

THE GOLD STANDARD

General Newsletter

Analytical Chemistry Division, Canadian Society for Chemistry

Spring 2010

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Message From The Chair

My term as Chair of the Analytical Chemistry Division (ACD) is soon coming to a close. It is bittersweet as I have been privileged to have worked with many dedicated individuals in this field for more than a decade now, but I will now be unencumbered to enjoy the excellent science being presented in this division at future conferences.

We have an excellent analytical program at the upcoming CSC conference in Toronto, May 29-June 2, 2010. The sessions are listed later in the newsletter along with the organizers who have made it happen.

Several analytical sessions at the conference are joint sessions; with the Biological and Medicinal Division, Environmental Chemistry Division, Industrial Chemistry Division, Physical & Theoretical Division and the Surface Science Division. This highlights the healthy interdisciplinary nature of the field of Analytical Chemistry today.

Our annual Analytical Chemistry Division Dinner will be held at Pier 4 Storehouse Restaurant 245 Queens Quay West, Monday May 31, 7:30pm. We will be walking over from the ACD Annual General Meeting (6-7pm) at the Metro Toronto Convention Centre, Room 201F. So please attend the AGM and join us for dinner. A confirmation of attendance would be appreciated by e-mail (rmclaren@yorku.ca) or verbally at the CSC conference so I can confirm numbers.

I'd like to thank past chairs of the ACD I have worked with, Scott Willie and Karen Waldron, and the dedicated members of the current ACD executive; the ACD is left in good hands. We keenly thank Mike Thompson for organizing the Analytical program this year and we look forward to an exciting program next year in Montreal.



Sincerely
Rob McLaren
Chair - ACD/CSC
Director - Centre for Atmospheric Chemistry &
Department of Chemistry
York University

CONGRATULATIONS TO THE 2010 ANALYTICAL AWARD WINNERS

2010 Maxxam Award
Sponsored by Maxxam Analytics Inc.

Dr. Eric Reiner
**Ontario Ministry of the
Environment**

This award is presented to a scientist residing in Canada who has made a distinguished contribution in the field of Analytical Chemistry while working in Canada.

2010 Fred Beamish Award
Sponsored by Eli Lilly Canada Inc.

Dr. André Simpson
University of Toronto

The Fred Beamish Award is to recognize individuals who demonstrate innovation in research in the field of Analytical Chemistry, where the research is anticipated to have significant potential for practical applications.

2010 W.A.E. McBryde Medal

Dr. Xing-Fang Li
University of Alberta

This medal is to be presented as a mark of distinction and recognition for a significant achievement in pure or applied analytical chemistry by a young scientist working in Canada.

2010 Graduate Student Award
In Honor of Douglas E. Ryan

Dajana Vuckovic
University of Waterloo

This award is presented to an outstanding senior graduate student. The selection of the recipient is made on the basis of research contribution and the excellence of academic record.

Look for times, locations and abstracts for all 4 award winner lectures to be delivered at the CSC Conference in Toronto, May 29-June 2, 2010
<http://abstracts.csc2010.ca/>

93rd CANADIAN CHEMISTRY CONFERENCE AND EXHIBITION



Metro Toronto Convention Centre,
Toronto, Ontario, Canada
May 29 – June 2, 2010



The Analytical Chemistry program is being organized by Michael Thompson (University of Toronto) and can be viewed on the Web at <http://www.csc2010.ca/>

Topics for the analytical symposia this year are:

Advances in Microarray Technology and Analysis: Organizers - Paul Li & Eric Lagally

Analysis of Single Cells: Organizers - Paul Li & Eric Lagally

Biomaterials and Bioanalysis (Joint with BM): Organizers - Shana O. Kelley & Kagan Kerman

Electrochemistry and Electrocatalysis (with SS&PT): Organizers - Gregory Jerkiewicz & Michael Eikerling

Frontiers in Analytical Techniques in the Environment (with EN): Organizers - Hans Osthoff & Jen Murphy

General Analytical Chemistry: Organizer - Mike Thompson

Novel Separations and Detection in Analytical Chemistry: Applications in Academia, Government, and

Industry (Joint with IC): Organizer - Nicole Baryla

Problems and Perspectives for the Analytical Chemist in Biomarker Detection: Organizer - Mike Thompson

Posters - Analytical: Organizer - Mike Thompson

The ACD Annual General Meeting

The AGM will be held at the Toronto CSC Conference, Monday May 31, 6:00-7:00pm, MTCC Room 201F. Following the meeting we will proceed via foot from the Convention Centre to the highly anticipated and much talked about Annual ACD Dinner!

ACD Annual Dinner - an evening by the lake

Everyone is welcome, although advance sign-up by e-mail (rmclaren@yorku.ca) or at the conference is appreciated to verify numbers. Ask one of the executive members to sign up.

Date: Monday May 31, 2010, 7:30pm - after the Analytical AGM

Location: Pier 4 Storehouse Restaurant, 245 Queens Quay West, Toronto.

Group menu: \$40 incl. tax & grat, choice of appetizer & main, drinks/desert extra.

Post Dinner Activities: Watermark Irish Pub (207 Queens Quay West)

OTHER NEWS

ICASS 2010

56th International Conference on Analytical Sciences and Spectroscopy (ICASS 2010) sponsored by The Spectroscopy Society of Canada will be held in August 15-18, 2010 in Edmonton, Alberta.
For information visit: www.icass.ca or contact the conference chair: Prof. X. Chris Le, xc.le@ualberta.ca

ENVIROANALYSIS 2010

This will be held May 9-13, in Toronto, Ontario. More information can be obtained at
<http://www.enviroanalysis.ca/>

STUDENT NEWS

Undergraduate Student Conferences -2010

38th Southern Ontario Undergraduate Student Chemistry Conference (SOUSCC)

Was held at the University of Western Ontario, March, 2010.

Western Canadian Undergraduate Chemistry Conference (WCUCC)

University of Lethbridge, May 2010.

Information: Roxanne Shank, shankr2@uleth.ca

ChemCon (CIC-APICS Atlantic Student Chemistry Conference)

Dalhousie University, May 2010.

Information: Gianna Aleman, gianna.aleman@Dal.Ca

22^e Colloque de Chimie

University of Sherbrooke, October 22, 2010.

Information: <http://pages.usherbrooke.ca/colloque-chimie/>

The Chemical Institute of Canada's (CIC) Career Services.

- The CIC is the association for all chemical professionals in Canada.

-The CIC provides a unique online job networking resource CareerSite for all chemical professionals and students

<http://www.cheminst.ca/careers/>

Increase your career opportunities by taking advantage of the CIC Career Services. Access Canada's sole chemical related job site. Opportunities abound! Receive multiple benefits with membership to The Chemical Institute of Canada.



OTHER BENEFITS OF MEMBERSHIP IN THE ACD (CSC)

In addition to the activities of the particular Student Chapter, membership will confer the following benefits for students:

- Receipt of Canadian Chemical News/ L'Actualité Chimique Canadienne for members in 2nd and higher years (by bulk mail);
- Eligibility to apply for group insurance on car and home insurance through Monnex Inc.;
- Use of the CIC Employment Service for students in the final year of their program who are seeking permanent employment after graduation;
- Substantially reduced registration fees for the annual CSC Conference;
- Full membership in the CSC in the first year after graduation for one-half of the full membership fee.

Eligibility for a range of scholarships and awards, a comprehensive list of which is given in this newsletter.

SCIENCE WEBSITES

www.chemweb.com/
www.chemcenter.org

FURTHER INFORMATION ON ANALYTICAL CHEMISTRY

ACD Web Page: <http://www.cheminst.ca/division/analytical/>

ACS Graduate Education in Analytical Chemistry:

http://www.acs-analytical.duq.edu/education_information.html



STUDENT AWARDS

ACD Undergraduate Student Travel Award

The intent of the award is to honor outstanding senior undergraduate students in analytical chemistry, to encourage them into postgraduate studies and to expose them to a stimulating scientific environment at the annual Canadian Chemical Conference. The Undergraduate Student Travel awards are open to all undergraduate students pursuing studies in the area of Analytical Chemistry and in attendance of a Canadian University, irrespective of the conference site of a given year. Each winner is expected to give a poster presentation of his/her work at the conference.

An award of \$500 will be made on the basis of the academic excellence and research promise of the nominees. These students will normally have completed a summer research project, or a Co-op term, or a senior year research project, in the area of analytical chemistry. The undergraduate student travel awardees and their supervisors are invited to attend the ACD Award Reception after the Annual General Meeting of the ACD at the annual meeting.

Each University Chemistry Department may nominate one candidate.

For more information concerning this award, Contact the Chair of the ACD

ACD Graduate Student Poster Awards Toronto, 2010

Graduate students who will be making poster presentations on a subject related to Analytical Chemistry in the ACD poster session are eligible for this award. Only one submission per student is permitted.

An *ad hoc* judging committee will be established prior to the meeting. Committee members will question each candidate and assess the quality of the poster. Two or three awards will be given.

Students that had not flagged their abstract for "Award" can still be considered by contacting rmclaren@yorku.ca or advising the judging committee at the conference.

Douglas Ryan Award Walter Harris Award (Graduate Student award)

These prestigious awards, named in honour of two senior and well-known analytical chemists in Canada (Dr. Douglas Ryan of Dalhousie University and Dr. Walter Harris from the University of Alberta) are presented in alternate years to an outstanding senior graduate student in analytical chemistry in Canada. Nominations are solicited from Canadian Universities each fall, by contacting both Chemistry Department Heads and all Professors who are active in research in analytical chemistry. The selection of the recipient is made on the basis of outstanding research contributions and the excellence of the academic record. The recipient of the award, who receives a cash award and framed certificate, is expected to make a presentation at the next annual CSC meeting. The awardee, and supervisor, are invited to attend the ACD Award Reception, normally held after the Annual General Meeting of the ACD at the annual CSC conference.

For more information about this award, contact the Analytical Division chairperson.

Research Profile

Professor Maxim V. Berezovski **University of Ottawa**

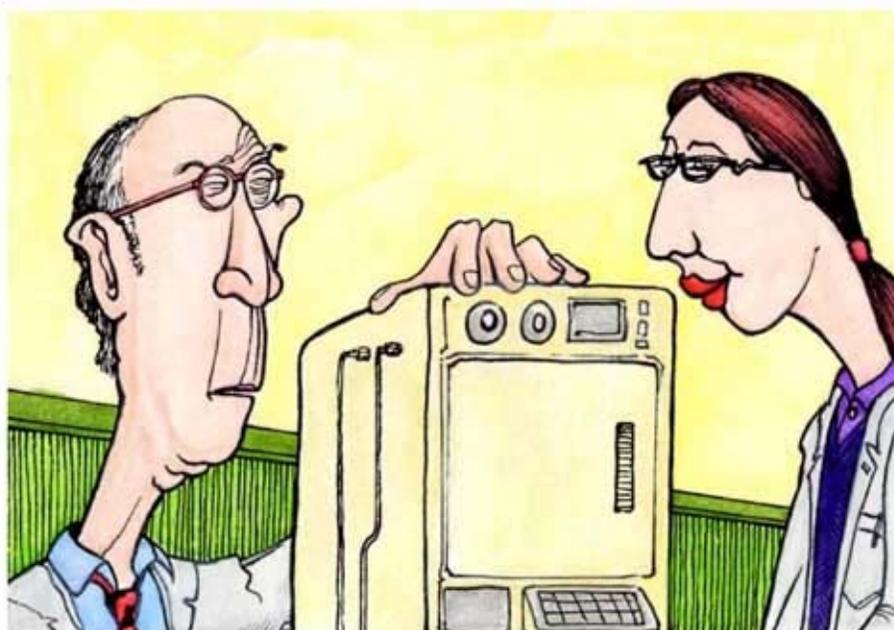


My research has been focused on the selection of aptamers from a combinatorial DNA library by Kinetic Capillary Electrophoresis (KCE). We applied KCE to select and characterize aptamers that bind to recombinant proteins. Aptamers are nucleic acid-based synthetic ligands with big potential to change the field of affinity probes and replace antibodies as diagnostic, analytical and therapeutic reagents. Aptamers were selected from a large library of random DNA sequences in a general approach termed "Systematic Evolution of Ligands by Exponential enrichment" (SELEX), involving repetitive rounds of (i) partitioning aptamers from non-aptamers by separating target-bound DNA from free DNA; and (ii) amplifying aptamers by the polymerase chain reaction (PCR). Following several rounds of selection, aptamers were cloned and sequenced. A single round of KCE-based selection was sufficient to obtain protein-specific aptamers exhibiting sub-nanomolar affinity. The entire selection procedure required approximately five days and needed only micrograms amount of the target protein. We also developed a breakthrough technology for non-SELEX selection of aptamers, which does not require intermediate PCR amplification, thereby accelerating aptamer selection without compromising accuracy. Non-SELEX provides a viable alternative to SELEX in commercial development of aptamers. More importantly, it points toward the as-yet unexploited opportunity for selection of drug candidates from large non-DNA libraries (small molecules and peptides), which cannot be amplified via PCR and are thus not amenable to SELEX. Fundamentally, KCE enables development of functional or "smart" aptamers: ligands with pre-defined rate and equilibrium constants (k_{on} , k_{off} , and K_d). For example, we demonstrated the detection of a protein in a wide dynamic range (pM - mM) by a mixture of three smart aptamers.

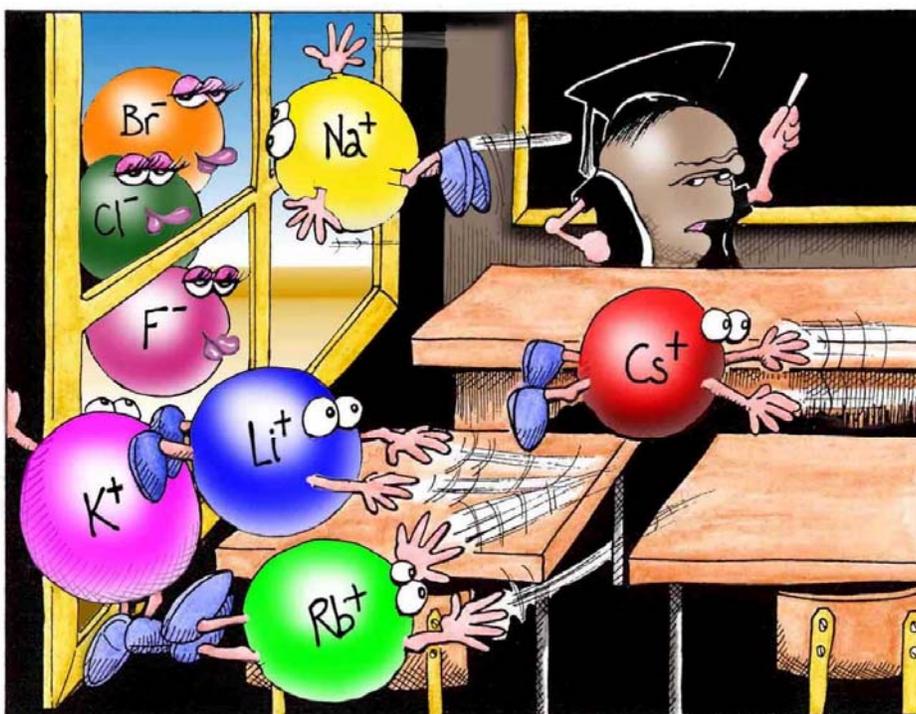
SELEX and non-SELEX technologies are effective and efficient technologies for aptamer selection in simple media, but have substantial limitations in complex mixtures (cell lysates and live cells). To overcome these limitations, we developed two additional approaches: Aptamer-facilitated Protein Isolation from Cells (AptaPIC) and Aptamer-facilitated Biomarker Discovery (AptaBiD), for the selection of aptamers to targets in complex mixtures. In AptaPIC, aptamers are developed to select for a protein in a cell lysate (i.e. in the presence of many other proteins and biomolecules), enabling isolation of the protein with an expression level as low as 1% of total protein. AptaBiD enables biomarker discovery of live cells, by selection of cell-specific DNA aptamers, integrating: (i) selection of DNA aptamers to biomarkers on the surface of live cells, (ii) separation of cells containing biomarkers from cells without biomarkers, using the aptamers as affinity probes, (iii) isolation of biomarkers from cells, again using the aptamers, and (iv) identification of biomarkers by mass spectrometry. As proof of principle, we used this technology to discover new surface biomarkers that distinguish live activated mature dendritic cells (mDCs) and non-activated immature dendritic cells (iDCs). AptaBiD holds promise as a transformative technology, because at present, it is the only approach able to uncover biomarkers in their native states. Moreover, it immediately generates synthetic affinity probes to these new biomarkers. Emerging work points toward potential use of cell specific aptamers in flow cytometry analysis and drug development as an alternative to Abs.

Our current research targets the design of new aptamer-based tools for understanding fundamental elements of cellular metabolism, transcriptional regulation and the immune response. Specifically, we intend to explore the capacity of aptamers to modulate cellular activity, and to function as pathogen biosensors and synthetic probes for cell imaging and biomarker discovery.

Maxim V. Berezovski
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"Yes, love is a potent drug indeed, Miss Cruickshank... But I still don't think we can analyze it using Gas Chromatography..."



"Perhaps one of you gentlemen would mind telling me just what it is outside the window that you find so attractive...?"

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2010 CSC Meeting

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