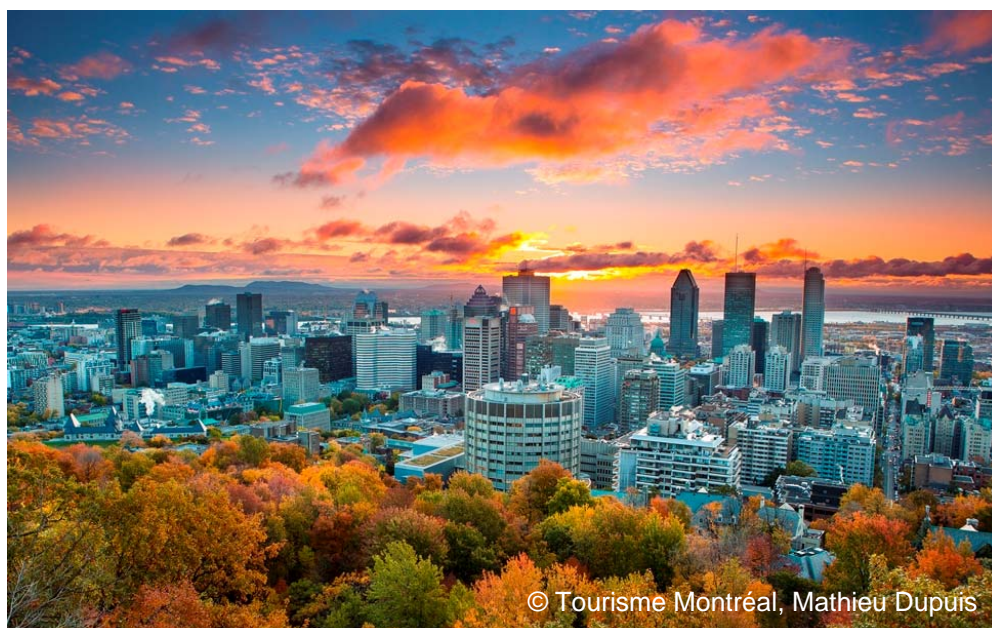


**Technical Program of the 43rd**

**NORTH AMERICAN  
THERMAL ANALYSIS SOCIETY CONFERENCE**



August 10 -13, 2015

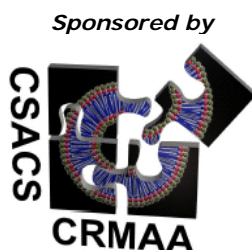
McGill University – Otto Maass Chemistry Building  
Montréal, Québec, Canada

Program Booklet provided courtesy of:

**METTLER TOLEDO**

| <b>Monday, August 10, 2015</b>    |   |  |                                   |                                    |
|-----------------------------------|---|--|-----------------------------------|------------------------------------|
| 15:00–18:00                       | Registration  |  |                                   |                                    |
| 18:00–21:00                       | Welcome Reception, Poster Sessions and Exhibition<br>(McGill Otto Maass Chemistry Building Ground Hall & Lab 100) |  |                                   |                                    |
| <b>Tuesday, August 11, 2015</b>   |   |  |                                   |                                    |
| 8:00–8:05                         | Greetings (Auditorium 112)  |  |                                   |                                    |
| 8:05–8:50                         | Plenary Lecture: Christine Allen (Auditorium 112)   |  |                                   |                                    |
| 8:50–9:00                         | Travel Break  |  |                                   |                                    |
| <i>Room</i>                       | <i>Auditorium 10</i>  | <i>Room 217</i>                                | <i>Room 328</i>                   | <i>Room 321</i>                    |
| 9:00–10:20                        | Pharmaceutics   | Environmental Sustainability & Green Chemistry | High Temperature Thermal Analysis | General Session                    |
| 10:20–10:40                       | Exhibition & Coffee Break (Lab 100)   |  |                                   |                                    |
| 10:40–12:00                       | Pharmaceutics   | Energetic Materials                            | High Temperature Thermal Analysis | General Session                    |
| 12:00–13:20                       | Lunch Break   |  |                                   |                                    |
| 13:20–15:00                       | Biomaterials & Biopolymers  | Energetic Materials                            | Fast Scanning Calorimetry         | General Session                    |
| 15:00–15:20                       | Exhibition & Coffee Break (Lab 100)   |  |                                   |                                    |
| 15:20–17:00                       | Biomaterial & Biopolymers   | Energetic Materials                            | Nanocomposites & Composites       |                                    |
| 17:00–17:30                       | NATAS Members Meeting   |  | CTAS Annual General Meeting       |                                    |
| <b>Wednesday, August 12, 2015</b> |   |  |                                   |                                    |
| 8:00–8:05                         | Greetings (Auditorium 112)  |  |                                   |                                    |
| 8:05–8:50                         | METTLER Award in Thermal Analysis – Plenary Lecture:<br>Richard Chartoff (Auditorium 112)                         |  |                                   |                                    |
| 8:50–9:00                         | Travel Break  |  |                                   |                                    |
| <i>Room</i>                       | <i>Auditorium 10</i>  | <i>Room 217</i>                                | <i>Room 328</i>                   | <i>Room 321</i>                    |
| 9:00–10:20                        | In Memoriam Edith Turi  | Thermal Hazards & Process Safety               | Biocalorimetry                    | Simultaneous & Combined Techniques |
| 10:20–10:40                       | Exhibition & Coffee Break (Lab 100)   |  |                                   |                                    |
| 10:40–12:00                       | In Memoriam Edith Turi  | Thermal Hazards & Process Safety               | Biocalorimetry                    | Simultaneous & Combined Techniques |
| 12:00–13:20                       | Lunch Break   |  |                                   |                                    |
| 13:20–15:00                       | In Memoriam Edith Turi  | Thermal Hazards & Process Safety               | Biocalorimetry                    | Molecular Materials                |
| 15:00–15:20                       | Exhibition & Coffee Break (Lab 100)   |  |                                   |                                    |
| 15:20–17:00                       | Thermal Transport & Electrical Properties   | Kinetics                                       | Biocalorimetry                    | Molecular Materials                |
| 18:00–18:30                       | Shuttle bus from La Citadelle / Delta Hotels to Old Port of Montreal  |  |                                   |                                    |
| 18:30–19:00                       | Boarding at Quai Jacques-Cartier  |  |                                   |                                    |
| 19:00–22:00                       | Award Banquet – Le Bateau Mouche dinner cruise  |  |                                   |                                    |
| 22:00–22:30                       | Shuttle bus to La Citadelle / Delta Hotels  |  |                                   |                                    |
| <b>Thursday, August 13, 2015</b>  |   |  |                                   |                                    |
| 8:00–8:05                         | Greetings (Auditorium 112)  |  |                                   |                                    |
| 8:05–8:50                         | Plenary Lecture: Tomislav Friscic (Auditorium 112)  |  |                                   |                                    |
| 8:50–9:00                         | Travel Break  |  |                                   |                                    |
| <i>Room</i>                       | <i>Auditorium 10</i>  | <i>Room 217</i>                                | <i>Room 328</i>                   |                                    |
| 9:00–10:20                        | Thermal Transport & Electrical Properties   | Kinetics                                       | Localized TA & Nanoconfinement    |                                    |
| 10:20–10:40                       | Coffee Break (Ground Hall)  |  |                                   |                                    |
| 10:40–12:00                       | Thermal Transport & Electrical Properties   | Kinetics                                       | Localized TA & Nanoconfinement    |                                    |
| <b>End of Conference</b>          |   |  |                                   |                                    |

**TECHNICAL PROGRAM OF  
THE 43<sup>RD</sup> NORTH AMERICAN  
THERMAL ANALYSIS SOCIETY CONFERENCE**



*With participation of*



**August 10–13, 2015**

**McGill University – Otto Maass Chemistry Building  
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## President's Message

It is my pleasure to welcome you to the 43<sup>rd</sup> annual meeting of the North American Thermal Analysis Society (NATAS) held in Montreal, Quebec, Canada from August 10-13, 2015. Arrangements to host the conference at McGill University were overseen by Conference Chair, Queenie Kwok (NRC Canadian Explosives Research Laboratory, CanmetCERL), and Conference Vice-Chair, Petr Fiurasek (McGill University). The conference spans four days, beginning on Monday with the reception and poster session, and ending Thursday at mid-day. The decision was taken to begin the conference on a Monday, in consideration of our vendors' travel and set-up time, and scheduling with McGill University. If this proves to be a popular choice, NATAS may continue this schedule in future meetings. The vendor exhibit arrangements were overseen by Conference Vice-Chair for Exhibits, Tina Adams (The Lubrizol Corp.). The proceedings of the meeting were arranged by Conference Proceedings Chair, Elizabeth Pelczar (Innophos, Inc.).



An exciting program has been organized by Technical Program Chair, Shanti Singh (Canmet CERL). The program comprises sixteen oral symposia in four parallel sessions, and two poster sessions, for student posters and general posters. The program offers sessions in energetics, sustainability, fast scanning and high temperature techniques, inorganics, kinetics, composites, molecular materials, pharmaceuticals, bio-related calorimetry, simultaneous techniques, thermal hazards, and transport and electrical properties. Each day (Tuesday – Thursday) the program begins with the Plenary Sessions, and we are pleased to have the following Plenary speakers: Christine Allen (University of Toronto), Richard Chartoff (University of Oregon), and Tomislav Friscic (McGill University).

A very special *In Memoriam* symposium is being held to honor Edith Turi, a luminary in the field of thermal analysis and a long-time NATAS member and NATAS Fellow (1981). Dr. Turi also had won the METTLER Award in Thermal Analysis in 1985. Other persons honored at this meeting include:

1. Richard Chartoff (University of Oregon), winner of the METTLER Award in Thermal Analysis, sponsored by Mettler Toledo;
2. Akihiko Toda (Hiroshima University), NATAS Fellow, sponsored by NETZSCH Instruments North America;
3. Queenie Kwok (CanmetCREL), winner of the NATAS Outstanding Service Award, sponsored by NETZSCH Instruments North America,
4. David Thomas (Tufts University), winner of the NATAS Student Award, sponsored by SETARAM.

In addition to these award winners, eight students won travel grants to support attendance at this meeting. The travel grants are supported by NATAS, TAFDV, DSC Consumables and Maria LaTorre.

Don't miss the special event planned for this year – a river cruise for the annual Awards Banquet, held on Wednesday evening with bus service at 6:00 to take participants to the cruise boat at the Old Port of Montreal. Come to enjoy a relaxing meal on the river, with colleagues and friends, and honor those who have won awards this year.

The exhibition this year includes eleven vendors of instruments, supplies, and services for thermal analysts. As members of NATAS, we all use these goods and services in our work, so please visit the exhibitions to learn about the latest products available to help us in our research, product development, and education and training missions.

NATAS is an organization that is run by volunteers, with management support provided by Greg Jewell and his team at AEC. On behalf of the membership of NATAS, I thank all the people who have given unstintingly of their time over the past year. If you are inclined toward volunteer activities, NATAS always has a place for you, and plenty of opportunities to get involved with running the society. I also invite you participate in the NATAS members meeting on Tuesday at 5:00 after the symposia.

Enjoy the meeting!

Peggy Cebe  
NATAS President

## 2015 Technical Session Chairs

| <b>Session</b>                                    | <b>Session Chair</b>  |
|---|---|
| In Memoriam for Edith Turi                        | Joseph Menczel, Thermal Measurements<br>Larry Judovits, Arkema Inc  |
| Biocalorimetry                                    | Anthony Mittermaier, McGill University  |
| Biomaterial & Biopolymers                         | Sophie-Dorothée Clas, Pharmasolv<br>Karine Khougaz, National Research Council   |
| Energetic Materials                               | Charles Dubois, Ecole Polytechnic Université de Montréal  |
| Environmental Sustainability &<br>Green Chemistry | Wassila Benaissa, SOLVAY Corporate Research & Innovation  |
| Fast Scanning Calorimetry                         | Louis Cuccia, Concordia University  |
| General Session                                   | Pierre-Claver Nkinamubanzi, National Research Council<br>Louis Cuccia, Concordia University                                   |
| High Temperature Thermal<br>Analysis              | Stephen Corbin, Dalhousie University  |
| Kinetics  | Refat Ghunem, National Research Council<br>Peter Ralbovsky, NETZSCH Instruments North America, LLC                            |
| Localized TA, Thin Films &<br>Nanoconfinement     | Jonathan Felts, Texas A&M University  |
| Molecular Materials                               | Dmitriy Soldatov, University of Guelph  |
| Nanocomposites & Composites                       | Pierre-Claver Nkinamubanzi, National Research Council   |
| Pharmaceutics                                     | Karine Khougaz, National Research Council<br>Suresh Narine, Trent University  |
| Simultaneous & Combined<br>Techniques             | Charles Potter, TA Instruments  |
| Thermal Hazards & Process<br>Safety               | Wassila Benaissa, SOLVAY Corporate Research & Innovation<br>Richard Kwasny, Fauske and Associates                             |
| Thermal Transport & Electrical<br>Properties      | Adam Harris, C-Therm  |
| General Poster                                    | Shanti Singh, Canadian Explosives Research Laboratory<br>Chi-Min Shu, National Yunlin University of Science and<br>Technology |
| Student Poster                                    | Chris Li, Drexel University<br>Steve Sauerbrunn, University of Delaware   |

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## 2015 Award Winners

### METTLER Award in Thermal Analysis

(sponsored by Mettler-Toledo, LLC)

**Prof. Richard Chartoff**

University of Oregon

### NATAS Fellow Award

(sponsored by NETZSCH Instruments, N.A. LLC)

**Prof. Akihiko Toda**

Hiroshima University

### NATAS Outstanding Service Award

(sponsored by NETZSCH Instruments N.A. LLC)

**Queenie Kwok**

NRCan Canadian Explosives Research Laboratory

### NATAS Student Award

(sponsored by SETARAM)

**David Thomas**

Tufts University

### NATAS Student Travel Awards

(sponsored by DSC Consumables, TAFDV, Maria LaTorre and NATAS)

**Rozana Bari**, Texas Tech University

**Yoseph G. Daniel**, Central Michigan University

**Simone T. Lazar**, Central Michigan University

**Evelyn Lopez**, Texas Tech University

**Christopher Odetola**, University of Ontario Institute of Technology

**Madhusudhan R. Pallaka**, Texas Tech University

**J. Rachel Prado**, University of Alabama at Birmingham

**Heedong Yoon**, Texas Tech University

## Previous Award Winners

| <b>METTLER Award in Thermal Analysis</b> |                        |                        |
|--|------------------------|------------------------|
| 2014 S. Simon                            | 1998 A. Riga           | 1982 J. Chiu           |
| 2013 P. Cebe                             | 1997 Y. Kanna          | 1981 T. Ozawa          |
| 2012 B. Howell                           | 1996 M.E. Brown        | 1980 J.H. Flynn        |
| 2011 A. McGhie                           | 1995 J.C. Seferis      | 1979 D. Dollimore      |
| 2010 J. Menczel                          | 1994 S. St. John Warne | 1978 J.K. Gilham       |
| 2009 R. G. Alamo                         | 1993 Y. Godovsky       | 1977 H. Kambe          |
| 2008 W. -P. Pan                          | 1992 H. Starkweather   | 1976 P.K. Gallagher    |
| 2007 E. L. Charsley                      | 1991 J.F. Johnson      | 1975 F.E. Karasz       |
| 2006 C. E. Schick                        | 1990 V. Balek          | 1974 J. Sestak         |
| 2005 D. J. W. Grant                      | 1989 R.B. Prime        | 1973 E.M. Barrall, III |
| 2004 S. Vyazovkin                        | 1988 J. Rouquerol      | 1972 F. and J. Paulik  |
| 2003 G. Delia Gatta                      | 1987 H. Bair           | 1971 B. Wunderlich     |
| 2002 V. Mathot                           | 1986 H.G. Wiedemann    | 1970 W.W. Wendlandt    |
| 2001 G. McKenna                          | 1985 E.A. Turi         | 1969 R.L. Stone        |
| 2000 M. Reading                          | 1984 L. Mandelkern     | 1968 R. MacKenzie      |
| 1999 S. Cheng                            | 1983 R.S. Porter       |                        |

## Previous Award Winners

| NATAS Fellows       |                     |                      |                 |
|---------------------|---------------------|----------------------|-----------------|
| 2014 C. Li          | L. Judovits         | A. R. McGhie         | R. Porter       |
| 2013 M. Kessler     | 1999 K. Lavanga     | A. K. Sircar         | 1983 J. Johnson |
| 2012 R. Ozao        | 1998 H. Friedman    | H. Starkweather      | G. Langer       |
| 2011 C.-M. Shu      | 1997 W.-P. Pan      | 1987 S. St. J. Warne | H. McAdie       |
| 2010 D. J. Burlett  | 1996 I. Goldfarb    | R. Weiss             | C. Murphy       |
| 2008 E. L. Charsley | L. Whiting          | H. Wiedemann         | W. Wendlandt    |
| P. Cebe             | 1995 R. Seyler      | 1986 D. Dollimore    | 1982 D. Brazier |
| 2007 M. Reading     | J. Oxley            | F. Karasz            | R. Ferrillo     |
| 2006 S. Vyazovkin   | 1994 I. Harrison    | W. Prest, Jr.        | J. Maurer       |
| 2005 C. E. Schick   | P. Ronco            | 1985 P. Gill         | E. Pearce       |
| L. C. Thomas        | 1993 S. Cheng       | J. Gillham           | B. Wunderlich   |
| 2004 M. Keating     | 1992 A. Riga        | R. MacKenzie         | 1981 J. Chiu    |
| C. M. Neag          | 1991 M. Jaffe       | L. Mandelkern        | J. Flynn        |
| 2003 M. Brown       | 1990 R. Chartoff    | R. B. Prime          | P. Gallagher    |
| S. L. Simon         | J. Seferis          | 1984 H. Bair         | P. Garn         |
| 2002 B. Howell      | R. Blaine           | B. Barrall, II       | E. Turi         |
| J. Menczel          | 1988/9 C.M. Earnest | J. Elder             |                 |
| 2001 D. Jones       | Y. Khanna           | R. Johnson           |                 |

| NATAS Outstanding Service Award |                    |                    |                     |
|---------------------------------|--------------------|--------------------|---------------------|
| 2014 M. LaTorre                 | 2006 W. Hammetter  | 1997 M. Keating    | 1988 C. B. Murphy   |
| 2013 B. Howell                  | 2005 L. Judovits   | 1996 J. Enns       | 1987 R. C. Johnson  |
| 2012 S. Simon                   | 2004 W. P. Pan     | 1995 A. Riga       | 1986 H. McAdie      |
| 2011 M. Varma-Nair              | 2003 D. Burlett    | 1994 L. Boyter     | 1985 P. Gallagher   |
| 2010 K. F. Schoch               | 2002 B. Wunderlich | 1993 B. Bachman    | 1984 J. J. Mauer    |
| 2009 R. G. Blaine               | 2001 C. M. Earnest | 1992 A. McGhie     | 1983 R. G. Ferrillo |
| D. E. G. Jones                  | 2000 C. M. Neag    | 1991 R. Hutchinson | 1982 J. Chiu        |
| 2008 T. Ramotowksi              | 1999 S. Dyszel     | 1990 M. Steiner    | 1981 E. Turi        |
| 2007 M. J. Rich                 | 1998 S. Mikhail    | 1989 B. Fabricant  |                     |

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**Plenary Lecture**  
**Tuesday, August 11, 2015**  
**8:05 - 8:50 am**  
**McGill Otto Maass - Auditorium 112**

**Thermosensitive Liposomes: a Therapeutic Strategy to  
Enhance the Effectiveness of Nanomedicines in Oncology**

Christine Allen  
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**ABSTRACT**

Liposomes are one of the few drug delivery platforms that have resulted in clinically approved products in oncology. Notwithstanding this success, the approved liposome formulations largely result in improvements in the toxicity profile of drug with limited to no enhancements in efficacy. In addition, a number of drugs relying on formulation in liposomes have failed in clinical development. The many pre-clinical and clinical studies that have been conducted on liposomes have revealed a number of limitations associated with this technology. These include variability in tumor accumulation due to clinical heterogeneity in the enhanced permeability and retention (EPR) effect as well as poor tumor penetration, and in some cases, limited drug release once at the tumor site. Thermosensitive liposomes have the potential to address these issues, in particular, when they are designed to provide largely intravascular release of drug within the tumor region.

Our laboratory has designed a thermosensitive liposome formulation of cisplatin that provides triggered drug release in response to temperatures in the mild hyperthermia range. This presentation will review our data obtained to date with this formulation in combination with mild hyperthermia in a series of tumor xenograft models of human cervical, lung and breast cancers. The factors that impact the effect of this therapeutic strategy will be discussed including tumor microenvironment parameters such as microvessel density, degree of hypoxia, stromal content, cell sensitivity to drug and heat shock protein expression.

**METTLER Award in Thermal Analysis – Plenary Lecture  
sponsored by Mettler Toledo**

**Wednesday, August 12, 2015**

**8:05 - 8:50 am**

**McGill Otto Maass - Auditorium 112**

**The Role of Thermal Analysis in Understanding Fundamentals Essential for  
Solving Practical Problems in Polymer Applications and Processing**

Richard Chartoff

University of Oregon

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**ABSTRACT**

Thermal Analysis is the core technology for successfully operating a modern polymer research and development laboratory. Using thermal analysis one can solve a variety of problems in basic and applied research involving polymer applications and processing. The key issues in using thermal techniques are determining the appropriate instruments to apply and how to successfully interpret the data. The emphasis is always on discovering the basic science that underlies the problem. We have used thermal methods in our laboratory for many years on research to solve a wide variety of fundamental and applied problems. The topics investigated include all manner of studies on thermoplastics, thermosets, elastomers, process design and optimization, and process modelling. The Mettler Award presentation will feature some key examples of this in a number of areas that will highlight the essential nature of thermal methods. These will include optimization of polymer thermal and mechanical properties, 3D printing, multi-phase polymer systems, and polymer matrix nano-composites.

# Plenary Lecture

Thursday, August 13, 2015

8:05 - 8:50 am McGill Otto Maass - Auditorium 112

## Thermal Microscopy for Discovery of New Molecular Materials: from Pharmaceutical Cocrystals to Photo/Thermomechanical Solids

Tomislav Friscic, Davin Tan and Jose Gregorio Hernandez  
McGill University, tomislav.friscic@mcgill.ca

### ABSTRACT

This lecture will provide a brief overview of thermal microscopy in service of characterization and discovery of new pharmaceutical solids, such as polymorph, solvates and cocrystals of active pharmaceutical ingredients [1]. Besides permitting the characterization of very small amounts of pharmaceutically relevant substances (micrograms or less), thermal microscopy can also be used to reveal increasingly important physicochemical properties. An example of this is the thermosalient effect, i.e. physical motion of crystals due to thermally-induced polymorphic transformations, that is currently being re-discovered as an attractive new possibility for using waste heat as a means of propulsion [2].

We will present studies from different laboratories, including ours, in which thermal microscopy is used to advance the understanding of pharmaceutical solids, either on its own or in combination with other means of solid-state analysis, such as TGA/DSC, X-ray diffraction or solid-state nuclear magnetic resonance (NMR). We will also highlight the development of thermosalient materials, especially molecular materials that exhibit reversible shape changes or undergo single-crystal-to-single-crystal thermosalient motion (Fig. 1), promising a means to achieve micro- or nano-actuators driven by heat. Finally, we will discuss the use of thermal microscopy in the discovery of a previously not observed thermomechanical motion of crystals of stable *cis*-azobenzene, driven by solid-state *cis-to-trans* molecular isomerization [3].

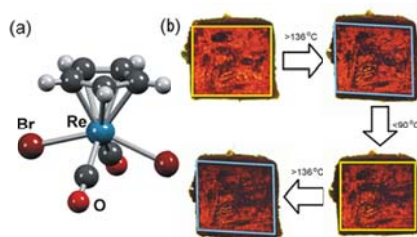


Fig 1. (a) Molecular structure and (b) thermomechanical behaviour of a crystal of recently discovered thermomechanical organometallic material, exhibiting a reversible change in shape upon thermally-induced polymorphic transformation

1. Berry DJ, Seaton CC, Clegg W, Harrington RW, Coles SJ, Horton PM, Hursthouse MB, Storey R, Jones W, Friščić T, Blagden N *Cryst. Growth Des.* 1999;8:1697-1712.
2. Panda MK, Runčevski T, Husain A, Dinnebier RE, Naumov P. *J. Am. Chem. Soc.* 2015;137:1895-1902.
3. Bushuyev OS, Corkery TC, Barrett CJ, Friščić T *Chem. Sci.* 2014;5:3158-3164.

**Monday, August 10, 2015**

**Welcome Reception, Exhibition and Poster Sessions**

**McGill Otto Maass – Ground Hall and Lab 100**

**18:00 to 21:00**

**General Poster Session**

**Shanti Singh, NRCan Canadian Explosives Research Laboratory &  
Chi-Min Shu, National Yunlin University of Science and Technology (Session Chairs)**

- \* Chemical Kinetics on Thermal Decompositions of Di-tert-butyl Peroxide Studied by Calorimetry: an Overview GP-1  
*C.-S. Kao (National United University), Y.-S. Duh, W.-L.Lee*
- \* Chemical Kinetics on Thermal Decompositions of Dicumyl Peroxide Studied by Calorimetry: an Overview GP-2  
*C.-S. Kao (National United University), Y.-S. Duh, W.-L.Lee*
- Prediction of Crystallization Onset of Amorphous Pharmaceutical Solids by Nonisothermal Crystallization Using DSC GP-3  
*K.-N. Hu (Vertex Pharmaceuticals), H.-R. Wang*
- Crystallization Measurement by Optical Observation DSC using a Polarizing Filter GP-4  
*Y. Kasai (Hitachi High-Tech Science Corporation), M. Iwasa, K. Shibata, B. Goolsby*
- Predicting Friction Material Composition Solely from TGA Data GP-5  
*T. Adams (The Lubrizol Corporation)*
- Optimization of Friction Material Analysis by TGA using Optical Microscopy GP-6  
*R. Kovach (The Lubrizol Corporation)*
- The Solid and Liquid Heat Capacity of Poly(N-isopropylacrylamide) GP-7  
*M. Pyda (Rzeszow University of Technology), I. Zarzyka, A. Czerniecka*
- Higher Orders of Virial Coefficients for Polar Molecules GP-8  
*J. Avsec (University of Maribor)*
- Thermal Analysis-Photo Ionization Mass Spectrometry (TA-PIMS) for Analysis of Crude Oils and Toxic Tricresylphosphates in Jet-turbine Oils GP-9  
*R. Zimmerman (University of Rostock), M. R. Saraji-Bozorgzad, J. Varga, T. Groeger, S. Ehlert, T. Streibel, A. Walte, T. Denner*
- Thermal Properties of a 1,8-Diaminonaphthalene Phytic Acid Salt GP-10  
*B. A. Howell (Central Michigan University), A. Dembski*
- Combustion of Three Ionic Liquids via GC/MS and FTIR: an Approach of Thermal Hazard Assessment and Properties GP-11  
*C.-M. Shu (National Yunlin University of Science and Technology), Y.-T. Tsai, W.-C. Lin, S.-H. Liu, J. Deng, J.-R. Chen*

Green Approach to Evaluating Thermal Hazard Reaction of PAA GP-12  
*C.-M. Shu (National Yunlin University of Science and Technology), Y.-T. Tsai, W.-C. Chen, J.-R. Lin, M.-S. Liao, Y.-W. Wang*

Bomb Calorimetry of Barium Styphnate using a Reduced Sample Size GP-13  
*S. Hightower (Sandia National Laboratories)*

**Student Poster Session**  
**Chris Li, Drexel University &**  
**Steve Sauerbrunn, University of Delaware (Session Chairs)**

DSC Analysis of Thermal Stability of Polymers to Determine Suitability as Bio Medical SP-1  
Implants  
*A. Gore (Case Western Reserve University), A. Riga, C. Maier, A. Venkataswamy, D. Mantheni*

Evaluating Polymer Durability as Measured by Thermogravimetric Analysis (TGA) SP-2  
*A. Leong (Case Western Reserve University), A. Riga, M. P. K. Maheswaram, F. Jia, J. Beiriger, C. Grimme*

\* Characterization on the Thermal Runaway of Commercial 18650 Lithium-ion Batteries SP-3  
Used in Electric Vehicle  
*M.-T. Tsai (National United University), Y.-S. Duh, C.-S. Kao*

\* Characterization on Thermal Decompositions of Tert-Butyl Hydroperoxide (TBHP) by SP-4  
Confinement Test  
*H.-Y. Kuo (National United University), Y.-S. Duh, C.-S. Kao*

\* Thermal Stability of Ethylene Carbonate Reacted with De-lithiated Cathode Materials in SP-5  
Lithium-ion Batteries  
*Y.-L. Chen (National United University), Y.-S. Duh, C.-S. Kao*

Thermal Stability of Gelatin Gels Confined to Silica Gel Nanopores SP-6  
*J. Prado (University of Alabama Birmingham), S. Vyazovkin*

Effect of Salt on the Main Phase Transition of Solid-Supported Lipid Bilayers SP-7  
*U. Kayiganwa Natyvella (Université de Montréal)*

Phase Transitions of Organogels of N-Alkyl-(R)-12-Hydroxyoctadecylammonium SP-8  
Chlorides in Safflower Oil  
*F. Alvarez Mitre (UASLP), R. G. Weiss, V. Ajay Mallia, J. F. Toro Vazquez*

Evaluating the Binding Affinity of a GM1 Binding Pro-drug SP-9  
*I. St-Jean (Université de Montréal), A. Melkoumov, X. Banquy, J. L. Chain, G. Leclair*

\* Polyelectrolyte Effects in G-quadruplexes SP-10  
*B. Kim (University of Toronto)*

|   |       |
|---|-------|
| Thermal Hazards for Cumene Hydroperoxide Mixed with Metal Ions by DSC, TAM III, and GC/MS<br><i>B. Laiwang (National Yunlin University of Science and Technology), Y.-L. Chen, J. Deng, C.-M. Shu, Z.-M. Luo, M.-L. You</i>   | SP-11 |
| Thermal Release Hazard for Decomposition of CHP in the Existence of Incompatibles by DSC, TAM III, and TIC<br><i>B. Laiwang (National Yunlin University of Science and Technology), S.-H. Liu, S.-Y. Huang, C.-M. Shu, H.-Y. Hou, J. Deng</i>   | SP-12 |
| Microcosmic Thermal Analysis on Coal Mixed with Oxide at Different Temperatures<br><i>C.-Y. Huang (National Yunlin University of Science and Technology), Y.-H. Chang, C.-M. Shu, J. Deng, J.-Y. Zhao, A. Huang</i>   | SP-13 |
| Thermal Analysis of Li <sub>2</sub> O-Containing Oxide Systems<br><i>B. Konar (McGill University), P. Hudon, M.-A. Van Ende, I.-H. Jung</i>   | SP-14 |
| Thermal Analysis and Thermodynamic Optimization of the K <sub>2</sub> O-SiO <sub>2</sub> and K <sub>2</sub> O-Al <sub>2</sub> O <sub>3</sub> Systems<br><i>D.-G. Kim (McGill University), M.-A. van Ende, I.-H. Jung</i>  | SP-15 |
| Crystallization Kinetics of Salts from Aqueous Solutions<br><i>V. Stanford (University of Alabama at Birmingham), C. McCulley, J. Prado, S. Vyazovkin</i>   | SP-16 |
| Evaluation of Explosion Properties with Different Particle Size Distribution of Bisphenol A Dust<br><i>T.-H. Lin (National Yunlin University of Science and Technology), C.-P. Li, S.-J. Shen, J.-Y. Liao, Y.-T. Tsai, C.-M. Shu</i>  | SP-17 |
| Thermal Decomposition Analysis Using Calorimetric Technology and a Simulation Approach to Determine the SADT of Self-reactive Bis (2,4-dichlorobenzoyl) Peroxide<br><i>T.-H. Lin (National Yunlin University of Science and Technology), M. Das, M.-H. Lee, J.-R. Chen, C.-M. Shu</i> | SP-18 |
| Adiabatic and Non-isothermal Calorimetry Combined with Simulation Approach to Study the Decomposition Characteristic of DCLBP<br><i>T.-H. Lin (National Yunlin University of Science and Technology), M. Das, M.-H. Lee, J.-R. Chen, C.-M. Shu</i>                                    | SP-19 |
| The Binary System n-Decane – n-Eicosane as a Model System for the Analysis of Complex Mixtures of Hydrocarbons<br><i>M. Ignacio (University of Guelph), K. M. Marczenko, G. W. Reitz, D. V. Soldatov</i>  | SP-20 |
| Thermal Stability of Phosphorus Compounds Derived from 2-Dopyl-1,4-benzenediol Diolate<br><i>G. Lienhart (Central Michigan University), B. A. Howell</i>  | SP-21 |
| A Coupled Experimental Study and Thermodynamic Modeling of Mn-RE Systems for the Development of Mg Alloys<br><i>J. Kim (McGill University), M. Paliwal, I.-H. Jung</i>  | SP-22 |
| Interactions of Prolyl Oligopeptidase with Covalent and Non-covalent Inhibitors Studied by DSC<br><i>C. Nevitt (McGill University), J. Di Trani, A. Mittermaier</i>   | SP-23 |

# Tuesday, August 11, 2015

## Plenary Lecture McGill Otto Maass – Auditorium 112 Peggy Cebe, Tufts University (NATAS President)

|           |   |      |
|-----------|---|------|
| 8:00–8:05 | Greetings   |      |
| 8:05–8:50 | Plenary Lecture: Thermosensitive Liposomes: a Therapeutic Strategy to Enhance the Effectiveness of Nanomedicines in Oncology<br><i>C. Allen (University of Toronto)</i> | PL-1 |

## Pharmaceutics Auditorium 10 Karine Khougaz, National Research Council & Suresh Narine, Trent University (Session Chairs)

|             |  |        |
|-------------|--|--------|
| 9:00–9:40   | A Perspective on Thermal Analysis in Pharmaceutics<br><i>Invited Speaker: S.-D. Clas (PharmaSolv Consulting)</i>   | Phar-1 |
| 9:40–10:00  | Direct Measurement of a Binary Amorphous Drug-polymer Phase Diagram: Methodology and Implications for Physical Stability<br><i>M. Grass (Bend Research Inc), M. Morgen, D. Vodak</i>   | Phar-2 |
| 10:00–10:20 | Thermal Analysis in Characterization and Evaluation of Novel Lipid-based Drug Delivery Systems<br><i>J. Musakhanian (Gattefosse Corporation)</i>   | Phar-3 |
| 10:20–10:40 | EXHIBITION & COFFEE BREAK (Lab 100)  |        |
| 10:40–11:20 | Thermal Analysis to Design Freeze-dried Pharmaceuticals<br><i>Invited Speaker: R. Suryanarayanan (University of Minnesota)</i>   | Phar-4 |
| 11:20–11:40 | * Thermal Dissolution Analysis and Chemical Imaging by Dissolution Analysis; Two New Techniques for Characterising Dissolution Kinetics and Mapping Materials on a Micro and Nano Scale<br><i>M. Reading (Huddersfield University)</i> | Phar-5 |
| 11:40–12:00 | Calorimetric Studies of the Interactions Between Immunoglobulin G and Polyacrylates<br><i>F. Winnik (Université de Montreal), D. Ma</i>  | Phar-6 |

**Environmental Sustainability & Green Chemistry  
Room 217**

**Wassila Benaissa, SOLVAY Corporate Research & Innovation (Session Chair)**

|             |  |       |
|-------------|--|-------|
| 9:00–9:20   | Thermal Degradation of Phosphorus Derivatives of 2,5-bis-Hydroxymethylfuran<br><i>B. A. Howell (Central Michigan University), X. Han</i>   | Env-1 |
| 9:20–9:40   | * <b>NATAS Student Travel Grant Award:</b> Thermal Degradation of Bisphosphorus Esters of Isosorbide<br><i>Y. Daniel (Central Michigan University), B. A. Howell</i>               | Env-2 |
| 9:40–10:00  | Solid State Chemical Transformation of Glycyl-glycine and Leucyl-alanine<br><i>F. I. Ali (University of Guelph), A. Tsang, M. Schreiber, D. V. Soldatov</i>                        | Env-3 |
| 10:00–10:20 | * <b>NATAS Student Travel Grant Award:</b> Thermal Decomposition of Poly(styrene) in the Presence of an Antioxidant<br><i>S. Lazar (Central Michigan University), B. A. Howell</i> | Env-4 |

**High Temperature Thermal Analysis**

**Room 328**

**Stephen Corbin, Dalhousie University (Session Chair)**

|             |  |        |
|-------------|--|--------|
| 9:00–9:40   | Characterization of the Sintering Process of Engineering Ceramics Using Advanced Thermal Analysis Methods<br><i>Invited Speaker: J. Blumm (NETZSCH)</i>  | High-1 |
| 9:40–10:00  | Study of the Sintering Behaviour of Powder-metallurgy-based Titanium-iron Alloys Using Differential Scanning Calorimetry and Dilatometry<br><i>J. O'Flynn (Dalhousie University), S. Corbin</i>  | High-2 |
| 10:00–10:20 | Determining the Transient Liquid Phase Bonding Behaviour of Inconel 625 and BNi-2 foil using Differential Scanning Calorimetry<br><i>D. C. Murray (Dalhousie University), S. Corbin</i>  | High-3 |
| 10:20–10:40 | EXHIBITION & COFFEE BREAK (Lab 100)  |        |
| 10:40–11:20 | An Overview of the Fundamentals of Both Low and High Temperature Thermal Conductivity as Related to Thermoelectric Materials<br><i>Invited Speaker: T. Tritt (Clemson University)</i>  | High-4 |
| 11:20–11:40 | Determining the Oxidation Behavior of Metal Powders During Heating Through Thermogravimetric and Evolved Gas Analysis Using a Coupled Gas Chromatography-Mass Spectrometry Technique<br><i>C. Whitman (Dalhousie University), J. O'Flynn, S. Corbin, A. Rayner</i> | High-5 |

**General Session**  
**Room 321**  
**Louis Cuccia, Concordia University &**  
**Pierre-Claver Nkinamubanzi, National Research Council (Session Chairs)**

|             |  |      |
|-------------|--|------|
| 9:00–9:20   | Gel Networks Made from Positive and Negatively Charged Fractal Particles<br><i>B. Grady (University of Oklahoma), J. Weston, J. Harwell</i>  | GS-1 |
| 9:20–9:40   | * Latent Heat of K-SmA, SmA-N and N-I Phase Transitions of 8CB Liquid Crystal<br><i>K. Farah (Lasell College), D. Sharma</i>   | GS-2 |
| 9:40–10:00  | Heat Capacity Measurements of Aviation Turbine Fuels<br><i>T. Fortin (National Institute of Standards and Technology), T. Bruno</i>  | GS-3 |
| 10:00–10:20 | Proximate Analysis of Coal Mine Dust<br><i>C. Potter (TA Instruments)</i>  | GS-4 |
| 10:20–10:40 | EXHIBITION & COFFEE BREAK (Lab 100)  |      |
| 10:40–11:00 | ASTM Standards & Applications of Thermal Analysis in Forensic Science<br><i>A. Riga (Case Western Reserve University), M. P. K. Maheswaram, D. Mantheni, C. Scott</i>  | GS-5 |
| 11:00–11:20 | Legal Case Study to Evaluate Product Liability Used Forensic Polymer Chemistry Measured by FTIR Spectroscopy and Differential Scanning Calorimetry<br><i>J. Moran (Notre Dame College), A. Riga</i>  | GS-6 |
| 11:20–11:40 | Managing an Expert Scientific Witness: Skills, Qualifications, Preparation, and Testimony<br><i>A. Riga (Case Western Reserve University), D. Mantheni, M. P. K. Maheswaram, C. Scott, J. Moran</i>  | GS-7 |
| 11:40–12:00 | Forensic Chemistry Structure-Property Fundamentals Interpret Legal Cases with Understanding of Chemical Structure and Physical Properties<br><i>J. Beiriger (Case Western Reserve University), A. Riga, D. Mantheni, M. P. K. Maheswaram, J. Moran, C. Scott</i> | GS-8 |
| 12:00–13:20 | LUNCH BREAK  |      |
| 13:20–13:40 | Forensic Pharmacy to Support Litigation: Patent and Civil<br><i>A. Leong (Case Western Reserve University), A. Riga, D. Mantheni, M. P. K. Maheswaram, C. Scott, K. S. Alexander</i>   | GS-9 |

|             |   |   |       |
|-------------|---|---|-------|
| 13:40–14:00 | * | Thermomechanical, Thermorheological and Dynamic Mechanical Measurements Using a Temperature Controlled Stage, a Digital Microscope and Image Analysis Software<br><i>M. Reading (Huddersfield University), G. Parkes, M. Morton</i> | GS-10 |
| 14:00–14:20 |   | Fog Testing of Automotive Components<br><i>C. Potter (TA Instruments)</i>   | GS-11 |
| 14:20–14:40 | * | Energetic of Degradation and Thermal Behaviour of Glass Fibre Reinforced Polymer Rebars (GFRP) Composites<br><i>F. Al-Mubaddel (King Saud University)</i>   | GS-12 |
| 14:40–15:00 | * | Thermal and Morphological Studies on PP/Petroleum Fly Ash Composites With and Without Compatibilizer<br><i>F. Al-Mubaddel (King Saud University)</i>  | GS-13 |
| 15:00–15:20 |   | EXHIBITION & COFFEE BREAK (Lab 100)   |       |

## Energetic Materials

### Room 217

#### Charles Dubois, École Polytechnique de Montréal (Session Chair)

|             |   |   |      |
|-------------|---|---|------|
| 10:40–11:20 |   | Techniques to Assess the Thermal Hazard Properties of Ammonium Nitrate and Ammonium Nitrate-Based Explosives<br><i>Invited Speaker: R. Turcotte (NRC Canadian Explosives Research Laboratory)</i>   | EM-1 |
| 11:20–11:40 |   | Nanocalorimetry of Energetic Materials<br><i>D. LaVan (National Institute of Standards and Technology), F. Yi, M. Staymates, J. G. Gillen</i>   | EM-2 |
| 11:40–12:00 |   | Safe Handling of Peroxide Explosives<br><i>J. Oxley (University of Rhode Island), J. Smith</i>  | EM-3 |
| 12:00–13:20 |   | LUNCH BREAK   |      |
| 13:20–13:40 |   | Testing Explosives and Propellants in the ARC<br><i>P. Rablovsky (NETZSCH Instruments North America)</i>  | EM-4 |
| 13:40–14:00 |   | On-going Study on the Thermal Decomposition of Nitrocellulose and its Mixture with Nitroglycerine<br><i>R. Turcotte (NRC Canadian Explosives Research Laboratory), Q. Kwok, S. Singh, M. Paquet</i>   | EM-5 |
| 14:00–14:20 | * | Effect of Particle Coating on the Thermal Response of Mixtures of Micro- and Nano-Aluminum Particles and Water<br><i>K. Trowell (McGill University), Y. Wang, Y. Yavor, S. Goroshin, J. Berghthorson, D. Frost, J.-C. St-Charles, C. Dubois</i> | EM-6 |

|             |   |  |       |
|-------------|---|--|-------|
| 14:20–14:40 |   | Cure Kinetics of Glycidyl Azide Polymer with Electron Acceptors Molecules by Means of DSC Analysis<br><i>E. Comtois (General Dynamics Ordnance and Tactical Systems Canada - Valleyfield University), C. Dubois, R. Pontes</i> | EM-7  |
| 14:40–15:00 | * | Flame Propagation Characteristics and Combustion Behaviour of FeOOH-coated Zirconium Particles<br><i>Q. Wang (Xi'an University of Science and Technology), J. Deng, J. Sun, H. Wen, Z. Luo, L. Ma, B. Liu</i>                  | EM-8  |
| 15:00–15:20 |   | EXHIBITION & COFFEE BREAK (Lab 100)  |       |
| 15:20–15:40 | * | Numerical Simulation of the Deflagration-to-Detonation Transition in Granular HMX Explosives Under Thermal Ignition<br><i>H. Dong (Institute of Applied Physics and Computational Mathematics), T. Hong, X. Zhang</i>          | EM-9  |
| 15:40–16:00 | * | Numerical Simulation for the Thermal Response of the Cookoff Bombs with PBX Explosive on Fire<br><i>X. Zhang (Institute of Applied Physics and Computational Mathematics), T. Hong, H. Dong</i>                                | EM-10 |
| 16:00–16:20 |   | Dynamics Features of Fluoropolymer - Al <sub>2</sub> O <sub>3</sub> Reactions at Various Heating Rates<br><i>K. Martirosyan (University of Texas Rio Grande Valley), M. Hobosyan</i>   | EM-11 |

## **Biomaterials & Biopolymers**

### **Auditorium 10**

**Sophie-Dorothée Clas, PharmaSolv Consulting &  
Karine Khougaz, National Research Council (Session Chairs)**

|             |  |  |      |
|-------------|--|--|------|
| 13:20–14:00 |  | The Lipid Biorefinery: Polymers and Fine Chemicals<br><i>Invited Speaker: S. Narine (Trent University)</i>                                     | BB-1 |
| 14:00–14:20 |  | Evaluation of the Ability of Cationic Lipids to Disrupt Membranes<br><i>L. Crocker (Merck Research Laboratories)</i>                           | BB-2 |
| 14:20–14:40 |  | Localized Heating Around Nanoparticles on Polymeric and Lipid Membranes: Application in Drug Delivery<br><i>A. Skirtach (Ghent University)</i> | BB-3 |
| 14:40–15:00 |  | Vibrational Heat Capacity of Collagen and Collagen-Water<br><i>M. Pyda (Rzeszow University of Technology), P. Zawada, P. Cebe</i>              | BB-4 |
| 15:00–15:20 |  | EXHIBITION & COFFEE BREAK (Lab 100)  |      |
| 15:20–15:40 |  | Lipid Derived Phase Change Materials for Thermal Energy Storage<br><i>M. Floros (Trent University), M. Tessier, S. Narine</i>                  | BB-5 |

|             |   |      |
|-------------|---|------|
| 15:40–16:00 | Green Silk-Graphene Nano-composite Materials<br><u>X. Hu</u> ( <i>Rowan University</i> )  | BB-6 |
| 16:00–16:20 | Mitigating the Crystallization Temperature of Biodiesel<br><u>A. Mohanan</u> ( <i>Trent University</i> ), <i>S. Narine, L. Bouzidi</i>                          | BB-7 |
| 16:20–16:40 | Fast Scanning Calorimetry of Silk Fibroin Protein<br><u>P. Cebe</u> ( <i>Tufts University</i> ), <i>B. Partlow, D. Kaplan, A. Wurm, E. Zhuravlev, C. Schick</i> | BB-8 |

**Fast Scanning Calorimetry**  
**Room 328**  
**Louis Cuccia, Concordia University (Session Chair)**

|             |   |        |
|-------------|---|--------|
| 13:20–13:40 | <b>NATAS Fellows Award sponsored by NETZSCH:</b> Melting Kinetics of Polymer Crystals Examined by Fast-scan DSC<br><u>A. Toda</u> ( <i>Hiroshima University</i> ), <i>T. Ando, K. Taguchi, K. Nozaki, M. Maruyama, Y. Mizutani, K. Tagashira, T. Fukushima, H. Kaji, M. Konishi</i> | Fast-1 |
| 13:40–14:00 | About the Interplay Between Rigid Amorphous Fraction and Crystalline Fraction in Polypropylene<br><u>J. Schawe</u> ( <i>Mettler-Toledo AG</i> )   | Fast-2 |
| 14:00–14:20 | <b>NATAS Student Travel Grant Award:</b> Determination of the Nonlinearity Parameter in the TNM Model of Structural Recovery: Simulation of Flash DSC Data<br><u>R. Bari</u> ( <i>Texas Tech University</i> ), <i>S. Simon</i>  | Fast-3 |
| 14:20–14:40 | <b>NATAS Student Travel Grant Award:</b> Intrinsic Isotherms, Asymmetry of Approach, and Memory Effect Experiments for a Single Polystyrene Film using Rapid Scanning Chip Calorimetry<br><u>E. Lopez</u> ( <i>Texas Tech University</i> ), <i>S. Simon</i>                         | Fast-4 |
| 14:40–15:00 | Investigation of Injection Molded PBT Microstructure via Fast Scanning Calorimetry<br><u>A. Rhoades</u> ( <i>Penn State Erie, Behrend College</i> ), <i>J. Guo, J. Williams, R. Androsch</i>  | Fast-5 |
| 15:00–15:20 | EXHIBITION & COFFEE BREAK (Lab 100)   |        |

**Nanocomposites & Composites**  
**Room 328**

**Pierre-Claver Nkinamubanzi, National Research Council (Session Chair)**

|             |   |        |
|-------------|---|--------|
| 15:20–16:00 | High Performance Multi-functional Nanocoatings<br><i>Invited Speaker: <u>L. Sun</u> (University of Connecticut)</i>   | Nano-1 |
| 16:00–16:20 | Void Level in Composites by Thermal Diffusivity<br><i><u>S. Sauerbrunn</u> (University of Delaware - CCM), <u>J. Deitzel</u></i>  | Nano-2 |
| 16:20–16:40 | The Use of Thermal Analysis Methods in Cement and Concrete Applications<br><i><u>P.-C. Nkinamubanzi</u> (National Research Council )</i>  | Nano-3 |
| 16:40–17:00 | Influence of Carbon Nano-tubes and Calcium Carbonate Filler on the Crystallization Behavior of Polypropylene at Processing Relevant Supercooling<br><i><u>J. Schawe</u> (Mettler-Toledo AG)</i> | Nano-4 |

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**NATAS Members Meeting**  
**McGill Otto Maass – Auditorium 10**  
**17:00 to 17:30**

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**CTAS Annual General Meeting**  
**McGill Otto Maass – Room 328**  
**17:00 to 17:30**

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## Wednesday, August 12, 2015

### METTLER Award in Thermal Analysis – Plenary Lecture

sponsored by Mettler Toledo

McGill Otto Maass – Auditorium 112

Queenie Kwok, NRCan Canadian Explosives Research Laboratory (Conference Chair)

|           |   |      |
|-----------|---|------|
| 8:00–8:05 | Greetings   |      |
| 8:05–8:50 | <b>METTLER Award in Thermal Analysis:</b> The Role of Thermal Analysis in Understanding Fundamentals Essential for Solving Practical Problems in Polymer Applications and Processing<br><i>R. Chartoff (University of Oregon)</i> | PL-2 |

### In Memoriam Edith Turi

Auditorium 10

Joseph Menczel, Thermal Measurements &  
Lawrence Judovits, Arkema Inc (Session Chairs)

|             |  |        |
|-------------|--|--------|
| 9:00–9:20   | In Memoriam Edith Turi – Introduction<br><i>J. Menczel (Thermal Measurements)</i>  |        |
| 9:20–9:40   | Crystal-to-Crystal Transition in Semicrystalline Polymers<br><i>J. Menczel (Thermal Measurements), S. Kohl</i>   | Turi-1 |
| 9:40–10:00  | Thermal Analysis of Isosorbide Containing Thermoplastics and Thermosets<br><i>M. Jaffe (New Jersey Institute of Technology), W. Hammond, G. Olaoya, G. Busto, R. Bhatt, A. Sadoh</i> | Turi-2 |
| 10:00–10:20 | Fast Scanning Calorimetry of Semicrystalline Trogamid<br><i>P. Cebe (Tufts University), B. Mao, A. Wurm, E. Zhuravlev, C. Schick</i>   | Turi-3 |
| 10:20–10:40 | EXHIBITION & COFFEE BREAK (Lab 100)  |        |
| 10:40–11:00 | Mimicking Bone Nanostructure by Combining Block Co-polymer Self-Assembly and 1D Crystal Nucleation<br><i>C. Li (Drexel University)</i>   | Turi-4 |
| 11:00–11:20 | Tackling Difficult Industrial Problems: Thermal Analysis of Oily Nanofilms on Steel<br><i>J. Matisons (Gelest Inc)</i>   | Turi-5 |

|             |   |        |
|-------------|---|--------|
| 11:20–11:40 | Strong Memory of Crystallization in Melts of Broadly Distributed Ethylene 1-Alkene Copolymers. A Study of Molar Mass and Comonomer Compositions Fractions<br><i>A. Mamun (Florida State University), X. Chen, R. G. Alamo</i> | Turi-6 |
| 11:40–12:00 | Cure Characterization of Readily Available Epoxies by Modulated Temperature DSC<br><i>L. Judovits (Arkema), R. B.Prime</i>  | Turi-7 |
| 12:00–13:20 | LUNCH BREAK   |        |
| 13:20–13:40 | Single Fiber Shear Modulus: Using a Rheometer as a Torsional Pendulum<br><i>S. Sauerbrunn (University of Delaware), M. Sheehan</i>  | Turi-8 |
| 13:40–14:00 | Influence of Moisture on Coal Oxidation Kinetics by TG-IR Analysis<br><i>X. Zhai (Xi'an University of Science &amp; Technology), H. Wen, K. Wang, J. Guo, Z. Yu</i>   | Turi-9 |

## Thermal Hazards & Process Safety

### Room 217

**Wassila Benaissa, SOLVAY Corporate Research & Innovation & Richard Kwasny, Fauske and Associates (Session Chairs)**

|             |   |      |
|-------------|---|------|
| 9:00–9:40   | Enthalpy or Energy that is the Question for Process Safety Calorimetry<br><i>Invited speaker: D. Carson (Institut National de l'Environnement Industriel et des Risques)</i>                                    | TH-1 |
| 9:40–10:00  | Process Safety and Heterogeneous Catalytic Hydrogenation using Reaction Calorimetry<br><i>R. Kwasny (Fauske &amp; Associates, LLC), D. Knoechel</i>   | TH-2 |
| 10:00–10:20 | Thermal Hazard Evaluation of Cumene Hydroperoxide (CHP) Using an Isothermal Calorimeter<br><i>S.-H. Wu (TransWorld University)</i>  | TH-3 |
| 10:20–10:40 | EXHIBITION & COFFEE BREAK (Lab 100)   |      |
| 10:40–11:00 | Thermal Analysis of Two Alkyl-imidazolium Ionic Liquids<br><i>C.-Y. Huang (National Yunlin University of Science and Technology), S.-Y. Huang, S.-H. Liu, J. Deng, H.-Y. Hou, Y.-H. Chang, C.-M. Shu</i>        | TH-4 |
| 11:00–11:20 | Fire Prevention Mechanism of the Coal Spontaneous Combustion for Zn/Mg/Al Layered Double Hydroxides<br><i>B. Liu (Xi'an University of Science and Technology), C. Wang, X. Zhai, X. Zhang, Q. Wang, J. Deng</i> | TH-5 |

|             |  |       |
|-------------|--|-------|
| 11:20–11:40 | Accelerated Reactions in Thermal Hazards Screening<br><i>P. Ralbovsky (NETZSCH Instruments North America)</i>  | TH-6  |
| 11:40–12:00 | Thermal Hazard Analysis with Custom-Made High-Pressure Crucibles and Their Application to Ionic Liquids<br><i>H. Xia (University of Notre Dame), J. Brennecke</i>  | TH-7  |
| 12:00–13:20 | LUNCH BREAK  |       |
| 13:20–13:40 | Simultaneous Consideration of DSC, ARC and DEWAR Data for Determination of Thermal Hazard Indicators<br><i>B. Roduit (AKTS Inc.), M. Hartmann, P. Folly, A. Sarbach, P. Brodard, R. Baltensperger</i>  | TH-8  |
| 13:40–14:00 | Effects of UV for (3,4-Epoxy cyclohexane) Methyl-3'4'-Epoxy cyclohexyl-carboxylate (EEC) Mixed with Reactants via Calorimetric Technology and Theoretical Kinetic Models<br><i>B. Laiwang (National Yunlin University of Science and Technology), Y.-T. Tsai, J. Deng, C.-M. Shu, J.-R. Chen</i> | TH-9  |
| 14:00–14:20 | Detection of Thermal Explosion Hazards for 18650 Li-ion Batteries Module by VSP2<br><i>C.-Y. Huang (National Yunlin University of Science and Technology), W.-C. Chen, Y.-W. Wang, J.-R. Chen, C.-M. Shu, Y.-H. Chang</i>  | TH-10 |
| 14:20–14:40 | Effects of Dust Explosion on the Production of Powdered Polyester Resin<br><i>C.-M. Shu (National Yunlin University of Science and Technology), Y.-T. Tsai, T.-H. Lin, S.-Y. Lin, S.-C. Ho</i>   | TH-11 |
| 14:40–15:00 | * Experimental Study on the Corresponding Relationship Between the Index Gases and Critical Temperature for Coal Spontaneous Combustion<br><i>Y. Xiao (Xi'an University of Science and Technology), Q.-W. Li, J. Deng, C.-M. Shu</i>   | TH-12 |
| 15:00–15:20 | EXHIBITION & COFFEE BREAK (Lab 100)  |       |

## Biocalorimetry

Room 328

Anthony Mittermaier, McGill University (Session Chair)

|             |  |         |
|-------------|--|---------|
| 9:00–9:40   | Transforming ITC Into kinITC Yields Thermodynamic and Kinetic Information<br><i>Invited Speaker: <u>P. Dumas</u> (Centre National de la recherche scientifique Bureau)</i> | Bioc-1  |
| 9:40–10:20  | Volume Change on Protein Unfolding: Paradox Solved<br><i>Invited Speaker: <u>G. Makhatadze</u> (Rensselaer Polytechnic Institute)</i>                                      | Bioc-2  |
| 10:20–10:40 | EXHIBITION & COFFEE BREAK (Lab 100)  |         |
| 10:40–11:00 | Probing G-register Exchange Dynamics in Guanine Quadruplexes<br><i><u>R. Harkness</u> (McGill University), A. Mittermaier</i>  | Bioc-3  |
| 11:00–11:40 | Isothermal Titration Calorimetry Methods for Studying Protein Allostery and Coupled Folding/Binding Reactions<br><i><u>A. Mittermaier</u> (McGill University)</i>          | Bioc-4  |
| 11:40–12:00 | * Energetics of G-quadruplex Polymorphism<br><i><u>B. Kim</u> (University of Toronto)</i>  | Bioc-5  |
| 12:00–13:20 | LUNCH BREAK  |         |
| 13:20–14:00 | Characterization of Ligand Binding by the Cocaine-Binding Aptamer<br><i>Invited Speaker: <u>P. Johnson</u> (York University), O. Reinstein, S. Slavkovic</i>               | Bioc-6  |
| 14:00–14:20 | Facile Determination of Hoogsteen Base Pair Populations in Duplex DNA<br><i><u>R. Harkness</u> (McGill University), A. Mittermaier</i>                                     | Bioc-7  |
| 14:20–15:00 | Ion Binding Properties of K <sup>+</sup> -selective and Non-selective Cation Channels<br><i>Invited Speaker: <u>S. Lockless</u> (Texas A&amp;M University)</i>             | Bioc-8  |
| 15:00–15:20 | EXHIBITION & COFFEE BREAK (Lab 100)  |         |
| 15:20–16:00 | Ionic Switch Controls the DNA State in Phage $\lambda$<br><i>Invited Speaker: <u>A. Evilevitch</u> (Carnegie Mellon University)</i>  | Bioc-9  |
| 16:00–16:20 | Studying Biological Reaction Kinetics Using Isothermal Calorimetry<br><i><u>J. Di Trani</u> (McGill University), A. Mittermaier</i>  | Bioc-10 |

**Simultaneous & Combined Techniques**  
**Room 321**  
**Charles Potter, TA Instruments (Session Chair)**

|             |  |       |
|-------------|--|-------|
| 9:00–9:20   | Innovative TG-GC-MS Methods for Thermal Degradation Studies of Polymers<br><i>K. Lilova (SETARAM Inc)</i>  | Sim-1 |
| 9:20–9:40   | Investigation of Sulfur and Selenium Vapors with Thermal Analysis – Single Photon Ionization Mass Spectrometry<br><i>J. Varga (Helmholtz Zentrum München), M. Fischer, S. Wohlfahrt, M. R. Saraji-Bozorgzad, G. Matuschek, A. Reller, R. Zimmermann</i>  | Sim-2 |
| 9:40–10:00  | Identification of Different NR/SBR Blends with Low SBR Contents by TGA-GC/MS<br><i>N. Fedelich (Mettler Toledo AG)</i>   | Sim-3 |
| 10:00–10:20 | On-line Characterization of the Organic Chemical Signature of Thermal Processes in Evolved Gas Analysis: Thermogravimetry Hyphenated to Photo-Ionization Mass Spectrometry or Fast Gas Chromatography-Photo-Ionization Mass Spectrometry<br><i>R. Zimmermann (JMASC Helmholtz Zentrum München/CMA and University of Rostock), M. Fischer, S. Wohlfahrt, T. Denner, G. Matuschek, A. Walte, T. Streibel, M. R. Saraji-Bozorgzad, J. Varga</i> | Sim-4 |
| 10:20–10:40 | EXHIBITION & COFFEE BREAK (Lab 100)  |       |
| 10:40–11:00 | Development of a TG/DTA Instrument with High-Resolution Sample Observation Capability and Some Applications<br><i>B. Goolsby (Hitachi High Technologies), Y. Nishiyama, K. Shibata, M. Iwasa</i>   | Sim-5 |
| 11:00–11:20 | Beyond Peak Area: Approaches for Improving Data Treatment for Evolved Gas Analysis<br><i>C. DeCarlo (Extrel CMS)</i>   | Sim-6 |

**Molecular Materials**  
**Room 321**  
**Dmitriy Soldatov, University of Guelph (Session Chair)**

|             |   |      |
|-------------|---|------|
| 13:20–13:40 | * <i>NATAS Student Award sponsored by SETARAM: Self Nucleation and Crystallization of Poly(vinyl alcohol)</i><br><i>D. Thomas (Tufts University), P. Cebe</i> | MM-1 |
| 13:40–14:00 | Nucleation and Supercooling in Saturated Fatty Acid Phase Change Materials<br><i>J. Noel (Dalhousie University), M. A. White</i>                              | MM-2 |

|             |  |      |
|-------------|--|------|
| 14:00–14:20 | Composition, Molecular and Solid State Structure, and Thermal Properties of Polyethylene Based Industrial Waxes<br><i>M. Ignacio (University of Guelph), K. M. Marczenko, G. W. Reitz, D. Di Mondo, D. V. Soldatov</i>                       | MM-3 |
| 14:20–14:40 | Complex Phase Behavior of Mesomorphic and Crystalline Dyes<br><i>H. Taing (University of Windsor), S. Holger Eichhorn</i>  | MM-4 |
| 14:40–15:00 | <b>NATAS Student Travel Grant Award:</b> Evaluation of Glucose Doped TiO <sub>2</sub> /Carbon Electrocatalyst Supports for Fuel Cell Application<br><i>C. Odetola (University of Ontario Institute of Technology), L. Trevani, B. Easton</i> | MM-5 |
| 15:00–15:20 | EXHIBITION & COFFEE BREAK (Lab 100)  |      |
| 15:20–15:40 | Thermal Stability and Decomposition Pathways of Short Leucine-Based Peptides<br><i>A. J. Smith (University of Guelph), F. I. Ali, D. V. Soldatov</i>   | MM-6 |
| 15:40–16:00 | Temperature Dependent Conformational Polymorphism of a 1,2,3-DTA Ligand<br><i>R. A. Mayo (University of Guelph), D. J. Sullivan, T. A. P. Fillion, D. V. Soldatov, K. E. Preuss</i>  | MM-7 |

**Thermal Transport & Electrical Properties**  
**Auditorium 10**  
**Adam Harris, C-Therm (Session Chair)**

|             |  |      |
|-------------|--|------|
| 15:20–15:40 | Simultaneous Thermal Property Measurements<br><i>E. Wolff (Precision Measurements And Instruments Corporation Laboratory)</i>  | TE-1 |
| 15:40–16:00 | * Thermodynamic and Transport Properties for Fluids and Solids Participating in CuCl and Solar Production Processes<br><i>J. Avsec (University of Maribor), Z. Wang, G. Naterer</i>                                  | TE-2 |
| 16:00–16:20 | A Study of Solid-Solid Phase Transitions of Ammonium Nitrate<br><i>M. Yao (Nanjing University of Science &amp; Technology), J. Peng</i>  | TE-3 |
| 16:20–16:40 | Thermal Conductivity Testing of Metal Hydrides at Elevated Temperatures and Atmospheric Pressures<br><i>S. Ackermann (University of New Brunswick), A. Harris; G. S. McGrady, S. Riley</i>                           | TE-4 |
| 16:40–17:00 | * Effect of Compressive Pressure on Thermal Contact Resistance and Anisotropic Thermal Conductivity of Natural Flake Graphite Sheets<br><i>A. Soleymani (Simon Fraser University), M. A. Fayazbakhsh, M. Bahrami</i> | TE-5 |

**Kinetics**  
**Room 217**  
**Refat Ghunem, National Research Council &**  
**Peter Ralbovsky, NETZSCH Instruments North America (Session Chairs)**

|             |  |      |
|-------------|--|------|
| 15:20–15:40 | Temperature Dependence of the Reaction Rate During Gas-solid Reactions<br><i>L. Favergeon (Ecole des Mines), M. Pijolat</i>  | KS-1 |
| 15:40–16:00 | New Kinetic Workflow Intended for Scale-up of Thermal Behavior of Materials Based on Merging Heat Flow Traces with Adiabatic or Large Scale Test Data<br><i>B. Roduit (AKTS Inc.), M. Hartmann, P. Folly, A. Sarbach, P. Brodard, R. Baltensperger</i> | KS-2 |
| 16:00–16:20 | <i>NATAS Student Travel Grant Award</i> : Kinetics of Gelatin Gel Melting: Probing the Effect of Solid Surfaces<br><i>J. Prado (University of Alabama Birmingham), S. Vyazovkin</i>  | KS-3 |
| 16:20–16:40 | * <i>NATAS Student Travel Grant Award</i> : Reaction Kinetics of Phenyl Cyanate Ester Trimerization<br><i>M. Pallaka (Texas Tech University), S. Simon</i>   | KS-4 |

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**Shuttle bus from La Citadelle / Delta Hotels to Old Port of Montreal**  
**18:00 to 18:30**

**Boarding at Quai Jacques-Cartier**  
**18:30–19:00**

**Award Banquet – Le Bateau Mouche Dinner Cruise**  
**19:00–22:00**

**Shuttle bus to La Citadelle / Delta Hotels**  
**22:00–22:30**

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# Thursday, August 13, 2015

## Plenary Lecture

McGill Otto Maass – Auditorium 112

Shanti Singh, NRCan Canadian Explosives Research Laboratory (Technical Program Chair)

|           |  |      |
|-----------|--|------|
| 8:00–8:05 | Greetings  |      |
| 8:05–8:50 | Plenary Lecture: Thermal Microscopy for Discovery of New Molecular Materials: from Pharmaceutical Cocrystals to Photo/Thermomechanical Solids<br><i>T. Friscic (McGill University)</i> | PL-3 |

## Thermal Transport & Electrical Properties

Auditorium 10

Adam Harris, C-Therm (Session Chair)

|             |  |       |
|-------------|--|-------|
| 9:00–9:20   | Measuring the Thermal Barrier Function of Phase Change Material (PCM) Integrated in Sheet-like Carrier Materials<br><i>B. Pause (Textile Testing &amp; Innovation, LLC.)</i>                 | TE-6  |
| 9:20–9:40   | * Improving the Thermal Performance of Printed Circuit Boards by Optimizing Vias Configuration<br><i>A. Soleymani (Simon Fraser University), M. Ahmadi, M. Bahrami</i>                       | TE-7  |
| 9:40–10:00  | * The Influence of Thermophysical Properties on Electromagnetic Liquid Flows<br><i>J. Avsec (University of Maribor)</i>  | TE-8  |
| 10:00–10:20 | A New Concept for the Measurement of Seebeck Coefficients<br><i>M.-A. Thermitus (NETZSCH Instruments), T. Denner, J. Blumm</i>   | TE-9  |
| 10:20–10:40 | EXHIBITION & COFFEE BREAK (Ground Hall)  |       |
| 10:40–11:00 | Criterion and Need for a Standard for Thermal Effusivity Measurements<br><i>R. Bateman (C-Therm Technologies)</i>  | TE-10 |
| 11:00–11:20 | Polar Ionic Conduction in the Solid State of Drugs and Polymers Can be Verified by Dielectric Thermal Analysis<br><i>K. Rodgers (Case Western Reserve University), A. Riga, D. Mantheni,</i> | TE-11 |
| 11:20–11:40 | Microscale IR Thermography; a Practical Application to Visual Thermal Analysis<br><i>J. Morikawa (Tokyo Institute of Technology)</i>   | TE-12 |

- 11:40–12:00 \* Forced Convection Heat Transfer Model & Simulation in the Developing Region of Porous Material Filled Channel for Same Wall Temperature  
*N. Singh (Endurance Technology), M. Sahni* TE-13

### Kinetics

#### Room 217

**Refat Ghunem, National Research Council & Peter Ralbovsky, NETZSCH Instruments North America (Session Chairs)**

- 9:00–9:20 \* Prediction of Modulus Evolution of a Silicone Composite Using DMA for Cure Kinetic Profile Development  
*J. Gao (GE Global Research), M. Ravalli, J. Kelley, K. Gurnon, F. LeBel, S. Rubinsztajn* KS-5
- 9:20–9:40 Kinetics of Wire Insulation Decomposition  
*H. Salerno (DuPont)* KS-6
- 9:40–10:00 Oxidation Kinetics and Reactivity of Jurassic Coal in North Shaanxi  
*J. Deng (Xi'an University of Science & Technology), K. Wang, Y. Zhang, H. Yang* KS-7
- 10:00–10:20 Oxidation Kinetics Characteristics of Jurassic Coal in North Shaanxi in the Low Temperature Process  
*Y. Zhang (Xi'an University of Science & Technology), J. Deng, K. Wang, J. Zhao* KS-8
- 10:20–10:40 EXHIBITION & COFFEE BREAK (Ground Hall)

### Localized TA & Nanoconfinement

#### Room 328

**Jonathan Felts, Texas A&M University (Session Chair)**

- 9:00–9:20 Thermomechanical Bond Scission Dynamics Measured on Functionalized Graphene using Scanning Probes  
*J. Felts (Texas A&M University), A. Oyer, S. Hernandez, K. Whitener, J. Robinson, S. Walton, P. Sheehan* LN-1
- 9:20–9:40 Measuring Bias Dependence of Thermal Strain in AlGaIn/GaN High Electron Mobility Transistors with Scanning Joule Expansion Microscopy  
*M. Rosenberger (University of Illinois Urbana-Champaign), W. King, S. Graham, J. Jones, G. Pavlidis* LN-2

|             |   |   |      |
|-------------|---|---|------|
| 9:40–10:00  | * | Thermal Analysis by Structural Characterisation; a New General Purpose Thermal Analysis Technique<br><i>M. Reading (Huddersfield University), M., Morton</i>  | LN-3 |
| 10:00–10:20 |   | Multilayer Films and Polymer Blends Characterized by NanoTA and Lorentz Contact Resonance<br><i>E. Dillon (Anasys Instruments), K. Kjoller</i>  | LN-4 |
| 10:20–10:40 |   | EXHIBITION & COFFEE BREAK (Ground Hall)   |      |
| 10:40–11:00 | * | <b>NATAS Student Travel Grant Award:</b> Glass Transition and Viscoelastic Properties of thin Selenium Films at the Nano Scale<br><i>H. Yoon (Texas Tech University), Y. P. Koh, S. Simon, G. McKenna</i> | LN-5 |
| 11:00–11:20 |   | Modification of PVC Materials for Breath Alcohol Sensor Devices<br><i>J. Allan (University of Ontario Institute of Technology)</i>  | LN-6 |
| 11:20–11:40 |   | The Glass Transition Behaviors of Polymers Confined in Alumina Nanoporous Templates<br><i>L. Li (Nanjing University), J. Chen, G. Xue</i>   | LN-7 |

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**End of Conference**

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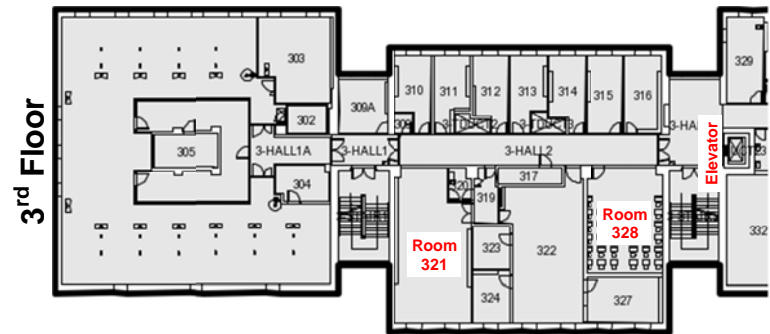
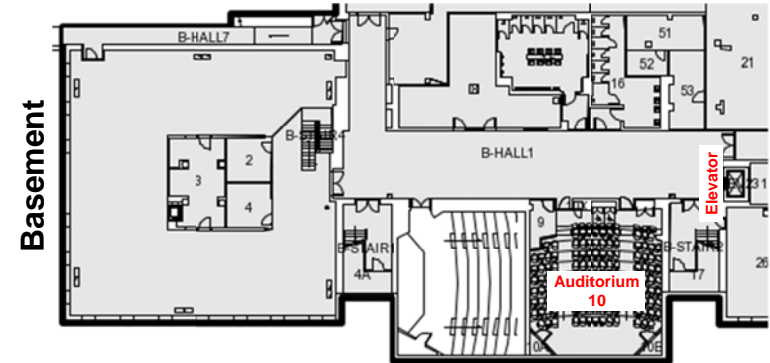
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# Map of Meeting Rooms

**McGill University – Otto Maass Chemistry Building**  
 801 Sherbrooke St. West, Montréal, Québec, Canada



1. Otto Maass Chemistry Building
2. McGill – La Citadelle Residence
3. McGill – Royal Victoria College Residence
4. Delta Montreal Hotel



Ground Floor

