

Ashley Wright

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I am an accomplished and highly organised Research Fellow with a PhD in flood forecasting and over 7 years of experience in delivering data driven insights using time series modelling techniques, statistical models, and algorithms.

KEY SKILLS

Data storytelling

- **End-user meetings** - I have been involved in research projects that have a significant focus on delivering research to end-users. To align strategic priorities with large government organisations and co-operative research centres, I have delivered presentations and reports to end-users who hold operational to director level positions. End-users are adopting recommendations and utilization pathways are in development.
- Delivered 8 presentations and 3 reports to executives and senior executives which led to incorporating a recommended flood forecasting model into a national water forecasting framework.
- **Workshops** – Ran 5 interactive workshops with research and government partners in Australia and Indonesia that enhanced awareness of flood mitigation measures which led to the adoption of water sensitive urban design flood mitigation strategies by the Indonesian city of Bogor (population of 1.2m).
- **Conference presentation** – Delivered 20 presentations on flood forecasting and modelling to conferences in 4 Australian cities and 3 international cities, including the American Geophysical Union conference which draws an attendance of 27,000 members from academia, government and private industry around the world.
- **Journal articles** – Advanced existing literature on flood forecasting area with publication of 4 articles (3 as lead author), in top tier journals, such as Water Resources Research and been cited a total of 18 times. Contributor to an upcoming book chapter on the Intersection of data science and sustainability. Delivered more than 10 research reports to end-users and produced 3 refereed conference articles for national conferences.

Business Acumen

- **Strategic thinking** – To deliver valuable research in a limited time frame I have used critical thinking skills to identify research gaps which add value, identify barriers to success, gain the necessary knowledge required to overcome barriers, execute on research plans, and communicate key findings.
- **Business areas and interconnection** – Projects I have worked on have included multidisciplinary stakeholders from numerous organisations and business units. To deliver successful outcomes I have taken the time to understand competing priorities, pain points, and identify ways to add value to project outcomes.
- **Financial elements** – I have been involved in developing budgets for grant proposals, research hardware, and conference expenses.
- **Leadership** - By developing good relationships and breaking down communication barriers I have demonstrated good leadership skills and effectively led and managed 3 research assistants, supervised more than 8 honours students and organised and ran more than 5 workshop sessions.

Programming

- **Python** – Developing deep learning neural networks such as LSTM and MLP to enhance the accuracy of electricity demand forecasting.
- **MATLAB** – Improve flood forecasting capability by 7.1% using MCMC optimization for Bayesian inference of model parameters and assimilating remotely sensed soil moisture data using the ensemble Kalman smoother.
- **R** – To statistically analyse weather and climatology data .
- **SQL** – Query and/or manipulate geographic and drainage data sets with millions of data points for implementation in flood forecasting models.

Technologies

- **Git/GitHub** - Managed project code.
- **High Performance Computing** - Reduced time to develop research code by scheduling and profiling batch jobs on the MASSIVE research cluster.
- Currently learning to use **Power BI** to develop dashboards and **AWS** to train deep learning networks.

Mathematics & Statistics

- Improved flood forecasting capability by 7.1% for a selection of Australian catchments using time series modelling techniques that involved millions of data points.

PROFESSIONAL CAREER

Monash University

Mar 2014 - Current

Ranked 64th globally in the Times Higher Education World University Rankings 2021

Research Fellow - Flood Forecasting (Sep 2018 - Current)

Accountable for delivering methods to improve hydrological flood forecast skill using remote sensing data. I contribute to team efforts to improve flood forecasting capability at large Australian government organisations to mitigate against the cost of flood damage which is \$377 million per year.

- Improved flood forecasting skill by 7.1% by developing methods to estimate rainfall. I achieved this by running MCMC and data assimilation experiments on the [MASSIVE](#) high performance computing cluster.
- Engage with end-users and stakeholders to ensure research tasks are aligned with strategic priorities.
- Presented research on methodologies to optimise rainfall inputs used in flood forecasts in the USA.
- Collaborate with external agencies to incorporate models into a national water forecasting platform.
- Deliver flood forecasting model development guidelines to end-users.
- Develop and deliver lectures on hydrological modelling.
- Supervision of 3 honours students.
- To demonstrate the capability of data driven models with process-based models to forecast floods. I am using the Long Short-Term Memory (LSTM) recurrent neural network (RNN).

Research Fellow - Flood Mitigation Strategy (Sep 2017 - Jan 2019)

Accountable for developing flood mitigation scenarios for Bogor's water sensitive transition. Our research team delivered roadmaps to aid the Indonesian city of Bogor in their transition to a water sensitive city.

- Organised workshop sessions and developed an app to assess stakeholder receptivity towards flood mitigation options. I presented research findings at the International Conference on Urban Drainage in Palermo Italy.
- Led and managed 3 research assistants, supervised 5 honours students.

EARLIER CAREER

Research Scientist	Metropolitan Fire Brigade	Feb 2016 - May 2016
Teaching Associate	Monash University	Mar 2014 - Sep 2017
Civil Engineer	Breese Pitt Dixon	Jan 2012 - Mar 2014

QUALIFICATIONS

Qualification	Institute	Majors	Awards/Medals	Dates
Doctor of Philosophy	Monash University	Hydrology	Eric Laurenson	Mar 2014-Sep 2017
Bachelor of Engineering	Monash University	Civil Engineering	First class honours	Mar 2007- Nov 2012
Bachelor of Science	Monash University	Maths & Physics		Mar 2007 - Nov 2010

Melbourne Datathon**2020**

As one of the largest Data Science groups the 13,362 member strong [Data Science Melbourne](#) group holds an annual Datathon which attracts interest from more than 700 experienced Data Science professionals and students.

Insights category (2020)

Forecasting models perform well when trained on observed data which has a high probability of being repeated in the future. Major disruptions to human behaviour caused by the COVID-19 pandemic have made many forecasting models less accurate. In this competition I explored the hypothesis that electricity demand forecasting models can be improved by including variables which account for COVID-19 restrictions.

- Delivered insights and demonstrated data science skills by developing my personal [website](#) and delivering weekly blogs.
- In 28 days my blogs and website attracted 267 users for 485 sessions which averaged 4 minutes and 47 seconds. The bounce rate on my website was 62% in this period.
- Adopted a quasi-agile approach by developing a weekly plan, conducting a weekly sprint, adapting my approach based on reviews and feedback obtained through my LinkedIn network and then iterating through this process until the competition ended.
- Performed routine extract transform load (ETL) procedures using the python pandas package.
- Conducted exploratory data analysis (EDA) using the python seaborn and statsmodels packages.
- Achieved fast experimentation rates by using modular coding practices.
- Ensured that value was achieved from day one and increased by adopting scalable modelling practices.
- Adapted my approach based on existing forecasting and electricity consumption forecasting literature.
- Demonstrated that, due to the causal nature of electricity consumption, MLP forecasts electricity consumption better than LSTM and triple exponential smoothers.
- Tracked code development and ensured that work is reproducible by using Git and GitHub and providing commented code.
- Demonstrated that forecast errors in electricity consumption can be reduced by 5.08% by accounting for COVID-19 restrictions.