

# Angus LEWIS

ADDRESS: Adelaide, South Australia

WEBPAGE: <http://angus-lewis.netlify.app/>  
GIT: <https://github.com/angus-lewis>

## EDUCATION

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2018 - Present	<b>PhD (Applied Mathematics)</b> The University of Adelaide <b>Thesis:</b> “Theory and computation for stochastic fluid-fluid models” (expected: early 2022). My work is centred around developing practical methods for approximating probabilities associated with a type of random process called a <i>stochastic fluid-fluid model</i> . Using a combination of probabilistic techniques, differential equations, approximation, and simulation, my research develops new mathematics to enable the practical application of these models. My numerical methods are implemented in Julia and available on github.
2016 - 2018	<b>Master of Philosophy (Applied Mathematics &amp; Statistics)</b> The University of Adelaide <b>Thesis:</b> “Inference of statistical models for South Australian electricity prices.” My work developed state-of-the-art computational statistical methods to learn parameters of, and assess goodness-of-fit for, stochastic models of electricity prices. I applied my methods to model the South Australian wholesale electricity market. The main challenge in fitting these models was to overcome the computational burden inherent in the models. I developed two statistical approaches to model fitting; a Bayesian methodology which employed Monte Carlo techniques, and a maximum-likelihood methodology for which I developed a novel optimisation (EM) algorithm. Both approaches are coded in MATLAB and available on github.
2012 - 2016	<b>Bachelor of Mathematics &amp; Computer Science</b> The University of Adelaide Major: Applied Mathematics & Statistics
2012 - 2016	<b>Bachelor of Finance</b> The University of Adelaide

## PROFESSIONAL EXPERIENCE

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2016 - Present	<b>THE UNIVERSITY OF ADELAIDE</b> <i>Associate Lecturer, Applied Probability – Semester 1, 2019</i> <ul style="list-style-type: none"><li>I delivered the course <i>Applied Probability</i> to 3rd year undergraduates which covered introductory analysis of stochastic processes, i.e. Markov chains and Martingales.</li><li>Group project: predictive-text (natural language processing) algorithms using Markov chains to write new song lyrics, incorporating rhythm and rhyme.</li></ul> <i>Tutor, Practical Supervisor, Casual Lecturer, Marker – Continuing</i> <ul style="list-style-type: none"><li>Courses:<ul style="list-style-type: none"><li>– Stochastic Decision Theory III (a course on stochastic optimisation).</li><li>– Foundations of Data Science.</li><li>– Introduction to Financial Maths.</li><li>– Communication Skills III.</li><li>– Probability &amp; Statistics II.</li><li>– Statistical Practice I.</li><li>– Maths IA.</li></ul></li><li>Teach skills in MATLAB, R, SPSS, Python.</li></ul>
2018	<b>ARC CENTRE OF EXCELLENCE FOR MATHEMATICAL &amp; STATISTICAL FRONTIERS</b> <i>Research Associate, Statistics – Semester 2, 2018</i> <ul style="list-style-type: none"><li>Optimisation algorithms for Bayesian experimental designs.</li><li>Used techniques such as surrogate models/kriging, and genetic algorithms.</li></ul>
2009 - 2016	<b>MACBRYDE HORWOOD AGENCIES</b> <i>Warehouse assistant, cook</i>

## PUBLICATIONS & KEY INDUSTRY ENGAGEMENTS

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Bean, N., **Lewis, A.**, Nguyen, G. (2020). *Estimation of Markovian-Regime-Switching models with independent regimes*. Submitted for review. ArXiv preprint: <https://arxiv.org/abs/1906.07957>.

Bean, N., **Lewis, A.**, Nguyen, G. (2020). *Bayesian estimation of trend components within Markovian regime switching models for wholesale electricity prices: an application to the South Australian wholesale electricity market*. Submitted for review. ArXiv preprint: <https://arxiv.org/abs/2009.07471>.

Bean, N., **Lewis, A.**, Nguyen, G., O'Reilly, M. M., Sunkara, V. (2020). *A discontinuous Galerkin method for approximating the stationary distribution of stochastic fluid-fluid processes*. In preparation.

Participant: *Planning, valuation and optimisation of long-distance electricity transmission lines*. Maths in Industry Study Group (MISG), Adelaide, 2018. About: utilised stochastic linear programming to value long-distance power transmission lines.

Participant: *Optimisation of electricity microgrid controllers*. Maths in Industry Study Group (MISG), Adelaide, 2017. About: utilised linear programming to optimise the use of battery storage systems for small communities of cooperative households.

## SKILLS

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- Programming skills in Julia, MATLAB and R.
- Communication of technical topics, evidenced by teaching and the preparation of manuscripts.
- Passion for solving real-world problems with quantitative approaches.
- Fast learner.

## AWARDS & ACTIVITIES

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| 2018-2021 |  | <b>Australian Research Training Program Stipend</b>  |
| 2018-2021 |  | <b>ACEMS (Centre of Excellence) Student Support Scheme Scholarship</b>   |
| 2016-2018 |  | <b>University of Adelaide Master of Philosophy Scholarship</b>   |
| 2018      |  | <b>Applied Probability Trust Prize, University of Adelaide</b><br>Prize for best Master's thesis in applied probability.   |
| 2017      |  | <b>Postgraduate representative, School of Mathematical Sciences, University of Adelaide</b>  |
| 2017      |  | <b>ACEMS student representative, retreat organiser</b>   |
| 2016      |  | <b>RB Potts Prize for Applied Mathematics</b><br>Prize for highest coursework grade in applied mathematics.  |
| 2015-2016 |  | <b>Australian Mathematical Sciences Institute (AMSI) summer research scholarship</b><br>Topic: Approximating heavy-tailed distributions with Phase-type distributions with infinitely many phases. |

## REFEREES AVAILABLE ON REQUEST

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