

PhD. Alexander Fengler

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Education **Brown University** Providence,

PhD. in **Cognitive Science** Jan. 2018 – Dec. 2022

Thesis Topic: Likelihood Approximations for Bayesian Analysis of Sequential Sampling Models

Mentors: Prof. Michael J. Frank, Prof. Thomas Serre, Prof. Jason Ritt

Representative Coursework:

Computational Statistics

Information Theory

Bayesian Computation

Bocconi University Milan, Italy

MPhil. **Statistics** Sept. 2016 – Aug. 2017

Representative Coursework:

Real Analysis

Advanced Probability

Advanced Data Analysis

Brown University Providence, United States

Enrolled in PhD. Program in **Cognitive Science** Aug. 2015 – Jul. 2016 Year

Mentor: Prof. Joseph Austerweil (left department during first year)

University Maastricht Maastricht, Netherlands

MSc. **Cognitive Psychology and Neuroscience** Sept. 2012 – Jul. 2014

Specialization: Neuroeconomics

Thesis: An application of the Drift Diffusion Model to Medium Size Choice Sets

Mentors: Prof. Arno Riedl, Prof. Alexander Vostroknutov, Prof. Antonio Rangel (California Institute of Technology)

Research Internship: California Institute of Technology Sept. 2013 - Jul. 2014

Representative Coursework:

Mathematical Methods for Economics

Microeconomic Theory

Neuroanatomy

University Maastricht Maastricht, Netherlands

BSc. **International Business** Sept. 2009 – Jul. 2012

Specialization: Finance

Thesis: Market Risk of Defined Contribution Systems in the Netherlands

Exchange Semester: National University Singapore

Research and
work experience

**Data Science Consulting:
PyMC Labs**

Aug. 2021 - now

Statistical Consulting with focus on Bayesian approaches. Lead two projects as principal Data Scientist for a client seeking data analysis and code infrastructure solutions concerning Bayesian inference for cognitive process models.

**Teaching Assistantships:
Brown University,**

Sep. 2018 - Sep. 2021

Department of Cognitive, Psychological and Linguistic Sciences

Classes: Quantitative Methods for Psychologists, Introduction to Psychology
Responsibility: Lead student sections, weekly open office hours and contribute to course organization.

Research Assistantship:

Sep. 2014 - May 2015

**California Institute of Technology,
Rangel Neuroeconomics Laboratory**

Continuation of MSc. Thesis project and leading experimental design and data collection process for a project in collaboration with a big software company.

Teaching Assistantship:

Sept. 2010 – May 2011

University Maastricht, SBE Business School

Classes: Quantitative Methods I and II
Responsibility: Lead weekly sections for 10-15 students in a flipped classroom environment.

Civil Service:

Sep. 2008 – Apr. 2009

University Cologne, Biochemical Faculty

Responsibilities: Laboratory work (DNA extraction) and full responsibility over the fish-stock held for experimental purposes

Honors and
scholarships

Tuition Refund for top 3% GPA (University Maastricht)	2011
Cum Laude BSc., less than 5% of students (University Maastricht)	2012
Selected for research based Bachelor Thesis (University Maastricht)	2012
PhD. Scholarship (Brown University)	2015
Tuition Waiver for MPhil. (University Bocconi)	2016
PhD. project funded through Carney Brainstorm initiative.	2021

Publications

Beyond Drift Diffusion Models: Fitting a Broad Class of Decision and Reinforcement Learning Models with HDDM

Alexander Fengler, Krishn Bera, Mads L. Pedersen, Michael J. Frank.
Journal of Cognitive Neuroscience, 2022.

Likelihood approximation networks (LANs) for fast inference of simulation models in cognitive neuroscience

Alexander Fengler, Lakshmi Govindarajan, Tony Chen, Michael J. Frank.
eLife, 2021.

Encoder-Decoder Neural Architectures for Fast Amortized Inference of Cognitive Process Models

Alexander Fengler, Lakshmi Govindarajan, Michael J. Frank.
Proceedings of the annual meeting of the Cognitive Science Society, 2020.

Conference posters

An application of the Drift Diffusion Model to Medium Size Choice Sets 2014

Alexander Fengler, Antonio Rangel
Society For Neuroeconomics Conference, Miami, United States

Neural Networks for Likelihood Estimation in Approximate Bayesian Computation: 2019

Application to Cognitive Process Models

Alexander Fengler, Michael J. Frank
RLDM, Montreal, Canada

Encoder-Decoder Neural Architectures for Fast Amortized Inference of Cognitive Process Models 2020

Alexander Fengler, Lakshmi Govindarajan, Michael J. Frank
Annual meeting of the Cognitive Science Society, Madison, United States

Likelihood Approximation Networks (LANs) for fast, tractable inference in cognitive process models 2022

Krishn Bera, Alexander Fengler, Michael J. Frank
RLDM, Providence, United States

Talks and tutorials

Introduction to Approximate Bayesian Methods 2019

Guest Lecture in Computational Modeling Workshop, Brown University, Instructor: Andra Gana

Approximate Bayesian Computation with Neural Networks 2020

Guest Lecture in Carney Computational Modeling Workshop, Brown University, Instructor: Andra Gana

Likelihood Approximation Networks and Approximate Bayesian Computation 2021

Guest Lecture at the Toronto Decision Neuroscience Lab, Toronto University, Principal Investigator: Prof. Cendri Hutcherson

Tutorial on HDDM-LAN extension 2022
Guest Lecture in Carney Computational Modeling Workshop, Brown University, Instructor: Andra Gana

Basic Introduction to HDDM 2022
Workshop, Royal Holloway University, UK

Introduction to Recurrent Neural Networks 2022
Carney Brainstorm EEG Challenge: Workshop & Hackathon, Brown University

Hierarchical Bayesian Inference with SSMs 2022
Tutorial, Mental Effort Workshop, Brown University

Skills

Programming

Proficient: Python, R.

Familiar with: Matlab, C++, Bash.

Code:

<https://github.com/hddm-devs/hddm>

(Hierarchical bayesian estimation of sequential sampling models)

https://github.com/AlexanderFengler/hddm_tutorial

(A Tutorial for an extension to above package)

https://github.com/AlexanderFengler/ssm_simulators

(Python package for simulation of sequential sampling models)

<https://github.com/AlexanderFengler/LANfactory>

(Pytorch based training of likelihood approximation networks)

<https://github.com/AlexanderFengler/addmtoolbox>

(R package to fit some variant of Drift Diffusion Models)

Languages

German (native), English (native level), Italian (B2), Chinese (HSK1)