Jin Sean (Nick) **Lim**

Postdoctoral Research Fellow | Statistical Data Science | Applied AI

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Professional Profile

Statistically grounded data scientist, machine learning researcher, and tertiary educator with a PhD in Statistics and a strong record in applied artificial intelligence for environmental and scientific data. Research expertise spans adaptive machine learning, data streams, environmental AI, computer vision, forecasting, and decision-support systems for real-world, evolving data.

Experienced in undergraduate and postgraduate teaching in machine learning, data mining, statistical methods, and data science, including curriculum design, assessment development, laboratory teaching, student mentoring, and postgraduate supervision. Experienced supervisor of MSc, PhD, and honours research students, with a strong commitment to inclusive, student-centred teaching.

Academic Qualification

2020 Doctor of Philosophy, Statistics, University of Waikato.
Thesis: *Ensemble Learning of High Dimension Datasets*

2015 Masters of Science, Mathematics, University of Waikato.
Thesis: *Star Decomposition of Bipartite Graphs.*

2004 Bachelors of Electronics Engineering, Telecommunications, Multimedia University

Professional Appointment

Postdoctoral Research Fellow **2020-Present**
Artificial Intelligence Institute, University of Waikato
Project: Time-Evolving Data Science and Artificial Intelligence for Advanced Open Environmental Science (Funded by the Ministry of Business, Innovation and Employment)

- Conduct research in machine learning, statistical data science, environmental AI, computer vision, data streams, forecasting, and applied decision-support systems.
- Contribute to the development and deployment of machine learning tools for environmental monitoring, flood forecasting, ecological image analysis, and scientific data platforms.
- Collaborate with researchers, postgraduate students, regional councils, conservation organisations, and national/international academic partners.
- Supervise and mentor postgraduate and honours students working on machine learning, environmental data science, and applied AI projects.
- Support research infrastructure, laboratory operations, technical workflows, and stakeholder-facing AI demonstrations.
- Contribute to publications in reputable journals and international conference proceedings across machine learning, ecological informatics, environmental science, remote sensing, and applied AI.

Teaching Experience

Co-Lecturer & Convenor **2021 – 2026**
University of Waikato

- **Machine Learning for Data Streams (COMPX523) [2026]:** Convenor and co-lecturer.
  - Convened and co-lectured postgraduate coursework in machine learning for evolving data, data stream mining, incremental learning, ensemble methods, and adaptive modelling.
  - Designed and delivered advanced learning materials connecting machine learning theory with real-world data stream applications.
  - Supported postgraduate students in developing research-informed technical understanding of online learning, changing distributions, and scalable machine learning methods.
  - Developed assessment and learning activities that encourage applied reasoning, algorithmic understanding, and critical interpretation of model behaviour.
  - Delivered material for online, recorded, or asynchronous learning environments.
  - Used Moodle, Panopto, online labs, remote consultation, online assessment, and other digital learning tools.
- **Machine Learning (COMPX310) [2021 – 2024]:** Co-lecturer.
  - Co-lectured undergraduate machine learning cohorts, contributing to curriculum design, lectures, assessment development, student support, and course delivery.
  - Taught core concepts in supervised and unsupervised learning, model evaluation, practical machine learning workflows, and applied data science.
  - Developed learning activities that ground abstract statistical and machine learning concepts in practical examples, tangible demonstrations, and real-world datasets.
  - Supported students in developing both conceptual understanding and practical implementation skills.

Sessional Assistant & Tutor **Feb 2014 – Nov 2019**
University of Waikato

- Facilitated tutorials and laboratory sessions across Practical Data Mining, Statistical Methods, General Mathematics, and related quantitative courses.
- Provided inclusive, student-centred teaching support across diverse learning backgrounds and levels of mathematical preparation.
- Delivered one-to-one and small-group academic support for students with additional learning needs, including work in partnership with the Disability Office and Pacific-Aid Scholarship Office.
- Helped students build confidence in statistical reasoning, mathematical problem solving, programming practice, and applied data analysis.
- Developed an interactive teaching style focused on clear explanation, practical examples, and supportive feedback.

Professional & Public Tutorials

Course Assistant, NVIDIA DLI Generative AI with Diffusion Models, AI Hackathon Bootcamp (2025)

Instructor, Introductory Machine Learning, AI Hackathon Bootcamp (2024)

Instructor, Scikit-Learn for Beginners, Indigidata Aotearoa Wanaga (2023)

Instructor, Machine Learning for Flood Practitioners, Waikato Regional Council (2023)

- Delivered machine learning, generative AI, and applied data science training to learners across academic, professional, public-sector, and community settings.
- Translated technical machine learning concepts into accessible material for practitioners and non-specialist audiences. Supported capability building in applied AI for environmental management, flood forecasting, and Indigenous data science contexts.
- Developed practical examples and demonstrations using Python, scikit-learn, deep learning tools, and domain-relevant datasets.

Postgraduate and Research Supervision

Ph.D.	2 Ongoing (Co-Supervisor)
M.Sc.	3 Completed / 3 Ongoing (Primary Supervisor)
B.Sc. (Hons)	5 Completed

Research Programme

My research develops explainable deep learning and adaptive statistical machine learning methods for time-series forecasting, evolving data streams, and environmental decision support. I focus on models that not only forecast complex real-world processes, but also provide interpretable evidence about the drivers, timing, uncertainty, and reliability of their predictions.

My work connects methodological questions in explainability, domain shift, robust forecasting, and data streams with applied problems in river-stage forecasting, environmental monitoring, ecological computer vision, and public-good decision support. A central aim is to build models that remain useful under changing conditions and can support trustworthy decisions in environmental, scientific, and operational settings.

Applied Research Projects & Impact

AI Platform for Flood Forecasting

Partners: Waikato Regional Council, Flood Management and Forecasting Inter-council

- Developed and deployed deep learning river stage forecasting models integrated into the TAIAO platform (Deployed 2025).
- Contributed to real-time flood impact assessment tools designed to support civil defence, emergency response, and regional flood-risk management.
- Worked at the interface of machine learning, environmental data, stakeholder needs, and public-good decision support.
- Delivered machine learning training for flood practitioners, helping translate AI methods into operational environmental management contexts.
- Led model development, stakeholder workshops, deployment evaluation, reporting, and grant deliverables.

Computer Vision for Wildlife & Environmental Monitoring

- Spearheaded a scalable computer vision pilot project that advanced automated ecological tracking and wildlife monitoring methodologies.
- Developed targeted detection systems for regional conservation efforts, including seastar detection in Ohiwa harbour, bird species analysis for the Maungatautari Sanctuary, and camera trap predator detection for Mt. Karioi.
- Engineered a semi-automated benthic habitat video annotation prototype to enhance the management and tracking of ecosystem threats.

TAIAO Environmental Data Science Programme

- Contributed to the MBIE-funded TAIAO programme, supporting time-evolving data science and AI for advanced open environmental science.
- Worked across environmental machine learning, image analysis, forecasting, data streams, and applied scientific AI.
- Supported collaborative research involving academic teams, students, public-sector partners, and environmental stakeholders.
- Helped develop resources and demonstrations that make machine learning methods available for New Zealand environmental data challenges

Publications

Peer-Reviewed Journal Articles

[1] C. Eastwood, **N. Lim**, R. Durie, B. D. Rue, A. Bifet, and C. Reed, "Integrating agentic artificial intelligence into pasture-based dairy systems: Applications, governance, and future directions," *JDS Communications*, 2026.

[2] G. Cassales, S. Salekin, **N. Lim**, D. Meason, A. Bifet, B. Pfahringer, and E. Frank, "A comparative study of four deep learning algorithms for predicting tree stem radius measured by dendrometer: A case study," *Ecological Informatics*, vol. 86, p. 103 014, 2025.

[3] H. Wang, P. Schlumbom, E. Frank, V. Vetrova, G. Holmes, B. Pfahringer, **N. Lim**, and A. Bifet, "Automatic species identification from images for aotearoa," *Journal of the Royal Society of New Zealand*, vol. 55, no. 6, pp. 2216–2232, 2025.

[4] **N. Lim**, A. Bifet, D. Bull, E. Frank, Y. Jia, J. Montiel, and B. Pfahringer, "Showcasing the taiao project: Providing resources for machine learning from images of new zealand's natural environment," *Journal of the Royal Society of New Zealand*, vol. 53, no. 1, pp. 69–81, 2023.

Refereed Conference Proceedings

[5] M. V. dos Santos Ferreira, L. C. D. Cavalcanti, T. N. Rios, G. W. Cassales, **N. J. S. Lim**, A. Bifet, and R. RIOS, "Environmental monitoring in new zealand: Exploring spatiotemporal relationships," in *AAAI-26 AI for Environmental Science Workshop*, 2026.

[6] Y. Sun, **N. Lim**, G. W. Cassales, H. M. Gomes, B. Pfahringer, A. Bifet, and A. Dwivedi, "Detecting domain shifts in myoelectric activations: Challenges and opportunities in stream learning," in *Pacific Rim International Conference on Artificial Intelligence*, Springer Nature Singapore Singapore, 2025, pp. 669–677.

[7] S. Cheng, Q. Shi, **N. J. S. Lim**, and A. Bifet, "Aa-rpn: Adaptive anchor-based region proposal network for remote sensing object detection," in *International Conference on Neural Information Processing*, Springer Nature Singapore Singapore, 2024, pp. 138–152.

[8] A. Dwivedi, **N. Lim**, A. Bifet, E. Frank, and B. Pfahringer, "Enhancing aerial imagery analysis: Leveraging explainability and segmentation," in *2024 International Conference on Machine Intelligence for GeoAnalytics and Remote Sensing (MIGARS)*, IEEE, 2024, pp. 1–3.
[9] Y. S. Koh, A. Bifet, K. R. Bryan, G. Cassales, O. Graffeuille, **N. J. S. Lim**, P. Mourot, D. Ning, B. Pfahringer, V. Vetrova, et al., "Time-evolving data science and artificial intelligence for advanced open environmental science (taiao) programme," International Joint Conferences on Artificial Intelligence (IJCAI), 2024.
[10] J. L. König, J. Penaredondo, **N. Lim**, A. Hinze, and J. Bowen, "The impact of data aggregation: Advocating for individualized analysis in wearable sensor research," in *Proceedings of the 36th Australasian Conference on Human-Computer Interaction*, 2024, pp. 717–726.
[11] P. Mourot, **N. Lim**, B. Pfahringer, and A. Bifet, "A regional flood impact prediction tool using machine learning to manage flood risk in real-time. a case study in new zealand.," in *EGU General Assembly Conference Abstracts*, 2022, EGU22–12 455.
[12] Y. Zhang, B. Pfahringer, E. Frank, A. Bifet, **N. J. S. Lim**, and Y. Jia, "Repeated augmented rehearsal: A simple but strong baseline for online continual learning," in *Proceedings of the 36th International Conference on Neural Information Processing Systems*, 2022, pp. 14 771–14 783.
[13] D. Bull, **N. Lim**, and E. Frank, "Perceptual improvements for super-resolution of satellite imagery," in *2021 36th International Conference on Image and Vision Computing New Zealand (IVCNZ)*, IEEE, 2021, pp. 1–6.
[14] Y. Jia, E. Frank, B. Pfahringer, A. Bifet, and **N. Lim**, "Studying and exploiting the relationship between model accuracy and explanation quality," in *Joint European Conference on Machine Learning and Knowledge Discovery in Databases*, Springer International Publishing Cham, 2021, pp. 699–714.
[15] B. Durrant and **N. Lim**, "A diversity-aware model for majority vote ensemble accuracy," in *International Conference on Artificial Intelligence and Statistics*, PMLR, 2020, pp. 4078–4087.
[16] K. Yeoh, **J. Lim**, K. Goh, and S. Tee, "Custom digital cell generation flow for 65nm processes," in *SoC Design Conference (ISOCC), 2009 International*, IEEE, 2009, pp. 177–181.
[17] F. N. Tan, S. G. Pang, D. Sasidaran, C. S. Lee, **J. S. Lim**, P. L. Ooi, and L. K. Yong, "Core excitation modeling methodology for efficient power delivery analysis," in *2008 10th Electronics Packaging Technology Conference*, IEEE, 2008, pp. 1415–1420.
[18] F. N. Tan, A. Chai, S. G. Pang, D. Sasidaran, K. H. Ng, S. C. Deo, C. S. Lee, **J. S. Lim**, P. L. Ooi, C. N. Loke, et al., "Transient current modeling & power delivery analysis for next gen chipset core," in *2007 International Conference on Electronic Materials and Packaging*, IEEE, 2007, pp. 1–23.

Theses

[19] **J. S. Lim**, "Ensemble learning of high dimension datasets," Ph.D. dissertation, The University of Waikato, Hamilton, New Zealand, 2020. [Online]. Available: `https://hdl.handle.net/10289/13422`.
[20] **J. Lim**, "Star decomposition of bipartite graphs," M.S. thesis, University of Waikato, 2015.

Academic Service and Administration

Institutional Leadership & Administration

- **Lab Manager and Administrator:** Direct technical infrastructure, procurement, and daily operations for the Artificial Intelligence Institute's research laboratory.

Professional Service & Committees

- **Treasurer, New Zealand Artificial Intelligence Olympiad [2025-]:** Oversee financial operations and administrative infrastructure (including domain management) for the New Zealand Artificial Intelligence Olympiad.

- **University Representative, AIRA [2026]:** Serve as the institutional liaison for the Artificial Intelligence Researchers Association (New Zealand), representing the University of Waikato.
- **Organizing Committee, AusDM 2024:** Facilitated event promotion and operational execution for the Australasian Data Mining Conference in Auckland.
- **Program Committee & Peer Reviewer:** Actively review for premier machine learning and AI venues including NeurIPS, ICLR, IJCAI, SIGKDD, ISPRS, AusDM, and the *Machine Learning* journal.

Equity, Inclusion, Te Tiriti Engagement, and Public Outreach

- Committed to inclusive teaching practices that support diverse learners, including students with different levels of mathematical preparation, learning needs, cultural backgrounds, and confidence in technical subjects.
- Provided tailored academic support in partnership with the Disability Office and Pacific-Aid Scholarship Office.
- Contributed to Indigenous data science capability building as instructor for Scikit-Learn for Beginners at Indigidata Aotearoa Wānanga.
- Engaged with indigenous interest groups, overseas researchers, government delegations, industry groups, and public audiences on artificial intelligence and large language models.
- Represented the department at University Open Days and roadshows, supporting student recruitment and public engagement with mathematical, computational, and AI disciplines.
- Committed to respectful engagement, inclusive teaching, community-aware research practice, and support for Māori and Pacific learner success.

Public Communication and Stakeholder Engagement

- Routinely represent the Artificial Intelligence Institute in public and stakeholder-facing presentations on artificial intelligence, machine learning, and large language models.
- Present to audiences including overseas researchers, foreign government delegations, industry groups, indigenous interest groups, public-sector practitioners, and the wider public.
- Translate complex AI and statistical data science concepts into accessible explanations for non-specialist audiences.
- Build relationships between academic AI research and practical societal needs in environmental management, ecological monitoring, education, and public understanding of AI.

Industry Experience

Component Design Engineer **May 2004 – Feb 2011**
Intel Corporation, Penang, Malaysia

- **Technical Pedagogy & Mentorship:** Served as Graduate Intern Trainer and Department-level instructor on UNIX computing and proprietary environments; mentored graduate hires in circuit-level simulation, and debugging.
- **Computational Modeling & Optimization:** Engineered automated mathematical models for transistor-level simulations, applying multi-variable numerical optimization to streamline the translation of complex designs into equivalent circuit models.
- **Software & Workflow Automation:** Earned a division-level award for engineering workflow automations that accelerated the translation of circuit designs between process nodes within a specialized 'skunkworks' initiative.