Niek Mooij

Personal Information:

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Personal Profile

I am a goal-oriented mathematician with a passion for innovative ideas and collaborative solutions. Through the use of mathematics I want to make the world a better place. I am interested in research that combines multiple branches of science to make new discoveries. Among others, I have an interest in the following subjects (in arbitrary order).

- Dynamical systems,
- Networks,
- Algorithm design,
- Real-life networks,
- Numerical methods.

Education

- **2019-2022:** Studies for a Master of Science degree in Mathematics at Utrecht University. Thesis: *Generating Maximal Independent Sets Using Lotka-Volterra Dynamics* (link to file). Under supervision of I. Kryven (Utrecht University). Graduation date: 1st of July 2022. One publication on new algorithms for maximal independent set computation is expected to appear.
- **2015-2019:** Studies for a Bachelor of Science degree in Mathematics at Utrecht University. Thesis: *Entropy and Option Pricing* (link to file). Under supervision of K. Dajani (Utrecht University).
- **2015-2019:** Studies for a Bachelor of Science degree in Physics at Utrecht University.

Work Experience

- **2022-2024:** PhD student at Utrecht University.
- **September 2023 - November 2023:** Research visit to Albert-László Barabási's lab at the Center for Complex Network Research (Boston, USA).
- **2018-2021:** Teaching assistant at Utrecht University.

- **Jul. 2019 - Sep. 2019**: IT automatisation at InAdmin RiskCo Group.
- **Apr. 2017 - Jul. 2018**: Tuition teacher for secondary school at Lyceo.

Teaching

I have done a lot of teaching next to my studies. Not only do I like the interaction with students, but it also forces one to extend their knowledge of the subject to a higher level. My responsibilities consist of helping the students with exercises during tutorials and grading exercises.

For the course *Methods and Models in Complex Systems* I have also been responsible for developing all the graded exercises and putting together the tutorial exercises.

I have been a teaching assistant at the Utrecht University mathematics/physics departments at the following bachelor courses.

- *Numerical Analysis* (2024).
- *Calculus and Linear Algebra 2* (2024).
- *Calculus and Linear Algebra 2* (2023).
- *Calculus and Linear Algebra 1* (2022).
- *Methods and Models in Complex Systems* (2021).
- *Introduction to Stochastic Processes* (2021).
- *Methods and Models in Complex Systems* (2020).
- *Introduction to Financial Mathematics* (2019).
- *Introduction to Geometry* (2019).
- *Mathematical Techniques 2* (2019).
- *Mathematical Techniques 1* (2018).
- *Introduction to Financial Mathematics* (2018).

Extracurricular Activities

- **Young Complexity Reserachers Utrecht (YCRU), Centre for Complex Systems Studies (Utrecht), Board chair (2024)** I have been chair of a group of inetrdisciplinary researchers, all with a focus on complexity. In the capacity of chair I have been responsible for organising talks and group events.
- **Teaching assistent training.** Aside from teaching, I have followed a course called *Teaching Assistant Training*, which prepares one to give tutorials.
- **μ-games (2021-2022).** I am a member of the board of organizers of the μ-games. This is a competition in mathematical problem solving, organized by the Utrecht University mathematics department, and aimed at students from Utrecht University.
- **PhysiCie (2015-2019).** For the physics study association I have been involved in organising guest speaker presentations aimed at students at both the bachelor as well as the master level.

Presentations

- **SIAM NNP (New York, New Jersey, Pennsylvania) '23 (Newark, New Jersey, USA) (October 2023)**. Title: *Approximating the Maximum Independent Set Problem using Lotka-Volterra dynamics.*.
- **Institute of Atmospheric Sciences and Climate (CNR-ISAC) (Turin, Italy) (March 2023)**. Title: *Ecological coexistence criteria in sparse graphs.*
- **Centre for Complex Systems Studies (Utrecht University) (February 2023)**. Title: *Generating Maximal Independent Sets Using Lotka-Volterra Dynamics.*
- **Utrecht University Algorithm group (October 2022)**. Title: *Generating Maximal Independent Sets Using Lotka-Volterra Dynamics.*
- **Utrecht University research group dr. Kryven (May 2022)**. Title: *Stable Roommates Problem - On Optimal Preference Matchings.*
- **Utrecht University Ecology research group (January 2022)**. Title: *Bifurcations in Lotka-Volterra Systems.*
- **Utrecht University research group dr. Kryven (November 2021)**. Title: *Lotka-Volterra for Maximum Independent Set Problem.*

Programming Skills

- **Python.**
- **Latex.**
- **Mathematica.**
- **Matlab.**
- **C#.**
- **C++.**

Personal Activities

- Basketball. I play competitive basketball with games in the weekends.
- I love vinyl records and turntables (music in general).
- Reading. In my free time I like to read, especially novels.
- Making pasta. I am trying to perfect my homemade ravioli.