

# Wonkwon Raymond Lee

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| Research Interests  | My research interests center on building secure, robust, and interpretable AI systems, particularly focusing on privacy-preserving techniques, out-of-distribution resilience, and interpretability. My past work includes differentially private synthetic data generation and benchmarking AI systems for privacy, utility, and reproducibility. Additionally, I am driven to explore the uncertainty and alignment challenges. I strive to harmonize AI with human values for safe, trustworthy applications, especially in high-stakes domains like healthcare, finance, and criminal justice.  |                          |
| Education           | <b>New York University</b>  | <b>09/2021 - 05/2023</b> |
|                     | Computer Science  | Master of Science        |
|                     | Advisor: <b>Julia Stoyanovich</b>   |                          |
|                     | Coursework: Computer Vision, Natural Language Processing, Responsible Data Science, Data Science for Healthcare, Big Data, Advanced Database Systems  |                          |
|                     | <b>University of Manchester</b>   | <b>09/2015 - 06/2018</b> |
|                     | Computer Science and Mathematics  | Bachelor of Science      |
|                     | Advisor: <b>Eva M. Navarro-Lopez</b>  |                          |
|                     | Thesis: <i>Models of Neurons and Neuronal Networks</i><br>Coursework: Machine Learning, Convex Optimization, Linear Algebra, Partial Differential Equations, Complex Analysis, Image Processing, Cryptography, Algebraic Structures   |                          |
| Research Experience | <b>Center for Responsible AI, New York University</b>   | <b>09/2022 - 05/2023</b> |
|                     | Graduate Research Assistant   | New York, NY             |
|                     | <ul style="list-style-type: none"><li>Conducted research under Professor Julia Stoyanovich on evaluating <b>differentially private (DP)</b> synthetic data generation methods.</li><li>Developed “Epistemic Parity,” an evaluation metric based on the likelihood of reproducibility of quantitative claims in social science research.</li><li>Created <b>SynRD</b>, an open-source DP synthetic data benchmarking Python package that organizes the Epistemic Parity workflow, existing papers, and datasets.</li></ul>   |                          |
|                     | <b>McDevitt Lab, New York University</b>  | <b>10/2021 - 02/2022</b> |
|                     | Graduate Research Assistant   | New York, NY             |
|                     | <ul style="list-style-type: none"><li>Performed diagnostic prediction modeling research for the Colgate Project under Professor John T. McDevitt, utilizing machine learning and statistical methods for data analysis.</li><li>Preprocessed and visualized complex unstructured biomarker data from microfluidic sensors using SQL, Stata, R, Pandas, and Seaborn.</li><li>Conducted a meta-analysis to combine and analyze data from multiple sources by extracting semantics.</li></ul>  |                          |
|                     | <b>University of Manchester</b>   | <b>09/2017 – 06/2018</b> |
|                     | Undergraduate Research Assistant  | Manchester, UK           |
|                     | <ul style="list-style-type: none"><li>Designed and implemented a Spiking Neural Network simulator using Python, QtPy5, Brian2, and neurodynex to investigate neuromorphic computing paradigms inspired by biological neural systems.</li><li>Simulated and analyzed dynamical behaviors and synchronization patterns in neuron populations influenced by network topology and external stimuli, leveraging Complex Systems methodologies.</li><li>Conducted research under the supervision of Dr. Eva Navarro Lopez, culminating in the thesis “<i>Models of Neurons and Neuronal Networks</i>,” which received the Best Paper award.</li></ul> |                          |
|                     | <b>Wireless Intelligence at Network Edge Lab, Korea University</b>  | <b>06/2016 – 08/2016</b> |
|                     | Undergraduate Research Intern   | Seoul, South Korea       |
|                     | <ul style="list-style-type: none"><li>Worked on an IoT Drone project under the supervision of Professor Hwangnam Kim as a Summer Undergraduate Research Intern.</li><li>Developed and implemented new functionalities in MATLAB to optimize real-time simulation of networked drone fleets.</li></ul>   |                          |

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| Industry Experience | <b>LG CNS America</b><br>System Engineer  | <b>04/2024 - Present</b><br>Englewood Cliffs, NJ |
|                     | <ul style="list-style-type: none"> <li>Designed and implemented network infrastructure to enhance system performance and security, collaborating with cross-functional teams to troubleshoot and resolve complex networking issues.</li> <li>Implemented automated network monitoring and reporting systems to ensure optimal uptime and reliability using <b>Python</b>, <b>Netmiko</b>, and <b>PRTG API</b>.</li> <li>Created comprehensive network documentation, including diagrams, operational procedures, and troubleshooting guides, to facilitate knowledge sharing and system maintenance.</li> </ul> |  |
|                     | <b>Stealth Project (EPLIA)</b><br>Co-founder / CTO  | <b>01/2023 – 01/2024</b><br>San Francisco, CA    |
|                     | <ul style="list-style-type: none"> <li>Co-founded a healthcare startup aimed at improving accessibility by addressing language barriers in telemedicine.</li> <li>Led the design and development of a web application using <b>Next.js</b>, <b>AWS</b> cloud infrastructure, and <b>WebRTC</b> for real-time communication.</li> <li>Managed cross-functional collaboration to deliver a scalable, reliable platform tailored to the unique needs of diverse users.</li> </ul>  |  |
|                     | <b>Pricewaterhouse Coopers</b><br>NLP Data Scientist  | <b>06/2022 – 08/2022</b><br>New York, NY         |
|                     | <ul style="list-style-type: none"> <li>Implemented and fine-tuned a BERT model to classify semantic relationships between entities using <b>PyTorch</b>.</li> <li>Designed data annotation protocols and ML pipelines from data, training, to deployment; deployed the models to <b>AWS</b> for scalable production use.</li> </ul>   |  |
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| Projects            | <b><u>Out-of-Distribution Robustness Evaluation Of Vision Models</u></b>  | <b>09/2022 – 01/2023</b>                         |
|                     | <ul style="list-style-type: none"> <li>Conducted <b>out-of-distribution robustness</b> comparison of <b>58</b> computer vision models, including ViT, convolution, attention-convolution hybrid, sequence-, and network-based, using OOD benchmark datasets to assess performance under distribution shifts.</li> </ul>   |  |
|                     | <b><u>Time-series Medical Image Classification</u></b>  | <b>01/2023 – 05/2023</b>                         |
|                     | <ul style="list-style-type: none"> <li>Developed a time-series classification model to predict disease progression from multi-image chest X-rays by fine-tuning pre-trained <b>DenseNet121</b> and <b>Vision Transformer</b> models on the MS-CXR-T dataset.</li> </ul>   |  |
|                     | <b><u>Collaborative-Filter Based Recommender System</u></b>   | <b>02/2022 – 05/2022</b>                         |
|                     | <ul style="list-style-type: none"> <li>Implemented a collaborative-filter-based movie recommender system using <b>PySpark</b>'s alternating least square method and achieved mean average precision of <b>0.066</b></li> </ul>  |  |
|                     | <b><u>Landslide Prediction Modeling</u></b>   | <b>04/2021 – 08/2021</b>                         |
|                     | <ul style="list-style-type: none"> <li>Preprocessed <b>GIS</b> and <b>time-series</b> climate data and implemented XGBoost and LightGBM models using <b>TensorFlow</b> and won 6th out of 150 teams in a national data science competition. (<b>top 4%</b>)</li> </ul>  |  |
| Publications        | <b><u>Epistemic Parity: Reproducibility as an Evaluation Metric for Differential Privacy</u></b>  | <b>05/2024</b>                                   |
|                     | Rosenblatt, L., Herman, B., Holovenko, A., Lee, W., Loftus, J., McKinnie, E., ... & Stoyanovich, J. (2024). Epistemic Parity: Reproducibility as an Evaluation Metric for Differential Privacy. <i>ACM SIGMOD Record</i> , 53(1), 65-74.  |  |
|                     | <b><u>Out of distribution performance of state of art vision model</u></b>  | <b>01/2023</b>                                   |
|                     | Rahman, S., & Lee, W. (2023). Out of distribution performance of state of art vision model. <i>arXiv preprint arXiv:2301.10750</i> .  |  |
|                     | <b><u>Epistemic Parity: Reproducibility as an Evaluation Metric for Differential Privacy</u></b>  | <b>08/2023</b>                                   |
|                     | Rosenblatt, L., Herman, B., Holovenko, A., <b>Lee, W.</b> , Loftus, J., McKinnie, E., ... & Stoyanovich, J. (2023). Epistemic Parity: Reproducibility as an Evaluation Metric for Differential Privacy. <i>Proceedings of the VLDB Endowment</i> , 16(11), 3178-3191.   |  |
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| Awards | <b>SIGMOD Research Highlight Awards</b><br><u>ACM SIGMOD 2024</u>                       | 06/2024           |
|        | <b>Best Experiment, Analysis &amp; Benchmark Paper Runner-up</b><br><u>VLDB 2023</u>    | 08/2023           |
|        | <b>Wasserman Center Career Grant</b><br>New York University                             | 11/2021           |
|        | <b>KMA Landslide Prediction Modeling Contest</b><br>Korea Meteorological Administration | 09/2021           |
|        | <b>Computer Science Final-Year Project Award</b><br>University of Manchester            | 07/2018           |
|        | <b>International Mathematical Excellence Scholarship</b><br>University of Manchester    | 09/2015 - 09/2017 |

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| Skills | <b>Programming Languages</b><br>Python, Java, C/C++, R, MATLAB, JavaScript, SQL   |
|        | <b>Frameworks and Libraries</b><br>PyTorch, TensorFlow, scikit-learn, Pandas, Numpy, SciPy, Flask, Django, Apache Spark |
|        | <b>Tools and Methodologies</b><br>Jupyter Notebooks, Git/GitHub, Docker, AWS, IBM Cloud, LaTeX                          |
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| Languages | <b>Korean</b><br>Native | <b>English</b><br>Fluent | <b>Japanese</b><br>Fluent |
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| References | <b>Julia Stoyanovich</b><br>Associate Professor, Computer Science and Engineering<br><a href="https://stoyanovich.org">https://stoyanovich.org</a><br>New York University<br>370 Jay Street<br>Brooklyn, NY 11201<br><a href="mailto:stoyanovich@nyu.edu">stoyanovich@nyu.edu</a>                                |
|            | <b>Martin Lotz</b><br>Associate Professor, Mathematics<br><a href="https://homepages.warwick.ac.uk/staff/Martin.Lotz">https://homepages.warwick.ac.uk/staff/Martin.Lotz</a><br>Zeeman Building<br>Coventry CV4 7AL<br>United Kingdom<br><a href="mailto:martin.lotz@warwick.ac.uk">martin.lotz@warwick.ac.uk</a> |
|            | <b>Rizos Sakellariou</b><br>Professor, Department of Computer Science<br><a href="http://www.cs.man.ac.uk/~rizos/">http://www.cs.man.ac.uk/~rizos/</a><br>University of Manchester<br>Oxford Road<br>Manchester M13 9PL<br>United Kingdom<br><a href="mailto:rizos@manchester.ac.uk">rizos@manchester.ac.uk</a>  |