



ACCESS Alberta

Wet lab puts Alberta on the biotech map

by Michèle Jackson, WD
Communications, Edmonton

Scientists working in Alberta's flourishing biotechnology industry can breathe a sigh of relief thanks to a new wet lab facility coming soon to Edmonton.

Biotechnology applies biological techniques to product research and development in the areas such as pharmacology, food science, agriculture, and medicine. Everything, from research of food products to the development of life-saving drugs, is part of this emerging industry. Like so many fast-growing industries in Alberta, it is struggling to keep up with the scientific advances and the demand for concrete results.

With over 50 biotechnology companies in Edmonton alone, it is evident the gap between the research phase of a product and its commercialization is narrowing. Life-altering products, whether diagnostics tools or drugs, will finally reach the marketplace because biotech companies will have access to

the facilities and equipment necessary for end-phase testing at the new wet lab.

Wet labs are laboratory spaces outfitted with fume hoods and sinks, often equipped with enhanced environmental control technology. Western Economic Diversification Canada (WD) and the provincial and municipal governments have all invested in the new wet lab facility, which is adjacent to the Alberta Research Council at the Edmonton Research Park. With these investment dollars, biotechnology companies will be able to compete in the global market and put Alberta on the map in the field of life sciences.

Edmonton Economic Development Corporation (EEDC) will manage the new wet lab, soon to be named the Biotechnology Business Development Centre. Three tenants have already been signed: Novokin BioTech Inc., Sci-Med Laboratories Inc. and Helix BioPharma Corporation.

"Greater Edmonton is home to the country's fourth-largest biocluster.

If there were no wet lab space to accommodate these growing companies, they might have to move to other cities," says EEDC's President and CEO Allan Scott. "We don't want Edmonton to only be successful on the startup side. We also want to develop a marketplace that anticipates and meets the very unique needs of our region's biotech companies."

Edmonton joins only a handful of other cities in Canada that have this kind of facility. With a projected completion date in 2007, the new wet lab will encourage more biotechnology companies to view Alberta's capital region as a viable place to do business and to conduct research. ■

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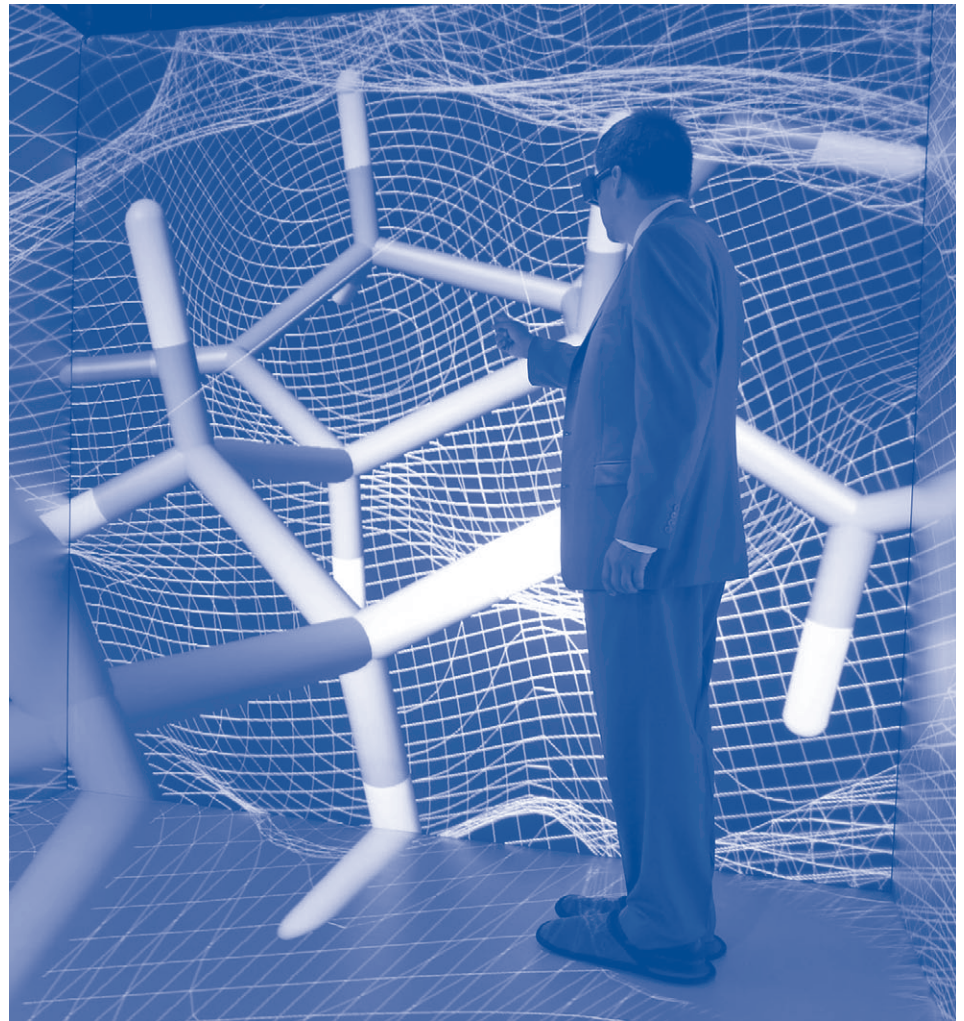
Inside the Cave

Imagine standing inside a human skeleton. Imagine being able to watch blood vessels branch out and to follow them visually.

Now, thanks to a leading-edge biomedical technology, we don't have to imagine these things, we can actually experience them. What scientists and researchers learn from these experiences can have profound effects in the areas of disease prevention and treatment, pre-surgical planning, diagnostic advancement, and even genomic mapping.

Known in the biomedical community as The Cave, the Sun Center of Excellence (COE) for Visual Genomics in the Faculty of Medicine at the University of Calgary is a bioinformatics facility that is revolutionizing this field of research and placing Alberta on the international map of genomics. Bioinformatics is the management and analysis of data using advanced computing techniques and applying them to biological research. The COE officially opened in February 2002 and has since collaborated on over 20 scientific projects involving international companies, and academic and government research labs in Canada, the US and Europe. It has also been referenced in over 100 scientific articles and scientific presentations around the world.

Dr. Christoph Sensen is the engine driving this machine and he is truly unstoppable. Currently managing a team of 24 and recently named to the faculty of Craniofacial Osseointegration and Maxillofacial Rehabilitation Unit (COMPRU) at the Misericordia Hospital in Edmonton, Dr. Sensen speaks passionately about the commercial potential of this new development in



Dr. Sensen inside The Cave.

bioinformatics. “This is a totally unique way of looking at our body composition. We are way ahead of the crowd. Life sciences applications, including analysis tools for large-scale genomics data, could benefit tremendously in the long term if access to Cave environments were more readily accessible.”

Genomics is basically the study of genes and their function. Recent advances in genomics are increasing our awareness

of the makeup of diseases and of the links between genetic and environmental factors. Genomics is also stimulating the discovery of innovative new drugs, vaccines, and DNA diagnostics. Because of the large amount of complex data the field of genomics generates, bioinformatics is particularly crucial to genomics research. The structure of cells, the composition of proteins and ultimately DNA sequencing are all part of this type of complex data that become

more accessible for researchers when projected into a virtual 3D environment. As Dr. Sensen says, “This allows us a much more intricate understanding of human diseases and complex biological systems, thereby accelerating the pace of life-saving research.”

The Cave itself is an automated virtual reality environment that allows researchers to immerse themselves into computer models of parts of the human body such as skeletal sections, blood vessels, and muscular details. This immersion into the “heart” of the matter will allow researchers to analyze key data relevant to genetic diseases and to map it more accurately in real space and time. In other words, the individual researcher is able to stand in the Cave and see the effect of diseases and biochemical patterns on the human body. What makes this totally unique is the fact that the entire human body has never been displayed in this type of virtual reality environment before.

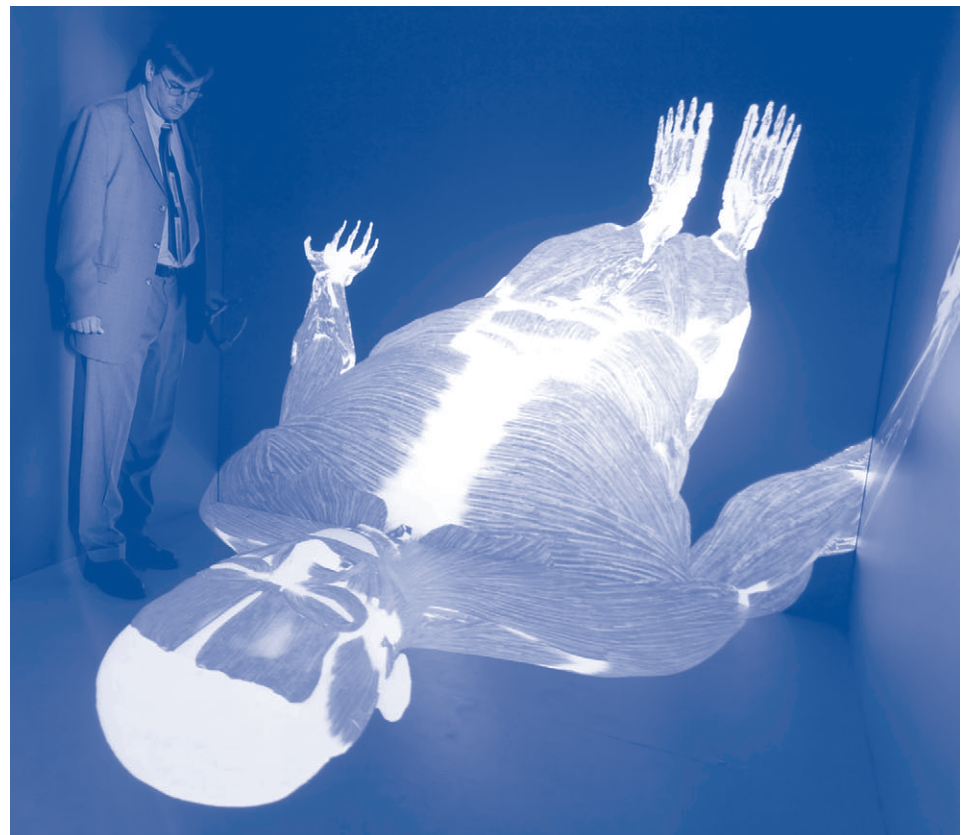
The Cave is also inspiring researchers in the field of genetic mapping to create digital anatomical atlases. The ability to project the full picture of disease mechanisms into this integrated high-tech visual environment will hopefully lead to developments in cancer, diabetes, Alzheimer’s, and Parkinson’s research. At the moment, the Cave is being used for general pre-surgical planning, studies in bone disease such as osteoporosis, and other broader topics. By magnifying these issues, researchers are able to study the channels that connect the various tissue and bone segments and to better isolate the causes of certain diseases.

Dr. Sensen believes that Alberta is the perfect environment in which to test this revolutionary process. “Alberta is a very science friendly province and welcomes unique ideas,” he admitted. In addition, the support from Western Economic Diversification Canada (WD) for this project, and projects of this sort, is invaluable. As Dr. Sensen says, “WD is supportive of innovative ideas and not afraid to recognize the commercial potential of these cutting-edge ideas.”

This project is on the forefront of its field and is years ahead of other known initiatives. It fits in with WD’s mandate of filling in gaps in the innovation and technology sector and improving

Alberta’s entrepreneurial environment. In fact, instrument manufacturers and other institutions have already approached Dr. Sensen regarding Cave technology.

The possibilities are endless, according to Dr. Sensen. He would like to see this technology applied someday to other fields, such as botany, in which researchers could actually watch a plant grow out of a seed. Or, envision the ability to understand the different compositions of brain tumours with the hope of detecting genetic predisposition and ultimately, strategies for prevention. Just imagine the possibilities. ■



Dr. Sensen standing over 3D human body.

by Roger Armstrong, Applied Research and Innovation Manager, NAIT

All charged up

The Northern Alberta Institute of Technology's (NAIT) Power Engineering Technology students will have braggin' rights when they graduate this spring. They'll be the first power engineers in Canada to have hands-on training experience in operating a fuel cell.

In January of this year, second-year Power Engineering students started a compulsory 51-hour fuel cell technology class. When they graduate this April, they'll enter the workforce armed with leading-edge technical knowledge and hands-on experience with a fuel cell, explains Gilbert Requena, program head of Power Engineering Technology at NAIT.

"There are a lot of companies in Vancouver and Ontario working on fuel cell research. And there's lots of research going on at universities too. Our grads could get jobs working in conjunction with scientists to further develop research on fuel cells."

"Everything is still experimental with fuel cell technology, so universities and industry need expertise from somebody; our NAIT grads can fill that need. We're fast becoming one of the schools with the most credibility regarding fuel cell technology."

NAIT currently has the only high-voltage commercial fuel cell in Canada. Across

the world, there are only 350 commercial fuel cells in use. Between 2003 and 2005, the 200 kW fuel cell produced 3.3 million kW of power. The commercial fuel cell meets eight per cent of NAIT's electrical needs. As well, it produces 1 million BTUs of heat, which are currently used to heat the swimming pool and provide hot water for showers in the recreation area.

The \$1.3 million commercial fuel cell combines oxygen and hydrogen to produce electricity and heat with less than half of the carbon dioxide output and 99 per cent less particulate pollution than traditional energy sources.

NAIT also has a Fuel Cell Applied Research Project Interpretive Centre on campus. The public can see the fuel cell at work, learn about the history and genesis of the technology, and watch mini fuel cells generate real power.

"Environmental sustainability and innovation are two important elements that have come together in our fuel cell applied research initiative," said NAIT President Dr. Sam Shaw. "New energy technologies, like fuel cells, have been incorporated into our curriculum to ensure our graduates bring leading-edge skills and knowledge into the workplace and hence give them a competitive edge in a global marketplace."

Western Economic Diversification Canada, the Government of Alberta, ATCO Gas, Climate Change Central, and the U.S. Department of Energy all provided funding for this \$3.2 million project. ■

The fuel cell at the Northern Alberta Institute of Technology.

