



## **Proceedings of the Third Canada-California Strategic Innovation Partnership Summit**

**Hosted by McGill University**

**October 27, 2008  
Centre Mont-Royal  
Montréal, Québec, Canada**

**[www.ccsip.org](http://www.ccsip.org)**

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## Section 1: Acknowledgements

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**Canada**

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<b>University of Saskatchewan</b>	<b>University of Toronto</b>
<b>University of Waterloo</b>	<b>University of Western Ontario</b>

The CCSIP Steering Committee would also like to recognize the invaluable contributions of the following individuals to the 2008 CCSIP Summit:

- Dr. Denis Thérien, Vice-Principal (Research and International Relations), McGill University, for this outstanding leadership as Chair of the 2008 CCSIP Summit
- Dr. Heather Munroe-Blum, Principal and Vice-Chancellor, McGill University, for continued commitment and support as a champion of the partnership
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## Section 2: Executive Summary

*“There is no recipe book that we are drawing from here—we are creating the recipes as we go. This is the mission of the entrepreneur, the innovator and the leader.”*

Dr. Denis Thérien, Vice-Principal (Research and International Relations), McGill University; CCSIP Steering Committee Member; and Chair of the 2008 Summit

The third Summit of the Canada-California Strategic Innovation Partnership (CCSIP) brought together more than 200 researchers, developers and leaders from both sides of the border, and provided a platform for brilliant minds to work together on ‘grand’ global sustainability challenges currently facing decision-makers in California, Canada and around the world.

Hosted by McGill University, this annual event aimed to catalyze the development of collaborative ‘Research, Development and Delivery’ (RD&D) projects that promise to provide economic and social benefits to the citizens of both jurisdictions. It featured plenary sessions with decision-makers and opinion leaders; interactive workshops that focused on key Canada-California priorities; the announcement of CCSIP’s first Call for Proposals; and a wealth of networking opportunities.

With a drive to action, participants assembled to harness their collective knowledge and collaborate on the development of creative solutions that aim to:

- Manage the increasing threat of infectious diseases such as the avian flu, HIV/AIDS and SARS, and accelerate the diagnosis, treatment and prevention of infections in the developed and developing worlds
- Create alternative sources of clean energy that fuel our cars, while preserving our natural resources, minimizing impact on food production and protecting our environment
- Slow the rate of climate change by reducing carbon emissions at their source, and by developing new technologies for capture and storage
- Reduce global warming by developing ‘green’ Internet technologies that are environmentally-sound and save millions of dollars in energy costs
- Leverage Next-generation digital media technologies and high performance networks to enhance human-computer interaction, and improve our sensory experience—whether we are watching a movie, playing a video game or performing tele-surgery

Consistent with these objectives, a sustainability theme underpinned the entire Summit. This ‘green’ event offered a menu with many local foods, pitchers of water, extensive recycling facilities and minimal paper.

On the morning of October 27<sup>th</sup>, delegates gathered at Centre Mont Royal in the heart of downtown Montréal to be greeted by Marc LePage, Consul General of Canada in San Francisco and Master of Ceremonies. The Summit opened with four esteemed leaders who welcomed participants and emphasized the tremendous opportunity presented by Canada-California and the increasing need for new approaches and collaborative action—the kind of action that is stimulated through CCSIP. This panel included the following invited speakers:

- Marie-Lucie Morin, former Deputy Minister of International Trade, Foreign Affairs and International Trade Canada, Government of Canada
- Dr. Heather Munroe-Blum, Principal and Vice-Chancellor, McGill University
- Terry Tamminen, Environmental Advisor to Governor Schwarzenegger, State of California
- Raymond Bachand, Minister of Economic Development, Innovation and Export Trade, Government of Québec

Following the delivery of opening remarks, delegates enjoyed a presentation on a CCSIP success story: the Cancer Stem Cell Consortium (CSCC). Dr. Cindy Bell, Interim Executive Director of the CSCC, and Executive Vice-President, Corporate Development, Genome Canada; and Dr. John Hassell, Chair of the CSCC Scientific Steering Committee, and Professor, Biochemistry and Biomedical Sciences, McMaster University provided an overview of the consortium—a very real example of what can be achieved when Canada and California work together and pursue models of collaboration that are truly ‘not business as usual’.

In January 2006, the Stem Cell and Regenerative Medicine Working Group convened at the first CCSIP Summit and committed to pursue a single, powerful objective: to identify and eliminate the root cause of cancer. Building on the initial ideas proposed by this group, Canadian stakeholders founded the CSCC in 2007. One year later, Arnold Schwarzenegger, Governor of California, and the Honourable Tony Clement, Minister of Health, Government of Canada, announced a landmark partnership between the CSCC and the California Institute for Regenerative Medicine (CIRM), with a pledge of over \$100 million from Canada.

Inspired by possibilities, delegates concluded the opening plenary session and proceeded to focus on their key objective: the development of novel ideas for collaborative RD&D between Canada and California.

The Summit featured six workshops that brought together experts from industry, academia, government and the investment community to discuss key challenges, propose ideas and explore projects in:

- Carbon Capture and Sequestration
- Cross-border Intellectual Property
- Green IT
- Infectious Diseases
- Next-generation Digital Media
- Sustainable Biofuels

In preparation for these sessions, delegates reviewed and discussed presentations and white papers, proposed ideas and project plan concepts.

During the lunch hour, Yolanda Benson, Principal of Government Strategies Inc. and CCSIP Steering Committee member, reconvened delegates and introduced Paul Krekorian, Assemblymember, Representative of the Speaker, California State Assembly who brought greetings from California. This was followed by a presentation by Dr. Vicky J. Sharpe, President and CEO, Sustainable Development Technology Canada (SDTC) on the opportunities presented by clean technologies and the power of strategic partnerships to deliver real results. Following this

informative lunchtime session, participants returned to the workshops to engage in further discussions, brainstorming and planning.

As the afternoon drew to a close, David Fransen, Consul General of Canada in Los Angeles and Master of Ceremonies, brought delegates back together to share workshop results. Delegates from each working group joined him at the podium to provide an overview of the ideas, recommendations and next steps that emerged from each session. Key areas outcomes are summarized below.

- **Carbon Capture and Sequestration (CCS):** This group focused on pathways to widespread CCS deployment. The team aims to identify emerging, breakthrough CCS technology; provide the support for technology to be further developed; and potentially demonstrate the feasibility of the technology on a pilot scale. In spring 2009, the group is hosting a follow-up 'technology pitch event' in California that will enable researchers from the University of California and universities across Canada to present novel CCS technologies to a panel of industry experts, venture capitalists and policy stakeholders; and explore potential investment and piloting opportunities.
- **Cross-border Intellectual Property:** This group focused on the development of an IP framework that will offer guidelines and recommendations to university researchers who participate in bilateral CCSIP projects. This framework articulates the jurisdiction that applies in collaborative research, actions required to improve transactions, and the legislative and policy constraints to be considered. The group is currently consulting Summit participants and leaders of the Cancer Stem Cell Consortium about how to evolve this IP framework, and ensure that it meets the needs of all stakeholders.
- **Green IT:** This group focused on virtualization technologies, and how optical networks could enable the placement of cyber-infrastructure closer to energy production sources. The team explored three potential models of collaboration: the development of Canada-California R&D networks; funding programs that support the development of specific Green ICT applications; and networked testbeds that link testbeds across Canada and California. Participants are undertaking a series of Green ICT initiatives (both individually and collectively) based on the outcomes of this workshop.
- **Infectious Diseases:** This workshop was composed of two groups. **The first group** focused on the development of a Canada-California Network of Research Nodes that aims to coordinate infectious disease research activities across different geographical nodes or centres of excellence. Proposed areas of focus include: infections caused by drug resistant microbes; emerging infectious diseases that affect North-American populations; ancient infectious diseases that present a risk to global health; the identification and characterization of major microbial virulence determinants and dominant immunogens in human pathogens; vaccine development; drug discovery for novel anti-viral, anti-bacterial, anti-fungal and anti-parasitic drugs; and the discovery and validation of host-based targets for modulation of innate immune defences. **The second group** focused on three key opportunities and challenges: the development of better diagnostics (virtually real-time surveillance for known and emerging threats), low-resolution diagnostics/point-of-care devices with the ability to screen locally for

dozens of diseases; vaccine development for rapidly emerging threats, and how to make a more effective flu vaccine in a short period of time; and technology platforms and large-scale technologies that are required if one is to screen for 10k pathogens simultaneously. These two groups are undertaking the development of additional workshops and proposals to advance these concepts.

- **Next-generation Digital Media:** This group proposed many initiatives loosely united by a single goal: the development of scalable, multi-modal distributed collaborative social networks enabled by digital media exchange infrastructure between California and Canada. As part of this broad vision, the team also noted the need for tools to promote remote collaboration to researchers and developers across a variety of disciplines. The group recommended that initial applications focus on the arts and culture domain. Members of this team are pursuing the development of an application for the first CCSIP Call for Proposals.
- **Sustainable Biofuels:** This group focused on biofuels and bioproducts, with an emphasis on the enhancement and development of cellulosic energy crops; conversion approaches (thermochemical and biological) for the development of cellulosic biofuels and bioproducts using energy dedicated crops and agricultural residues; and the development of novel micro-organisms; processes and enzymes, such as fuel from algae. The group plans to host a workshop with researchers, industry entrepreneurs and policy makers from Canada and California in 2009. The team hopes this session will lead to a RD&D program with defined deliverables.

To learn more about the outcomes of each workshop, please reference Section 4 of these proceedings.

Following presentations from each working group, Dr. Steven Beckwith, Vice-President, Research and Graduate Studies, University of California, and Stuart Wilson, Vice-President, ISTPCanada, announced the first Call for Proposals to be hosted by the Canada-California Strategic Innovation Partnership.

The University of California, together with over 20 participating Canadian universities are allocating \$2 million to stimulate the development of novel models of collaboration (such as the establishment of bilateral collaborations, R&D consortia, the structuring of Canada-California Centres of Excellence and/or the creation of new working relations between university systems), capitalize on the complementary strengths of Canada and California and catalyze innovative multi-campus and multi-disciplinary research and educational cooperation between the two jurisdictions. The Call will be managed by the University of California, Office of the President and ISTPCanada.

The initiatives that emerge from this CFP will create a strategic research agenda between Canada and California. It offers a framework that Canada or California could replicate with other target innovation partners across the US and around the world to build strategic S&T collaborations with universities, regions or countries. Additional information about this CFP is available at:

<http://www.ccsip.org/programs.html>

The formal program concluded with inspirational words from Dr. Eliot Phillipson, President and CEO of the Canada Foundation of Innovation. In his closing remarks, Dr. Phillipson reflected on

the outcomes of the day, shared perspectives on key success factors for bilateral R&DD initiatives, and encouraged participants to seize the tremendous opportunities presented by Canada-California S&T cooperation.

Following an informative program, delegates celebrated a successful Summit with a networking reception. This event featured the signing of a Memorandum of Understanding (MoU) between the University of British Columbia, the University of California (San Diego), and Prompt, a non-profit corporation that stimulates industry-university R&D partnerships to increase the competitiveness of the Information and Communications Technologies (ICT) sector in Québec. These organizations pledged to work together to reduce greenhouse gas emissions on university campuses while developing ‘green cyber-infrastructure’—information technology that improves energy efficiency and reduces greenhouse gas emissions. Additional information on this MoU may be found in Appendix 5 of this document.

Energized by the Summit and the announcement of CCSIP’s first Call for Proposals, participants expressed confidence that Canada-California collaboration in areas such as Carbon Capture and Sequestration, Green IT, Infectious Diseases, Next-generation Digital Media and Sustainable Biofuels would yield promising results, and deliver economic and social benefits to citizens in both jurisdictions.

## Section 3: Summit Agenda and Content

### 3.1 Summit Agenda:

7:30 AM - 8:30 AM	Registration and breakfast
8:30 AM - 9:40 AM	<p>Opening plenary session, featuring:</p> <ul style="list-style-type: none"> <li>• Marie-Lucie Morin, former Deputy Minister of International Trade, Foreign Affairs and International Trade Canada, Government of Canada</li> <li>• Dr. Heather Munroe-Blum, Principal and Vice-Chancellor, McGill University</li> <li>• Terry Tamminen, Environmental Advisor to Governor Schwarzenegger, State of California</li> <li>• Raymond Bachand, Minister of Economic Development, Innovation and Export Trade, Government of Québec</li> <li>• A CCSIP Success Story –The Cancer Stem Cell Consortium (CSCC): A presentation from Dr. Cindy Bell, Interim Executive Director of the CSCC; and Executive Vice-President, Corporate Development, Genome Canada; and Dr. John Hassell, Chair of the CSCC Scientific Steering Committee; and Professor, Biochemistry and Biomedical Sciences, McMaster University</li> <li>• Marc LePage, Consul General of Canada in San Francisco and Master of Ceremonies</li> </ul>
9:40 AM -10:00 AM	Coffee break
10:00 AM – 12:15 Noon	Workshops (presentation of specific project ideas, open discussion, and planning to advance collaborative RD&D projects)
12:15 Noon – 13:30 PM	<p>Luncheon featuring:</p> <ul style="list-style-type: none"> <li>• Paul Krekorian, Assemblymember, Representative of the Speaker, California State Assembly</li> <li>• Dr. Vicky J. Sharpe, President and CEO, Sustainable Development Technology Canada (SDTC)</li> <li>• Yolanda Benson, Principal, Government Strategies Inc. (California), CCSIP Steering Committee Member and Master of Ceremonies</li> </ul>
13:30 PM – 15:45 PM	Continuation of workshops
15:45 PM – 16:00 PM	Coffee break
16:00 PM – 17:00 PM	<p>Closing plenary session featuring:</p> <ul style="list-style-type: none"> <li>• Workshop Results</li> <li>• CCSIP Call for Proposals: Dr. Steven Beckwith, Vice President, Research and Graduate Studies, University of California; and Stuart Wilson, Vice President, ISTPCanada</li> <li>• Closing Remarks: Dr. Eliot Phillipson, President and CEO, Canada Foundation for Innovation (CFI)</li> <li>• David Fransen, Consul General of Canada in Los Angeles and Master of Ceremonies</li> </ul>
17:00 PM – 19:00 PM	<p>Networking reception:</p> <ul style="list-style-type: none"> <li>• Signing of Green ICT Memorandum of Understanding between the University of British Columbia, the University of California, San Diego, and Prompt</li> </ul>

### **3.2 Summit Content:**

Summit content approved for publication is available on the CCSIP website at:

<http://www.ccsip.org/workshops.html>

#### **Featured Presentations:**

*The Cancer Stem Cell Consortium (CSCC) –A CCSIP Success Story:* Dr. Cindy Bell, Interim Executive Director of the CSCC; and Executive Vice-President, Corporate Development, Genome Canada; and Dr. John Hassell, Chair of the CSCC Scientific Steering Committee; and Professor, Biochemistry and Biomedical Sciences, McMaster University.

*Partnering for Real Results:* Dr. Vicky J. Sharpe, President and CEO, Sustainable Development Technology Canada (SDTC)

[http://s205604208.onlinehome.us/docs/Vicky\\_Share\\_Keynote\\_Slides.pdf](http://s205604208.onlinehome.us/docs/Vicky_Share_Keynote_Slides.pdf)

#### **Working Group Materials:**

For additional information about the 2008 CCSIP Working Groups, please visit:

<http://www.ccsip.org/workshops.html>

Password: Registrant08

This page features information on workshop participants, research ideas (including white papers and presentations) and initial plans for targeted workshops on Sustainable BioFuels, Carbon Capture and Sequestration, Green IT, Infectious Diseases, Next-generation Digital Media and Cross-border Intellectual Property.

## **Section 4: Outcomes from CCSIP Summit Working Groups**

CCSIP extends special thanks to all working group leaders, coordinators, moderators and note takers who contributed the following outcomes of the six workshops conducted at the 2008 Summit.

### **4.1 Carbon Capture and Storage (or Sequestration, CCS)**

#### **Workshop Leaders:**

- Arthur Lee, Principal Advisor, Global Policy and Strategy, Chevron Corporation USA
- Dr. Larry Myer, Scientist and Energy Resources Program Leader, Geophysics Department, Lawrence Berkeley Laboratory; and WESTCARB, the Western Regional Carbon Sequestration Partnership of the US Department of Energy
- Bill Reynen, Director, Geological Survey of Canada, Natural Resources Canada

#### **Moderator:**

- Dr. Roberto Peccei, Vice Chancellor for Research, University of California, Los Angeles

#### **Workshop Coordinator:**

- Lisa Stockley, Trade Commissioner, Foreign Affairs and International Trade Canada

#### **Summary:**

Theme: Pathways to widespread CCS deployment

This working group focused on potential areas of collaboration that could chart a path for widespread deployment of CCS technologies.

Key topics of discussion included Canadian and Californian geologic storage capacity, capture technologies for concentrated and diffuse CO<sub>2</sub> sources, CO<sub>2</sub> compression and transportation, storage site selection and (mapping) risk assessment, combined biological and geological sequestration, monitoring and verification technologies, public awareness and education, human capital, and regulatory and policy uncertainties.

The group discussed key CCS challenges including storage capacity, uncertainties in the economy, technology development (and the potential to scale development costs) and the lack of investor appetite (as most investors are in the service business).

The working group concluded that the cost of capture technology presents a significant challenge to CCS. This is further complicated by the lack of a clear regulatory and policy framework for geologic carbon storage. With increasing recognition that widespread, commercial-scale deployment of CCS may still be at least 15 years away, participants discussed the need to solicit increased support, achieve regulatory certainty, and establish appropriate models of financing, to accelerate CCS technology adoption.

Going forward, the working group will focus on the identification of emerging, breakthrough CCS capture technology. It will aim to provide support for the development of promising technologies, and enable demonstration at a pilot scale.

**Key Outcomes:**

The group proposed the following recommendations on collaboration that could help chart a path for widespread deployment of CCS for the benefit of both jurisdictions. The group proposed coordinated research clusters that focus on:

- Capturing diffuse sources of CO<sub>2</sub>, and the potential technologies that could achieve this objective
- CO<sub>2</sub> compression and transportation, with an emphasis on how to reduce compression costs
- Finding, selecting and acquiring approval for the use of appropriate geological storage sites, managing the required risk assessment when choosing a site
- Capturing CO<sub>2</sub> generated from burning biofuels, and generating a net reduction by taking the gas out of the atmosphere
- Monitoring and verification technologies that could be developed by researchers in Canada and California (technologies that monitor and *verify* that the CO<sub>2</sub> is staying underground)
- Public perception of CCS opportunities, challenges and solutions

The group also identified key success factors or conditions required to enable a successful CCS initiative:

- Ensure that human capital is fully engaged in this initiative; this includes skills-based trade professionals such as welders
- Concentrate on small scale pilot projects that demonstrate the potential of CCS technologies
- Focus on the `capture` side the technology
- Promote the need for the regulatory certainty (as it is required help facilitate investment)

The working group believes these areas are ripe for collaboration between the two regions.

**Follow-up CCS Workshop in 2009:** In spring 2009, this working group will host a `technology pitch session` in California, enabling Canadian and UC researchers to present CCS capture technologies to a panel of industry experts, venture capitalists and policy stakeholders; and explore potential investment and piloting opportunities.

For additional information about this session, please contact Lisa Stockley, Trade Commissioner, Canadian Consulate, San Francisco at: [lisa.stockley@international.gc.ca](mailto:lisa.stockley@international.gc.ca)

## 4.2 Cross Border Intellectual Property

### Workshop Leaders:

- Sanjay Goorachurn, Counsel, Smart & Biggar
- Angus Linvingstone, University-Industry Liaison Office, University of British Columbia
- Tom Sweeney, Garage Canada

### Summary:

This working group focused on the development of an IP framework that provides guidelines to university researchers who participate in bilateral CCSIP projects, and articulates the jurisdiction that applies in collaborative research; the actions required to improve transactions; and the legislative and policy constraints that participants must consider.

The group discussed key IP issues in cross-border research collaboration, as well as specific jurisdictional considerations (USA vs. the State of California vs. Canada), and the project management practices that would best support the commercialization of IP.

The team emphasized that inventorship must be protected by participation agreements signed by PhD students and researchers (before they initiate an R&D project). With globalization, this issue is more acute as graduate students from different countries are contributing to funded projects. The group noted that post doctoral students should sign a participation agreement before initiating a project. Researchers must become more sensitized to this requirement.

The groups also discussed the ‘publish or perish’ dilemma for researchers, and the difference between trade secrets and ‘know-how’ (trained students). The group noted that the value of trade secrets is far more recognized in the US than in Canada.

On the topics of commercially viable IP, the team observed that although it used to be status quo in Canada, we “*have now engaged with the lions*”. As such, there is a need for clear contractual IP rights to the licensee or commercializing entity. The significant opportunities are in corporate sponsored research and licensing, rather than in spin-offs or start-ups.

To commercialize IP, the group noted that ownership must be identified, patentability should be assessed and Freedom to Operate (FTO) must be established verses competing IP rights (formal FTO assessment can only be done by law firms).

To develop and commercialize IP with delivery or commercialization potential, there is a need for clear contractual IP rights to the licensee or commercializing entity. Cross-Border Inter-Institutional Agreements (CBIIA) are essential to achieve this objective. The group believes it is important to start with the end goal in mind-this is commercialization.

An IP framework will be essential to the “Cancer Stem Cell Consortium” (CSCC), a collaborative project stimulated by CCSIP that coordinates and funds cancer stem cell research between Canada and California (spanning university researchers, governments and private companies).

There are three voices at this table: industry, government and researchers. A funding mechanism is needed to raise IP awareness. A funding body could establish an IP framework (otherwise each university or institution will draw on its own policy). While universities could approve a collective IP agreement, the challenge will be acquiring signoff from companies. The Springboard Network in Atlantic Canada could serve as one example of how public sector financing can provide leverage. Springboard encourages the transfer of knowledge and technologies to the private sector. Its membership includes universities and colleges in Atlantic Canada.

The group also discussed the possibility of building on an existing Canada-US Treaty on the allocation of IP between federal departments and agencies of the Government of Canada and the Government of United States. The group suggested using the Treaty (CTS 1997/5) as a starting point for further discussions on the potential to extend the agreement to university and privately funded research between the two countries.

Following the Summit workshop and post-workshop research on DFAIT's treaty database, it appears that the Governments of Canada and the US signed a Treaty (CTS 1997/5) on Intellectual Property that is still IN FORCE for all American-Canadian Science and Technology Cooperative Research Activities. Established 1997, and still active today, this published Treaty applies to Intellectual Property in any or all research disciplines in science and technology in federal departments or agencies covered by a "Written Arrangement" as Defined in Section I (D) of this Treaty.

Treaty title:

**"Exchange of Notes constituting an Agreement between the Government of Canada and the Government of the United States of America on the Allocation of Intellectual Property Rights, Interests and Royalties for Intellectual Property Created or Furnished under Certain Scientific and Technological Cooperative Research Activities"**

Canada Treaty Series (CTS) 1997/5

Entry into Force: February 4, 1997

Status: In Force

This Treaty is available at: [http://www.treaty-accord.gc.ca/ViewTreaty.asp?Treaty\\_ID=101467](http://www.treaty-accord.gc.ca/ViewTreaty.asp?Treaty_ID=101467)

Additional details: [http://www.treaty-accord.gc.ca/Details.asp?Treaty\\_ID=101467](http://www.treaty-accord.gc.ca/Details.asp?Treaty_ID=101467)

**Key Outcomes:**

Members of this working group united on the strong need for a cross-border intellectual property management tool kit or document that clearly enunciates the key issues and provides potential solutions. It should provide IP guidance, ideas and pathways that individual groups and project teams could follow when engaging in bilateral R&D projects (as opposed to strictly identifying the key challenges). This would enable researchers to navigate through the treacherous waters that sometimes flow around IP management.

The group believes this tool kit or document should educate and inform researchers about IP, as

opposed to being prescriptive and trying to enforce regulations. Again, tools and pathways would provide an effective way to move forward.

Finally, the group demonstrated a great desire to evolve this concept, and consult the following three groups:

- US counterparts (with which this working group has not spent much time to date): the group would like to acquire additional feedback on this idea.
- Research funders: the group expressed strong interest in learning more about funding provided to the Cancer Stem Cell Consortium (CSCC), and the associated terms and the conditions that funding agencies, investors and other collaborators will place on the IP. This is required to ensure that the IP is well managed for the benefit of all stakeholders.
- Last, but not least, the group would like to consult participants from the other Summit working groups and broader CCSIP stakeholders. The group reiterated the need to acquire an understanding of what is important for each research program, to ensure that the proposed IP tool kit benefits the broader Canada-California research community.

Next Steps: The group is preparing a revised draft of the IP document, and has initiated additional stakeholder consultations. Members have engaged in preliminary discussions with Dr. Cindy Bell, Interim Executive Director, and legal counsel for the CSCC.

Note: At this time, the Cross-border IP working group is composed of Canadian members.

### **4.3 Green IT**

#### **Workshop Leaders:**

- Dr. Charles Despins, President and CEO, Prompt
- Jerry Sheehan, Government Program Development UCSD, CalIT2
- Bill St. Arnaud, Chief Research Officer, CANARIE

#### **Moderator:**

- Stuart Wilson, Vice President, ISTPCanada

#### **Workshop Coordinator:**

- Lisa Stockley, Trade Commissioner, Foreign Affairs and International Trade Canada

#### **Workshop Agenda:**

- The Role of ICT & Green Next-generation Internet in Reducing GHG Emissions: Bill St. Arnaud, CANARIE
- Memorandum of Understanding Between the University of British Columbia, University of California, San Diego (UCSD) and Prompt: Charles Despins, Prompt; and Jerry Sheehan, UCSD
- ‘Follow the Sun /Follow the Wind’ Grid Pilot Project: Mathieu Lemay, Inocybe
- Green IT Strategy at the University of California, San Diego (UCSD): Jerry Sheehan, UCSD
- Prompt’s Green-ICT Strategy: Dr. Charles Despins, Prompt
- Understanding ISO 14064: Bruce Ringrose and Ron Dembo, ClimateCHECK

#### **Summary:**

##### **The Role of ICT & Green Next-generation Internet in Reducing GHG Emissions: Bill St. Arnaud, CANARIE**

- It is estimated that the ICT industry produces CO<sub>2</sub> emissions equivalent to the carbon output of the entire aviation industry
- ICT is now the 5<sup>th</sup> largest industry in terms of power consumption
- One small computer server generates as much CO<sub>2</sub> as an SUV with fuel efficiency of 15 miles per gallon
- Nearly 40% of servers at universities and businesses are under utilized by more than 50%
- Exploring solutions: Carbon taxes, cap and trade, carbon offsets, carbon neutrality imposed by law
- SMART 2020 is one of the most conservative reports on why ICT and Internet is critical to reducing CO<sub>2</sub>

- The Internet and ICT-based solutions could reduce emissions by 15% and save global industry \$US 800 billion in annual energy costs by 2020
- We need a “zero carbon” strategy because increased usage will not change emission equation
- Zero Carbon Data Centre:
  - Data center facilities do not need to be located in cities
  - Most renewable energy sites are very remote and impractical to connect to the electrical grid
- ISO 14064 is the accounting process required to validate whether a project actually reduces CO<sub>2</sub>
- ISO 14062/3 sets the measurement process for life cycle CO<sub>2</sub> emissions for a product or service
- You can not earn credits after you implement network equipment or architectures to reduce CO<sub>2</sub>
- Many companies like Cisco, Google, IBM, etc., will purchase carbon offsets if you use their technology to reduce CO<sub>2</sub>
- Consider carbon rewards rather than carbon taxes?

**Memorandum of Understanding between the University of British Columbia, University of California (San Diego) and Prompt: Dr. Charles Despina, Prompt; and Jerry Sheehan, USCD**

**Overview:**

- Objectives: to reduce greenhouse gas emissions on university campuses, and share best practices in reducing greenhouse gas (GHG) emissions and baseline emission data for cyber-infrastructure and networks as per ISO 14064
- These organizations aim to work with national funding bodies to explore carbon reduction strategies directly or indirectly enabled by new network and distributed computing architectures such as Green ICT initiatives supported by Prompt, OptiPuter and CineGrid
- To work with Research and Education (R&E) network providers to explore methodologies and architectures to decrease GHG emissions including options such as relocation of resources to renewable energy sites, virtualization, etc.
- To explore the potential of ‘virtual’ carbon trading systems where carbon offsets earned through a variety of GHG reduction mechanisms are traded between participating institutions in exchange for access to grid computational cycles, wide area network bandwidth, research funding and or other virtual services
- To explore the creation of a multi-sector pilot of a generalized ICT carbon trading system, including stakeholders from government, industry and universities
- To collaborate with each other, and with government agencies ,departments and other organizations in their respective countries, to promote and encourage other universities, institutions and organizations such as EDUCAUSE, CENIC, Compute Canada, CANARIE, and CUCCIO to sign this Memorandum of Understanding
- Initial signatories include UBC, UCSD and Prompt

### **‘Follow the Sun /Follow the Wind’ Grid Pilot Project: Mathieu Lemay, Inocybe**

- A live, green, next-generation Internet (NGI) platform, creating green experiments over a virtualized infrastructure
- Overview of the Green ICT Strategy:
  - **Step 1:** Re-localize the infrastructure to the zero carbon datacenters (opportunity to use locations in the Canadian North to reduce expenditures related to cooling equipment)
    - Some infrastructure doesn't need to be located in businesses or universities; this non location-specific infrastructure could be placed at renewable sites
  - **Step 2:** Segment and optimize the infrastructure by using virtualization techniques
    - Virtualization and segmentation
  - **Step 3:** Share the infrastructure with different users by offering IaaS (Infrastructure as a Service) and providing different levels of control
    - Virtual infrastructure consists of many types of resources that are allocated to specific users
  - **Step 4:** Add power-related resources to networks to monitor, optimize power consumption (as it is done for network resources in Step 3)
  - **Step 5:** Use new wireless and optical technologies to reduce the current carbon footprint of networks

### **Green IT Strategy at the University of California, San Diego: Jerry Sheehan, UCSD**

- UCSD/Calit2 is using ICT to address global climate change
- UCSD green facilities for ICT includes:
  - Photovoltaics (2 MW)
  - Modular data center
  - Sea water cooling
  - Campus fuel cell
- The GreenLight Project:
  - Modular data center as the controlled environment
  - World accessible instrument
  - Architectural instrumentation for power and temperature
  - Hardware platform and software tools for hosting alternative architectures
  - Instrumented process units, memory, disk drives and network interfaces
- NGI Telescience
- Additional information on the project may be found online at: <http://greenlight.calit2.net>

### **Prompt Green-ICT Initiatives: Dr. Charles Despins, Prompt**

- Focus of the proposed centre:
  - Network technologies to deploy zero carbon networks:
    - Wired and wireless
    - New router, optical and distributed computing architectures
  - University, business and consumer applications:
    - Distributed grids and clouds using zero carbon data centers

- Use of web services and SOA with virtualization
- Remote instrumentation
- Deployment of a zero carbon network testbed to test and validate research and products by linking participating sites:
  - Government labs, industry, universities and zero carbon data centers
  - Bits per carbon unit benchmarks
- Commercialization of ICTs via carbon credit mechanisms
- Project rationale: ICT consumes 2 to 6% of all energy and produces 3 to 4% of all CO<sub>2</sub> (doubling every four years)
- International mobilization in 2008:
  - International Telecom Union (ITU) initiative on ICT and climate change
  - Climate Change Group report on the 2020 Low Carbon Economy
  - Development Strategy: Bootstrapping approach
    - Plan initiative
      - R&D: Prompt, NSERC and the private sector (Q1/2009)
      - Subsequent scale-up to commercialization activities
    - Create awareness:
      - CCSIP Summit
      - International events
      - Communications, including workshops, website, etc.
    - Launch specific activities:
      - Partnerships agreements (such as testbed initiatives)
      - Launch individual sub-projects
  - Strong initial interest
    - Over \$15M of cash and in-kind commitments from 11 companies, 15 Canadian universities and institutions and 11 international organizations

#### **Understanding ISO 14064: Bruce Ringrose and Ron Dembo, ClimateCHECK**

- ISO 14064 is the accounting process required to validate whether a project actually reduces CO<sub>2</sub>
- ISO 14062/3 sets the measurement process for life cycle CO<sub>2</sub> emissions for a product or service
- Companies actually need to implement ISO 14064 process to demonstrate actual CO<sub>2</sub> reductions (vendors will need to provide 14062/3 data for their products and services)

#### **Industry Plans and Perspectives: Contributions from Nortel, RIM, Cisco and HP**

##### **Nortel:**

- Curtailing travel and using teleconferencing options more regularly
- Developing and implementing technology tools for enhanced collaboration
- Tele-working for employees
- Emphasizing low power consumption in operations
- Looking at ways to standardize operations to minimize footprint

- Tracking best practices (e-government, customers, some countries, etc.)

**Research In Motion:**

- Moving forward with new regulations
- Company has the largest population of co-op students in the country
- Students and future employees want to work for socially responsible companies with low carbon footprint

**Cisco:**

- Committed to reduce their GHG by 25% (2007 level) by 2012
- All power adapters meet California's ENERGY STAR requirements
- Looking at hotel offices for employees; no permanent desks
- Net impact and environmental improvement; Cisco tele-presence and virtualization initiatives
- Advocacy; member of the Global e-Sustainability Initiative; Cisco Canada's *One Million Acts of Green* initiative includes local activities such as tree planting in Toronto

**Key Cisco Results:**

- 40% reduction in electrical demand
- 54% reduction in IT cabling
- Increased collaboration
- Increased telecommuting and reduced traffic congestion

**Hewlett-Packard:**

- HP will reduce the absolute energy consumption of its facilities by 15% (from 2006 levels by 2010)
  - Data center consolidation
  - Office space and equipment optimization
  - Business travel reduction through teleconferencing
  - Use of renewable energy
  - Employee engagement – part of the solution
  - Product energy efficiency (25% less energy consumption); this includes dynamic smart cooling and supply chain management (materials, logistics, recycling)
  - HP actively supports policy efforts to mitigate climate change to help protect society and global economic development from adverse climate impact

**Key Outcomes:**

***Opportunities for Green ICT Collaboration:***

The group discussed many opportunities for green ICT R&DD collaboration. This included using universities as testbeds. The group emphasized the need to examine systems for a matrix of both hardware and software as part of the solution.

Other recommendations included the remote location of cyber-infrastructure and computer hubs where renewable energy is produced (often at remote sites) and linking these back to user communities via optical networks. Another idea involved software solutions that relate to the utilization of ICT for the monitoring of energy usage and emissions and carbon credit offsets and enforcement, etc.

***Comments on the proposed Call for Proposals (CFP)***

The group focused on two major themes:

- How can the IT industry reduce its carbon-energy footprint?
- How can IT applications be used by industry and broader society to reduce their carbon footprint?

In terms of specific criteria for the CFP, the group believes proposals should reflect ISO 14064 standards and be multi-disciplinary.

With respect to specific research areas, the team focused on virtualization technologies, and how optical networks could enable the placement of cyber-infrastructure closer to energy production sources.

On the topic of collaborative structures, three basic models were discussed by this group:

- The development of Canada-California R&D networks in these areas
- Funding programs that support the development of specific Green ICT applications
- Networked testbeds that link testbeds in Canada and California

## **4.4 Infectious Diseases**

### **Workshop Leaders (for two Infectious Diseases Working Groups)**

- Dr. Michel G. Bergeron, Directeur, Centre de recherche en infectiologie, Université Laval
- Dr. Philippe Gros, Professor of Biochemistry, McGill University
- Dr. Scott Layne, Principal Investigator, Center for Rapid Influenza Surveillance and Response, University of California, Los Angeles
- Dr. Marc Madou, Chancellor's Professor of Mechanical and Aerospace Engineering, University of California, Irvine

### **Moderator:**

- Dr. John Hepburn, Vice President, Research, University of British Columbia

### **Workshop Coordinator:**

- Éric Holdrinet, Consul & Trade Commissioner, Foreign Affairs and International Trade Canada

### **Summary:**

#### **Group 1: Treatment of Infectious Diseases**

**Leader:** Dr. Philippe Gros, Professor of Biochemistry, McGill University

The first Infectious Diseases Working group focused on the development of a Canada-California Network of Research Nodes (with expertise in infectious diseases). This concept is based on an earlier proposal developed by Dr. Bob Hancock, Professor Department of Microbiology and Immunology, University of British Columbia; Dr. Alan Barbour, Departments of Microbiology & Molecular Genetics and Medicine, University of California, Irvine; Dr. Rafick-Pierre Sékaly, Department of Immunology, McGill University; and Dr. Scott Layne, Center for Rapid Influenza Surveillance and Response, University of California, Los Angeles.

The proposed Canada-California Network of Research Nodes was discussed and endorsed by Dr. Agabian, Interim Director, Research, Global Health Sciences, and Dr. Joel Palefsky, Infectious Disease Physician, University of California, San Francisco; colleagues at the University of British Columbia, the Vaccine and Infectious Disease Organization (VIDO) at the University of Saskatchewan, the University of Toronto and McGill University (including Dr. Bob Hancock, Dr. Lindsay Eltis, Dr. Andrew Potter, Dr. Jeremy Mogridge, Dr. Brian Ward, Dr. Timothy Geary, Dr. Anne Gatignol, Dr. Albert Berghuis, etc.).

The proposed network aims to:

- Coordinate research activities across different geographical nodes or centres of excellence. The network would enable individual scientists or groups of scientists to work on trans-border research projects in areas of strategic priority
- Fund select technology platforms and/or core facilities that support individual trans-border research projects. The network would provide a flexible vehicle to facilitate technology transfer and enable the training of highly qualified personnel at different network sites
- Organizing a framework for knowledge transfer between labs. The network would support interaction and networking activities between member labs and other stakeholders such as investors, industry, regulatory agents etc.
- Facilitate the identification and development of intellectual property, and stimulate downstream commercial activities

Proposed areas of focus include:

- Infections caused by drug resistant microbes
- Emerging infectious diseases that affect North-American populations
- Ancient infectious diseases that present a threat to global health (such as those that affect world travellers and/or those which are increasingly prevalent in North America)
- The identification and characterization of major microbial virulence determinants and dominant immunogens in human pathogens
- Vaccine development and drug discovery for novel anti-viral, anti-bacterial, anti-fungal and anti-parasitic drugs
- Discovery and validation of host-based targets for modulation of innate immune defences

Core principles:

- Acquire and provide centrally administered funding for projects involving research teams from both jurisdictions
- Establish strong administration with a paid director, academic leader, and representative steering committee with responsibility for the definition of research priorities, the conduct of a competitive proposal process, and the selection of focused research projects
- Leverage synergies and facilitate collaboration between research teams with complementary expertise, with support from core enabling facilities
- Support the translation of research discoveries into products and clinical outcomes
- Accelerate the process of pre-clinical and clinical evaluation of new molecule products by bringing together or bridging research laboratories with complementary expertise
- Solicit industry investment to be applied on a project-specific basis in exchange for licensing rights to joint intellectual property (diagnostics, therapeutics)
- Deliver economic benefits (investment and income)
- Enable knowledge and technology transfer, and the training of highly qualified personnel; the Network will build on previous investments in research infrastructure across Canada and California
- Facilitate public health policy outputs including rapid response, communications, planning and regulatory issues

**Key Outcomes:**

Drawing on the concepts discussed during the workshop, this group aims to submit an application for the development of a Canada-California Network of Research Nodes to the upcoming CCSIP Call for Proposals in 2009.

**Group 2:****Leaders:**

- Dr. Michel G. Bergeron, Directeur, Centre de recherche en infectiologie, Université Laval
- Dr. Scott Layne, Principal Investigator, Center for Rapid Influenza Surveillance and Response, University of California, Los Angeles
- Dr. Marc Madou, Chancellor's Professor of Mechanical and Aerospace Engineering, University of California, Irvine

The second Infectious Diseases Workshop featured three presentations. Workshop participants aimed to:

- Discuss actions/next steps in infectious diseases
- Deliberate the CCSIP Call for Proposals
- Build new collaborations
- Identify funding sources
- Discuss modalities for moving forward

**Presentation 1: Dr. Michel Bergeron, Université Laval****Context:**

Modern medicine remains empirical. Very often, patients receive antibiotic treatments because it could take anywhere from 2 days to 5 weeks to receive results from the tests currently used to diagnose an infection. As such, doctors decide to treat patients with antibiotics without a definite diagnosis or any certainty about the infection (whether it is viral or bacterial). And the choice of the antibiotic agent may not be optimal or even relevant for the patient. This occurs in far too many cases.

**Some key facts:**

- Every year, 17 million deaths are caused by infectious diseases worldwide
- There is an obvious need for revolutionary diagnostics in this field, and on-going Canada/California multi-disciplinary collaboration on the development of 'rapid, point-of-care diagnostics'
- According to the United Nations, most countries are not ready for an eventual pandemic disease; this further reinforces the need for this technology

The ‘dream’ in the field of infectious diseases: rapid theranostics that provide accurate and fast microbiology results and determine the most relevant therapy for the patient.

### **Developing Solutions:**

Dr. Bergeron and his team at *Centre de recherche en infectiologie* have developed a CD-based rapid diagnosis test that could be performed in a doctor’s office anywhere in the world. This innovation is also expected to significantly reduce emergency room waiting times. Based on microfluidics technology, this lab-on-a-chip can also serve to detect microbial DNA.

### **Presentation 2: Dr. Scott P. Layne, University of California, Los Angeles**

#### **Topics:**

- Global infectious diseases predicaments
- High-throughput lab
- IT systems
- Merging clinical and public health
- Integration of low + high resolution diagnostics
- Next step for human health: near-time, global and more transparent surveillance of infectious diseases

### **Presentation 3: Dr. Marc Madou, University of California, Irvine**

#### **Topics:**

- Portable, rapid, molecular diagnostics for infectious diseases
- Abbott Point-of-Care/ISTAT
- Blood-based point-of-care (POC) technology evolution
- Molecular POC technology
- CD technology as a platform
- Goal: the integration of three functions: lysis, PCR and detection

Note: Dr. Madou is working with Dr. Bergeron’s research team.

### **Questions and discussions**

- Canada must aim to build critical mass in this area, as opposed to vertical empires
- A significant shift in culture is required to help doctors go from ‘not having results’ to ‘having results and fast’
- Given the different stages in the research and development process, we must examine how to meet the needs of industry and engage companies at the right time
- We need a multidisciplinary group to build a strategy that promotes and supports the adoption of new technology by reimbursement bodies, by doctors, and by other sectors
- Challenge: developing a technology that is inclusive, while maintaining a focus

- Choose a few infectious diseases (targets) and get them ‘insured’; this would help market penetration
- Develop proposals, a vision by idea
- Develop a business plan on how those ideas can be developed

**Key Outcomes:**

This group focused on three key opportunities and challenges.

First: The group emphasized the need for better diagnostics (virtually real-time surveillance for known and emerging threats), specifically low-resolution diagnostics/point-of-care devices with the ability to screen locally for dozens of diseases.

- The group proposes to combine low-res point-of-care with high-res high-throughput global surveillance, so that each can better inform the other; this will also improve the tracking of infectious diseases as they emerge and spread (this is critical to public health)

Second: The group discussed the challenge of vaccine development for rapidly emerging threats, and how to make a more effective flu vaccine in a short period of time.

- Understanding the response of the human body is as important as developing therapeutics

Finally, the group focused on the technology platforms and large-scale technologies that are required if one is to screen for 10k pathogens simultaneously. When level 3 and 4 are involved, collaboration becomes crucial; there are complementary facilities in California and Canada that could support this activity.

## **4.5 Next-generation Digital Media**

### **Workshop Leaders:**

- Dr. Sheldon Brown, Director, Center for Research in Computing and the Arts, University of California, San Diego
- Dr. Don McLean, Dean, Schulich School of Music, McGill University

### **Moderator:**

- Dr. Gretchen Kalonji, Director of International Strategy Development, University of California, Office of the President

### **Workshop Coordinator:**

- Éric Holdrinet, Consul & Trade Commissioner, Foreign Affairs and International Trade Canada

### **Summary:**

This working group focused on the future of digital media and the challenge of capturing and properly storing digitized audio files. While innovative content development represents a competitive edge for digital media leaders (such as the US); there is always pressure to develop more.

However, getting to ‘the next best thing’ in programming is not easy. While CPU capacity has continued to expand (as per Moore’s Law), programming has not. This represents a weak link in innovation. This is further compounded by the fact that our legacies to the world rely on social networks and collaborative architecture that exists in a haphazard way. For example, digital media is the first type of media that does not preserve original sound and content in a formal fashion. Furthermore, 65% of broadband usage is from media files, yet only 5% of these files are licensed. This market is currently valued at \$5 billion (and represents a potential market of \$100 billion per year that is not yet harnessed).

Institutional problems contribute to this lack of content development. For example, legal regimes in the US and Canada limit the usage and accompanying storage (especially in caches) of IP-protected media. There are also challenges in describing metadata and streamlining it across institutions and programs. There is also no formal system to commercialize institutional innovations in an efficient manner. Funding at various levels and stages of development could offer part of the solution. Finally, the coordination of these activities presents an enormous challenge. How do we create a massively multi-user virtual reality (MMOVR) interface, without losing the original mandate and content?

Tele-presence technology was noted as another part to the solution. The ability to collaborate remotely would help to resolve innovation issues and move users to a more streamlined process of

content storage. The Digital Media Exchange Infrastructure, and evolving e-learning technology and approaches, would help to push users towards standardization and enable faster innovation.

**Key Outcomes:**

Many of the proposed initiatives are loosely united by a single goal: the development of scalable, multi-modal distributed collaborative social networks enabled by digital media exchange infrastructure between California and Canada. As part of this broad vision, the team also noted the need for tools to promote remote collaboration to researchers and developers across a variety of disciplines.

This infrastructure should address key challenges related to collaboration in social media, meta-data objects databases, cultural issues related to ownership, and various jurisdictional filters. Surprisingly, there are many differences between California and Canada, including the ongoing challenge of censorship and privacy issues. Finally, and perhaps most importantly, there is the whole issue with perceptual meaning.

The group believes that initial applications should focus primarily on the art and culture domain, including film, music and gaming, etc. Furthermore, the group identified a strategic advantage in the development of innovative content from inner woven sets of skills that are emerging from the new class of professionals who merge technology and artistic content.

With all of these activities, the group is excited by the wonderful opportunity to integrate this with new educational programs and activities for students. For example, the University of California and many Canadian universities are creating new degree granting programs that combine aspects of technology and computer science and art, music, etc. These programs enable the development of highly qualified people with cutting-edge bimodal working capacity. Therefore, in all of the initiatives proposed above, one could envision collaborative student activities embedded in the curriculum. These elements could come together and support the objectives of the program, and a grander multimedia vision.

The group also believes that scientists from different scientific disciplines should be engaged in the planning of this initiative. This should include those who could contribute to development of the technology, the art, the social sciences, psychology, legal and IP issues.

The group also discussed new media objects and cultural heritage preservation as part of the workshop.

With regard to the CCSIP CFP, the group believes the proposed scope of potential next-generation digital media activities was far too broad. The group recommended an initial focus on the arts and culture domain.

## 4.6 Sustainable Biofuels

### Workshop Leaders:

- Dr. Franco Berruti, Director, Institute for Chemicals and Fuels from Alternative Resources, University of Western Ontario
- Dr. Sharon Shoemaker, Executive Director, California Institute of Food and Agricultural Products, University of California, Davis
- Dr. Don Smith, Professor and Chair, Plant Science Department Head, Green Crop Network, McGill University

### Moderator:

- Nigel Lloyd, Executive Vice-President, Natural Sciences and Engineering Research Council of Canada

### Workshop Coordinator:

- Éric Holdrinet, Consul & Trade Commissioner, Foreign Affairs and International Trade Canada

### Summary:

The Sustainable Biofuels session was divided into three complementary workshops related to the process of making biofuels and bioproducts:

1. Thermochemicals Workshop
2. Biological Workshop
3. Workshop on Sustainable Development and the Use of Plants and Feedstock

Dr. Franco Berruti, Director of the Institute for Chemicals and Fuels from Alternative Resources, University of Western Ontario led the Thermochemicals Workshop. He is working on a project called *Thermochemical mini-refineries for agricultural residues from Canada and California*. This workshop focused on:

- Technologies for thermal conversion of biomass resources with minimal use of water
- The definition of the characteristics of the products (bio-oil, bio-char and gas)
- The separation processes for the valuable fractions of the bio-oils and their upgrading, and the potential use of that bio-oil and bio-char

Dr. Sharon Shoemaker, Director of the California Institute of Food and Agricultural Products, University of California, Davis, led the Biological Workshop. This session focused on second and third-generation biofuels through longer chain biofuels. Participants discussed a metabolic switching approach that brings together genomics, proteomics, metabolic engineering, microbiology, enzymology and engineering.

Dr. Don Smith, Professor and Chair of the Plant Science Department Head and Green Crop Network, McGill University led the Workshop on Sustainable Development and the Use of Plants and Feedstock. This session focused on how to improve cellulose availability and how to produce high biomass level with minimum conventional inputs. The participants identified common feedstock including tomatoes, grape skins/seeds, apple pomace, flax and rice straw and off specification carrots. They developed a model approach (from plant data to the output) to improve second generation biofuels crops.

**Floor interventions:**

Participants across the three groups noted that California has strong regulations about the use of wood and forest residues. It was mentioned that although this session focused on biofuels, other bioproducts should not be excluded from the discussions as they could have a higher value than fuel. The group also commented on the key differences between funding programs in Canada and California.

**Conclusions:**

At the end of the day, participants of all the three workshops summarized their ideas and recommendations. The group then merged them into a single project entitled ‘Sustainable Biofuels and Bioproducts’. Proposals focused on:

- Enhancement and development of cellulosic energy crops
- Conversion approaches (thermochemical and biological) for the development of cellulosic biofuels and bioproducts, using energy dedicated crops and agricultural residues
- Development of novel micro-organisms; processes and enzymes, such as fuel from algae

**Key Outcomes:**

As a whole, the group agreed that it should focus on biofuels and bioproducts as there is often more value in some of the chemical bio-products, than in the fuel itself.

The group plans to conduct a workshop with researchers, industry entrepreneurs and policy makers from Canada and California in 2009. The team hopes this session will lead to a RD&D program with defined deliverables. The group aims to ensure that any new initiative includes a component for research student mobility. The program could also stimulate the creation of an RD&D consortium or a Canada-California institute for biofuels and bioproducts.

## Section 5: Appendices

### 5.1 Summit Participants

First Name	Last Name	Role	Organization
Nina	Agabian	Director, Research Global Health Sciences	University of California, San Francisco
Song Ho	Ahn	Visualization developer	Sheridan College
Nicolas	Amyot	Officer, International Affairs	Economic Development, Innovation and Export Trade, Government of Québec
Brooke	Anderson	Chief Operating Officer	CombiMatrix Corporation
Malcolm	Anderson	Project Manager	Clean Hydrogen Power Generation
Ben	Anthony	Senior Research Scientist, Carbon Management (CCS, UCG and other technologies)	CETC-O
Raymond	Bachand	Ministre	Développement économique, Innovation et Exploration
Ravin	Balakrishnan	Associate Professor and Canada Research Chair	University of Toronto
Danuta	Balicki	M.D., PhD	Hôtel-Dieu du Centre hospitalier de l'Université de Montréal, Canada
René	Barsalo	Director, Research and Strategy	Society for Arts and Technology
Alain	Beaudet	President	Canadian Institutes of Health Research
Georges	Beaudoin	Professor, Geology	Université Laval
Stewart	Beck	Assistant Deputy Minister	Foreign Affairs and International Trade Canada
Steven	Beckwith	Vice-President Research and Graduate Studies	University of California, Office of the President
Claude	Bédard	Dean of Research and Technology Transfer	École de technologie supérieure (ÉTS)
Robert	Beiko	Canada Research Chair, Bioinformatics	Dalhousie University
Marie-Hélène	Béland	Trade Commissioner	Foreign Affairs and International Trade Canada
Sanjay	Belkhode	Director, Business Development	Spartan Bioscience Inc.
Cindy	Bell	Executive Vice-President, Corporate Development	Genome Canada
Yolanda	Benson	Consultant	Government Strategies Inc.
Michel G.	Bergeron	Directeur, Centre de recherche en infectiologie	Université Laval
Albert	Berghuis	Associate Vice-Principal	McGill University
Eric	Bernier	Chief Technology Officer	CANARIE
Gary	Bernstein	Director, Network & Communications Services	McGill University
Franco	Berruti	Professor and Director of International Centre for Fine Art Research (ICFAR)	University of Western Ontario
Kelly	Birkinshaw	Advisor to Jim Boyd, Commissioner	California Energy Commission

Karine	Blondin	Project Director	Montréal International
Pierre	Boucher	Director, Research	Ericsson Canada
Edwin	Bourget	Vice-Rector, Research and Innovation	Université Laval
Cedric	Briens	Professor, Chemical Engineering	University of Western Ontario
Jean-Robert	Brisson	Senior Research Officer	National Research Council of Canada
Pierre	Brodeur	Director	Economic Development, Innovation and Export Trade, Government of Québec
Sheri	Brodeur	Eastern Region Lead, Open Innovation Office	Hewlett Packard
Martin	Brooks	Emeritus Researcher	Natural Resources Canada
Sheldon	Brown	Director, Center for Research in Computing and the Arts (CRCA)	University of California, San Diego
Jean	Brunet	Managing Partner	Stein Monast
Guy	Bujold	President and CEO	CANARIE
Joanne	Carrière	Director	National Film Board of Canada
Jamal	Chaouki	Professor, Chemical Engineering	École Polytechnique de Montréal
Pierre	Charbonneau	Vice President, Regional Partnerships and Business Strategy	Cisco
Esteban	Chornet	Professor	Université de Sherbrooke
William	Coderre	Director, Corporate and Regional Development	Natural Sciences and Engineering Research Council of Canada (NSERC)
Seth	Cohen	Professor, Chemistry	University of California, San Diego
Jeremy	Cooperstock	Associate Professor, Electrical and Computer Engineering	McGill University
Luc	Courchene	Professor of Design	Université de Montréal
Martha	Crago	Vice President, Research	Dalhousie University
Ron	Dembo	CEO and Founder	Zerofootprint
Charles	Despins	President and CEO	Prompt
D. George	Dixon	Vice-President, University Research	University of Waterloo
Jim	Dolgonas	President and CEO	CENIC
Christian	Doonan	Research Scientist	University of California, Los Angeles
Cassie	Doyle	Deputy Minister	Natural Resources Canada
Judith	Doyle	Chair, Integrated Media	Ontario College of Art and Design
Alain	Dudoit	Associate Vice-Principal, Strategic Innovation Partnerships	McGill University
Kevin	Dunn	Associate Director, Industry Liaison	Dalhousie University
Christel	Durand	Senior Consultant	Deloitte
Francois	Durocher	Principal	YOG Management
Julie	Dutrisac	Head, Research and Development	National Film Board of Canada

Lindsay	Eltis	Professor	University of British Columbia
Elaine	Feldman		Foreign Affairs and International Trade Canada
Phil	Felgner	Director Protein Microarray Laboratory, Infectious Disease, School of Medicine	University of California, Irvine
Gordon	Fitzell	Professor, Faculty of Music	University of Manitoba
Kevin	Fitzgibbons	Director, Science, Technology and Innovation	Foreign Affairs and International Trade Canada
Suzanne	Fortier	President	The Natural Sciences and Engineering Research Council of Canada (NSERC)
Sylvia	Franke	Chief Information Officer	McGill University
David	Fransen	Consul General	Canadian Consulate General, Los Angeles
Kamiel	Gabriel	Associate Provost, Research	Ontario Institute of Technology
Victor	Garcia	Chief Technology Officer	Hewlett Packard (Canada)
Marielle	Gascon-Barré	Vice President and Scientific Director	Fonds de la recherche en santé du Québec
Anne	Gatignol	Associate Professor, Molecular Biology and Virology	McGill University
Jean-Claude	Gavrel	Associate Vice-President	Networks of Centres of Excellence (NCE)
Timothy	Geary	Canada Research Chair in Parasite Biotechnology	McGill University
Michael	Gentry	Greenhouse Gas Focus Area Manager	Chevron Corporation USA
Martin	Godbout	President and CEO	Genome Canada
Michel	Goyette	Executive Director	Carbon DataSpace
Philippe	Gros	Professor, Biochemistry	McGill University
Jacques	Grou	Project Manager	Takt-etik
J. Wayne	Gudbranson	President and CEO	Branham Group
Joane	Hallé	Assistant Director	Foreign Affairs and International Trade Canada
Chris	Harder	R&D Manager	Spartan Bioscience Inc.
David	Harris Kolada	Vice President, Corporate and Market Development	Sustainable Development Technology Canada
Sadiq	Hasnian	Senior Advisor	National Research Council Canada
John	Hassel	Chair of the Cancer Stem Cell Consortium Scientific Steering Committee; Professor	McMaster University
Paul J.	Hearty	Associate Dean and Director, Rogers Communication Centre	Ryerson University
Gemma	Heddle	Carbon Management Advisor	Chevron Corporation USA
Jenifer	Hedrick	CHPG Technology Manager	Clean Hydrogen Power Generation
Mark	Henderson	Managing Editor	Research Money
John	Hepburn	Vice-President, Research	University of British Columbia
Howard	Herzog	Principal Research Engineer	Massachusetts Institute of Technology (MIT)

Ted	Hewitt	Vice President, Research	University of Western Ontario
Paul	Hoffert	CEO of Noank Media Inc; Fine Arts Professor	York University
Éric	Holdrinet	Consul & Trade Commissioner	Foreign Affairs and International Trade Canada
Joseph	Hubert	Vice-Rector, Research	Université de Montréal
Pourang	Irani	Professor, Human Computer Interface Laboratory	University of Manitoba
Christer	Jansson	Professor and Senior Staff Scientist, Ecology	Lawrence Berkeley Laboratory
Digvir	Jayas	Vice-President, Research	University of Manitoba
Dominic	Jean	Secretary, CCSIP Steering Committee	Foreign Affairs and International Trade Canada
Madeleine	Jean	Research Partnerships	Cirque du Soleil
Tina	Jeoh	Assistant Professor, Biological and Agricultural Engineering	University of California, Davis
Martine	Joly- Mukhopadhyay	Trade Commissioner	Foreign Affairs and International Trade Canada
Gretchen	Kalonji	Director	University of California, Office of the President
Stephen	Kaufman	Chairman	Integrated CO <sub>2</sub> Network
Blaine	Kennedy	Manager, Screening and Evaluation (Renewable Energy and Industrial Utilization)	Sustainable Development Technology Canada
Matthew	King	Assistant Deputy Minister	Industry Canada
Kathlyn	Kirkwood	Assistant Professor, Faculty of Engineering	University of Ottawa
Paul	Krekorian	Assemblymember	California State Assembly
Richard	Labelle	Principal	The Aylmer Group
Martha	Ladly	Associate Professor of Design	Ontario College of Art and Design
Robert	Landry	Trade Commissioner	Foreign Affairs and International Trade Canada
Paul	L'Archevêque	Chair of the Board of Directors	Montreal in Vivo
Scott	Layne	Professor, Epidemiology and Environmental Health Sciences	University of California, Los Angeles
Marcel	Lebleu	Director	Foreign Affairs and International Trade Canada
Abraham	Lee	Professor, Biomedical Engineering	University of California, Irvine
Arthur	Lee	Principal Advisor	Chevron Corporation
Aladin	Legault d'Auteuil	Trade Commissioner	Foreign Affairs and International Trade Canada
George	Legrady	Director, Experimental Visualization Lab	University of California, Santa Barbara
Mathieu	Lemay	President	Inocybe Technologies Inc.
Marc	LePage	Consul General	Canadian Consulate General, San Francisco
David	Levin	Associate Professor,	University of Manitoba

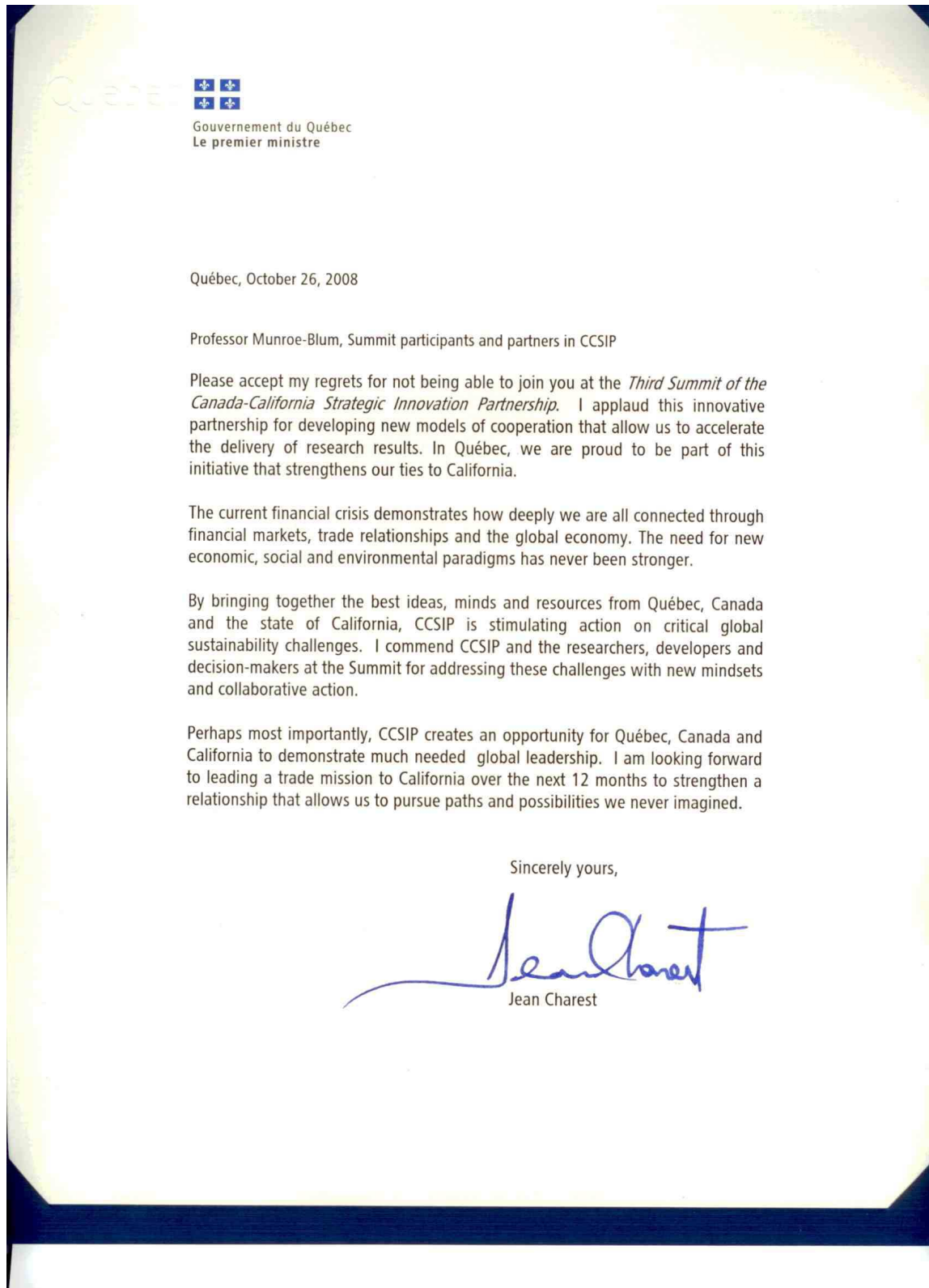
		Biosystems Engineering	
Daniel	Levitin	James McGill Professor and Bell Canada Chair in Psychology of Electronic Communications	McGill University
Eric M.	Levy	Partner	Heenan Blaikie LLP
James	Liao	Chancellor's Professor, Department of Chemical and Biomolecular Engineering	University of California, Los Angeles
Angus	Livingstone	Managing, Director, University-Industry Liaison Office	University of British Columbia
Nigel	Lloyd	Executive Vice-President	Natural Sciences and Engineering Research Council of Canada (NSERC)
Jane	Long	Director	Lawrence Livermore National Laboratory
Jeffrey	Long	Professor, Chemistry	University of California, Berkeley
Marc	Madou	Chancellor Professor, Department of Mechanical and Aerospace Engineering and Department of Biomedical Engineering	University of California, Irvine
Susan	Marlin	Associate Vice-Principal, Research	Queen's University
John	Marrone	Director General	CANMET Energy Technology Centre
Richard	Martin	Manager, S&T International	Industry Canada
Emma	Master	Assistant Professor, Department of Chemical Engineering and Applied Chemistry	University of Toronto
Mireille	Mathieu	Vice Rector, International Relations	Université de Montréal
Stephen	McAdams	Canada Research Chair in Music Perception and Cognition	McGill University
Margaret	McCuaig-Johnston	Assistant Deputy Minister	Natural Resources Canada
Don	McLean	Dean, Faculty of Music	McGill University
Jacques	Mc Neill	Green ICT Project Coordinator	Prompt
Tim	McTiernan	Assistant Vice-President Research and Executive Director, The Innovations Group	University of Toronto
Magali	Merkx-Jacques	Research Assistant	McGill University
Ariadne	Moisan	Chief of the Western Desk	Ministry of International Relations, Government of Québec
Marie-Lucie	Morin	Former Deputy Minister, International Trade	Foreign Affairs and International Trade Canada
Heather	Munroe-Blum	Principal and Vice-Chancellor	McGill University
Patrick	Muzzi	Director	Ministry of International Relations, Government of Québec

Larry	Myer	Scientist and Energy Resources Program Leader, Geophysics Department	Lawrence Berkeley Laboratory
Michael	Oster	National Director	Cisco
Peter	Otto	Director of Music Technology, Calit2	University of California, San Diego
Pascale	Ouellet	Associate Vice-Rector, Research	Université de Montréal
Marc	Ouellette	Canada Research Chair in Antimicrobial Resistance, Professor, Microbiology	Université Laval
Joel	Palefsky	M.D., Infectious Disease Specialist, Professor	University of California, San Francisco
Guillaume	Parent		Foreign Affairs and International Trade Canada
Sandy	Pearlman	Visiting Scholar and Schulich Distinguished Chair	McGill University
Roberto	Peccei	Vice Chancellor for Research	University of California, Los Angeles
Eliot	Phillipson	M.D., President and CEO	Canada Foundation for Innovation
Andrew	Potter	Director and CEO	Vaccine and Infectious Disease Organization, University of Saskatchewan
Pierre	Prémont	Chief Executive Officer	Fonds québécois de la recherche sur la nature et les technologies (FQRNT)
Moura	Quayle	Commissioner	Pacific Coast Collaborative, Government of British Columbia
Bill	Reynen	Director, Geological Survey of Canada-Calgary	Natural Resources Canada
Bruce	Ringrose	Vice President, Business Development	ClimateCHECK Corporation
Dave	Risk	Professor, Earth Sciences	St. Francis Xavier University
John	Roston	Adjunct Professor and Director of Instructional Multimedia Services	McGill University
Jacque	Rourke	Communications Officer; Office of the Vice-Principal (Research and International Relations)	McGill University
Jo-Ann	Roux	Trade Commissioner	Foreign Affairs and International Trade Canada
Lucie	Roy	Trade Commissioner	Foreign Affairs and International Trade Canada
Rima	Rozen	Associate Vice-Principal (Research and International Relations)	McGill University
Mark	Sandstrom	President	Optimum Zone
Burnilde	Sansò	Professor, Electrical Engineering	École Polytechnique de Montréal
Rob	Seeley	Manager, Quest Venture Project	Shell Canada Energy
Kalyanasundaram	Seshadri	Professor, Professor of Chemical Engineering and Fluid Mechanics	University of California, Davis

Vicky	Sharpe	President & CEO	Sustainable Development Technology Canada (SDTC)
Jerry	Sheehan	Government Program Development	CallIT2
Sharon	Shoemaker	Executive Director, California Institute of Food and Agricultural Research	University of California, Davis
Sonya	Shorey	CCSIP Communications Strategist	Sonya Shorey Consulting
Bhagirath	Singh	Scientific Director	Canadian Institutes of Health Research (CIHR)
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John	Smiciklas	Manager, Sustainability and Corporate Responsibility	Research In Motion
Berend	Smit	Professor, Chemical Engineering	University of California, Berkeley
Don	Smith	James McGill Professor and Chair, Department of Plant Science	McGill University
John	Spence	Emeritus Researcher	Communications Research Centre Canada
Bill	St-Arnaud	Chief Scientific Officer	CANARIE
Bill	Stewart	Software Sales Specialist	IBM Canada
Lisa	Stockley	Trade Commissioner	Foreign Affairs and International Trade Canada
Dominic	Suciu	Development Lead, Infectious Diseases	CombiMatrix Corporation
Neil	Swain	Trade Commissioner	Foreign Affairs and International Trade Canada
Tom	Sweeney	Chairman	Venture Capital & Intellectual Property Working Group
Roman	Szumski	Vice-President, Life Sciences	National Research Council of Canada
Terry	Tamminen	Operating Advisor	Pegasus Capital Advisors
Martin	Tampier	Owner	ENVINT Consulting
William	Tang	Associate Dean for Research	University of California, Irvine
Genevieve	Tanguay	Acting President and CEO	Fonds de la recherche en santé du Québec
Sailesh	Thaker	Vice President, Industry & Stakeholder Relations	Sustainable Development Technology Canada
Denis	Thérien	Vice-Principal (Research and International Relations)	McGill University
Jim	Thornill	Associate Dean, Research and Medicine	University of Saskatchewan
Lorraine	Torpy	Communication Administrator, Office of the Vice-Principal (Research and International Relations)	McGill University
Tony	Valeri	Special Advisor on Research Partnerships and Internationalization	McMaster University
Teodor	Veres	Group Leader	Industrial Materials Institute, National Research Council of Canada

Julia	Walden	Director of the Visualization Design Institute	Sheridan Visualization Design Institute
Deborah	Walsh	Senior Government Relations Advisor	Chevron Canada
Marcelo	Wanderley	Associate Professor	McGill University
Brian	Ward	Associate Professor, Centre for the Study of Host Resistance	Montréal General Hospital; McGill University
Noah	Wardrip-Fruin	Assistant Professor, Computer Science	University of California, Santa Cruz
Danial D.	Wayner	Director General	Steacie Institute for Molecular Sciences, National Research Council of Canada
Thierry	Weissenburger	Consul & Senior Trade Commissioner	Foreign Affairs and International Trade Canada
Rodney	Wilson	Director, Strategic Technologies Research	Nortel
Stuart	Wilson	Vice President	International Science and technology Partnerships Canada (ISTPCanada)
Phil	Wong	Director, Projects and Quality Assurance	Sustainable Development Technology Canada (SDTC)
David	Wright	Professor, Mechanical Engineering	University of Ottawa
Robert	Wright	Senior Advisor	Office of Fossil Energy, U.S. Department of Energy

## 5.2 Letter from the Honourable Jean Charest, Premier of Québec



### **5.3 Press Release: Green IT Memorandum of Understanding**

**MEDIA RELEASE | OCTOBER 27, 2008**

#### **California, Canada campuses combat greenhouse gas emissions with green IT**

In one of the first efforts of its kind, universities in Canada and California are pledging to work together to reduce greenhouse gas emissions on their campuses while developing so-called “green cyberinfrastructure”—information technology that improves energy efficiency and reduces the impact of emissions on climate change.

A Memorandum of Understanding was signed today by the University of British Columbia (UBC), the University of California, San Diego—both sustainability leaders—and Prompt Inc., non-profit corporation that fosters research and development, building university-industry partnerships to increase the competitiveness of Quebec’s information and communications technology (ICT) sector.

The MoU signing took place at the third Summit of the Canada-California Strategic Innovation Partnership (CCSIP), held on October 27<sup>th</sup> in Montreal. “By pooling our knowledge, resources and best practices, Canada and the US will be that much more able to contribute cutting edge research on climate change,” says John Hepburn, Vice-President, Research, UBC. “Moreover, this is a critical lead role that we’re taking to reduce energy consumption and greenhouse gas emissions from computer and telecommunications technologies within campus infrastructure.”

In the near term, the institutions agreed to develop methods to share greenhouse gas (GHG) emission data in connection with International Organization for Standardization (ISO) standards for information computer and telecommunications equipment (ISO 14062), as well as baseline emission data for cyberinfrastructure and networks (ISO 14064).

“Many universities are confronting the issue of global climate change with a new focus on sustainability,” said Art Ellis, Vice Chancellor for Research at UC San Diego. “This MoU creates a unique international partnership that will examine how cyber-infrastructure can be used in research universities to create carbon-neutral environments. We are committed to sharing best practices, and working together to realize the promise of our collaboration.”

“This collaboration will enable the development of industrially-relevant methodologies and technologies with broad application across the ICT sector,” says Dr. Charles Despins, President and CEO of Prompt. “Building on our mandate,” says Dr. Despins, “we aim to facilitate university-industry partnerships that will help translate ‘green’ research results into viable new commercial opportunities for companies in Quebec, across Canada and California. The outcomes of this partnership could help stimulate the commercialization of new IT products with reduced carbon footprint, enhance the branding of ICT as a ‘clean’ sector, and influence the development of new paradigms for this industry.”

“While the carbon footprint of high performance computing has risen because of huge growth in this area, networking and trends such as virtualization offer great hope that we can also be part of the solution,” said Bill St. Arnaud, Chief Research Officer at CANARIE. “This MoU reinforces existing close links between key Canadian institutions and their counterparts in California, notably at UC San Diego, and we are hopeful that over time we will be able to extend the alliance to other universities in both countries.”

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## **BACKGROUND**

UBC is one of Canada’s leading research-intensive universities with a strong commitment to sustainability research and practice. In the 2009 Green Report Card, UBC is the only university in Canada to earn an A- and one of just 15 schools to achieve that grade. In 2006, UBC’s Vancouver campus surpassed Canada’s 2012 Kyoto Protocol targets, having reduced greenhouse gas emissions by 25 per cent over a period of 16 years.

UC San Diego is a pioneer in distributed computing platforms such as the OptIPuter and CineGrid, and recently launched GreenLight, a project to build an instrumented datacentre to measure energy savings and CO2 reductions using different server configurations and software in a real-world environment. Simultaneously, Canada’s Green-Next Generation Internet (G-NGI) program, led by Prompt to reduce global warming, is building a set of testbeds to develop the necessary protocols for testing, verifying and auditing carbon credits in compliance with ISO 14064–protocols made possible through the application of Next-generation Internet technologies.

The MoU stipulates that signatories will explore a system whereby “carbon offsets earned through a variety of GHG reduction mechanisms” would be traded between participating institutions in exchange for access to cyber-infrastructure resources, including, for example, grid computational cycles, wide area network bandwidth, other virtual services and even research funding.

### **Related Links:**

UBC Earns Top Sustainability Marks in Canada:

<http://www.publicaffairs.ubc.ca/media/releases/2008/mr-08-125.html>

California Canada Strategic Innovation Partnership: <http://www.ccsip.org/>

Prompt: <http://www.promptinc.org/>

UCSD GreenLight Project: <http://greenlight.calit2.net>– 30 –

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**5.4 Green IT Memorandum of Understanding**

**Memorandum of Understanding**  
Between  
**University of California, San Diego (UCSD)**  
And  
**University of British Columbia (UBC)**  
And  
**Prompt Inc.**

October 27, 2008  
California-Canada Summit  
Montréal, Canada

## **TITLE**

This Memorandum of Understanding is between the University of California, San Diego (**UCSD**), the University of British Columbia (**UBC**) and PROMPT Inc (**PROMPT**). It is our intent to collaborate in defining a process for sharing information and best practices in the use of university cyber-infrastructure, research networks, and Information Computer and Telecommunications (**ICT**) technologies to reduce Green House Gas (**GHG**) emissions at universities and research centers. The parties hope that this initial collaboration will provide part of the basis for longer-term initiatives such as creating the world's first carbon trading system for universities, and identifying new research and business opportunities in the multi-disciplinary field of ICT and GHG accounting. However, participation in the collaborative work described in this MOU does not bind any of the parties to participate in or contribute resources toward these or other future goals.

## **PARTIES TO THE MEMORANDUM**

The University of California, San Diego is one of the premier research universities in the United States and is committed to continued institutional leadership in the area of understanding, analyzing, and developing solutions to issues of global climate change. UCSD was recently rated 21<sup>st</sup> out of 300 colleges and universities surveyed by the Green Report Card, was the first University on the West Coast to join the Chicago Climate Exchange, and through the California Institute for Telecommunications and Information Technology, is host to the GreenLight Project for measuring climate impact of cyberinfrastructure.

The University of British Columbia (**UBC**) is one of Canada's leading research-intensive universities with a strong commitment to sustainability research and practice. In the 2009 Green Report Card, UBC is the only university in Canada to earn an A- and one of just 15 schools to achieve that grade. In 1997, UBC became Canada's first university to implement a sustainable development policy. A year later, the university opened Canada's first Sustainability Office (SO). UBC is among hundreds of leading educational institutions that signed 1990's Talloires Declaration. These institutions pledged to make sustainability the foundation for campus operations, research, and teaching.

PROMPT Inc (**PROMPT**) is both a private corporation and a non-profit organization whose efforts are supported financially by the Québec government and industry in the ICT sector. Its objective is to reinforce the Québec innovation system and increase the benefits of public investments to research. Prompt's mission is to enhance the competitiveness of companies in the ICT sector through research partnerships with universities and Québec public research centers. These research partnerships are jointly financed by the private sector, the Québec government and the government of Canada. PROMPT has recently been building a Green Next Generation Internet initiative involving a large critical mass of domestic and foreign partners. ([www.promptinc.org](http://www.promptinc.org))

## **CONTEXT**

The signatories to this agreement recognize that:

1. Global climate change is occurring and that society has a responsibility to address it;
2. Cyber-infrastructure, research networks, and information communication technologies are critical tools in helping North American universities and research centers reduce their GHG emissions;
3. Many universities throughout North America are moving toward carbon-neutral strategies either on a voluntary basis, or as part of a government mandate; and
4. UCSD, UBC and PROMPT wish to further promote their respective objectives by providing for appropriate collaborations and interconnections between their researchers, public sector organizations, and industry partners.

## **AGREEMENT**

Therefore, UCSD, UBC and PROMPT agree as follows:

1. To explore and share best practices in reducing GHG emissions at their respective institutions and more specifically to develop methods to share GHG emission data for ICT equipment (ISO 14062) and baseline emission data for cyber-infrastructure and networks as per ISO 14064, either through a common registry or other means.
2. To strategically engage the appropriate national organizations in their respective countries toward securing resources that will support various instruments and test beds - such as UCSD's "GreenLight Project" and PROMPT's G-NGI - to enable measurement of ISO 14062 life cycle and ISO 14064 project baseline emission data.
3. To work with national funding bodies in their respective countries for the establishment of cyber-infrastructure programs to explore carbon reduction strategies enabled, either directly or indirectly, by new network and distributed computing architectures such as PROMPT G-NGI, OptiPuter and CineGrid.
4. To collaborate with appropriate wide area research networks to explore methodologies and architectures to decrease GHG emissions, including options such as relocation of resources to renewable energy sites, virtualization, etc.
5. To explore the potential for "virtual" carbon trading systems, whereby carbon offsets earned through a variety of GHG reduction mechanisms are traded between participating institutions in exchange for access to cyber-infrastructure resources (grid computational cycles, wide area network bandwidth, research funding and/or other virtual services.)
6. To explore the creation of a multi-sector pilot of a generalized carbon trading system including stakeholders from government, industry, and universities.
7. To collaborate with each other and with government agencies and departments and other organizations in their respective countries to promote and encourage other universities, institutions and organizations such as EDUCAUSE, CENIC, Compute Canada, CANARIE, and CUCCIO to be additional signatories to this Memorandum of Understanding.

### **Agreed to By:**

Dated at \_\_\_\_\_, this \_\_\_\_\_ day of \_\_\_\_\_, 2008.

For the UNIVERSITY of CALIFORNIA, San Diego (UCSD)

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Arthur B. Ellis

Vice Chancellor - Research , University of California, San Diego  
For University of British Columbia.

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Ted Dodds

Chief Information Officer  
For PROMPT Inc.

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Charles Despins

President & CEO

## 5.5 Press Release: CCSIP Call for Proposals



### **The Canada-California Strategic Innovation Partnership (CCSIP) Launches First Call for Proposals with ISTPCanada and the University of California**

#### **Canadian and Californian Universities Commit \$2 Million to Stimulate Groundbreaking Approaches for Bilateral R&D Collaboration**

OTTAWA, Ontario, and LOS ANGELES, California, December 10, 2008—The Canada-California Strategic Innovation Partnership (CCSIP), a catalyst for collaborative Research, Development and Delivery (RD&D) between two innovation-intensive jurisdictions, today announced its first Call for Proposals (CFP).

The University of California and Canadian universities have committed \$2 million to stimulate the analysis and development of groundbreaking approaches for bilateral R&D collaboration. These co-operative models will be novel, in that they will aim to capitalize on the complementarities that are unique to Canada and California. Such approaches include the establishment of bilateral R&D consortia, the structuring of Canada-California Centres of Excellence, and the creation of new working relations between university systems, in addition to other collaborations.

The CFP will be managed by International Science and Technology Partnerships Canada Inc. (ISTPCanada) and the University of California Office of the President (UCOP). It will invite innovators from academia, industry and government to propose bilateral approaches that build on complementary strengths, address common challenges and recommend novel solutions with strong commercialization potential in areas such as: Carbon Capture and Sequestration, Green IT, Infectious Diseases, Next-generation Digital Media and Sustainable Biofuels.

The CCSIP Steering Committee will select the winning proposals by spring 2009. The Committee aims to recommend funding for a minimum of six strategic round tables, workshops or other activities that enable the development of bilateral proposals; and six detailed business plans that could be presented to potential investors. As per previous CCSIP-stimulated initiatives, the outcomes of these projects are expected to attract investment from public and private funders. For example, the Cancer Stem Cell Consortium, a concept initially proposed at the inaugural CCSIP Summit in January 2006, garnered a \$100 million commitment from Canada earlier this year.

“This Call presents a great opportunity for Canadian academic and industrial researchers to contribute to, and benefit from one of the greatest innovation engines in the world,” said Dr. Henri Rothschild, President of ISTPCanada. “Consistent with the objectives of CCSIP, it will lead to greater entrepreneurialism, and the pursuit of higher-risk, higher-return RD&D projects that will

deliver economic and social benefits within and beyond our borders. This is particularly important for Canada, as we strengthen our position as a strong global innovation partner. This Call for Proposals is really a call for leadership. Canada and California will respond, and establish a model for other strategic innovation partnerships.”

“The University of California is proud to allocate \$1 million to CCSIP’s first Call for Proposals. This investment will initiate promising, multi-campus and multi-disciplinary projects to strengthen research, development and delivery collaboration between California and Canada,” said Dr. Steven Beckwith, Vice President of Research and Graduate Studies, University of California. “These bilateral activities enhance the capability of our professors and research leaders, and accelerate the development of promising, young innovators who routinely emerge from our university and shape the future of California – and our world. More broadly, they support the development of new international partnership to increase our future research collaborations with other nations.”

CCSIP will officially launch the Request for Proposals by mid-December, 2008.

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### **About CCSIP**

The Canada-California Strategic Innovation Partnership (CCSIP) is a catalyst for collaborative Research, Development and Delivery (RD&D) between two innovation-intensive jurisdictions: California, one of the most dynamic innovation engines on earth; and Canada, a leading country in university research intensity. Drawing on an entrepreneurial and informal process of cooperation, CCSIP is a bilateral collaboration initiative that aims to capitalize on the complementary strengths of Canada and California, and to build on a well-established trade relationship valued at over \$38 billion in 2007.

With leadership from a highly respected bilateral Steering Committee, and participation from universities, companies and governments on both sides of the border, CCSIP stimulates the:

- Development of new models of collaboration between Canada and California that leverage key research capabilities, address common priorities, and accelerate the delivery of research results; and
- Launch of revolutionary RD&D projects that aim to bring new products and services to market, and deliver economic and social benefits to citizens in both jurisdictions

Additional information is available at: [www.ccsip.org](http://www.ccsip.org)

### **About ISTPCanada**

As global technology partnerships become increasingly important in trade and economic relations between countries, these partnerships become strategic components of those relations. International Science and Technology Partnerships Canada Inc. (ISTPCanada) was incorporated with the primary objective to deliver the S&T cooperation agreements between Canada and its key trading partners, including India, China Brazil and Israel. The organization aims to strengthen Canada’s science and technology (S&T), business to business relations and ultimately overall economic, trade and

political relations. ISTPCanada fosters and supports the development of research partnerships for Canadian companies and research organizations with international counterparts, with an emphasis on research and development. In all of its programs, ISTPCanada strongly encourages the participation of Canadian universities through enhanced university-industry cooperation.

ISTPCanada's raison d'être is to make Canadian firms more globally competitive through internal alliances with academia and the increased use of international research-based projects. Additional information is available at: [www.istpcanada.ca](http://www.istpcanada.ca)

### **About the University of California**

The University of California is the largest system for higher education in the United States. Recognized worldwide for its academic distinction, it includes more than 220,000 students, 170,000 faculty and staff, and an \$18 billion annual budget at its 10 campuses at Berkeley, Davis, Irvine, Los Angeles, Merced, Riverside, San Diego, San Francisco, Santa Cruz and Santa Barbara. The university offers programs in more than 150 disciplines, many of which are ranked among the top 10 nationally, and for the last 12 years has generated more patents than any other university in the nation. UC's five medical centers support the clinical teaching programs of the university's medical and health sciences schools and handle more than three million patient visits each year. The UC system also is involved in managing the U.S. Department of Energy national laboratories at Berkeley, Livermore and Los Alamos. Additional information is available at: [www.universityofcalifornia.edu/](http://www.universityofcalifornia.edu/)

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