

Welcome from the Director

I am very pleased to welcome all of you to the 2nd Annual Biorefining Conversions Network (BCN) Strategic Retreat. Thank you for taking the time to join us in this incredibly picturesque world heritage site for what I'm confident will be a very informative and productive event. We are poised to build on the momentum of last year's retreat in Jasper, which brought together representatives from government, academia, and industry, spanning the forestry, agriculture, and energy sectors. Together we developed research initiatives that have helped shape our strategic direction over the past year.

For the 2010 retreat we have refined our focus to develop advanced biomass conversion technologies to produce "drop-in" chemicals and fuels compatible with both traditional and emerging industries. We have again gathered leaders from various academic backgrounds and government ministries and have seen enhanced industry interest and participation. We appreciate your willingness to participate because your contributions and insights are critical to the success of this meeting and the future growth of Alberta's bioindustrial sector. My sincere thanks goes out to our esteemed speakers and panellists for agreeing to share their knowledge and expertise with us.

Our primary goal is to build research programs focused on developing innovative biomass conversion technologies that capitalize on Alberta's unique strengths and resources. During the retreat we will identify the biomass opportunities in Alberta, highlight the role of the BCN in supporting research aimed at developing biomass conversion technologies, and engage industry to help steer this sector towards a robust and sustainable future. We are excited to showcase the initial progress of the current BCN research projects while providing a stimulating environment where new partnerships and research initiatives are sure to emerge. I also hope that you will join me in supporting the next generation of talented researchers by attending the graduate student/post-doc competition that will precede the industry panel discussions on Tuesday morning.

I trust that you will find this retreat to be an excellent forum for networking and look forward to visiting with all of you over the next couple of days.

Once again, welcome and thank you for your participation!

Sincerely,

David C. Bressler Director, Biorefining Conversions Network



ALBERTA ADVANCED EDUCATION AND TECHNOLOGY

> Deputy Premier Office of the Minister

Message from the Deputy Premier and Minister of Advanced Education and Technology

Welcome to the second annual Biorefining Conversions Network Strategic Retreat, "Refining Technology for Biomass Conversion: Conventional Products through Unconventional Approaches." In only a short time, the Biorefining Conversions Network has established itself nationally and internationally as a valuable resource for advancing innovation in Alberta's bioindustrial sector.

This year's retreat focuses on developing research in the area of biorefining and biomass conversion, which will play an even greater role in both the energy equation and the renewable chemical industry.

Sustainability is the key to a strong and resilient economy. With our impressive, renewable biomass resources and innovative people and companies, Alberta is poised to take a leading role as a provider of products and solutions. Moreover, as the Biorefining Conversions Network guides efforts towards the development of technologies for production of chemicals made from renewable biomass, network members will be able to tap into our province's existing wealth of expertise in engineering and natural sciences.

As a part of the Alberta Innovates system for innovation, the Biorefining Conversions Network supports the principle of open innovation to leverage knowledge and research infrastructure to speed new products to market.

I'd like to offer my congratulations to the Biorefining Conversions Network on their efforts to leverage our province's public and industry-based research infrastructure in an open innovation environment to benefit all Albertans. I wish all delegates an informative and productive meeting.

Deputy Premier and Minister

berta

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Welcome to the University of Alberta!

I am pleased to welcome you all to the Second Annual Biorefining Conversions Network (BCN) Strategic Retreat, "Refining Technology for Biomass Conversion: Conventional Products through Unconventional Approaches". I am excited by the partnerships that have been created through the BCN between researchers and industry to bring biomass conversion technologies to market.

With Alberta's economy, natural resources and world-class research centres, it is important that the province and the University of Alberta take a leadership role in the development of a strong bio-industrial sector. We are making progress in our goal to develop Alberta into a global bioindustry power and I am confident that this year's event will build on the success of last year's retreat. I hope that you will be able to take advantage of the excellent networking opportunities that this retreat offers and meet new colleagues to share information and potentially build new partnerships and collaborations.

Please accept my best wishes for an enjoyable and productive BCN Strategic Retreat.

Yours sincerely,

Indira V. Samarasekera, O.C. President and Vice-Chancellor



SECOND ANNUAL BIOREFINING CONVERSIONS NETWORK STRATEGIC RETREAT

Refining Technology for Biomass Conversion: Conventional Products through Unconventional Approaches

November 7-9, 2010 Fairmont Chateau Lake Louise Lake Louise, Alberta, Canada

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ACKNOWLEDGEMENTS.

The BCN management committee would like to thank the following people and organizations for making this event possible:

Our primary event sponsor for providing funding for this event



• Our other event sponsors and supporting organizations

Platinum



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Gold



NSERC's role is to make investments in people, discovery and innovation for the benefit of all Canadians. We invest in people by supporting 26,500 university students and postdoctoral fellows in their advanced studies. We promote discovery by funding nearly 11,800 university professors every year and we help make innovation happen by encouraging about 1,400 Canadian companies to invest in university research and training. Over the last ten years, NSERC has invested more than \$7 billion in basic research, university-industry projects, and the training of Canada's next generation of scientists and engineers.





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- All of our speakers, panellists, and moderators for agreeing to participate in this event and for sharing their knowledge and expertise
- Our many event volunteers for their time and assistance helping the retreat run as smoothly as possible
- The Fairmont Chateau Lake Louise staff for their event coordination support, willingness to accommodate, and attention to detail



RETREAT PURPOSE AND OBJECTIVES.

History

The theme for the BCN's inaugural meeting held in November 2009 in Jasper, AB was "Defining Technology Development Initiatives in Alberta's Bioindustry". The goal of the retreat was to create awareness for the BCN and Alberta's bioindustrial sector by bringing together industry, academia, and government representatives who will play a critical role in Alberta's burgeoning bioindustry from different sectors including oil and gas, petrochemical, forestry, and agriculture. The outcomes of this meeting were extremely positive and the BCN was successful in establishing itself as a key network in the area of biomass conversion as well as linking together researchers with industry and government partners.

Refined Vision

The 2010 BCN retreat, titled "Refining Technology for Biomass Conversions, Conventional Products through Unconventional Approaches" will build on the momentum generated in 2009 and explore opportunities to develop novel biomass conversion technologies to produce renewable fuels and chemicals. Keeping with the BCN's multidisciplinary approach, different conversion platforms will be discussed with a focus on an integrated biorefinery approach. The retreat will highlight the BCN's refined vision "To develop advanced technologies to convert biomass into "drop-in" chemicals and fuels compatible with both traditional and emerging industries." The advantages of developing chemicals and fuels that are compatible with current infrastructure is that they can be easily integrated or "dropped-in" to existing processes with minimal or no modification to existing equipment or procedures. This is very appealing to the oil and gas and petrochemical sectors that already have significant capital investment in extensive processing and distribution infrastructure and is also very relevant to Alberta.

Program Format & Objectives

The overarching goal of the retreat is to build research programs that will support the advancement of Alberta's bioindustrial sector within the BCN's mandate. The BCN is pleased to welcome Honourable Doug Horner, Deputy Premier of Alberta and Minister of Advanced Education and Technology to open this year's retreat. The participation of the Deputy Premier highlights the province's interest in supporting the BCN's vision of a robust bioindustrial sector. The technical program will support this goal through oral presentations, a poster session profiling all BCN projects, industry panels, strategic breakout sessions, and a graduate student and post-doc competition. In addition to the formal program, there will be ample opportunity for networking during the receptions, meals, and breaks.



Day 1 of the retreat will consist of four main sessions. In the first session, opportunities in the bioindustrial sector including an overview of technology and biomass inventory within Alberta will be discussed. The second session will include presentations by the network theme leads who will explore future research opportunities within their themes: chemical conversions, biological conversions, thermal conversions, and biomass pre-processing. These presentations will highlight the BCN's research capacity with emphasis on the BCN's refined vision of developing drop-in chemicals. The latter half of day 1 will focus on current BCN projects. Three BCN projects that align well with the refined vision and are advancing towards commercialization were selected to be featured through oral presentations. All BCN projects will be profiled in the poster session where project PI's will present their project and be available for discussion.

Day 2 of the retreat will include three industry panels that will discuss the current R&D challenges associated with bioindustrial technology commercialization in Alberta. These panels will be followed by breakout sessions aimed at building bioindustrial research programs. More information about the format and goals the breakout sessions can be found on pages 5 and 6. Prior to the industry panels, the BCN will host an exciting student competition that will feature some of the graduate students and post doctoral fellows working on BCN projects. The competition will include a uniquely formatted five minute "investment pitch" on their research. All those who are able attend the session are encouraged come out and support the next generation of innovative researchers.



BREAKOUT SESSIONS. Building Bioindustrial Research Programs Tuesday, November 9, 2010 1:30-3:45 pm

Purpose and Objectives

Four concurrent breakout sessions will be held on the afternoon of Tuesday November 9, 2010. The key objectives of these breakout sessions will be to:

- Identify target research areas in the Alberta bioindustrial space that align with the BCN's vision and core research themes and address current industry-relevant R&D barriers
- Begin to develop collaborative research programs around these target research areas

The breakout sessions are open to all conference attendees that have an active interest in developing bioindustrial partnerships and research programs in Alberta. Those interested in exploring these opportunities through meaningful and productive discussion are encouraged to attend these sessions. Development of successful research programs requires input from all industry sectors as well as academia, industry, government, and funding agencies. The intent of the industry panels prior to the breakout sessions is to discuss current technical barriers to bioindustrial commercialization. These panels will provide good insight into what research areas are needed by industry to commercialize bioindustrial conversion technologies and provide initial discussion points for the breakout sessions.

Outcomes of the breakout sessions will include identification of target research areas and an assessment of the strengths and weaknesses of each, key players in the bioindustrial sector and their role in the Alberta context, existing research capacity and resources that can be leveraged, what metric define successful program outcomes for all partners, given the diversity of potential stakeholders.

Format

The themes of the four breakout sessions will mirror the core research themes in the BCN: biomass pre-processing, chemical conversions, biological conversions, and thermal conversions. Each session will be 1.5 hours in length and will be moderated by the corresponding BCN theme lead. Following the sessions, attendees will reconvene for a 30 minute plenary session to allow the moderators to present a brief overview of their themes outcomes and conclusions. This will give an opportunity to identify potential collaborative opportunities across the different themes. A guideline for the breakout discussions is presented on the following page.



BREAKOUT SESSIONS. Building Bioindustrial Research Programs Tuesday, November 9, 2010 1:30-3:45 pm

Guidelines for Discussion





Retreat Agenda.

Sunday November 7,	2010			
5:00pm – 8:00pm	Registration Open			
7:00pm – 9:00pm	Welcome Reception (Sunroom)*			
Monday November 8	, 2010			
7:30am – 12:00pm	Registration Open			
7:30 am – 8:45am	BREAKFAST (Tom Wilson Room)			
9:00am - 9:30am	WELCOME & OPENING REMARKS			
7.00am - 7.30am	Mount Temple Rooms A&B			
9:00am - 9:10am	Dr. David Bressler			
	Dr. Ellen MacDonald			
9:10am - 9:15am University of Alberta				
	Honourable Doug Horner			
9:15am - 9:30am	Deputy Premier, Government of Alberta			
	Minister, Advanced Education and Technology			
9.20am_11.45am	SESSION A. OPPORTUNITIES IN ALBERTA'S BIO-INDUSTRIAL SECTOR			
7.30am-11.43am	Mount Temple Rooms A&B			
	Keynote 1. Conversion Technology - A Sector Overview			
9:30am – 10:15am	Tim Haia			
	Chief Executive Officer, BIOX			
10:15am – 10:45am	ENERGY BREAK (Heritage Hall)			
	Keynote 2. Alberta's Agricultural Resource			
10.45am - 11.15am	Trevor Kloeck			
	Leader Biomaterials Development, Alberta Biomaterials Development Center			
	Alberta Agriculture, Food and Rural Development			
11:15am – 11:45am	Dr. Amit Kumar			
	Assistant Professor, Mechanical Engineering, University of Alberta			
	SESSION B. THE FUTURE OF BIOMASS CONVERSION TECHNOLOGY			
11:45am – 3:00pm	Production of "drop-in" biochemicals and biofuels: Perspectives from the BCN theme leads			
	Chair: Kelly Maher (Assistant Director, BCN)			
	Biomass Pre-processing			
11:45am – 12:15pm	Theme Lead, Biomass Pre-processing			
	Assistant Professor, Mechanical Engineering, University of Alberta			
12:15pm – 1:15pm	LUNCH (Tom Wilson Room)			
	Biological Conversions			
1:30pm – 2:00pm	Dr. Mike Ellison			
	Theme Lead, Biological Conversions			
2:00pm – 2:30pm	Dr. Fred West			
	Theme Lead, Chemical Conversions			
	Professor, Chemistry, University of Alberta			
	Thermal Conversions			
2:30pm – 2:50pm	Director Biorefining Conversions Network			
	Associate Professor, Agriculture, Food, and Nutritional Science, University of Alberta			
	Associate Professor, Agriculture, Food, and Nutritional Science, University of Alberta			



NSERC support for research collaborations				
2:50pm – 3:00pm	Irene Mikawoz, PEng			
	Manager, Prairies Regional Office, NSERC			
3:00pm – 3:30pm	ENERGY BREAK (Heritage Hall)			
	SESSION C. CUTTING-EDGE TECHNOLOGIES: FEATURED RESEARCH PROJECTS			
3:30pm – 5:10pm	Chair: Ange Scott (Research Manager, BCN)			
	Mount temple Rooms Add			
	Synblo for development of a folerant bacterial chassis for solvent production Dr. loel Weiner			
2.20.5.55	Professor, Biochemistry, University of Alberta			
3:30pm – 4:10pm	Metabolic engineering of yeast for the production of long chain alcohol biofuels			
	Dr. David Stuart			
	Biochemistry, University of Alberta			
1:10pm 1:40pm	A biomass route to dimethyl ether Dr. Pabart Hawas			
4.10pm - 4.40pm	Chemical and Materials Engineering, University of Alberta			
	Pyrolysis of triglycerides			
4:40pm – 5:10pm	Dr. David Bressler			
	Associate Professor, Agriculture, Food, and Nutritional Science, University of Alberta			
	SESSION D. THE BCN RESEARCH PORTFOLIO			
5:30pm – 7:00pm	Victoria Ballroom			
	Poster reception featuring BCN research projects*			
7:00pm – 10:00pm	BANQUET DINNER (Victoria Ballroom)**			
Tuesday November 9	, 2010			
7:00am – 8:30am	BREAKFAST (Tom Wilson Room)			
7:30am – 9:00am	Graduate Student & Post-doc Competition (Mount Temple Rooms A&B)			
	SESSION E. INDUSTRY PANELS			
9:15am 12:15am	Overcoming technological barriers in the bioindustrial sector through innovative research			
7.15am – 12.15am	Chair: Dr. David Bressler (Director, BCN)			
	Mount Temple Rooms A&B			
	Panel A. Feedstock			
	MODERATOR			
	Norm Dreger			
	Head of Business Development, Syngenta Crop Protection Canada			
	PANELLISTS			
9:15am – 10:05am	Bob Winship			
	Business Development Manager, weyernaeuser Stephen Sulz			
	Director of Production, ALPAC			
	Leo Meyer Board Mombor Loo Mover Grain Braduction			
	Gary Smith			
	Technical Director, Alberta Newsprint			
10:05am – 10:25am	ENERGY BREAK (Heritage Hall)			



	Panel B. Biochemicals
	MODERATOR Dr. Manfred Kircher Chairman, CLIB ²⁰²¹
10:25am – 11:15am	PANELLISTS Dr. Stewart Campbell President, SJC Investments Dr. Paul Clark Senior Affiliate, Ian Murray & Company Ltd.
	Dr. Tim Eggeman
	Founder and Chief Technology Officer, ZeaChem Inc.
	MODERATOR Dr. Stan Blade CEO, Alberta Innovates Biosolutions
11:25am – 12:15pm	PANELLISTS Dr. Hugh McLaughlin Director of Biocarbon Research, Alterna Biocarbon Inc. Dr. Rob Broin Chairman & CTO, Otoka Dr. Charles Wyman Co-founder, Chief Development Officer, Chair of Scientific Advisory Board , Mascoma
	Robert (Bob) A. Cooper, PEng Supply Projects Lead, Shell Canada Products
12:15pm – 1:15pm	LUNCH (Tom Wilson Room) Closing Remarks
1:30pm – 3:45pm	SESSION F. BCN STRATEGIC WORKSHOP
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1:30pm – 3:45pm 1:30pm – 3:00pm	SESSION F. BCN STRATEGIC WORKSHOP Strategic Breakout Sessions Biomass Pre-processing – Mollison Room MODERATOR Dr. Amit Kumar Assistant Professor, Mechanical Engineering, University of Alberta Biological Conversions – Beehive Room MODERATOR Dr. Mike Ellison Professor, Biochemistry, University of Alberta
1:30pm – 3:45pm 1:30pm – 3:00pm	SESSION F. BCN STRATEGIC WORKSHOP Strategic Breakout Sessions Biomass Pre-processing – Mollison Room MODERATOR Dr. Amit Kumar Assistant Professor, Mechanical Engineering, University of Alberta Biological Conversions – Beehive Room MODERATOR Dr. Mike Ellison Professor, Biochemistry, University of Alberta Chemical Conversions – Lakeshore Room MODERATOR Dr. Fred West Professor, Chemistry, University of Alberta
1:30pm – 3:45pm 1:30pm – 3:00pm	SESSION F. BCN STRATEGIC WORKSHOP Strategic Breakout Sessions Biomass Pre-processing – Mollison Room MODERATOR Dr. Amit Kumar Assistant Professor, Mechanical Engineering, University of Alberta Biological Conversions – Beehive Room MODERATOR Dr. Mike Ellison Professor, Biochemistry, University of Alberta Chemical Conversions – Lakeshore Room MODERATOR Dr. Fred West Professor, Chemistry, University of Alberta Thermal Conversions – Parker Room MODERATOR Dr. Greg Dechaine Assistant Professor, Chemical & Materials Engineering, University of Alberta

*A cash bar will be available at the Welcome Reception and Poster Reception and three complimentary drink tickets will be provided to each delegate for use at either of the two receptions

**Wine will be served at tables and a cash bar will be available at the Banquet Dinner

***More details on the strategic breakout sessions included on pages 5 and 6



BCN MANAGEMENT.

DAVID C. BRESSLER

DIRECTOR, BIOREFINING CONVERSIONS NETWORK ASSOCIATE PROFESSOR, DEPARTMENT OF AGRICULTURAL, FOOD AND NUTRITIONAL SCIENCE FACULTY OF AGRICULTURAL, LIFE AND ENVIRONMENTAL SCIENCES, UNIVERSITY OF ALBERTA



Dr. David Bressler is the Director of the BCN and the principal investigator on 4 BCN research projects spanning the Biological, Chemical, and Thermal Conversions themes. He is also a collaborator on 6 BCN research projects. Dr. Bressler earned his Ph.D. in Microbiology and Cell Biotechnology from the University of Alberta. He is jointly appointed with the Faculty of Agricultural, Life & Environmental Sciences where he is an Associate Professor, and the Bio-Industrial Technologies Division of Alberta Agriculture and Rural Development.

Dr. Bressler's general area of research is the industrial application of chemical, thermal, and biological systems for the catalytic conversion of conventional agricultural products to platform chemicals, fuels, and value-added commodities. The recognition of novel mechanisms and the optimization of catalytic biochemical pathways are of special interest.

His research program is unique in that it utilizes a multidisciplinary approach combining industrial microbiology, biotechnology, and analytical chemistry with previous experience in petrochemical conversions and upgrading in conjunction with scale-up and engineering support by the Bio-Industrial Technologies Division of Alberta Agriculture and Rural Development. Much of the biological work involves production, modification, purification, and design of biocatalytic systems.

As Director of the BCN, Dr. Bressler is a strong advocate for taking an integrated, multidisciplinary approach to developing novel, commercializable technologies that will cultivate Alberta's bioindustrial sector.

KELLY MAHER

ASSISTANT DIRECTOR, BIOREFINING CONVERSIONS NETWORK UNIVERSITY OF ALBERTA



Kelly Maher earned her B.Sc. in Chemical Engineering and M.Sc. in Bioresource Engineering from the University of Alberta. Her thesis focussed on hightemperature conversion of lipid feedstock for the production of hydrocarbonbased biofuels and other platform chemicals. From 2007-2008 Kelly worked as the Assistant Director of Engineering for Canadian Bioenergy where she was responsible for managing all aspects of the development of a global scale biodiesel facility in BC. Kelly returned to Alberta in 2009 where she accepted the position of Assistant Director of the BCN. Her responsibilities include strategic, extension, and political management of the BCN, identification of research and development funding opportunities, and preparation of collaborative agreements and proposals.



ANGE SCOTT RESEARCH MANAGER, BIOREFINING CONVERSIONS NETWORK UNIVERSITY OF ALBERTA



Ange Scott earned her B.Sc. in Microbiology (Honors) and M.Sc. in Microbiology and Biotechnology from the University of Alberta (U of A). Her graduate thesis focused on characterization of toxic compounds present in oil sands processaffected waters and examination of various chemical and biological remediation options. Ange continued working in this area as a senior technologist and consultant after completing her graduate studies before transitioning to a role in the Faculty of Agriculture, Life & Environmental Sciences at the U of A. She was originally recruited as Manager of the Biorefining Conversions and Fermentations Laboratory under the leadership of Dr. David Bressler and concurrently conducted research on novel pathways to biobutanol as part of a collaboration between Dr.

Bressler and Dr. Mike Ellison (Department of Biochemistry, U of A). In July 2009 she accepted the position of Research Manager of the BCN. In this role Ange oversees public, academic, government and industry relations within the BCN. She also handles key communications, project management, and the daily business functions of the network.

JANINE ROBIN

ADMINISTRATIVE ASSISTANT, BIOREFINING CONVERSIONS NETWORK UNIVERSITY OF ALBERTA



Janine Robin earned her Business Administration Management Diploma from the Northern Alberta Institute of Technology and is continuing her education part-time at the University of Alberta. Janine joined the BCN as an administrative assistant in January 2010. Her responsibilities include providing administrative support to the BCN, including helping to plan and organize BCN-hosted conferences, such as the Annual BCN Strategic Retreat, general clerical, and project administration. Janine projects a professional image for the network through in-person and phone interaction.



BCN THEME LEADS.

AMIT KUMAR

THEME LEAD BIOMASS PRE-PROCESSING PROJECTS DEPARTMENT OF MECHANICAL ENGINEERING FACULTY OF ENGINEERING, UNIVERSITY OF ALBERTA



Dr. Amit Kumar leads the Biomass Pre-processing theme of the BCN and is an Assistant Professor in the Department of Mechanical Engineering at the University of Alberta. He received an M.Eng. from the Asian Institute of Technology (Thailand) in energy technology, and a B.Sc. in Energy Engineering from the Indian Institute of Technology, India. Dr. Kumar earned his Ph.D. in Mechanical Engineering from the University of Alberta after completing his doctoral research in the area of utilization of biomass for power and liquid fuels. Dr. Kumar's current research interests include techno-economic assessment of bioenergy systems including biopower and biofuels, large scale biomass transport and logistics such

as pipeline transport, simulation and modeling of biomass feedstock supply systems, greenhouse gas mitigation, and energy forecasting and planning. He has extensive experience in biomass energy studies and is widely published in the area of bioenergy and biofuels.

Dr. Kumar is currently working on a range of projects funded by various provincial and national agencies, industrial partners such as Weyerhaeuser and Highmark Renewables Inc., international

partners such as Cluster Industrielle Biotechnologie (CLIB²⁰²¹) (a consortium of more than 60 companies based in Germany), and the Town of Drayton Valley, Alberta. He serves as the Associate Editor of the Canadian Biosystems Engineering Journal and has established the Sustainable Energy Research Laboratory in the Dept. of Mechanical Engineering at the University of Alberta.



MICHAEL ELLISON THEME LEAD BIOLOGY PROJECTS DEPARTMENT OF BIOCHEMISTRY FACULTY OF MEDICINE AND DENTISTRY, UNIVERSITY OF ALBERTA



Dr. Michael Ellison leads the Biological Conversions theme of the BCN and is a professor in the Department of Biochemistry at the University of Alberta. Dr. Ellison received his Ph.D. from the University of Toronto in 1983 for research focussed on chromosome structure. He spent the next six years at MIT developing accurate computational approaches for predicting the physical behaviour of biomacromolecules. There his interests shifted toward understanding the ubiquitin system, an important cellular signalling pathway that formed the core of his research program at the University of Alberta from 1990 to 2003.

Dr. Ellison's current focus is on synthetic biology, an emerging discipline that sits at the interface between biology and engineering. The goal of this new filed is to produce modular biological circuits of increasing sophistication using well-understood molecular components that can be reliably assembled into novel and useful forms of artificial life. As the BCN's Biological Conversions theme lead, his current efforts are directed toward the creation of microbial systems with the capacity to produce high value chemical feedstocks from provincially available sources of biomass.

Dr. Ellison continues to be a strong advocate for innovative science. He has served on the boards of Genome Prairie, the Alberta network for Proteomic Innovation, and has played a major role in bringing new technologies to the University of Alberta through two multi-million dollar investments from the Canada Foundation for Innovation. He is also actively engaged in the dissemination of synthetic biology to undergraduates with his involvement in iGEM, a student research competition held annually at MIT.

Department of Biochemistry Faculty of Medicine & Dentistry, University of Alberta



FRED G. WEST THEME LEAD CHEMICAL PROJECTS DEPARTMENT OF CHEMISTRY FACULTY OF SCIENCE, UNIVERSITY OF ALBERTA



Dr. Fred West leads the Chemical Conversions theme of the BCN. He was born and raised in southern Arizona and received his undergraduate training (Chemistry with Honors and Summa cum Laude) at the University of Arizona in Tucson. While there he conducted research with Victor Hruby on conformationally restricted analogues of the peptide hormone oxytocin, and developed one of the first HPLC-based methods for amino acid analysis of peptide hydrolysates. Dr. West then moved to Madison, Wisconsin where he was an NSF Predoctoral Fellow at the University of Wisconsin in the labs of Professor Edwin Vedejs. His doctoral research concerned the generation of nonstabilized azomethine ylides using desilylation methods for application to the synthesis of pyrrolizidine alkaloids. He spent two

years at Columbia University as an NIH Postdoctoral Fellow with Professor Gilbert Stork, working on radical cyclization-based approaches to the cardenolides.

Dr. West began his independent career at the University of Utah in 1988. Initially, his program focussed on the use of pyran-4-one photochemistry for the rapid assembly of complex polycyclic skeletons, and the Stevens rearrangement of metallocarbene-derived ylides. Subsequent areas of interest have included the Nazarov cyclization, taxane synthesis and bioconjugate chemistry. In 2002, Dr. West moved to the University of Alberta where he is currently Professor of Chemistry and Chair of the Organic Division.

SCIENCE University of Alberta

MURRAY GRAY THEME LEAD THERMAL PROJECTS DEPARTMENT OF CHEMICAL AND MATERIALS ENGINEERING FACULTY OF ENGINEERING, UNIVERSITY OF ALBERTA



Dr. Murray Gray leads the Thermal Conversions theme of the BCN. He obtained his Ph.D. in Chemical Engineering from the California Institute of Technology in 1984 and also holds an M.Eng. in Chemical Engineering from the University of Calgary (1980). Dr. Gray has been with the University of Alberta since 1983 where he has held a number of senior academic positions including Chair of the Department of Chemical Engineering and Dean of Graduate Studies & Research.

Dr. Gray is currently Director of the Imperial Oil – Alberta Ingenuity Centre for Oil Sand Innovation. With over 22 years of experience in kinetics and reaction

engineering, Dr. Gray has focussed on bitumen and heavy oil upgrading and bioprocessing. His achievements have been recognized by the Canadian Society for Chemical Engineering (CSChE) Syncrude Innovation Award (1996), the Syncrude/NSERC Industrial Research Chair in Advanced Upgrading and Bitumen (2000), the Industrial Practice Award of the CSChE (2003), and the Frank Spragins Technical Award from APEGGA (2007). In 2005 he was elected a Fellow of the Canadian Academy of Engineering. In 2006 he was awarded a Canada Research Chair and an NSERC Industrial Research Chair in Oil Sands Upgrading. He has served the national and international

engineering and science communities in many roles, including national President of the Canadian Society for Chemical Engineering and Chair of the NSERC Chemical/Metallurgical Engineering Grant Selection Committee.



SPEAKERS.

ELLEN MACDONALD

ASSOCIATE DEAN/RESEARCH

FACULTY OF AGRICULTURAL, LIFE & ENVIRONMENTAL SCIENCES



Ellen Macdonald is a Professor of Forest Ecology in the Department of Renewable Resources and Associate Dean (Research and Graduate Studies) in the Faculty of Agricultural, Life & Environmental Sciences at the University of Alberta. Ellen completed her BSc in Environmental Biology and Ph.D. in Plant Ecology at the University of Calgary and then immediately joined the then Department of Forest Sciences at the University of Alberta as a Postdoctoral Fellow. She was appointed as an Assistant Professor one year later. Ellen's research focuses on regeneration and successional dynamics of northern forests and impacts of natural and anthropogenic disturbance on northern plant communities, with a particular focus on forest understory plant communities.



HONORABLE DOUG HORNER

DEPUTY PREMIER AND MINISTER OF ADVANCED EDUCATION & TECHNOLOGY GOVERNMENT OF ALBERTA



Doug Horner was elected to his third term as a Member of the Legislative Assembly for Spruce Grove-Sturgeon-St. Albert on March 3, 2008, and currently serves as Deputy Premier, Minister of Advanced Education and Technology, and Minister Liaison to the Canadian Forces. During his second term he also served as Minister of Advanced Education and Technology and Minister of Agriculture, Food and Rural Development. Additionally, he served as vice-chair of the Agenda and Priorities Committee and is a member of the Treasury Board and the Cabinet Policy Committee on Managing Growth Pressures. Born in Barrhead, Alberta, to Jean and Dr. Hugh Horner, Mr. Horner has spent most of his life in rural Alberta.

Three generations of his family have been involved in agriculture, and his father was a previous minister of agriculture.

Mr. Horner also has a solid business background, graduating from the Southern Alberta Institute of Technology (SAIT) with a diploma in business. After completing further studies, he was accredited by the Institute of Canadian Bankers.

Before being elected to the Alberta Legislature, Mr. Horner had extensive experience in the private sector, including banking in southern Alberta and a sound understanding of the value-added sector of agriculture. He was integral in the start-up and operations of his family's barley and oat processing mill. Later he became responsible for international marketing and sales of specialty grains for ConAgra out of its Nebraska office. After three years he moved back to Canada and established a trading company for agrifoods and agrifeeds for domestic and international markets.

Mr. Horner is an active member of his community. He is currently a member of the Spruce Grove & District Chamber of Commerce, the St. Albert Parkland Rotary Club, the Royal Canadian Legion, the Loyal Edmonton Regiment Association as well as several other service and community organizations.

Mr. Horner has previously served as a member of the Standing Committee on Law and Regulations, the Special Standing Committee on Members' Services and the Standing Policy Committee on Justice and Government Services. He has also served as chair of the Alberta government's Information and Communications Technology Implementation Committee and vice-chair of the Alberta Grain Commission.





TIM HAIG PRESIDENT AND CEO BIOX



Mr. Haig has more than 20 years of experience in the field of strategic business development with an emphasis on environmental technologies and engineering. Prior to co-founding BIOX Corporation in September 2000, Mr. Haig held several senior management positions with high profile organizations both in Canada and the United Kingdom. He served as the Marketing Director of Ove Arup & Partners, as well as Director of Strategy and Development for Tarmac, Black and Veatch. In addition, Mr. Haig was a principal in CMA Associates which promoted, developed and financed several major wind farms across Europe. He has been a Director of BIOX Corporation since 2000. In 2009, he was the recipient of the Ernest & Young's

Cleantech Entrepreneur of the Year Award. Mr. Haig received his MBA in London, England. He also has a degree as an Industrial Engineer from the Royal Military College of Canada. He served in the Canadian Forces (Army) for 10 years.



TREVOR KLOECK LEADER - BIOMATERIALS DEVELOPMENT ALBERTA BIOMATERIALS DEVELOPMENT CENTRE



Trevor was raised on a mixed farming operation in Northern Alberta and has a BSc. in Plant Biology from the University of Alberta. In the late 90's Trevor managed non-profit applied research program for grain crops focused on agronomic development and best management practices for farmers in northern Alberta. He joined Alberta Agriculture and Rural Development (ARD) in 1999 as a Cereals and Oilseeds specialist, and later as a Pulse and Special Crops specialist. Since then, Trevor has moved into the industry development role with ARD and coordinates connections between the research, manufacturing, and agricultural sectors as it pertains to biomass and bioproduct development. He is also co-leading the implementation of the Alberta Biomaterials Development Centre, a provincial

initiative to accelerate the development of bioproducts using agricultural and forestry biomass.



JOEL WEINER

PROFESSOR AND PRINCIPAL INVESTIGATOR UNIVERSITY OF ALBERTA, BIOREFINING CONVERSIONS NETWORK



Dr. Joel Weiner is the principal investigator on the BCN's Biological Conversions project "Biocatalyst Chassis Development". Dr. Weiner completed his doctoral research at Cornell University in 1972. Dr. Weiner is currently a Distinguished University Professor, Professor of Biochemistry, adjunct professor of Medical Microbiology & Immunology and lead of the School of Molecular & Systems Medicine in the Faculty of Medicine and Dentistry (UofA). He served as Associate Dean, Research for the Faculty of Medicine and Dentistry (UofA) from 1993 -2005 and Director of MRC Group in the Molecular Biology of Membranes from 1990-1996. Dr. Weiner's expertise is in bioenergetics, bacterial physiology, molecular

biology, protein expression and export in bacteria (several patents held), electron paramagnetic resonance spectroscopy, beta-lactam antibiotic resistance, and membrane protein structure. His research is focused on the function and structure of E. coli membrane-bound energy conserving enzymes proteomics and synthetic biology. He has published over 185 peer-reviewed papers in these areas and has made major contributions to our understanding of membrane protein assembly and translocation, cofactor biosynthesis, subunit-subunit communication in complex membrane-bound enzymes and the role of electron transfer relays in

complex oxidation-reduction enzymes.

Department of Biochemistry Faculty of Medicine & Dentistry, University of Alb



DAVE STUART ASSOCIATE PROFESSOR AND PRINCIPAL INVESTIGATOR UNIVERSITY OF ALBERTA, BIOREFINING CONVERSIONS NETWORK



Dr. David Stuart is the principal investigator on the BCN's Biological Conversions project "Genetic Engineering of Yeast for Production of Industrially Useful Chemical Precursors and Advanced Biofuels from Various Feedstocks". Dr. Stuart completed his M.Sc. in the Department of Kinesiology at the University of Waterloo. His thesis was on phosphorylation of the myosin light chains of human skeletal muscle and selected contractile properties of the knee extensor muscles. Dr. Stuart went on to conduct similar work as a research assistant at the University of Texas in Dallas before moving to Edmonton to pursue his Ph.D. at the University of Alberta. DNA replication and recombination of tumorigenic Poxvirus were the

focus of his doctoral research. Upon completion of his Ph.D., Dr. Stuart worked with The Scripps Research Institute as a Post Doctoral Fellow where he was involved in projects studying yeast cell growth and physiology with emphasis on cell growth and cell cycle regulation and control of cell cycle regulated transcription. He has since returned to Edmonton as Faculty in the Department of Biochemistry at the University of Alberta.

Dr. Stuart's current major research interest is in the application of synthetic biology to create novel metabolic pathways in yeast followed by evolutionary engineering to optimize cells for biosynthesis of candidate fuels and valuable products from glucose or hemicellulosic materials. Additionally, Dr. Stuart is interested in developing microbial strains that display increased tolerance to butanol and to inhibitors generated during the processing of lignocellulosic biomass. Dr. Stuart is also interested numerous aspects of cell growth and metabolism including the regulation of DNA replication and the control of cellular differentiation in response to environmental signals.



ROBERT HAYES

PROFESSOR AND PRINCIPAL INVESTIGATOR UNIVERSITY OF ALBERTA, BIOREFINING CONVERSIONS NETWORK



Dr. Bob Hayes is the principal investigator on the BCN's Thermal Conversions project "Dimethyl Ether from Biomass". He received B.Sc. and B.Eng. degrees from Dalhousie University in 1977 and 1979 respectively. This was followed by a Ph.D. at the University of Bath, graduating in 1983. He spent two years at Dalhousie University as Assistant Professor, and moved to the Department of Chemical Engineering at the University of Alberta in 1985. He was promoted to Professor in 1993, and is currently Associate Chair (graduate studies) of the department.

Dr. Hayes's expertise is in catalytic reaction engineering, environmental catalysis, and alternative fuels. His current research interests are focused on environmental

catalysis, which uses the science of chemical reaction engineering to understand and solve problems related to the environment. There is a strong emphasis on mathematical modelling of complex reactors, including transport effects.

Dr. Hayes's laboratory also studies the application of finite element computational fluid dynamics techniques to systems involving heat and mass transfer, chemical reactions and porous media.





MODERATORS AND PANELLISTS.

PANEL A: FEEDSTOCK

NORM DREGER (MODERATOR) HEAD OF BUSINESS DEVELOPMENT

SYNGENTA CROP PROTECTION CANADA



Norm Dreger is Head of Cereals for Syngenta in Canada and leads Business Development for Syngenta Crop Protection Canada, Inc., an agri-business committed to sustainable agriculture – farming with future generations in mind. With products in crop protection, seed care and seeds aimed at raising farm productivity, Syngenta is helping bring plant potential to life. Norm has been part of the Syngenta team for more than 27 years, holding leadership positions in sales, marketing and product development. He has also worked outside of Canada, branching out to the businesses in the United States, a global role based out of the United Kingdom and Hungary where he was Country Manager.

Norm comes from a family farming background, is a graduate of the University of Calgary MBA program and holds a degree in Agriculture Economics & Farm Management from the University of Manitoba. In his role, he seeks opportunities to expand and enhance the Canada reach and link the industry to new developments in our Global business. These include opportunities for improved customer care and farm profitability. One such project is the Syngenta commitment to transforming wheat production by investing in new technology for cereals.

Norm grew up on a farm in the Red River Valley of Manitoba, where his brother operates a 4,800 acre cereal/oilseed operation. Norm, his wife Shelley, daughter Lindsay and son Blair, reside in the Alberta foothills.



LEO MEYER

BOARD MEMBER LEO MEYER GRAIN PRODUCTION



Married to loving wife Kathy with six children (two daughters, four sons); Operating primary grain production, marketing and logistics operation applying integrated crop management (ICM) approach, emphasizing on environmental stewardship, sustainability and healthy production systems; Served in the army, earning engagement as an officer in the tank corps; Being a past-governor to Winnipeg Commodity Exchange through the process of moving from a public to private corporation; Completed C-Team; Founding member of the Prairie Oat Growers; President of Alberta Oats, Rye and Triticale Association; Vice-Chair of the Alberta Barley Commission; Management Team and Board Member of Canadian Triticale

Bio-Refining Initiative Network; Board member of Alberta Bio Conversion Network and Grain Growers of Canada; Member of the governance body of Agri-Food Discovery Place at the University of Alberta; Member of National Steering Committee of Climate Change.

Overall, Leo is interested to look for improvements in the agriculture industry and its connected communities as a significant part of the overall economy of Canada.





GARY SMITH TECHNICAL DIRECTOR ALBERTA NEWSPRINT COMPANY



Gary has a long history working with Alberta Innovates Technology Futures (previously Alberta Research Council) on numerous projects to add value to the forestry resource. The most recent major project has been the development of technologies that permit the use of Mountain Pine Beetle killed wood in the manufacture of premium newsprint. Gary at this time is working to develop a major integration of the forest products industry with the Oil & Gas industry on the energy front. The project promises to save large volumes of natural gas and reduce green house gas CO2 emissions. Additional projects Gary is working towards include Biochar of waste wood (for carbon sequestering and greenhouse arowing media) plus the creation of value added

products from mill effluent streams. Effluent treatment biosolids utilization to promote plant growth has been a very successful previous project.



STEPHEN SULZ

DIRECTOR OF PRODUCTION ALPAC



Stephen is responsible for the operation of the Alberta Pacific Kraft pulp mill near Boyle Alberta. Alberta-Pacific Forest Industries Inc. (Al-Pac) is one of the most modern pulp mills in the world utilizing environmentally sustainable practices to produce approximately 650,000 tonnes of high quality, elemental-chlorine-free bleached Kraft pulp annually. Stephen is responsible for technology investigation and selection in order to best utilize renewable biomass available from the forest.

Stephen obtained a degree in Chemical Engineering from the University of Saskatchewan in 1999 and then attended the University of Alberta specializing in Advanced Process Controls. Stephen has over ten years experience at Al-Pac in the operations group,

including major projects such as the \$63 million investment in renewable power generation and installation of a world class wood chipping line converting over 1 million ODT of wood fiber per year.



BOB WINSHIP

BUSINESS DEVELOPMENT MANAGER, CANADIAN TIMBERLANDS WEYERHAEUSER COMPANY

Bob is a registered professional forester in Alberta, and has been in a wide variety of roles in forest management working primarily for the forest industry. His experience includes landscape-scale resource management planning, silviculture, timber harvesting operations, business management and safety leadership. He has served on numerous initiatives involving Provincial resource management issues, industry competitiveness, Government policy and regulatory development, and Aboriginal relations. In his current role for Weyerhaeuser Company, Bob is promoting and managing bio-energy and biomass opportunities for Weyerhaeuser's Canadian Timberlands operations.





PANEL B: BIOCHEMICALS

MANFRED KIRCHER (MODERATOR) CHAIRMAN OF THE BOARD CLIB²⁰²¹ (CLUSTER INDUSTRIELLE BIOTECHNOLOGIE)



Manfred Kircher is chairman of the board of CLIB²⁰²¹, an initiative of companies, academic institutes and investors fostering industrial biotechnology in Germany. The consortium's more than 70 members include Germany's household names in the chemical industry - Altana, Bayer Material Science, Bayer Technology Services, Evonik Industries, Lanxess, Henkel and Cognis. Small and mid-sized enterprises like Artes, bitop and Protagen and the universities Bielefeld, Dortmund and Duesseldorf are represented on board-level. Dr. Kircher is delegated by Evonik Industries AG where he is in charge of funding biotechnology in Evonik's Science to Business Center Biotechnology. Before he managed in 2001 - 2004 Degussa's investment in Burrill & Company - a San Francisco based life sciences

venture capital bank.

Dr. Kircher brings along more than 25 years of experience in the field of investments, biotechnology R&D, production and project development. He received his Ph.D. at the Institute of Microbiology at the Johann-Wolfgang-Goethe-University in Frankfurt/Germany in the area of molecular yeast genetics and joined Degussa in 1981. After organizing a biotechnological R&D department in Degussa's feed additive business unit he was in charge of microbial strain development since 1984. Later he was co-building Fermas s.r.o., an international joint venture for amino acid production in Slovakia. Since 1996, Dr. Kircher was director of biotechnology project development in Degussa's R&D center Hanau/Germany. In addition Dr. Kircher is an expert in business plan competitions and serves on the advisory board of start-ups.



STEWART CAMPBELL PRESIDENT SJC INVESTMENTS



Dr. Campbell is retired but continues as Chairman of SAPONIN Inc., Director of Guardian Biotechnologies Inc. and President of S. J. Campbell Investments Ltd. SAPONIN and Guardian are young bioscience-based companies developing products for human and animal health. Most recently, Stewart was Vice President, Commercial Development, Canadian Bioenergy Corporation. Dr. Campbell conducted business in Indonesia, Philippines, Thailand, India, China, Japan, Lithuania, Russia, Iran, Algeria, Sierra Leone, Western Europe, and North America, primarily involving oilseeds, grains, oleochemicals and bioenergy.

Stewart has a Ph.D. in Physical Organic Chemistry from the University of Alberta and an MBA in Entrepreneurship and Venture Development from the University of Calgary. Dr. Campbell is known for his experience in the development and commercialization of agricultural biotechnologies and the processing of agricultural products into goods important to Canada. In the 1980s, he was an executive in the canola processing industry and participated in Canola Council of Canada, canola crusher and international trade activities. From 1988 - 2010, he consulted privately and with identified firms on their technical and commercial development.

Stewart is a member of the ASTM International Committee D02 on Petroleum Products and Lubricants and represents Canadian Bioenergy Corporation on the Middle Distillate and Alternative Fuels Committee of the Canadian General Standards Board.



PAUL CLARK SENIOR AFFILIATE IAN MURRAY & COMPANY LTD.



Paul Clark is currently President, VisionGain Consulting Inc, a company providing service in the fields of vision/strategy building, research & technology management, and advanced technical based facilitation.

Paul is also a Senior Affiliate with Ian Murray & Company Ltd., Previously he was Vice-President, Research & Technology for NOVA Chemicals Corporation and President, NOVA Chemicals Research & Technology Inc. and Global Operations Director Polyethylene R&D, Dow Chemical Co. He has had a wide and varied career in the chemical industry in both Canada and the U.S. His work involved extensive relationships with universities and government to create and manage

collaborative research projects which have had significant commercial impact.

His other affiliations include: Board of Directors and Executive Committee, National Research Council of Canada (NRC-CNRC), Board of Directors, Alberta Innovates – Energy & Environment Solutions, Board of Directors, Climate Change & Emissions management Corp., Past Chair, Canadian Plastics Industry Association (CPIA), Fellow, The Centre for Innovation Studies (THECIS), Board of Directors, Sustainable Chemistry Alliance (SCA).

Paul has received numerous awards including: NOVA Chemicals Distinguished Applause 1997 & 2003, CanPlast Leadership Award (CPIA), Society for Chemical Industry A.N.Purvis Award (SCI), Natural Science & Engineering Research Council Synergy Award (NSERC).



TIM EGGEMAN

Founder and Chief Technology Officer ZeaChem Inc.



Tim is an expert chemical process modeler and is a co-inventor of the ZeaChem process. Prior to founding ZeaChem, Tim was an independent consultant serving clients in the biofuels, syngas and Fischer-Tropsch areas. He was Process Development Manager at Chronopol, where he supervised a group that developed manufacturing technology to produce biodegradable plastics based on polylactic acid. He also served as Process Design Engineer with the C.W. Nofsinger Company, where he worked on projects in the pharmaceutical, specialty chemical, corn wet milling, corn dry milling, and petroleum industries. Tim has numerous patents, a Ph.D. and M.S. in Chemical Engineering from the University of Kansas, and a B.S. in Chemical Engineering from University of Illinois.

He is a licensed Professional Engineer.





PANEL C. BIOENERGY AND BIOFUELS

STAN BLADE (MODERATOR) CHIEF EXECUTIVE OFFICER ALBERTA INNOVATES - BIO SOLUTIONS



Dr. Stan Blade is the Chief Executive Officer of the Alberta Innovates – Bio Solutions Corporation (Al-Bio). The new Corporation will invest in innovation which delivers value to Alberta's agriculture and forestry sectors, and to all Albertans. Al-Bio will work with all stakeholders in the research-development continuum to provide strategic leadership and investment to create prosperous and sustainable agriculture and forestry industries.

The new Bio Solutions Corporation builds on the activities of the Alberta Agricultural Research Institute, the Alberta Forestry Research Institute, the Alberta Life Sciences Research Institute and the Alberta Prion Research Institute. Dr. Blade

is also an Adjunct Professor in the Faculty of Agriculture, Life and Environmental Sciences at the University of Alberta.

Dr. Blade previously served as Deputy-Director General (Research) for the International Institute of Tropical Agriculture (active in 23 sub-Saharan African countries). Dr. Blade's expertise has been recognized through his invitations to participate in research reviews conducted by the European Union, Consultative Group on International Agricultural Research, the Canadian Foundation for Innovation and participation on numerous industry advisory groups. Dr. Blade is a Board Member of the CHF – Partners in Rural Development (an international NGO).



ROB BROIN CHAIRMAN AND CTO OTOKA



Rob has over 25 years of experience in the biomass to energy industry. Since 2008 he has been involved in the biomass electrical power business, working to develop projects in California and Alberta, Canada. Prior to that Rob was an industry leader in the domestic Fuel Ethanol Industry.

In 1987, Mr. Broin co-founded Broin Companies, where he served as Chief Technology Officer until his departure in 2007. Broin Companies started as a single family-owned fuel ethanol plant and, during Rob's tenure, constructed additional facilities and subsequently operated them to an eventual capacity of over one billion gallons of ethanol per year. This group of plants became the largest and

most efficient corn-dry-mill ethanol production group in the world.

Rob led the design and construction of 25 ethanol plants, and oversaw the technical operations for many of them. Each of the projects was completed on time, on budget, and became successful, profitable facilities. Rob and his team pioneered and guided the implementation of many of the processing and plant design improvements that are considered to be the gold standard in today's dry mill ethanol industry. Rob has a degree in Agricultural Science from the University of Minnesota – Waseca, Minnesota, United States.





ROBERT COOPER SUPPLY PROJECTS LEAD SHELL CANADA PRODUCTS



Robert (Bob) Cooper has lead the Shell in Canada Biofuels project team since September 2006. In this position, Bob has responsibility for ensuring Shell is compliant with all Biofuels and Low Carbon Fuel Legislation and Regulations in Canada. This includes management of the issues as it relates to Shell facilities operated in Canada including oil sands facilities, refineries, terminals, and distribution networks, including the various sales channels. Bob graduated from the University of Waterloo with a degree in Chemical Engineering as well as a Masters Degree in Management Sciences. He spent 13 years at Suncor in progressive refining, retail marketing, international trading and

downstream business management roles. Bob also worked in the Petrochemical Industry in Canada as well as Eastern Europe, in Management Consulting and in the Sulphuric Acid Business. In 1996, he joined Shell Canada Products with responsibility for the marketing of styrene in North America, in 1998 was appointed Supply Manager for Solvents for North America and in 2006 moved to the current position of leading the Biofuels compliance effort in Canada.



HUGH MCLAUGHLIN

DIRECTOR OF BIOCARBON RESEARCH ALTERNA BIOCARBON INC.



Hugh McLaughlin has a BS in Chemistry (Harvey Mudd College, 1976) in addition to a MS (USC, 1978) and Ph.D. in Chemical Engineering (Rensselaer Polytechnic Institute, 1988). He has worked in process development and environmental engineering for over three decades, with most of that experience in the role of consulting engineer to a wide variety of manufacturing operations. He is an expert in the area of activated carbon manufacture and its utilization in air and water treatment applications. He has several patents in the area of activated carbon use and regeneration. Dr. McLaughlin has led the efforts at Alterna Biocarbon to enhance the Native Adsorption Capacity of Alterna Biocarbons, whereby

biocarbons can be utilized in applications traditionally requiring more expensive activated carbon products.



CHARLES WYMAN

CO-FOUNDER, CHIEF DEVELOPMENT OFFICER, CHAIR OF SCIENTIFIC ADVISORY BOARD MASCOMA



Charles Wyman is co-founder of Mascoma Corporation, a startup company focused on development and implementation of advanced technology to overcome the recalcitrance of cellulosic biomass and headquartered in Lebanon, NH. Wyman serves as Chief Development Officer and Chair of the Scientific Advisory Board for Mascoma. He has been Ford Motor Company Chair in Environmental Engineering at the Center for Environmental Research and Technology and a professor in Chemical and Environmental Engineering Department at the University of California, Riverside since 2005. Prior to that, he was the Queneau Distinguished Professor at Dartmouth College and Director of

Technology for BC International, which evolved into Verenium. Wyman has devoted most of his career to advancing technology for conversion of cellulosic biomass to fuels that reduce our petroleum dependence, including almost 20 years of leadership roles at the National Renewable Energy Laboratory (NREL). Wyman has a BS degree from the University of Massachusetts and MA and Ph.D. degrees from Princeton University, all in chemical engineering, and an MBA from the University of Denver. He has contributed about 93 peer reviewed publications, 27 book chapters, an edited book, 155 invited presentations, 78 other presentations, more than 81 poster presentations,

and 16 patents and provided leadership for meetings and symposia. Dr. Wyman is on the editorial board of several technical journals and the board of directors or board of advisors for a number of organizations and institutions.





STRATEGIC BREAKOUT SESSIONS

BCN Theme Leads will moderate the Strategic Breakout Sessions (see pg. 12 -13 for bios). Dr. Greg Dechaine will moderate the Thermal Conversions breakout session in place of Dr. Murray Gray, who is unable to attend this year's retreat.

GREG DECHAINE

DEPARTMENT OF CHEMICAL & MATERIALS ENGINEERING ASSISTANT PROFESSOR UNIVERSITY OF ALBERTA



Dr. Greg Dechaine recently joined the department of Chemical and Materials Engineering at the University of Alberta as an assistant professor. He received a MASc. in Chemical Engineering from the University of Waterloo (2004) where he studied and developed coated catalysts for catalytic distillation columns, and a Ph.D. in Chemical Engineering from the University of Alberta (2010) where he studied the selective removal of vanadium from bitumen and asphaltenes. Prior to pursuing postgraduate studies, Dr. Dechaine spent 4 years in the fertilizer industry as a plant process engineer with Agrium Inc., working with a variety of chemical processes including ammonia, nitric acid, ammonium nitrate, and most

other fertilizer synthesis processes.

The unifying theme of Dr. Dechaine's research is separation process engineering. Rather than specialize in a single technique and seek applications for it, the goal is to tackle difficult separation problems by selecting and optimizing the most suitable separation technique for each case. This requires a fluency in the various separation processes available to process engineers including distillation (conventional, catalytic/reactive, azeotropic/extractive), membrane separations,

absorption/stripping, extraction, and filtration. The search for value added fuels and products from biomass precursors will undoubtedly spawn many interesting and challenging separation problems, hence Dr. Dechaine's interest and involvement with the BCN.





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