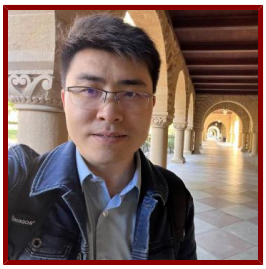
Stanford



Suihong Song

Physical Science Research Scientist, Energy Science & Engineering

Bio

BIO

Suihong Song collaborates with Professor Tapan Mukerji at the Stanford Center for Earth Resources Forecast (SCERF) as a postdoctoral scholar. His research is centered on integrating machine learning with geosciences, specifically focusing on machine learning-based reservoir characterization and geomodelling, Physics-informed Neural Networks (PINNs) and neural operators as well as their applications in porous flow simulations, neural networks-based surrogate and inversion, decision-making under uncertainty, and machine learning-based geological interpretation of well logs and seismic data. These research endeavors have practical applications in managing underground water resources, oil and gas exploration, geological storage of CO2, and the evaluation of hydrothermal and natural hydrogen, among others.Song proposed GANSim, an abbreviation for Generative Adversarial Networks-based reservoir simulation, which presents a reservoir geomodelling workflow. This innovative approach has been successfully implemented in various 3D field reservoirs by international oil companies, including ExxonMobil.

ACADEMIC APPOINTMENTS

- Physical Science Research Scientist, Energy Science & Engineering

HONORS AND AWARDS

- Student Travel Grant, IAMG (2019)
- First-class PhD. Scholarship, China University of Petroleum-Beijing (2017-2021)
- National Scholarship, Ministry of Education of China (2017)
- First-class Graduate Scholarship, China University of Petroleum-Beijing (2014-2016)
- Outstanding Graduate Award, Beijing Municipal Education Commission (2013)

BOARDS, ADVISORY COMMITTEES, PROFESSIONAL ORGANIZATIONS

- Associate Editor, Journal of Hydrology (2023 - present)
- Session Chair, Annual Conference of International Association of Mathematical Geosciences (IAMG) (2023 - 2023)
- Journal Review, Water Resources Research, Journal of Hydrology, Geophysics, Computers and Geosciences, Mathematical Geosciences, Computational Geosciences, IEEE TGRS, etc. (2018 - present)

PROFESSIONAL EDUCATION

- Ph.D, China University of Petroleum-Beijing , Geological Resources and Geological Engineering (2021)
- Visiting Ph.D., Stanford University , Energy Sciences & Engineering (2020)
- M.Eng., China University of Petroleum-Beijing , Geological Resources and Geological Engineering (2017)
- B.Eng., China University of Petroleum-Beijing , Petroleum Geology (2013)

Publications

PUBLICATIONS

- **GANSim-surrogate: An integrated framework for stochastic conditional geomodelling** *JOURNAL OF HYDROLOGY*
  Song, S., Zhang, D., Mukerji, T., Wang, N.
  2023; 620

- **GANSim-3D for Conditional Geomodeling: Theory and Field Application** *Water Resources Research*
  Song, S., Mukerji, T., Hou, J., Zhang, D., Lyu, X.
  2022

- **Bridging the Gap Between Geophysics and Geology With Generative Adversarial Networks** *IEEE TRANSACTIONS ON GEOSCIENCE AND REMOTE SENSING*
  Song, S., Mukerji, T., Hou, J.
  2022; 60

- **Geological Facies modeling based on progressive growing of generative adversarial networks (GANs)** *COMPUTATIONAL GEOSCIENCES*
  Song, S., Mukerji, T., Hou, J.
  2021

- **GANSim: Conditional Facies Simulation Using an Improved Progressive Growing of Generative Adversarial Networks (GANs)** *MATHEMATICAL GEOSCIENCES*
  Song, S., Mukerji, T., Hou, J.
  2021

- **Geologist-level wireline log shape identification with recurrent neural networks** *COMPUTERS & GEOSCIENCES*
  Song, S., Hou, J., Dou, L., Song, Z., Sun, S.
  2020; 134

- **Lithology identification using well logs: A method by integrating artificial neural networks and sedimentary patterns** *JOURNAL OF PETROLEUM SCIENCE AND ENGINEERING*
  Ren, X., Hou, J., Song, S., Liu, Y., Chen, D., Wang, X., Dou, L.
  2019; 182

- **Local optimization of DFN by integrating tracer data based on improved simulated annealing** *JOURNAL OF PETROLEUM SCIENCE AND ENGINEERING*
  Song, S., Hou, J., Sun, S., Li, Y., Wang, X., Dou, L., Liu, Y., Kang, Q., Huang, S.
  2018; 170: 858-872