

# HELMER HERMAN KOPPELMAN

## ABOUT ME

Experienced researcher with several publications in top-tier journals and an affinity for **statistics, data science, data analysis, and machine learning**. Can-do attitude with a pragmatic approach to problem solving. Proven track record of communicating abstract concepts to expert and general audiences.

Seeking a position where I can create business solutions from data insights

## CONTACT

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## EXPERIENCE

### **Postdoctoral Researcher** - *Institute for Advanced Study* 2020 -

Through statistical analysis of large astronomical data sets, and the interpretation of observations with theory, I study the structure, dynamics, and formation history of the Milky Way. A selection of projects:

- **Finding 'twins' in a data set with over 1 billion objects** identifying pairs of stars with almost identical motions
- **MCMC fitting of a Gaussian mixture model with deconvolution** to find the motion of a dwarf galaxy in a data set with large measurement uncertainties
- **Statistical analysis of correlation versus causation of high-dimensional features in sparse data** analyzing properties of planets and their host stars

### **PhD Candidate Astrophysics** - *University of Groningen* 2016 - 2020

- Bayesian regression analysis to find the escape velocity of the Milky Way
- Applying clustering algorithms to select and study extragalactic stars
- Optimization of numerical integrals (>1000 times faster)
- Modifying algorithms (C/C++/Fortran) to adjust for custom use cases

### **Kaggle competition (machine learning)**

Our team finished top 5% in a [kaggle.com](https://www.kaggle.com) competition for text classification where we build a model to flag toxic comments. I trained our best performing neural network

### **Board experience**

- Founding executive board member (1.5 yr) study association 2016 - 2017
- Secretary and chair (1yr each) of executive board sports club 2011 - 2013

## SELECTED COMPETENCES

- 10+ years experience in programming in Python
- 10+ years of experience in data visualization (featured in scientific papers, newspapers, magazines, online media, documentaries, planetarium shows, and a textbook on galaxy formation)
- 5+ years experience with data science and analysis
- 5+ years experience in Machine Learning neural networks for text analysis and image classification, mixture models with deconvolution, regression, Gaussian processes, normalizing flows, outlier detection, and generative models

## ADDITIONAL ACTIVITIES

### **Coaching & Teaching**

Co-mentored 2 students at a summer school on dynamics (2021)  
Co-mentored 1 MSc student  
Co-mentored 1 BSc student

Creating practice exams (2013-2016)

### **Teaching assistant**

'Dynamics of Galaxies' (2018, 2020)  
'Intro to Programming' (2017, 2019)

### **Communication**

20+ scientific talks  
10+ public talks  
3+ live interviews on (local) radio

### **Leadership & teamwork**

Organizational work for the faculty, study association, and sports club:  
Sports tournaments  
Galas and other social events  
Symposium  
Faculty introduction camp  
Program committee of astronomy  
Chair of first-year PhD committee

5+ magazine interviews  
Creating illustrations and animations for (inter)national media

## EDUCATION

*University of Groningen*

PhD Astronomy (**cum laude**) 2016 - 2020

MSc Astronomy (**cum laude**) 2014 - 2016

BSc Astronomy 2011 - 2014

## LIBRARIES & TOOLS

Data preprocessing & analysis  (pandas, vaex, jupyter)

Scientific computing  (numpy, scipy, matplotlib, sklearn)

Dimensionality reduction  (t-SNE, UMAP, PCA)

Statistical modeling  (regression, clustering, classification, decision trees)

Neural Networks  (Keras, PyTorch, Jax, TensorFlow)

## LANGUAGES

### **Programming**

Python/UNIX   
Fortran/git/SQL   
C/C++/HTML/Matlab 

### **Spoken**

Dutch (native)   
English 

## AWARDS & PRIZES

Wierenga-Rengerink PhD Prize nominee  
My thesis was selected as best thesis of the Faculty of Science and Engineering in 2020, out of 200+ theses, and nominated as best thesis of the university

## PUBLICATIONS

	Total	First Author
Submitted	17	9
Refereed	14	8
Citations	942	227

August 2021, see also [Google Scholar](https://scholar.google.com/citations?user=HJLWJgAAAAJ&hl=en)