Dr Daniel Wamriew

AI Scientist | Technology Builder | Innovation Leader

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PROFILE

AI scientist working at the intersection of artificial intelligence, scientific computing and engineering. More than six years of doctoral and postdoctoral research on deep learning for detection, localization and inversion problems, including conditional diffusion models, scientific data processing and quantitative baseline comparison. Postdoctoral Fellow at KAUST and Project Manager of HydraFrac, a laboratory hydraulic fracturing research project. Builds research software and applications, including an internally used PyTorch application for acoustic emission detection and picking, and teaches machine learning to engineers.

CORE COMPETENCIES

Artificial intelligence: deep learning, convolutional neural networks, conditional diffusion models, supervised learning, uncertainty quantification through repeated sampling.

Scientific computing: inverse problems, numerical simulation, signal processing, feature extraction, statistical analysis, experimental design and visualization.

Programming and tools: Python, PyTorch, TensorFlow, NumPy, Pandas, SciPy, MATLAB; high-performance computing and GPU training.

Sensing and experiments: microseismic and acoustic emission monitoring, distributed acoustic sensing (DAS), laboratory hydraulic fracturing experiments.

Leadership and delivery: technical project management, multidisciplinary team coordination, research workflows, documentation, teaching and knowledge transfer.

PROFESSIONAL EXPERIENCE

Postdoctoral Fellow

King Abdullah University of Science and Technology (KAUST), Saudi Arabia · June 2024 – present

- Implement and compare learned models for scientific prediction, linking preprocessing choices and validation results to the interpretation of model outputs.
- Develop processing and learning workflows for event detection, localization and source characterization.
- Train and evaluate deep learning models on complex scientific data; investigate prediction error, sensitivity to noise and uncertainty.
- Communicate findings through research papers and conference contributions, in collaboration with geomechanics, rock physics and sensing specialists.

Project Manager, HydraFrac

KAUST · October 2024 – present (concurrent with the postdoctoral appointment)

- Lead laboratory technicians, PhD researchers and master's students in a multidisciplinary project investigating hydraulic fracturing through controlled experiments.
- Plan laboratory hydraulic fracturing research, coordinate experimental design and instrumentation, and align acoustic emission and distributed acoustic sensing acquisition with analysis requirements.
- Coordinate technical discussions, guide computational analysis and interpretation, and communicate findings, progress and scientific deliverables.

Freelance Data Scientist and Analyst

Independent, Moscow, Russia · November 2022 – May 2024

- Designed, trained and evaluated machine learning and deep learning models in Python and PyTorch for structured and unstructured data.
- Built data preprocessing pipelines, feature engineering workflows and model evaluation frameworks; managed projects end to end.
- Concurrently taught physics and mathematics at British Lyceum Moscow (October 2022 – May 2024), delivering lessons aligned with Cambridge International Education standards.

Graduate Researcher in Petroleum Engineering

Skolkovo Institute of Science and Technology (Skoltech), Russia · November 2018 – October 2022

- Developed neural network methods for microseismic detection, event localization and velocity model inversion using borehole and distributed acoustic sensing data.
- Designed numerical simulations and processing workflows for seismic waves in complex geological media; investigated rapid scientific inference.
- Published first-author research in *Sensors*, *Computers & Geosciences* and *Remote Sensing* and presented at international conferences.

Technology Analyst

Oil and Gas Eurasia, Moscow, Russia · January 2017 – January 2019

- Researched energy technologies, supported design and testing, provided technical recommendations and worked with colleagues on troubleshooting and reporting.

Intern Geophysicist

Geothermal Development Company, Nakuru, Kenya · May – September 2015

- Took part in seismic, magnetotelluric, transient electromagnetic and gravity surveys for geothermal exploration; processed field data and supported geological modeling.

SELECTED PROJECTS

Conditional diffusion for microseismic localization

KAUST · generative modeling and predictive evaluation

- Formulated event localization as conditional heatmap generation, combining waveform preprocessing, learned features and quantitative baseline evaluation.
- Reported MAE below 22 m and R^2 above 0.81 on each spatial axis across 1,774 test samples in the 2025 preprint, using semi-synthetic data with recorded field noise.
- Benchmarked against a CNN: the diffusion model achieved lower MAE on each axis, while the CNN had higher R^2 and lower error standard deviation.
- Investigated noise sensitivity and repeated stochastic sampling to characterize uncertainty.

HydraFrac Studio

Machine learning application in internal research use

- Built a PyTorch convolutional neural network application for acoustic emission detection and picking; researchers in the group use it internally.

ae-picker

Open-source Python package · pypi.org/project/ae-picker

- Developed and released an open-source package for automatic first-arrival picking in acoustic emission, microseismic and seismic waveforms (AIC and refined STA/LTA pickers, frequency-adaptive presets, batch processing, QC). MIT license; Zenodo doi:10.5281/zenodo.20126965.

Revision Base and AI marketing intelligence

Founder and product lead · revision-base.com

- Founded and lead Revision Base, an educational technology platform for Kenya's CBE and KCSE curricula with learning resources, holiday homework, parent and teacher tools, tutoring and subscriptions. Its Android app was released in August 2026.
- Direct AI-assisted development and testing of a multi-agent marketing application; configure integrations and evaluate campaign plans and draft content.

PangaOS

Founder and developer · pangaos.io

- Founded and develop a deadline-driven project execution application (workdays left, burndown, decision gates and a daily checklist derived from the plan).

TEACHING

Course Designer and Instructor, Machine Learning for Petroleum Engineers and Geoscientists (ML4PEGs)

Open course · June 2026 – October 2026

Designed and taught a course taking engineers and geoscientists from Python fundamentals to deep learning and physics-informed neural networks, with well-log, seismic and reservoir examples and a capstone project.

EDUCATION

PhD in Petroleum Engineering

Skolkovo Institute of Science and Technology (Skoltech), Russia · November 2018 – September 2022

Research focus: deep learning for microseismic monitoring and inverse problems.

MSc in Petroleum Engineering, First Class Honors

Russian State Geological Prospecting University, Russia · September 2016 – June 2018

MSc in Physics

Kenyatta University, Kenya · September 2014 – July 2019

Geophysics research: magnetotelluric and transient electromagnetic imaging for geothermal resources in the Arus-Bogoria area, Kenya.

SELECTED PUBLICATIONS

Full list: Google Scholar

- **Wamriew, D.**, and Alkhalifah, T. (2025). Conditional diffusion model for robust 3-D microseismic event localization from noisy waveforms. *ESS Open Archive*, preprint. doi:10.22541/essoar.175913795.57819063/v1
- **Wamriew, D.**, Alkhalifah, T., and Ravasi, M. (2025). 3D microseismic events localization using a 2D conditional diffusion model. *IMAGE 2025*, SEG/AAPG, 1462–1466. doi:10.1190/image2025-4307437.1
- **Wamriew, D.**, Birnie, C., Yang, B., Ma, B., Kang, C. H., Ashry, I., Diallo, E., Ravasi, M., Ooi, B., and Finkbeiner, T. (2025). Fiber-optic distributed acoustic sensing in laboratory-scale hydraulic fracture experiments: implications for monitoring. *ARMA/DGS/SEG International Geomechanics Symposium*. doi:10.56952/IGS-2025-0181
- **Wamriew, D.**, Ravasi, M., Saad, O., and Alkhalifah, T. (2025). Simultaneous localization and moment tensor inversion of microseismic events using convolutional neural network. *86th EAGE Annual Conference & Exhibition*, 1–5. doi:10.3997/2214-4609.202510674
- **Wamriew, D.**, Charara, M., and Pissarenko, D. (2022). Joint event location and velocity model update in real-time for downhole microseismic monitoring: a deep learning approach. *Computers & Geosciences*, 158, 104965. doi:10.1016/j.cageo.2021.104965
- **Wamriew, D.**, Dorhjie, D. B., Bogoedov, D., Pevzner, R., Maltsev, E., Charara, M., Pissarenko, D., and Koroteev, D. (2022). Microseismic monitoring and analysis using cutting-edge technology: a key enabler for reservoir characterization. *Remote Sensing*, 14(14), 3417. doi:10.3390/rs14143417
- **Wamriew, D.**, Pevzner, R., Maltsev, E., and Pissarenko, D. (2021). Deep neural networks for detection and location of microseismic events and velocity model inversion from microseismic data acquired by distributed acoustic sensing array. *Sensors*, 21(19), 6627. doi:10.3390/s21196627

SELECTED TALKS

- *Laboratory-Constrained Microseismic Imaging of Hydraulic Fractures: From Acoustic Emissions to Fracture Architecture*. EAGE community webinar, 15 September 2026.

AWARDS AND CERTIFICATES

- IBM Data Science Professional Certificate, March 2023
- Skolkovo Foundation Scholarship, 2018

PROFESSIONAL MEMBERSHIPS

- Society of Petroleum Engineers (SPE)
- European Association of Geoscientists and Engineers (EAGE)

Updated November 2026