



Open Positions in the Geothermal Energy Lab

Area: Hard Rock Drilling for Advanced Geothermal Systems
Duration: 1 year, renewable up to 3 years
Start date: May 1, 2021 (earlier possible)

Positions

1. **Research Associate (RA)** in Drilling Operations, Drilling Performance Optimization and Drilling Modelling.
2. **Postdoctoral Fellow (PDF)** in Drilling Mechanics and Non-Linear Systems Dynamics Modelling.
3. **Three Ph.D. Research Assistantship** openings:
 - a. Fluid Modelling for hydraulic hammers
 - b. Estimation Techniques for Digital Twinning
 - c. Physics-Informed Data Driven Model Development

A research collaboration between the **Departments of Chemical and Petroleum Engineering** and **Electrical and Software Engineering** and in the **Schulich School of Engineering** and the **Department of Geosciences** in the **Faculty of Science** at the **University of Calgary** and **Eavor Technology, Inc** is accepting applications for a Research Associate, a Postdoctoral Fellow and three Ph.D. students.

The **Research Associate** will support and conduct research in Drilling Operations, Drilling Performance Optimization, Data Analytics, Drilling Modelling and Control. An M.Sc. in engineering is required, but industry experience and/or Ph.D. preferred.

The **Postdoctoral Fellow** will work on Drilling Mechanics, Bit-Rock interaction Modelling, and Non-Linear System Dynamics and Control. Prior work in one or more of these areas is expected and industry experience (through sponsored projects or internships) is preferred. A recent Ph.D. in engineering is required.

Three Ph.D. Research Assistantships in the following areas:

- Hydraulic percussion hammer modelling. A B.Sc. and/or an M.Sc. in Chemical or Mechanical Engineering, or a closely related field, is required.
- Physics-informed data driven model development. A B.Sc. and/or an M.Sc. in Software Engineering, Computer Science or extensive experience in machine learning is required.
- Estimation techniques for digital twinning. A B.Sc. and/or an M.Sc. in Engineering with a strong background in control theory and mathematics is required.

Project Description:

An exciting new project is being launched in collaboration with Eavor Technologies, Inc, to optimize hard rock drilling for Advanced Geothermal Systems. Eavor has developed the Eavor-Loop, a closed loop geothermal system for heat and power application. This project seeks to develop a digital twin of the drilling system to help improve drilling operations and optimize drilling rate.

This project is funded, in part, by an NSERC Alliance grant, the application for which is in submission. The project is expected to start on May 1st, 2021 and there is a possibility for the Research Associate and Postdoctoral Fellow to begin sooner. The positions are located in Calgary and it is expected that candidates relocate to Calgary prior to starting.

Application details:

Applications should consist of a current CV, a list of 2-3 referees with contact information, a cover letter describing relevant past research experience and a writing sample – either a conference or journal paper. The position is available immediately and the search will continue until the position is filled. Send complete applications to Dr. Roman Shor (roman.shor@ucalgary.ca) at your earliest convenience.

About the Research Team

The research team consists of:

- Dr. Roman Shor (PI) is an assistant professor in the Department of Chemical and Petroleum Engineering working on drilling automation and machine learning applications.
- Dr. Apostolos Kantzas (co-PI) is a professor and Industrial Research Chair in the Fundamentals of Unconventional Resources in the Department of Chemical and Petroleum Engineering working on topics in fluid flow in porous media and heat transfer.
- Dr. Kristopher Innanen (co-PI) is a professor in Geophysics and the director of CREWES, the seismic consortium, working on methods in seismic exploration.
- Dr. Gias Uddin (co-PI) is an assistant professor in Software Engineering working on advanced machine learning and explainability in data driven models.

About the University of Calgary

The University of Calgary is Canada’s leading next-generation university – a living, growing and youthful institution that embraces change and opportunity with a can-do attitude. Located in the nation’s most enterprising city, the university is making tremendous progress on its Eyes High journey to be recognized as one of Canada’s top five research universities, grounded in innovative learning and teaching and fully integrated with the community it both serves and leads. The University of Calgary inspires and supports discovery, creativity and innovation across all disciplines. For more information, visit ucalgary.ca. To succeed as one of Canada’s top universities, where new ideas are created, tested and applied through first-class teaching and research, the University of Calgary needs more of the best minds in our classrooms and labs. We’re increasing our scholarly capacity by investing in people who want to change the world, bringing the best and brightest to Calgary to form a global intellectual hub and achieve advances that matter to everyone.

About Calgary, Alberta

Calgary is one of the world's cleanest cities and has been named one of the world's most livable cities for years. Calgary is a city of leaders – in business, community, philanthropy and volunteerism. Calgarians benefit from the strongest economy in the nation and enjoy more days of sunshine per year than any other major Canadian city. Calgary is less than an hour’s drive from the Rocky Mountains and boasts the most extensive urban pathway and bikeway network in North America.

The University of Calgary recognizes that a diverse staff/faculty benefits and enriches the work, learning and research experiences of the entire campus and greater community. We are committed to removing barriers that have been historically encountered by some people in our society. We strive to recruit individuals who will further enhance our diversity and will support their professional success while they are here. We encourage all qualified applicants to apply, however preference will be given to Canadian citizens and permanent residents of Canada.