The future of mining is here.

March 2020
Ore deposit discovery rates are **DECREASING**, and exploration spending has peaked.

**ENORMOUS AMOUNTS** of data are present, and the data deluge worsens as more new technologies and instruments come online.
Mineral deposits form for a reason (geology).

Machine Learning processes geological data to discover patterns.

Machine Learning derived products support exploration (e.g., new exploration regions)
Adding value to mining

The World Economic Forum has classified mining technologies into four main categories. These areas have the potential to add more than $315 billions of additional value to the mining industry.

Automation, Robotics, and Operational Hardware
- Autonomous operations and robotics
- 3D printing
- Smart sensors

Digitally Enabled Workforce
- Connected workers
- Remote operations centre

Integrated Enterprise, Platforms and Ecosystems
- IO/OT convergence
- Asset cybersecurity
- Integrated sourcing, data exchange, commerce

Next-Generation Analytics and Decision Support
- Advanced Analytics and Simulation Modelling
- Artificial Intelligence

Total value at stake
- Automation, Robotics, and Operational Hardware: $90 billion
- Digitally Enabled Workforce: $162 billion
- Integrated Enterprise, Platforms and Ecosystems: $52 billion
- Next-Generation Analytics and Decision Support: $11 billion

Source: Digital Transformation Initiative, Mining and Metals Industry, World Economic Forum, January 2017
Next-generation analytics and decision support

**Training Data**
- Input Data
  - Mineral Occurrences
  - Faults
  - Geology
  - Geochemistry
  - Geophysics
  - Satellite Imagery
  - Topography
  - Spatial Data

**Apply Learning Algorithms**
- Data is cleaned, transformed, interpreted and then used to train machines in order to predict targets

**Identify Targets**
- Targets are identified with high potential for mineralization

**Prospectivity map with known deposits**
Galley et al., 2007

**Gold-Spots**
- deposits
- prospects
- occurrences

**Prospectivity zones**

**Target Heat Map (Prospectivity map)**
Putting geoscience data to work

Geological models and interpretations are built from the ground up, eliminating as much bias as possible. Targets are identified with both domain expertise and AI, allowing for clear interpretability of the final targets.

**The Data**
- Mineral Occurrences
- Faults
- Geology
- Geochemistry
- Geophysics
- Satellite Imagery
- Topography
- Spatial Data

**The Algorithms**
- Domain expertise
- Regression
- Clustering
- Bayesian Probability
- Decision Trees
- Neural Networks
- Deep Learning
- NLP
- OCR
- Ensemble Modelling

**The Targets**
- Targets identified with high potential for mineralization
**GoldSpot: Globally, any resource**

GoldSpot works with industry leaders to identify new mineral exploration targets, to develop new methodology, and to invest strategically in small-cap mineral exploration companies.

**Project Experience**

<table>
<thead>
<tr>
<th>Element</th>
<th>Price (USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Au</td>
<td>196.97</td>
</tr>
<tr>
<td>Ag</td>
<td>79</td>
</tr>
<tr>
<td>Cu</td>
<td>63.55</td>
</tr>
<tr>
<td>Ni</td>
<td>58.88</td>
</tr>
<tr>
<td>Pb</td>
<td>207.2</td>
</tr>
<tr>
<td>Zn</td>
<td>65.39</td>
</tr>
<tr>
<td>Ru</td>
<td>101.07</td>
</tr>
<tr>
<td>Rh</td>
<td>102.91</td>
</tr>
<tr>
<td>Pd</td>
<td>126.42</td>
</tr>
<tr>
<td>Os</td>
<td>199.06</td>
</tr>
<tr>
<td>Ir</td>
<td>150.22</td>
</tr>
</tbody>
</table>

**Past & Current Clients**

- Sprott Mining Inc.
- Hochschild Mining
- McEwen Mining
- Yamana Gold
- Vale
- Integra Resources
“GoldSpot has produced a very high-quality 3D geological model of the Jerritt Canyon district which provides an excellent foundation for continued exploration. We look forward to drilling the priority targets derived by GoldSpot through their detailed assessment (AI techniques) of the data. The management of Jerritt Canyon Gold looks forward to future collaboration with GoldSpot in the continued exploration and development of the Jerritt Canyon district.”

Jamie Lavigne, VP Exploration of Sprott Mining

“GoldSpot and Yamana Gold recently completed a machine learning collaboration in the area surrounding the El Penon mine site using extensive, multidisciplinary, geological, geophysical and geochemical datasets. The study was successful in identifying known mineralized areas in the mine in blind tests and is now playing a significant role in aggressive ongoing exploration efforts. GoldSpot was able to create a predictive lithological map for covered areas that is particularly useful for prioritizing drill targets. The highly collaborative approach demonstrated by the GoldSpot team contributed greatly to the quality of the final product.”

Henry Marsden, Senior Vice President, Exploration

"We are very excited to be partners with GoldSpot, their approach to exploration using leading edge technology has not only allowed us to validate targets, but has provided us with fresh ideas and new concepts. GoldSpot is helping us to embrace new technologies."

Ramón Barúa, CFO of Hochschild Mining
GoldSpot Discoveries is using machine learning as a very powerful extension of geological brainpower to unlock deep value in exploration and investment data.

The team comprises of subject-matter experts covering geology to data science, including 8 Ph.D., 10 M.Sc., and 10 professional designations in Engineering and Geoscience.
Case Study

Regional Scale Targeting

Abitibi, Quebec

Greenfields prospectivity mapping for gold
GoldSpot prospectivity workflow

Phase I: Raw data
Phase II: Geological model
Phase III: Machine-learning algorithm
Phase IV: Targets

Knowledge
Phase I & II: data cleaning

- Geological Map (1:50,000 scale)
- Outcrops (n=94,51)
- Diamond Drill Holes (n = 67,329)
- Regional Lake, Till & River Sediment Geochemistry (n=67,750)
- Electromagnetic Map
- Structural Data Lines (n=53,870) & Points (n=6,001)
- Gold Occurrences, Prospects & Deposits (n=1,572)

88 Variables determined

Each variable converted into grid point data of different types
Phase III: Machine Learning model selection

1. Establish a training set of data points (deposits vs barren)
2. Test exploration vectors on the training set and rank their importance
3. Select best suited machine-learning methods and optimizing parameters
4. Create machine learning models
5. Apply machine learning solutions and create prospectivity estimate over the AOI
Phase VI: model in production

Results are based on a prospectivity score from 0 to 1

A high score means there are significant variables that are correlated to gold

86% of existing deposits identified, plus new target properties

GoldSpot PROJECT
Quebec – Canada Gold Prospectivity Target Generation

<table>
<thead>
<tr>
<th>Scale: 1:1,000,000</th>
<th>Date: Sep. 30-16</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projection: UTM 17N</td>
<td>GIS: Data Miners</td>
</tr>
<tr>
<td>Datum: NAD 1983</td>
<td>Source: SIGEOM</td>
</tr>
</tbody>
</table>
86% of the existing gold deposits in the Abitibi identified, but only 4% of the total surface area required, and creating additional target generation

Narrowing the exploration search space significantly reduces exploration time and costs.
Case Study

Near-Mine Exploration

Northeastern Ontario
Argentina
Newfoundland

Brownfields prospectivity mapping for gold
Phase I: data clean up and management

- Drill hole logs (RC, DDH, etc)
- Drill hole assays
- Structural Data
- Geophysical Data
- (Litho)geochemical data
- Multispectral Data
Phase I: data clean up and management

- Assess and rank data based on relevance
- Extract and refine data
- Import into Leapfrog Geo
- **Clean and homogenize DDH logging database**
- Declustering data
- Leveling of different survey types (e.g. geophysical, geochemical)
Phase II: interpreting geoscientific data

- Perform traditional geoscientific investigative work
- Highlight which variables control the distribution and grades of the deposit
- Combine geological data and interpretations in the 2D and 3D space
Phase III: Machine Learning

- Integrate all relevant data sets into a $n$-dimensional space
- Explore and quantify the different correlations, trends and relationships between the different variables
- Predict zones with high mineral potential
Phase IV: target generation and validation

- Evaluation of all targets generated using
  - Geological modelling
  - Geochemical data analysis
  - Geophysical interpretation
  - Machine learning algorithms

- Compare and rank all targets

- Issue recommendations for exploration and a prospectivity map
Case Study examples

AI in the mining value chain

Machine learning to deliver automation and operational efficiencies from exploration to mining
Improved maps for regional exploration

A combination of domain expertise & supervised learning techniques

Original Geological Map

Additional Data
- Multispectral Data
- Magnetic Data
- Radiometric Data

Final Geological Map
Drill targets from improved maps

Drillhole #1 NFG-19-01: 19m of 92.86 gpt Au (1,764.34 gram-meters)

Original Outdated Geological Map

Additional Data
Magnetic & EM survey (VTEM) over 225 layers
Residual Mag
Chargeability
dB/dt SQ-05

GoldSpot Deep Learning Bedrock Map
Geophysical clusters
Domain Expertise
Sector knowledge
Machine learning
Field Validation
R&D Products in Development

Remote Sensing: 22%
Computer Vision: 16%
GIS: 13%
Geophysics Inversion: 14%
Mapping: 11%
Targeting: 8%
Geochemistry: 5%
3D Modelling: 5%
Resources: 3%
Other: 3%

>40
Automated core relogging from photography
R&D Example

Rapid, automatic processing of directories of core photos to extract geological observations
Automated core relogging from photography

Example from a quartz-hosted gold deposit

**Extracted photo**

**Quartz Veins**

**Quartz Veins**

**Lithology**

**Assay Intervals**
Our Team
### Technical, research, and AI talent

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Field</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chris MacInnis, P.Geo.</td>
<td>VP, Technical Services</td>
<td>VP, Technical Services</td>
</tr>
<tr>
<td>Brenda Sharp, M.Sc., P.Geo.</td>
<td>Chief Geophysicist</td>
<td>Chief Geophysicist</td>
</tr>
<tr>
<td>Michael Cain, P.Eng.</td>
<td>Engineer in Geophysics</td>
<td>Engineer in Geophysics</td>
</tr>
<tr>
<td>Sarane Sterckx, M.Sc.</td>
<td>Associate</td>
<td>Associate</td>
</tr>
<tr>
<td>Vivien Janvier, Ph.D., P.Geo.</td>
<td>Geologist</td>
<td>Geologist</td>
</tr>
<tr>
<td>Mireille Pelletier, M.Sc., P.Geo.</td>
<td>Geologist</td>
<td>Geologist</td>
</tr>
<tr>
<td>William Oswald, Ph.D.</td>
<td>Associate</td>
<td>Associate</td>
</tr>
<tr>
<td>Charles Bérubé, Ph.D.</td>
<td>Geological Data Scientist</td>
<td>Geological Data Scientist</td>
</tr>
<tr>
<td>Pierre De Tudert, M.Sc.</td>
<td>Geologist</td>
<td>Geologist</td>
</tr>
<tr>
<td>Shervin Azad, M.Sc., P.Geo.</td>
<td>Geophysicist Data Scientist</td>
<td>Geophysicist Data Scientist</td>
</tr>
<tr>
<td>Véronique Bouzaglou, Ph.D.</td>
<td>Geological Data Scientist</td>
<td>Geological Data Scientist</td>
</tr>
<tr>
<td>Grace Dupuis, Ph.D.</td>
<td>Data Scientist</td>
<td>Data Scientist</td>
</tr>
<tr>
<td>Louis Beaupre, P.Eng.</td>
<td>Engineer in Geology</td>
<td>Engineer in Geology</td>
</tr>
<tr>
<td>Frédéric Courchesne, M.Sc.</td>
<td>Data Scientist</td>
<td>Data Scientist</td>
</tr>
<tr>
<td>Lindsay Hall, M.Sc., P.Geo.</td>
<td>Senior Geologist</td>
<td>Senior Geologist</td>
</tr>
<tr>
<td>Shawn Hood, Ph.D, P.Geo.</td>
<td>VP, Technical Services</td>
<td>VP, Technical Services</td>
</tr>
<tr>
<td>Ludovic Bigot, M.Sc., P.Geo.</td>
<td>Senior Geologist</td>
<td>Senior Geologist</td>
</tr>
<tr>
<td>Max Tian, M.Sc.</td>
<td>Data Scientist</td>
<td>Data Scientist</td>
</tr>
<tr>
<td>Xun Wang, Ph.D.</td>
<td>Data Scientist</td>
<td>Data Scientist</td>
</tr>
<tr>
<td>Minghaol Lyu</td>
<td>Data Engineer</td>
<td>Data Engineer</td>
</tr>
<tr>
<td>Peter McIntyre, P.Geo.</td>
<td>Principal Geologist</td>
<td>Principal Geologist</td>
</tr>
<tr>
<td>Britt Bluemel, M.Sc.</td>
<td>Senior Geochemist</td>
<td>Senior Geochemist</td>
</tr>
<tr>
<td>Pejman Shamsipour, Ph.D.</td>
<td>Geological Data Scientist</td>
<td>Geological Data Scientist</td>
</tr>
</tbody>
</table>
Management & board

Frank Holmes | Independent Chairman
Renowned global investor Frank Holmes, Chief Executive and Chief Investment Officer at U.S. Global Investors, a leading mutual fund and asset management firm.
Sought after keynote speaker at international investment conferences and a regular guest in business media. His Frank Talk CEO Blog is one of the most widely read in finance.

Denis Laviolette | President, CEO & Director
Over 10 years of experience in exploration, mine operations, and capital markets.
Worked in Northern Ontario (Timmins, Kirkland Lake and Red Lake), Norway and Ghana and took on a diverse array of tasks, including grass roots exploration, start-up mine management, and advanced mine operations. Worked as a Mining Analyst with Pinetree Capital Ltd.
BSc Earth Sciences (Geology) from Brock University.

Cejay Kim | Chief Business Officer
Chief Investment Officer of Palisade Global Investments.
Previously served in a senior capacity at ReQuest Equities, a merchant bank in the junior resource sector supported by the KCR Fund, a $100 million venture backed by Marin Katusa, Doug Casey, and Rick Rule.
BA in Economics from the University of Calgary, MBA in Global Asset and Wealth Management from Simon Fraser University, a CFA charterholder, and a member of the Calgary CFA Society.

Vincent Dubé-Bourgeois | COO & Director
Co-Founder of GoldSpot Discoveries
Worked for the Ontario Geological Survey (OGS) and Noront Resources Ltd.
MSc project consisted of describing and interpreting the geochemistry and geodynamic setting of the volcanic rocks hosting the gold-rich VMS Lalor deposit, Snow Lake, Manitoba.
BSc in Geology from the University of Ottawa.

Ramón Barúa | Director
CFO of Hochschild Mining plc. Previously the CEO of Fosfatos del Pacífico, a mining project in northern Peru owned by Cementos Pacasmayo, an associate company of the Hochschild Group. Previously worked as the General Manager for Hochschild Mining’s Mexican operations, and Deputy CEO and CFO of Cementos Pacasmayo. Economics graduate from Universidad de Lima and holds an MBA from Columbia Business School.

Donovan Pollitt | Independent Director
Over 15 years of resource industry experience, ranging from grassroots exploration to underground and open-pit mining explorations. Currently the President of Pollitt Mining and previously the President and CEO of Wesdome Gold Mines, BASc in Mining & Mineral Engineering the University of Toronto and an MBA from Columbia Business School. Mr. Pollitt is a PEng and a CFA Charterholder.

James Dendle | Independent Director
P.Geo, with ten years of global experience in both the private sector and in consultancy services. Currently serves as the VP, Geology & Investor Relations at Triple Flag Precious Metals Corp., a streaming and royalty company. Broad background in estimating and auditing resources and reserves, multi-disciplinary due diligence and technical studies BSc in Applied Geology (1st Class Honours) and a MSc in Mining Geology (Distinction) from the University of Exeter, Camborne School of Mines, and is a Chartered Geologist of the Geological Society of London.

Gerry Feldman | Independent Director
Managing Partner of DNTW Toronto LLP, brings 35 years of experience in advising both private and public companies on their acquisition, divestiture and tax strategies. Extensive experience in a broad range of sectors and mandates. Holds and has held Senior Officer and Director positions in several companies that are listed on various stock exchanges.

Sarah Sun | Chief Data Strategist
Decade of experience in financial services & Data Science. Previously Senior Manager, Data Strategy at TD Bank and Principal Data Scientist at Capital One Canada. Experienced in Data Strategy, Data Monetization, AI & ML, Data Science, and Data Governance. BMath, double major Mathematical Finance and Statistics from the University of Waterloo. Coach for Math Team Canada.

Binh Quach | Chief Financial Officer
Chartered Professional Accountant with over 20 years experience working for both public and private companies. Previously, the Controller of Pinetree Capital Ltd for 14 years. Currently, the Controller of ThreeD Capital Inc.
Summary
Monetization strategy

**CONSULTANCY SERVICES**

- Engage producers & advanced stage companies in cash for service contracts
- **Consultancy revenue covers all overhead and research & development**
- Validates technology for the market and ensures first mover advantage
- Every project product refinement & new product creation

**Examples**
- Hochschild Mining
- McEwen Mining
- Sprott Mining
- Yamana Gold
- Gran Colombia Gold
- Vale

**INVESTMENTS & ROYALTIES**

- Invest in junior exploration companies
- Junior engages GoldSpot to incorporate AI into its narrative and generate targets
- In some cases, GoldSpot acquires royalty on project
- GoldSpot is building a portfolio of equities & royalties for its discovery objective

**Examples**
- Pacton Gold Inc
- New Found Gold Corp
- Tristar Gold Inc
- Group Ten Metals Inc
- Northstar Gold Corp
- Manitou Gold Corp
Revenue growth

GoldSpot Revenues (CAD)

- 2017: 0.45MM
- 2018: 1.20MM (170% growth)
- 2019 Est.: 2.30MM (92% growth)
- 2020 Est.: 3.00MM (Projected Revenue)

Already booked:

- 2017: 0.45MM
- 2018: 1.20MM
- 2019 Est.: 2.30MM
- 2020 Est.: 3.00MM
Royalty portfolio

**NEWFOUND GOLD CORP**

0.4 – 1% NSR

- The next big Canadian gold belt in discovery phase. Over 100 km of strike length on the JBP and Appleton linears
- Knob deposit contains a historical resource of 97,000 ounces gold at 16 g/t

**ONEBULLION**

0.5% NSR

- Primary focus is acquiring land in the Kraaipan Greenstone belt, home to South Africa’s premier gold district
- Substantial gold values quoting surface rock chip samples: 50 m averaging 21.1 g/t, 50 m averaging 8.62 g/t, 100 m averaging 2.93 g/t

**ManitouGold Inc.**

0.5 – 2.5% NSR

- Kenwest project acquired from Goldcorp and is comprised of 32 patented mining claims and 10 mining licenses of occupation covering 599 hectares
- 19,387 m drilled (104 diamond drill holes), including 53.7 kg/t AU over 0.55 m

**PACTON GOLD**

0.5% NSR Red Lake

- Land package adjacent to Great Bear Resources, whose discoveries are situated in volcanic structures with dilation, folds, and fold axis along D2 structures
- Data surveys indicate proper structural setting and mafic contacts comparable to neighboring properties
GoldSpot capital structure

Capital Structure as of Sept 30, 2019

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Shares Outstanding</td>
<td>94.7M</td>
</tr>
<tr>
<td>Broker Warrants</td>
<td>1.3M</td>
</tr>
<tr>
<td>Options</td>
<td>7.4M</td>
</tr>
<tr>
<td>Fully Diluted</td>
<td>103.4M</td>
</tr>
<tr>
<td>Cash &amp; Portfolio</td>
<td>8.4M</td>
</tr>
<tr>
<td>Debt Outstanding</td>
<td>N/A</td>
</tr>
</tbody>
</table>

Ownership Structure

- Palisade Global: 14%
- Management & Employees: 14%
- Eric Sprott: 10%
- US Global & Frank Holmes: 8%
- Triple Flag: 8%
- Hoschschild: 7%
- Rob McEwen: 1%
- Other: 37%
LONG-TERM VISION:

**More data. Smarter machines.**
We continuously evolve our machine learning algorithms to improve our outcomes.

**Walk the Talk.**
We invest in companies to drill our targets.

**Next Generation Technology.**
We constantly explore the latest mining technologies to generate more data and stay one step ahead of the curve.

**Consulting, technology, and investment**
We use the data analytics and AI toolbox to improve operational efficiencies, de-risk resource and reserve addition, and lower exploration costs.
Investors don’t need another exploration gamble...

They need a new way to play the mining space.
GoldSpot’s dedication to R&D is recognized across both geological and data sciences

Vector drives excellence and leadership in Canada’s knowledge, creation, and use of artificial intelligence to foster economic growth and improve the lives of Canadians

Metal Earth, through MERC, is on a mission to conduct and promote cutting-edge, field-based, collaborative research on mineral deposits and their environments