# QILIN LI

Associate Lecturer (Teaching & Research)

*Curtin University, Perth, WA*

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*"Stay hungry. Stay foolish."*

## Summary

- Lecturer of Computing at Curtin university who teaches computer science and machine learning
- Multi-discipline researcher with expertise in machine learning and domain knowledge in civil engineering
- Researcher devoted in data-driven computational models for structural dynamics

## Employment

### Curtin University

*Perth, Australia*

Lecturer

*Dec. 2022 - Present*

- Responsibilities:
  - Teaching: curriculum design, units coordination, lecture delivering, postgraduate supervision
  - Research: academic research and industrial collaboration
- Achievements:
  - Developed and coordinated a large unit "Machine Learning" with around 400 students across five global campuses
  - Developed innovative graph-based auto-regressive model for structural dynamics analysis, which is several orders of magnitude faster than numerical models
  - Won a Third prize in the International Competition for Structural Health Monitoring (IC-SHM2022), with project title "Computer Vision based Ship Detection and 3D Trajectory Reconstruction for Ship-bridge Collision Prevention"

### Curtin University

*Perth, Australia*

Associate Lecturer

*Jun. 2020 - Dec. 2022*

- Responsibilities:
  - Teaching: units coordination, lecture delivering, postgraduate supervision
  - Research: academic research and industrial collaboration
- Achievements:
  - Participated as one of the CIs in the ARC Linkage project LP21010027, titled "Damage Detection and Quantification using Infrastructure Digital Twins"
  - Co-supervising two PhD projects and supervising many honours and advanced-science projects
  - Collaborated with multi-discipline researchers from civil engineering and humanities on projects of "Structure Protection via Machine Learning against Explosion" and "Household Practice Analysis based on Machine Learning for Energy Saving"
  - Coordinated and lectured several units, including "Foundations of Computer Science", "Fundamental Concepts of Cryptography", and "Explainable Approaches in AI"
  - Managed units of various levels from first year to postgraduate with the number of students up to 120

**Curtin University** *Perth, Australia*

SESSIONAL ACADEMIC *August 2018 - Jun. 2020*

- Responsibilities:
  - Deliver tutorials, practical sessions, and laboratory sessions for computing units
  - Mark tests, assignments, and exams
- Achievements:
  - Involved in multiple units, including "Data Mining", "Fundamentals of Programming", "Fundamental Concepts of Cryptography", and "Artificial and Machine Intelligence"
  - Conducted tutorial sessions with students of diverse backgrounds and levels, from undergraduate to postgraduate

**Resonance Health Ltd.** *Perth, Australia*

R&D OFFICER *Sep. 2016 - Jan. 2018*

- Project: **a machine learning approach to measuring volumetric liver fat fraction in histological sections of liver biopsies**
- Responsibilities:
  - Conducted in-depth research on how to reduce the measurement variance, and how to address data imbalance problem
  - Designed and conducted experiments for the evaluation of various approaches
  - Generated vast amount of synthetic data using data augmentation techniques to make deep learning approaches applicable
  - Cooperated with experts on AI, physics, and medicine, from both academia and industry
- Achievements:
  - Developed two successful solutions. One was based on random forest using carefully handcrafted features. Another was based on convolutional neural network using the raw image data enhanced by data augmentation
  - Significantly **improved the efficiency from 30 minutes human experts evaluation to 30 seconds automatic machine processing** for a typical histological section of liver biopsies
  - Achieved satisfactory accuracy compared to manually assessed results with significantly less variance

# Education

**Curtin University** *Perth, Australia*

PH.D. - MACHINE LEARNING, DEEP LEARNING, COMPUTER VISION *Mar. 2017 - August. 2020*

- Thesis title: affinity learning on graphs with diffusion process
  - Representation learning on graphs using graph convolutional networks. It is promising as current deep learning techniques are powerful only on Euclidean data, but can not be directly applied on other geometric data, such as graphs
  - Conducted in-depth research on graphs with other techniques, such as graph regularization, spectral graph theory and random walks. These methods work fine when prominent feature representation is given, which is usually not the case in computer vision
  - Achieved state-of-the-art performances on various tasks on graphs, such as graph node clustering, semi-supervised classification
- **Published 5 quality journals (3 Q1, 2 Q2) and 1 conference paper**, mostly as main contributor
- Received the full RTP scholarship from Curtin University
- **Graduated with commendation from the chancellor of Curtin university**

**Curtin University** *Perth, Australia*

M.PHIL. - MACHINE LEARNING, COMPUTER VISION *Mar. 2014 - Mar. 2016*

- Thesis title: clustering by pairwise similarity
  - Focused on pair-wise similarity learning with fuzzy logics and diffusion processes
  - Utilized fuzzy memberships to extract prominent features, and diffusion processes to augment pair-wise similarity with nearest neighbor context
  - Significantly improved benchmark clustering algorithms, including spectral clustering, sparse subspace clustering when applied on common image data, such as face, object
- Published **2 journals (1 Q1) and 2 conference papers**, mostly as main contributor
- **Graduated with commendation from the head of discipline**

**SUN YAT-SEN University** *Guangzhou, China*

B.S. - COMPUTER SCIENCE *Sep. 2009 - June. 2013*

- Top 10 university in China
- Average grade 82.57/100

# Publication

## Selected Journals

- **Li, Q.** et al., (2024). Machine learning prediction of BLEVE loading with graph neural networks.
  *Reliability Engineering & System Safety* **(Q1, IF 8.1)**
  - Highlight: the first paper use GNN to predict spatial-temporal blast loading
- **Li, Q.** et al., (2023). Machine learning prediction of structural dynamic responses using graph neural networks.
  *Computers & Structures* **(Q1, IF 4.7)**
  - Highlight: the first paper use GNN to predict spatial-temporal structural dynamics
- **Li, Q.** et al., (2023). A comparative study on the most effective machine learning model for blast loading prediction: From GBDT to Transformer.
  *Engineering Structures* **(Q1, IF 5.5)**
  - Highlight: the first comparative study to rigorously evaluate ML models for blast loading prediction
- **Li, Q.** et al., (2023). Multi-View Diffusion Process for Spectral Clustering and Image Retrieval.
  *IEEE Transactions on Image Processing* **(Q1, IF 10.6)**
  - Highlight: diffusion based graphical model for both clustering and retrieval
- Li, J., **Li, Q.** et al., (2021). Prediction of BLEVE blast loading using CFD and artificial neural network.
  *Process Safety and Environmental Protection* **(Q1, IF 4.966)**
  - Highlight: early work of using ANN for BLEVE blast loading prediction
- **Li, Q.** et al., (2020). Semi-supervised learning on graphs with an alternating diffusion process
  *IEEE Transactions on Neural Networks and Learning Systems* **(Q1, IF 8.793)**
  - Highlight: semi-supervised learning on graphical models

# Honors & Awards

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|---|---|---|
| 2023 | **Third Prize in ICSHM 2022**, Won the third prize in an international competition for structural health monitoring | *Online, International* |
| 2020 | **PhD Graduation Commendation**, Awarded a letter of Commendation from the Chancellor of Curtin University | *Perth, Australia* |
| 2017 | **RTP Scholarship**, Received the full RTP scholarship from Curtin University for the entire period of PhD | *Perth, Australia* |
| 2016 | **MPhil Graduation Commendation**, Received a commendation letter from Computing Discipline at Curtin University | *Perth, Australia* |

# Extracurricular Activity

### International Journals

Reviewer *2016 - Present*

- Contributed to the academia as a peer-reviewer of many international journals.

### Machine Learning Framework

Contributor *2017 - Present*

- Contributed to the clustering module of the open source machine learning framework of our research group
- Aimed at providing easy usage of machine learning algorithms for current and future students

### Open Source Code in Publications

Developer *2018 - Present*

- Open source codes for all publications at my github: `https://github.com/qilinli`

# Referees

**Professor Hong Hao**
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