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Houlin Chen

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Education

University of Toronto
***Honours Bachelor of Science**, Double Majors in Mathematics and Statistics* — *Fall 2020 – Winter 2024*
Mathematics: Groups and Symmetries, Complex Variables, Nonlinear Optimization
Statistics: Methods for Multivariate Data, Applied Bayesian Statistics, Theory of Practical Statistics

Renmin University of China and **Nankai University**
Visiting Student — *Summer 2021*

Research Experience

University of Toronto — Toronto, ON, CA
***Environmental Science and Machine Learning**, Undergraduate Research Assistant* — *Jul 2023 - Aug 2024*
Supervisor: **Prof. Meredith Franklin**

- Leading an independent research project that assessed changes at approximately 5,000 water quality stations over a 70-year span, conducting a pioneering spatio-temporal analysis of 4 surface water quality indicators across California's diverse climates and topographies [IGARSS 24, arXiv 23].
- Implementing 6 advanced ML models to establish, validate, and interpret the complex relationships between spatio-temporal variables, water quality indicators, Köppen climate zones, and geographical types.
- Spearheading the employment of predictive models that interpolate and forecast water quality trends up to 50 years into the future, highlighting potential pollution zones, the impact of seawater erosion, and the trends of global warming.

University of Toronto — Toronto, ON, CA
***Statistical Signal Processing**, Undergraduate Research Assistant* — *Jan 2022 - Mar 2023*

- Developed a highly customizable 3D indoor positioning system utilizing a passive radio frequency sensor to capture small-scale fading variations, optimized frequency band selection, and Gaussian process regression, culminating in accurate positioning without any predeployed transmitter.
- Conceived and executed a frequency selection methodology, calculating spectral feature importance to expedite sampling speeds by 98.77% while ensuring comparable performance [IoT-J 23].
- Employed a Dirichlet process to analyze and establish the intrinsic relationship between received signal strength, frequency, and spatial coordinates, exploring the use of opportunistic signals for 3D spatial positioning [DDDAS 22].

Renmin University of China and **Nankai University** — Beijing and Tianjin, CN
***Sociology Research**, Undergraduate Research Assistant* — *May 2021 - Aug 2021*

- Engaged in extensive debates with professors and students in different countries on love, marriage, and sexuality, higher education, and health.
- Composed 3 three short commentaries on subjects of agrarian reform, family planning, and the growth of underground LGBTQ+ organizations in China.
- Wrote a perspective paper about the solution of violent law enforcement of urban management.

Work Experience

AP Lazer — Windsor, ON, CA
Marketing Data Analyst Intern — *Sep 2022 – Present*
Supervisor: **Dr. Tong Li, CEO**

- Organizing and summarizing the marketing sales, as well as various data details under each campaign, providing a comprehensive understanding of marketing efforts.
- Running both paid search campaigns on Google and paid social media campaigns on Meta Facebook, calculating Return on Investment (ROI), and creating summary and comparison tables for these ad reports.
- Analyzing the performance of each campaign, ad group, and individual ad from Google Advertisement and Meta Facebook.
- Combining the static information from the Customer relationship management (CRM) program to provide a highlighted and simplified data table, and providing guidance for the marketing team to improve the ads.

Publication

[IGARSS 24] **H. Chen** and M. Franklin, "Spatio-Temporal Analysis of Surface Water Quality: A California Case Study," *accepted by 2024 IEEE IGARSS*, Jul. 2024.

[arXiv 23] **H. Chen** and M. Franklin, "Spatio-Temporal Modeling of Surface Water Quality Distribution in California (1956-2023)," *arXiv:2311.12736*, Nov. 2023.

[IoT-J 23] L. Yuan, **H. Chen**, R. Ewing, E. Blasch, and J. Li, "Three Dimensional Indoor Positioning Based on Passive Radio Frequency Signal Strength Distribution," *IEEE Internet of Things Journal*, vol. 10, no. 15, pp. 13 933–13 944, Mar. 2023.

[DDDAS 22] L. Yuan, **H. Chen**, R. Ewing, and J. Li, "Passive Radio Frequency-based 3D Indoor Positioning System Via Ensemble Learning," *4th International Conference on InfoSymbiotics/Dynamic Data Driven Applications Systems (DDDAS)*, Oct. 2022. (Oral Presentation, Book Chapter).

Professional Activity

Journal Reviewer

IEEE Internet of Things Journal — *2023 – Present*

IEEE Access — *2023 – Present*

Membership

Association for Computing Machinery (ACM) — *2023 – Present*

American Statistical Association (ASA) — *2023 – Present*

Institute of Electrical and Electronics Engineers (IEEE) — *2023 – Present*

Award

Entrance Scholarship, University of Toronto — *Sep 2020*

Skill

Tools	RStudio, Python, Matlab, ArcGIS
Writing	MarkDown, LaTeX, Overleaf
Communication	Chinese (native), English (IELTS: 7.0, GRE: 332)