

GRANVILLE MATHESON


I am an academic data scientist with a background in neuroscience. I am a generalist, but my speciality is in statistical modelling and inference, as well as presentation and communication. My work has made international news and been cited in policy¹, I have been involved in developing field-wide guidelines to improve replicability² and several R packages that I developed are used internationally. I am passionate about learning new things, and enjoy the challenge of presenting complex results in a compelling way to audiences with different backgrounds.



I am currently looking for a position that allows me to work with complex data to derive useful insights, and to develop tools to streamline the process and make it reproducible.




EDUCATION

- | | | |
|-------------------|---|---|
| 2018


2014 | <ul style="list-style-type: none">● PhD, Neuroscience
Stockholm, Sweden |  Karolinska Institutet |
| | <ul style="list-style-type: none">• Thesis: Reliability, Replicability and Reproducibility in PET Imaging• Working with PET imaging of the dopamine system in psychosis and proneness to developing psychosis, as well as methods development. | |
| 2013


2010 | <ul style="list-style-type: none">● MSc, Neuroscience
Utrecht, The Netherlands |  Universiteit Utrecht |
| 2009 | <ul style="list-style-type: none">● BA Hons, Psychology
Johannesburg, South Africa |  University of Witwatersrand |
| 2008

2006 | <ul style="list-style-type: none">● BSc, Psychology, Applied Chemistry
Johannesburg, South Africa |  University of Witwatersrand |
| | <ul style="list-style-type: none">• Other courses: Chemistry I & II, Major Physics I, Major Pure Mathematics I, Research Design and Analysis | |

RESEARCH EXPERIENCE

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|-------------------|--|---|
| 2022

2020 | <ul style="list-style-type: none">● Postdoctoral Researcher*
Columbia University |  Molecular Imaging / Biostatistics |
| | <ul style="list-style-type: none">• * Cancelled / indefinitely postponed on account of COVID-19 pandemic (NYC)• Developing Bayesian methods for performing pharmacokinetic modelling using a multilevel framework, with Markov Chain Monte Carlo. | |
| 2020

2018 | <ul style="list-style-type: none">● Postdoctoral Researcher
Karolinska Institutet |  Cervenka Lab, PET Group |
| | <ul style="list-style-type: none">• Developing tools for reproducible modelling, data storage and documentation. | |

CONTACT

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- 🔗 github.com/matheson
- 🌐 granvillematheson.com
- in [granville-matheson](#)

TECHNICAL SKILLS

R STAN Git Docker
Python MATLAB Bash
Markdown Cloud-Computing
SQL APIs Binder tidyverse
ggplot2 devtools brms caret

OPEN SOURCE CONTRIBUTIONS

I have written and maintain several R packages, available on GitHub:

kinfitr: PET
pharmacokinetic modelling
rwithings: Withings Activity
API access
relfeas: Study feasibility
assessment
nls.multstart: Nonlinear
least squares regression

2014
|
2012



Research Assistant

Karolinska Institutet



Cervenka Lab, PET Group

- Responsible for image processing and analysis of MR and PET Imaging data for the Karolinska Behavioural PET Database

2011
|
2010



Research Intern

Universiteit Utrecht



Ramakers Group, Rudolf Magnus Institute

- Worked with single-cell electrophysiology to investigate the dynamics of ion channel caused by morphine



SELECTED DATA SCIENCE WRITING

2020



Nonlinear Modelling using nls, nlme and brms

granvillematheson.com

- A demonstration of how to fit nonlinear models using standard gradient descent optimisation, as well as both frequentist and Bayesian multilevel modelling strategies

2020



Creating an API for 4.2M texts with tidytext, RSQLite, dbplyr and plumber

granvillematheson.com

- I prototyped an idea for identification of useful patterns in a large set of text data, to identify useful skills to learn to maximally improve employability from job postings.
- To handle the data set size, I turned it into a SQLite database for fast, convenient access, and then created an online API to make its results accessible.

2020



Pharmacokinetic Modelling of PET Data in R using kinfitr. Part 2: Basics and Iteration³

granvillematheson.com

- Part 2 of a four part series describing my kinetic modelling R package. Here I cover basic usage of the package. I cover bias-variance tradeoffs and other relevant considerations during modelling.

2018



My Physiological Response to my PhD Defence⁴

granvillematheson.com

- I recorded my physiological data in the months leading up to my PhD defence, and analysed it here, using data visualisation to tell the story of my sleep changes, and heart rate, both before and during the defence.
- I also wrote an R package for extracting this data from the Withings API. I have been contacted by others from around the world who are using my software.

Competencies



R package development
Bayesian statistics
Multilevel modelling
Nonlinear models
Statistical inference
Version control
Reproducibility
Measurement & Reliability
Data visualisation
Machine Learning
Natural Language Processing
Web-scraping
API Usage and Deployment

I have a blog about data science and visualisation where I publish mostly side projects. Upcoming posts include city commute time visualisations.

- 2018 ● **Making a Reminder Bot for Automating Meeting Organisation using R and Google Sheets⁵**
granvillematheson.com
- Demonstrated my reminderbot system which has effectively automated the organisation for two sets of meetings continuously for the past 4 years.
 - Setting up a productionised system, running several times each week on a Raspberry Pi
- 2018 ● **The Weather in Stockholm, Inside and Out, and the Curious Case of Summer 2018⁶**
granvillematheson.com
- Analyzing meteorological data from open data and private data, examining the effects of global warming, and examining how extreme 2018 really was



TEACHING EXPERIENCE

- 2019
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2015 ● **Positron emission tomography imaging of the CNS**
Karolinska Institutet  Stockholm, Sweden
- Lecturer and TA training students in biannual course, teaching about pharmacokinetic modelling and statistical analysis
- 2009 ● **Research Design and Analysis**
University of Witwatersrand  Johannesburg, South Africa
- Tutor for research design and statistics



SELECTED PUBLICATIONS

- 2020 ● **Guidelines for the content and format of PET brain data in publications and archives: A consensus paper**
Journal of Cerebral Blood Flow & Metabolism
- Authored with all the influential figures in our field
 - This article establishes a consensus for how to report on studies within our field, for which I was asked to contribute my expertise.
- 2020 ● **Kinfitr – an open source tool for reproducible PET modelling: validation and evaluation of test-retest reliability**
bioRxiv
- Authored with Jonathan Tjerkaski, Simon Cervenka and Lars Farde
 - I supervised this project, in which we evaluated the performance of my kinetic modelling R package against the established commercial tool used in our field.

I am passionate about teaching, and in addition to direct teaching experience, I have held numerous seminars to teach colleagues how to approach statistical problems, and to share knowledge about various new tools that may be helpful.

2017

● **The readability of scientific texts is decreasing over time**

Elife

- Authored with Pontus Plavén-Sigraý, Björn Schiffler and William Hedley Thompson
- This project resulted from our gathering as PhD students, without any supervisors, for a collaborative data science project. In this, we learnt version control with GitHub, collaborative coding among other things.

2015

|
2019

● **We need to talk about reliability: making better use of test-retest studies for study design and interpretation**

PeerJ

- Sole author publication
- I present a new statistical method for estimating study feasibility with limited, and not directly representative data.



LINKS

- 1: <https://www.altmetric.com/details/18028335>
- 2: <https://journals.sagepub.com/doi/abs/10.1177/0271678X20905433>
- 3: <https://www.granvillematheson.com/post/pharmacokinetic-modelling-of-pet-data-in-r-using-kinfitr-part-2-basics-and-iteration/>
- 4: <https://www.granvillematheson.com/post/self-portrait/>
- 5: <https://www.granvillematheson.com/post/reminder-bot/>
- 6: <https://www.granvillematheson.com/post/20180821-stockholmweather/>