Technical Program of the 46th

NORTH AMERICAN
THERMAL ANALYSIS SOCIETY CONFERENCE

August 5 – 8, 2019

Gurney’s Resort
Newport, Rhode Island
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
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<tbody>
<tr>
<td><strong>Monday, August 5, 2019</strong></td>
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<tr>
<td>18:00-19:30</td>
<td>Opening Reception (Ballroom B)</td>
</tr>
<tr>
<td>19:30-20:30</td>
<td>Opening Plenary Lecture: Catherine DeCesare, <em>Rhode Island History 101</em> (Vanderbilt)</td>
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<tr>
<td><strong>Tuesday, August 6, 2019</strong></td>
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<tr>
<td>8:00-8:10</td>
<td>Welcome (Ballroom CD)</td>
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<td>8:10-8:55</td>
<td>Plenary Lecture: Michael Jaffe (Ballroom CD)</td>
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<td>8:55-9:00</td>
<td>Travel Break</td>
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<tr>
<td>9:00-10:20</td>
<td>Room Vanderbilt Ballroom CD Heritage</td>
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<tr>
<td>10:20-10:40</td>
<td>Break</td>
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<tr>
<td>10:40-12:00</td>
<td>Room Vanderbilt Ballroom CD Heritage</td>
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<td>12:00-13:30</td>
<td>Lunch Break</td>
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<td>13:30-15:30</td>
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<td>15:30-17:00</td>
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<td>12:00-13:30</td>
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<td>15:30-17:30</td>
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<td>17:30-18:30</td>
<td>NATAS Business Meeting (Vanderbilt)</td>
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<td>19:00-21:00</td>
<td>Banquet &amp; Awards (Rose Island)</td>
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<td><strong>Thursday, August 8, 2019</strong></td>
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<td>10:00-11:40</td>
<td>Room Vanderbilt Ballroom CD Heritage</td>
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TECHNICAL PROGRAM OF THE 46TH
NORTH AMERICAN THERMAL ANALYSIS SOCIETY
CONFERENCE

August 5 – 8, 2019
Gurney’s Resort
Newport, Rhode Island

Conference Chair
Jimmie Oxley
University of Rhode Island

Technical Program Chair
Jimmie Oxley
University of Rhode Island

Exhibition Chair
Tina Adams
The Lubrizol Corporation

Award Chair
Andrew McGhie
University of Pennsylvania

Proceedings Chair
Elizabeth Pelczar
Hydromer, Inc.

Short Course Chair
Sara Reynaud
Arkema

NATAS Staff
Management
Greg Jewell
AEC Management Resources

Short Course Assistant Chair
Han Xia
Eli Lilly

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President’s Message

As a native New Englander, I would like to welcome you my region of the country for the 46th Annual Conference of the North American Thermal Analysis Society (NATAS) in Newport, Rhode Island. I hope that while you are here, you have a chance to venture away from the beautiful Gurney’s Resort to take in this historic town filled with New England charm. Ocean Drive or the Cliff Walk offer stunning coastal views while downtown Newport is home to many shopping venues and restaurants. Make sure to grab some New England Clam Chowder while you are out!

Newport is famous for its mansions. These are the summer “cottages” of America’s wealthiest at the turn of the century. The mansions have been well maintained and are open to the public. Visit some of these beautiful mansions and take a trip back through time to see where and how America’s wealthiest families were spending their summers.

I would like to thank this year’s conference committee for all of their hard work in planning this conference. Our Conference Chair and Technical Chair, Jimmie Oxley (University of Rhode Island); Awards Chair, Andrew McGhie (University of Pennsylvania); Exhibition Chair, Tina Adams (Lubrizol Corp); Proceedings Chair, Elizabeth Pelczar (Hydromer); and Short Course Chairs Sara Reynaud (Arkesma) and Assistant Chair Han Xia (Eli Lilly) have worked hard to put together a great meeting, with outstanding plenary lectures, parallel technical sessions each day, general and student poster sessions, and awards banquet. The conference would not be possible without the dedication of these volunteers.

Each year, the conference includes a vendor exhibition where attendees can see the newest thermal analysis instruments, software, and support products. We are grateful to our exhibitors, without whom this conference and this society would not be possible. Their multiple forms of support help to make NATAS the great society that it is. Please, set aside some time to visit the exhibition booths. You will find it well worth the time invested.

As you enjoy the conference, I hope you will consider becoming active in the society as a volunteer. We are always looking for capable and committed people to help improve NATAS to better serve our members. For 46 years, NATAS has been the society at the forefront of thermal analysis, which continues to be an important interdisciplinary branch of science with applications spanning diverse fields such as pharmaceuticals, life-sciences, nano-materials, and energetic materials. Thermal analysis is central in much of our professional lives, and your talents and contributions to the society would be welcome. Don’t hesitate to contact me at EPelczar@hyromer.com.

Enjoy the conference!

Elizabeth Pelczar
NATAS 2019 President
# NATAS 2019 Conference – Technical Session Organizers

<table>
<thead>
<tr>
<th>Session</th>
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<tr>
<td>Advances in Instrumentation &amp; Coupled Techniques</td>
<td>Kadine Mohamed, TA Instruments</td>
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<td>Additive Manufacturing</td>
<td>Joseph F Stanzione, Rowan University</td>
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<td>Batteries</td>
<td>Frank Puglia, Yardney</td>
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<td>Energetic Materials</td>
<td>Libby Glascoe, Lawrence Livermore National Lab</td>
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<td>Laura Smilowitz, Lawrence Livermore National Lab</td>
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<td>Food Science</td>
<td>Patricia Rayas-Duarte, Oklahoma State University</td>
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<td>General Session</td>
<td>Tara Fortin, NIST</td>
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<td>Bryan F. Henson, Lawrence Livermore National Lab</td>
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<td>Vadim Krungauz, ICU Medical</td>
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<td>Metals &amp; Ceramics</td>
<td>Ralph Napolitano, Iowa State University</td>
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<td>Otto Gregory, University of Rhode Island</td>
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<td>Parr Calorimetry</td>
<td>Ben Yancy, Lawrence Livermore National Lab</td>
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<td>Xiao Hu, Rowan University</td>
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<td>Steve Sauerbrunn, University of Delaware</td>
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<td>Joe Menczel, Thermal Measurements</td>
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<td>Polymers – Bio</td>
<td>John Torkelson, Northwestern University</td>
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<td>Process Safety</td>
<td>Han Xia, Eli Lilly</td>
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<td>Rheology</td>
<td>Ran Tao, NIST</td>
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<td>Ben Xu, Sherman Williams</td>
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<td>TA Theory &amp; Fast Scan Calorimeter</td>
<td>Sindeed Simon, Texas Tech</td>
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<td>Wenbing Hu, Nanjing University</td>
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<tr>
<td>Thermal Conductivity</td>
<td>Sarah Ackermann, Thermal Analysis</td>
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</tbody>
</table>
2019 NATAS Conference Exhibitors

AKTS AG, Advanced Kinetics and Technology Solutions
TECHNOArk 1
3960 Siders
Switzerland
+4 1 (0) 848 800 221
www.akts.com

Anton Paar
Strasse 20
8054 Graz
Austria
+43 316 257 0
www.anton-paar.com

Extrel
575 Epsilon Dr. #2
Pittsburgh, PA 15238
(412) 963-7530
www.extrel.com

Frontier Lab
5141 Lone Tree Way
Antioch, CA 94531
925-813-0498
www.frontier-lab.com

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P.O. Box 612208
Dallas, TX 75261-2208
972-615-9000
www.hitachi-hightech.com

Instrument Specialists, Inc.
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Twin Lakes, WI 53181-0280
262-877-3600
www.instrument-specialists.com

Mettler-Toledo, LLC
1900 Polaris Parkway
Columbus, OH 43240
800-638-8537
www.mt.com

Netzsch Instruments North America, LLC
129 Middlesex Turnpike
Burlington, MA 01803
781-272-5353
www.netzsch-thermal-analysis.com

Quick Accurate Testing
303 W Lancaster Ave
PO Box 137
Wayne PA 19087
www.qatlab.com

SETARAM, Inc.
Valley Business Park
216 State Highway 206, Suite 22
Hillsborough, NJ 08844
844-4-SETARAM
908-262-7060
www.us.setaram.com

TA Instruments
159 Lukens Drive
New Castle, DE 19720
302-427-4000
www.tainstruments.com

Thermtest Inc.
34 Melissa Street, Unit 1
Fredericton, NB E3A 6W1
Canada
506-458-5350
www.thermtest.com

Waters Corporation
34 Maple Street
Milford, MA 01757
1-508-478-2000
www.waters.com

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2019 Award Winners

**Mettler Award in Thermal Analysis**
(sponsored by Mettler-Toledo)

**Michael Jaffe**
New Jersey Innovation Institute

**NATAS Fellow**
(sponsored by Netzsch Instruments, N.A. LLC)

**Connie Roth**
Emory University

**NATAS Outstanding Service Award**
(sponsored by Netzsch Instruments N.A. LLC)

**Mike Kessler**
North Dakota State University

**NATAS Best Student Paper Award**
(Sponsored by SETARAM)

**John Alexander Zapata**, Texas Tech University
*Investigation of Thermal Properties of Itraconazole Using Flash DSC*

**NATAS Student Travel Award**
(sponsored by NATAS)

**Madhu Pallaka**, Texas Tech University
**Victoria Stanford**, University of Alabama
**Ye Xue**, Rowan University

**International NATAS Travel Award**
**Yi-Hung Chung**, Yunlin University, Taiwan

**TAFDV Student Travel Award**

**Darrel Cowan**, Rowan University
**Stacy Love**, Rutgers University (Camden)
**Laura Sonnenberg**, Temple University

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## Previous Award Winners

<table>
<thead>
<tr>
<th>Mettler Award in Thermal Analysis</th>
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<tr>
<td>2018 Janis Matisons</td>
<td>2018 Joseph Menczel</td>
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<td>2017 C-M. Shu</td>
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<td>2017 S. Sauerbrunn</td>
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## Previous Award Winners

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<th>NATAS Fellows</th>
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<td>Nobuyoshi Koga</td>
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2019 NATAS Conference Sponsors

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University of Rhode Island

Mettler - Toledo

Netzsch Instruments

SETARAM Instrumentation

TA Instruments

Thermal Analysis Forum of Delaware Valley (TAFDV)
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2019 NATAS Committee Chairs

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Iowa State University
Department of Materials Science and Engineering, 2220 Hoover Hall
Ames, IA 50011
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Mettler Award in Thermal Analysis – Plenary Lecture
(sponsored by Mettler-Toledo)
Tuesday, August 6, 2019
8:10 – 8:50 am
Ballroom CD

Thermal Analysis: A Key to Understanding Materials Behavior Process-Structure-Property-Performance

Michael Jaffe
New Jersey Innovation Institute

ABSTRACT

Primary variables in Materials Processing include temperature, time, stress/pressure and mass transfer. The suite of Thermal Analysis techniques, DSC, TGA, DMA, TMA provides data specifically monitoring sample properties as a function of chemistry and process history (T, t, σ, P, Δm). Recognizing that most materials processing produces kinetically stable, equilibrium metastable states, TA can provide a valuable dataset that relates to both sample properties as-produced and sample stability as a function of potential end-use environment. Detailed knowledge of how TA responses change as a function of process history allows one to relate TA response to specific process parameters, greatly increasing the value of TA data to manufacturing or reverse engineering projects. As manufacturing details are seldom revealed by materials producers, the ability to obtain process history details is limited to the patent literature, company encouraged publication and the ability of research organizations to simulate industrially relevant processes. This reality leads to emphasis on structure-property relationships in many laboratories, omitting critical processing insights into materials performance.
Monday, August 5, 2019

Welcome Reception & Opening Plenary
Vanderbilt

Ballroom CD

17:00-19:00  Registration, Gurney’s Conference Center (Ballroom Foyer)
18:00-19:30  Reception (Ballroom B)
19:30-20:30  History of Rhode Island 101
             Catherine DeCesare (University of Rhode Island)
Tuesday, August 6, 2019

Mettler Award in Thermal Analysis – Plenary Lecture
(sponsored by Mettler-Toledo)
Ballroom CD

8:00–8:10 Welcome

Thermal Analysis: A Key to Understanding Materials Behavior Process-
Structure-Property-Performance

Michael Jaffe (New Jersey Innovation Institute)

Energetic Materials
Vanderbilt

Libby Glascoe & Laura Smilowitz, Lawrence Livermore National Laboratory
(Session Chairs)

9:00–9:20 Kinetics of thermo-chemical decomposition of RDX in cyclohexanone and
gamma-butyrolactone determined with ARCTM and heat flow
microcalorimetry

Manfred Bohn (Fraunhofer ICT)

9:20–9:40 Influence of nanoconfinement on the degradation of CL-20 and HMX

Sindee Simon (Texas Tech University), Rozana Bari, Aric Denton, Zachary
Fondren, Victor Stepanov, Gregory McKenna

9:40–10:00 Thermal behavior of CL-20 at ultra-high heating and cooling rates using
flash DSC

Aric Denton (Texas Tech University), Rozana Bari, Zachary Fondren, Yung P.
Koh, Victor Stepanov, Sindee Simon, Gregory McKenna

10:00–10:20 Kinetics of the HMX beta-delta phase transition from DSC experiments

Geoffrey Brown (Los Alamos National Laboratory), Hongzhao Tian

10:20–10:40 Break

10:40–11:00 Preparation and Characteristic of NC/RDX Nanofibers by Electrospinning

Yue Yang, Long Cheng, Hongtao Yang (Nanjing university of science and
technology), Yifan Li, Yingyi Meng, Dongming Song, Yanchun Li

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<table>
<thead>
<tr>
<th>Time</th>
<th>Title</th>
<th>Speaker(s)</th>
<th>Venue</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:00</td>
<td>Characterizing Radiative Damage in TATB-based Energetic Materials</td>
<td>Steven Hawks (LLNL), Elizabeth Glascoe, Joseph Zaug, Cindy Alviso, Keith Coffee, Ginger Guillen, Jason Olivas, Benjamin Yancey</td>
<td>EM-6</td>
</tr>
<tr>
<td>11:20</td>
<td>Thermal Hazards Characterization of an Energetic Ionic Liquid: 1-methylimidazolium nitrate (MIM-NO3)</td>
<td>Shanti Singh (Canadian Explosives Research Laboratory), Jonathan Lavoie, Barbara Acheson, Richard Turcotte, Chris Badeen</td>
<td>EM-7</td>
</tr>
<tr>
<td>11:40</td>
<td>Erythritol Tetranitrate: Attribution Characteristics</td>
<td>Jimmie Oxley, Lindsay McLennan (University of Rhode Island), Taylor Taylor, Alex Yevdokimov, James Smith</td>
<td>EM-8</td>
</tr>
<tr>
<td>12:00</td>
<td>Lunch Break</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13:00</td>
<td>Thermal Property Study for Pellet to Clad Interaction in CFR600 Design</td>
<td>Yan Peng (China Institute of Atomic Energy)</td>
<td>EM-9</td>
</tr>
<tr>
<td>13:30</td>
<td>Thermal effects on electronic-grade Cu-etchant during transportation by calorimetric aging test</td>
<td>Yu-Jung Lin (China Medical University), Yih-Wen Wang</td>
<td>EM-10</td>
</tr>
<tr>
<td>14:10</td>
<td>Thermal Equilibrium Analysis of Al:Zr Composite Reactions</td>
<td>Colton Cagle, I. Shancita, Michelle Pantoya (Texas Tech University)</td>
<td>EM-11</td>
</tr>
<tr>
<td>14:30</td>
<td>Development of a novel insulating material for pyrotechnic protection</td>
<td>Jimmie Oxley, Robert Ichiyama (University of Rhode Island), James Smith</td>
<td>EM-12</td>
</tr>
<tr>
<td>14:50</td>
<td>Interactions of Nitrocellulose and Energetic Plasticizers</td>
<td>Eugene Rozumov (US Army CCDC Armaments Center), Kelley Caflin, Viral Panchal, Thelma Manning</td>
<td>EM-13</td>
</tr>
<tr>
<td>15:10</td>
<td>Prerequisites of correct workflow during scale-up of kinetic description of processes</td>
<td>Bertrand Roduit (AKTS SA), Marco Hartmann, Raphael Zufferey, Patrick Folly, Alexandre Sarbach, Martin-Karl Rolli</td>
<td>EM-14</td>
</tr>
</tbody>
</table>

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<table>
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<tbody>
<tr>
<td>9:00–9:20</td>
<td>Hierarchically Structured Polymer Fibers Prepared through Crystal Transformation</td>
<td>Bingbing Li (Central Michigan University)</td>
<td>POLY-1</td>
</tr>
<tr>
<td>9:20–9:40</td>
<td>Investigating ionic liquid-polymer interaction in fully zwitterionic copolymers using modulated calorimetry</td>
<td>Andrew Clark (Tufts University), Morgan Taylor, Matthew Panzer, Peggy Cebe</td>
<td>POLY-2</td>
</tr>
<tr>
<td>9:40–10:00</td>
<td>Modulated Temperature TMA for Easy Determination of the Glass Transition Temperature</td>
<td>Joseph Menczel (Thermal Measurements LLC)</td>
<td>POLY-3</td>
</tr>
<tr>
<td>10:00–10:20</td>
<td>Water in Differential Scanning Calorimetry</td>
<td>Joseph Menczel (Thermal Measurements LLC), Patricia Rayas-Duarte</td>
<td>POLY-4</td>
</tr>
<tr>
<td>10:20–10:40</td>
<td>Break</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10:40–11:00</td>
<td>Improved time-temperature-superpositioning results</td>
<td>Steve Sauerbrunn (University of Delaware - CCM), Stephen Bennison, Michael Haerth</td>
<td>POLY-5</td>
</tr>
<tr>
<td>11:00–11:20</td>
<td>Thermal Analysis as a Tool for Polymer Processing Diagnosis</td>
<td><strong>Mettler Award Winner: Michael Jaffe (New Jersey Innovation Institute)</strong></td>
<td>POLY-6</td>
</tr>
<tr>
<td>11:20–11:40</td>
<td>Correlating local versus global measures of glassy polymer dynamics by comparing different thermal analysis methods</td>
<td><strong>NATAS Fellow: Connie Roth (Emory University)</strong></td>
<td>POLY-7</td>
</tr>
<tr>
<td>12:00–13:30</td>
<td>Lunch Break</td>
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</tbody>
</table>
BioPolymers
Ballroom CD

John Torkelson, Northwestern University (Session Chair)

13:30-13:50
DSC for quantification of permeability of the lipid bilayer in the presence of therapeutics
Anju Gupta (Rochester Institute of Technology)

13:50-14:10
Comparative Study of Flexible Silk/Boron Nitride Thin Films and Electrospun Nanofibers
NATAS Travel Award: Ye Xue (Rowan University), Xiao Hu

14:10-14:30
Understanding the Morphological and Thermal properties of Cellulose-silk Biocomposites as a function of Coagulation Agent Concentration
TAFDV Award: Stacy Love (Rutgers University), David Salas de la Cruz, Xiao Hu, Karleena Rybacki, Abneris Morales

14:30-14:50
Optimization of thermal damage to living biological tissues by laser irradiation using Response Surface Method
Nazia Afrin (St. Mary's University)

14:50-15:10
Hyphenation of thermogravimetric analyzers with MS, FTIR, and GC-MS
Gray Slough (TA Instruments), Kadine Mohomed

Kinetics
Heritage

Brian Hensen & Craig Tarver, Lawrence Livermore National Laboratory (Session Chairs)

9:00-9:20
Thermokinetics evaluation using TSS and AKTS models on Cu-etchant and its etching waste in TFT-LCD panel factory
Yu-Jung Lin (China Medical University), Yih-Wen Wang, Zih-Syuan Lin

9:20-9:40
Reaction, Sorption, and Transport (ReSorT) modeling to predict material and system level-compatibility
Elizabeth Glascoe (Lawrence Livermore National Laboratory), Yunwei Sun, Hom Sharma, Jennifer Knipe, Steven Castonguay, Pratanu Roy, Sarah Matt

The photographing or recording of any talk or poster without the author’s consent is prohibited.
9:40-10:00 Crystallization kinetics and beta-phase suppression at high cooling for poly(vinylidene fluoride) and amorphous copolymer blends

Nelaka Govinna (Tufts University), Ilin Sadeghi, Christoph Schick, Ayse Asatekin, Peggy Cebe

Continuous monitoring of shelf lives of materials by application of data loggers with implemented kinetic parameters

Bertrand Rodiut (AKTS SA), Charly Luyet, Marco Hartmann, Patrick Folly, Alexandre Sarbach, Alain Dejeaifve, Rowan Dobson, Nicolas Schroeter, Olivier Vorlet, Michal Dabros, Richar Baltensperger

10:20-10:40 Break

10:40-11:00 Compositional analysis using TGA and kinetic models

Steve Sauerbrunn (University of Delaware - CCM)

Crystallization of ammonium perchlorate from solution confined to native and organically modified silica nanopores

NATAS Travel Award: Victoria Stanford (University of Alabama at Birmingham), Sergey Vyazovkin

11:20-11:40 Digital Versatile Disk Stability: Kinetics of Water Vapor Diffusion into UV-Cured Adhesive Layer

Vadim Krongauz (ICU Medical, Inc.)

11:40-12:00 Approach to derivation of condense phase kinetic compensation effect

Vadim Krongauz (ICU Medical, Inc.)

12:00-13:30 Lunch Break


Craig Tarver (Lawrence Livermore National Laboratory)

Interplay of Thermal Analysis and Quantum Chemistry in the Study of Kinetics, Thermochemistry, and Phase Transitions of Energetic Materials

Vitaly Kiselev (Brown University), Nikita Muravyev, Alla Pivkina, C. Franklin Goldsmith

14:10-14:30 Modeling cookoff of explosives using distributed activation energies

Michael Hobbs (Sandia National Laboratories), Michael Kaneshige, William Erikson
Food Science
Heritage

Patricia Rayas-Duarte, Oklahoma State University (Session Chair)

14:30-14:50  Thermal Analysis of Arabica Coffee Beans
Samuel Amanuel (Union College), Shanice Wilson, Victoria Chee, Salman Syed, Lavonia Duncan, Joanne Kehlbeck

14:50-15:10  Influence of amylose lipid complexes formation on amylopectin retrogradation of tortillas
Rosa María Mariscal-Moreno (UPFIM), Juan de Dios Figueroa-Cárdenas, David Santiago-Ramos, Patricia Rayas-Duarte

15:10-15:30  Protein composition and starch effects of wheat flour and its relationship with breadmaking quality of wheat
Patricia Rayas-Duarte (Oklahoma State University), Zorba J. Hernández-Estrada

General and Student Posters
&
Exhibition
Ballroom B
15:30-17:00

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Flow of a cement suspension in a pipe

Chengcheng Tao (National Energy Technology Laboratory)

New molecules derived from p-phenylene and p-biphenylene that present better characteristics during the gas generation process in rocket motors

Juan Arroyo (IDIC), Cesar Morales, María Belén Camarada, Paula Povea

Effect of deformation mode and fiber orientation on dynamic mechanical properties of a carbon-fiber-reinforced composite

Gunther Arnold (Anton Paar Germany), Alexander Troiss, Alexander Klutz, Abhishek Shetty

Evaluation of thermal and oxidative properties of diesel/biodiesel blends with high-pressure DSC


Degradation of polypropylene using silica-based meso-macroporous material evaluated by TGA

Valter Jose Fernandes Jr. (UFRN-Federal University of Rio Grande do Norte), Josué Santiago de Almeida, Rafaela R. Oliveira, Márcio S. Araújo, Marcio R. Souza, Antonio S. Araújo

Evaluation for melting behaviors of polymer materials using sample observation DSC

Yuichi Kasai (Hitachi High-Technologies Science America, Inc.), Yoshikazu Nishiyama

Study of thermal properties of HMX in molten TNT

Natalya Suvorova (Los Alamos National Laboratory), David Oschwald, Laura Smilowitz, Bryan Henson

Thermal decomposition of metatitanic acid and its application as a heavy metal adsorbent

Monika Motlochová (Institute of Inorganic Chemistry of Czech Academy of Sciences), Jan Šubrt, Václav Slovák

Fuel-Oxidizer mixtures: A lab and field study

Jimmie Oxley, Jeffrey Canaria (URI), Matthew Porter, Ryan Rettinger, James Smith

Investigation of how powder flow properties affect segregation

Laura Nebel (Arkema), Sara Reynaud, Mark Lavach
Student Poster Session
Ballroom B

Effects of microstructure on the crystallinity and relaxation dynamics of PVDF blended with a zwitterionic copolymer
Andrew Clark (Tufts University), Miriam Salcedo Montero, Nelaka Govinna, Samuel Lounder, Ayse Asatekin, Peggy Cebe

Melt-electrospinning of poly(ether ether ketone) fibers to avoid sulfonation
Nelaka Govinna (Tufts University), Thomas Keller, Christoph Schick, Peggy Cebe

Effect of Electrospinning Parameters on Biopolymer Nanofibers Produced by Ionic Liquids
TAFDV Award: Darrel Cowan (Rowan University), Ye Xue, David Salas de la Cruz, Xiao Hu

Crystallization of ammonium perchlorate from solution confined to native and organically modified silica nanopores
NATAS Travel Award: Victoria Stanford (University of Alabama at Birmingham), Sergey Vyazovkin

Improving thermal performance of the battery module by hybrid system of composite phase change material combined with liquid cooling device
Wan-Yu Lu, Yi-Hong Chung, Chi-Min Shu (National Yunlin University of Science and Technology)

Effect of parameters on the thermal hazards of various grades of coal
Jing-Wen Luo, Yu-Chi Cheng, Yi-Hong Chung, Chi-Min Shu (National Yunlin University of Science and Technology)

Inhibiting effect of two stabilizers on unexpected reaction of hydrogen peroxide
Kuei-Hua Lin, Wei-Cheng Lin, Chi-Min Shu, Yi-Hong Chung (National Yunlin University of Science and Technology)

Electrospun silk-cellulose composite nanomaterials using ionic liquid regenerated films
Ashley Rivera-Gallett (Rowan University), Darrel Cowan, Ye Xue, Stacy Love, David Salas de la Cruz, Xiao Hu

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**Wednesday, August 7, 2019**

**Energetics**  
**Vanderbilt**

Libby Glascoe & Laura Smilowitz, Lawrence Livermore National Laboratory  
*(Session Chairs)*

<table>
<thead>
<tr>
<th>Time</th>
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</thead>
<tbody>
<tr>
<td>9:00-9:40</td>
<td>The role of thermodynamics and kinetics in the thermal response of secondary explosives</td>
<td>EN-1</td>
</tr>
<tr>
<td><strong>Keynote speaker honoring Dr. Tom Brill</strong>: Bryan Henson <em>(Los Alamos National Laboratory)</em></td>
<td></td>
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</tr>
<tr>
<td>9:40-10:00</td>
<td>Continuing to try and to find a solution to the simple question with complex answers; is nitroglycerine compatible with boron potassium nitrate or not?</td>
<td>EN-2</td>
</tr>
<tr>
<td>Ruth Tunnell <em>(QinetiQ)</em></td>
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<tr>
<td>10:00-10:20</td>
<td>Preparation and combustion performance of B/PVDF/Al composite microspheres</td>
<td>EN-3</td>
</tr>
<tr>
<td>Long Cheng <em>(Nanjing University of Science &amp; Technology)</em>, Chuan Huang, Yue Yang, Yifan Li, Yingyi Meng, Dongming Song, Yanchun Li</td>
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<td></td>
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<tr>
<td>10:20-10:40</td>
<td><strong>Break</strong></td>
<td></td>
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<tr>
<td>10:40-11:00</td>
<td>Thermal studies of pyrotechnic materials</td>
<td>EN-4</td>
</tr>
<tr>
<td>Jimmie Oxley, Athina Kominia <em>(URI)</em>, Jeffrey Canariam, James Smith</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:00-11:20</td>
<td>Trace Explosives Aids for Scent</td>
<td>EN-5</td>
</tr>
<tr>
<td>Jimmie Oxley, Michelle Gonsalves <em>(URI)</em>, Allex Yevdokimov, James Smith</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:20-11:40</td>
<td>Isothermal calorimetry study of FK-800® crystallization as a function of CTFE content</td>
<td>EN-6</td>
</tr>
<tr>
<td>Geoffrey Brown <em>(Los Alamos National Laboratory)</em>, Robert Houlton</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11:40-12:00</td>
<td>Preparation of B/NC/Fe Particles and their Effect on the Performance of HTPB/AP Propellant</td>
<td>EN-7</td>
</tr>
<tr>
<td>Yanchun Li <em>(Nanjing university of science and technology)</em>, Long Cheng, Hongtao Yang, Yue Yang, Yifan Li, Yingyi Meng, Dongming Song</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12:00-13:30</td>
<td><strong>Lunch Break</strong></td>
<td></td>
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</table>

The photographing or recording of any talk or poster without the author’s consent is prohibited.
13:30-13:50  Modelling confined granular propellant fires pressures in the conductive and convective limits
Frederick Paquet, Mario Paquet (General Dynamics - Ordnance and Tactical Systems)  EN-8

13:50-14:10  Formation of an Energetic Cocrystal by Co-melting
Jimmie Oxley, Taylor Busby (University of Rhode Island), James Smith  EN-9

**Rheology**

**Vanderbilt**

Ran Tao, NIST & Ben Xu, Sherman Williams  
(Session Chairs)

14:10-14:30  End Effect Correction for Orthogonal Superposition of Small Strain
Oscillatory Shear in a Rotational Shear Rheometer  
Ran Tao (National Institute of Standards and Technology), Aaron Forster  RH-1

Building on the van Gurp-Palmen plot in the study of molecular structure
14:30-14:50  effects in polymer dynamics
Gregory McKenna (Texas Tech University), Zhiyuan Qian  RH-2

**Batteries**

**Ballroom CD**

Frank Puglia, Yardney (Session Chair)

9:00-9:20  Lithium Ion Battery Module Thermal Run-Away Studies
Daniel Griffin (Design Automation Associates), Robert Gitzendanner  BAT-1

9:20-9:40  Isothermal Calorimetry of Li-Ion Cells
Peter Ralbovsky (NETZSCH Instruments North America, LLC)  BAT-2

9:40-10:00  Thermal and electrochemical characterization of adiponitrile (ADN)-LiXF6 (X = P, As, Sb) cocrystals
**TAFDV Award:** Laura Sonnenberg (Temple University), Birane Fall, Stephanie Wunder, Michael Zdilla  BAT-3

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10:00-10:20  Overview of Energy Release and Propagation Methods
Frank Puglia (EaglePicher), Stuart Santee  BAT-4

10:20-10:40  Break

10:40-11:00  Testing Li-ion batteries with the Hot Disk thermal constants analyser
Mattias Gustavsson (Hot Disk AB), Andrey Sizov, Ma Yi, Besira Mekonnen Mihiretie  BAT-5

Additive Manufacturing
Ballroom CD

Joseph F Stanzione, Rowan University (Session Chair)

11:00-11:20  3D and 4D Printing of High Performance Polymers and Nanocomposites:
Characterization and Optimization
Rogoberto Advincula (Case Western Reserve University)  AM-1

11:20-11:40  Dynamic mechanical properties of thin adhesives
Andreas Bach (Mettler-Toledo GmbH), Juergen Schawe  AM-2

11:40-12:00  Next Generation SLA 3D Printing Resins Derived from Renewable Resources
Joseph Stanzione (Rowan University), John La Scala  AM-3

12:00-13:30  Lunch Break

13:30-13:50  Solid state fast sintering kinetics of metal alloys with nano precipitation
Jianing Gao (Veloxint)  AM-4

13:50-14:10  Laser-induced projectile impact testing (LIPIT) for extreme material science in cold spray
Jae-Hwang Lee (University of Massachusetts), Swetaparna Mohanty, Carmine Taglienti, Wanting Xie, Victor Champagne  AM-5

14:10-14:30  New Polymers, Processes, and Applications for Additive Manufacturing
John La Scala (Army Research Laboratory), Anthony Clay, Jason Robinette, Nicole Zander, Eric Wetzel, Thomas PLAisted, Joshua Mitchell, Giuseppe Palmese  AM-6

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Thermal analysis of additively manufactured aluminum alloys produced by laser-powder bed fusion

*Michael Van Order (Northrop Grumman Corporation), Kevin Chasse*

14:30-14:50

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**Advanced Instrumentation Heritage**

*Kadine Mohamed, TA Instruments (Session Chair)*

9:00-9:20

The Analysis of Regulated Phthalates in a Complex Matrix using Thermal Desorption-GC/MS Based on ASTM and IEC Methods

*Rojin Belganeh (Frontier Laboratories), Terry Ramus, Robert Freeman*

9:00-9:20

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9:20-9:40

Analysis, Characterization, and Deformation of Apparently Similar Rubber Parts Using Multiple Modes of Pyrolysis-GC/MS

*Rojin Belganeh, Terry Ramus (Diablo Analytical), Itsuko Iwai*

9:20-9:40

---

9:40-10:00

Determination of the viscoelastic Poisson’s ratio of polymers using a combined torsional-axial DMA

*Abhishek Shetty (Anton Paar USA), Gunther Arnold, Alexander Troiss, Alexander Klutz*

9:40-10:00

---

10:00-10:20

Applications of Quadrupole Mass Spectrometry for Evolved Gas Analysis

*Iliir Beta (Extrel CMS, LLC), Gregory Their, Jian Wei, Brian Regel, Luke Kephart*

10:00-10:20

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10:20-10:40

**Break**

10:20-10:40

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10:40-11:00

Combined Calorimetric and Manometric Studies of Porous Silica and Metal Organic Frameworks (MOFs) for the Adsorption of Carbon Dioxide and Hydrogen Gases

*Reena Rahi (SETARAM Inc.)*

10:40-11:00

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11:00-11:20

Electrohydrodynamic Thermal Oscillator for Laminate Pyroelectric Waste Heat Harvesting Device

*Tianxing Ma (Rutgers University), Matthew Signorelli, Darrel Dsouza, Jonathan Singer*

11:00-11:20

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11:20-11:40  Quantification Methods of Carbon Dioxide Evolved from a Calcium Oxalate

Daniel VanNess (Netzsch Instruments North America LLC), Peter Ralbovsky, Marc-Antoine Thermitu

11:40-12:00  Investigation of primary crystallization and relaxation in Al-based metallic glasses by high rate Calorimetry

John Perepezko (University of Wisconsin-Madison), Meng Gao

12:00-13:30  Lunch Break

13:30-13:50  Tg and Structural Recovery of 20 nm Stacked Polystyrene Nanorods

NATAS Travel Award: Madhusudhan Reddy Pallaka (Texas Tech University), Sindee Simon

13:50-14:10  Thermal Properties of Polyvinyl Alcohol by Fast Scanning Calorimetry

David Thomas, Evgeny Zhuravlev, Andreas Wurm, Christoph Schick, Peggy Cebe (Tufts University)

14:10-14:30  Thermal conductivity characterized by fast scanning calorimetry

Wenbing Hu (Nanjing University)

14:30-14:50  The influence of fillers and nucleating agents on polypropylene crystallization at high supercooling by Fast DSC

Andreas Bach (Mettler-Toledo GmbH), Juergen Schawe

14:50-15:10  Confined Polymer Crystallization in Vapor-Deposited Immiscible Polymer Blend Films

Yucheng Wang (Princeton University), Rodney Priestley

TA Theory and Fast Scanning Calorimetry

Heritage

Wenbing Hu, Nanjing University & Sindee Simon, Texas Tech (Session Chair)
Student & General Posters  
Ballroom B  
15:30-17:30  

NATAS Business Meeting  
Vanderbilt  
17:30-18:30  

Conference Dinner & Awards Ceremony  
Rose Island  
19:00-21:00
Thursday, August 8, 2019

Thermal Conductivity
Vanderbilt

Sarah Ackermann, Thermal Analysis Labs (Session Chair)

8:00-8:20
Experimental validation of a Circular Heat Source (CHS) sensor for thermal conductivity testing of thin films
Sarah Ackermann (Thermal Analysis Labs), Robert Bateman, Michael Emanuel

8:20-8:40
Accelerated Aging Tests of Thermal Interface Materials
Karl Schoch (Northrop Grumman), Amanda Brocki, Philip Panackal, Nichola Secord

8:40-9:00
Mark Dietenberger (USDA Forest Products Laboratory), Charles Boardman, David Weise

9:00-9:20
An investigation of the error resources on the transient thermal conductivity methods
Sofia Mylona (Thermtest Inc.), David Landry, Dale Hume

9:20-9:40
Use of Heat Flow Meter Instruments for Testing Thin and Thick Samples
Akhan Tleoubaev (TA Instruments - Waters LLC)
**Process Safety**

**Ballroom CD**

Han Xia, Eli Lilly (Session Chair)

8:00-8:40  Mechanism Study of Ammonium Nitrate Decomposition with Chloride Impurity using Experimental and Molecular Simulation Approach  *Keynote speaker: Jingyao Wang (Texas A&M University), Rong Xia, Benjamin Wilhit*  PS-1

8:40-9:00  Overview of Thermal Hazards Evaluation Methods  *Peter Ralbovsky (NETZSCH Instruments North America, LLC)*  PS-2

9:00-9:20  Investigation on safer composite phase change material with flame retardant for battery thermal management system  *International Travel Award: Yi-Hong Chung (National Yunlin University of Science and Technology), Yih-Wen Wang, Chi-Min Shu*  PS-3

9:20-9:40  Process Safety Assessments of some Peptide Coupling Reagents  *Han Xia (Eli Lilly and Company)*  PS-4

**Metals and Ceramics**

**Heritage**

Ralph Napolitano, Iowa State University & Otto Gregory, University of Rhode Island (Session Chairs)

8:00-8:20  Ribbon Ceramic, Novel Form Factor Enabling Thermal Product Applications  *John Olenick (ENrG Incorporated)*  MC-1

8:20-8:40  Ultrasensitive, thin film sensors for trace detection of explosives  *Peter Ricci (University of Rhode Island), Otto Gregory*  MC-2

8:40-9:00  Heat-flux Measurements on Advanced SiC-SiC CMC Engine Components  *Kevin Rivera (University of Rhode Island), Otto Gregory*  MC-3

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Utilizing Differential Scanning Calorimetry Simultaneously with Magnetically-biased Thermo-gravimetric Analysis to Determine Optimal Processing Practices for Alnico Permanent Magnets

9:00-9:20

Emily Rinko (Iowa State University), Iver Anderson, Emma White, Wei Tang, Tim Prost, Pratik Ray, Lin Zhou, Matthew Kramer, Kevin Dennis

Integrated analysis of metastable phase selection in amorphous Al-Sm

9:20-9:40

Ralph Napolitano (Iowa State University), Fanqiang Meng, Shihuai Zhou, Ryan Ott, Matthew Kramer

General Session

Vanderbilt

Chi-Min Shu, Yun Technical & Tara Fortin, NIST (Session Chair)

10:00-10:20

In-situ Characterization of Moisture Absorption and Hygroscopic Swelling of an Epoxy Molding Compound for Electronic Packaging

Yi He (Intel Corporation), Mohammad Kabiri

10:20-10:40

Critical temperature of jet fuels by HPDSC

Steve Sauerbrunn (University of Delaware - CCM)

10:40-11:00

Using DSC Software to Determine the Ratio of PP and PE in a Sample

Daniel VanNess (Netzsch Instruments North America LLC), Peter Ralbovsky, Marc-Antoine Thermitus

11:00-11:20

Purification and Characterization of Organic Materials by Melt Crystallization Techniques

Andrew McGhie (LRSM, University of PA), Gilbert Sloan

11:20-11:40

Role of Melt Rheology in Stochastic Modeling of Extrusion and Evolution of Cell Structure in Biopolymer Foams

Sajid Alavi (Kansas State University), Pavan Manepalli

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Pharmaceuticals
Ballroom CD

Xiao Hu, Rowan University (Session Chair)

10:00-10:40  Role of Thermal Analysis in Pharmaceutical Materials Characterization
             *Keynote speaker: Paroma Chakravarty (Genentech, Inc.)  PHRM-1

10:20-10:40  Nano-confinement Effects on the Glass Transition and Crystallization
             Behaviors of Pharmaceutical Nifedipine
             Gregory McKenna, Sixue Cheng (Texas Tech University)  PHRM-2

10:40-11:00  Investigation of Thermal Properties of Itraconazole Using Flash DSC
             SETERAM Student Award Winner: John Zapata (Texas Tech University),
             Madhusudhan Reddy Pallaka, Sindee Simon  PHRM-3

Short Course Begins (Vanderbilt)

End of Conference

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Yevdokimov, A. EM-8
Yi, M. BAT-5
Zander, N. AM-6
Zapata, J. PHRM-3
Zaug, J. EM-6
Zdilla, M. BAT-3
Zhou, L. MC-4
Zhou, S. MC-5
Zhuravlev, E. TH-3
Zufferey, R. EM-14

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