, and Vice Dean of the Faculty of Engineering & Computer Science. His interdisciplinary research mainly focuses on applying computer science to ecology, epidemiology and other domains. He founded the Multi-Agent Research & Simulation Group (MARS, <http://www.mars-group.org>) and is currently establishing an international network of socio-ecological modelling to support capacity building. Hamburg University of Applied Sciences (HAW) focuses on applied sciences, giving the students a practical insight into their fields of study through projects, lab work, internships and theses in industry and research. A number of high-ranked research projects - some in collaboration with national and international top universities - proof its scientific excellence.



Karen Bradshaw (Prof Dr)

Karen Bradshaw is an Associate Professor in the Department of Computer Science, Rhodes University, Grahamstown, South Africa. Her main area of research is parallel and distributed computing, including general purpose programming on graphics processing units (GPUs). She is particularly interested in accelerating sequential applications by porting them to GPUs. Since computer models and simulations are ideal candidates for acceleration on a GPU due to their very high computational requirements, Karen has been involved in various computer modelling projects, specifically aimed at ecological modelling. A further research interest is in facilitating the use of information and communications technology for non-computer scientists, and in this regard, she is exploring ways of creating high level libraries for use in computer modeling.



Ulfia A. Lenfers (M.Sc.)

Ulfia Lenfers studied geography, botany and soil science at University of Kiel, Germany. She completed her M.Sc. in Environmental Science through the Interdisciplinary Distance Studies program. Since 2015, she has been working in an international project to assess the impact of climate change and land-use management on African savanna ecosystems (<http://www.ars-africae.org>). In her research she is focusing on conceptual modelling, tree ecology and functional traits.

