National Ultrahigh-Field NMR Facility for Solids
Centre national de RMN à ultrahaut champ pour les solides

Canadian NMR Research News Bulletin #5.4
Fall 2011

Guest Editorial

Kalle Gehring
McGill University

Harnessing the Power of Molecular Machines

Thanks to the NSERC Collaborative Research and Training Experience (**CREATE**) program, an exciting new training opportunity exists for undergraduate and graduate students in the developing field of bionanomachines.

Bionanomachines are submicron scale molecular devices that perform a wide variety of useful tasks. Composed of organic molecules such as sugars, proteins, or nucleic acids, they offer unparalleled advantages in their extremely small size, low production cost, and ease of modification. Bionanomachines already play significant roles in everyday lives, ranging from protein-digesting enzymes in laundry detergents, to improved natural fibers and inexpensive drugs. Biosynthetic medicines, such as insulin, and biomachine-based diagnostic tools are used in healthcare and medicine. In the future, bionanomachines offer the promise of new medical treatments for heart disease and cancer, tools for understanding key biological processes such as cell division or nerve function, and smart materials that respond to external stimuli.

The purpose of this new CREATE Training Program in Bionanomachines (**CTPB**) is to train students in the principles, design and applications of bionanomachines. The program aims to develop creative, versatile and highly skilled experts who can maintain Canada's position as a leader in bionanotechnology. These researchers will also be empowered to drive technological advances and will be capable of building off of their training to pursue careers in a broad variety of domains. The CTPB group consists of researchers at the University of Calgary, University of Saskatchewan, McGill University, Concordia University, Université de Montréal, Université Laval and Université du Québec à Montréal, who focus on different aspects of bionanomachines. Individual areas of expertise are NMR spectroscopy, X-ray crystallography, supramolecular chemistry, biophysics and biomembranes.

bionano
CREATE TRAINING PROGRAM IN BIONANOMACHINES

A more specific example of work done on bionanomachines is by **Dr. Normand Voyer**, whose group produces artificial ion channels to understand mechanisms of transport and to potentially aid with transport-related diseases such as cystic fibrosis. **Dr. René Roy**'s group uses carbohydrates to study antibody-antigen

In This Issue

recognition as it pertains to the treatment of various diseases. In McGill University's Department of Chemistry, the group of **Dr. Hanadi Sleiman** constructs a variety of structures using DNA, which can be used to form nanotubes, or cargo-delivering molecular "cages". At the University of Calgary, **Dr. Peter Tieleman**'s laboratory uses computer simulations to study and model the interaction of lipids with proteins, permitting predictions about drug bioavailability. With his team, **Dr. Kalle Gehring**, the director of the CTPB, studies the structure of proteins and nucleic acids, focusing particularly on understanding the regulation of their interaction. At Concordia University's Department of Chemistry and Biochemistry, **Dr. Christopher Wilds** produces intentionally mutated DNA, in order to study how such mutations can be repaired, and also to gain a better understanding of the diseases these mutants mimic. Combining molecular biology with practical applications is the work of Université Laval's **Dr. Michèle Auger**'s group, which strives to understand and reproduce the biological process of the production of silk webbing by spiders. These are just some of the projects done by members of the CTPB, and there are many other options to choose from.

The CTPB offers two levels of funding: undergraduate and graduate. For undergraduates, 16-week summer research awards of $5,625 are available at any of the 22 participating laboratories. Graduate CTPB stipends, worth $20,000 per year for two years, fund graduate studies at the Master's or Doctoral level with a three-month exchange period to promote interdisciplinary training in the rapidly evolving field of bionanomachines. International students are eligible for all CTPB awards.

CTPB graduate applications are due by January 16th, 2012 and undergraduate applications are due by February 15th, 2012. Forms and further details about the programs can be found on the CTPB website at http://bionano.ca/en or http://bionano.ca/fr

For questions, please contact **Chris von Roretz**, the CTPB Coordinator, at

bionano.med@mcgill.ca

Canadian NMR News

Outstanding High School Student Science Awards

Continuing the tradition started three years ago by **André Simpson** and colleagues, the University of Toronto Scarborough has awarded *the UTSC's Outstanding High School Student Science Awards* to six area high school students who wrote the winning essays in science. As part of the visit to the university, the students attended a physics lecture and were able to use equipment in the Nuclear Magnetic Resonance Lab to analyze soft drinks.

This year award was supported by the UTSC department of physical and environmental sciences, Bruker Canada and Pall Life Sciences.

To read the full story:
http://webapps.utsc.utoronto.ca/ose/ose_new_v/article.php?id=3082&cid=1

CFI LOF 2011 Competition Results

Mitsuhiko Ikura (University of Toronto) has been awarded $795,562 to support the Structural Biology Facility for New Generation Cancer Research

See Dr. Mitsu Ikura speak about his research http://www.youtube.com/watch?v=i7MNwdSZTxY

Dmitri Goussev (Wilfrid Laurier University, Waterloo) has received a $196,533 equipment grant for a new high-resolution nuclear magnetic resonance (NMR) spectrometer for the Chemistry Department.

Read the press release by WLU:
http://tinyurl.com/cjkxaw3

Trinity Western University (Langley, B.C.) has been awarded a $398,251 equipment grant for a 400 MHz NMR spectrometer and a mass spectrometer for an Advanced Analytical Laboratory in the recently expanded Neufeld Science Centre.

Read the news story in *Langley Today*:
http://langleytoday.ca/?p=14522

Canadian Cancer Society
2011 Research Grants

Cheryl Arrowsmith (Ontario Cancer Institute/PMH) *Structure and function of p53 related proteins* $430,158 over three years

Julie Forman-Kay (Hospital for Sick Children) *Understanding how multi-site phosphorylation regulates cell cycle* $397,440 over three years

Lawrence McIntosh (University of British Columbia) *Regulation of ETS transcription factors* $431,712 over three years

Read the announcement and the complete list of awardees:
http://tinyurl.com/7c44w9s

Valerie Booth (Memorial University of Newfoundland) has had her **Tier 2 Canada Research Chair** in Membrane Proteins renewed for five years. Valerie has been also awarded complementary CFI funding under the Leaders Opportunity Fund.

Canada Research Chairs in MR

http://www.chairs.gc.ca/

Cheryl Arrowsmith (Toronto) Biochemistry
Bruce Balcom (UNB) Multidisciplinary
Valerie Booth (Memorial) Biochemistry
Blaine Chronik (Western) Medical Physics
Yining Huang (Western) Materials Science
Mitsuhiko Ikura (Toronto) Molecular Biology
Lewis Kay (Toronto) Biochemistry
Vladimir Ladizhansky (Guelph) Biophysics
Raymond Laflamme (Waterloo) Physics
Pascale Legault (Montréal) Biochemistry
Simon Sharpe (Toronto) Biochemistry
Gary Shaw (Western) Structural Neurobiology
Roderick Wasylishen (Alberta) Phys Chemistry
Josef Zwanziger (Dalhousie) Phys Chemistry

A Life in NMR: Interview with Regina Schuck (Agilent)

Regina Schuck is vice president and general manager of Agilent's Research Products Division in the Life Sciences Group. Regina has more than 25 years of experience in NMR and research MRI. She holds a doctorate in natural sciences from the University of Frankfurt in Germany. Regina speaks with http://www.spectroscopyNOW.com about her career in magnetic resonance and her vision and future of MR: http://tinyurl.com/73g7ljn

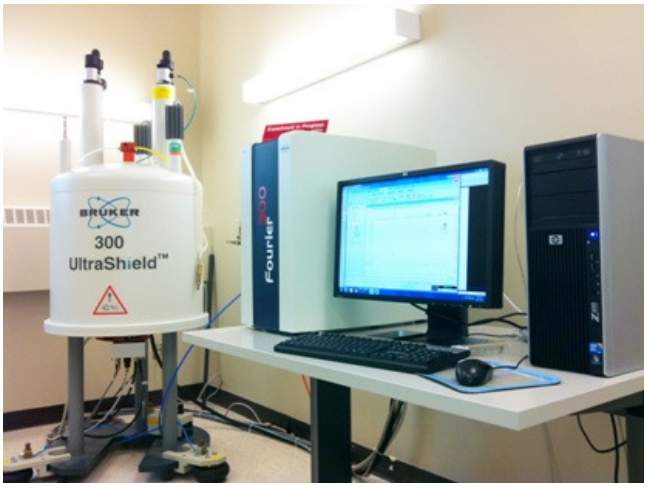
Agilent 101: An Introduction to NMR – a crash course on NMR by Regina Schuck (Agilent) (also available in PDF)
http://www.agilent.com/labs/features/2011_101_nmr.html

Submitted by Paul Morris

News from Morris Instruments Inc.

Morris Instruments Inc., based in Ottawa, has brought out a new addition to their line of R.F. Sweeper instruments for probe and coil tuning. The model MX has the same functionality and physical form factor as the lower frequency models, but extends **the tuning range up to 1010 MHz**. The company expects this new model to become increasingly popular as NMR magnets are pushed to ever higher fields.

For more information visit:
http://morrisinstruments.com/
Or email:
morris-instruments@rogers.com

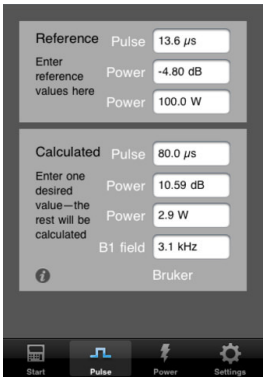


First in Canada: **Bruker Fourier 300** high-resolution compact NMR spectrometer installed in the undergraduate teaching lab, the Department of Chemistry, University of Ottawa (Photo: Glenn Facey) http://www.science.uottawa.ca/nmr/

The Russell Varian Prize 2012: call for nominations

The Russell Varian prize honors the memory of the pioneer behind the first commercial Nuclear Magnetic Resonance spectrometers and co-founder of Varian Associates. The prize is awarded to a researcher based on a single innovative contribution (a single paper, patent, lecture, or piece of hardware) that has proven of high and broad impact on state-of-the-art NMR technology. The prize aims to reward the initial contribution that laid the ground for the specific technology of great importance in state-of-the-art NMR. It is sponsored by Agilent Technologies and carries a monetary award of 15,000 Euro. The award ceremony will take place at the XXVth ICMRBS in Lyon, August 19-24, 2012, with the winner delivering the Russell Varian Lecture.

For more information:
http://nmr900.ca/nmr_news.html#rvp2012



Attenuator app

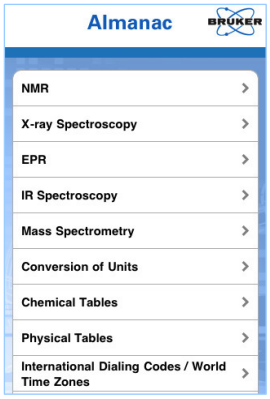
Version 1.5 of the popular **Attenuator** app by **Tim Burrow** (University of Toronto) is available for download from iTunes for iPhone, iPod touch and iPad.

Attenuator is a utility for anyone working with radio frequency sources and needs to know power and voltage after attenuation. You can specify an input voltage (Vpp or Vrms) and dB of attenuation to get the output voltage, power and attenuation. The impedance can be specified, typically 50 Ohm for most systems. **Added in Version 1.5** for NMR spectroscopists is an option to calculate pulses based on power, in Watts or dB for Agilent and Bruker NMR instruments. This free application is available in English, French, Chinese and Japanese and is sponsored by *Open Technologies*.

To download the **Attenuator** app visit:
http://itunes.apple.com/ca/app/attenuator/id367216554

Tim Burrow
http://www.chem.utoronto.ca/facilities/nmr/staff.html

Bruker Almanac app



Published annually for over three decades, **Bruker Almanac** has been a tradition in Bruker's history, providing useful information to many scientists around the world. This almanac is now available as a free application for iPhone/iPod touch/iPad that can be downloaded from the iTunes store. Recently updated **Version 2.0** contains almost all tables of the printed edition including various NMR related data, molecular spectroscopy, x-ray diffraction and mass spectrometry related useful information.

http://itunes.apple.com/ca/app/almanac/id367770786

You are also invited to visit **"the Resonance"** a new user-oriented website by the Bruker Biospin team to find the latest hardware and software developments, events, tips and tricks, and more http://www.theresonance.com/

the resonance
The first word in magnetic resonance news

NMR on Twitter

List of new solid-state NMR papers updated by Luke O'Dell (NRC-SIMS)
http://twitter.com/solidstateNMR

uOttawa NMR by Glenn Facey
http://twitter.com/uOttawaNMR

NMR Wiki http://twitter.com/nmrwiki

nmr900 http://twitter.com/nmr900

Bruker http://twitter.com/bruker

Agilent http://twitter.com/agilent

Recognition

Brian Sykes, a Distinguished University Professor in the Department of Biochemistry, University of Alberta, has won **the 2010 University of Alberta Cup**. The University Cup is among the highest honors that the University of Alberta confers on its faculty members. It is awarded in recognition of faculty members who have clearly excelled in both teaching and research. Prof. Sykes was presented with the University Cup at the 2011 **Celebrate!** ceremony, the university's annual celebration of teaching, learning and research, held on September 16, 2011.

Read the news story
http://tinyurl.com/bwgb8xz

Photo credit: University of Alberta

Kristopher Ooms (King's University College, Edmonton) won **the 2011 Canadian Society for Chemistry Faculty Advisor Award**. This award is based on a nomination submitted by the Student Chapter recognizing the exceptional performance of their faculty advisor.

Aaron Rossini, a graduate student of Robert Schurko, Windsor, was awarded **the Governor General's Gold Medal** for the highest academic standing at the graduate level among his cohort. *Congratulations, Aaron!*

UWindsor Daily News
http://tinyurl.com/7bh9ntx

Bruce Balcom (UNB) is named the Editor of ***New Developments in NMR***, an upcoming in 2012 series of reference books by the Royal Society of Chemistry (RSC) "… that will focus on novel aspects of method and instrumentation development, applications in emerging fields, new techniques and various technologies, fundamentals and theory, the development of new interfaces and important advances being made in many areas of NMR. Special emphasis will be placed on providing comprehensive introductions to the relevant theory to facilitate wider usage of NMR techniques by the chemical community."
http://www.rsc.org/shop/books/series/91.asp?seriesid=91

NMR Theses Recently Defended

Zhenghua Nie (McMaster University), August 2011

Supervisors: Profs. Christopher K. Anand and Alex D. Bain

Ph.D. thesis: "Simulation and Optimal Design of Nuclear Magnetic Resonance Experiments"
http://digitalcommons.mcmaster.ca/opendissertations/5543/

External Examiner: Prof. Elliott Burnell (UBC)

Myriam Laneville (Université Laval), October 2011

Supervisor: Prof. Michèle Auger

M.Sc. thesis: "Étude de la structure et des interactions membranaires de différents peptides amyloïdes"

On the move

Alan Wong (a former graduate student of Prof. Gang Wu, Queen's) has recently accepted the 1st-class Charge de Recherche (CR1) position with Centre National de la Recherche Scientifique (CNRS). He will hold the position at CEA-Saclay in France. His current research interests focus on methodology developments: Micro-volume Metabonomic NMR Spectroscopy, Magic-Angle Sample Spinning Magnetic Resonance Imaging and Detection with B1-gradient.

http://sites.google.com/site/alanwongnmr/home

Christopher Barr is the new NMR Facility manager in the Department of Chemistry, University of Victoria. At UVic Chris is replacing **Christine Greenwood**, a long-time NMR Facility manager who has recently retired.

To contact Chris Barr:
http://www.chemistry.uvic.ca/people/staff.php

Devon Fyson has joined the Bryce lab (uOttawa) as an honours project student.

Mustafa Zeybek has joined the Bryce lab as an Undergraduate Research Opportunity Program (UROP) student.

Upcoming NMR Events

NMR Winter School at CEA Saclay: Experiment and modelling in Structural NMR

November 28 - December 2, 2011, INSTN - CEA Saclay, France
http://www-instn.cea.fr/-2011-Events-.html#NMR

High-Throughput Structural Biology (J5) & **Structural Biology of Cellular Processes: From Atoms to Cells** (J6), Keystone Symposium

January 22-27, 2012, Keystone, Colorado
http://www.keystonesymposia.org/

Biophysical Society 56th Annual Meeting

February 25-29, 2012, San Diego, California
http://www.biophysics.org/2012meeting

53rd ENC

April 15-20, 2012, Miami, FL
http://www.enc-conference.org/

20th ISMRM Scientific Meeting and Exhibition of the International Society for Magnetic Resonance in Medicine

May 5-11, 2012, Melbourne, Australia
http://www.ismrm.org

CSC 2012, the 95th Canadian Chemistry Conference and Exhibition

May 26-30, 2012, Calgary, Alberta, Canada
http://www.csc2012.ca/

EUROMAR 2012

July 1-5, 2012, Dublin, Ireland
http://euromar2012.org

54th Rocky Mountain Conference on Analytical Chemistry

July 15-19, 2012, Copper Mountain, Colorado
http://www.rockychem.com/

ICMRBS 2012 the XXVth International Conference on Magnetic Resonance in Biological Systems

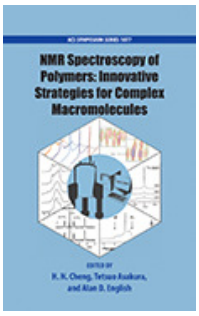
August 19-24, 2012, Lyon, France
http://www.pasteur.fr/infosci/conf/sb/ICMRBS/

SMASH 2012 Small Molecule NMR Conference

September 9-12, 2012, Providence, Rhode Island, USA
http://www.smashnmr.org/

New MR Books

NMR Spectroscopy of Polymers: Innovative Strategies for Complex Macromolecules



ACS Symposium Series, Volume 1077

Editors: **H.N. Cheng, T. Asakura, A.D. English**
Publisher: ACS, October 2011
Language: English
ISBN: 978-0841226678

http://dx.doi.org/10.1021/bk-2011-1077

This *ACS Symposium Series* book includes papers presented at the Symposium *"NMR Spectroscopy of Polymers - Innovative NMR Strategies for Complex Macromolecular Systems"* which was part of **Pacifichem 2010**, the 2010 International Chemical Congress of Pacific Basin Societies in Honolulu, Hawaii, December 15-20, 2010. Among over 30 contributions on the state-of-the-art NMR spectroscopy in polymers and related systems there are two chapters by Canadian NMR research groups.

P.M. Macdonald, "Diffusion NMR of Polymers in Bicelles," Chapter 14, *NMR Spectroscopy of Polymers: Innovative Strategies for Complex Macromolecules,* Eds. H.N. Cheng, T. Asakura, A.D. English, ACS (2011) pp. 221-250.
http://dx.doi.org/10.1021/bk-2011-1077.ch014

H. Thérien-Aubin, Y.J. Wang, and X.X. Zhu, "NMR Imaging and Its Application in the Study of Pharmaceutical Tablets," Chapter 27, *NMR Spectroscopy of Polymers: Innovative Strategies for Complex Macromolecules,* Eds. H.N. Cheng, T. Asakura, A.D. English, ACS (2011) pp. 441-457.
http://dx.doi.org/10.1021/bk-2011-1077.ch027

NMR Jobs and Vacancies

Postdoctoral Fellow - Structural Biology of the Ubiquitination Cycle

University of Alberta, Department of Biochemistry

Dr. Leo Spyracopoulos invites applications for a Postdoctoral Fellowship in structural biology of the ubiquitination cycle, with a focus on protein NMR spectroscopy. This is a one-year position, with the possibility of extension. Salary will be commensurate with qualifications and experience.

The Department of Biochemistry offers an intensive, collaborative environment for research in structural biology, housing state-of-the-art research facilities, which include high field 600 and 800 MHz NMR spectrometers.

The successful applicant will be employed primarily to study the structure, dynamics, interactions, and kinetics of proteins and enzymes of the ubiquitination cycle, with an emphasis on determining the molecular basis underlying the recognition of polyubiquitin chains as well as the enzymatic catalysis of ubiquitin chain elongation. Experience with general biochemistry, protein expression and purification, protein NMR spectroscopy, protein structure determination, molecular dynamics simulations, enzyme kinetics, and familiarity with computer programming and software (UNIX, Linux, Mathematica) is an asset. Responsibilities of the postdoctoral fellow include coordinating and completing research projects, training and mentoring graduate students, participating in research discussions, and working closely and cooperatively with other members of the Department involved in structural biology. The postdoctoral fellow will be expected to participate fully in research, publication, and dissemination activities.

Qualified candidates will have a recent Ph.D. in protein NMR spectroscopy or a closely related field. Applications will be accepted from candidates who will complete their doctoral degree within one year. Information about this position can be obtained by contacting **Dr. Leo Spyracopoulos**

leo.spyracopoulos@ualberta.ca

Applicants should send a letter of application, a curriculum vitae, and an example of published research to Dr. Leo Spyracopoulos by e-mail, or by regular mail:

Dr. Leo Spyracopoulos
Department of Biochemistry
Room 416, Medical Sciences Bldg.,
University of Alberta
Edmonton, Alberta, T6G 2H7
Canada

The University of Alberta welcomes diversity and encourages applications from all qualified women and men, including persons with disabilities, members of visible minorities, and Aboriginal persons.

Additional Information:

Department of Biochemistry:
http://www.biochem.ualberta.ca

Postdoctoral Fellows Office:
http://www.postdoc.ualberta.ca

the Spyracopoulos lab:
http://www.bionmr.ualberta.ca/~lspy/index.html

Postdoctoral Opening: Solid-State NMR Investigation of Battery Materials

Brown University, Providence, RI

A joint postdoctoral position is available at Brown University between the Department of Chemistry and the School of Engineering. The research project supported by the US Department of Energy is to investigate battery materials using solid-state NMR techniques including ^{129}Xe NMR. The successful candidate will benefit from strong collaborations between Chemistry and Engineering. Interested applicants should have a Ph.D. in Chemistry, Physics, Engineering, or a related discipline with an emphasis on solid-state NMR spectroscopy. Previous NMR experiences and expertise in one or more of the following areas are highly desirable: solid-state NMR spectroscopy, NMR instrumentation, electrochemistry, battery, ^{129}Xe NMR, materials synthesis and characterization.

Inquiries and applications should be directed by email to **Dr. Li-Qiong Wang**

li_qiong_wang@brown.edu

Applications should include a CV, brief description of research interests, and contact information for references.

Brown University situated on the College Hill in the historically and culturally rich city of Providence is a leading Ivy League institute

with distinctive undergraduate and graduate academic programs.

Brown University is an equal opportunity employer with a strong commitment to seeking diversity in its workforce.

Additional Information:

Brown University
http://www.brown.edu/

Department of Chemistry
http://chemistry.brown.edu/

School of Engineering
http://www.brown.edu/academics/engineering/

Dr. Li-Qiong Wang
http://www.chem.brown.edu/people/facultypage.php?id=1263922649

Metropolitan Museum of Art/University of Delaware

Postdoctoral position

The Metropolitan Museum of Art and the Department of Chemistry and Biochemistry of the University of Delaware have an immediate opening for a postdoctoral fellow to participate in a collaborative project funded by the Cultural Heritage Science Program of the National Science Foundation. The project involves making and characterizing model compounds and systems related to the stability of oil paintings, primarily using solid-state ^{13}C and ^{207}Pb NMR spectroscopy, as well as other techniques, to identify reactions of lead-containing pigments with the polymer matrix.

http://nmr900.ca/nmr_jobs.html#udmma

Listings of NMR jobs and vacancies

Canadian NMR Jobs
http://nmr900.ca/nmr_jobs.html

NMR Wiki
http://nmrwiki.org/wiki/index.php?title=Category:Jobs

NMR jobs on the NMR Information Server
http://www.spincore.com/nmrjobs/

AMPERE mailing list
https://listes.sc.univ-paris-diderot.fr/sympa/info/nmr

NMR jobs on SpectroscopyNow.com
http://www.spectroscopynow.com/coi/cda/list.cda?type=Job&chId=0

FG-MR Jobs
http://fgmrjobs.blogspot.com/

Canadian NMR Research Highlights

MetaboHunter

D. Tulpan, S. Léger, L. Belliveau, A. Culf, M. Cuperlovic-Culf, "MetaboHunter: an automatic approach for identification of metabolites from ^{1}H-NMR spectra of complex mixtures," *BMC Bioinformatics* **12** (2011) 400. (**open access**)
http://dx.doi.org/10.1186/1471-2105-12-400

Background One-dimensional ^{1}H-NMR spectroscopy is widely used for high-throughput characterization of metabolites in complex biological mixtures. However, the accurate identification of individual compounds is still a challenging task, particularly in spectral regions with higher peak densities. The need for automatic tools to facilitate and further improve the accuracy of such tasks, while using increasingly larger reference spectral libraries becomes a priority of current metabolomics research.

Results We introduce a web server application, called MetaboHunter, which can be used for automatic assignment of ^{1}H-NMR spectra of metabolites. MetaboHunter provides methods for automatic metabolite identification based on spectra or peak lists with three different search methods and with possibility for peak drift in a user defined spectral range. The assignment is performed using as reference libraries manually curated data from two major publicly available databases of NMR metabolite standard measurements (HMDB and MMCD). Tests using a variety of synthetic and experimental spectra of single and multi metabolite mixtures show that MetaboHunter is able to identify, in average, more than 80% of detectable metabolites from spectra of synthetic mixtures and more than 50% from spectra corresponding to experimental mixtures. This work also suggests that better scoring functions improve by more than 30% the performance of MetaboHunter's metabolite identification methods.

Conclusions MetaboHunter is a freely accessible, easy to use and user friendly ^{1}H-NMR-based web server application that provides efficient data input and pre-processing, flexible parameter settings, fast and automatic metabolite fingerprinting and results visualization via intuitive plotting and compound peak hit maps. Compared to other published and freely accessible metabolomics tools, MetaboHunter implements three efficient methods to search for metabolites in manually curated data from two reference libraries.
http://www.nrcbioinformatics.ca/metabohunter/

"Anarchy in the proteome" - interview with Julie Forman-Kay

Julie Forman-Kay (Hospital for Sick Children) speaks about her research in disordered proteins in a podcast interview to *the Chemistry World*. Available for download at

Chemistry World Podcast, August 2011, "6.05-13.00 Julie Forman-Kay reveals that disordered, unfolded proteins are much more functional and much more common than previously thought".

http://www.rsc.org/chemistryworld/podcast/2011/CWpodcastAug11.asp

Part of this interview is also featured in the printed August 2011 issue of the *Chemistry World* (subscription required): **M. Gross** "Anarchy in the proteome", *Chemistry World*, August 2011, Volume 8, No 8, p.42-45.
http://www.rsc.org/chemistryworld/Issues/2011/August/index.asp

***Encyclopedia of Magnetic Resonance*: new entries**

G. Wu "Oxygen 17 NMR Studies of Organic and Biological Molecules", *Encyclopedia of Magnetic Resonance* (2011).
http://dx.doi.org/10.1002/9780470034590.emrstm1212

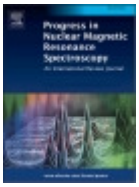
D.I. Hoult "Magnetic Resonance with Conducting and High-Dielectric Samples", *Encyclopedia of Magnetic Resonance* (2011).
http://dx.doi.org/10.1002/9780470034590.emrstm1182

Paper in *Angewandte Chemie*

E. MacDonald, L. Doyle, N. Burford, U. Werner-Zwanziger, and A. Decken, "Stannylphosphonium Cations," *Angewandte Chemie International Edition* (2011) online.
http://dx.doi.org/10.1002/anie.201105370

R.T. McKay, "How the 1D-NOESY suppresses solvent signal in metabonomics NMR spectroscopy: An examination of the pulse sequence components and evolution," *Concepts in Magnetic Resonance Part A* **38A** (2011) 197–220.
http://dx.doi.org/10.1002/cmr.a.20223

Progress in NMR Spectroscopy



J.L. Kitevski-LeBlanca and R.S. Prosser, "Current Applications of ^{19}F NMR to Studies of Protein Structure and Dynamics," *Progress in Nuclear Magnetic Resonance Spectroscopy* (2011) online. **(Invited Review)**
http://dx.doi.org/10.1016/j.pnmrs.2011.06.003

G. Wu and J. Zhu "NMR studies of alkali metal ions in organic and biological solids," *Progress in Nuclear Magnetic Resonance Spectroscopy* (2011) online. **(Invited Review)**
http://dx.doi.org/10.1016/j.pnmrs.2011.06.002

L.A. O'Dell "Direct Detection of Nitrogen-14 in Solid-State NMR Spectroscopy," *Progress in Nuclear Magnetic Resonance Spectroscopy* **59** (2011) 295-318. **(Invited Review)**
http://dx.doi.org/10.1016/j.pnmrs.2011.04.001

A.D. Bain and B. Berno, "Liouvillians in NMR: the Direct Method Revisited," *Progress in Nuclear Magnetic Resonance Spectroscopy* **59** (2011) 223-244. **(Invited Review)**
http://dx.doi.org/10.1016/j.pnmrs.2010.12.002

NMR papers in *Nature*

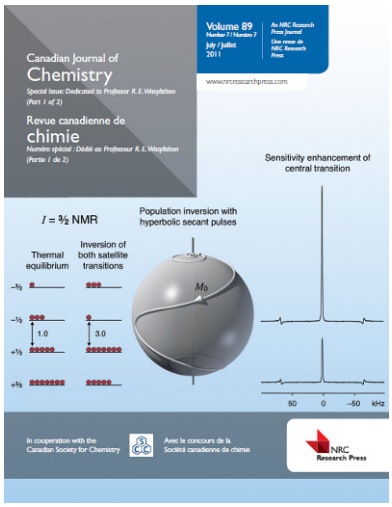
J.R. Bothe, E.N. Nikolova, C.D. Eichhorn, J. Chugh, A.L. Hansen and H.M. Al-Hashimi, "Characterizing RNA dynamics at atomic resolution using solution-state NMR spectroscopy," *Nature Methods* **8** (2011) 919–931. **(Review)**
http://dx.doi.org/10.1038/nmeth.1735

G. Bouvignies, P. Vallurupalli, D.F. Hansen, B.E. Correia, O. Lange, A. Bah, R.M. Vernon, F.W. Dahlquist, D. Baker & L.E. Kay, "Solution structure of a minor and transiently formed state of a T4 lysozyme mutant," *Nature* **477** (2011) 111–114.
http://dx.doi.org/10.1038/nature10349

T. Wu, H. Mayaffre, S. Krämer, M. Horvatic, C. Berthier, W.N. Hardy, R. Liang, D.A. Bonn and M.-H. Julien, "Magnetic-field-induced charge-stripe order in the high-temperature superconductor $YBa_2Cu_3O_y$," *Nature* **477** (2011) 191–194.
http://dx.doi.org/10.1038/nature10345

Canadian Journal of Chemistry

Special Issue Dedicated to Professor R.E. Wasylishen



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Exact calculation of the response of a quadrupolar nucleus to radio frequency irradiation
T. Leigh Spencer, Gillian R. Goward, Alex D. Bain
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Nuclear magnetic resonance and mass spectrometry studies of 2′,3′,5′-*O*-triacetylguanosine self-assembly in the presence of alkaline earth metal ions (Ca^{2+}, Sr^{2+}, Ba^{2+})
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Alan Wong, Mark E. Smith, Victor Terskikh, Gang Wu
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Structural analysis of lanthanum-containing battery materials using ^{139}La solid-state NMR
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M. Goswami, P.J.M. van Bentum, A.P.M. Kentgens
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Christopher W. Kirby, Jason L. McCallum, Bourlaye Fofana
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Participants of the ICASS 2009 NMR symposium in honour of Rod Wasylishen (August 2009, Kingston, ON). Photo credit: Irene Kwan

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Memorial University of Newfoundland

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