

Saskatoon Synchrotron Summer School IV
June 13th - 18th, 2009

Saturday June 13th **location: CLS** Registration, Welcome, & Synchrotron basics		
12:00 - 1:30	Registration & Safety Training	Please arrive in time to receive your registration packages, have your photo taken for your access identification, and to write your safety tests so you can have full access to our facility
2:00	Joseph Hormes, Executive Director of CLS	Welcome to CLS; Development of Synchrotron Radiation
3:00	Tasha Summers, Accelerator Physicist, CLS	Synchrotron 101: The _very basics_ of what a synchrotron is and how it works
4:00	Tom Regier, Acting Beamline Scientist, CLS-SGM	Beamline Basics: How a beamline works: Soft X-ray, Hard X-ray and IR
5:00	CLS Staff	Tours: become familiar with both the machine and the beamlines; refreshments available
Sunday June 14th **location: Room 2E25 Agriculture** Research cases and their techniques		
8:30	Robert Blyth, Assistant Director of Research	A basic overview of techniques available at CLS as background for the invited speaker talks Synchrotron Radiation and Matter - introducing the basic concepts and vocabulary including both x-ray and infrared interactions.
9:30	Ingrid Pickering, Canada Research Chair in Molecular Environmental Science, Associate Professor, University of Saskatchewan	Case study - Hard X-rays and Environmental Applications - Plants
10:30	Break	
10:45	Julie Thompson, CLS Industry Scientist	We will go over the available beamlines, techniques and capabilities for the analysis of environmental samples using hard x-rays at the CLS
11:45	Lunch	
12:45	Adriana Predoi-Cross, Professor Physics & Astronomy, University of Lethbridge	Case Study - FarIR - Environmental Applications - Atmosphere
1:45	Brant Billingham, CLS Scientist Far IR	We will go over the available techniques and capabilities for the analysis of gas phase environmental samples using infrared spectroscopy on the FarIR beamline at the CLS
2:45	Break	
3	Lisa Van Voon, CLS Industry Scientist	Case Study - A New Method for Determining Nickel Speciation in Workplace Aerosols Using X-Ray Absorption Near- Edge Structure Spectroscopy
4	Jeff Warner, CLS Industry Scientist	We will go over the available techniques and capabilities for the analysis of environmental samples using the hard x-ray microanalysis beamline at the CLS
Monday June 15th **location: Room 2E25 Agriculture** Research cases and their techniques		
8:30	Peter Leinweber, Universtat Rostock	Case Study: Soil & soft x-ray absorption spectroscopy
9:30	Lucia Zuin, CLS Staff Scientists & Robert Blyth, Assistant Director of Research	We will go over the available beamlines, techniques and capabilities for the analysis of environmental samples using soft x-rays at the CLS
10:30	Break	
10:45	Hoi - Yin Holman, Lawrence Berkeley National Laboratory	Case Study - The Bio-geological interface
11:45	Luca Quaroni, CLS Staff Scientist, MidIR	We will go over the available beamlines, techniques and capabilities for the analysis of environmental samples using infrared microscopy at the CLS
12:45	Lunch	
1:45	Robert Blyth, Assistant Director of Research	Secrets of accessing CLS beamtime: the peer review process - common pitfalls to avoid while writing proposals
2:45	Jeffrey Cutler, CLS Directory of Industry Science	How does CLS work with an industrial environmental question?
3:45	Break	
4:00	Tom Kotzer, Senior Environmental Geochemist, Cameco Corp	Industry involvement/science conducted on mine tailings (Engineered Tailings program) and CO2 sequestration
Princess Cruise - dinner and a perfect way to view the city of bridges!		

Tuesday June 16th **Location: CLS** Practical Session on the Beamlines		
	You will be divided into three groups to cycle through a practical session in each of Infrared, Soft and Hard X-ray techniques.	
	<p>The practical session on the Far-IR beamline will, go over the basics of how to load a sample, collect spectra and how to choose collection parameters. Participants will collect High Resolution Spectra of Carbon Dioxide and to estimate the isotope ratio between $^{12}\text{CO}_2$ and $^{13}\text{CO}_2$. Lead by Brant Billingham, Staff Scientist, Far IR Beamline.</p> <p>The practical session on the Mid-IR beamline will provide the basics of instrument setup, experiment design and sample mounting. The experiment will show how to use synchrotron FTIR spectromicroscopy to characterize the interaction between a microbial colony and its geological substrate. Participants will have direct access to the instrumentation and perform the experiment in small groups, from data collection to data analysis and interpretation. Lead by Luca Quaroni, Staff Scientist, MidIR Beamline.</p>	<p>Sessions on SGM and PGM beamlines will go over the basics of preparation and loading of environmental samples for soft x-ray spectroscopy using soil samples as an example. Participants will collect x-ray absorption spectra of minerals in soil. This session is lead in collaboration by Lucia Zuin, Staff Scientist, VLS-PGM Beamline, Tom Regier, Acting Beamline Scientist SGM, & Robert Blyth, Assistant Director of Research.</p>
	Become familiar with hard x-ray beamlines with members of our Industrial Science team. Explore several beamlines including our Biomedical Imaging and Therapy Facility. Beamline scientists will describe the details of their beamline to you and demonstrate hutch lock-down procedures (8:30 Vespers; 11:30 CMCF; 2:30 SXRMB). This session is lead by Industry Scientists Julie Thompson, Jennifer Heggie, Jigang Zhou, and Lisa Van Loon.	
8:00	Breakfast is served in the BMIT addition area of the Mezzanine	
8:30 - 11:00	Session leaders will bring you from the BMIT area to the experimental hall for your session. Please return to BMIT at the beginning of the next session time.	
11:00 - 11:30	Break	
11:30 - 2:00	Session leaders will bring you from the BMIT area to the experimental hall for your session. Please return to BMIT at the beginning of the next session time.	
2:00 - 2:30	Lunch	
2:30 - 5:00	Session leaders will bring you from the BMIT area to the experimental hall for your session. Please return to BMIT at the beginning of the next session time.	
Supper at the Boffins in beautiful Innovation Place		
Wednesday June 17th **Location: Radisson Hotel** CLA AUM Associated Workshops		
Registration for the summer school includes registration for the CLS Annual Users Meeting and associated workshops. http://www.lightsource.ca/uac/meeting2009/program.php		
full day	Quantitative Analysis of X-ray Absorption Near-edge Spectra Organized by Graham George, University of Saskatchewan	X-ray Absorption Near-edge Spectra have been widely used to provide information on electronic structure and chemical speciation in diverse fields, with applications ranging from the bio-medical and environmental sciences to materials science. Until recently tools for quantitative analysis of these spectra have been lacking. The aim of the workshop is to review the current state-of-the-art methods for interpreting X-ray absorption near-edge spectroscopic data, and discuss possible future directions for enhancements of the available methods.
8:30 - 12:30	Pump Probe Experiments using the Synchrotron Organized by Ramaswami Sammynaiken, University of Saskatchewan	Electronic structure, geometric structure, speciation and some dynamical studies investigated by the "continuous beam " of synchrotron radiation have contributed to tremendous growth in science and technology. The development of fast and ultra fast optical lasers has shown that it is possible to obtain dynamical information on a limited range of materials. This workshop shows how synchrotron goes beyond the static structure to probe dynamics. The nanosecond time structure of third generation synchrotrons to the femtosecond of fourth generations view dynamical structures and show the new frontier of synchrotron radiation.
1:00 - 4:15	Dirt in the Beamlines: Soft X-ray Absorption Techniques in Soil Science Organized by Tom Regier, Canadian Light Source	X-ray Absorption Spectroscopy has become a valuable tool in the field of molecular environmental soil chemistry. Study of the near edge structure in the XAS of elements contained in both organic and inorganic soil components provides a powerful probe of the chemical bonding found in these materials. There are several challenges associated with measuring the XAS of soils and many of these challenges are common to other environmental samples. As many of the elements found in soil have core level binding energies in the soft x-ray energy range, samples have to be prepared for in-vacuum measurement. Signal quality is often a problem as soils contain many elements generating a large background signal. This workshop will explore some of the techniques that have been applied in the measurement of soft x-ray absorption spectra in soil. Instrumentation will be discussed and a plan for the development of hardware for the study of soil and other environmental samples will be formed

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7:00 - 9:00	Public Lecture: Robert J. Sawyer - Science Fiction as a Mirror for Reality	International award-winning science fiction author Robert J. Sawyer will be writer-in-residence at the Canadian Light Source synchrotron from June 1 to July 31, 2009. Sawyer, widely regarded as one of Canada's most influential authors and most successful science fiction writers, will use the residency to explore the creative processes at the root of science and art, and increase public discussion of science in Canada. Sawyer is the author of 20 science fiction novels, which have been published in 15 languages. He is one of only seven authors – and the only Canadian – to win all three of the world's top science fiction awards: the Hugo Award (2003) for the novel Hominids, the Nebula Award (1996) for The Terminal Experiment and the John W. Campbell Memorial Award (2006) for Mindscan. His novel Flashforward is currently in development as a TV series for the U.S. network ABC. He has taught at the University of Toronto, Ryerson University and the Banff Centre, and is a frequent commentator on the Discovery Channel and CBC television and radio. Several of his stories are set at Canadian science facilities, such as TRIUMF, SNOLab, and the Royal Ontario Museum.
Thursday June 18th **Location: Radisson Hotel Michelangelo Room A&B** CLS Annual Users Meeting		
Summer School participants are automatically registered for the AUM		
7:00	Meeting registration and poster set up	Michaelangeo C room
8:30	Welcome	Helen Nichol, Users Advisory Committee Chair
8:35	A vision for the CLS	Josef Hormes, Executive Director Canadian Light Source
9:00	Beamlines and Facilities Update	CLSI Management
9:15	X-ray Absorption Spectroscopy in Earth and Environmental Sciences: Past, Present and Future Challenges	Georges Calas, Universite Pierre et Marie Curie-Paris 6, Universite Paris 7 (CISR funded Keynote Speaker)
10:00	Break and Poster viewing	
10:30	Powder Diffraction at HXMA - Recent Status and Future Perspective	John Tse, University of Saskatchewan
11:00	The interplay of soft x-ray spectroscopy and materials properties: nano-heterostructures and nanocomposites	T.K. Sham, University of Western Ontario
11:30	Soft X-ray Spectromicroscopy - An Advanced Technique for Agricultural and Bio-products Research	Chithra Karunakaran, Canadian Light Source
12:00	Data Generated at the CLS, Crucial for Research in Bioremediation, Prion Disease and Drug Design: A Collection of Short Stories	Emil Pai, University of Toronto
12:30	Lunch and Poster Viewing	
1:00	Report from the UAC	Helen Nichol, Users Advisory Committee Chair
1:15	User Concerns and Feedback Session	Ramaswami Sammynaiken, University of Saskatchewan
1:30	Grazing Incidence Diffraction	Andrew Tersigni, University of Guelph
1:50	Characterization of Esophageal Tumours	Ronghua Zhao, University of Saskatchewan
2:10	Characterization of Nerval Tissue Scaffolds by the BMIT Beamline	Ning Zhu, University of Saskatchewan
2:30	KshAB: A Rieske Monooxygenase in the Cholesterol Degradation Pathway of Mycobacterium Tuberculosis	Jenna Capyk, University of British Columbia
2:50	Developments in experimental techniques and high-pressure science at HXMA	Jesse Smith, University of Ottawa
3:10	Coffee Break	
3:40	High School Students on the Beamlines: Investigating Natural and Synthetic Chelates	Glenn Hamonic, Bishop Grandin High School, Calgary, AB
4:00	Poster Session and Wine and Cheese	
5:30	Awards Reception: CISR Student Poster Award Presentation; Summer School Award Presentation; Students on the Beamlines Award Presentation	
6:00	Banquet Michaelangelo AB	