

CFI boosts ORION-powered grid and super computing

Among the \$586 Million in Canada Foundation for Innovation (CFI) funding announced this month is more than \$32.1 million for two grid and super computing projects, supported by ORION's advanced network.

The CFI, in its March 8 announcement of approved projects, recognized ORION's contribution as a full partner in its approval of \$19.3 million towards Phase 3 of the SHARCNET project.

"It is gratifying to see ORION recognized as a critical research partner and playing an important role in transforming the way that research is conducted in Ontario," said ORION President and CEO Phil Baker.

The planned expansion will connect a number of sites along the ORION backbone

(Universities of Windsor, Western Ontario, Waterloo, Guelph, York, and McMaster) at 10Gbps. Additional sites (University of Ontario Institute of Technology, Brock University, Sheridan College, Fanshawe College and Wilfrid Laurier University) will be linked into SHARCnet at 1 gigabit each.

“... transforming the way research is conducted in Ontario.”

Additional CPU resources and Storage Arrays are also planned. The SHARCnet bandwidth

will be provisioned as parallel capacity to the ORION routed network, using DWDM and CWDM to derive the separate circuits over the ORION co-funded dark-fibre local loops.

SHARCnet, being a truly customer empowered network, will be able to decide what protocols and signaling they utilize within their "slice" of the ORION transport network.

In addition to supplying Gigabit connectivity for the project, ORION will also provide a substantial in-kind contribution to SHARCnet, which is expected to exceed \$10M in value over five years.

HPCVL (Queen's/Carleton/Ottawa/RMC) received \$12.8 million for its "Secure Multidisciplinary High Performance Computing Virtual

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Ontario institutions claim \$173 million CFI pot

Two Ontario institutions alone claimed \$70 million in research project funding as the Canada Foundation for Innovation (CFI) announced its latest round of approved national research projects. Nearly \$173 million of the \$586 million announced on March 8 is for Ontario-based projects.

The University of Western Ontario and the University of Toronto came out big winners in this round of funding. The contribution to Western totalled \$34.1 million for five projects, while the U of T received \$31.6 for eight projects. Western's funding does not include an additional \$4.4 million in support for three additional, "national" projects, in which the university will be the administrative centre.

This tremendous show of support from CFI demonstrates the level of research excellence at Western," says Paul Davenport, President of the University of Western Ontario. "In this round of funding, Western received more support than any other institution in Ontario and I want to offer my sincere congratulations to all who worked so hard for this success." Nils Petersen, Western's Vice-President (Research), says, "These projects show how our researchers are collaborating with other institutions in Ontario and across the country. At Western, we are leading major research initiatives that will have significant impact both regionally and nationally."

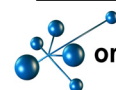
At the UofT, the CFI contribution was also celebrated. "We are most grateful to the CFI for this investment. It is a clear indication that our research community is conducting work that resonates well not only with the CFI, but also with the priorities of Canada," said Professor John Challis, UofT vice-president (research) and associate provost.

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The ORION Research and Discovery News is a monthly electronic publication providing news and information of interest to users of the Ontario Research and Innovation Optical Network and to the worldwide research and education community.



Ontario school boards can connect for a trial period



Ontario school boards are now being encouraged to connect to the ORION network in a trial designed to help schools boards and ORION identify how boards can best make use of the broadband capabilities of the network to enhance education.

ORION is providing Ontario school boards with "free" access to the network for a trial period as an opportunity to assess their interest in connecting to the network on an ongoing basis.

Although a handful of Ontario school boards have already signed on to connect to ORION, many more have expressed interest. In response, ORION is instituting a trial period specifically for Ontario school boards. This trial period will assist ORION in consulting with school boards on how boards, teachers and students may benefit from ORION connectivity, by exploring administrative efficiencies, new applications and collaborations and by gaining access to new educational resources and partners over the ORION infrastructure.

"School boards have always been eligible to connect to ORION," says Senior Manager of Strategic Partnerships, Randy Neals "It's just that most of our outreach efforts has been directed to colleges and universities. As a result, Ontario school boards are not generally aware that they are eligible to connect to the network," he said.

ORION recently revised its fee structure to address unique circumstances facing school boards in different regions of the province. The revised fee structure is based in part on student enrollment as well as other factors. It is expected that a trial period will enable several school boards to make an assessment of continued connectivity to ORION with no obligation, without the barrier of any immediate financial commitment. ORION is also consulting with the school board IT community through such organizations as the Ontario Association of School Board Officials IT sub-committee, and other organizations.

A number of school boards have signed on to connect to ORION, including several boards from Northwestern Ontario school boards and the York District School Board.

School boards have to cover their own connectivity costs and will need to work with their local telecom suppliers to address local connectivity and wide area network infrastructure. There is no further obligation to sign on to the ORION network beyond this period. School boards that are interested in taking advantage of this offer need to sign an Acceptable Use Policy. They may obtain more information by consulting directly with Randy Neals, or by communicating with ORION at info@orano.on.ca.



Ontario institutions claim \$173M CFI pot *(continued from previous page)*

"Our researchers continue to have great success in a highly competitive process," said Mamdouh Shoukri, vice president research & international affairs at McMaster University, which received \$16.3 million for six projects.

"The research we're doing at McMaster is leading edge and will contribute, for example, to a better understanding of how diverse materials are constructed and operate at super small levels, how genes function in cancer and infectious diseases and the effects of low-dose radiation," he said.

Ontario institutions also shared millions in funding for new research in critical life science projects, such as \$10 million to the University Health Network Advanced Medical Discovery Institute for the Genomic Instability and Cancer Cell Survival project, and a \$2 million contribution to Brock University's Integrated Tools for Biotechnology: Genomic, Proteomic, Metabolomic, Spectroscopic, and Computational Approaches Project.

"It's a wonderful endorsement of the quality and international competitiveness of research in the biological and physical sciences at the University of Guelph," said Microbiology professor

Chris Whitfield, who received more than \$7.3 million to head a state-of-the-art facility dedicated to research on the membranes and surfaces of living cells. It's U of G's second-largest CFI-funded project and involves some 20 scientists from five departments. "It will be a pivotal factor in our ability to attract and recruit the very best trainees and new faculty members," he said.

That was one of two large projects announced for the University of Guelph. The Biotron project, collaboration between Guelph and the University of Western Ontario to assess the effects of climate change, was allocated \$11.3 million.

Lakehead and Laurentian universities are the only northern institutions to receive funding in this round. Lakehead shares \$2 million with Laurentian for the Lakehead University Virtual Centre for Advanced Research in Teaching and Training (LUV CARTT) project. Lakehead also receives \$530,687 for Watershed Integrated Nutrient Study Sites in the Boreal Forest.

A complete list of projects can be reviewed at the following link: http://www.innovation.ca/media/08.03.2004_IF/pdf/ontario.pdf



CFI boosts ...

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Laboratory for Innovative Research".

ORION supplies the gigabit speed connectivity linking the HPCVL partners, including the University of Ottawa, Carleton University, and Queen's University. Each university is connected at 1 Gigabit/s using local loop fibre co-funded by ORION.

Carmen Gicante, SHARCNET Executive Director, said he believes that this latest award reinforces the importance of SHARCNET's collaborative model and the exceptional research it enables.

"The calibre of research being conducted on SHARCNET systems was instrumental to the success of this proposal."

With this new funding, SHARCNET will expand significantly, adding the Universities of Waterloo, Brock, York and the Ontario Institute of Technology.

It will also expand its capabilities to satisfy the demand for HPC by new fields and research groups, such as Bioinformatics and Biocomputation, Financial Mathematics, High Performance Computing Tools, and Computational Social Sciences.

It will help meet the growing demands for HPC in established research areas, including Engineering and Applied Science, Physics and Chemistry, and Astrophysics.

It will also help attract and retain outstanding new researchers, and provide a test bed for innovative solutions in storage and visualization over a distributed network.

"The announcement is truly exciting for HPCVL," said Executive Director Ken Edgcombe. "It assures researchers continued access to a world-leading innovative research environment."

"This is an exciting time and HPCVL is positioned to help researchers in a wide range of disciplines conduct innovative research in areas that will impact the economy of Canada and the health of its population," he said.

"Enabling innovative research is why HPCVL exists, and the growing need for HPC by innovative researchers is reflected by the growing number of researchers from other Ontario and Canadian institutions, not just from the founding member institutions, who are using HPCVL resources."



University of Waterloo "geek" makes a difference



ORION's state-of-the-art gigabit broadband network is a gateway to the world, but not to Mali, which might as well be on a different planet. Increasingly isolated by a widening technology gap and without the resources to reverse the trend, Mali is a sprawling secular land-locked equatorial country in Western Africa that is underdeveloped even in comparison to other African countries.

But for one employee and former graduate of the University of Waterloo, Mali's predicament is an opportunity to test his belief that "wireless technology has the opportunity to bridge the digital divide."

Ian Howard has been in Mali since late January, halfway through a leave of absence from his job with the university's Department of Information Systems and Technology and two months into his stint with an organization called Geekcorps on a project funded primarily by USAID.

Ian Howard in Mali since January. Member of international GeekCorps

Two years ago, Howard applied to Geekcorps, a U.S.-based non-profit organization that places international technical volunteers in developing nations, after coming to the realization that digital wireless could begin to bridge a growing divide in the information gap between the developing and developed world.

Aid organizations already identify radio as the most efficient cost-effective mass communication vehicle in poorer countries. In Mali, where the population is mostly rural, there are almost 200 radio stations, most do not have telephone lines much less connections to the internet.

The immediate goal of Howard and other Geekcorps volunteers in Mali was to lay the groundwork for future implementation of a wireless network by making contact with community radio stations, establishing partnerships with local businesses and organizations, and determining how the network will be implemented after his four-month stint is up.

"The project has really done a sharp turn with knowledge that we have gained of Mali since our arrival," said Howard. "Creating a project plan, and architecting technology from overseas for here is very difficult. Doing anything in Africa seems to be difficult. The rules, procedures and manner of getting things done here are totally different. It is very humbling."

"Among the greatest challenges to providing Internet connectivity here is the lack of infrastructure," Howard added. "The only affordable Internet connectivity here is

via 802.11b wireless, and that is only available in the capital city of Bamako. Once connected, you still have to contend with very limited up-link to the Internet. At best connectivity to the world-at-large is less than a 56k modem link in North America."

And to make the task even more challenging radio stations could neither create nor use digital programming. Howard and other volunteers first had to provide expertise to help the radio stations "computerize" recording studios to allow local content to be recorded onto CD and into digital format for easy transmission and reception among radio stations or for later broadcast.

According to Howard, the main problems with networking technology in Mali are the limited numbers of skilled IT workers and limited supplies of equipment. Few skilled IT workers stay in Mali and few pieces of technology make it here without hefty price tags.

"Installing any equipment here is a challenge, and creating something that is sustainable is very difficult without foreign money or expertise beyond the completion of the project," said Howard, noting that an objective in Mali is also to develop plans to provide guidance, training and limited capital support, as well as business models for the radio stations to sustain the cost of connectivity which can cost up to several thousand dollars per month.

Howard is also attempting to help the crippled University of Mali wireless network, which spans 11 campuses. Unlike institutions on the ORION network, the university has little ability to use its connectivity for high bandwidth research.

Howard observed that speed is a secondary problem to reliability, where a loose cable can sometimes keep a site disconnected for several weeks and rampant virus damage goes unchecked. Whereas the University of Waterloo was able to deal with network problems introduced by malicious worms within a few days in 2003, the University of Mali still has no means to do the same, Howard explained. These worms, peer-to-peer networking and other bandwidth hogs, quickly consume the limited network bandwidth.

"I am quickly learning of the difficulties in development work, which strives to juggle the objectives of many people and many organizations," he added. "That being said, I have never felt more compelled by my work. I have never felt as though I have ever made this great an impact before."

While Howard is grateful for the support of Geekcorps, his family, friends and co-workers at the University of Waterloo, which made it possible for him to do this gratifying work, he is still hopeful that he will receive the equipment and sponsorship support he needs to continue his work beyond the next two months.

He can be contacted at ihoward@uwaterloo.ca. Howard's websites are <http://dingo.uwaterloo.ca/~ihoward/geekcorps> and <http://dingo.uwaterloo.ca/~ihoward/index.php>. Find out more about the Geekcorps at www.geekcorps.com.



HPCVL Welcomes Ryerson University



The High Performance Computing Virtual Laboratory (HPCVL) at Queen's University has officially welcomed Ryerson University as its host site in Toronto.

"HPCVL is pleased to have Ryerson University join this effort and is extremely grateful to our partner, Sun Microsystems, for their contributions," says Executive Director Ken Edgecombe, who notes that the company's Ryerson equipment contribution is valued at nearly \$1 million.

To date, Sun Microsystems has contributed over \$20 million in both cash and in-kind to the HPCVL project. "There have not been very many investments of this size to university research by a private sector partner in Canada," said Edgecombe.

"HPCVL is Sun's largest research installation in North America and is a Sun Centre of Excellence in Secure Grid and Portal Computing.

HPCVL is extremely grateful to Sun Microsystems for their continued investments in HPCVL and especially for this equipment," he said.

The equipment installed at Ryerson will enable local workup and interactive computing by researchers in the Toronto area as they prepare larger production jobs to be submitted to the HPCVL central site, located in Kingston at Queen's University.

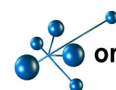
HPCVL was formed by a consortium of four universities located in Eastern Ontario, namely Carleton University, Queen's University, The Royal Military College of Canada, and the University of Ottawa.

It is dedicated to providing researchers at member institutions and selected researchers from elsewhere in Ontario with the High Performance Computing (HPC) resources they need to conduct innovative research in a broad spectrum of disciplines.

HPCVL has been awarded funding by the Ontario Research and Development Challenge Fund (ORDCF), the Canada Foundation for Innovation (CFI), and the Ontario Innovation Trust (OIT).

In addition, it has formed partnerships with Sun Microsystems, NAG, and Entrust Technologies to provide one of the best HPC environments for research in the world.

Find out more at the HPCVL web site at <http://www.hpcvl.org>.





ORION Day at Waterloo

Some of the most cutting-edge research in the country is taking place in Waterloo, Ontario. That was clearly in evidence last week as researchers presented their work at the most recent ORION - CA*net 4 Advanced Networking Day, at the University of Waterloo. The university, which prides itself as one of the early adopters of advanced technology and connectivity, co-hosted the March 18 event with ORION and CANARIE, Canada's advanced internet development organization, which operates the CA*net 4 national backbone. Presentations ranged from using multiple terabytes of data on the web as a new and powerful linguistic resource, to user controlled lightpaths. Find out more and download some of the presentations at the event web site, at <http://www.orion.on.ca/postwaterloo.html>

Fanshawe selected for AFV demo

Fanshawe College is one of only two Canadian sites to host a North America-wide event designed to showcase alternatives to standard gasoline and diesel-powered vehicles. The one-day exposition on April 2 offers visitors an opportunity to see the vehicles, meet the experts, learn about trends, explore ownership opportunities, and discover AFV (alternative fuel vehicles) training and job possibilities. The National AFV Day Odyssey is coordinated across North America at 58 sites by the National Alternative Fuels Training Consortium (NAFTC). Located at the University of West Virginia, NAFTC is a consortium of members from educational institutions, industry, government, and others promoting cleaner air and energy independence by supporting the use of advanced-technology and AFVs. Fanshawe's event will be held at the London Campus Truck Shop in "C" Building on Friday, April 2nd from 10 a.m. to 5 p.m. Winnipeg is the second Canadian location. Visit <http://www.nationalafvdayodyssey.org> for more details.

Bell works with educators on privacy and risk management

In a world of unlimited, online communications and stringent surveillance needs, educators now face new challenges and new requirements

under the law. Chief Information Officers and Directors of Education from Ontario colleges, universities and school boards will gather in Toronto on April 7 to hear from government and Bell Canada experts on privacy and risk management in education's new high-tech environment. Since the Municipal Freedom of Information and Protection of Privacy Act was introduced in 1990, technology has rapidly advanced, and educators now require an enhanced level of diligence to address this Act. They also need to be compliant with the new federal Personal Information Protection and Electronic Documents Act (PIPEDA). Participants will hear from John Swaigen, Legal Counsel, Office of the Information and Privacy Commissioner for Ontario and Suzanne Morin, Senior Legal Counsel, Bell Canada and others. Among other topics, participants will learn about best practices for proactively integrating privacy and risk management procedures. For more information, contact leslie.hetherington@bell.ca.

Internet2 tackles critical performance measurement

A recent transatlantic data transmission is helping achieve greater performance measures in the use of high-performance networks by the global science community. The Internet2 End-to-End Performance Initiative Performance Environment System (E2E piPEs), in close cooperation with DataTAG and GEANT in Europe and CANARIE in Canada, is tackling critical performance measurement issues that face the greater Internet community. One such step to address these issues is to work towards the interoperability between the E2E piPEs project, the National Science Foundation supported National Laboratory for Applied Research (NLANR) Advisor project, and the High Energy Nuclear Physics MonALISA (MONitoring Agents using a Large Integrated client Architecture) project.

A demonstration was recently conducted at the First International Grid Networking Workshop (GNEW 2004) and the Transatlantic Performance Monitoring Workshop both at CERN in Geneva, Switzerland. It focused on moving data packets across the IP-routed infrastructure and a next-generation hybrid optical-packet network, and measuring the performance of this packet transfer over three separate transatlantic, bi-directional paths between Los Angeles, Califor-

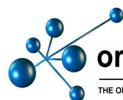
nia and Geneva. "This demonstration highlights the degree of collaborative work going on with our partners to deploy, on an international basis, an end-to-end performance measurement and monitoring infrastructure critical to supporting the use of high-performance networks by global science communities," said Cheryl Munn-Fremon, director of Internet2's End-to-End Performance Initiative.

Ireland and Taiwan connect across CA*net 4 via UCLP

Two of the world's leading research networks HEAnet in Ireland and TANET2 in Taiwan autonomously cross connected to each other across CA*net 4 March 26, using the new developed User Controlled LightPath (UCLP) network management software co-funded by Cisco Canada and CANARIE. For the first time networks in Europe and Asia have direct layer 1 peering with complete topology control of the layer 1 network infrastructure. The UCLP software allows end users to create and manage their own optical layer 1 VPNs and dynamically reconfigure them as they desire without signaling or requiring permission from a central network management authority. The UCLP software allows users to cross connect layer 1 VPNs on a peer to peer basis, as well as create daughter VPNs.

This allows users to create lambda grid networks that are optimized for the needs of high end applications and data flows. The UCLP software also allows users at the edge to integrate wavelengths and dark fiber from different suppliers and create wide area networks that is part of their enterprise network management domain with the ability to create VPNs across these heterogeneous facilities and offer them to their own users. In the next phase of the program, the same state-full web services based on OGSA used for UCLP will be extended to sensor networks and software process to make them a seamless part of the network in what is called "network recursive architectures". It is hoped that this will be the foundation of the evolving cyber-infrastructure or e-infrastructure environments.

For more information on the UCLP network management software please see www.canarie.ca/canet4/uclp/index.html. To download a copy of the UCLP software please see www.canarie.ca/canet4/uclp/uclp_software.html.



orion research and discovery news

THE OFFICIAL NEWSLETTER OF THE ONTARIO RESEARCH AND INNOVATION OPTICAL NETWORK

ORION is an advanced high-speed fibre optic network that connects research and education institutions to each other and to colleagues around the world. Spanning 3,700-kilometre to 21 cities throughout the Province of Ontario, ORION was created to bring leading-edge network capability to Ontario's publicly funded R&E community and to become a catalyst for creative and innovative next generation Internet applications. ORION is owned and operated by the Optical Regional Advanced Network of Ontario (ORANO). For more information, visit our web site at <http://www.orion.on.ca>. Communicate directly with the Editor of the ORION Newsletter at info@orano.on.ca.

