PAN CHEN

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PhD student in Computer Science at the University of Toronto specializing in applied machine learning, intelligent systems, and human-computer interaction. Strong background in systems development, algorithm design, and research communication. Published and presented work in JMIR, SIGCITE, ICML, and XPrize Digital Learning Challenge. Passionate about robotics, autonomy, and scientific discovery through AI.

EDUCATION

PhD Student in Computer Science, University of Toronto   2023 - Present

- Supervisor: Dr. Alán Aspuru-Guzik
- Regular Committee Members: Dr. Nicholas Papernot, Dr. Michael Liut

Summer School, Carnegie Mellon University   Jul 2023

- Mentors: Dr. John Stamper, Dr. Steven Moore

Bachelor of Science in Computer Science and Statistics, University of Toronto   2018 - 2022

- Research advisor: Dr. Joseph Jay Williams

TECHNICAL SKILLS

Programming Languages:	Python, C, Java, Bash, SQL, NoSQL
Frameworks / Libraries:	PyTorch, TensorFlow, OpenCV, scikit-learn, NumPy, Pandas
Tools:	Git, Docker, Linux, Jupyter, LaTeX
Systems / Platforms:	Scientific Computing, Distributed Systems, Web Infrastructure
Other:	Experimental Design, Academic Writing

EXPERIENCE

Instructor   Jan 2025 - Present
Departments of Computer Science   *Toronto, Ontario*

- CSC148, Introduction to Computer Science (Python)
- CSC207, Software Design (Java)

Research Assistant   Sep 2022 - Dec 2023
Dynamic Graphics Project Lab & Data Sciences Institute, University of Toronto   *Toronto, Ontario*

Teaching Assistant   Sep 2021 - Dec 2024
Departments of Computer Science and Statistics, University of Toronto   *Toronto, Ontario*

Software Developer Co-op   Jun 2020 - Jun 2021
Infrastructures for Information   *Toronto, Ontario*

PROJECTS

Schema-Based In-Context Learning

- Led a cross-functional team of machine learning and cognitive science researchers.
- Developed a schema-based in-context learning framework to enhance scientific discovery.
- Utilized transformer-based models to represent and generalize scientific abstractions.
- Achieved **15% improvement** in chemistry tasks (in progress).

Computer Vision for Materials Synthesis

- Contributed to the development and evaluation of a computer vision model for **robotic materials synthesis**.
- Achieved **83% accuracy** in phase labeling, outperforming human annotation benchmarks.
- Collaborated with researchers in materials science and machine learning.

Adaptive Experiment Infrastructure for Science

- Built a modern platform for data-driven experiments.
- Designed the system to adapt and improve over time using machine learning algorithms.

Digital Learning Challenge by XPrize

- Lead software developer & machine learning designer for cross-platform machine learning infrastructure.
- Collaborated with **CMU & UNC** and deployed infrastructure in over **25 courses**.
- **Grand Winner** of the XPRIZE Digital Learning Challenge, sponsored by IES. More

Voice Reflection System

- Lead designer & developer of an online voice-based reflection system.
- Enables 500+ students to reflect on course topics by speaking at the University of Toronto.

PUBLICATIONS

Chen, P., et al. (n.d.). Schema-Based Reasoning: A new paradigm for in-context learning (Work in progress).

Zhang, Z., Chen, P., Du, F., Ye, R., Huang, O., Liut, M., Aspuru-Guzik, A. (n.d.). TreeReader: A hierarchical academic paper reader powered by language models (Manuscript under review).

Gaidimas, M. A., Mandal, A., Chen, P., Leong, S. X., Kim, G.-H., Talekar, A., Kirlikovali, K. O., Darvish, K., Farha, O. K., Bernales, V., Aspuru-Guzik, A. (n.d.). Computer vision for high-throughput materials synthesis: A tutorial for experimentalists (Manuscript under review).

Chen, P., Zavaleta Bernuy, A., Liut, M., Williams, J. J. (2024). Adaptive experiments for continuous improvement in computer science education: A case study. In Proceedings of the 26th Western Canadian Conference on Computing Education (pp. 1-7).

Bhattacharjee, A., Chen, P., Mandal, A., Hsu, A., O'Leary, K., Mariakakis, A., Williams, J. J. (2024). Exploring user perspectives on brief reflective questioning activities for stress management: Mixed methods study. JMIR Formative Research, 8(1), e47360.

Ye, R., Chen, P., Mao, Y., Wang-Lin, A., Shaikh, H., Zavaleta Bernuy, A., Williams, J. J. (2022, September). Behavioral consequences of reminder emails on students' academic performance: A real-world deployment. In Proceedings of the 23rd Annual Conference on Information Technology Education (pp. 16-22).

Musabirov, I., Zavaleta Bernuy, A., Chen, P., Liut, M., Williams, J. (2024, May). Opportunities for Adaptive Experiments to Enable Continuous Improvement in Computer Science Education. In Proceedings of the 26th Western Canadian Conference on Computing Education (pp. 1-7).

Chen, P., Sibia, N., Zavaleta Bernuy, A., Liut, M., Williams, J. J. (2022, March). Investigating the Impact of Voice Response Options in Surveys. In Proceedings of the 53rd ACM Technical Symposium on Computer Science Education V. 2 (pp. 1124-1124).

Han, Z., Gorobets, E., Chen, P. (2022). Parameter efficient dendritic-tree neurons outperform perceptrons. arXiv preprint arXiv:2207.00708. Work presented at ICML 2022 Dynamic Neural Networks Workshop.

ADDITIONAL INFORMATION

Country of Permanent Residence: Canada