

CONTACT AND GENERAL INFO	<p>NAU Building 90, Office 210 1295 S. Knoles Dr. Flagstaff, AZ 86011 Web: <a href="http://tdhock.github.io">http://tdhock.github.io</a> E-mail: <a href="mailto:toby.hocking@nau.edu">toby.hocking@nau.edu</a></p>	<p>Birth: 17 March 1984 in Newport Beach, California Citizenship: USA Language skills: English (native) French (fluent since 2009)</p>
RESEARCH INTERESTS	<p>Machine learning algorithms, statistical software, and data visualization techniques. Emphasis on efficient algorithms for large datasets, based on constrained optimization (regression, classification, ranking, clustering, segmentation, changepoint detection, survival analysis). Application domains include medicine, genomics, neuroscience, audio, internet, sensors, recommendation systems.</p>	
PROFESSIONAL EXPERIENCE	<p><b>Northern Arizona University</b>, Flagstaff, Arizona, USA (2018-present). Assistant Professor, School of Informatics, Computing, and Cyber Systems. “Optimization algorithms for machine learning and interactive data analysis.”</p> <p><b>McGill University</b>, Montreal, Canada (2014-2018). Postdoc with Guillaume Bourque, Department of Human Genetics. “Changepoint detection and regression models for peak detection in genomic data.”</p> <p><b>Tokyo Institute of Technology</b>, Tokyo, Japan (2013). Postdoc with Masashi Sugiyama, Department of Computer Science. “Support vector machines for ranking and comparing.”</p> <p><b>Sangamo BioSciences</b>, Richmond, CA, USA (2006-2008). Research Assistant with Jeff Miller in the Technology group. “A web app for visualization and statistical analysis of experimental data.”</p>	
EDUCATION	<p><b>École Normale Supérieure</b>, Cachan, France (2009-2012). Ph.D. with Francis Bach, Département d’Informatique; Jean-Philippe Vert, Institut Curie. “Learning algorithms and statistical software, with applications to bioinformatics.”</p> <p><b>Université Paris 6</b>, Paris, France (2008-2009). Master of Statistics, internship at INRA with Mathieu Gautier and Jean-Louis Foulley. “A Bayesian Outlier Criterion to Detect SNPs under Selection in Large Data Sets.”</p> <p><b>University of California, Berkeley</b>, CA, USA (2002-2006). Double B.A. in Statistics, Molecular and Cell Biology; thesis in Statistics with Terry Speed. “Chromosomal copy number analysis using SNP microarrays and a binomial test statistic.”</p>	
HONORS AND AWARDS (SELECTED)	<p>Co-PI on National Science Foundation grant, \$3,000,000, Sept 2021 to Aug 2026. “MIM: Discovering in reverse: using isotopic translation of omics to reveal ecological interactions in microbiomes.”</p> <p>Air Force Research Laboratory, Summer Faculty Fellowship, May–July 2020, “Machine learning algorithms for understanding physically unclonable functions based on resistive memory devices.”</p> <p>R Consortium Grant, \$34,000, Jan-Dec 2020, “RcppDeepState: an easy way to fuzz test compiled code in R packages.”</p>	

“Mobilité entrant” travel award to work with Guillem Rigai in Université Evry, France, 2016.

International useR conference, Best Student Poster Award, “Adding direct labels to plots,” 2011.

PEER-REVIEWED  
PUBLICATIONS  
(SELECTED)

In addition to peer-reviewed journals, I publish papers at computer science conferences such as *ICML* and *NeurIPS*, with double-blind peer reviews, and  $\approx 20\%$  acceptance rates.

**Hocking TD**, Rigai G, Fearnhead P, Bourque G. Generalized Functional Pruning Optimal Partitioning (GFPOP) for Constrained Changepoint Detection in Genomic Data. Accepted for publication in *Journal of Statistical Software*, arXiv:1810.00117.

Fotoohinasab A, **Hocking TD**, Afghah F. A Greedy Graph Search Algorithm Based on Changepoint Analysis for Automatic QRS-Complex Detection. *Computers in Biology and Medicine* 130 (2021).

**Hocking TD**. Wide-to-tall data reshaping using regular expressions and the nc package. *R Journal* (2021), doi:10.32614/RJ-2021-029.

**Hocking TD**, Rigai G, Fearnhead P, Bourque G. Constrained dynamic programming and supervised penalty learning algorithms for peak detection in genomic data. *Journal of Machine Learning Research* 21(87):1–40, 2020.

Jewell S, **Hocking TD**, Fearnhead P, Witten D. Fast Nonconvex Deconvolution of Calcium Imaging Data. *Biostatistics* (2019), doi: 10.1093/biostatistics/kxy083.

Drouin A, **Hocking TD**, Laviolette F. Maximum margin interval trees. *Neural Information Processing Systems (NeurIPS)*, 2017.

**Hocking TD**, Joulin A, Bach F, Vert J-P. Clusterpath: an Algorithm for Clustering using Convex Fusion Penalties. *International Conference on Machine Learning (ICML)*, 2011.

BOOKS, CHAPTERS,  
MANUALS

**Hocking TD**. Introduction to Machine Learning and Neural Networks. Chapter in textbook *New Advances in Land Carbon Cycle Modeling* edited by Yiqi Luo. (in press)

**Hocking TD**. Animated interactive data visualization using the grammar of graphics (The animint2 Manual), 17 web pages/chapters with interactive graphics and exercises. (2018)

CONFERENCE  
TUTORIALS

**Hocking TD**, Killick R. Introduction to optimal changepoint detection algorithms, *useR* 2017.

**Hocking TD**, Ekstrøm CT. Understanding and creating interactive graphics, *useR* 2016.

PROFESSIONAL  
SERVICE

Co-administrator and mentor for R project in Google Summer of Code, since 2012.

Editor for *Journal of Statistical Software* since 2018, and *rOpenSci Statistical Software* since 2020.

President of organizing committee for “R in Montreal 2018” conference.

Reviewer since 2010: *Technometrics*, *International Conference on Machine Learning (ICML)*, *Advances in Neural Information Processing Systems (NeurIPS)*, *Journal of Machine Learning Research (JMLR)*, *Artificial Intelligence Review*, *Journal of Computational and Graphical Statistics (JCGS)*, *R Journal*, *Bioinformatics*, *PLOS Computational Biology*, *BMC Bioinformatics*, *IEEE Transactions on Pattern Analysis and Machine Intelligence*, *Information and Inference*, etc.