



**TECHNICAL PROGRAM OF THE JOINT
51st NORTH AMERICAN THERMAL ANALYSIS SOCIETY
CONFERENCE & IX INTERNATIONAL BAEKELAND
SYMPOSIUM**



**August 11-15, 2025
University of Michigan - Dearborn**



Start Time (Eastern Time)	Monday August 11th	Michigan Room East	Room 188	Room 186	Michigan Room East	Break out room 2: Room 188	Break out room 3: Room 186	Break out room 1: Michigan Room East	Friday August 10th
9:00	Welcome Reception, Poster Session, and Exhibition	Tuesday August 12th							
9:20		Welcome and Plenary - John Kieffer of Univ. of Michigan - Ann Arbor; Room: Michigan Room East							
9:40		Break							
10:00		Batteries Chair - Chen, (Invited speaker: Fang) Gonzalez Malahet Bai Lee	Thermophys. Prop. Chair - Rhodes (Inv. sp. Bakdash) McKenna Karakus Zhang	Composites Chair - Cheng (Inv. sp. Wang) Hashemipour Gady Patti	Sustainable Poly. Chair - Naskar (Inv. sp. Tommy) Sreth Zhao Kuang	Eng. and Therm. Mtx. Chair - Guillen (Inv. sp. Rosener) Rodut PENG Singh	FSC/Nanotech Chair - Zhang (Inv. sp. Koh) Rhodes Thomas Schoenitz	Elec. Packaging Chair - Schoolt (Inv. sp. Bomborg) Tao Jadhav Schich	NATAS Award Presentation; Room: Michigan Room East
10:20									
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15:00									
15:20	Welcome Reception, Poster Session, and Exhibition	Zhou Ali	Adv. Int. & Trans. Tech. Chair - Slough (Inv. sp. Wagner) Slough	Kinetics Chair - Howell (Inv. Sp. Mushkina) Rodut Howell Mushkina	Elkhatib Stewart Gosh Naskar	Break	FSC/Nanotech Student Award Williams Zhang	Short course - Day 1; Room 188	Short course - Day 2; Room 188
15:40									
16:00									
16:20									
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August 11-15, 2025

**University of Michigan – Dearborn
Dearborn, MI.**

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Wayne State University

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Larry Judovits
ARKEMA (retired)

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President's Message

Welcome to the 51st annual meeting of the North American Thermal Analysis Society (NATAS) and the joint IX International Baekeland Symposium held in Dearborn, Michigan. This year's conference at the Dearborn campus of the University of Michigan promises wonderful exhibits, technical presentations, posters, and plenary talks which will stimulate and encourage discussions amongst us all.

Organizing a NATAS conference in this unusual year – marked by unforeseen economic constraints impacting collaboration and travel as our scientific community continues to bound from the pandemic – attests to the tremendous efforts of this year's Conference Chair, Camille Bishop (Wayne State University) and Technical Program Chair, Ken Kearns (Dow Chemical Company). Their resilience and determination resulted in an engaging and high-quality program, underscoring the enduring relevance of thermal analysis as a cornerstone driving the innovations within materials science, chemistry, engineering, and safety research.



I would also like to express my heartfelt appreciation to all the volunteers working behind the scenes to realize this conference, exhibit, and short course. NATAS is a volunteer society that proudly brings together a diverse membership who share a lasting commitment to the advancement of thermal analysis, vendors included. The vendor exhibit is an important feature, showcasing the latest technological state of the art instruments to at NATAS conferences. Please take full advantage of the wealth of knowledge and latest innovations these vendors bring to the field. If you are interested in expanding your network and making an impact in the field of thermal analysis, volunteering at NATAS is an excellent way to do so. There are many opportunities to get involved, and you can find out more by joining our Annual General Meeting or contacting any NATAS councillor.

There is much to look forward to, enjoy the conference!

Shanti Singh
NATAS President 2025

NATAS 2025 Conference – Technical Session Organizers

<u>Session</u>	<u>Session Chair</u>
Advanced Instrumentation & Tandem Techniques	Gray Slough (TA Instruments) Danielle Kimmel (Mettler-Toledo)
Batteries	Lei Chen (University of Michigan - Dearborn) Solomon Adera (University of Michigan) Meng Jiang (General Motors)
Composites & Nanocomposites	Shiwang Cheng (Michigan State University)
Electronic Packaging Materials	Stian Romberg (National Institute of Standards and Technology) Eric Schoch (Northrop Grumman Mission Systems)
Energetics & Thermal Hazards	Ginger Guillen (Lawrence Livermore National Laboratory) John Rosener (Lawrence Livermore National Laboratory)
Fast Scan & Nanocalorimetry	Xiaoshi Zhang (Penn State – Behrend) Alicyn Rhoades (Penn State – Behrend)
Kinetics	Bob Howell (Central Michigan University)
Sustainable Polymers	Amit K. Naskar (Oak Ridge National Lab)
Thermophysical Properties	Alicyn Rhoades (Penn State – Behrend)

2025 Award Winners

NATAS Award for Outstanding Achievement

(sponsored by Mettler-Toledo)

Dr. Brian Grady

Institute for Applied Surfactant Research,
University of Oklahoma

NATAS Fellowship Award

(sponsored by NETZSCH Instruments N.A. LLC)

Dr. Alicyn Rhoades

Department of Materials Science and Engineering
Penn State - Behrend

NATAS Outstanding Service Award

(sponsored by NETZSCH Instruments N.A. LLC)

Dr. Peggy Cebe

Department of Physics and Astronomy
Tufts University

NATAS Best Student Paper Award

(sponsored by SETARAM)

Logan Williams

North Carolina State University

Impact of Lamellar Infill and Thickening on the Rigid Fraction of Semicrystalline PLLA

NATAS Student Travel Grant

(sponsored by NATAS)

Elaheh Moghadam

North Carolina State University

Previous Award Winners

Mettler Award in Thermal Analysis

2024	J. Schawe	1986	H. G. Wiedemann
2023	K. Kearns	1985	E. A. Turi
2022	B. van Mele	1984	L. Mandelkern
2021	J. Oxley	1983	R. S. Porter
2019	M. Jaffe	1982	J. Chiu
2018	J. Matisons	1981	T. Ozawa
2017	C-M. Shu	1980	J. H. Flynn
2016	A. Toda	1979	D. Dollimore
2015	R. Chartoff	1978	J. K. Gilham
2014	S. Simon	1977	H. Kambe
2013	P. Cebe	1976	P. K. Gallagher
2012	B. Howell	1975	F. E. Karasz
2011	A. McGhie	1974	J. Sestak
2010	J. Menczel	1973	E. M. Barrall, III
2009	R. G. Alamo	1972	F. and J. Paulik
2008	W.-P. Pan	1971	B. Wunderlich
2007	E. L. Charsley	1970	W. W. Wendlandt
2006	C. E. Schick	1969	R. L. Stone
2005	D. J. W. Grant	1968	R. MacKenzie
2004	S. Vyazovkin		
2003	G. Delia Gatta		
2002	V. Mathot		
2001	G. McKenna		
2000	M. Reading		
1999	S. Cheng		
1998	A. Riga		
1997	Y. Kanna		
1996	M. E. Brown		
1995	J. C. Seferis		
1994	S. St. John Warne		
1993	Y. Godovsky		
1992	H. Starkweather		
1991	J. F. Johnson		
1990	V. Balek		
1989	R. B. Prime		
1988	J. Rouquerol		
1987	H. Bair		

NATAS Outstanding Service Award

2024	R. Tao	1987	R. C. Johnson
2023	E. Pelczar	1986	H.G. McAdie
2022	J. Matisons	1985	P. Gallagher
2021	E. Pelczar	1984	J. J. Mauer
2019	M. Kessler	1983	R. G. Ferrillo
2018	J. Menczel	1982	J. Chiu
2017	S. Sauerbrunn	1981	E. Turi
2016	T. Adams		
2015	Q. Kwok		
2014	M. LaTorre		
2013	B. Howell		
2012	S. Simon		
2011	M. Varma-Nair		
2010	K. F. Schoch, Jr.		
2009	R. G. Blaine		
	D. E. G. Jones		
2008	T. S. Ramotowski		
2007	M. J. Rich		
2006	W. Hammetter		
2005	L. Judovits		
2004	W. P. Pan		
2003	D. Burlett		
2002	B. Wunderlich		
2001	C. M. Earnest		
2000	C. M. Neag		
1999	S. Dyszel		
1998	S. Mikhail		
1997	M. Keating		
1996	J. Enns		
1995	A. Riga		
1994	L. Boyter		
1993	B. Bachman		
1992	A. McGhie		
1991	R. Hutchinson		
1990	M. Steiner		
1989	B. Fabricant		
1988	C. B. Murphy		

Previous Award Winners

NATAS Fellows

2024	K. E. Schoch	1995	R. Seyler	1982	D. Brazier
2023	R. Advincula		J. Oxley		R. Ferrillo
2022	S. Sauerbrunn	1994	I. Harrison		J. Maurer
2021	None		P. Ronco		E. Pearce
2020	S. Reynaud	1993	S. Cheng		B. Wunderlich
2019	C. Roth		R. Eby	1981	J. Chiu
2018	N. Koga	1992	A. Riga		J. Flynn
2017	G. McKenna	1991	M. Jaffe		P. Gallagher
2016	J. Matisons	1990	R. Chartoff		P. Garn
2015	A. Toda		J. Seferis		E. Turi
2014	C. Li		R. Blaine		
2013	M. Kessler	1988/9	C. M. Earnest		
2012	R. Ozao		Y. Khanna		
2011	C.-M. Shu		A. R. McGhie		
2010	D. J. Burlett		A. K. Sircar		
2009	None		H. Starkweather		
2008	E. L. Charsley	1987	S. St. J. Warne		
	P. Cebe		R. Weiss		
2007	M. Reading		H. Wiedemann		
2006	S. Vyazovkin	1986	D. Dollimore		
2005	C. E. Schick		F. Karasz		
	L. C. Thomas		W. Prest, Jr.		
2004	M. Keating	1995	P. Gill		
	C. M. Neag		J. Gillham		
2003	M. Brown		R. MacKenzie		
	S. L. Simon		L. Mandelkern		
2002	B. Howell		R. B. Prime		
	J. Menczel	1984	H. Bair		
2001	D. Jones		B. Barrall, II		
	L. Judovits		J. Elder		
2000	None		R. Johnson		
1999	K. Lavanga		R. Porter		
1998	H. Friedman	1983	J. Johnson		
1997	W.-P. Pan		G. Langer		
1996	I. Goldfarb		H. McAdie		
	L. Whiting		C. Murphy		
			W. Wendlandt		

2025 Conference Sponsors

The following sponsors are gratefully acknowledged for their financial support of the 2025 NATAS Conference.

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2025 Conference Exhibitors

Please stop by and visit our conference exhibitors.

AKTS SA

AMI - Instrument Specialists

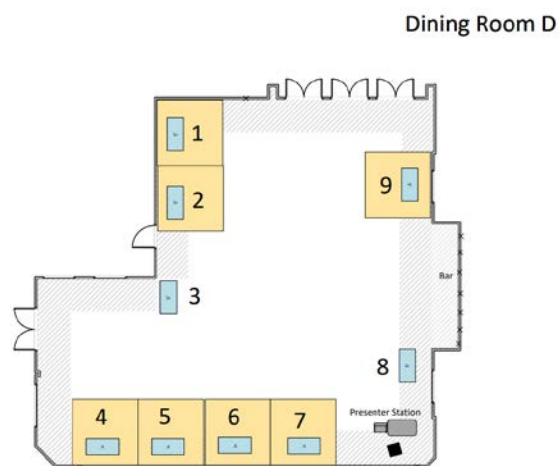
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Bylaws

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as needed

Academic Liaison

Available

Historian / Photographer

Available

Long Range Planning

Available

Education

Available

Interested in volunteering for NATAS? The following positions are open: Academic Liaison, Historian/Photographer, Long Range Planning and Education.

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National and International Thermal Analysis Societies

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AICAT	Italian Association of Calorimetry and Thermal Analysis	https://www.aicat-gicat.it/
ASTM	Committee E37 on Thermal Measurements	https://www.astm.org/membership-participation/technical-committees/committee-e37
CEEC-TAC	Central and Eastern European Committee for Thermal Analysis and Calorimetry	http://www.ceec-tac.org/
EVITHERM	European Virtual Institute for Thermal Analysis	http://www.evitherm.org/
FINTAC	Finnish Thermal Analysis and Calorimetry Association	https://www.fintac.org/
GECA	Spanish Thermal Analysis and Calorimetry Group	https://gecat.rseq.org/
GEFTA	German Association of Thermal Analysis and Calorimetry	https://www.gefta.org/index.php
HETA	Hellenic Society of Thermal Analysis	http://www.hsta.gr
ICTAC	International Confederation for Thermal Analysis and Calorimetry	http://www.ictac.org/
ITAS	Indian Thermal Analysis Society	https://www.itasindia.org/
JSCTA	Japan Society of Calorimetry & Thermal Analysis	https://www.netsu.org/
NATAS	North American Thermal Analysis Society	https://www.natasinfo.org/
RSC-TMG	Royal Society of Chemistry - Thermal Methods Group	https://www.thermalmethodsgroup.org.uk/
SFT	French Society of Thermal Engineers	https://www.sft.asso.fr
STK	Swiss Society for Thermal Analysis and Calorimetry	https://stk-online.ch/
TAWN	Dutch Society for Thermal Analysis and Calorimetry	www.tawn.nl
ThermSA	Thermal Division of the South African Chemical Institute	https://www.saci.co.za/ThermSA/index_ThermSA.html

Plenary Lecture
Tuesday, Aug. 11, 2025
9:00-10:00 am
Michigan Room East

Viscoelasticity and Light-Matter Interactions at GHz Frequencies

Dr. John Kieffer
College of Engineering
University of Michigan – Ann Arbor

Abstract:

Brillouin light scattering (BLS) is a non-invasive technique that probes the propagation velocity and attenuation of thermal phonons that exist in thermodynamic equilibrium within any condensed matter phase at finite temperatures. The elastic storage modulus is derived from the propagation velocity, whereas the attenuation coefficient yields the loss modulus.

The measurement is performed without mechanical contact to the sample. Therefore, it does not disrupt the equilibrium state of the material under investigation and requires only micron-sized sample sizes. The technique can be applied to characterize bulk materials, thin films, or single cells.

This presentation illustrates the capabilities of BLS and the type of information revealed by these measurements. We review two case studies: (i) The unique experimental setup in our lab combines a miniature tensile tester placed into the BLS optical path to probe the elastic properties of materials while uniaxially strained. BLS yields the adiabatic modulus, while the isothermal modulus is derived from the measured stress-strain curves. Upon straining, the elastic moduli of polymers drop precipitously, but during stress relaxation at constant strain both the isothermal and adiabatic moduli reconstitute, tending towards the unstrained values. While the former is implicit in the Maxwell-Wiechert (MW) model, the latter is not. Indeed, the structure rearranges to optimize molecular packing and maximize the non-bonding interactions. Hence, viscoelastic property changes require descriptions beyond simple MW models. (ii) The adiabatic loss modulus of a melt can be related to its viscosity. The temperature dependence of viscosity is at the heart of glass formation and reflects the structural developments that occur in the supercooled liquid as it passes through the glass transition regime. We demonstrate that the high-frequency complex mechanical modulus determined using Brillouin light scattering yields the same values for the viscosity as a function of temperature as zero-



frequency rotating cylinder viscometry when interpreted using a modified MW model, which is based on the assumption of a correlative activation free energy (CAFE) for the viscous dissipation process.

Accordingly, both the activation energy and entropy vary with temperature, which implies that the free energy landscape topography evolves along with the molecular structure as the material transitions from a liquid to a glass.¹ Conversely, we can determine the activation energy and entropy by fitting viscosity data using our CAFE model. We have analyzed the viscosity data for 849 glass compositions, confirming the robustness of our model and yielding results that enable deeper insights into structural relaxation mechanisms. We elaborate on the relationship between the rate of change of the energy landscape and fragility, the importance of activation entropy, and the influence of materials chemistry. (Acknowledgement: NSF-DMR 1610742.)

References:

1. J. Kieffer, 'Brillouin Light Scattering,' in Modern Glass Characterization, edited by M. Affatigato (Wiley & Sons, Hoboken, NJ, 2015), p. 107.
2. M.C. Beg and J. Kieffer, 'Fragility and the rate of change of the energy landscape topography,' J. Non-Cryst. Solids X 14, 100101 (2022).
3. M.C. Beg, J. Byeon, N. Berman, and J. Kieffer, 'Correlative Activation Free Energy (CAFE) Model: Application to Viscous Processes in Inorganic Oxide Glass-Formers,' Acta Materialia 283, 120538 (2025).

Plenary Lecture
Wednesday, Aug. 13, 2025
9:00-10:00 am
Michigan Room East

New Simulation and Modeling Tools to Understand Rheology, Processing, and Crystallization of Polyethylene Melts

Dr. Ronald G. Larson
Department of Chemical Engineering
University of Michigan – Ann Arbor

Abstract:

New simulation methods are contributing to solving an old problem: how molecular weight and branching distribution, and rheology and processing conditions control properties such as modulus and toughness, of polyethylene film.

In one part of this talk, a practical method is presented that accounts for the effects of short- and long-chain branching on rheological properties of commercial polyethylene through use of an “optimal ensemble” of chains, that can be used to predict chain orientation in a processing flow such as film blowing.



In a second part, molecular dynamics simulations are used to show that both primary and secondary nucleation proceed through a nematic-like intermediate. We show that short-chain branches are partially expelled from the growing crystal to an extent dependent on branch length and by measuring the degree of expulsion, and we can infer the “defect energy” induced by trapping of branches of various lengths in the crystal. We develop a “stem-by-stem” model for the effect of short-chain branching on the rate of crystallization of polyethylene that is in accord with experiments, and can be useful in modeling crystallization during film blowing.

NATAS Award for Outstanding Achievement

(sponsored by Mettler-Toledo)

Thursday, Aug. 14, 2025

9:00-10:00 am

Michigan Room East

Differential Scanning Calorimetry (DSC) of Polymers: Tips and Tricks (or Hacks for the Younger Crowd)

Dr. Brian Grady

Institute for Applied Surfactant Research,
University of Oklahoma

Abstract:

This talk will be to highlight some 35 years of learnings in performing DSC experiments on polymers, interspersed with personal recollections. Four items will be discussed.

Over the last 35 years, perhaps the most underreported improvement of changes in DSC experiments has been the improvement in baseline stability. In particular, good baseline stability is a requirement for accurate heat capacity measurement. With a high quality DSC, the limiting situation has been reached in the case of good sample/pan contact; namely that the specifics of how the sample sits in the pan limits the error in the measurement.

One reason to measure heat capacity is that a mass balance can determine the amount of crystalline, amorphous and rigid amorphous fraction (RAF). In this section, the RAF will be explained, and some studies on ionomers and composites will be discussed.

The importance of sample thickness with respect to heating or cooling rate will be discussed. This problem becomes much harder to quantify in cases where crystallization or melting occurs, since there is a local intake or release of heat. Our studies in this area will be highlighted.

DSC allows for the measurement of thermal conductivity for samples with low thermal conductivity. Our work in this area will be highlighted, and the limits of the technique will be discussed.



NATAS Fellowship Award & Talk
(sponsored by NETZSCH Instruments, N.A. LLC)

Wednesday, Aug. 13th

14:00 pm-15:00 pm

Michigan Room East

Combined influence of pressure and shear flow on the crystallization of isotactic polypropylene

Alicyn Rhoades, Benson Jacob, Jörg Läger, Xiaoshi Zhang, Ralph Colby, Markus Nemeth, Kirt Page

Dr. Alicyn Rhoades

Department of Materials Science and Engineering

Penn State – Behrend

Abstract:

In many melt processing techniques, polymers undergo rapid melting and deformation under pressure, followed by a rapid cooling or quench to solidification – conditions far from equilibrium and difficult to explore using traditional rheology instrumentation. To better understand polymer flow and crystallization under pressure, we studied with a commercial isotactic polypropylene using new rheological tools capable of applying simultaneous rotational shear flow and pressure. As expected, the combination of flow and pressure accelerated crystallization kinetics. However, the most striking finding was the profound impact that pressure seems to have on the crystallization mechanism and resulting morphology.

At moderate pressures (~2 bar), typical shish kebab morphologies resulted after shear flow. However, at elevated pressures of 100-180 bar alignment was suppressed, and morphologies were more isotropic despite shear flow. This shift may suggest a transition to a different crystallization pathway that is not simply accelerated but fundamentally altered by pressure. Unexpectedly, crystallization occurred above nominal melting conditions, indicating a pressure-induced suppression of chain mobility. X-ray scattering revealed the presence of a new crystalline peak exclusive to samples produced under the shear/pressure combination, potentially indicating a pressure-induced polymorphism. These morphologies resulted in melting temperatures that were up to 10 K higher than their quiescently crystallized counterparts. Together, these results point to pressure-driven processes that influence not only crystallization kinetics and resulting morphology, but to enhanced bulk properties that are potentially important for industrial adoption.



Monday, August 11, 2025

Welcome Reception, Poster Session and Exhibition

18:00 – 20:30

Dining Room A/D

Oscillatory Rheological Analysis of Poly(Vinylidene Fluoride) Solutions made from γ -Valerolactone

PS-1

Anuja Jayasekara, Peggy Cebe, Lily Buyea, Karin Wyatt (Tufts University)

Application of Modulated DSC Methods on Cooling for Analysis of Petroleum-Based Products

PS-2

Jennifer Schott (TA Instruments - Waters, LLC)

Next-Gen Skincare: Rheological Insights into Silver-Enhanced Aloe Gel vs. Commercial Hand Creams

PS-3

Tien Nguyen, Brooke Wilcox, (Central Michigan University) Isaac Roscoe Finch (University of Michigan)

Integration of DSC and ARC Data for Determination of TMRad in DTBP/Toluene Systems with Various Concentrations

PS-4

Bertrand Roduit, Patrick Folly, Alexandre Sarbach, Richard Baltensperger (AKTS SA)

Tuesday, August 12, 2025

Welcome and Plenary Lecture

Michigan Room East

9:00 – 10:00	Viscoelasticity and Light-Matter Interactions at GHz Frequencies <u>John Kieffer</u> (University of Michigan)	PL-1
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10:00-10:20	AM Break	
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Batteries

Lei Chen (University of Michigan - Dearborn)

Solomon Adera (University of Michigan)

Meng Jiang (General Motors)

Michigan Room East

10:20-11:00	Keynote Speaker: Lignin-Based Thermally Stable Separators for Lithium-Ion Batteries <u>Chengcheng Fang</u> (Michigan State University)	BAT-1
11:00-11:20	Oxidation Sensitivity and Thermal Decomposition of Halide-Doped Argyrodite Solid Electrolytes via TGA/DSC and Gas Analysis Method <u>Hernando Gonzalez Malabet</u> (General Motors)	BAT-2
11:20-11:40	From Winter to Summer: How Seasonal Climate Variation Shapes Battery Lifespan and Mileage <u>Hanyu Bai</u> , Qiu hao Hu, Yao Ren, Weiran Jiang, Ziyong Song (University of Michigan)	BAT-3
11:40-12:00	Acoustically Driven Thermal Management of Battery Packs in Electric Vehicles <u>Young Jin Lee</u> , Mikko Hendricks, Solomon Adera (University of Michigan)	BAT-4

12:00-13:20	Lunch Break	
13:20-13:40	Wide Band Gap Semiconductor Thermal Management using Direct Immersion Cooling <i><u>Biruk Teka Gidreta</u>, Runshuang Guo, Solomon Adera (University of Michigan)</i>	BAT-5
13:40-14:00	Temperature Estimation of Pouch Cell with Indirect Liquid Cooling Based on Physics-Informed Machine Learning <i><u>Zheng Liu</u> (University of Michigan-Dearborn)</i>	BAT-6
14:00-14:20	Dual-scale model enabled explainable-AI toward decoding internal short circuit risk of lithium metal batteries <i><u>Jinrong Su</u>, Lei Chen (University of Michigan-Dearborn)</i>	BAT-7
14:20-14:40	Investigating the Effect of Thermophysical Inhomogeneity and Uneven External Cooling on Battery Degradation <i><u>Wenxue Liu</u>, Zhiwen Wan, Jason B. Siegel, Anna G. Stefanopoulou (University of Michigan)</i>	BAT-8
14:40-15:00	A Compact Hybrid Battery Thermal Management System for Enhanced Cooling <i><u>Jinrong Su</u>, Lei Chen (University of Michigan-Dearborn)</i>	BAT-9
15:00-15:20	PM Break	
15:20-15:40	Phase Change Material Seeded Coolant for Electronics Thermal Management <i><u>Yimin Zhou</u>, Tomasz Kulakowski, Solomon Adera (University of Michigan)</i>	BAT-10

15:40-16:00	Phase change-based thermal management for battery packs <u>Takiyah Ali</u> , Solomon Adera (Michigan State University)	BAT-11
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Thermophysical Properties
Alicyn Rhoades (Penn State – Behrend)
Room 188

10:20-11:00	Keynote Speaker: The Hidden Flow: Unnoticed Rheology, Thermal Effects, and Their Impact on Daily Life, Industry, and Health <u>Leela Rakesh</u> (Central Michigan University)	TP-1
11:00-11:20	Building on History: 200+ Years of Thermal Analysis in Rubber Characterization <u>Gregory McKenna</u> (North Carolina State University)	TP-2
11:20-11:40	Modeling the Glass-Liquid Transition in Thin Films: A Theoretical Approach using the Modified Allen-Cahn Model <u>Koksai Karakus</u> , Leela Rakesh, Valeriy V. Ginzburg, Keith Promislow (Central Michigan University)	TP-3
11:40-12:00	Synchrotron X-Ray Mapping on Flow-Induced Crystallized Polymers Session: Thermophysical Properties <u>Xiaoshi Zhang</u> , Benson Jacob, Jason Alexander, Ryan Flanigan, Kirt Page, Arthur Woll, Ralph Colby, Alicyn Rhoades (Penn State - Behrend)	TP-4
12:00-13:20	Lunch Break	
13:20-13:40	Thermal Transport Characterization of Materials in Non-Ambient Conditions and Non-Conventional Configurations <u>Emma Mattinson</u> , Hitoshi Taniguchi (C-Therm Technologies Ltd.)	TP-5

Advanced Instrumentation & Tandem Techniques

Gray Slough (TA Instruments)

Danielle Kimmel (Mettler-Toledo)

Room 188

13:40-14:00	Undercooling Minimization in Ultrasound Coupled DTA Measurements of Molten Salts <i><u>Jacob Yingling</u>, Andrew Johanssen, Michael Woods, William Phillips (Idaho National Laboratory)</i>	AITT-1
14:00-14:20	Predicting Friction Material Composition Solely from TGA Data <i><u>Tina Adams</u> (The Lubrizol Corporation)</i>	AITT-2
14:20-14:40	Dynamic mechanical analyzer updated and engineered for comprehensive viscoelastic characterization of materials <i><u>Peter Vichos</u> (NETZSCH Instruments North America, LLC)</i>	AITT-3
14:40-15:00	Cooling Calibration of DSCs: Comparison of the Liquid Crystalline and Magnetic Transition Temperatures <i><u>Joseph Menczel</u> (Thermal Measurements LLC)</i>	AITT-4
15:00-15:20	PM Break	
15:20-16:00	Keynote Speaker: Solid Water Interactions and their Impact on Storage, Processing, and Shelf Life of Materials <i><u>Matthias Wagner</u>, Markus Schubnell, Nicolas Fedelich, Andreas Bach, Angela Hammer (METTLER TOLEDO)</i>	AITT-5
16:00-16:20	Introducing the TGA Smart-Seal Pans™ <i><u>Carlton (Gray) Slough</u> (TA Instruments)</i>	AITT-6

Composites & Nanocomposites
Shiwang Cheng (Michigan State University)
Room 196

10:20-11:00	<i>Keynote Speaker:</i> Mechanical Reinforcement in Polymer Nanocomposites: Insights from Small-Angle Neutron Scattering <u>Yangyang Wang</u> , Shiwang Cheng (Oak Ridge National Laboratory)	CN-1
11:00-11:20	Dynamics and Rheology of Polymer Nanocomposites with Repulsive Polymer-Nanoparticle Interactions <u>Neda Hashemipour</u> , Shiwang Cheng (Michigan State University)	CN-2
11:20-11:40	The Effect of Nanotube Length and Functionalization on Rheological Properties of Carbon Nanotube/Polymer Composites <u>Brian Grady</u> , Mason Rhue (University of Oklahoma)	CN-3
11:40-12:00	Dynamics of Poly(Methyl Acrylate)/Poly(Methyl Methacrylate)-Grafted Fe ₃ O ₄ <u>Shalin Patil</u> , Christopher Mbonu, Tsengming Chou, Ruhao Li, Di Wu, Pinar Akcora, Shiwang Cheng (Michigan State University)	CN-4
12:00-13:20	<i>Lunch Break</i>	
13:20-13:40	Spatial Gradient of the Dynamics of Capped Thin Polymer Films through Broadband Dielectric Spectroscopy <u>Juncheng Zheng</u> , Shiwang Cheng (Michigan State University)	CN-5
13:40-14:00	Recycling Carbon Fiber Epoxy Composites via Lewis Acid-Mediated Solvolysis <u>Cassandra Reese</u> , Wenbin Kuang, Kevin Simmons (PNNL/Bat)	CN-6
14:00-14:20	Carbon Precursor Resins and Semi-Fluorinated Polyaryl Ethers. Synthesis, Performance, and Commercialization Ernesto Borrego, ^{1,2} Gustavo Munoz, ^{1,2} Will Johnson, ¹ Niroshani Abeynayake, ^{1,2} Maxim Solovyeu, ¹ Erfan Masaeli, ¹ Charles Pittman, Jr., ¹ and <u>Dennis W. Smith, Jr.</u> ^{1,2} (¹ Mississippi State University, ² Hand Technologies)	CN-7

14:20-14:40	Network Dynamics of Polymer Nanocomposites <u>Shiwang Cheng</u> (<i>Michigan State University</i>)	CN-8
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Kinetics

Bob Howell (Central Michigan University)
Room 196

14:40-15:00	Stability and Crystallization of Indomethacin/ Sucrose Benzoate Co-Amorphous Glasses <u>Elaheh A. T. Moghadam</u> , <i>Sindee Simon (NC State University)</i>	KIN-1
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15:00-15:20	PM Break	
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15:20-16:00	Keynote Speaker: Dependence of curing kinetics on mass ratio for epoxy/amine systems and on intensity of UV light for photopolymers <u>Elena Moukhina</u> , <i>Claire Strasser (NETZSCH Geraetebau GmbH)</i>	KIN-2
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16:00-16:20	Combined Effects of Temperature and Humidity on the Decomposition Kinetics of Nitrocellulose-Based Propellants: From Milligram to Kilogram Scale <u>Bertrand Roduit</u> , <i>Patrick Folly, Alexandre Sarbach, Richard Baltensperger (AKTS SA)</i>	KIN-3
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16:20-16:40	Action of Organophosphorus Flame Retardants: Impact of Structure and Mode of Thermal Degradation <u>Bob A. Howell</u> (<i>Central Michigan University</i>)	KIN-4
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16:40-17:00	Kinetic Modelling of Pressure Influences on Reactions in Solids <u>Elena Moukhina</u> (<i>NETZSCH Geraetebau GmbH</i>)	KIN-5
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Wednesday, August 13, 2025

Welcome and Plenary Lecture

Michigan Room East

9:00-10:00	New Simulation and Modeling Tools to Understand Rheology, Processing, and Crystallization of Polyethylene Melts <u>Ronald Larson</u> (<i>University of Michigan</i>)	PL-2
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10:00-10:20	<i>AM Break</i>	
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Sustainable Polymers

Amit K. Naskar (Oak Ridge National Lab)

Michigan Room East

10:20-11:00	Keynote Speaker: Sustainable 3D-printing materials: Printability and performance <u>Michael Toomey</u> (<i>Oak Ridge National Lab</i>)	SP-1
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11:00-11:20	Pressure-Differential Scanning Calorimetry of Virgin and Recycled Polyethylene <u>Heather Snell</u> (<i>Intertape Polymer Group</i>)	SP-2
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11:20-11:40	Go with the Flow: Viscoelastic Behavior of Biopolymer-Based Rheology Modifiers in Today's Complex Fluids <u>Jin Zhao</u> , <u>Matthias Knarr</u> , <u>Leela Rakesh</u> (<i>Roquette</i>)	SP-3
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11:40-12:00	Unraveling the Influence of Hydrogen and Blended Gas on Polymer Performance in Infrastructure Systems <u>Wenbin Kuang</u> , <u>Kevin Simmons</u> , <u>Nalini Menon</u> , <u>Logan Kearney</u> (<i>Pacific Northwest National Laboratory</i>)	SP-4
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12:00-15:00	<i>Awards Luncheon & NATAS Fellow Talk</i>	
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15:00-15:20	PM Break	
15:20-15:40	Advancing Sustainability: Thermal Analysis of PLA Composites <u>Karim Elhatab</u> (TA Instruments)	SP-5
15:40-16:00	Thermal Characterization of Devulcanized Ground Tire Rubber (dGTR): Advancing Sustainability and the Circular Economy <u>Cathy Stewart</u> (Intertape Polymer Group)	SP-6
16:00-16:20	Sustainable polymer composites based on hemp hurd and recycled polyolefins <u>Arun Ghosh</u> (Troy University)	SP-7
16:20-16:40	A sustainable structural adhesive and its improved corrosion resistance in adhesively bonded metal joints <u>Amit Naskar</u> , Zeyang Yu (Oak Ridge National Laboratory)	SP-8

Energetics & Thermal Hazards

Ginger Guillen (Lawrence Livermore National Laboratory)

John Rosener (Lawrence Livermore National Laboratory)

Room 188

10:20-11:00	Keynote Speaker: Leveraging controlled-atmosphere preparation methods with heat flow calorimetry to study environmental factors in explosive compatibility <u>John Rosener</u> , Elizabeth Glascoe, Cody Cockreham, Steven Hawks (Lawrence Livermore National Laboratory)	ETH-1
11:00-11:20	Determination of Heat transfer in Virtual Packaging Systems (VPS) for Cookoff and Self Accelerating Decomposition Temperature (SADT) Evaluation <u>Bertrand Roduit</u> , Patrick Folly, Alexandre Sarbach, Richard Baltensperger (AKTS SA)	ETH-2

11:20-11:40	Nuclear Recriticality Test Study of PCI Based on ASTM E521 & E261 & E228 <u>Yan Peng</u> (China Institute of Atomic Energy)	ETH-3
11:40-12:00	Explosive testing and assessment of in-house material standards <u>Shanti Singh</u> , Hope Dettweiler, Isa Mohammed, Ricardo Pontes (Canadian Explosives Research Laboratory)	ETH-4
12:00-15:00	Awards Luncheon & NATAS Fellow Talk	
15:00-15:20	PM Break	

Fast Scan & Nanocalorimetry
Xiaoshi Zhang (Penn State – Behrend)
Alicyn Rhoades (Penn State – Behrend)
Room 196

10:20-11:00	Keynote Speaker: The Rigid Amorphous Fraction in Commercial Isotactic Polypropylene Fibers using Flash DSC <u>Yung P. Koh</u> , Sindee Simon (North Carolina State University)	FSN-1
11:00-11:20	Advancing crystallization modeling in thermoplastic composites: Incorporating fiber effects <u>Alicyn Rhoades</u> , Xiaoshi Zhang, Benson Jacob, Richard Schaaake, Gijs Kort, Ralph Colby (Penn State - Behrend)	FSN-2
11:20-11:40	Tunable Dynamic Fragility and Salt-Enhanced Glass Transition Definition in Polyzwitterion Systems John Thomas, Sophia Dinn, Ashleigh Herrera, Ayse Asatekin, Xiaoshi Zhang, Alicyn Rhoades, <u>Peggy Cebe</u> (Tufts University)	FSN-3

11:40-12:00	Rapid Thermal Decomposition of Viton-A <u>Mirko Schoenitz</u> , Edward L Dreizin (New Jersey Institute of Technology)	FSN-4
12:00-15:00	Awards Luncheon & NATAS Fellow Talk	
15:00-15:20	PM Break	
15:20-16:00	Student Award: Impact of Lamellar Infill and Thickening on the Rigid Fraction of Semicrystalline PLLA <u>Logan Williams</u> , Sindee Simon (North Carolina State University)	FSN-5
16:00-16:20	Crystallization of Polyamide 66 Blends <u>Xiaoshi Zhang</u> , John Buzinkai, René Androsch, Ralph Colby, Alicyn Rhoades (Penn State - Behrend)	FSN-6

Awards Luncheon

12:00 pm – 14:00 pm

Michigan Room West

NATAS Song

Please sing to the tune of the "Hokey Pokey"

Take an N and an A and a T, A, S
Put them all together and you've got to confess
That NATAS is a group at the top of the tree
In thermal technology

For it's science-based and very useful, too
It can solve a lot of problems when you don't know what to do
Choose a thermal method and apply it right away
That's what the experts say

Run some TGAs or some DSCs
To find out all about a material's properties
You can see a phase transition and study its kinetics
Or measure its energetics

There are other techniques taking hours instead of weeks
Sometimes yielding valleys but also giving peaks
Try calorimetry or else rheology
And be amazed at what you see

Yes, there's just no doubt that they've got a lot of clout
When it comes to thermal methods they can help you work it out
Combining SDT with mass spectrometry
Can do it so powerfully

So take an N and an A and a T, A, S
Put them all together and you've got to confess
That NATAS is a group at the top of the tree
In thermal technology

Andrew Roxburgh McGhie 08.10.09

NATAS Fellowship Award & Talk
(sponsored by NETZSCH Instruments, N.A. LLC)

14:00-15:00

Michigan Room East

Dr. Alicyn Rhoades

Combined influence of pressure and shear flow on the crystallization of isotactic
polypropylene

*Alicyn Rhoades, Benson Jacob, Jörg Läuger, Xiaoshi Zhang, Ralph Colby, Markus Nemeth,
Kirt Page
(Penn State – Behrend)*

NATAS Annual Membership Meeting

Shanti Singh, 2025 NATAS President
(Canadian Explosives Research Laboratory)

17:00-17:40

Michigan Room East

Thursday, August 14, 2025

Welcome and Plenary Lecture

NATAS Award for Outstanding Achievement

(Sponsored by Mettler-Toledo)

Michigan Room East

9:00-10:00	Differential Scanning Calorimetry (DSC) of Polymers: Tips and Tricks (or Hacks for the Younger Crowd) <u>Brian Grady</u> (<i>University of Oklahoma</i>)	PL-3
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10:00-10:20	<i>AM Break</i>
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Electronic Packaging Materials

Stian Romberg (National Institute of Standards and
Technology)

Eric Schoch (Northrop Grumman Mission Systems)

Michigan Room East

10:20-11:00	<i>Keynote Speaker:</i> Advanced Metrology Suite for Linking Residual Stress to Fundamental Properties of Thermoset Packaging Materials <u>Stian Romberg</u> , <i>Polette Centella, Ran Tao, Alexander Landauer, Huong Giang Nguyen, Gale Holmes, Gery Stafford, Christopher Soles (National Institute of Standards and Technology), Karl Schoch (Northrop Grumman)</i>	EPM-1
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11:00-11:20	Thermal Interface Materials for Advanced Packaging: The Role of Thixotropic Rheology <u>Ran Tao</u> , <i>Stian Romberg, Amanda Forster, Christopher Soles, Kaitlyn Hartog (National Institute of Standards and Technology), Karl Schoch (Northrop Grumman)</i>	EPM-2
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11:20-11:40	Experimental Investigation and Modeling of Direct Immersion Cooling for Electronics Thermal Management <i><u>Hrushikesh Jadhav</u>, Runshuang Guo, Solomon Adera (University of Michigan)</i>	EPM-3
11:40-12:00	Measurement of Cure Stress During Cure of Thermosets and Subsequent Thermal Cycling <i><u>Karl Schoch</u>, Kortney Kersten, Philip Panackal (Northrop Grumman)</i>	EPM-4
12:00-13:00	<i>Lunch Break</i>	

Short Courses

Thursday, August 14, 2025

Room 188

13:00 pm – 17:10 pm

- 13:00-14:00 **TMA Theory & Practice**
Dr. Larry Judovits (Arkema, retired)
- 14:00-15:00 **DSC Theory & Practice**
Dr. Han Xia (Eli Lilly)
- 15:00-15:10 ***Break (Refreshments will be provided)***
- 15:10-16:10 **TGA Theory & Practice**
Cathy Stewart (IPG, retired)
- 16:10-17:10 **DMA Theory & Practice**
Dr. Karl F. (Eric) Schoch (Northrop Grumman)

Friday, August 15, 2025

Room 188

8:30 am – 12:00 pm

- 8:30-9:20 **Introduction Rheology: Techniques & Applications**
Dr. Stian Romberg (NIST)
- 9:20-10:10 **Extreme Soft Materials by Polymer-network Design**
Prof. Shaoting Lin (Michigan State University)
- 10:10-10:20 ***Break (Refreshments will be provided)***
- 10:20-11:10 **Soft and Hard X-rays for Organic, Non-crystalline materials**
Prof. Camille Bishop (Wayne State University)
- 11:10-12:00 **Designing Polymeric Materials to Modulate Photon and Mass Transport**
Prof. Xinyue Liu (Michigan State University)

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This image shows a single sheet of white paper with horizontal blue ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Parking Directions



Take the Southfield Service Drive to Hubbard Drive. Follow Hubbard Drive and turn right into the southern entrance of the UM-Dearborn Fairlane Center. Follow the entrance road to the back and turn left at the stop sign. The North Building will be located on your left hand side. Parking is directly across from the North Building.

Fairlane Conference Center South

