# Kairan ZHAO

MB 4.17 – University of Warwick – Coventry, UK
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## Education

**University of Warwick** **Jan. 2023 - present**
*Coventry, UK*
- Ph.D. in Computer Science
- Advisors: Prof. Peter Triantafillou
- Research focus: Machine Unlearning, Machine Learning Privacy

**Xi'an Jiaotong University** **Sep. 2019 - Jun. 2022**
*Xi'an, China*
- M.Sc. in Control Engineering
- Advisors: Prof. Chao Shen, Prof. Meng Zhang, Prof. Xiaohong Guan
- Member of MOE Key Lab for Intelligent Networks and Network Security
- GPA: 3.72/4.0

**École Centrale de Lille** **Jul. 2017 - Jun. 2019**
*Lille, France*
- M.Eng. in General Engineering (Diplôme d'Ingénieur Généraliste)
- Double Master's Degree Program

**Xi'an Jiaotong University** **Sep. 2015 - Jun. 2019**
*Xi'an, China*
- B.Eng. in Computer Science and Technology

## Projects

**Understanding Difficulty of Unlearning** **Sep. 2023 - present**
- Led the project to comprehend the difficulty of machine unlearning, in collaboration with Google DeepMind
- Implemented ideas from model pruning to study the models' parameters in unlearning
- Implemented ideas from disentangled representation learning to bring new insights to the problem

**NeurIPS 2023 Machine Unlearning Competition (Project Page, Kaggle)** **May. 2023 - present**
- Served as an organiser of NeurIPS 2023 Machine Unlearning Challenge
- Developed unlearning baselines and basic attack models, with a unified API
- Reviewed participant code submissions for rule compliance and technical precision

**Towards Secure and Privacy-Preserving Driver Identification** **Oct. 2022 - Nov.2023**
- Proposed a new digital twin attack and analysed its effectiveness against various identification models
- Developed a defence strategy employing key generation, ensuring a low-complexity solution without the need for powerful hardware on the vehicle side

**Secure P2P Electricity Trading System for Electric Vehicles** **Oct. 2020 - Jun. 2021**
- Proposed a P2P energy trading mechanism based on blockchain to improve demand-response management and intensify the information security
- Employed ensemble learning for energy trading volume prediction, leveraged multi-objective optimization and game theory for effective trading coordination, and integrated transactions into blockchain for secure operations
- Achieved better overall social welfare with better algorithm performance

**Blockchain-Based Smart Grid Data Protection System** **Jul. 2021 - Nov.2021**
- Proposed a blockchain-based data protection system to ensure data security in the smart grid, including attack simulation, attack detection, and defence modules.
- Developed an ensemble learning model for attack detection, surpassing traditional methods by over 20% in accuracy. Implemented a blockchain mechanism reducing specific attack success rates by 95% and overall attack rates by 17.6%.
- Led the project and successfully applied the system to the national smart grid experimental platform.

## Experience

**Department of Computer Science, University of Warwick**
*Teaching Assistant* *Oct. 2023 - present*
- CS342 Machine Learning
- CS130 Mathematics for Computer Scientists

**SPRITZ Group (Security and Privacy Research Group)**
*Research Assistant* *Jun. 2022 - present*
- Advisors: Prof. Mauro Conti, Dr. Alessandro Brighente
- Conducted research on security and privacy in Cyber-Physical Systems

**Community Service**
- **Programme Committee & Reviewer**, Warwick Postgraduate Colloquium in Computer Science (WPCCS)
- **External Reviewer**, IEEE Robotics & Automation Magazine

## Publications & Patents

- **A Secure Intra-Regional-Inter-Regional Peer-to-Peer Electricity Trading System for Electric Vehicles.** Kairan Zhao, Meng Zhang, Rongxing Lu, Chao Shen. *IEEE Transactions on Vehicular Technology* (*2022*) (link)
- **Blockchain-Enabled EV P2P Electricity Trading Method, System and Equipment.** Meng Zhang, Kairan Zhao, Chao Shen, Xiaohong Guan. *CN113450183A* [Patent Pending] (link)

## Honors & Awards

**Computer Science Centre for Doctoral Training and Research Scholarships** **2023 – 2027**
- Value: Tuition fees, stipend, travel expenses

**Postgraduate Academic Awards** **2019 – 2022**
- Excellent Student Leader of the Year (Top3%)
- Excellent Postgraduate of the Year (Top10%)
- First-class Scholarship (Top5%)

**National College Student Innovation & Entrepreneur Competition** **2021**
- Bronze medallist (Business Proposal for Intelligent Hotel Management Platform)

**"Huawei Cup" 17th China Postgraduate Mathematical Contest in Modeling** **2021**
- National Third Prize (EEG Signal Analysis and Discriminant Model)

**China Scholarship Council (CSC) Scholarship** **2017 – 2019**
- Selected through a rigid academic evaluation process organized by CSC

**Undergraduate Academic Awards** **2015 – 2017**
- Excellent Student of the Year (Top5%)
- Siyuan Scholarship (Top 10%)
- Outstanding Social/Student Affairs Worker

## Extracurricular Activities

**Student Staff Liaison Committee (SSLC), University of Warwick** **May. 2023 – present**
- Served as a representative of Computer Science PGR (Postgraduate Researcher) SSLC

**ITCILO Winter Global Youth Forum 2021 & Internship Training Program** **Jan. 2021 – Feb. 2021**
- Participated in training activities with other global youth leaders within International Labour Organization
- Led a team to complete the training project and was selected as "Excellent Group Leader"

**Global Governance Course** **Nov. 2020 – Jan. 2021**
*Advisor: Prof. Slav W. Hermanowicz, UC Berkeley*
- Completed the course "Sustainable Development and Entrepreneurship: Ethics, Physics and Technology" with a score of 87/100 and was selected as "Excellent Student"

**Sino-French Communication Student Association** **Sep. 2019 – Oct. 2020**

- Minister of Literature and Art Department

**Volunteer for "Heart to Heart" Organization** **Sep. 2015 – Jun. 2017**

- Completed more than 30 hours of volunteer work

## Skills

- **Programming Languages & Developer Tools:** Python, Matlab, Linux, Git, Java, C, LaTeX, Microsoft Office suite, etc.
- **Libraries:** PyTorch, Keras, Scikit-learn, Pandas, NumPy, Matplotlib, etc.
- **English Skills:** Advanced, 7.5(6.5) on IELTS, 323(V153+Q170) on GRE, 855/990 on TOEIC
- **Other Languages: Mandarin:** Native; **French:** Advanced, C1 on DALF