Jungang(Gordon) Chen

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Summary

Seeking a full-time position in the field of **scientific machine learning + numerical simulation + computational engineering**, . As a dedicated and quick learner, I blend substantial expertise in numerical simulation, coupled flow and geomechanics, along with proficiency in machine learning. My background is further strengthened by a firm dedication to ethical work practices and a passion for research excellence.

Education

Texas A&M University **College Station, TX**
Ph.D. in Petroleum Engineering, 4.0/4.0 GPA *Aug 2019 - Dec 2024*

- Specializes in **numerical simulation**, **scientific machine learning**, **deep learning-based surrogate modeling**, and **reinforcement learning** applications. Showcasing a strong ability to rapidly master state-of-the-art technologies and apply them for large-scale problems.

University of Southern California **Los Angeles, CA**
M.S. in Petroleum Engineering, 3.94/4.0 GPA *Aug 2017 - May 2019*

China University of Petroleum, Beijing **Beijing, China**
B.E. in Petroleum Engineering, 90.3/100 GPA *Aug 2013 - May 2017*

Work Experience

Bureau of Economic Geology, UT Austin **Feb 2025 - Present**
*Postdoctoral Fellow (**Python**, **PyTorch**, **Supabase**)* *Austin, TX 78758*

- Designed and advanced the CO_2 storage estimation platform **EASiTool**, a Python-based web application integrating backend, frontend, and user management systems; This app was utilized by hundreds of government, industry, and academic users for large-scale CCS project assessments. EASiTool
- Leading the development of a multi-agent reinforcement learning framework to **optimize stakeholder objectives** in complex, real-world CCS projects involving multiple stakeholders.

CNPC USA **June 2024 - Aug 2024**
*Machine Learning Intern (**Python**, **PyTorch**, **TensorFlow**)* *Katy, TX 77449*

- Collaborated with a cross-functional team to establish strategic roadmap for machine learning applications in drilling operations.
- Utilized industry-standard metrics and physics-based methodologies to identify and label drilling dysfunctions

ConocoPhillips Company **May 2022 - Aug 2022**
*Machine Learning Intern (**AWS Sage Maker**, **Python**, **PyTorch**, **TensorFlow**)* *Remote*

- Developed **GeoGPT** which generate geomodels according to user-defined properties, offering up to a **95% reduction** in geomodel generation time.
- Compressed 2000 geomodels into discrete latent space representations with state-of-art vector-quantized variational auto-encoder 2 (**VQ-VAE-2**), achieving **416.7 compression ratio** while preserving over **90% reconstruction accuracy**.
- Developed and applied the **PixelSNAIL** auto-regressive deep learning model for the rapid generation of new geomodels, significantly outpacing conventional techniques, **published** an impactful paper as the **first author**.

Teaching Experience

Bureau of Economic Geology **Jul 2025**
Instructor, GeoForce program *Onsite*

- GeoFORCE is a free youth education outreach program for high school students across Texas.
- Delivered STEM outreach instruction to 10+ high school students using the EASiTool web app.
- Simplified complex technical concepts for diverse learners with no prior background.

Texas A&M University **Aug 2022 - May 2023**
Teaching Assistant, PETE 419-Petroleum Data Analytics & Machine Learning *Onsite*

- Collaborated with professor in delivering lectures, preparing and conducting examinations, and managing various academic projects.
- Guided and supported over **30 students** during office hours, providing **personalized tutoring** and **assistance** with coursework, enhancing their understanding and performance in the subject matter.

Research Experience

Ph.D. Dissertation Supervised by John Killough & Eduardo Gildin **Sep 2019 - Dec 2024**

Flow-Geomechanics Coupling, Reduced-order Modeling and Optimization Techniques

- Developed in-house **coupled flow and geomechanics simulator** for fractured reservoirs utilizing EDFM-XFEM and complex fracture distributions can be modeled, improved **computational efficiency by 10x**, **presented** at international meetings as the **first author**.
- Engaged in the development of deep learning-based approaches for **reduced-order modeling**, **optimization** of subsurface problems, including oil&gas resources extraction and CO2 storage problems. Authored a few preprints and journal papers, serving as the **first author** for those publications. Achievements include **reducing computational time** by over **1000 times**, leading to substantial cost **savings in millions of dollars** for a CO2 storage project.

Subsurface Energy and Environmental Systems Lab at USC **May 2018 - May 2019**

Graduate student

- Formulated and applied a projection-based ESMDA for **assimilating** CO2-injected induced micro-seismic data, justifying its applicability to discrete data.
- Simulated Geo-mechanical Responses of **CO2 Storage** at Sleipner Field Using CMG GEM.
- Employed sequential Gaussian simulation via SGeMS to **quantify reservoir uncertainties**, leading to a more precise understanding of reservoir behavior and risk assessment, significantly improving decision-making processes in reservoir management.

Recent Projects

Funded Project by Woodside Energy (not included in Ph.D. Dissertation) **Aug 2023 - May 2024**

Data-Driven Reservoir Characterization Using ML-assisted Pressure Transient Analysis

- Generated 2000 simulation runs using CMG IMEX under different reservoir properties, achieved **speed up of over 4 folds** while retain the accuracy of **over 95%**.
- Developed subroutines to seamlessly extract transients from well pressure and rates data.
- **Designed and deployed** machine learning models for predicting reservoir properties using well data from Gulf of Mexico, achieving high accuracy with testing **MAE of 28.2 mD** for permeability.

Deep Learning Course Projects **Jan 2022 - May 2022**

*Graduate student (**NLP**, **LLM**, **Time-series ML**)*

- Led an advanced **artificial language translation** project, implementing a cutting-edge transformer model; fine-tuned hyperparameters and leveraged state-of-the-art **NLP** techniques, resulting in a remarkable **35% improvement in translation accuracy** over baseline models and securing the highest evaluation scores in a competitive academic setting.
- Developed and led a text prediction project, employing **RNN, Bi-LSTM, and Transformer models**; through rigorous experimentation and optimization, **achieved a 20% boost in predictive accuracy** and a **30% reduction** in processing time, compared to existing benchmarks.

PUBLICATIONS

For a detailed list of publications, please refer to Google Scholar

- **Chen, J.**, Wu, K., Killough, J. (2022, September). "Coupled Flow and Geomechanics in Reservoirs with Complex Fractures Using Embedded Meshes." In SPE Annual Technical Conference and Exhibition. OnePetro. Link
- **Chen, J.**, Huang, CK., Delgado, J.F. et al. (2023). "Generating subsurface earth models using discrete representation learning and deep autoregressive network." Computational Geosciences 27(6): 955-974. Link
- **Chen, J.**, Gildin, E., Killough, J. E. (2023). Physics-informed Convolutional Recurrent Surrogate Model for Reservoir Simulation with Well Controls. arXiv preprint arXiv:2305.09056. Link
- **Chen, J.**, Gildin, E., Killough, J. E. (2023). "Transfer learning-based physics-informed convolutional neural network for simulating flow in porous media with time-varying controls. " Mathematics **2024**, 12, 3281. https://doi.org/10.3390/math12203281 Link
- **Chen, J.**, Gildin, E., Kompantsev, G. (2024). Optimization of pressure management strategies for geological CO2 storage using surrogate model-based reinforcement learning. International Journal of Greenhouse Gas Control, 138, 104262. Link
- **Chen, J.**, Gidlin, E., Killough, J. (2024, September). Advancing Proxy Modeling in Reservoir Simulation: A Multi-Step Embed to Control Approach. In SPE Annual Technical Conference and Exhibition? (p. D021S023R006). SPE. Link

- Misra, S., **Chen, J.**, Falola, Y.,Churilova, P., Huang, C. K., & Delgado, J. (2023, June). "Massive Geomodel Compression and Rapid Geomodel Generation Using Advanced Autoencoders and Autoregressive Neural Networks." In SPE EuropEC- Europe Energy Conference featured at the 84th EAGE Annual Conference & Exhibition.OnePetro. Link
- Misra, S., **Chen, J.**, Churilova, P., & Falola, Y. (2024, February). Generative Artificial Intelligence for Geomodeling. In International Petroleum Technology Conference (p. D031S128R001). IPTC. Link

Technical Skills

Programming Languages: Python (5 years+), MATLAB(5 years+), C++ (3 years+), FORTRAN (3 years+)
Software & Tools: CMG, ECLIPSE, Petrel, ABAQUS, COMSOL, AWS, AZURE, Google Cloud
ML Platform & Tools: TensorFlow (3 years+), PyTorch (3 years+), GitHub, LaTex
Languages: Chinese(native), English (fluent)

Honors and Other Roles

- Invited Reviewer, Geoenergy Science and Engineering (IF=3.6), Neural Computing and Applications (IF=6.0), Computer Methods in Applied Mechanics and Engineering (IF=7.2), Mathematical Geosciences, Advances in Water Resources
- Member, Society of Petroleum Engineers.
- Graduate Research Assistantship, 2019-2021, Texas A&M University.
- Graduate Fellowship, 2022-2023, Texas A&M University.
- Killough Family Fellowship in Reservoir Simulation, 2022-2023.
- Chevron-USC Engineering Week Showcase, 1st Place, Feb. 2018.