

**REGISTER BY** MAY 6, 2019 to save

**25<sup>TH</sup>** INTERNATIONAL CONGRESS ON GLASS (ICG2019)  
HOSTED BY ACERS GLASS & OPTICAL MATERIALS DIVISION  
*100 years*

JUNE 9–14, 2019 | BOSTON PARK PLAZA HOTEL AND TOWERS | BOSTON, MASSACHUSETTS | USA



[www.ceramics.org/icg2019](http://www.ceramics.org/icg2019)

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Make your plans now to attend the International Congress on Glass (ICG) 2019 in Boston, Mass., June 9–14, 2019 and join the expected 1,000 attendees and more than 900 papers and posters representing the best and brightest glass science and technology minds in the world.

Held every three years since the late 1980s, the International Congress on Glass provides valuable networking and collaborative efforts. ICG 2019 will include:

- Special recognition of the 100<sup>th</sup> anniversary of GOMD
- A strong and vibrant technical program
- Sessions organized by ICG Technical Committees
- Student activities including a poster contest
- The Arun K. Varshneya Festschrift

**Register now for this important glass science and technology meeting. ACerS Glass & Optical Materials Division is the ICG 2019 host.**

## ORGANIZATION CHAIRS:



Brow

ICG 2019 Congress president

**Richard K. Brow**

Missouri University of Science & Technology  
[brow@mst.edu](mailto:brow@mst.edu)



Mauro

ICG 2019 program chair

**John C. Mauro**

The Pennsylvania State University  
[jcm426@psu.edu](mailto:jcm426@psu.edu)

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## SCHEDULE OF EVENTS

### Sunday, June 9, 2019

ICG Technical Committee Meetings  
Registration

### Monday, June 10, 2019

Registration  
ICG Opening session  
Opening remarks including ICG Award presentations:  
– ICG President's Award  
– The W.E.S. Turner Award  
– The V. Gottardi Prize  
– Woldemar A. Weyl International Glass Science Award  
– GOMD George W. Morey and Stookey Lecture of Discovery awards

Technology Fair  
Break  
Gottardi Award #1 lecture  
Gottardi Award #2 lecture  
Weyl Award lecture  
Break: Attendees pick up box lunch and find their seats in Grand A Ballroom  
GOMD 100<sup>th</sup> Year Anniversary Luncheon & Award Lectures  
George W. Morey Award presentation  
Stookey Lecture of Discovery presentation  
GOMD anniversary program  
Afternoon technical sessions  
CTC business meeting  
Women in Science reception  
Welcome reception, poster session (1 of 2), and Technology Fair

### Tuesday, June 11, 2019

Registration  
Concurrent sessions  
Lunch on own  
Technology Fair  
ICG Steering Committee meeting  
ICG council meeting  
Poster session (2 of 2), Technology Fair, and reception

### Wednesday, June 12, 2019

Registration  
Michael Cable Memorial lecture  
Concurrent sessions  
Technology Fair  
ICG/PCSA Early Career Networking Event  
Free time

### Thursday, June 13, 2019

Registration  
GlassTrend Sustainability Debate  
Concurrent sessions  
Lunch on own  
Dinner banquet

### Friday, June 14, 2019

Registration  
Concurrent sessions  
Lunch on own  
Closing ceremony

8 a.m.–6 p.m.  
3–6 p.m.

7 a.m.–5 p.m.  
8–11:15 a.m.  
8–9:30 a.m.

9:30 a.m.–8 p.m.  
9:30–9:45 a.m.  
9:45–10:15 a.m.  
10:15–10:45 a.m.  
10:45–11:15 a.m.  
11:15–11:30 a.m.  
11:30 a.m.–1:15 p.m.  
11:30 a.m.–Noon  
Noon–12:30 p.m.  
12:30–1:10 p.m.  
1:20–5:20 p.m.  
2:30–5 p.m.  
5–6 p.m.  
6–8 p.m.

7:30 a.m.–5 p.m.  
8 a.m.–5:10 p.m.  
Noon – 1:20 p.m.  
10 a.m.–7 p.m.  
9 a.m.–Noon  
1–4 p.m.  
5–7 p.m.

7:30 a.m.–12:30 p.m.  
8–9 a.m.  
9 a.m.–12:30 p.m.  
8:30 a.m.–12:30 p.m.  
12:45–2:30 p.m.  
12:30 p.m. to end of day

7:30 a.m.–5 p.m.  
11 a.m.–Noon  
8 a.m.–6:40 p.m.  
Noon– 1:20 p.m.  
7–9:30 p.m.

7:30 a.m.–Noon  
8 a.m.–12:45 p.m.  
12:30–2 p.m.  
2–2:30 p.m.

## Organizing chairs

**Richard K. Brow**, Congress president  
Missouri University of Science & Technology

**John C. Mauro**, Program chair  
The Pennsylvania State University

## Program committee

**Carol Click**  
Corning Incorporated, USA

**Jane Cook**  
Corning Museum of Glass, USA

**Takumi Fujiwara**  
Tohoku University

**Juejun Hu**  
MIT, USA

**Lina Hu**  
Shandong University, China

**Mathieu Hubert**  
Corning Incorporated, USA

**Julian Jones**  
Imperial College London, UK

**Gurbinder Kaur**  
Thapar University, India

**Ken Kelton**  
Washington University, USA

**Lisa Klein**  
Rutgers University, USA

**Marina Konon**  
Institute of Silicate Chemistry of Russian  
Academy of Sciences, Russia

**Hong Li**  
NEG, USA

**Lisa Manning**  
Syracuse University, USA

**Matthieu Micoulaut**  
UPMC, France

**Doris Möncke**  
Alfred University, USA

**Gerardo Naumis**  
UNAM, Mexico

**Madoka Ono**  
AGC Asahi Glass Research Center, Japan

**Mingying Peng**  
South China University of Technology, China

**Ana Candida M. Rodrigues**  
Universidade Federal de São Carlos, Brazil

**Morten M. Smedskjaer**  
Aalborg University, Denmark

**Mette Solvang**  
Rockwool International, Denmark

**Randall Youngman**  
Corning Incorporated, USA

**Yuanzheng Yue**  
Aalborg University, Denmark

**Anita Zeidler**  
University of Bath, UK

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### BOSTON PARK PLAZA – A Boston Hotel



**50 Park Plaza at Arlington Street  
Boston, Mass. 02116  
(617) 426-2000**

Group rate from \$254 + tax, based on availability and effective through **May 8, 2019**.  
Mention The American Ceramic Society to get group rate.  
Rooms will sell out quickly so book early!

#### REGISTRATION RATES

	ON OR BEFORE MAY 6, 2019	AFTER MAY 6, 2019
Attendee (member/nonmember)	\$795	\$945
Attendee + ACerS membership	\$915	\$1,065
ACerS Emeritus/Senior/Associate Member	\$595	\$745
Attendee one-day	\$595	\$745
Student (member/nonmember)	\$350	\$450
Student + ACerS membership	\$380	\$480
Guest*	\$225	\$225
Banquet ticket only	\$150	\$150

Registration includes coffee breaks, two receptions, one lunch, and dinner.

\*Guest registration includes receptions and dinner.

**CANCELLATION POLICY**  
Full refund upon request, less a \$50 processing fee, if registration is cancelled on or before May 6, 2019. If registration is cancelled between May 7 and June 7, 2019 a 50% refund is sent. No refunds are offered after the start of the conference. Contact ACerS Customer Service (customerservice@ceramics.org)

#### SHORT COURSE REGISTRATION

	ON OR BEFORE MAY 9, 2019	AFTER MAY 9, 2019
<b>ULTRAFAST GLASS SCIENCE AND ENGINEERING</b>		
Registration	\$395	\$545
ACerS member	\$335	\$485
Student	\$225	\$325
<b>GLASS CORROSION</b>		
Registration	\$550	\$700
ACerS member	\$450	\$600
Student	\$275	\$375

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## GOMD STUDENT POSTER CONTEST AND ICG STEVANATO BEST POSTER AWARD

The poster contest will take place as part of the regular poster sessions on Monday from 6 – 8 p.m. and on Tuesday from 5 – 7 p.m. in Grand Ballroom A. This year's GOMD student contest is organized by Irene Peterson and Sushmit Goyal, both from Corning and the ICG Stevanato Award is organized by Gabriele Peron of Stevanato Group.

## ICG/PCSA EARLY CAREER NETWORKING EVENT

**Wednesday, June 12 | 12:45–2:30 p.m.**

Students and young professionals will want attend this informal discussion and networking event with scientists from industry, national laboratories, and academia. This will be an opportunity for attendees to ask questions in a casual environment on diverse topics (work-life balance, career opportunities, etc.). Attendees will be encouraged to rotate every 15 minutes so they can have a chance for candid discussions with several professionals during the session. Lunch will be provided. Visit the Student Events web page at [ceramics.org/icg2019](http://ceramics.org/icg2019) to register.

## FACEBOOK EVENT PAGE

Students can network prior to the event with fellow attendees and coordinate hotel arrangements to decrease conference costs within the ICG 2019 Facebook event. To locate the event, search, "25<sup>th</sup> International Congress on Glass (ICG 2019)" under Facebook events to join the conversation!



## ICG/GOMD AWARD SCHEDULE

AWARD	AWARDEE	LECTURE TITLE	DATE/TIME
The ICG President's award	TBA	None	June 10, during ICG opening session
The Turner award	TBA	None	June 10, during ICG opening session
The Gottardi Prize	2018 - Shifeng Zhou, South China University of Technology, China; 2019 recipient to be named	Multicomponent photonic glasses and fibers TBA	June 10, 9:45 a.m. 10:15 a.m.
Woldemar A. Weyl International Glass Science Award	Thomas Bennett, Cambridge University, UK	Metal-organic framework liquids, glasses and blends	June 10, 10:45 a.m.
George W. Morey award	Himanshu Jain, Lehigh University, USA	The architected glass	June 10, 11:30 a.m.
Stookey Lecture of Discovery	Bulent Yoldas, USA	Formation of glass and ceramics by chemical polymerization and its effects on properties	June 10, Noon
Norbert J. Kreidl Award for Young Scholars	Emily M. Aaldenberg, Rensselaer Polytechnic Institute, USA	Surface stress relaxation of silica glass and the presence of composition fluctuations	June 11, 12:15 p.m.
Michael Cable Memorial lecture	Richard Hulme, Guardian Glass, USA	You ought to go away and think again!	June 12, 8:00 a.m.
Varshneya Glass Science lecture	Josef W. Zwanziger, Dalhousie University, CAN	Mechanics, chemistry, and light: The photoelasticity of glass	June 12, 9:30 a.m.
Varshneya Glass Technology lecture	Robert Hill, Imperial College, UK	Structure-property relationships in halide containing bioactive glasses	June 13, 8:00 a.m.
L. David Pye Lifetime Achievement Award	TBA	None	June 10, during GOMD 100th anniversary lunch

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## SYMPOSIA AND TECHNICAL SESSIONS

### SYMPOSIUM I: GLASS STRUCTURE AND CHEMISTRY

Lead Organizer

- **Doris Möncke**, National Hellenic Research Foundation, Greece  
[dmoencke@eie.gr](mailto:dmoencke@eie.gr)

#### S1: Definition of Network Formers and Network Modifiers (ICG TC03 & TC26)

Organizers

- **Daniel Neuville**, Institut de Physique du Globe de Paris, France
- **Bernard Hehlen**, University of Montpellier, France

#### S2: Glass and Melt: Macroscopic Properties and Structure of Melt at High Temperature (ICG TC03 & TC26)

Organizers

- **Daniel Neuville**, Institut de Physique du Globe de Paris, France
- **Bernard Hehlen**, University of Montpellier, France

#### S3: Metallic Glasses

Organizers

- **Yunfeng Shi**, Rensselaer Polytechnic Institute, USA
- **Jian Luo**, Corning Incorporated, USA

#### S4: Chalcogenide Glass Structure and Chemistry

Organizers

- **J. David Musgraves**, IRqadiance Glass, USA
- **Laurent Calvez**, University of Rennes, France

#### S5: Borate Glasses

Organizers

- **Efstratios I. Kamitsos**, National Hellenic Research Foundation, Greece
- **Steve Feller**, Coe College, USA

#### S6: Phosphate Glasses

Organizers

- **Doris Möncke**, Alfred University, USA
- **Richard K. Brow**, Missouri University of Science & Technology, USA
- **Ladislav Koudelka**, University Pardubice, Czech Republic

#### S7: Silicate Glass Structure

Organizers

- **Randall Youngman**, Corning Incorporated, USA
- **Daniel Neuville**, Institut de Physique du Globe de Paris, France

#### S8: Crystallization of Glasses and Glass-Ceramics (ICG TC07)

Organizers

- **Mark Davis**, SCHOTT, USA
- **Ralf Müller**, Bundesanstalt für Materialforschung und -prüfung, Germany

#### S9: Sol Gel Glasses

Organizers

- **Lisa Klein**, Rutgers University, USA
- **Andrei Jitianu**, City University of New York, USA

#### S10: Hybrid Glasses and Metal-Organic Framework Glasses

Organizers

- **Thomas Bennett**, Cambridge University, UK
- **Satoshi Horike**, Kyoto University, Japan

#### S11: Glass-Organic Adhesion

Organizers

- **Aravind Rammohan**, Corning Incorporated, USA
- **Eunseog Cho**, Samsung, Korea
- **Hyunbin Kim**, Corning Precision Materials, Korea

### SYMPOSIUM II: GLASS PHYSICS

Lead Organizer

- **Morten M. Smedskjaer**, Aalborg University, Denmark, [mos@bio.aau.dk](mailto:mos@bio.aau.dk)

#### S1: Glass Transition and Relaxation

Organizers

- **Gerardo Naumis**, National Autonomous University of Mexico, Mexico
- **Ozgur Gulbiten**, Corning Incorporated, USA

#### S2: Nucleation, Crystallization, and Phase Separation

Organizers

- **Ken Kelton**, Washington University in St. Louis, USA
- **Edgar D. Zanotto**, Federal University of Sao Carlos, Brazil

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## S3: Glass under Extreme Conditions

Organizers

- Anita Zeidler, University of Bath, UK
- Shinji Kohara, National Institute for Materials Science, Japan

## S4: Topological Constraint Theory of Glass

Organizers

- Mathieu Bauchy, University of California Los Angeles, USA
- N.M. Anoop Krishnan, Indian Institute of Technology Delhi, India

## S5: Modeling and Simulation (ICG TC27)

Organizers

- Jincheng Du, University of North Texas, USA
- Walter Kob, University of Montpellier, France

## S6: Glass Surfaces (ICG TC19)

Organizers

- Seong Kim, The Pennsylvania State University, USA
- Matthew Linford, Brigham Young University, USA
- Ilkay Sökmen, Sisecam Turkey

## S7: Mean-Field and Low-Dimensional Theories of Glasses

Organizers

- Lisa Manning, Syracuse University, USA
- Patrick Charbonneau, Duke University, USA

## S8: Optical Properties of Glass

Organizers

- Mingying Peng, South China University of Technology, China
- Qinyuan Zhang, South China University of Technology, China
- Zhongmin Yang, South China University of Technology, China

## S9: Strength, Fracture, and the Mechanical Properties of Glasses (ICG TC06)

Organizers

- Lothar Wondraczek, University of Jena, Germany
- Morten Smedskjaer, Aalborg University, Denmark

## S10: Acoustic Properties of Glass

Organizers

- Benoit Rufflé, University of Montpellier, France
- Anne Tanguy, University of Lyon, France

## S11: Thermal Properties of Glass

Organizers

- Lina Hu, Shandong University, China
- Limin Wang, Yanshan University, China
- Jacob König, Institute Jozef Stefan, Slovenia

## S12: Electromagnetic Properties of Glass

Organizers

- Gang Chen, Ohio University, USA
- B.G. Potter, University of Arizona, USA



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## SYMPOSIUM III: GLASS TECHNOLOGY AND MANUFACTURING

Lead Organizer

- **Mathieu Hubert**, Corning Incorporated, USA, [hubertm@corning.com](mailto:hubertm@corning.com)

### S1: Raw Materials, Batch Melting, and Fining (TC18)

Organizers

- **Jaroslav Klouzek**, University of Chemistry and Technology Prague, Czech Republic
- **Mathieu Hubert**, Corning Incorporated, USA

### S2: Glass Furnace Operation and Design (TC21)

Organizers

- **Aaron Huber**, Johns Manville, USA
- **Scott Cooper**, Owens Illinois, USA

### S3: Glass-Refractory Interactions

Organizers

- **Irene Peterson**, Corning Incorporated, USA
- **Hong Li**, Nippon Electric Glass, USA

### S4: Glass Forming Operations

Organizers

- **Adnan Karadag**, Sisecam, Turkey
- **Greg Nafziger**, Owens Illinois, USA

### S5: Towards Carbon-Free Glass Production

Organizers

- **Anne-Jans Faber**, CelSian Glass & Solar, Netherlands
- **Oscar Verheijen**, CelSian Glass & Solar, Netherlands

### S6: Glass Recycling and Sustainability

Organizers

- **Stefano Ceola**, Stazione Sperimentale del Vetro, Italy
- **Sezhian Annamalai**, PPG, USA

### S7: 3D Printing of Glass and Rapid Prototyping

Organizers

- **Laura Cook**, Corning Incorporated, USA
- **Neil Palumbo**, Corning Incorporated, USA

## ACERS SHORT COURSES

### ULTRAFAST GLASS SCIENCE AND ENGINEERING

June 9, 2019—8:00 a.m.– Noon | Boston Park Plaza Hotel

Instructor: **S.K. Sundaram**, Alfred University, USA

This course will introduce fundamental science behind ultrashort laser pulse-glass interactions and how that can be used to produce novel structures in glasses, ceramics, and glass-ceramics for materials science with a special focus on ceramics and glass research.

### GLASS CORROSION

June 9, 2019—8:30 a.m.–4:00 p.m. | Boston Park Plaza Hotel

Instructors: **Stéphane Gin**, CEA, France; **Joe Ryan**, Pacific Northwest National Lab, USA; **Jincheng Du**, North Texas University, USA; **Nick Smith**, Corning, USA; **Delia Brauer**, University of Jena, Germany; **John Vienna**, Pacific Northwest National Laboratory, USA; and **Aurélien Verney-Carron**, University of Paris-Créteil, France

How do silicate glasses behave when they come into contact with water? This course provide comprehensive knowledge about the fundamental mechanisms of glass corrosion and their relation with kinetics.

Visit [ceramics.org/icg2019](http://ceramics.org/icg2019) for details and to register.

## SYMPOSIUM IV: EMERGING APPLICATIONS OF GLASS

Lead Organizer

- **JueJun Hu**, Massachusetts Institute of Technology, USA  
[hujuejun@mit.edu](mailto:hujuejun@mit.edu)

### S1: Energy and Environmental Aspects – Fundamentals and Application

Organizer

- **Joachim Deubener**, Clausthal University of Technology, Germany

### S2: Glass in Healthcare (TC04)

Organizers

- **Julian Jones**, Imperial College London, UK
- **Delia Brauer**, Friedrich-Schiller-Universität Jena, Germany
- **Qiang Fu**, Corning Incorporated, USA

### S3: Glass-Based Integrated Optics

Organizers

- **Hongtao Lin**, Zhejiang University, China
- **Tian Gu**, Massachusetts Institute of Technology, USA



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## S4: Glass in Sensor Technology

Organizers

- Pierre Lucas, University of Arizona, USA
- Younès Messaddeq, Université Laval, Canada

## S5: Glass for Buildings and Transportation

Organizers

- Mehran Arbab, PPG, USA
- Andriy Romanyuk, GlasTrösch AG

## S6: Glass and Glass-Ceramics for Packaging and Sealing

Organizers

- Steve Dai, Sandia National Laboratories, USA
- Amber Tremper, Corning Incorporated, USA
- Robert Hettler, Schott Electronic Packaging, Germany

## S7: Photosensitive Glasses and Glass-Ceramics

Organizer

- Nadja Lönnroth, Helsinki R&D Center, Huawei Technologies Oy, Finland

## S8: Glass for Nuclear Waste Immobilization (TC05)

Organizers

- Olivier Pinet, French Alternative Energies and Atomic Energy Commission, France
- Ashutosh Goel, Rutgers University, USA

## S9: Quantum Dots and Nanocrystals in Glasses

Organizers

- Jong Heo, Pohang University of Science and Technology, Korea
- Heike Ebendorff-Heidepriem, University of Adelaide, Australia
- Takumi Fujiwara, Tohoku University, Japan

## S10: Glass Materials and Devices for Photonic Systems (TC20)

Organizers

- Giancarlo Righini, Enrico Fermi Centre, Italy
- Shibin Jiang, AdValue Photonics, USA

## S11: Fiberglass (TC28)

Organizers

- Yuanzheng Yue, Aalborg University
- Hong Li, Nippon Electric Glass, USA

## S12: Multimaterial Fibers

Organizers

- Fabien Sorin, École polytechnique fédérale de Lausanne, Switzerland
- Sylvain Danto, University of Bordeaux, France
- Alexander Stolyarov, Massachusetts Institute of Technology, Lincoln Laboratory, USA

## S13: Open Session on Glasses for Pharma (TC12)

Organizers

- Massimo Guglielmi, University of Padova, Dipartimento di Ingegneria Industriale, Italy
- Daniele Zuccato, Stevanato Group, Italy
- Holger Roehl, Roche, Switzerland

## SYMPOSIUM V: GLASS EDUCATION (TC23)

Lead Organizer

- Ana Candida Martins Rodrigues, Federal University of São Carlos, Brazil

## SYMPOSIUM VI: ARCHAEOOMETRY (TC17)

Organizers

- Stephen P. Koob, The Corning Museum of Glass, Corning NY, USA
- Robert H. Brill, The Corning Museum of Glass, Corning NY, USA

## SYMPOSIUM VII: ARUN K. VARSHNEYA FESTSCHRIFT

Organizers

- John C. Mauro, The Pennsylvania State University, USA
- Vijay Jain, Savannah River Remediation, USA



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## PROGRAM AT-A-GLANCE

SYMPOSIUM	SESSION
AWARD LECTURES	
SYMPOSIUM I: GLASS STRUCTURE AND CHEMISTRY	SESSION 1: Definition of Network Formers and Network Modifiers (ICG TC03 & TC26)
SYMPOSIUM I: GLASS STRUCTURE AND CHEMISTRY	SESSION 2: Glass and Melt: Macroscopic Properties and Structure of Melt at High Temperature (ICG TC03 & TC26)
SYMPOSIUM I: GLASS STRUCTURE AND CHEMISTRY	SESSION 3: Metallic Glasses
SYMPOSIUM I: GLASS STRUCTURE AND CHEMISTRY	SESSION 4: Chalcogenide Glass Structure and Chemistry
SYMPOSIUM I: GLASS STRUCTURE AND CHEMISTRY	SESSION 5: Borate Glasses
SYMPOSIUM I: GLASS STRUCTURE AND CHEMISTRY	SESSION 6: Phosphate Glasses
SYMPOSIUM I: GLASS STRUCTURE AND CHEMISTRY	SESSION 7: Silicate Glass Structure
SYMPOSIUM I: GLASS STRUCTURE AND CHEMISTRY	SESSION 8: Crystallization of Glasses and Glass-Ceramics (ICG TC07)
SYMPOSIUM I: GLASS STRUCTURE AND CHEMISTRY	SESSION 9: Sol Gel Glasses
SYMPOSIUM I: GLASS STRUCTURE AND CHEMISTRY	SESSION 10: Metal-Organic Framework Glasses
SYMPOSIUM I: GLASS STRUCTURE AND CHEMISTRY	SESSION 11: Glass-Organic Adhesion
SYMPOSIUM II: GLASS PHYSICS	SESSION 1: Glass Transition and Relaxation
SYMPOSIUM II: GLASS PHYSICS	SESSION 2: Nucleation, Crystallization, and Phase Separation
SYMPOSIUM II: GLASS PHYSICS	SESSION 3: Glass under Extreme Conditions
SYMPOSIUM II: GLASS PHYSICS	SESSION 4: Topological Constraint Theory of Glass
SYMPOSIUM II: GLASS PHYSICS	SESSION 5: Modeling and Simulation (ICG TC27)
SYMPOSIUM II: GLASS PHYSICS	SESSION 6: Glass Surfaces (ICG TC19)
SYMPOSIUM II: GLASS PHYSICS	SESSION 7: Mean-Field and Low-Dimensional Theories of Glasses
SYMPOSIUM II: GLASS PHYSICS	SESSION 8: Optical Properties of Glass
SYMPOSIUM II: GLASS PHYSICS	SESSION 9: Strength, Fracture, and the Mechanical Properties of Glasses (ICG TC06)
SYMPOSIUM II: GLASS PHYSICS	SESSION 10: Acoustic Properties of Glass
SYMPOSIUM II: GLASS PHYSICS	SESSION 11: Thermal Properties of Glass
SYMPOSIUM II: GLASS PHYSICS	SESSION 12: Electromagnetic Properties of Glass

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SYMPOSIUM III: GLASS TECHNOLOGY AND MANUFACTURING	SESSION 5: Towards Carbon-Free Glass Production
SYMPOSIUM III: GLASS TECHNOLOGY AND MANUFACTURING	SESSION 6: Glass Recycling and Sustainability
SYMPOSIUM III: GLASS TECHNOLOGY AND MANUFACTURING	SESSION 7: 3D Printing of Glass and Rapid Prototyping
Symposium IV: EMERGING APPLICATIONS OF GLASS	SESSION 1: Energy and Environmental Aspects – Fundamentals and Application
Symposium IV: EMERGING APPLICATIONS OF GLASS	SESSION 2: Glass in Healthcare (TC04)
Symposium IV: EMERGING APPLICATIONS OF GLASS	SESSION 3: Glass-Based Integrated Optics
Symposium IV: EMERGING APPLICATIONS OF GLASS	SESSION 4: Glass in Sensor Technology
Symposium IV: EMERGING APPLICATIONS OF GLASS	SESSION 5: Glass for Buildings and Transportation
Symposium IV: EMERGING APPLICATIONS OF GLASS	SESSION 6: Glass and Glass-Ceramics for Packaging and Sealing
Symposium IV: EMERGING APPLICATIONS OF GLASS	SESSION 7: Photosensitive Glasses and Glass-Ceramics
Symposium IV: EMERGING APPLICATIONS OF GLASS	SESSION 8: Glass for Nuclear Waste Immobilization (TC05)
Symposium IV: EMERGING APPLICATIONS OF GLASS	SESSION 9: Quantum Dots and Nanocrystals in Glasses
Symposium IV: EMERGING APPLICATIONS OF GLASS	SESSION 10: Glass Materials and Devices for Photonic Systems (TC20)
Symposium IV: EMERGING APPLICATIONS OF GLASS	SESSION 11: Fiberglass (TC28)
Symposium IV: EMERGING APPLICATIONS OF GLASS	SESSION 12: Multimaterial Fibers
Symposium IV: EMERGING APPLICATIONS OF GLASS	SESSION 13: Open Session on Glasses for Pharma (TC12)
SYMPOSIUM V: GLASS EDUCATION (TC23)	
SYMPOSIUM VI: ARCHAEOOMETRY (TC17)	
SYMPOSIUM VII: ARUN K. VARSHNEYA FESTSCHRIFT	



# REGISTER BY MAY 6, 2019 to save

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