Department of Chemistry

PARKER COMMUNICATIONS

DECEMBER 15, 2016

UNIVERSITY OF MANITOBA

A Note From The Department

Dear Alumni and Friends of the Department of Chemistry,

It is my honour and privilege to share with you, departmental highlights from the past year. This year, we revived the tradition of sending departmental semi-annual newsletter to our former graduates and friends as we, as a Department, would like to stay connected with you. Last year, the Department graduated 34 undergraduate and 12 graduate chemistry and biochemistry students. With the help of donors, alumni, and central administration, our undergraduate Physical Chemistry Laboratories were renovated last summer, while thanks to an amazing donation from Dr. David McBride, we were able to equip our Physical Chemistry, Biochemistry, and the first-year chemistry laboratories with cutting-edge educational instruments. We are in the process of finalizing the design of the new first-year laboratories, which will be renovated during the Summer of 2017 and 2018. This year, our undergraduate Chemistry Club moved into a remodeled spacious room on the first floor of the Parker Building. As usual, students in the Chemistry Club are busy with a large variety of outreach activities as highlighted in the report below. The Departmental research profile is very strong as evident from the numerous research papers and presentations given by our faculty members as well as undergraduate and graduate students at local, national, and international conferences. This year, one of the research laboratories of Prof. Jennifer van Wijngaarden was renovated and the COGRAD research center was brought to operational conditions by Drs. Gregg Tomy and Jörg Stetefeld. We are also excited about a new Departmental web-page, which will become active at the beginning of January.

All our Departmental accomplishments in education, research, and service are significantly enhanced by the generous support of friends and alumni. Your contribution will help us to provide our deserving undergraduate and graduate students with scholarships, maintain summer undergraduate research programs, support Chemistry Club activities, update our instructional and research laboratories, and improve Departmental research infrastructure. We will be delighted to learn about your recent accomplishments and success stories. Please stop by if you are in the area and we will be happy to share with you our news. We hope to stay connected with you for a long time! Please share our newsletter with others we haven't reached at this time - it would be greatly appreciated. We will provide you with many new and exciting updates in our next issue.

With best regards,

Victor Nemykin

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WE WANT TO HEAR FROM YOU!

Do you have any news that you would like us to feature in our next issue? We are eager to hear from our alumni and friends and support their endeavors. Please contact us!

Department of Chemistry, University of Manitoba
chem_dept@umanitoba.ca

Honoured Chemistry Alumnus: Dr. R. J. Dwayne Miller

In 2016, the Faculty of Science established seven Honoured Alumni Awards to celebrate the extraordinary accomplishments and contributions of graduates from our seven Departments. The inaugural awardee in Chemistry was Professor R. J. Dwayne Miller who obtained a BSc in Chemistry and Immunology in 1978. Dr. Miller earned a Ph.D. in 1983 from Stanford University moving directly to a faculty position at the University of Rochester upon graduation. In 1995, he relocated his research group to the University of Toronto to take up the NSERC Lumonics Chair in Quantum Optics. The motivation for this move was to dedicate his group to the study of fast atomic dynamics in biological systems. By designing a new generation of electron guns, his group was the first to be able to capture atomic motions with femtosecond time resolution. This work has realized a long held dream to watch atoms in real time during a chemical event, i.e. to watch atoms move during the breaking or making of a chemical bond. A fifteen-year effort was finally realized in 2003 with the cover story of Science first announcing it to the world. He has since taken up the Directorship of the Max Planck Group for Atomically Resolved Dynamics at the Center for Free Electron Laser Science in Hamburg and now splits his time between the University of Hamburg and the University of Toronto. At Hamburg Miller has built a new Max Planck Institute in the field he has pioneered.

Dr. Miller has published over 190 research articles, one book, and several seminal reviews. His achievements have been recognized with an abundance of very prestigious awards from scientific bodies and universities in Canada, the United States, Europe and Japan. In 2016, Professor Miller was awarded the British Royal Society of Chemistry Centenary Prize and in 2015 the E. Bright Wilson Award for Spectroscopy by the American Chemical Society in recognition of his discoveries that have created an entirely new field of science. Dr. Miller has received the highest prizes available to Chemistry and Physics researchers in Canada including the John Polyani Award, and the Royal Society of Canada Rutherford Medal. Internationally, he has earned the Humboldt Award, the US National Science Foundation Young Investigator Award and a NATO Science Fellowship. Notable too are the many lectureships he has been awarded in recognition of his groundbreaking discoveries as well as his leadership in teaching; the Camille and Henry Dreyfus Teacher-Scholar Award is one example of the recognition he has earned for his outstanding teaching. Professor Miller was also elected to the Royal Society of Canada and is a board member of many scientific organizations including the Scientific Advisory Board of the Stanford Linear Accelerator to name just one. He is on the Editorial Board of the Journal of Chemical Physics; the Advisory Editorial Board of Chemical Physics and Chemical Physics Letters; and has been Program Chair and General Chair of Ultrafast Phenomena, the most prestigious meeting in his field.

By designing a new generation of electron guns, his group was the first to be able to capture atomic motions with femtosecond time resolution.

On top of his scientific exploits, Dwayne is also dedicated to the promotion of science education through high school outreach and teacher training programs. He has served as a Board Member and Chair of Scientists in School that has helped bring interactive science experiments to the classrooms of now over 500,000 children yearly. His most significant accomplishment came with his founding of Science Rendezvous. This annual event exposes the general public to the importance of science and provides a means to keep the public engaged and active in support of science that is so critical to our collective future. This event has now gone National in Canada and with over 150,000 attendees and 4000 volunteers it has become the largest event of its kind. Professor Miller was awarded the McNeil Medal in 2011 from the Royal

Society of Canada for his strong advocacy and leadership in the promotion of science to the general public.

The Department was delighted to receive a visit from Professor Miller on January 21 and 22, 2016. Dr. Miller visited with students and faculty over the two days, received his Award and participated in a panel discussion with Science students meant to highlight the value of a Science degree and the limitless career opportunities it affords. He also presented a general seminar on atomic dynamics aimed at undergraduates and a more advanced seminar to our Department on his research. Current and past members of the Department were thrilled by his visit and his highly thought-provoking talks, and rightly proud of our small contribution to his extraordinary success.

For more information about some of the Dr. R. J. Dwayne Miller's science education projects, please visit:

www.scientistsinschool.ca
www.sciencerendezvous.ca

Stefi Baum, Dean, Faculty of Science presents Dr. R.J. Dwayne Miller with Honoured Alumni Award at 2016 event.

A New Research Centre in Parker Building

On January 17, 2015 the Federal Government announced the formation of a new Research Centre to be located on the 5th floor of the Parker Chemistry building. Led by Drs. Gregg Tomy and Jörg Stetefeld the Canadian Oil and Gas Research and Development Centre (COGRAD) is an internationally accredited Centre funded in part by a $2.4 million grant from the Western Economic Diversification fund. There is no other Centre in Western Canada that has the capacity of COGRAD and some of the instrumentation in the Centre is unique in Canada.

COGRAD has two components. The first component is based on Dr. Tomy's expertise in Environmental Analysis. He will use a unique-in-Canada 2D gas chromatograph coupled to a high-resolution time-of-flight mass spectrometer to fingerprint complex crude oil residues in the environment. This will be done to support Canada's oil and gas industry. Stantec Consulting Ltd., a Canadian oil and gas consultant, has identified a largely unmet demand for government-mandated environmental monitoring in connection with, for example, existing and proposed pipelines. The new research centre not only will provide state-of-the-art environmental monitoring but will also work to support private sector monitoring companies. The intent is not to compete with the private sector but to support it and at the same time improve environmental monitoring in Canada related to the oil and gas sector.

continued over...

A New Research Centre continued

The second major activity of COGRAD is to develop more sensitive, faster and more cost-effective environmental monitoring methods for the oil and gas sector and, under the direction of Dr. Jörg Stetefeld, to develop environmental oil and gas spill remediation tools. Once it is in full operation, COGRAD is expected to generate significant revenue generated entirely from environmental testing alone. On the research side, it is expected that the development of improved monitoring and remediation tools will generate significant additional revenues for the Centre. Already, COGRAD has had a huge impact on the Department of Chemistry through the introduction of state-of-the-art instrumentation available for graduate and undergraduate research projects amounting to a large expansion of the research capacity of our Department. In addition, COGRAD has provided employment for several Manitobans and research projects for chemistry and biochemistry graduate and undergraduate students. Dr. Tomy and Dr. Stetefeld are about to make a significant contribution to Canadian environmental monitoring and the remediation of oil and gas spills. Besides the obvious environmental benefits the Centre is also poised to generate significant employment, intellectual property, and economic benefits to our Province and University. This is a singular achievement and bodes well for the future of our education and research programs.

For more information, visit www.COGRAD.ca

Dr. Gregg Tomy

Dr. Jörg Stetefeld

Dr. Frank Schweizer

Global Crisis: U of M breakthrough

Research teams 'out-of-the-box' thinking delivers promising ammunition in war with antibiotic-resistant bacteria

A research team led by Dr. Frank Schweizer received significant attention in the media this past year for tackling one of the most daunting public-health threats of our generation, antibiotic-resistant bacteria. Schweizer's team has created a hybrid antibiotic that ties moxifloxacin and tobramycin together using a "rope" of carbon molecules, creating a new, hybrid antibiotic.

Their "bizarre" molecule has shown promise in the battle against *Pseudomonas aeruginosa*, generally considered to be one of the most challenging pathogens we face. The next step is turning the promise into a significant arsenal on the front-line medicine.

The research was published on August 13, 2016 by the Journal of Medicinal Chemistry visit http://pubs.acs.org/doi/abs/10.1021/acs.jmedchem.6b00867.

Lab Renovations in Parker

Graduate student TA Jeff Perkins assists physical chemistry student Danzel Ramirez in the new teaching lab.

If you haven't stopped by the Parker Building lately, you may have trouble recognizing some of our labs!
The Department is grateful to the commitment shown by the University of Manitoba to renewal of its infrastructure over the last decade. 2016 was a busy year for the Parker building with major renovations completed to two research laboratories and one teaching laboratory. This shows recognition that science and how we do it has changed since the Parker building was built more than 50 years ago. Modern researchers need modern tools housed in modern facilities. Gone are Bunsen burners, rows of dusty chemicals and shelves of glassware. Today, the diverse questions being asked by chemists require us to have chemistry labs that are filled with high tech instruments that need clean, dry space; that need stable electrical connections, sound damping, heat dissipation and reliable internet. Also, safety protocols have changed since the Parker building was first opened and it's important that spaces be well-lit, well-ventilated and that researchers have quick access to emergency equipment. Renovations to the Physical Chemistry teaching lab (3rd floor) were completed in September and our first group of undergraduate students have christened the space in our CHEM 2260 Introduction to Spectroscopy course. In the courses that this lab supports, students work at a different station each week which requires the lab to be set up for multiple experiments at a time. As computational tools are becoming more important for all chemists, our undergraduate students gain critical experience with these methods in the Physical Chemistry lab. The renovation has allowed dedicated space for computational modelling. The $675,000 renovation was funded through central administration's Teaching Laboratory Renewal fund.

Renovations to Dr. van Wijngaarden's research lab (1st floor) were designed to house one of her custom-built high resolution microwave spectrometers used to probe the structure and dynamics of astrochemical species. In addition to connecting the space to her adjacent lab for easier access, the $320,000 renovation added the key infrastructure required for a modern spectroscopy lab including installation of a stainless steel gas manifold, soldering station, water cooling lines and custom-made cabinetry to support the large vacuum pumps used to simulate the conditions in space. This update was funded through the Research Support Fund which is derived from federal money given to the University of Manitoba to maintain infrastructure supporting tri-council research (NSERC, SSHRC, CIHR).

Finally, a $780,000 renovation of Dr. Tomy's adjoining laboratories on the 5th floor was completed in July. The Centre for Oil and Gas Research and Development (COGRAD) is a newly established state-of-the-art analytical facility committed to advancing and supporting environmental science as it relates to crude oil and natural gas. Because the Centre operates under the International Standards Organization 17025 Quality System, consolidating analytical instrumentation into a single laboratory was mandatory. More information on the Centre can be found at www.COGRAD.ca.

The outlook for 2017 looks equally promising. Two of the 1st year chemistry teaching laboratories are slated for renovation starting in summer.

Notes from the Graduate Chair

The Department is currently home to 56 graduate students working towards M.Sc. and Ph. D. degrees in Chemistry and Biochemistry. They form the core of our research efforts. Our graduate students have diverse backgrounds and have brought a wealth of experience to our program from their home countries which include China, Colombia, India, Iran, Nigeria, Portugal and the U.S. to name but a few! Each student accepted into our graduate program is guaranteed a minimum stipend of $20 000/year (M.Sc., 2 years) or $22 000/year (Ph.D., 4 years) which is paid through faculty research grants and teaching assistantships within the Department. Thanks to the generosity of our donors, we are also able to offer approximately 40 Department scholarships each year which are given in addition to the annual stipend. These endowments are critical to the Department's research efforts as they have allowed us to compete with other universities to attract the best graduate students to Manitoba.

Meet Ph. D. student Matt McDougall

The Department would like to extend its congratulations to Ph. D. student Matt McDougall whose research under the guidance of Dr. Jörg Stetefeld was recently featured in Nature Communications (doi: 10.1038/ncomms13515). This high profile article, a collaboration with groups in France, Germany, Switzerland, the U. S. and the U. K., reports on the team's work to determine the crystal structure and function of netrin-4. The netrin family of proteins are extremely important guidance molecules; the most famous member, netrin-1, guides the growth of neurons through interactions with effector molecules. Its less-studied cousin, netrin-4, was thought to work in a similar manner, but the Stetefeld team uncovered an entirely new and unique mode of action for its axon growth promotion and anticancer activities. They found that netrin-4 interacts directly with basement membrane components to regulate basement membrane permeability. This discovery opens up the possibility that netrin-4 may become a target in future cancer treatments because tumour survival depends critically on the development and maintenance of a specialized tumour blood supply that is now known to be disrupted by netrin-4 interactions with the basement membrane.

In addition to being a lead author on this seminal paper, Matt is wrapping up his Ph. D. research and plans to stay in Manitoba to work with the Center for Oil and Gas Research and Development (COGRAD), founded by Tomy and Stetefeld. This will build on his Ph. D. research and involves adapting a protein from deep-sea archaea to bind PAHs, a class of pollutants that are difficult to measure with current technology.

Matt is from Selkirk, Manitoba and enrolled as an undergraduate student in our Department in 2007. He spent his summers working heavy construction on highways and in railyards, and had no research experience until his final year of his B. Sc. degree when he completed an Honours research project with Dr. Stetefeld. At that point, he realized that he had barely scratched the surface of what he could learn by working in the Stetefeld group and thus decided to stay in Manitoba for his Ph. D. Matt credits the facilities and knowledge within the Department with creating an exceptional environment for graduate student learning.

Undergraduate Student Research Projects

Over the past two years we have had two very strong groups of students in the Research Project Course in Chemistry and Biochemistry (CHEM 4710). This is an independent research project course which extends over both the fall and winter terms. Students arrange to work with a professor on a mutually agreeable research problem. In the 2015/2016 academic year there were 12 students enrolled in CHEM 4710. The presence of several new faculty members in the department was clearly a major attraction as over half of these students were supervised by our newest members. The projects ranged from the extraction and analysis of hydrocarbons from wastewater to the latest in novel methodologies in organic synthesis. There were also projects that examined the expression of proteins involved in cell apoptosis, the synthesis of selective enzyme activators, and the development of organometallics for novel applications. The course was capped off with a day-long symposium where the students presented a talk on their work to the Department.

The 2016/2017 CHEM 4710 course is also off to a very strong start. There are 15 students participating this year, three of whom are being supervised by our adjunct faculty members. This current year also offers a broad range of projects from the synthesis of natural products to the latest in separations technology and the development of novel techniques for the analysis of proteins. The CHEM 4710 students are required to submit an interim report in early December and a full research report by mid-April. They are scheduled to give their final oral presentation on their projects on Saturday April 8th. These presentations are open to the entire university community and are an excellent chance to learn about the latest research in the Department of Chemistry.

Nicole Nolasco's honours project is conducted in Dr.John Sorensen's research laboratory

The CHEM 4710 students are ...scheduled to give their final oral presentation on their projects on Saturday April 8th. These presentations are open to the entire university community and are an excellent chance to learn about the latest research in the Department of Chemistry.

Sixteen undergraduate students worked in eight different research labs during the summer of 2016. Eleven of the 16 students held Faculty, University or NSERC Summer Scholarships. Our undergraduates make a highly valued contribution to our research efforts. The undergraduates in turn are rewarded by their research experiences that are an important opportunity for them to participate in discovery and network with graduate students, postdoctoral fellows and faculty.

Undergraduate Chemistry Society enters School Year with some Smashes and Bangs

The Undergraduate Chemistry Society (aka Chem Club) has had an exciting and event filled year. In the summer, the student's basement clubhouse (Parker 134) was closed for a long overdue update. The Club executives, members and their liaison, Dr. Davis spent nights and weekends throughout the summer cleaning, painting and bringing in new furniture to accommodate the study and social needs of the group. Thanks to the hard work of the students and donations from the Chemistry Department, the renovations were completed in September. With over 50 members, the redesigned space has provided room for students to study and socialize.

Promoting Chemistry

The Chem Club has also taken on a big responsibility in outreach and are doing a great job promoting chemistry. In the fall, they drew crowds at the Science Fair hosted by the Science Students Association. Their show stopping performance was a hit with high-school seniors at this year's Evening of Excellence recruitment event . In the coming months they will be taking their game to the next level by hosting a chemistry night for interested high-school students. We are lucky to have such motivated and engaging students and we thank them for their efforts!

Featured Undergraduate Students

Sophia Schreckenbach and Tristan Smythe are outstanding honours undergraduate students. They are pursuing research projects in the brand-new analytical chemistry laboratory of Dr. Gregg Tomy, on the fifth floor of the Parker Building.

Sophia explains that her interest in Chemistry is not just because her father is Dr. Georg Schreckenbach of our Department. "I've always liked math and science, and have always been interested in environmental issues… Once I learned that the chemistry department had a program in environmental chemistry, I knew I'd found the perfect fit for me!" Tristan says he was attracted by the human side of chemistry: "Of the main STEM sciences, chemistry always appealed to me the most. But it wasn't the lab coats, flasks, reactions, and colours that got me hooked; it was the friendly and relaxed community here at the U of M, and getting first-hand experience using analytical chemistry techniques to answer questions about human impacts on the environment."

"I've always liked math and science, and have always been interested in environmental issues… Once I learned that the chemistry department had a program in environmental chemistry, I knew I'd found the perfect fit for me!"

Sophia and Tristan attended the 2016 Canadian Society for Chemistry conference in Halifax where they presented some of their Honours research. This year their chemistry also led to exciting international experiences. Sophia spent 3 months at the Paul Scherrer Institute in Switzerland

(L-R) Tristan Smythe and Sophia Schreckenbach prepare samples for the time-of-flight mass spectrometer.

supported by a ThinkSwiss Scholarship, where she examined glacial ice cores for evidence of climate trends in the past. She has written a blog describing her Swiss visit, and the thrill of working at the top of the Jungfraujoch glacier.

In February Tristan represented the University of Manitoba at the 7th Annual Japan-Canada Academic Consortium (JACAC) Student Forum held at Nagoya University. The theme of this year's conference was "Energy and Society: Increasing Efficiency and Improving Our Quality of Life". Tristan worked with a group of Canadian and Japanese students to draft a proposal titled "Improving Energy Conservation in the Residential Sector in Canada".

Tristan and Sophia are not only top students academically; they are both active on campus. Tristan is a student representative on the University Senate, and he is a leader in the Chemistry Club in the Department. He was the co-chair

"…my degree and research experience within this department has put me in a great position to continue pursuing a Ph.D. in Environmental/Analytical Chemistry. I think that as we continue to produce new materials and release them into the environment, it is important to have people trained in their detection and monitoring, and I'd love to get the chance to build my own research team based on my experiences here in this department."

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of the Western Canadian Undergraduate Chemistry Conference (WCUCC) held at the University of Manitoba in May 2016. Sophia is also active in the Chem Club. She received an Emerging Leader Award in 2015, and this year she is a Supplementary Instruction leader giving tutorials for students in the second-year Organic Chemistry classes.

Where are these students going next? Sophia writes "I haven't decided yet, but I'm planning to pursue either a M.Sc. or a Ph.D. in Environmental/ Analytical Chemistry. Through getting the opportunity to do a lot of research here in the department, I've come to realize that I really enjoy it! I hope to build on the experience I've gotten so far, and eventually go into a career in environmental research." Tristan has a similar plan: "…my degree and research experience within this department has put me in a great position to continue pursuing a Ph.D. in Environmental/Analytical Chemistry. I think that as we continue to produce new materials and release them into the environment, it is important to have people trained in their detection and monitoring, and I'd love to get the chance to build my own research team based on my experiences here in this department."

"...I think that as we continue to produce new materials and release them into the environment, it is important to have people trained in their detection and monitoring..."

Western Canadian Undergraduate Chemistry Conference

From May 5-7, 2016 the University of Manitoba Undergraduate Chemistry Society hosted the Western Canadian Undergraduate Chemistry Conference (WCUCC) on the campus of the University of Manitoba. The WCUCC is held annually under the auspices of the Chemical Institute of Canada, and is an opportunity for undergraduate Chemistry students from Western Canada to present their research results, listen to high quality research seminars, and network with the best and brightest students. For many of the participants it was their first scientific conference and they found meeting and sharing their research with other like-minded chemistry students highly rewarding both educationally and personally.

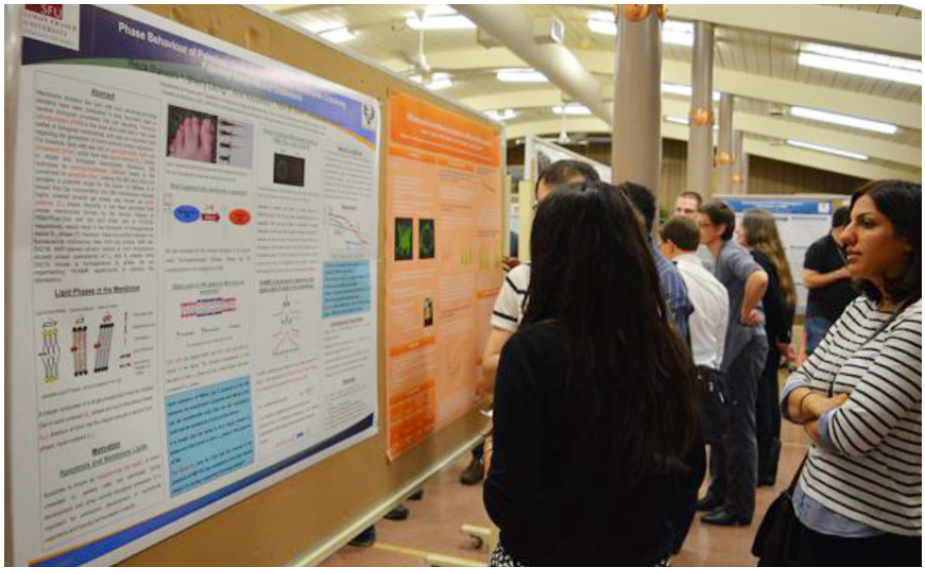
The organizing committee was led by Tristan Smythe, Courtney Clark, and Simarpreet Singh, who were assisted by Wes Johnson, Jennifer Page, Tyler Saj, and Danielle Wilson, all under the guidance of Dr. Davis, their faculty liaison. The committee worked tirelessly over the course of a year to attract sponsors, create a web site, invite outstanding and multidisciplinary keynote speakers and organize an event filled schedule of talks, poster sessions and banquets. The keynote speakers were: Dr. Robert McMahon from the University of Wisconsin-Madison; Dr. Tim Kelly from the University of Saskatchewan; Dr. Peter Ross from the Vancouver Aquarium; and our own Dr. Jörg Stetefeld. The conference attracted nearly 40 undergraduates from the western provinces by any measure it was a fabulous success. Congratulations to everyone involved!

Members of the WCUCC executive committee (left to right: Wes Johnson, Tristan Smythe, Tyler Saj, Jennifer Page, Simarpreet Singh, Courtney Clark, Danielle Wilson)

For more information, please visit: http://wcucc2016.weebly.com/

Biophysical Society of Canada Annual Meeting

The Biophysical Society of Canada Annual Meeting, the National Lecture by Dr. Lewis Kay (University of Toronto): "NMR: Why Bother?" St. Pauls College.



Poster session in Hanley Hall

The 2nd Annual Meeting of the Biophysical Society of Canada was held on June 1-3, 2016 in St. Paul's College of the University of Manitoba. This symposium was organized by a committee chaired by Dr. Mazdak Khajehpour.

The meeting was a great success and approximately 150 attendees took part in this conference. The meeting was inaugurated by an opening lecture by Dr. Susan Marqusee (University of California-Berkeley): "Touring the Protein Folding Landscape: The View Depends on How and Where You Look". Other notable scientific highlights of the conference were the National Lecture by Dr. Lewis Kay (University of Toronto): "NMR: Why Bother?" and Keynote Lectures by Drs. John Katsaras (Oakridge National Laboratory), Alex Mogilner (New York University), Michael Schlame (New York University), Valerian Kagan (University of Pittsburgh), Kranthi Mandadapu (University of California-Berkeley) and Robert Matthews (University of Massachusetts-Amherst).

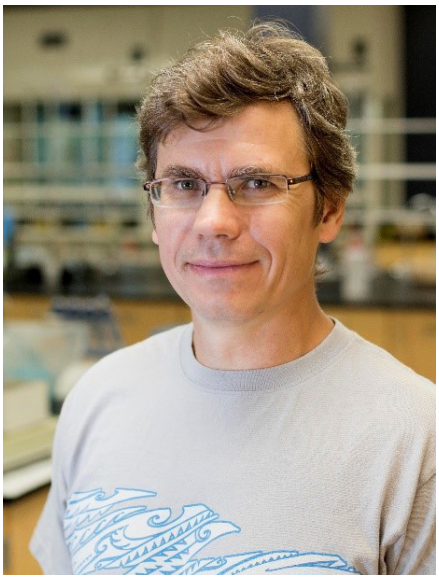
Congratulations to our students Edis Dzananovic and Jaryd Sullivan, for winning two of the poster awards of this conference.

For more information visit: http://www.biophysicalsociety.ca/

New Department Head, Dr. Victor Nemykin

The Department welcomed a new colleague, Dr. Victor Nemykin, in July 2016 to serve as Department Head. Dr. Nemykin came to us from the University of Minnesota (Duluth) where he was a faculty member since 2004 and held the rank of Professor. Following a B.Sc. in Chemistry at Kiev State University, he pursued a Ph.D. at the Institute of General and Inorganic Chemistry at Ukrainian Academy of Sciences and completed postdoctoral research in Japan and in the U.S. Dr. Nemykin's brings unique expertise to the Department in the field of organometallic chemistry and has published more than 170 peer-reviewed publications during his career. After 5 months in the Department, Dr. Nemykin has launched some major initiatives including an overhaul of the undergraduate curriculum over the coming years.

We expect an exciting year ahead so please stay tuned for other new hires!



Dr. Victor Nemykin

Betts Lectureship

On Wednesday April 6th Professor Emily A. Carter gave the 2016 RH Betts Memorial Lectures. Professor Carter is the Founding Director of the Andlinger Centre for Energy and the Environment located on the campus of Princeton University. She is also the Gerhard R. Andlinger Professor in Energy and the Environment and a Professor of Mechanical and Aerospace Engineering and Applied and Computational Mathematics at Princeton University. One of her lectures was a technical lecture titled "Understanding Photoelectrocatalysis from First Principles" and the second was a public lecture titled "The Future of Energy".

Dr. Carter has published over 300 papers and delivered over 500 invited and plenary lectures on her research. She has received many awards for her groundbreaking research that advanced quantum computational techniques permitting their application to modeling the electronic structures of large systems including solid materials and charge transfer processes. She is especially interested in applying these advances to the development of new materials for sustainable energy production. Professor Carter met with students and faculty and toured our new Manitoba Institute for Materials. Upon returning to Princeton, Dr. Carter was named the Dean of the Faculty of Engineering and Applied Science.

The RH Betts Lectureship is named after Robert H. Betts, Head of our Department from 1966 to 1975. The Lectureship was established in 1989 to bring leading Physical Chemists to the University of Manitoba to interact with students and researchers and promote chemistry to the campus community and the general public.

SUPPORT THE DEPARTMENT OF CHEMISTRY!

All our departmental accomplishments in education, research, and service are significantly enhanced by the generous support of friends and alumni. Your contribution will help us to provide our deserving undergraduate and graduate students with scholarships, maintain our summer undergraduate research program, support Chemistry Club activities, update our instructional and research laboratories, and improve departmental research infrastructure.

The University of Manitoba central administration has established the following special funds associated with the Department of Chemistry:

- Chemistry Graduate Students' Association Scholarship
- Gifts to Operating for Chemistry, Life Sciences and Physics (in Comments, please note for Chemistry Department)
- Chemistry Teaching Lab Refurbishment
- Chemistry Centennial Scholarship

Our 2016 Graduates

Graduates

Charette, Bronte (M.Sc.)
Crawford, Jeremie (M.Sc.)
Dzananovic, Edis (Ph.D.)
Hutchings, Roy (M.Sc.)
Iyogun, Akin (Ph.D.)
Nazaripour, Sedigheh (M.Sc.)
Ogunsina, Makanjula (Ph.D.)
Peeples, Craig (M.Sc.)
Samandari, Golnaz (M.Sc.)
Saran, Sagar (M.Sc.)
Trieu, Benchmen (M.Sc.)
Zhang, Xiaobin (M.Sc.)

Undergraduates

Agarwal, Abhishek
Badogoo, Pavan K.
Blanco, Dan Angelo
Chan, Michael
Chan, Steven
Choo, Hui Ser
Dickson, Derek R.
Fehr, Gaelen M.
Granados, Amanda R.
Granger, Matthew J.
He, Wenguang
Hoang, William
Johnson, Wesley O.
Kanojia, Aditya K.
Kelly, Justus M.
Kuang, Weibin
Ma, Daisy Z.
Malabanan, Jemima
Match, Christophe
McLellan, Michelle
Melnyk, Lubomyr T.
Miller, Richard J.
Organ, Robert
Penney, Eric A.
Reinhorn, Ian M.
Retumalta, Nathaniel
Rubinchik, Ilan
Santiano, Sherwin R.
Singer, James M.
Tamayo, Marielou G.
ten Have, Tamara
Upadhyaya, Rashmi
Wiebe, Nathan E.
Zhang, Lizheng

Upcoming Events:

- Friday January 27
  3:30 - 4:30 pm.
  207 Buller Building
  - "The Discovery of TriBE Antibacterial Agents: A New Class of Broad Spectrum, Dual-Targeting Antibacterials" - **Alumnus, Dr. Leslie Tari, [BSc (Hons.), Chemistry/89, PhD, Chemistry/95], Vice President, Discovery, Cidara Therapeutics**

- Friday February 24
  3:30 - 4:30 pm.
  207 Buller Building
  Alumnus Dr. Brandon Findlay, Assistant Professor, Concordia University

- Saturday April 8
  Honours Project Research Presentations
  Location and time TBA

2017 Alumni Awards Event

faculty of SCIENCE

discover the unknown + invent the future

Honouring those who make science real!

Exceptional Achievement in Statistics
Dr. David Bellhouse
[BA /70, MA /72]
A Pillar of the Canadian statistical community. Professor. Pioneer.

Exceptional Achievement in Biological Sciences
Dr. Murray Humphries
[BSc (Hons.) /93]
Environmental Physiologist. Professor. NSERC Northern Research Chair (2006 - 2013).

Exceptional Achievement in Computer Science
Charles (Chuck) Loewen
[BSc (Hons.) /85]
Entrepreneur. Industry leader. Pioneer.

Exceptional Achievement in Physics
Melanie Martin
[BSc (Hons.) /95]
Visionary Physicist. Professor.

Exceptional Achievement in Mathematics
Hersh Shefrin
[B.Sc. (Hons)/70]
Pioneer. Economist and Theorist. Professor. Author.

Exceptional Achievement in Chemistry
Dr. Leslie Tari,
[BSc (Hons.) /89, PhD/95]
Innovator. Entrepreneur.

Exceptional Achievement in Microbiology
Dr. Karl Tibelius,
[B.Sc. (Hons)/84]
Doctor. Renowned Researcher. Administrator.

January 26, 2017
Marshall McLuhan Hall
3:30 PM - 6:00 PM

Q&A Roundtable, Awards Ceremony, and Reception
Everyone welcome
Please RSVP email: foscomms@umanitoba.ca

faculty of SCIENCE
discover the unknown + invent the future

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Student Awards 2016/2017

Our Department is fortunate to be able to recognize our outstanding and deserving students because of the generous gifts from donors.

UNDERGRADUATE SCHOLARSHIPS/AWARDS

The Hugh J. Anderson Scholarship in Chemistry
Neal Bailey
Daniel Padeanu
Hyotaik Kang
Danzel Ramirez
Minji Sagong
Daramole Oluwadamiloia
Ryan Pangilinan
Heather Rossong
Gideon Ong
Vanessa Hoi

The Demchuk Scholarship for Women in Chemistry
Kelsey Friesen
Sophia Schreckenbach
Alexandra Burnett

The Peter Letkeman Scholarship in Chemistry
Paul Gocik

The Instrumental Analysis Award
Marjorie Buist

The Reverend Joseph Hogg Scholarship
Paul Gocik
Patrique Bulloch
Neal Bailey
Kelsey Friesen
Zhe Xia
Sophia Schreckenbach
Alexandra Burnett

The A. N. Campbell Scholarship
Paul Gocik
Patrique Bulloch
Zhe Xia
Myungsun Choi
Alexandra Burnett
Daniel Padeanu
Hyotaik Kang

The David Renfrew Petrie Memorial Medal
Paul Gocik

The Canadian Society of Chemistry Medal
Zhe Xia
Vanessa Hoi
Ryan Pangilinan

GRADUATE SCHOLARSHIPS/AWARDS

Hugh J. Anderson Graduate Award in Chemistry
Patrick Giesbrecht
Ewan McRae
Cole Mauws
Peter Trokajlo
Amit Koul
Ifeoluwa Idowu
Jorge Dourado
Jason Braun
Monika Gupta
Gurpreet Kour
Milan Teraiya
Juan Camilo Fabra Prieto
Xiaobin Zhang
Tanner Blesener
Dustin Nevonen
Jonathan Challis
Joey Lussier
Ronald Domalaon
Robert Bertrand
Matthew McDougall
Catherine Findlay
Natalie Krahn
Alistair Brown
Eric Cuthbert
Pavan Mandapati
Rajarshi Mondal
Vu To
Naser Rahimi
Emmanuel Ariyo
Mary Hernando
Jeffery Perkins
Navriti Mittal

R.H. Betts Graduate Award in Chemistry
Patrick Giesbrecht
Jonathan Challis
Robert Bertrand
Matthew McDougall
Catherine Findlay

Ernst and Ingrid Bock Graduate Award
Ewan McRae
Cole Mauws
Amit Koul
Ifeoluwa Idowu
Jason Braun
Jonathan Challis
Saumya Jayasundara
Robert Bertrand
Catherine Findlay
Natalie Krahn
Alistair Brown
Eric Cuthbert

Chemistry Centennial Scholarship
Ronald Domalaon

Walter and Elizabeth Rodewald Scholarship
Jorge Dourado
Jason Braun
Natalie Krahn
Alistair Brown
Eric Cuthbert
Pavan Mandapati
Rajarshi Mondal
Vu To
Kirill Levin

Theodore (Ted) Peter Schaefer Graduate Award
Ewan McRae

Chemistry Graduate Students' Association Scholarship
Matthew McDougall
Catherine Findlay
Natalie Krahn

Mark G. and Patricia N. Smerchanski Graduate Award
Patrick Giesbrecht
Joey Lussier
Jeffery Perkins

Frank and Donna Hruska Travel Award
Patrick Giesbrecht
Amit Koul
Monika Gupta
Matthew McDougall
Natalie Krahn

EXTERNAL GRADUATE STUDENTS AWARDS

A number of our graduate students were recipients of major external awards from provincial and federal funders in 2016. These students (listed below) join a distinguished group of other major scholarship holders in our Department including 1 Vanier scholar, 2 NSERC doctoral scholars, 5 University of Manitoba Graduate fellows and 1 Research Manitoba scholar.

Manitoba Graduate Scholarship
Jason Braun
Monika Gupta
Cole Mauws

Research Manitoba Fellowship
Ewan McRae

NSERC Masters Scholarship
Peter Trokajlo

Conference Prizes
Jonathan Challis, 1st Place at SETAC Conference
Alistair Brown, 2nd Place at SETAC Conference

Congratulations 2015/2016 Chemistry TA Award Winners

Paul Gocik

Tristian Symthe

Luis Castro

Ronald Domalaon

Chemistry Research Publications 2016

1. Abdel-Hameed, M.; Bertrand, R.; Piercey-Normore, M.; Sorensen J. L. "Identification of 6α Hydroxymellein Synthase and Accessory Genes in the Lichen Cladonia uncialis" *J. Nat. Prod.* **2016**, 79, 1645-1650 (ACS Editor's Choice Article).

2. Abdel-Hameed, M.; Bertrand, R.; Piercey-Normore, M.; Sorensen J. L. "Putative identification of the usnic acid biosynthetic gene cluster by de novo whole-genome sequencing of a lichen-forming fungus" *Fung. Biol.* **2016**, 120, 306-316.

3. Akbari-Birgani, S.; Paranjothy, T.; Zuse, A.; Janikowski, T.; Cieślar-Pobuda, A.; Likus, W.; Urasińska, E.; Schweizer, F.; Ghavami, S.; Klonisch, T.; Łos, M. J. "Cancer stem cells, cancer-initiating cells and methods for their detection" *Drug Discov. Today.* **2016**, 21, 836-842.

4. Amin, B.; Kaloni, T. P.; Schreckenbach, G.; Freund, M. S. "Materials Properties of Out-of-Plane Heterostructures of MoS2-Wse2 and WS2-MoSe2", *Appl. Phys. Lett.* **2016**, 063105 (5 pages).

5. de Andrade, J. K.; Komatsu, E.; Perreault, H.; Torres, Y. R.; da Rosa, M. R.; Felsner, M. L. "In house validation from direct determination of 5-hydroxymethyl-2-furfural (HMF) in Brazilian corn and cane syrups samples by HPLC-UV" *Food Chem.* **2016**, 190: 481-486.

6. Anderson, D. R.; Solntsev, P. V.; Rhoda, H. M.; Nemykin, V. N. "How big is big? Separation by conventional methods, X-ray and electronic structures of positional isomers of bis-tert-butylisocyano adduct of 2(3),9(10),16(17),23(24)-tetrachloro-3(2),10(9),17(16),24(23)-tetra(2,6-di-iso-propylphenoxy)-phthalocyaninato iron(II) complex" *J. Porphyrins Phthalocyanines* **2016**, 20, 337-351 (invited paper for special issue).

7. Arnold, P. L.; Dutkiewicz, M. S.; Zegke, M.; Walter, O.; Apostolidis, C.; Hollis, E.; Pecharman, A. F.; Magnani, N.; Griveau, J. C.; Colineau, E.; Caciuffo, R.; Zhang, X.; Schreckenbach, G.; Love, J. B. "Subtle Interactions and Electron Transfer Between UIII, NpIII, or PuIII and Uranyl Mediated by the Oxo Group", *Angew. Chem. Int. Ed.* **2016**, 128, 12989–12993.

8. Astha, A.; Chojnowksi, G.; Koul, A.; McKenna, S. A.; Bujnicki, J.; Patel, T. R. "Characterization of RNA-protein complexes using a hybrid approach involving hydrodynamic, scattering, and computational methods." *Methods* **2016**, Accepted.

9. Bao, X. Z.; Zhao, H. B.; Qu, N.; Schreckenbach, G.; Pan, Q. J. "Theoretical Investigation of Low-Valent Uranium and Transuranium Complexes of a Flexible Small-Cavity Macrocycle: Structural, Formation Reaction and Redox Properties", *Dalton Trans*. **2016**, 45, 15970–15982 (invited article).

10. Bell, A.; Singer, J.; Desmond, D.; Mahassneh, O.; van Wijngaarden, J. "Rotational spectra and conformer geometries of 2-fluorophenol and 3-fluorophenol" *Journal of Molecular Spectroscopy*, **2017**, 331, 53-59.

11. Belosludov, R. V.; Rhoda, H. M.; Zhdanov, R. K.; Belosludov, V. R.; Kawazoe, Y.; Nemykin, V. N. "Conceptual design of tetraazaporphyrin- and subtetraazaporphyrin-based functional nanocarbon materials: electronic structures, topologies, optical properties, and methane storage capacities" *Phys. Chem. Chem. Phys.* **2016,** 18, 13503-13518.

12. Bera, S.; Mondal, D.; Palit, S.; Schweizer, F. "Structural modifications of the neomycin class of aminoglycosides" *MedChemComm* **2016**, 7, 1499-1534.

13 Booy E. P.; McCrae E. K.; Howard R.; Deo S. R.; Ariyo E. O.; Dzananovic E.; Meier M.; Stetefeld, J.; McKenna, S. A. "The RNA helicase RHAU (DHX36) interacts with the 3' tail of the long non-coding RNA BC200 (BCYRN1)." *Journal of Biological Chemistry* **2016**, 291, 5355-5372.

14. Buist, M.; Komatsu, E.; Lopez, P.; Girard, L.; Bodnar, E.; Salama, A.; Sachs, D.; Galli, C.; Perota, A.; Conchon, S.; Judor, J.-P.; Concordet, J.-P.; Lazzari, G.; Soulillou, J.-P.; Perreault, H. "Features of N-Glycosylation of Immunoglobulins from Knockout Pig Models" *Journal of Analytical and Bioanalytical Techniques* **2016**, DOI: 10.4172/2155-98(7(4))

15. Casanova, C. A. G.; Othen, E.; Sorensen J. L; Levin, D. B.; Birouk, M. "Measurement of Laminar Flame Speed and Flammability Limits of a Biodiesel Surrogate" *Energy Fuels* **2016**, 30, 8737-8745.

16. Chanawanno, K.; Holstrom, C.; Crandall, L. A.; Dodge, H.; Nemykin, V. N.; Herrick, R. S.; Ziegler, C. J. "The synthesis and structures of 1,1'-bis(sulfonyl)ferrocene derivatives" *Dalton Trans.* **2016**, 45, 14320-14326.

17. Chanawanno, K.; Rhoda, H. M.; Hasheminasab, A.; Crandall, L. A.; King, A. J.; Herrick, R. S.; Nemykin, V. N.; Ziegler, C. J. "Using hydrazine to link ferrocene with Re(CO)3: A modular approach" *J. Organomet. Chem.* **2016**, 818, 145-153.

18. Chanawanno, K.; Rhoda, H. M.; Crandall, L. A.; Herrick, R. S.; Nemykin, V. N.; Ziegler, C. J. "New 1,1'-ferrocene bis(sulfonyl) reagents" *Chemistry Select* **2016,** Ahead of Print.

Chemistry Research Publications 2016

19. Cidlina, A.; Miletin, M.; Fathi-Rasekh, M.; Nemykin, V.; Zimcik, P.; Novakova, V. "OFF-ON-OFF red-emitting fluorescence indicators for a narrow pH window" *Chem. Eur. J.* **2016**, Accepted (Editor's choice paper with front cover page).

20. Crandall, L. A.; Rhoda, H. M.; Nemykin, V. N.; Ziegler, C. J. "Boron templated synthesis of a BODIPY analogue from a phthalocyanine precursor" *New J. Chem.* **2016**, 40, 5675-5678 (invited paper for special issue).

21. Didukh, N. O.; Zatsikha, Y. V.; Rohde, G. T.; Blesener, T. S.; Yakubovskyi, V. P.; Kovtun, Y. P.; Nemykin, V. N. "NIR absorbing diferrocene-containing meso-cyano-BODIPY with a UV-Vis-NIR spectrum remarkably close to that of magnesium tetracyanotetraferrocenyltetraazaporphyrin" *Chem. Commun.* **2016**, 52, 11563-11566.

22. Domalaon, R.; Zhanel, G. G.; Schweizer, F. "Short Antimicrobial Peptides and Peptide Scaffolds as Promising Antibacterial Agents" *Curr. Top. Med. Chem.* **2016**, 16, 1217-1230.

23. Domalaon, R.; Findlay, B.; Ogunsina, M.; Arthur, G.; Schweizer, F. "Ultrashort cationic lipopeptides and lipopeptoids: Evaluation and mechanistic insights against epithelial cancer cells" *Peptides* **2016**, 84, 58-67.

24. Dudkin, S. V.; Erickson, N. R.; Vologzhanina, A. V.; Novikov, V. V.; Rhoda, H. M.; Holstrom, C. D.; Zatsikha, Y. V.; Yusubov, M. S.; Voloshin, Y. Z.; Nemykin, V. N. "Preparation, X-ray Structures, Spectroscopic, and Redox Properties of Di- and Trinuclear Iron-Zirconium and Iron-Hafnium Porphyrinoclathrochelates" *Inorg. Chem.* **2016**, 55, 11867-11882.

25. Ehm, C.; Cipullo, R.; Budzelaar, P. H. M.; Busico, V. "Role(s) of TMA in polymerization" *Dalton Trans.* **2016**, 45, 6847-6855.

26. Ehm, C.; Cipullo, R.; Passaro, M.; Zaccaria, F.; Budzelaar, P. H. M.; Busico, V. "Chain Transfer to Solvent in Propene Polymerization with Ti Cp-phosphinimide Catalysts: Evidence for Chain Termination via Ti–C Bond Homolysis" *ACS Catalysis* **2016**, 6, 7989-7993.

27. Elshobary, M. E.; Osman, M. E.; Abo-Shady, A. M.; Komatsu, E.; Perreault, H.; Sorensen J. L.; Piercey-Normore, M. D. "Algal carbohydrates affect polyketide synthesis of the lichen-forming fungus" *Cladonia rangiferina Mycologica*, **2016**, 108, 646-656.

28. Erratico, C.; Zheng, X.; Van den Eede, N.; Tomy, G.T.; Covaci, A. "Stereo-selective metabolism of alpha-, beta-, and gamma-hexabromocyclododecane (HBCDs) by human liver microsomes and CYP3A4"*Environmental Science and Technology,* **2016**, 50, 8263-8273.

29. Gorityala, B. K.; Guchhait, G.; Fernando, D.; Deo, S.; McKenna, S. A.; Zhanel, G. G.; Ayush Kumar, A.; Schweizer, F. "Hybrid antibiotics-based adjuvants overcome resistance in Pseudomonas aeruginosa and enhance fluoroquinolone efficacy" *Angewandte Chemie* **2016**, 55, 555-559.

30. Gorityala, B. K.; Guchhait, G.; Goswami, S.; Fernando, D. M.; Kumar, A.; Zhanel, G. G.; Schweizer, F. "Hybrid Antibiotic Overcomes Resistance in P. aeruginosa by Enhancing Outer Membrane Penetration and Reducing Efflux" *J. Med. Chem.* **2016**, 59, 8441-8455.

31. Goss, C. D.; Wiens, R.; Gorczyca, B.; Gough, K. M. "Comparison of Three Solid Phase Extraction Sorbents for the Isolation of THM Precursors from Manitoban Surface Waters" *Environmental Science and Technology*, **2016**, accepted, online Nov. 11.

32. Grandin, M.; Meier, M.; Delcros, J. G.; Nikodemus, D.; Reuten, R.; Patel, T. R.; Goldschneider, D.; Orriss, G.; Okun, N.; Boussouar, A.; Dean, A. Y.; Neves, D.; Bernet, A.; Depil, S.; Schneiders, F.; Poole, K.; Mehlen, P.; Koch, M.; Stetefeld, J. "Structural decoding of the Netrin-1-UNC5 interaction and its therapeutical implications in Netrin-1 expressing cancers" *Cancer Cell* **2016**, 29, 173-185.

33. Guo, R.; Megson, D.; Myers, A. L.; Helm, P. A.; Marvin, C.; Crozier, P.; Mabury, S.; Bhaysar, S. P.; Tomy, G.; Simcik, M.; McCarry, B.; Reiner, E. J. "Application of a comprehensive extraction technique for the determination of poly- and perfluoroalkyl substances (PFASs) in Great Lakes Region sediments" *Chemosphere*, **2016**, 164, 535-546.

34. Hada, N.; Kitamura, A.; Yamano, K.; Schweizer, F.; Kiuchi, F. "Synthesis and Antigenicity against Human Sera of a Biotin-Labeled Oligosaccharide Portion of a Glycosphingolipid from the Parasite Echinococcus multilocularis" *Chem. Pharm. Bull.* **2016**, 64, 865-873.

35. Idowu, T.; Samadder, P.; Arthur, G.; Schweizer, F. "Design, synthesis and antitumor properties of glycosylated antitumor ether lipid (GAEL)- chlorambucil-hybrids" *Chem. Phys. Lipids.* **2016**, 194, 139-148.

36. Jeng, S. C. Y.; Chan, H. H. Y.; Booy, E. P.; McKenna, S. A.; Unrau, P. J. "Fluorophore ligand binding and complex stabilization of the RNA Mango and RNA Spinach aptamers." *RNA* **2016**, Accepted.

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Chemistry Research Publications 2016

37. Kaloni, T. P.; Schreckenbach, G.; Freund, M. S. "Band Gap Modulation in Polythiophene and Polypyrrole-Based Systems" *Sci. Rep*. **2016,** 6, 36554 (18 pagess).

38. Kaloni, T. P.; Schreckenbach, G.; Freund, M. S.; Schwingenschlögl, U. "Current Developments in Silicene and Germanene" *Phys. Status Solidi – Rapid Res. Lett.* **2016**, 10, 133–142 (invited review article).

39. Komatsu, E.; Buist, M.; Roy, R.; Gomes de Oliveira, A. G.; Bodnar, E.; Salama, A.; Soulillou, J. P.; Perreault, H. "Characterization of immunoglobulins through analysis of N-glycopeptides by MALDI-TOF MS" *Methods* **2016**, 104, 170-181.

40. Krahn, N.; Spearman, M.; Meier, M.; Dorion-Thibaudeau, J.; McDougall, M.; Patel, T. R.; De Crescenzo, G.; Durocher, Y.; Stetefeld, J.; Butler, M. "Inhibition of glycosylation on a camelid antibody uniquely affects its FcγRI binding activity" *Eur. J. Pharm. Sci.* **2016**, 30423-30427.

41. Kroeker, S.; Schuller, S.; Wren, J. E. C.; Greer, B. J.; Mesbah, A. "133Cs and 23Na MAS NMR spectroscopy of molybdate crystallization in model nuclear glasses" *J. Am. Ceramic Soc.* **2016**, 99, 1557-1564.

42. Li, Y.; Rhoda, H. M.; Wertish, A. M.; Nemykin, V. N. "Organometallic pyrene-containing porphyrins: Synthesis, characterization, and non-covalent interactions with C60 fullerenes" *J. Porphyrins Phthalocyanines* **2016**, 20, 1098-1113 (invited paper for special issue).

43. Lopez, P. G.; Girard, L.; Buist, M.; de Oliveira, A. G.; Bodnar, E.; Salama, A.; Soulillou, J. P.; Perreault, H. "Characterization of N-glycosylation and amino acid sequence features of immunoglobulins from swine" *Glycoconj J.* **2016**, 33, 79-91.

44. McLellan, M.; Doyle, M. G.; Bodnar, E. D.; Lopez, P. G.; Domalaon, R.; Roy, R.; Cordova, K.; Schweizer, F.; Perreault, H. "Multiplex Azido-Group Isotopic Capture (MAGIC) Beads: Selective Analysis of Azido Compounds Using a Propargyl-based Cleavable Linker, a Proof of Concept" *Rapid Commun Mass Spectrom*. **2016**, 30, 2497-2507.

45. Modarresi, M.; Kuang, W. B.; Kaloni, T. P.; Roknabadi, M. R.; Schreckenbach, G. "Topological Phase in Oxidized Zigzag Stanene Nanoribbons" AIP Advances 2016, 6, 095019.

46. Mondal, R.; Giesbrecht, P. K.; Herbert, D. E. "Nickel(II), copper(I) and zinc(II) complexes supported by a (4-diphenylphosphino)phenanthridine ligand" *Polyhedron* **2016**, 108, 156-162 (Invited Contribution to Special Issue: Modern Canadian Inorganic Chemistry).

47. Morris, A.; Muir, D.C.G.; Solomon, K.; Letcher, R.J.; McKinney, M.; Fisk, A. ; McMeans, B.; Tomy, G.T.; Teixeira, C.; Duric, M.; Wang, X. "Current use pesticides in seawater and their bioaccumulation in polar bear-ringed seal food chains of the Canadian Arctic" *Environmental Toxicology and Chemistry,* **2016**, 35, 1695-1707.

48. Mueller, H. S. P.; Belloche, A.; Xu, L.- H.; Lees, R.; Garrod, R.; Walters, A.; van Wijngaarden, J.; Lewen, F.; Schlemmer, S.; Menten, K. "Exploring molecular complexity with ALMA (EMoCA): alkanethiols and alkanols in Sagittarius B2(N2)" *Astronomy and Astrophysics*, **2016**, 587, A92 (36 pages).

49. Ogunsina, M.; Samadder, P.; Idowu, T.; Arthur, G.; Schweizer, F. "Design, Synthesis and Evaluation of Bisamino Glycosylated Antitumor Ether Lipids against Cancer Cells and Cancer Stem cells" *MedChemComm*, *2016*, 7, 2100-2110.

50. Omar, S. I.; Albensi, B. C.; Gough, K. M. "Protein structural analysis of Calbindin D28k function and dysregulation: potential competition between Ca2+ and Zn2+" *Current Alzheimer Research* **2016**, 13,1-10.

51. Osinski, A.; Blesener, T.; Hasheminasab, A.; Holstrom, C.; Nemykin, V.; Herrick, R.; Ziegler, C. "Re(CO3)-Templated Synthesis of Semihemiporphyrazines" *Inorg. Chem*. **2016**, Ahead of Print.

52. Patel, T. R.; Nikodemus, D.; Besong, T. M.; Reuten, R.; Meier, M.; Harding, S. E.; Winzor, D. J.; Koch, M.; Stetefeld, J. "Biophysical analysis of lethal laminin alpha-1 mutation reveals altered self-association" *Matrix Biology* **2016**, 93-105.

53. Peeples, C. A.; Schreckenbach, G. "Implementation of the SM12 Solvation Model into ADF and Comparison with COSMO" *J. Chem. Theory Comp.* **2016**, 12, 4033–4041.

54. Pintus, A.; Rocchigiani, L.; Fernandez-Cestau, J.; Budzelaar, P.H.M.; Bochmann, M."Stereo- and Regioselective Alkyne Hydrometallation with Gold(III) Hydrides" *Angew. Chem. Int. Ed.* **2016**, 55, 12321–12324 (VIP paper, highlighted in "Chemistry Views").

55. Pleskach, K.; Hoang, W.; Chu, M.; Halldorson, T.; Loseto, L.; Ferguson, S.A.; Tomy, G.T. "Use of mass spectrometry to measure

Chemistry Research Publications 2016

aspartic acid racemization for ageing beluga whales" *Marine Mammal Science*, **2016**, In press.

56. Pushkarev, V. E.; Tomilova, L. G.; Nemykin, V. N. "Historic overview and new developments in synthetic methods for preparation of the rare-earth tetrapyrrolic complexes" *Coord. Chem. Rev.* **2016**, 319, 110-179 (invited review).

57. Qu, N.; Zhong, Y. X.; Schreckenbach, G.; Pan, Q. J. "A Computational Investigation of Polypyrrolic Macrocyclic Actinyl Complexes: Effects of Explicit Solvent Coordination on Structure, Vibrational Spectra and Redox Property" *Theor. Chem. Acc.* **2016**, 135, 1–9.

58. Rajagopalan, N.; Nelson, K. M.; Douglas, A. F.; Jheengut, V.; Alarcon, I. Q.; McKenna, S. A.; Abrams, S. R.; Loewen, M. C. "Abscisic acid analogs that act as universal or selective antagonists of phytohormone receptors." *Biochemistry* **2016**, 55, 5155-5164.

59. Reuten, R.; Nikodemus, D.; Oliveira, M. B.; Patel, T. R.; Brachvogel, B.; Breloy, I.; Stetefeld, J.; Koch, M. "Maltose-Binding Protein (MBP), a Secretion-Enhancing Tag for Mammalian Protein Expression Systems" *PLoS One* **2016**, 11, e0152386.

60. Reuten, R.; Patel, T.; McDougall, M.; Rama, N.; Nikodemus, D.; Gibert, B.; Delcros, J.; Prein, C.; Meier, M.; Metzger, S.; Zhou, Z.; Kaltenberg, J.; McKee, K.; Bald, T.; Tüting, T.; Zigrino, P.; Djonov, V.; Bloch, W.; Clausen-Schaumann, H.; Poschl, E.; Yurchenco, P.; Ehrbar, M.; Mehlen, P.; Stetefeld, J.; Koch, M. "Structural decoding of netrin-4 reveals unique non-enzymatic disruptive forces towards mature basement membranes" *Nature Communications*, **2016**, accepted 20.9. 2016.

61. Reynard, O.; Jacquot, F.; Evanno, G.; Lê Mai, H.; Salama, A.; Martinet, B.; Duvaux, O.; Bach, J.-M.; Conchon, S.; Judor, J.-P.; Perota, A.; Lagutina, I.; Duchi, R.; Lazzari, G.; Le Berre, L.; Perreault, H.; Lhériteau, E.; Raoul, H.; Volchkov, V.; Galli, C.; Soulillou, J.-P. "Anti-EBOV GP IgGs Lacking α1-3-Galactose and Neu5Gc Prolong Survival and Decrease Blood Viral Load in EBOV-infected Guinea Pigs" *PlosONE* **2016**, doi: 10.1371/journal.pone.0156775.

62. Rhoda, H. M.; Akhigbe, J.; Ogikubo, J.; Sabin, J. R.; Ziegler, C. J.; Bruckner, C.; Nemykin, V. N. "Magnetic Circular Dichroism Spectroscopy of meso-Tetraphenylporphyrin-Derived Hydroporphyrins and Pyrrole-Modified Porphyrins" *J. Phys. Chem. A* **2016**, 120, 5805-5815.

63. Rhoda, H. M.; Kayser, M. P.; Wang, Y.; Nazarenko, A. Y.; Belosludov, R. V.; Kiprof, P.; Blank, D. A.; Nemykin, V. N. "Tuning Up an Electronic Structure of the Subphthalocyanine Derivatives toward Electron-Transfer Process in Noncovalent Complexes with C60 and C70 Fullerenes: Experimental and Theoretical Studies" *Inorg. Chem.* **2016**, 55, 9549-9563 (Editor's choice paper with front cover page).

64. Schreckenbach, G.; "Differential Solvation", *Chem. Eur. J.* **2016**, Accepted Oct. 10, 2016.

65. Sherbo, R.S.; Bindra, G.S.; Budzelaar , P.H.M. "Square-Planar–Tetrahedral Interconversion without Spin Flip in (β-diiminate) Rh(1,3-diene) Complexes" *Organometallics* **2016**, 35, 2039–2048.

66. Sivagnanam, K.; Komatsu, E.; Rampitsch, C.; Perreault, H.; Gräfenhan, T. "Rapid screening of Alternaria mycotoxins using MALDI-TOF mass spectrometry" *Journal of the Science of Food and Agriculture* **2016**, doi: 10.1002/jsfa.77.

67. Sivagnanam, K.; Komatsu, E.; Patrick, S.; Rampitsch, C.; Perreault, H.; Gräfenhan, T. "Screening ergot alkaloids in sclerotia by MALDI-TOF mass spectrometry" *Journal of AOAC International* **2016**, DOI: http://dx.doi.org/10.5740/jaoacint.16-0117.

68. Skopak, T.; Hee, P.; Ledemi, Y.; Dussauze, M.; Kroeker, S.; Cardinal, T.; Fargin, E.; Messaddeq, Y. "Mixture experimental design applied to gallium-rich GaO3/2-GeO2-NaO1/2glasses" *Journal of Non- Crystalline Solids* **2016**, in press.

69. Solntsev, P. V.; Anderson, D. R.; Rhoda, H. M.; Belosludov, R. V.; Fathi-Rasekh, M.; Maligaspe, E.; Gerasimchuk, N. N.; Nemykin, V. N. "Initial Report on Molecular and Electronic Structure of Spherical Multiferrocenyl/tin(IV) (Hydr)oxide [(FcSn)12O14(OH)6]X2 Clusters" *Crystal Growth Design* **2016**, 16, 1027-1037.

70. Stetefeld, J.; McKenna, S. A.; Patel, T. R. "Dynamic Light Scattering: a practical guide and applications in biomedical sciences." *Biophysical Reviews* **2016**, Accepted DOI - 10.1007/s12551-016-0218-6.

71. Su, P.H.; Hou, C.Y.; Sun, D.; Feng, D.L.; Halldorson, T.; Ding, Y.S.; Li, Y.F.; Tomy, G.T. "Laboratory study of the particle-size distribution of decabromodiphenyl ether (BDE-209) in ambient air" *Chemosphere*, **2016**, 144, 241-248.

continue over

Chemistry Research Publications 2016

72. Talarico, G.; Budzelaar, P.H.M. "Agostic Interactions and Growing Chain Orientation for Olefin Polymerization Catalysts" *Organometallics* **2016**, 35, 47–54.

73. Thompson, J. R.; Snider, D.; Wren, J. E. C.; Kroeker, S.; Williams, V. E.; Leznoff, D. B. "Correlating structural features and 207Pb NMR parameters with stereochemical activity of Pb(II) lone pairs in birefringent Pb[2,6-bis(benzimidazole)pyridine] complexes" *Eur. J. Inorg. Chem.* **2016**, in press.

74. Thorwirth, S.; Martin-Drumel, M. A.; Endres, C. P.; Salomon, T.; Zingsheim, O.; van Wijngaarden, J.; Pirali, O.; Gruet, S.; Lewen, F.; Schlemmer, S.; McCarthy, M. C. "An ASAP treatment of vibrationally excited S2O: The ν3 mode and the ν3+ν2−ν2 hot band" *Journal of Molecular Spectroscopy,* **2016**, 319, 47-49.

75. To, V.; Dzananovic, E.; McKenna, S. A.; O'Neil, J. "The Dynamic Landscape of the Full-Length HIV-1 Transactivator of Transcription" *Biochemistry,* **2016** 55,1314-1325.

76. Trana, M. R.; Roth, J. D.; Tomy, G. T.; Anderson, W. G.; Ferguson, S. H. "Increased blubber cortisol in ice-entrapped beluga whales (Delphinapterus leucas)" *Polar Biology* **2016**, 39, 1563-1569.

77. Van den Eede, N.; Tomy, G.T.; Tao, F.; Halldorson, T.; Harrad, S.; Neels, H.; Covaci. A. "Kinetics of tris(1-chloro-2-propyl) phosphate (TCIPP) metabolism in human liver microsomes and serum" *Chemosphere* **2016**, 144, 1299-1305.

78. West, C.; Sedo, G.; van Wijngaarden, J. "Newly assigned microwave transitions and a global analysis of the combined microwave/millimeter wave rotational spectra of 9-fluorenone and benzophenone" *Journal of Molecular Spectroscopy*, **2016**, in press.

79. Wiens, R.; Findlay, C. R.; Baldwin, S. G.; Kreplak, L.; Lee, J. M.; Veres, S. P.; Gough, K. M. "High spatial resolution (1.1 μ m and 10 μm) polarization contrast imaging reveals pre-rupture disorder in damaged tendon" *Faraday Discussions* **2016**, 187, 555-573.

80. Yoshimura, A.; Nguyen, K. C.; Klasen, S. C.; Postnikov, P. S.; Yusubov, M. S.; Saito, A.; Nemykin, V. N.; Zhdankin, V. V. "Hypervalent Iodine-Catalyzed Synthesis of 1,2,4-Oxadiazoles from Aldoximes and Nitriles" *Asian J. Org. Chem.* **2016**, 5, 1128-1133.

81. Yu, Y.; Busico, V.; Budzelaar, P.H.M.; Vittoria, A.; Cipullo, R. "Of Poisons and Antidotes in Polypropylene Catalysis" *Angew. Chem. Int. Ed.* **2016**, 55, 8590–8594.

82. Zatsikha, Y. V.; Didukh, N. O.; Blesener, T.; Kayser, M. P.; Kovtun, Y. P.; Blank, D. A.; Nemykin, V. N. " Preparation, Characterization, Redox, and Photoinduced Electron-Transfer Properties of the NIR-Absorbing N-Ferrocenyl-2-Pyridone BODIPYs" *Eur. J. Inorg. Chem.* **2016**, Ahead of Print (invited paper for special issue).

83. Zhanel, G.G.; Cheung, D.; Adam, H.; Zelenitsky, S.; Golden, A.; Schweizer, F.; Gorityala, B.; Lagacé-Wiens, P. R.; Walkty, A.; Gin, A. S.; Hoban, D. J.; Karlowsky, J. A. "Review of Eravacycline, a Novel Fluorocycline Antibacterial Agent" *Drugs* **2016,** 76, 567-588.

84. Zheng, X. J.; Bell, N. L.; Stevens, C. J.; Zhong, Y. X.; Schreckenbach, G.; Arnold, P. L.; Love, J. B.; Pan, Q. J. "Relativistic DFT and Experimental Studies of Mono- and Bis-Actinyl Complexes of an Expanded Schiff-base Polypyrrole Macrocycle" *Dalton Trans.* **2016**, 45, 15910–15921 (invited article).

85. Zhdankin, V. V.; Yoshimura, A.; Klasen, S.; Shea, M.; Nguyen, H.; Rohde, G. T.; Saito, A.; Postnikov, P.; Yusubov, M. S.; Nemykin, V. N. "Preparation, Structure, and Reactivity of Pseudocyclic Benziodoxole Tosylates: New Hypervalent Iodine Oxidants and Electrophiles" *Chem. Eur. J.* **2016**, Ahead of Print.

PARKER COMMUNICATIONS – 2016

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