Jobbnorge ID: 302358
Deadline: 7/10/2026
Website: http://www.ntnu.no
Scope: Fulltime
Duration: Fixed Term

The Department of Geosciences has a vacancy for a

PhD Candidate in Mining Engineering - IV-26/26

This is NTNU

NTNU is a broad-based university with a technical-scientific profile and a focus in professional education. The university is located in three cities with headquarters in Trondheim.

At NTNU, 9,000 employees and 43,000 students work to create knowledge for a better world.

You will find more information about working at NTNU and the application process here.

Video: https://youtu.be/Xt-yHCN5QS0

About the position

The Department of Geosciences (IGV) has a vacancy for a full-time 100% position as a PhD candidate within the field of Mining Engineering. The prospective candidate will be part of the Mining Engineering research group at IGV but will also collaborate with other NTNU departments and societal stakeholders.

Are you motivated to take a step towards a doctorate and open up exciting career opportunities? As a PhD Candidate with us, you will work to achieve your doctorate, and at the same time gain valuable experience that qualifies you for a further career in higher education and research, in and outside academia.

Your immediate leader will be the Head of Department and the main supervisor of the project will be Professor Hakan Basarir.

About the project

The project focuses on developing an advanced, AI-integrated methodology for adaptive underground stope dimensioning to address the limitations of traditional empirical approaches. While underground stope design is critical for safe and efficient ore extraction, it is often constrained by sparse geotechnical data. Conventional interpolation techniques frequently struggle with site-specific conditions such as structural anisotropy and in-situ stress variations leading to either overly conservative designs or unplanned dilution.

To overcome these challenges, this project will embed user-defined conditions and structural constraints directly into machine learning routines to achieve high-resolution 3D interpolation of rock mass properties. These synthesized geotechnical fields will feed into an automated stope design workflow, producing variable-length, locally adaptive geometries that optimize the balance between stability, recovery, and dilution control.

Through collaboration with national and international stakeholders, the project aims to establish a validated, data-driven design framework. Key outcomes will include an open-source Python toolkit, measurable improvements in stope performance, and practitioner guidelines for next-generation underground mine planning.

The successful candidate will become part of the newly established MIN30 initiative at the NTNU Mineral Centre, a strategic research initiative focused on securing the future supply of critical minerals through sustainable and innovative technologies. The centre covers the entire mineral value chain, including exploration and resource characterization, mineral processing and extraction, by-product utilization, recycling, metal production, and environmental aspects associated with sustainable and responsible resource development. The MIN30 initiative will recruit several PhD candidates working on both fundamental studies and industrial applications related to future mineral and mining technologies and methodologies. The candidate hired in this position will be integrated with other PhD candidates and researchers within the centre.

Duties of the position

- Conduct rock engineering and geological assessments to identify key parameters influencing stope stability and dimensioning.
- Evaluate traditional empirical design methods and quantify their limitations in heterogeneous or structurally complex rock masses.
- Collect, preprocess, and synthesize geotechnical data from diverse sources, including underground mining case studies, drill logs, structural mapping, and cavity monitoring (CMS) records.

- Develop and train user-informed machine learning models that incorporate geological/geotechnical priors to interpolate 3D rock mass properties between sparse data points.
- Architect and implement a new stope optimization algorithm that interface with interpolated geotechnical fields to generate adaptive, variable-length stope geometries.
- Calibrate and validate the developed models using real-world mine data
- Develop, document, and maintain an open-source Python toolkit for adaptive stope dimensioning and geospatial interpolation.
- Engage with industry partners, academic research groups to ensure practical relevance and facilitate technology transfer.
- Prepare technical reports, design guidelines, and high-impact peer-reviewed publications.
- Present research findings at national and international conferences, workshops, and industry stakeholder meetings.
- Complete the doctoral education until obtaining a doctorate
- Carry out research of good quality within the framework described above

Be prepared for changes to your work duties after employment.

Required selection criteria

- You must have an academically relevant background within Mining engineering, Engineering geology, Rock mechanics or rock engineer, Geotechnical engineering, Computational engineering or applied mathematics, Data science or Artificial intelligence.
- You must have a Master's degree in above listed areas or equivalent. Your course of study must correspond to a five-year Norwegian course, where 120 credits have been obtained at master's level.
- Strong analytical and problem-solving skills with the ability to work independently and collaboratively in interdisciplinary research environments.
- You must have a strong academic background from your previous studies and have an average grade from your Master's degree study, or equivalent education, which is equal to B or better compared to NTNU's grading scale. If you do not have letter grades from previous studies, you must have an equally good academic foundation. If you have a weaker grade background, you may be considered if you can document that you are particularly suitable for a PhD education.
- Experience with programming (ideally Python) and a foundational understanding of geostatistics or numerical modeling is considered a strong advantage.
- Good oral and written presentation skills in English.
- You must meet the requirements for admission to the Faculty of Engineering Doctoral programme: PhD in Engineering (Doctoral Programme) 3 years - Trondheim - NTNU

PLEASE NOTE: For detailed information about what the application must contain, see paragraph “About the application”.

The appointment is to be made in accordance with NTNUs guidelines for recruitment positions for general criteria for the position.

Preferred selection criteria

- Experience with numerical modelling software (e.g., FLAC3D, 3DEC, RS2/RS3, PLAXIS) and empirical underground excavation design methods.
- Understanding of geospatial variability in geological or rock mass properties, including spatial correlation, anisotropy, and heterogeneity.
- Familiarity with machine learning/AI techniques applied to geospatial or geotechnical data, including model training, validation, and uncertainty quantification.
- Proficiency in programming languages such as Python, with experience in scientific computing and ML libraries (e.g., NumPy, SciPy, PyTorch/TensorFlow, scikit-learn).
- Experience with spatial data analysis, interpolation techniques, or geostatistical concepts variography, kriging, conditional simulation) is advantageous.
- Experience handling geological, geotechnical, or mining datasets, including drill hole data, structural mapping.
- Familiarity with GIS platforms, 3D modelling software, or digital tools for spatial data visualization and analysis.
- Experience in writing technical reports, academic papers, or presenting research findings to academic and industry audiences.
- Familiarity with a Scandinavian language will be seen as an advantage.

Personal characteristics

To complete a doctoral degree (PhD), it is important that you are able to:

- Intellectual curiosity and initiative: Ability to work independently on open-ended research questions, proactively explore novel intersections of rock mechanics, spatial data science, and machine learning, and propose creative solutions to data-scarce geotechnical challenges.
- Interdisciplinary collaboration: Enjoys working in multidisciplinary teams and engaging constructively with stakeholders from academia, industry, and government. Comfortable translating technical concepts across domains (geology & engineering & data science).
- Problem-driven innovation: Creativity oriented toward practical engineering outcomes developing tools and workflows that improve safety, efficiency, or sustainability in underground operations, not just algorithmic novelty.
- Resilience in ambiguity: Comfort working with incomplete, heterogeneous, or noisy datasets; ability to make defensible engineering judgments when data is sparse and uncertainty is high.
- Ethical and open-science orientation: Commitment to reproducible research, responsible data use, and contributing to open-source tools that benefit the broader mining and geotechnical community.

In the evaluation of which candidate is best qualified, emphasis will be placed on education, experience, personal suitability, and motivation in terms of the qualification requirements specified in the advertisement. We look for candidates who have experience bridging traditional engineering methods with data-driven approaches, are excited by the challenge of making reliable predictions from sparse, heterogeneous data, value both scientific publication and practical tool development, seek to contribute to safer, more sustainable underground resource extraction.

We offer

- An exciting job with an important mission in society

- Developing tasks in a strong and international professional environment
- Career guidance and follow-up during the PhD period
- Open and inclusive working environment with committed colleagues
- Working capital that can be used to implement the project
- Mentor programme as a new employee at NTNU
- Favorable terms as a member of the Norwegian Public Service Pension Fund (SPK)
- Free Norwegian language training at a basic level (A2)

As a PhD Candidate at NTNU, you will have access to employee benefits.

Diversity

Diversity is a strength, and at NTNU we aim to be an employer that reflects the diversity in society and that makes use of the potential of the population's collective skills. Our vision is Knowledge for a better world and our values are creative, critical, constructive and respectful. We believe that an organization that is equal, diverse and gender-balanced is essential for us to achieve our goals.

We strive to attract employees with different skills, life experiences and perspectives to contribute to even better problem solving of our societal mission in research and education.

If you think this position is relevant and interesting, we encourage you to apply, regardless of gender, functional ability and cultural background, or whether you have been out of work for a period of time.

At NTNU we want to increase the proportion of women in scientific positions. We have a number of measures to promote equality.

Salary and conditions

In the position of PhD Candidate, code 1017, your gross salary will normally be NOK 550 800,-per annum depending on qualifications and seniority. A 2% statutory contribution to the State Pension Fund is deducted from the salary.

The employment period is 3 years.

For employment as a PhD Candidate, it is a prerequisite that you gain admission to the PhD programme in Engineering within three months of your employment contract start date, and that you participate in an organized doctoral programme through out the period of employment.

As an employee at NTNU, it is important that you keep yourself up to date with academic and organizational changes and adapt to them.

For the necessary professional and social interaction, it is a prerequisite that you are physically present and available to the institution on a daily basis.

The appointment is carried out in accordance with the principles of the State Employees Act, and Export control (legislation that regulates the export of knowledge, technology and services). Candidates who, after assessment of the application and attachments, are considered to bein conflict with the criteria in the latter act, will not be able to be employed.

About the application

The attachments (including a description of your scientific work) must accompany the application as these documents form the basis of the application assessment. The documents must be in Norwegian/a Scandinavian language or English.

Please note: the application will only be assessed on the basis of the information we have received by the application deadline. Therefore, make sure that your application clearly shows how your skills and experience meet the criteria described above. The application and all attachments must be sent electronically via Jobbnorge.no. If you are invited to an interview, you must bring certified copies of certificates and diplomas upon request.

The application must include:

- Transcripts and diplomas for Bachelor's and Master's degrees
- CV
- Copy of Master's thesis. If you have recently submitted your Master's thesis, you can attach a draft of the thesis. Documentation of a completed Master's degree must be presented before taking up the position.
- Project outline containing proposals for an overall description of research questions, theoretical perspectives, methodological design for the project and progress plan (maximum 1500 words/4 pages)
- Short letter of motivation (400 words/1 page)
- Possibly publications etc. other relevant research work
- Possibly certificates
- Names and contact information of three relevant referees

If all, or parts, of your education has been taken abroad, we also ask you to attach documentation of the scope and quality of your entire education, both Bachelor's and Master's education, in addition to other higher education. If your institution uses “diploma supplement” (normal for most European institutions), you must attach this. A description of the documentation required can also be found here. If you already have a statement from Norwegian Directorate for Higher Education and Skills (HK-dir), please attach this as well.

Joint work will be considered. If it is difficult to identify your contribution to joint work, you must attach a brief description of your participation.

When assessing the best qualified, we emphasize necessary qualifications such as education, experience and personal suitability. Motivation for the position, ambitions, and potential for research will also count when assessing the candidates.

NTNU recognizes a wide range of academic contributions and has committed itself to The San Francisco Declaration on Research Assessment and CoARA (responsible assessment of research and recognition of a greater breadth of academic contributions in accordance with NTNU's social mission).

General information

A public list of applicants with name, age, job title and municipality of residence is prepared after the application deadline. If you wish to be exempt from entry on the public applicant list, this must be justified. Assessment will be made in accordance with current legislation. You will be notified if the exemption is not granted.

If you think this position looks interesting and in line with your qualifications, you are welcome to apply.

If you have any questions about the position, please contact Professor Hakan Basarir, email: hakan.basarir@ntnu.no.

If you have any questions about the recruitment process, please contact Eli Meistad, Senior Adviser HR, email: eli.meistad@ntnu.no.

Application deadline: 10.07.2026

For practical information about working at NTNU, please visit this webpage.

The city of Trondheim is a modern European city with a rich cultural scene. Trondheim is the tech capital of Norway with a population of 200,000. The Norwegian welfare state, including healthcare, schools, kindergartens and overall equality, is probably the best of its kind in the world. Professional subsidized day-care for children is easily available. Furthermore, Trondheim offers great opportunities for education (including international schools) and possibilities to enjoy nature, culture and family life and has low crime rates and clean air quality.

NTNU - knowledge for a better world

NTNU - knowledge for a better world

The Norwegian University of Science and Technology (NTNU) creates knowledge for a better world and solutions that can change everyday life.

Department of Geosciences

We conduct teaching and research related to management of Earth's geological resources. Norway's rich resources of wind, water, oil, gas and minerals have been and are essential to the country's prosperity, and will continue to be in the future. The Department plays a key role in the development of technology and the education of graduates who enable value creation based on our natural resources. The Department of Geosciences is one of eight departments in the Faculty of Engineering.

Additional information

Contact persons:

- Hakan Basarir, Professor
  Phone: | E-mail: hakan.basarir@ntnu.no
- Eli Meistad, Seniorrådgiver HR
  Phone: | E-mail: eli.meistad@ntnu.no

Place of service:

S. P. Andersens vei 15A 7491 Trondheim (Trondheim Municipality)