

## Brainpower - 06/06

BY NORM TOLLINSKY

Sudbury's new Centre of Excellence in Mining Innovation (CEMI) at Laurentian University, proposed in May 2005 by the Ontario Mineral Industry Cluster Council (OMICC), has gone from dream to reality in record time.



Sudbury's Centre of Excellence in Mining Innovation stakes its claim to mining research pre-eminence

With \$10 million in seed funding from the government of Ontario and \$5 million pledged by Inco in March, CEMI has staked its claim to mining research pre-eminence.

The culmination of years of capacity building in Canada's most important mining centre, CEMI brings together nine existing research centres at Laurentian University and reinforces Sudbury's status as a centre of excellence in mining on the international stage.

It has been a 30-year evolution, beginning with the founding of Laurentian University, said Peter Kaiser, president of the Mining Innovation, Rehabilitation and Applied Research Corporation (MIRARCO), Professor of Mining Engineering and Chair for Rock Engineering and Ground Control.

"Laurentian University has incrementally developed its research capabilities to the point where there is enough momentum and energy to get to us to the level where we are internationally recognized."

The resource sector is a major contributor to the Canadian economy and needs research at a level far beyond our current capabilities, said Kaiser.

"To truly advance the state of knowledge in mining, you have to have a budget that is ten times what we spend today. Problems in mining can't be solved on a shoestring. You have to spend time and money to come up with innovative solutions."

### Priorities

CEMI's research priorities, established with industry input, will focus on mining exploration, deep mining, integrated mine process engineering, telerobotics and environment and reclamation.

The centre will bring together several existing research groups and initiatives under one umbrella. They include MIRARCO, which is itself an amalgamation of the Centre for Environmental Monitoring (CEM), the Geomechanics Research Centre (GRC), the Centre for Mining Technology (CMT) and the Centre for Integrated Monitoring Technology (CIMTEC), as well as the Mineral Exploration Research Centre (MERC), the Laurentian University Automation Laboratory (LUMAL), the Centre in Mining and Mineral Exploration Research (CIMMER) and the Telerobotics and Automation Centre (TRAC).

Paul Dunn, director of MIRARCO's Centre for Mining Technology, sees several advantages in bringing the university's research capabilities together under one umbrella.

Among them are improved efficiencies, better interaction, and more effective support services. Equally important, however, will be the ability to leverage research funds through a larger, higher profile organization.

The umbrella model adopted by CEMI is ideal "because there are different ways to do research and achieve success," said Kaiser. "MIRARCO's corporate not-for-profit structure works for certain types of research. There are other models like MERC, which is a more department-based model with a stronger educational component."

Research can also be conducted through industry-led initiatives such as the Deep Mining Research Consortium (DMRC) and through for-profit companies such as Penguin Automated Systems Inc., led by Laurentian's Greg Baiden, who holds a Canadian Research Chair in Robotics and Mine Automation.

By bringing together these existing groups, CEMI is able to hit the ground running with an impressive catalog of research under way and in the works.

Dunn, for example, has \$5.6 million in commitments from mining companies for a Planning and Rapid Integrated Modeling Optimization (PRIMO) research project that will be led by MIRARCO and carried out in collaboration with researchers at several Australian universities.

PRIMO will be focused on developing code to enhance the optimization capability of mine planning and scheduling software for underground applications.

## **Geoscience**

MERC director Harold Gibson has a long wish list of priorities and research projects he hopes to advance through CEMI. Among them are a research project focusing on the problems, processes and the exploration for nickel-copper-PGE deposits and the establishment of research chairs in exploration geophysics and exploration geochemistry.

Also on Gibson's agenda are two ambitious educational programs - a co-op B.Sc. in Mineral Exploration and a collaborative graduate program that would expose students to teaching talent at universities all over Ontario through modular courses.

"The mining exploration industry is facing a critical shortage of trained geoscientists," said Gibson. Initiatives such as these, co-ordinated through MERC and CEMI, will help to attract more students and provide them with access to a broader faculty base.

"It's really exciting," said Gibson. "There are so many initiative in the works, and with CEMI, we have a vehicle and an infrastructure to move them forward."

Baiden, who will head up TRAC, sees telerobotics becoming more and more prevalent in the mining industry due to the combination of increased risk, rising demand for commodities and skill shortages.

Remote operation of underground mining equipment may be one solution to the dangers and challenges associated with deep mining, but Baiden suggests that at some point in the future, we will also be drawn to mineral deposits in even more hostile environments.

"We're mining perhaps 20 per cent of the world. Eighty per cent of it is under water," he said.

"Many mining companies are going to have to embrace this technology for all kinds of different reasons. We should be on the leading edge."

Designing and building prototypes through CEMI will also offer opportunities to the hundreds of mining supply and service companies in northeastern Ontario.

It will be a two-way street, said Baiden. Local suppliers will work with TRAC to build prototypes and will be able to take advantage of the centre's expertise to accelerate their own product development and innovation.

"CEMI will put Sudbury and Laurentian University on an international stage. We're going to be one of the premiere players in the world in this robotics work."

In the area of deep mining and lateral development, there are several research initiatives already under way.

### **Deep mining**

The Deep Mining Research Consortium (DMRC), funded by seven mining companies, CANMET and the City of Sudbury, is conducting a series of research projects on gelfill, automated hoist rope inspection, heat stress and diesel performance at depth.

Co-ordinated by the Canadian Mining Industry Research Organization's (CAMIRO) mining division based at Laurentian University, the DMRC is tackling issues that will impact directly on the industry's competitiveness as mining companies follow ore deposits to greater and greater depths.

CEMI will complement the work of the DMRC, said Associate Professor Vassilios Kazakidis

"There is much more to do with regard to deep mining research. We won't be short of research projects."

Also in the picture is the nascent Lateral Development Research Consortium, which has brought Inco, Falconbridge, Barrick Gold, Rio Tinto and several Scandinavian groups together to develop new methods and equipment to accelerate lateral development.

The fifth research priority area for CEMI will focus on the environment and reclamation.

Laurentian's Associate Vice President, Research, Liette Vasseur, points out that CEMI will build on the university's existing reputation for excellence in greening and environmental monitoring.

Research to minimize the environmental impact of mining is necessary to help companies meet standards and counter the perception that this is an industry "that leaves all the mess behind," said Vasseur.

While it has staked a claim to mining research pre-eminence and has the support and blessing of the Ontario government, the ultimate success of CEMI will depend on the federal government stepping up to the plate.

CEMI is only halfway toward its goal of raising start-up funds of \$30 million and is quietly lobbying Ottawa to get onboard.

### **CANMET**

How the federal government responds may depend on what it decides to do with CANMET, Canada's leading mining research organization until 10 years ago when the federal government cut its funding.

"The Australians did the same thing, but they immediately invested in centres of excellence," said Kaiser.

One option is for Ottawa-based CANMET to generate funding from industry, but the private sector is generally not eager to give money to government.

"It's one of those things that wasn't thought through properly and CANMET is now in the strange situation where it has to attract funding," observed Kaiser.

Ideally, a broader, national focus would ease the recognition of CEMI as a national centre of excellence in mining research, but to push the agenda ahead, you can't wait until everyone agrees, he said.

The strategy was to get it off the ground by focusing on Ontario and create national linkages over time.

The federal government is expected to assist CEMI through Fednor, Industry Canada's regional development agency for Northern Ontario, but recognition as a national centre of excellence is still being sought.

Sudbury's qualifications to host a centre of mining innovation aren't limited to the critical mass at Laurentian and its existing research centres. The city lives and breathes mining. The incredible wealth of the Sudbury Basin has sustained a mining industry for more than 100 years. It hosts one of the largest integrated mining complexes in the world, hundreds of mining supply and service companies, two community colleges with mining programs, the Ontario Geological Survey and a concentration of mining expertise that no other city in Canada can lay claim to.

"Sudbury's rich history and promising future makes it the perfect centre for an institution promoting mining excellence and innovation," said Mark Cutifani, Inco president for North America and Europe. "Inco is proud to demonstrate significant support for this project because we believe the innovative solutions developed here will boost the competitiveness and longevity of our operations – and those of the broader mining industry – in Sudbury and around the world."

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