

Michael J. Hay

PH.D.

712 S. Scott St #11, Spokane, WA, 99202

☎ (+01) 206-660-5320 | ✉ mhay@protonmail.com | [kamucks.github.io](https://github.com/kamucks)

Skills

Applied Research	Excel at applying programming and mathematics to solve difficult problems.
Languages	Clojure (3 years), Python (8 years), R, C, Julia
Statistical libraries	Scikit-Learn, NLTK, Tensorflow, Matplotlib, GGPlot2, GenSim
Cloud technologies and administration	Linux, AWS (Lambda, RDS, S3, EC2), Docker, API integration
SQL	PostgreSQL, MySQL, Database migration, schema design, query optimization
Statistical methods	Bayesian methods, random forests, logistic regression, clustering
Communication	Skilled at communicating technical insights non-specialist audiences.

Projects and experience

Structural diffing and merging

2020

At OCTO, completed a pilot project from the Alfred P. Sloan Foundation to develop a novel algorithm in Clojure for space- and time-efficient diff and merging of a wide variety of recursive data types.

Data Scientist, OCTO

2018-2020

Developed tools in Clojure, R, and Python to process and analyze OCTO data. Developed a number of internal tools for OCTO to interface with external APIs, among other tasks. Designed and implemented PostgreSQL databases, as well as developing backend APIs for communication.

Ice-crystal fabric data assimilation

2016-2017

Applied statistical skills to correct unreliable data collected from a faulty instrument. Used Tensorflow to estimate crystal fabric orientation distributions from multiple data sources.

Coupled perturbation model of anisotropic ice flow and ice-crystal fabric evolution

2016-2017

Developed a coupled model of anisotropic ice flow and fabric evolution in Mathematica. Showed that anisotropic ice flow coupled to ice crystal fabric is dynamically unstable. This explained disordered layering observed in ice cores, which complicates interpretation of past climate.

Response of crystal fabric to stochastic flow perturbations

2014-2017

Studied the uncertainty of crystal fabric distributions in response to random flow perturbations treated as Gaussian processes, motivated by the observation of small-scale layer disturbances found in ice cores.

Statistical analysis of ice-crystal fabrics

2014-2017

Developed analytical and bootstrap estimates of crystal fabric sampling error in thin section measurements. Showed that previous estimates of sampling error were overconfident. Applied these techniques to data collected in Antarctica to better calibrate uncertainties of ice-flow characteristics.

Antarctic fieldwork

2012

Conducted active seismic surveys at Beardmore Glacier.

Ice crystal fabric evolution model

2011-2013

Developed a new model of ice crystal fabric evolution in Julia.

Education

University of Washington

Seattle, WA

PH.D., EARTH AND SPACE SCIENCES

2010-2017

Focused on statistics and uncertainty of ice-crystal orientation fabric in ice sheets.

University of Washington

Seattle, WA

B.S., MATHEMATICS AND ECONOMICS

2004-2007

Economics coursework focused on mathematical economics and econometrics.