J.C. (Junxing) Chen Ph.D.

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Skills

- **Programming Languages:** Python, MATLAB, R, SQL, Docker, Git, Django, Flask, JavaScript, etc.
- **Machine Learning:** TensorFlow, PyTorch, Scikit-Learn, XGBoost, Transformer, Hugging Face, Cloud Platforms (GCP, Watson, Azure, AWS), Gen AI, Large-Language-Models (LLMs), Computer Vision, Multi-Modal, Data Visualization.
- **Mathematics:** Statistical Modeling, FDMs, MCMC, Linear Algebra.
- **General:** Teamwork, Research, Problem Solving, Scientific Writing, Presentation, Data Analysis.

Experience

Data Scientist | IBM

Markham, Canada | September 2022 - June 2023

- Developed various machine learning projects using frameworks such as **TensorFlow and PyTorch**, and platforms including **Hugging Face** and **IBM Watson**.
- Led the **fine-tuning**, **Retrieval-augmented generation (RAG)** and deployment of **LLMs** (e.g., **Llama, Mistral, GPT-4**) for AI assistant applications, resulting in a 15% improvement in response accuracy.
- Developed a **multi-modal transformer model** combining vision, audio, and text data, improving accuracy by 25% in comprehensive analysis tasks.
- Utilized **computer vision** models for **real-time object detection and image segmentation**, achieving 95% precision in tasks.
- Designed **fraud detection and customer behavior prediction** models using banking data, enhancing detection rates by 30%.
- Utilized **GANs and diffusion models** for image content creation, increasing efficiency by 20%.
- Deployed **text-to-audio** and **speech-to-text** models for natural-sounding speech synthesis and voice cloning, increasing user engagement by 25%.
- Managed a team of 10 professionals and created top-rated (4.7/5) data science instructional content for the Skills Network.

Machine Learning Researcher

Remote, Canada | June 2023 - Present

- Deployed and fine-tuned ML models on **cloud platforms** for customized applications.
- Designed 10+ computationally efficient, **domain-specific ML projects**, reducing costs by 30%.
- Evaluated 50+ research papers to integrate cutting-edge ML techniques into projects.

Researcher | University of Toronto

Toronto, Canada | August 2018 - November 2023

- Authored **6** papers in esteemed scientific journals; presented at AGU and Goldschmidt.
- Built **2D thermo-metamorphic modeling** for tectonic slabs, considering topographical, physical, geological, and chemical settings contributes to the reconstruction of the environmental evolutionary history of Earth and Venus, **published in Nature Communications**.

- Analyzed geochemical models and developed solutions through experimentation, measurement and **Markov Chain Monte Carlo (MCMC)**, **published in the Journal of Petrology**.
- Taught courses in environmental science, geology, planetary science, and numerical modeling to over 500 university students.

Software Developer | University of Toronto

Toronto, Canada | *June 2020 - November 2023*

- Developed the **thermodynamic software DIFFUSUP** (🌐 https://diffusup.org), **published in Applied Computing and Geosciences**. DIFFUSUP uses the **finite-difference method (FDM, Crank-Nicolson)** to solve **partial differential equations (PDEs)** for diffusion modeling, helps 200+ Scientists.

Research Assistant | University of New Mexico

Albuquerque, USA | *June 2017 - September 2017*

- Conducted and **processed data* for Brillouin laser experiments and published findings in **Scientific Reports**.

Research Assistant | University of Science and Technology of China

Hefei, China | *August 2014 - June 2018*

- Analyzed geochemical isotopic data using (MC-)ICP-MS for the origin of rock and biological samples in experimental geochemistry.

Education

Doctor of Philosophy | University of Toronto

Toronto, Canada | *August 2018 - November 2023* | *Department of Earth Science*

Bachelor of Science | University of Science and Technology of China

Hefei, China | *August 2014 - June 2018* | *The School of Earth and Space Science*

Award

- Full-Funded Direct PhD. *University of Toronto, 2018-2023*
- Recipient of the Naldrett A.J. Scholarship and the Nowlan Explorers' Scholarship. *University of Toronto, 2018-2023*
- Awarded outstanding Top 5% student scholarship. *University of Science and Technology of China, 2014-2018*

Publications

- **Chen, Junxing**, et al. "Venus' light slab hinders its development of planetary-scale subduction." Nature Communications 13.1 (2022): 7647.
- **Chen, Junxing**, et al. "DIFFUSUP: A graphical user interface (GUI) software for diffusion modeling." Applied Computing and Geosciences 22 (2024): 100157.
- **Chen, Junxing**, Xu Chu. "Bridging the gap in garnet diffusion models at low temperatures: Recalibration using Western Tianshan eclogitic breccia." Journal of Petrology 65.3 (2024): egae012.
- Zhou, Zhenhao, **Junxing Chen**, et al. "The timescale and carbon flux recorded by skarn garnet from Gangdese arc, southern Tibet." Journal of Geophysical Research: Solid Earth 129.3 (2024): e2023JB028463.
- Yi, Zou, **Chen, Junxing**, et al. "Diffusion in metamorphic geology: Principles, applications, and problems." Acta Petrologica Sinica 38.10 (2022): 2949-2970.
- Zhang, Jin S., **Chen, Junxing**, et al. "Grain size dependent high-pressure elastic properties of ultrafine micro/nanocrystalline grossular." Scientific reports 11.1 (2021): 22481.