CEMI
Centre for Excellence in Mining Innovation

FOSTERING INNOVATION, IMPLEMENTING EXCELLENCE.

The Centre for Excellence in Mining Innovation (CEMI) directs and coordinates step-change innovation in the areas of exploration, deep mining, integrated mine engineering, environment and sustainability for the metal mining industry. With a seasoned team of program directors, CEMI identifies, assesses and manages industry-driven applied research & development projects that extend from geology and engineering to include the natural sciences. We recognize innovation is a three-phase process: research, development and implementation (R&D, I). With implementation, we routinely turn innovative ideas into best practices.

CEMI offers a single point of entry for collaboration, knowledge resources and human resource capital, creating greater capacity for excellence in innovation and greater value to the economic development of the metal mining industry by:

1. **collaborating with major Canadian and global mining companies, universities, government researchers, technical consultants, and innovative SMEs across Canada, and around the world**
2. **facilitating industry-focused research and innovation that advances concepts, processes and methodologies**
3. **developing and nurturing future generations of researchers, industry leaders and highly qualified personnel by providing training opportunities and in-field access to facilities**
4. **implementing sound business practices with a focus on accountability, efficiency and effectiveness**
5. **attracting global patrons and government funding**

We have established capability for management and implementation of major strategic research programs and successfully obtained the following research funding and resources to date:

- **$12.9 million for over 30 strategic R&D projects in the areas of exploration, deep mining, integrated mine engineering, environment and sustainability**
- **$2 million to Research Chairs**
- **$1.9 million for SME-led projects to help bring innovations to development and potentially market**

CEMI currently collaborates with 30 professors and 50 undergraduate, graduate (MSc, PhD and PDF) and co-op students working on over 30 research projects.

CEMI DIRECTS AND COORDINATES STEP-CHANGE INNOVATION IN 5 STRATEGIC PROJECT CATEGORIES

EXPLORATION | FindMine

MINERAL EXPLORATION RESEARCH & GEOPHYSICS

PROJECT LEADS: DAMIEN DUFF, DOUGLAS MORRISON

The implementation of step-change research in the area of exploration (new deposits, expanded mines) and geophysics, both on surface and in underground exploration, is strategically important to mining sustainability.

Our industry-driven research focuses on:

- advancing knowledge of the Sudbury Igneous Complex, specifically within the footwall and offset geologic environments where ore bodies can be valued at $1000/t, or greater
- developing new or improved geophysical detection techniques to optimize the chances of future exploration successes

DEEP MINING | DeepMine

RISK MITIGATION AND COST EFFECTIVENESS FOR MINING HIGHLY STRESSED ORE BODIES AT DEPTH

PROJECT LEADS: DAMIEN DUFF, KEITH BULLOCK, PETER K. KAISER

Research and development of new technologies and processes to ensure safe, profitable mining at depth, with a focus on risk mitigation, mechanized underground excavation, cost reduction, and productivity enhancement.

Our research in this area focuses on:

- understanding rock behaviour response to mining in order to mitigate and manage geotechnical risks
- alleviate the sensitivity to risk for mining investors by reducing the time required in developing a mine and ramping up production

UNDERGROUND MINE CONSTRUCTION | ConstructMine

UNDERGROUND MINE CONSTRUCTION FOR IMPROVED PRODUCTIVITY AND STABILITY

PROJECT LEADS: PETER K. KAISER, KEITH BULLOCK

Strategic research and development for safe, rapid, mechanized development of underground mines.

Our research in this area focuses on:

- implementation of new and mechanized technologies, utilizing world-wide expertise, for improved speed and quality of underground infrastructure construction
- ground control process assessment and development to support advances in rapid mechanised development systems for vertical and horizontal applications
- assessment and advances in conventional drill and blast excavation processes
- assessment of Railveyor technology, with emphasis on geotechnical and fragmentation parameters

INTEGRATED MINE ENGINEERING | ValueMine

MINE DESIGN TO EXTRACT OPTIMAL MINE VALUE WITH ENABLING TECHNOLOGIES

PROJECT LEADS: GLENN LYLE, KEITH BULLOCK, AL AKERMAN

Strategic research and development in the areas of: Mine Process Engineering and Mine Design to enhance safety and performance, minimize impact and cost risk and emphasize best practices; Enabling Technologies that result in advances in data and knowledge transfer.

Our industry-driven research:

- focuses on the collaborative development of a *Best Practice Handbook Wiki* for underground hardrock mine design that brings together industry thought leaders to contribute their mine design expertise
- identifies knowledge gaps and new approaches in mine design for the development of new tools or additional research to safely extract optimal value
- energy saving through ventilation improvements
- aids in the training of young professionals

ENVIRONMENT & SUSTAINABILITY | SustainMine

ENVIRONMENTAL STUDIES AND SUSTAINABILITY

PROJECT LEADS: DOUGLAS MORRISON, DAMIEN DUFF

Research is underway to try to identify processes that might lead more environmentally benign results and better stewardship of the mineral resource. The current strategy is to provide modest funding to initiate novel techniques or reconsider previously abandoned techniques for the secondary processing of mine waste and mine waste water. The outcome is to assemble a collection of processes that can be developed into a major research programs 3 to 5 years into the future.

Research in this area focuses on:

- established Chair in Holistic Mining Practices to focus research on identifying new and different techniques in the disposition of tailings and mine waste, with the associated potential effect of mine water on the surrounding environment
- initiatives to develop comprehensive remote monitoring packages for tailings management facilities (TMF), to monitor potential geotechnical instability of containment structures; anticipate potential for over- and under-supply of water for aqueous cover to the tailings
- initiatives that will improve the reliability of performance of tailings management facilities and reduce the risk of environmental impact
- initiatives that will improve the recovery of metals from mine waste and waste water and potentially lead to a significant reduction of the footprint from mine waste and waste water

Join us as we expand our network of Sponsors and industry-driven research.
Your organization will gain access to information and research that will create greater capacity for excellence in innovation and greater value to the economic development of your organization and the industry at large.

For information on our collaborative research projects, knowledge resources and sponsorship opportunities, please visit our website at www.miningexcellence.ca

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