

Cristian Lopez Penafiel

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Senior Digital Analytics and Operational Technology Manager at one of the world's biggest mining companies, I am armed with a deep understanding of software and technologies applied to mining, metallurgical and logistic processes. My academic and professional experience has provided me with a quick, analytical and innovative mindset, focused on adding value and leading technological projects to promote asset optimisation, organisational ambidexterity, artificial intelligence transformation, process automation, and business-IT alignment while implementing strong change management strategies to foster adaptability and business optimisation

Education

- **Master of Information Systems** **2015-2016**
School of Engineering,
University of Melbourne. *Melbourne, Australia*
 - **Graduate Diploma, Management of Mining Business** **2013**
Executive Education Centre,
Universidad Adolfo Ibañez. *Santiago, Chile*
 - **Mining Engineering, Geomechanics** **2011-2012**
Department of Mining Engineering,
Universidad de Chile. *Santiago, Chile*
 - **Bachelor in Engineering Science, Major in Extractive Mining and Metallurgy** **2006-2011**
Faculty of Physical and Mathematical Sciences,
Universidad de Chile. *Santiago, Chile*
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Professional Experience

- **GLENCORE** **Oct/2023-to date**
Senior Manager - Digital Analytics and Operational Technology *Brisbane, Australia*
 - Accountable for the digital transformation and automation strategy.
 - Accountable for the digital optimisation portfolio definition and prioritisation in Copper assets globally (+25MUSD CAPEX), including OT deployments, GenAI, Advanced Process Control, AI and Business Intelligence.
 - Accountable for the design and execution value driven asset modernisation strategies (+75MUSD CAPEX).
 - Founder and Co-chair of the information system steering committee and governance process to optimise and simplify the portfolio of applications and software in Copper.
 - Founder of the digital academy which aims to improve the organisation digital literacy.
 - Responsible of overseeing the IT&OT Cybersecurity strategy and initiatives globally.
 - Responsible for managing the relationship with technology contractors and consultants.
 - Successfully leading the execution of the first digital optimisation projects in African Assets.
- **GLENCORE** **Mar/2021-Oct/2023**
Global Digital Analytics Manager *Brisbane, Australia*
 - Led the implementation of digital, advanced analytics, and automation initiatives across the organisation (+18MUSD CAPEX).
 - Led the execution of the first three value-capturing projects of Operational Excellence and Technology in LATAM Assets.
 - Led the execution of the first Business Intelligence waves in LATAM assets.
 - Founder and manager of the first data science, data engineering, and OT automation disciplines in Copper assets.
 - Developed and prioritised a new digital portfolio across all assets based in their digital maturity.
 - Built a market intelligence dashboard to understand vendors landscape and its capabilities globally.
 - Building internal analytics and automation capacity, establishing a network of agile teams in assets to ensure smooth transfer to operations.

• **CODELCO, Headquarters**

Dec/2019-Feb/2021

Corporate Director of Digital Transformation

Santiago, Chile

- Corporate leader of digital and advanced analytics initiatives across the organisation.
- Development of an internal COVID-19 mobile app to disseminate critical information, reinforce health protocols, track internal cases, and collect data via digital geofences for informed decision-making.
- Implementation of three prescriptive models using machine learning in Chuquicamata, resulting in a copper uplift of 9.7% within three months.
- Led a change management program at Chuquicamata iROC, ensuring smooth transitions and fostering a culture of adaptability and resilience.
- Validation and pilot testing of three advanced analytics initiatives employing Kalman filters, LightGBM, and Metropolis Hastings techniques in comminution plant assets.
- Development and prioritisation of a new digital portfolio across all mining operations.
- Training and mentoring main stakeholders on digital concepts and agile methodologies.
- Promoting a data-driven decision-making culture within operational excellence teams.
- Building internal AI capacity to establish a network of agile teams on-site.

• **CODELCO, El Teniente**

Jan/2019-Nov/2019

Director of Innovation

Rancagua, Chile

- Leader of the Digital Transformation and Innovation Team.
- Founder of the first data science unit and the first data governance committee in Codelco.
- Control, monitoring, and optimisation of the portfolio of inventions to secure its value creation.
- Technological roadmapping, development, and implementation of artificial intelligence prescriptive models, asset automation, and IT/OT alignment across the mining value chain.
- Change management planning to secure adherence, innovation intensity, and promote new business models in different processes within the organisation.
- Technological surveillance to introduce inventions from different industries into mining and metallurgy.
- Piloting, validation, and scaling of different technologies across all operations in the mining value chain.
- Modelling and optimisation of a SAG mill grinding circuit and flotation using XGBoost and EMCEE libraries that created an uplift of 6.06% of fine Copper.
- Succeeded in meeting and surpassing 2019 innovation intensity measured in EBITDA goals.

• **Tiger Spider**

Feb/2016-Dec/2018

Product Manager

Melbourne, Australia

- Project manager of a multi-body dynamics cloud based software (Tiger Spider Web).
- Project manager of logistics solutions for Mining Transport Operators
- Lead software engineer and coordinator between the Russian development team and the Australian engineering team.
- Requirements engineering, software architecture and quality assurance of a Software as a Service.
- Data strategist for continuous improvement and business performance.
- Technological road-mapping for Tiger Spider.

• **Antofagasta PLC, Minera Michilla**

Jan/2014- Feb/2015

Mining Engineer

Antofagasta, Chile

- Software architect of the in-house development and implementation of a dispatch system for load and haul vehicles.
- Development and implementation of a short term mine planning sequencer.
- Control and management of all operational indicators including two open pits, two underground operations (cut and fill and sublevel stoping) and minerals purchased to tertiary mines.
- Budget and cost control of all mining operations.
- Modelling of haul truck circuits in secondary leaching zone using Promodel.
- Improvement of the ore control module for the geology area.
- Active member of the short term mine planning team.
- Development of a mine ranking simulator.

- **Antofagasta PLC, Minera Michilla**
Mining Process Engineer

 - Holistic BPM modelling of all processes of the open pit Mine Superintendency and secondary leaching.
 - Detection and mitigation of inefficiencies inherent to processes.
 - Structuring and analysis of cost models for the Mine Superintendency.
 - Generation of a management model in order to establish strategic guidelines.
 - Leader of the winning project of Young Professionals at Antofagasta Minerals 2013.
 - Assembling and starting operation of a geotechnical monitoring station.
 - Generation and development of the cost module for Minera Michilla's management system.

2013
Antofagasta, Chile

- **Advanced Mining Technology Center, AMTC**
Research Assistant
Tutor: Javier Vallejos, Ph.D.

 - Research assistant at the mine planning and design group at the AMTC.
 - Numerical fragmentation modelling in caving methods using the synthetic rock mass technique during the project "Laboratory testing services in geological structures and advisory in the application of the numerical modelling technique of Synthetic Rock Mass (SRM)" CODELCO Chile, División El Teniente.

Jun/2012-Mar/2013
Santiago, Chile

- **CODELCO, Radomiro Tomic**
Professional Internship III

 - Statistical and deterministic analysis of the performance of shovels.
 - Automation of operating performance indexes through VBA programming.

Feb/2012-Mar/2012
Calama, Chile

- **CODELCO, Mina Sur**
Professional Internship II

 - Analysis and sizing of optimal edge berms through cinematic and geomechanical modelling.
 - Statistical analysis of the TKHP of the transport fleet.
 - Automation of the database consultation of Leica Jigsaw System.

Jan/2011-Mar/2011
Calama, Chile

- **Yamana Gold, El Peñon**
Professional Internship I

 - In charge of the statistical study to find the causes of the formation of bridges and hang ups in underground stopes.
 - On-site measurement of drilling deviations and determination of its impact in blasting.

Feb/2009-Mar/2009
Antofagasta, Chile

Awards, Publications, Projects and Other

- **Australian Global Talent Independent Program**
Sponsored by the Australian Government

 - Australian residence for exceptionally talented and prominent individuals who can raise Australia's standing in their field.

Dec/2020
Australia

- **C. Lopez, J. Diaz, U. Contreras, G. Droguett, C. Ordenes**
Procemin-GEOMET 2019

 - Optimising SAG Plant production using Advanced Analytics at Codelco El Teniente Division.

Nov/2019
Santiago, Chile

- **C. Lopez, M. Coleman**
HVTT15

 - Leveraging Cloud Computing for Heavy Vehicle Optimisation and in-service performance assessment.

Oct/2018
Rotterdam, Netherlands

- **Lean Six Sigma Greenbelt**
By 6Sigma

 - Knowledge, values, applications and expertise in the adoption of lean practices.

Sep/2017
San Jose, California, USA

- **Certified ScrumMaster® (CSM)**
By Scrum Alliance

Sep/2017
San Jose, California, USA

- Knowledge, values, applications and expertise in the adoption of agile practices.

- **ANZ Bank Innovation Hackathon**

Jul/2016

Service innovation hackathon performed by ANZ bank and the University of Melbourne

Melbourne, Australia

- Hackathon to innovate the delivery of home loans.
- Innovation project recognised as the winner of the hackathon event.

- **Becas Chile Scholarship**

Jul/2014

Sponsored by the National Commission for Scientific and Technological Research (CONICYT)

Chile

- Full tuition scholarship to study a Master of Information Systems at the University of Melbourne in Australia.

- **J. Vallejos, C. Lopez, A. Brzovic, L. Bouzeran, D. Mas Ivars.**

Oct/2013

3rd International FLAC/DEM Symposium

Hangzhou, China

- Application of the Synthetic Rock Mass approach to characterize rock mass behaviour at the El Teniente Mine, Chile.

- **Energy resources optimization at Michilla operation**

Apr/2013-Dec/2013

Operational research to optimize the use of petrol at Minera Michilla S.A.

Santiago, Chile

- Improvement of the design and routes of haul roads, reaching a 7-month payback.
- Project recognised as the best work awarded by Antofagasta Minerals and Universidad Adolfo Ibañez in 2013.

- **PFC Course, FCFM**

Mar/2013

Personalised course for researchers of the mining design group at the AMTC

Santiago, Chile

- Focused on the geomechanical numerical modelling through the Particle Flow Code in three Dimensions of Itasca.

Language Skills

Spanish: Native proficiency.

English: Native proficiency.

French: Limited working proficiency.

Computer skills and personal interest

Software skills: Microsoft Azure, JIRA, Confluence, TeamCity, Sencha Architect, Prezi, Excel, Word, Visio, MSProject, Powerpoint, Visual Studio, Sencha Architect, Source Tree, SRMLab, Sketchup, Rocscience Examine 2D, Rocscience RocLab, Rocscience Slide, MatLab, Java, C#, MySQL, Python, PowerBI, Visual Basic, Maptek Vulcan, Minesight, Gemcom Whittle, Rocscience Phase2, AutoCAD, ArcGis, Pix4D, PhotoScan, SAP-PM/MM, Bizagi Process Modeler, ProModel, PFC3D, Universal Mechanism, \LaTeX .

Professional interests: Data Science, logistics, enterprise architectures, project leadership, innovation in information systems, cross-cultural management, change management, mine planning and design, operations research, emerging technologies, process analysis, optimisation, control and automation, geotechnics, software modeling, simulation technologies, operations management, service innovation, entrepreneurial frameworks, and agile organisations.

Personal interests: Fitness, snowboarding, ski, fishing, football, basketball, foreign languages, and travel.
