

PhD and Master's Opportunities in Electromobility for Underground Mining at Universidad de Chile



Universidad de Chile ¹(UCHILE) offers exciting **3 PhD research positions in Electrical and Mining Engineering**. These positions provide a unique opportunity to engage in cutting-edge research focused on **electromobility within underground mining operations**. The candidates will have the opportunity to work in an applied research program funded by Codelco², the world's largest copper producer and world leader in massive underground operations.

Successful candidates will join a dynamic research team and work under the guidance of UCHILE faculty members, including [Prof. Angela Flores](#) (Electrical Engineering), [Prof. Luis Felipe Orellana](#) (Mining Engineering), [Prof. Marcos Orchard](#) (Electrical Engineering), and [Prof. Javier Ruiz del Solar](#) (Electrical Engineering). The primary objective is to contribute to advancing sustainable and efficient technologies for underground mining.

¹ <https://uchile.cl/>

² <https://www.codelco.com/>

Position 1: PhD Mining Engineering

- Identify and address the technical, logistical, and economic challenges of adopting electromobility in underground mining.
- Develop a framework to analyze and optimize the impact of electromobility on production efficiency, mining costs, and greenhouse gas emissions.
- Develop, simulate, and analyze multiple scenarios for integrating electric mobile equipment in underground mines.
- Contribute to developing and improving the ELMO-UG (ElectroMobility management for zero carbon MINing) simulation and optimization tool for underground mining.

Direct supervision: Prof. Luis Felipe Orellana & Prof. Angela Flores

Position 2: PhD Electrical Engineering

- Develop a framework to optimize the operation of electric mobile equipment in underground mining and propose efficient solution methodologies.
- Adapt and integrate advanced into the operational optimization framework models of electric mobile equipment consumption, battery operation, and state of health.
- Develop and analyze multiple scenarios for integrating electric mobile equipment in underground mines.
- Contribute to developing and improving the ELMO-UG (ElectroMobility management for zero carbon MINing) simulation and optimization tool for underground mining.

Direct supervision: Prof. Angela Flores & Prof. Luis Felipe Orellana

Position 3: PhD Electrical Engineering

- To establish technical and operational baselines, review and assess various charging solutions for electric mobile equipment in underground mining, including direct charging, battery swapping, and catenary systems.
- Develop a methodology for sizing charging infrastructure based on simulation results and real-world data, considering multiple operational scenarios.
- Determine the optimal locations and necessary upgrades for charging infrastructure, ensuring efficient and effective integration of electric mobile technologies in underground mining operations.
- Contribute to developing and improving the ELMO-UG (ElectroMobility management for zero carbon MINing) simulation and optimization tool for underground mining.

Direct supervision: Prof. Angela Flores & Prof. Marcos Orchard

Requirements

1. A master's or bachelor's degree in a discipline related to mining engineering, electrical engineering, computer engineering, mechanical engineering, or other related disciplines. A master's degree will be considered a plus (only for PhD candidates).
2. Excellent academic record. A minimum grade point average (GPA) of 5.0 on a scale of 1.0 to 7.0 is required (Chilean grade system), or equivalent.
3. English language proficiency: good verbal and written communication skills for effective collaboration and for writing peer-reviewed journal publications and technical reports.
4. Excellent teamwork and communication skills.
5. Ability to work independently, with flexibility, and critical thinking.
6. A strong interest in the role of mining in climate change and mitigation strategies.
7. A strong interest in optimization and its application to mining, energy, or industrial sectors.
8. Good programming skills in Python, C++ or Java and knowledge of algebraic or optimization modeling languages such as Pyomo or GAMS will be considered a plus.

Starting date: Upon agreement, the starting date will be between April and July 2025.

Important: Non-Chilean residents must have a work permit to work in Chile legally.

What You Will Do

- Collaborate with industry partners and other researchers.
- Complete the coursework requirements of the PhD program or Masters
- Assisting in the instruction of both undergraduate and postgraduate courses in Mining and/or Electrical Engineering as a Teaching Assistant (~20%).
- Collaborating on research grant proposal writing
- Apply to external funding.
- Write reports and publications, and presentations.
- Attending conference(s).
- Other activities of your interest.

Successful candidates for the **PhD positions** will have a strong academic and research background, excellent communication skills, and an evident passion for their research area. Candidates should also be prepared to work independently and as part of a team, and to engage in both academic and industry collaborations.

PhD Program duration: 3.5 – 4 years. This is a full-time appointment.

How to apply

Please send an email with the subject “Research – Electromobility” to luorella@uchile.cl, with the following documents (**English or Spanish**) and information:

- **Position of interest:**
- **An updated version of your C.V.**
- **Transcripts of your academic degrees.**
- **A statement of research interests (max 500 words)**
- **The contact information of two potential referees.**
- **Preferred starting date.**

Any inquiries should be addressed to the same mail.

Applicants are required to submit their application to the corresponding Ph.D. program at the University of Chile as well.

We invite you to apply until March 10, 2025.

The review of applications will begin immediately and will continue until the positions are filled.

We promote equality of opportunity, value diversity, and nurture a working and learning environment in which the rights and dignity of all our staff and students are respected.

Santiago, Chile, January 2025