Jonny Sjöberg – ITASCA International Inc.

Chief Executive Officer

Expertise

Rock Mechanics, Geomechanics, Mining Engineering

Education

Ph.D. (Rock Mechanics), 1999
Luleå University of Technology, Luleå, Sweden

Licentiate in Engineering (Rock Mechanics), 1992
Luleå University of Technology, Luleå, Sweden

Master of Science in Geotechnology, 1988
Luleå University of Technology, Luleå, Sweden

Professional Affiliations

Member: International Society of Rock Mechanics

Keynote Lectures

EuroEngGeo 2020, 3rd European Regional Conference of IAEG (Athens, 2021). *Engineering geology for civil and mining engineering — case examples from Sweden*.

Second International Conference on Underground Mining Technology (Perth, 2020). *Solving rock mechanics issues through modelling: then, now, and in the future?*

Slope Stability 2018 (Sevilla, April 10–13, 2018). *Analysis of Large-Scale Pit Slope Stability — The Aitik Mine Revisited*.

Finnish Rock Mechanics Day (Helsinki, October 29, 2015). *Numerical simulations for underground mining and tunnel stability*.

EAGCG (Eastern Australian Ground Control Group) workshop on Stress and Seismicity (Launceston, March 19–20, 2015). Keynote no. 1: *Numerical Modeling of Mine Inducted Seismicity – A Case Study form the Malmberget Mine*. Keynote no. 2: *Seismicity in the Kiruna Sublevel Caving Mine – A Review*.

6th International Symposium on In-situ Rock Stress (Sendai, August 20–22, 2013). *Numerical Modeling of Mining-Induced Seismicity — Review and Case Study Example from the Malmberget Mine*.

Professional Experience

2024 – Present	ITASCA International Inc. Chief Executive Officer
2011 – 2023	ITASCA Sweden General Manager, Principal Engineer
2007 – Present	Luleå University of Technology, Luleå, Sweden Adjunct Professor in Rock Mechanics and Rock Engineering

2009 – 2011	LKAB, Luleå/Kiruna, Sweden Senior Researcher, Rock Mechanics
2007 – 2009	Vattenfall Power Consultant AB, Luleå, Sweden Rock Mechanics Consultant
2000 – 2006	SwedPower AB, Luleå, Sweden Rock Mechanics Consultant
1998 - 2000	Boliden Mineral AB, Boliden, Sweden Rock Mechanics Engineer
1994 – 1998	Luleå University of Technology, Luleå, Sweden Doctoral Student, Division of Rock Mechanics
1992 – 1994	Itasca Consulting Group, Inc. Minneapolis, USA Rock Mechanics Engineer
1988 – 1992	Luleå University of Technology, Luleå, Sweden Doctoral Student / Research Engineer, Division of Rock Mechanics
1987	LKAB Field Measurement Assistant
1986	LKAB Trainee

Project Experience

Mining: Rock mechanics and mining selection study for a vein-type orebody in the Skellefteå mining district. Study of crown pillar mining and feasibility assessment of deep sublevel cave mining for a mine in Finland,. Review work, as well as stability assessments for a large zinc mine in Ireland. Rock mechanics pre-feasibility studies for several deep orebodies within the Skellefteå mining district, as well as for the Nautanen deposit. Numerical modeling using *3DEC* focusing on the potential for fault-slip seismic events for different mining scenarios.

Assessment of caving and surface deformations resulting from underground sublevel cave mining using numerical modeling. Development of infrastructure restriction volumes (stand-off distance) for sublevel cave mining. Analysis of mining sequences and seismic potential for deep mining. Scenario description of caving and crown-pillar stability comprised of data compilation, analysis of seismicity data and empirical assessment of stope stability and caveability. Project manager for a research project on deformation measurements using radar satellite technology (InSAR technology) with the purpose of detecting mining-inducted ground deformations. Responsible for rock mechanics work related to mining-induced (from sublevel caving) ground deformations. Three-dimensional forensic numerical modeling using 3DEC for a rockburst fatality. Three-dimensional stress modeling for complex excavation geometries (chute drifts, crusher chamber) for a new major haulage level in a deep underground mine.

Stability assessment and design of rock slopes for several large and medium-size open-pit mines in Scandinavia, Bulgaria and Spain, including technical review, blast design, drainage design, geomechanical characterization, slope monitoring, and extensive numerical modeling. Member of Panel of Experts for slope design at open pits in Canada and Norway, peer-review of design study for a mine in Chile.

Review of design, excavation, and maintenance of shafts and ore passes under high stress conditions, and study of orepass stability in an underground mine, including site data collection, numerical analysis of orepass stability, identification of failure mechanisms, prognosis of future stability conditions, and assessment and recommendation of remedial measures and follow-up. Bulkhead design for a near-surface mine drift, to prevent flooding of the mine. Examination of sill-pillar rockbursting in underground mines. Investigation of fractured rock-mass response to dynamic loading by fault slip. Development of design methods for stope roofs and sill pillars in cut-and-fill and open-stope mining. Numerical analysis of stope-and-pillar stability in large-scale open-stope mining.

Member of the Peer Review Panel for numerical simulation of the Aznalcóllar tailings dam failure in southern Spain.

Infrastructure (Tunneling): Design work for the Västlänk railway tunnel in Gothenburg. Design work for the extension of the Stockholm metro involving new underground stations, and deep tunnels, for two of the planned three metro lines. Design and analysis work for tunnels and underground railroad stations in Gothenburg. Design work for the Slussen bus terminal in Stockholm. Detailed design work for the Citybanan (City Link) commuter-train tunnel project in Stockholm (Internal Project Leader). Rock mechanics analysis of bridge foundation over open-mine stopes for a new railroad in Kiruna. Evaluation, interpretation and analysis of all rock stress measurements in the Stockholm area in order to obtain design data for the Citybanan project. Numerical analysis of shotcrete reinforcement in rock tunnels, using two- and three-dimensional models for the simulation and evaluation of shotcrete in tunnel design work.

Developed design guidelines for road and railroad tunnels in rock for Trafikverket (the Swedish Transport Administration), and R&D-coordinator for Swedish Railroad Administration research program for tunnels and rock cuts, and corresponding handbooks.

Numerical analysis of the effect of foundations loads on existing subway and railway tunnels in Stockholm. Numerical analysis using *UDEC* and *3DEC* to study the mechanism of block separation in rock culverts under railroad embankments.

Underground Repositories: Rock mechanics analysis of LRC (Lined Rock Cavern) for storage of hydrogen gas. Rock mechanics study for underground storage of metal waste from a smelter plant. Principal internal reviewer for all rock mechanics work within Posiva, Finland for final storage of spent nuclear fuel. Rock mechanics design work for the excavation of the final (long-term) repository for spent nuclear fuel in Forsmark, Sweden. Site-model design review for nuclear waste repositories. Participation in the "Olkiluoto Modelling Task Force" for the construction of a spent nuclear fuel final-storage facility in Finland. Three-dimensional boundary element analysis using *EXAMINE3D* of tunnels at the Äspö Hard Rock Laboratory, Sweden.

Hydropower: Study of rock foundation issues and dam safety for a large hydropower dam in Sweden. Stability assessment of the rock abutment at the Vargfors hydropower concrete arch dam, including borehole logging, assessment of rock and joint shear-strength properties, and review and update of stability calculations for the rock abutment. Technical reviews for the Rio Estí (Panama) hydropower plant construction.

Stress Measurements: Project leader for rock stress measurements using overcoring in various projects in Sweden and Finland, including both shallow and deep boreholes, as well as the application of hydraulic fracturing. Investigation of core disking and overcoring rock stress measurements in high-stress

environments through field testing (drilling and overcoring) and analyses. Development of a methodology for analysis and quality control of rock stress measurements in anisotropic rock. Review of measurements and assessment of initial stress state for several mining and repository sites worldwide.

Teaching and Academic Experience:
(All teaching experience at Luleå University of Technology, unless otherwise noted.)

Opponent at Bibek Neupane's presentation of his doctoral thesis at the NTNU University in Trondheim (2021).

Thesis reviewer for Juan Andres Jarufe Troncoso's PhD thesis at University of Western Australia (2020).

Opponent at Chhatra Bahadur Basnet's presentation of his doctoral thesis at the NTNU University in Trondheim (2018).

Opponent at Mario Morales Cárdenas' presentation of his doctoral thesis at the NTNU University in Trondheim (2018).

Opponent at Guro Grøneng's presentation of her doctoral thesis at the NTNU University in Trondheim (2010).

Supervisor for two graduate students (doctoral thesis) with Ph.D. degrees awarded in 2017. Supervisor for graduate student (doctoral thesis) on a project dealing with the strength of hard rock masses, including strength estimation and numerical modeling (2004-2008); Supervision of a large number of undergraduate thesis projects — e.g., bonded block modeling, prediction of damage in mining infrastructure, 3D modeling of hydropower plant, 3D analysis of tunnel advance and reinforcement needs, caving and ground deformation in mining operations, numerical modeling of drift-and-slash underground mining, 3D numerical modeling, brittle failure in shafts and ore passes, ground subsidence, open pit slope design, application of digital photogrammetry for mapping of joints, several projects on overcoring rock stress measurements, rock erosion in spillwater channels, and various underground mining design projects.
Member of the executive group for HLRC—the Hjalmar Lundbohm Research Centre (funded by LKAB) at the Luleå University of Technology (2009–2010).

Review of applicants for the position of professor in engineering geology at Norwegian University of Science and Technology (2021). Review of applications for the position of professor at the Department of Geoscience and Petroleum, Norwegian University of Science and Technology (2019). Review of applicants for the position of adjunct professor (Professor II) at the Department of Geology and Mineral Resources Engineering, Norwegian University of Science and Technology (2007). Review of applicants for the position of associate professor (university lecturer) at the Division of Rock Mechanics, Luleå University of Technology. Teaching of Sandvik International Mining School students on rock mechanics in sublevel cave mining (2009, 2010, 2011, 2012, 2013, 2014).

Planned and gave several postgraduate courses e.g., on rock stress measurements, slope stability, and numerical modeling (1997 to present).

Instructor of undergraduate students in civil and mining engineering at Luleå University of Technology, including classes on fundamental rock mechanics, stability and design, monitoring, numerical analysis, rock reinforcement, and probabilistic design (1989 to present).

Assisted in training of numerical modeling using *FLAC*, *FLAC3D*, *UDEC*, and *3DEC* (1994, 2013, 2016).