Dr Charles Ludowici

charlie.ludowici@gmail.com
www.charlieludowici.com
Berkeley, CA

Scientist with expertise in statistical inference and modeling, mathematical methods, human behavior, experimentation and psychophysics.

Skills and tools

Mathematics - Multivariable calculus, probability, statistics, linear algebra

Experiments - Design and analysis

Statistical inference - Linear regression, generalized linear models (logistic etc.), frequentist hypothesis testing (ANOVA, t-tests, chi-squared tests, likelihood ratio statistics etc.), custom mixture models (in Ph.D.), spline bases, generalized additive models, mixed models.

Machine learning - Reinforcement learning (TDL, SARSA, GQ(λ), continuous and tabular, coded from scratch), SVMs, multinomial logistic regression, random forests, MLP, penalization (ridge regression, LASSO)

Data science - NumPy, pandas, ggplot2, SciPy, Matplotlib, Jupyter, Git(Hub), SQL

Programming languages - R, Python, MATLAB

Analysis Experience

The University of California, Berkeley: Feb 2020 - present

Postdoctoral Scholar, Sight Enhancement Lab, The School of Optometry

- Statistical inference and modeling of behavioral and eye-movement data
- Designing and conducting experiments for research on visual function in ocular disease.
- Producing academic papers, an RL model of eye movements, a complex experiment on vision loss, and analysis of a large eye gaze data set (presented at ARVO)
- Managing lab resources, mentoring undergraduate research apprentices and assisting with lab recruitment
- **Tools:** regression, reinforcement learning, multinomial logistic regression, spline bases, frequentist hypothesis tests, signal processing, GAMs, Matlab, Python, R

The Visual Attention Lab, Harvard University: Feb 2019 - June 2019

Visiting Scholar

- Conducting eyetracking analysis and experimental design for research related to medical image perception.
- Invited to visit and collaborate with the world's leading visual attention researcher on research related to radiology
- **Tools:** Matlab, R, frequentist hypothesis tests

The University of Sydney: 2014 - 2020

Ph.D Candidate, Prof. Alex Holcombe's Lab, School of Psychology: 2016 - 2020

- Experimental design and statistical analysis of experiments investigating the temporal properties of vision and the visual system's ability to process multiple stimuli simultaneously.
- Developing novel statistical analyses and models of behavioral data
- Co-authoring academic publications and presentations
- **Tools:** Custom mixture models, custom analyses based on mixture distributions, mixed models, regression, Bayesian and frequentist hypothesis tests, R, Python, Matlab

Research Assistant, Dr Micah Goldwater, School of Psychology: 2014 - 2016

- Experimental design and statistical analysis of research investigating higher-order cognitive functioning and psychological development.
- Produced analyses of behavioral data, papers and and conference presentations
- **Tools:** ANOVA, linear and logistic regression, mixed models, R, Qualtrics

Other Experience

Teaching, The University of Sydney

TA, The School of Psychology: 2016 - 2018

- Statistics and Research Methods for Psych (PSYC2012), Cognitive and Social Psychology (PSYC2013) and Analytical Thinking (ATHK1001).

TA and Lecturer, School of Health Sciences: 2016

- Quantitative Research Methods in Health (HSBH3018)

Publications

Ludowici, C,. Holcombe, A. O., (2020) The Dynamics of Buffered and Triggered Selection from RSVP Streams. *Journal of Experimental Psychology: Human Perception and Performance* Preprint

Goldwater, M. B., Gershman, S. J., Moul, C., Ludowici, C., Burton, A., Killer, B., Kuhnert, R.-L., & Ridgway, K. (2020). Children's understanding of habitual behaviour. *Developmental Science,* 23(5), e12951. https://doi.org/10.1111/desc.12951

Coates, D., Ludowici, C., Chung, S. T. L (Under review) *The generality of the critical spacing for crowded optotypes: From Bouma to the 21st century*

Education

2016 - 2020: **PhD (Science, Psychology), The University of Sydney**

Thesis: *Temporal Selection in Dynamic Displays: Sensory Information Persists Despite Masking*

2011 — 2015: **Bachelor of Arts (Psychology Honours, First Class), The University of Sydney**

Thesis: *Scaffolding Individual Differences in Category Learning*

Presentations and Talks (selected)

Ludowici, C., Chung, S. T. L. (2021) *Development of preferred retinal loci for fixation in response to binocular asymmetric simulated central scotomas.* Poster presented at the Annual Meeting of The Association for Research in Vision and Ophthalmology, Online.

Ludowici, C., Holcombe, A. (2019) *Selection from concurrent RSVP streams: attention shift or buffer read-out?* Poster presented at the Annual Meeting of the Vision Sciences Society, St. Pete Beach

Holcombe, A., Ludowici, C., Haroz, S. (2019) *Is there a reproducibility crisis around here? Maybe not, but we still need to change.* Poster presented at the Annual Meeting of the Vision Sciences Society, St. Pete Beach

Reproducible Manuscripts with R and R Markdown, (2019), Invited Workshop, Macquarie University, Sydney

Work Authorization

I am Australian and eligible for an E3 speciality occupation visa, an inexpensive 2-year US work visa reserved for Australian nationals, available for unlimited 2-year renewals and premium internal processing (15 days). I am exempt from the home clause on my current J1, which makes in-country processing possible

References

Available upon request