LEANNE J DONG

Postdoctoral Research Fellow in System and Environmental Engineering

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EXPERIENCE

Postdoctoral Research Fellow

Concordia University, School of Computer Science and Engineering

📅 Feb 2020 – Ongoing   📍 Montréal, Canada

- Extending the C/C++ Engine of :: $INSEL^{4D}$ towards an undirected concept.
- Hydraulic/Energy Network simulation
- Mathematical and Physical Modelling of Networks
- Teaching and Supervising graduate students
- Conducting research, writing tutorials on physics-enhanced explainable Deep Learning

Visiting Researcher

UTS, School of Computer Science

📅 Dec 2019 – Aug 2020   📍 Sydney, Australia

- Finalising the theoretical framework of HIPPER, a tool that allows accurate forecast of social media intensity
  1. Implement an explicit numerical approximation of the intensity function in C++;
  2. Compute the conditional expectation of the future intensity having observed past counts.

Postdoctoral Research Fellow

UTS, School of Computer Science

📅 May 2019 – December 2019   📍 Sydney, Australia

- Theoretical Development of a novel Stochastic Information Diffusion models with partially observed/interval-censored processes for social media analytic, with gigantic twitter data
- Compute the conditional expectation of the future intensity having observed past counts.

Postdoctoral Intern

Centre for Translational Data Science, School of Computer Science at the University of Sydney

📅 Jan 2019 – May 2019   📍 Sydney, Australia

- Learn about the fundamentals of Machine Learning/Deep Learning and software development tools
- Learn to write neural-network from scratch in Python and C++ (include feedforward, Bayesian and Recurrent neural-network)
- Learn the basics of Natural Language Processing

CURRENTLY ACTIVE PROJECTS

Project 1: Network simulation and development of INSEL engine

CERC/Concordia University

📅 2020-2022   📍 Montréal, Canada

- Extending the INSEL C/C++ engine towards undirected graph
- Automating Power and Hydraulic Networks
- Computational Fluid Dynamics for hyperbolic PDEs

Project 2: Explainable AI

ThalesAI

📅 2020-2022   📍 Montréal, Canada

Recent theoretical developments in ML, supplemented by the rapid growth of computational power and the availability of large data sets, have contributed to the rapid development of AI systems. Despite the great performance AI encompasses, there is an issue of user adoption at a larger scale. In recent years, there has been considerable research efforts on developing AI systems that are easily understood by humans. The lack of human trust of AI system leads to the field - eXplanable Artificial Intelligence, or xAI.
In this project, we take an algorithmic approach to a few difficult questions in the domain of intepretable machine learning and xAI, accompanied with data experiments and C++ implementations.

PUBLICATIONS

Dong, J, Leanne: *Stochastic Navier-Stokes equation on a 2D rotating sphere with stable Lévy noise*; in Bulletin of the Australian Mathematical Society 1-2; Download, January, 2019 Dong, J, Leanne: *Strong solu-*

tions for the Stochastic Navier-Stokes equation on a 2D rotating sphere with stable Lévy noise; Volume 489 (2); **Journal of Mathematical Analysis and Applications** T https:

- Conduct research in MCMC/Variational Inference, Bayesian neural-network through reading highly cited machine learning papers

Lecturer in Charge in Statistic

Faculty of Education and Art, Australian Catholic University

📅 June 2018 – Jan 2019   📍 Sydney, Australia

- Developed, coordinated and lectured the second year unit- Statistics and Probability using Rmarkdown
- Developed presentations with RSlidy and Rmarkdown
- Administration, Marking and tutoring
- Help art students learn statistical programming language R in a simple and meaningful way

Teaching Associate

School of Mathematics and Statistics, The University of Sydney

📅 March 2016 – June 2019   📍 Sydney, Australia

Taught over 12 subjects in range of
- Statistics and Data Science: Foundation Data Science (normal and advanced); Statistical thinking with R; Stochastic Processes
- Mathematics: Differential/ Integral and Vector Calculus, Linear Algebra (1st&2nd year level); Partial Differential Equation

Duty: Deliver face-to-face weekly whiteboard tutorials to large group of students, Assignment/Final Exam marking and invigilation

Teaching Associate

Discipline of Business Analytic, The University of Sydney

📅 2019-2020   📍 Sydney, Australia

Taught subjects in range of
- Statistical Machine Learning and Data Mining with Python
- Quantitative Business Analytic
- Financial Time series and Forecasting

Deliver face-to-face weekly tutorial to Master coursework students, Design python tutorials on unsupervised learning and deep learning

Teaching Associate

School of Mathematics and Physics, The University of Technology Sydney

📅 March 2011 – June 2019   📍 Sydney, Australia

Talk over 10 subjects in range of
- Mathematics: Advanced Mathematics and Physics (Complex Analysis focus); Mathematical Analysis and Modelling; Computational Linear Algebra (with Python/Matlab); Dynamical Systems; Mathematical Modelling for Science and Engineering
- Physics: Quantum Physics

Duty: Prepare teaching material, deliver face-to-face tutorial to large group of engineering students, Assignment/Final Exam marking and invigilation

Private Tutor

2018

📅 Sydney, Australia

//doi.org/10.1016/j.jmaa.2020.124182, May, 2020

Dong, J, Leanne: *Random Attractors for Stochastic Navier-Stokes equation on a 2D rotating sphere with stable Lévy noise*;Available at https://arxiv.org/abs/1811.10532; **Under Review**

Dong, J, Leanne: *Invariant Measures for the Stochastic Navier-Stokes equation on a 2D rotating sphere with stable Lévy noise*; Available at https://arxiv.org/abs/1812.05513, December, 2018.

Dong, J, Leanne and Van der Hoek, John: *An Explicit Numerical Algorithm to the Solution of Volterra Integral Equation of the 2nd Kind*; Available at https://arxiv.org/abs/1908.02862, August, 2019

Dong, J, Leanne and Van der Hoek, John: *Generalised Solution of the Volterra Integral Equation of the Second Kind*; Available at arXiv preprint, September, 2019

Dong, J, Leanne: *Temporal Modelling Of Job Counts Data: Regression Analysis with Copulas*; September, 2019; Demo available

MY LIFE PHILOSOPHY

"The more you know, the more you fear you don't know."

MOST PROUD OF

🏆 **Completed a PhD in Mathematics**

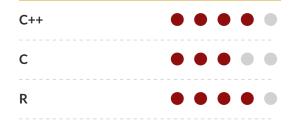❤️ **Work in two development-driven research jobs after the PhD**

SKILLS

Hard-working   Listener   Motivator   Technical writing   Numerical Analysis   Energy network modelling   Mathematical, Physica   Machine Learning   Stochastic/Statistical Analysis

LANGUAGES

C++   ●●●●○

C   ●●●○○

R   ●●●●○

Deliver one-to-one Advanced Multivariable and Vector tutorial to a matured student over the weekend.

PRIZES, AWARDS AND GRANT

2012
Dean Merit of Academic Excellence, UTS
🏛 Rank 1st in honour year

2013-2015
Australian Postgraduate Awards

2012-2015
Industrial Doctoral Training Stipend

2018
MAGIC ECR travel grant
🏛 MAGIC

2019
Postdoctoral Fellowship at UTS (Sydney)
🏛 Institute for Data Science

2019
Postdoctoral Fellowship at Concordia (Montreal)
🏛 Gina Cody School of Engineering and Computer Science

2020
Mitac/Thale AI postdoc grant

WORKSHOPS AND CONFERENCE PARTICIPATION AND PRESENTATION

- Workshops: GPU computing with Artemis HPC (1st March, 2019, Sydney Informatics Hub)
- **Conferences**
  - CppEurope Conference (23rd, June 2020, Scholarship recipient)
  - Quantum Computer Science Summer School (14th - 16th Jan 2020, UTS)
  - Stochastic PDE workshop (26th-28th August 2019, The University of Sydney)
  - MAGIC 2018 – Mentoring and guidance in careers workshop for early career female researchers in Mathematics and Physics (29th Oct – 2nd Nov 2018, Australian National University, Canberra)
  - Analysis and PDE seminar (July, 2016, UNSW)
  - AMSI/AustMS 2014 Workshop in Harmonic Analysis and its Applications (21st-25th July 2014, Macquarie University)
  - Simon centre lectures in "Mathematical Aspects of Quantum Field Theory"
- Attended Hons/Master Pure Mathematics courses at Uni Adelaide:
  - Functional Analysis (S2, 2014)
  - Lie groups, Lie algebras (S2, 2014)
  - Algebraic Topology (S1, 2014)
  - Abstract Algebra (S1, 2014)

Python ●●●○○

MATLAB ●●●○○

English ●●●●●

Mandarin ●●●●○

Cantonese ●●●●○

EDUCATION

Ph.D. in Mathematics
The University of Sydney
🏛 Jan 2016 – April 2018

Thesis title: Stochastic Navier Stokes equations on 2D rotating sphere perturbed by stable Lévy noise

B.Sc. in Mathematics with First Class Honours and University Medal
The University of Technology Sydney
🏛 Mar 2008 – May 2012

Thesis title: The pricing of VWAP options under geometric Lévy process framework

M.Sc. in Finance (Investment Banking)
The University of New South Wale
🏛 Aug 2005 – Jan 2008

B.Com. in Accounting and Economics
Macquarie University
🏛 Aug 2003 – Feb 2005

CERTIFICATES

2008
Completed Level I of Chartered Financial Analyst Exam

2012
Obtained a full certificate of Object-Oriented C++
🏛 PhD coursework funded by UTS Faculty of Science

2018-2019
Completed 10 programming certificates on Object-Oriented Programming in C++, Machine Learning in Python

- Groups and Rings (S1, 2014)
- AMSI Summer school January 5th-30th 2014
  - Differential Geometry (Attended for credit, Mark:81)
  - Conformal Field Theory and String theory (Attended)
- Gave 2 talks in PDE seminar at UNE on the topic of travelling wave solutions,
- Gave a talk on PhD research proposal in the school of Petroleum, University of Adelaide,
- Attend regular research seminars given by peers doctoral students, staff members and visiting scholars.

See LinkedIn page

PROFESSIONAL MEMBERSHIPS

Australian and New Zealand Association of Mathematical Physics (ANZAMP)

VOLUNTEERING

CppCon Ambassador
Sep 2020

The C++ Conference

Participants supervisor in the Simon Marais Mathematics Competition
Sep 2017

The University of Sydney

Montreal C++/Linux Meetup

Sydney C++/Linux Meetup

CITIZENSHIP

Australian

VISA

Currently on a Canadian work permit until 2022