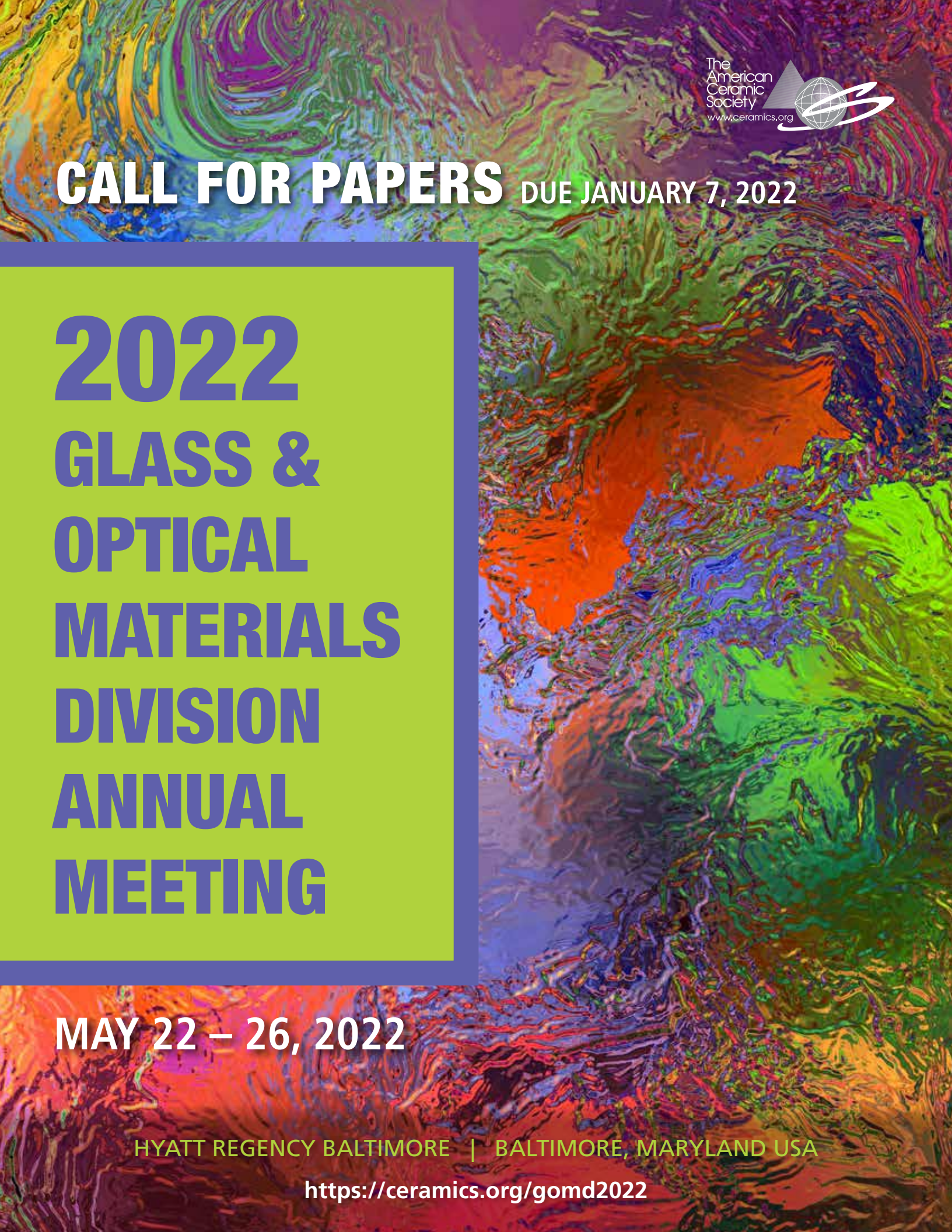
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2022
GLASS & OPTICAL MATERIALS DIVISION ANNUAL MEETING
MAY 22 – 26, 2022
HYATT REGENCY BALTIMORE | BALTIMORE, MARYLAND USA
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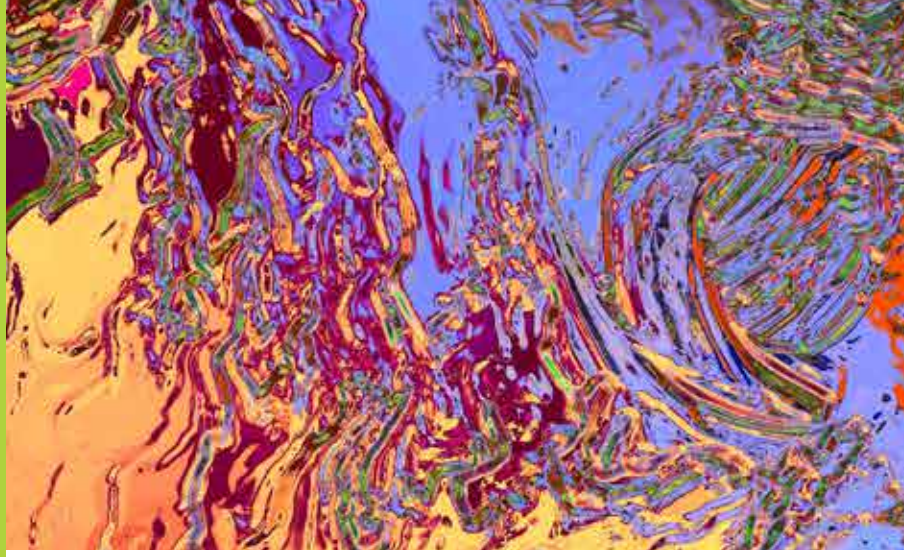
JANUARY 7, 2022

2022 GLASS & OPTICAL MATERIALS DIVISION ANNUAL MEETING

MAY 22 – 26, 2022

HYATT REGENCY BALTIMORE
BALTIMORE, MARYLAND USA



*Join the **Glass & Optical Materials Division (GOMD)** for its annual meeting May 22-26, 2022, in Baltimore, Md. The 2022 GOMD meeting is special because 2022 has been declared the "International Year of Glass" by the United Nations. We will have a number of special events to commemorate this occasion as we meet together in-person for the first time since 2019.*

This year's program will feature four symposia: Fundamentals of the Glassy State; Glass and Interaction with its Environment—Fundamentals and Applications; Optical and Electronic Materials and Devices—Fundamentals and Applications; Glass Technology and Cross-cutting Topics.

Technical leaders from industry, national laboratories, and academia will lead the technical sessions featuring oral and poster presentations that provide an open forum for glass scientists and engineers worldwide to present and exchange findings on recent advances in various aspects related to glass science and technology.

Students are encouraged to enter their presentations in the annual poster competition for professional recognition and cash awards. Students attending the 2022 GOMD meeting are invited to attend a career roundtable discussion with scientists from industry, national laboratories, and academia about career opportunities and other topics in a casual environment. This 2022 GOMD meeting will provide a unique opportunity for students to learn, interact, and win.

Nestled in the heart of downtown, the Hyatt Regency Baltimore Inner Harbor hotel offers a luxury gateway to the enchanting waterfront town. The conference venue is only 12 miles from Baltimore/Washington International Thurgood Marshall Airport (BWI) and within walking distance to museums, historic landmarks, restaurants, and attractions like the National Aquarium and Camden Yards.

On behalf of the GOMD executive committee and volunteer organizers, we sincerely hope you will join us at the 2022 GOMD meeting to find new collaborative opportunities and to exchange ideas in the international glass community.

2022 PROGRAM CHAIRS

Ashutosh Goel
Rutgers University
ag1179@soe.rutgers.edu

Charmayne Lonergan
Pacific Northwest National Laboratory
charmayne.lonergan@pnnl.gov

2021-2022 OFFICERS

Chair: **Gang Chen**, Ohio University

Chair-Elect: **Joseph Ryan**, Pacific Northwest National Lab

Vice Chair: **Irene Peterson**, Corning Research and Development Corporation

Secretary: **Michelle Korwin-Edson**, Owens Corning

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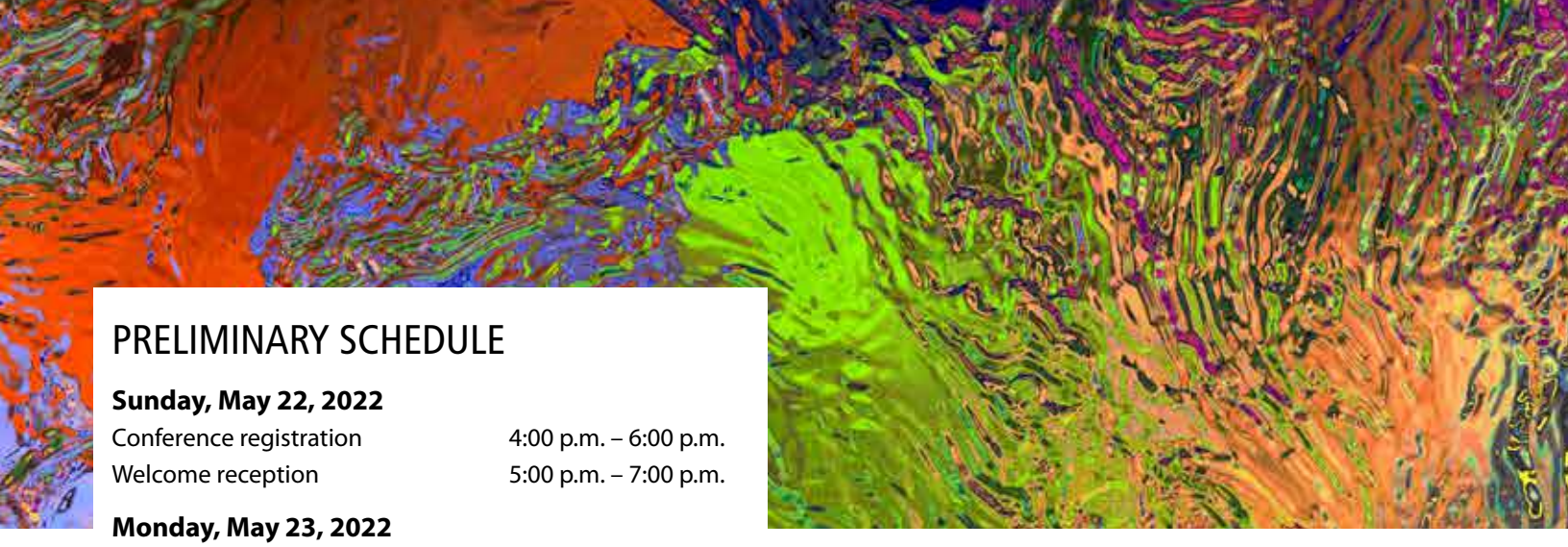

PRELIMINARY SCHEDULE

Sunday, May 22, 2022

Conference registration	4:00 p.m. – 6:00 p.m.
Welcome reception	5:00 p.m. – 7:00 p.m.

Monday, May 23, 2022

Conference registration	7:00 a.m. – 5:30 p.m.
Stookey Lecture of Discovery	8:00 a.m. – 9:00 a.m.
Concurrent technical sessions	9:20 a.m. – 6:00 p.m.
Lunch on own	Noon – 1:30 p.m.
Poster setup – 2:30 p.m. – 5:30 p.m. students hang posters	
Poster session and reception student poster competition	6:30 p.m. – 8:30 p.m.

Tuesday, May 24, 2022

Conference registration	7:30 a.m. – 5:30 p.m.
George W. Morey Award lecture	8:00 a.m. – 9:00 a.m.
Concurrent technical sessions	9:20 a.m. – 6:00 p.m.
Norbert J. Kreidl Award for Young Scholars	Noon – 1:00 p.m.
Lunch on own	Noon – 1:30 p.m.
GOMD general business meeting	5:45 p.m. – 6:45 p.m.
Conference banquet	7:00 p.m. – 10:00 p.m.

Wednesday, May 25, 2022

Conference registration	7:30 a.m. – 5:00 p.m.
Varshneya Frontiers of Glass Science lecture	8:00 a.m. – 9:00 a.m.
Concurrent technical sessions	9:20 a.m. – 6:00 p.m.
Lunch on own	Noon – 1:30 p.m.

Thursday, May 26, 2022

Conference registration	7:30 a.m. – 3:00 p.m.
Varshneya Frontiers of Glass Technology lecture	8:00 a.m. – 9:00 a.m.
Concurrent technical sessions	9:20 a.m. – 6:00 p.m.

ABSTRACT SUBMISSION INSTRUCTIONS

- Visit https://ceramics.org/gomd2022 to review session topics.
- Select "Submit Abstract" to be directed to the Abstract Central website.

Abstract title plus text total character limit (including spaces) is 1,500 characters. If you have questions, please contact Marilyn Stoltz at mstoltz@ceramics.org or +1 614-794-5868.

SPECIAL SESSION

Remembering Ted Day

This session is dedicated to the memory of our friend and colleague, Ted Day, who passed away in September 2020. Speakers will review Ted's many contributions to our glass and bio-ceramics communities, as an entrepreneur, a philanthropist, and a dedicated member of the American Ceramic Society. If you would like to contribute to this session, to share a memory or offer a story, please contact Richard Brow (brow@mst.edu) or Julian Jones (julian.r.jones@imperial.ac.uk).

HYATT REGENCY BALTIMORE

300 Light Street | Baltimore, MD 21202
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Rates

Single/Double - $199 plus tax
Government – Prevailing Government Rate

Cut-Off Date: April 22, 2022

Main attendees:
https://www.hyatt.com/en-US/group-booking/BWIRB/G-GOMD

Government Attendees:
https://www.hyatt.com/en-US/group-booking/BWIRB/G-GOMD/GOVT

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SYMPOSIUM 1: FUNDAMENTALS OF THE GLASSY STATE

This symposium will provide a discussion forum on fundamental principles of glass science. Contributions covering experimental and theoretical developments in the field of glass science are welcome. Topics of interest include novel developments in the following sessions:

Session 1: Glass Formation and Structural Relaxation

Organizers: **Ozgur Gulbiten**, Corning Inc. USA, GulbitenO@corning.com

Sabyasachi Sen, University of California Davis, USA, sbsen@ucdavis.edu

Collin Wilkinson, GlassWRX, USA, c.wilkinson@glasswrx.com

This session will address all fundamental aspects of glass formation, including experimental, modeling, and theoretical developments in our understanding of the glass transition and relaxation. All glass-forming systems including oxide, non-oxide, metallic, and organic glasses will be covered. Topics of interest include but are not limited to various relaxation phenomena and dynamical processes in the glass transition range including fragility, structural and dynamical heterogeneity

Session 2: Glass Crystallization and Glass Ceramics

Organizers: **Edgar Zanotto**, Federal University of Sao Carlos, Brazil, dedz@ufscar.br

Matthew Mckenzie, Corning, USA, McKenzieME@corning.com

Kisa Ranasinghe, Kennesaw State University, USA, kranasin@kennesaw.edu

This symposium is devoted to advancing fundamental understanding of crystallization in glasses and its application in glass-ceramics and related materials. The symposium will cover both experimental, analytical/characterization, as well as numerical/modeling aspects of nucleation and growth in glass forming materials. Topics to be covered include, but are not limited to the following:

- Theoretical, simulation, and experimental studies of nucleation and crystal growth in glasses and liquids
- The role of glass composition, structure, and nucleating agents on crystallization
- Amorphous phase separation and its role in influencing crystallization
- Novel methods and characterization techniques (ex-situ, in-situ) to understand crystallization
- Modeling and simulation techniques to elucidate crystallization Glass forming ability of compositions
- Crystallization phenomena in organic and metallic materials
- Novel processing techniques for glass-ceramics
- Microstructure/property relationships in glass-ceramics
- Predicting glass-ceramic generation
- Applications of glass-ceramics

Session 3: Structural Characterizations of Glasses

Organizers: **Daniel Neuville**, CNRS-IPGP-UP, France, neuville@ipgp.fr

Thibault Charpentier, CEA Saclay, France, thibault.charpentier@cea.fr

Oliver Alderman, ISIS Neutron and Muon Source, UK, oliver.alderman@stfc.ac.uk

This session will present recent advances on structural aspects of glasses, at the short and medium range order including heterogeneities. Any contributions that cover basic glass characterization and correlation between the glass structure and glass properties are welcome. Further, contributions should include – but are not limited to – various experimental techniques such as: magnetic resonance spectroscopy; X-ray, neutron, light scattering; X-ray absorption and emission spectroscopy; vibrational spectroscopy; and scanning probe and electron microscopies.

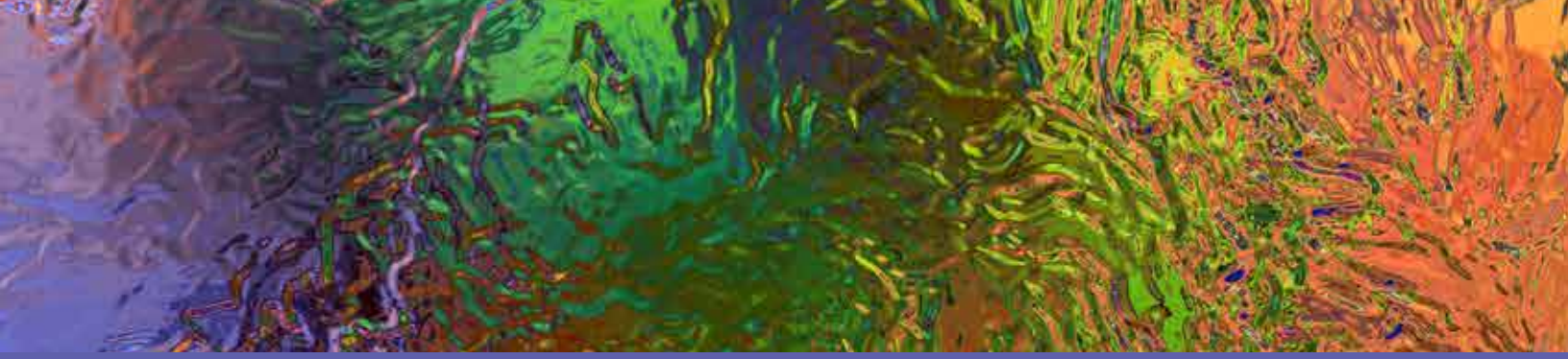
Session 4: Topology and Rigidity

Organizers: **N.M. Anoop Krishan**, Indian Institute of Technology Delhi, India, krishnan@iitd.ac.in

Mathieu Bauchy, University of California Los Angeles USA, bauchy@ucla.edu

Morten Smedskjaer, Aalborg, Denmark, mos@bio.aau.dk

Understanding structure–property relationships in glasses is extremely challenging due to their disordered structure. Topology, connectivity, and homology concepts have enabled many breakthroughs, both from a fundamental perspective and practical standpoint, in the area of glass science. The aim of this session is to focus on the recent advances in the field of composition-structure–property relationships disordered materials through experimental, computational, and theoretical studies. The broad topics of interest include, but are not restricted to, topology and rigidity in glasses; effect of extreme conditions on the atomic topology and connectivity; topological modeling applied to the prediction of glasses' properties; quantifying the medium-range order–composition relationships through persistent homology; quantifying the short-range order–composition relationships through statistical mechanics; topology-based machine learning; and connectivity, topology, and homology beyond oxide glasses (granular materials, gels, disordered solids, phase-change materials, proteins).



Session 5: Atomistic Simulation and Predictive Modeling of Glasses

Organizers: **Sushmit Goyal**, Corning Inc, USA
GoyalS@corning.com
Alfonso Pedone, University of Modena and Reggio Emilia, Italy, alfonso.pedone@unimore.it

Modeling and simulation play an important role in materials research, particularly for glasses, amorphous and nanostructured materials due to their complex nature. This session will focus on computer simulations and modeling approaches to gain insight into the structures, properties and behavior of glasses and glass-forming liquids. Of particular interest are recent developments and applications of first principles, classical, mesoscale methods and their integration with the aim of expanding the space and time-scales explored by conventional modelling techniques. Also, welcome are numerical studies that help the interpretation of experimental data and structural validation using methods such as X-ray and neutron diffraction, solid-state NMR, and other spectroscopic techniques. Finally, integrated computational material design of glass compositions using physics-based modeling and simulation methods will also be covered.

Session 6: Data-based Modeling and Machine Learning for Glass Science

Organizers: **Adama Tandia**, Corning Inc. USA
TandiaA@Corning.com
Aditya Kumar, Missouri S&T, USA, kumarad@mst.edu
Daniel Cassar, Brazilian Center for Research in Energy and Materials,
Brazil, daniel.cassar@cnpem.br

Data-driven methods and artificial intelligence-based models have been attracting a lot of attention in recent years to solve complex problems in the field of glass science. Specifically, machine learning has been successfully applied to resolve long-standing problems such as predicting composition–property relationships, developing optimized glass compositions, accelerating glass modeling, and even understanding the fundamental aspects of glass transition. This session focuses on the recent advances achieved using machine learning in the areas of glass science, technology, and modeling. The topics of interest include, but are not restricted to, the application of machine learning and artificial intelligence to: develop composition-property relationships, design optimized glass compositions, 3D printing and additive manufacturing of glasses, advance computational modeling by developing machine-learned interatomic potentials and accelerating glass simulations, image processing, predict the structure of glasses, identifying key structural patterns/descriptors that govern glass properties, and understanding the fundamentals of glassy state.

Session 7: Mechanical Properties of Glasses

Organizers: **Satoshi Yoshida**, AGC Inc., Japan,
satoshi.s.yoshida@agc.com
Timothy Gross, Corning Inc., USA,
GrossTM@corning.com

This session will discuss the mechanical properties of disordered materials across multiple scales, while bridging the fields of metallic and non-metallic glasses. We will consider the structural origin of elasticity, plasticity, and fracture with the objective of designing glasses with superior toughness, defect tolerance, and stiffness. Particular attention shall be given to the identification of general, material-independent constitutive laws which may be used as guidelines to improve the mechanical properties; the combination of experimental approaches and computational modeling of the stress-response of glasses and early stages of damage infliction; and the interplay between size and time effects, stress-corrosion, and the chemical aspect of fracture.

Contributions are especially invited on:

- Dynamic fracture and brittleness, or crack initiation, including the application of in-situ techniques
- Slow crack growth and stress corrosion cracking, the underlying chemistry and transport phenomena in high stress fields
- Multiscale investigation of elasticity, plasticity and hardness in relation to bulk topology through combining mechanical analyses with structural analyses
- Strategies for toughening inorganic oxide glasses as well as metallic glasses

Session 8: Non-Oxide Glasses and Glass-Ceramics

Organizers: **Francisco Munoz**, CSIC-ICV, Spain,
fmunoz@icv.csic.es
Pierre Lucas, The University of Arizona,
pierre@email.arizona.edu
Catherine Boussard-Pledel, Institut des Sciences Chimiques de Rennes, France,
catherine.boussard@univ-rennes1.fr

This session aims to present and discuss the recent developments in both fundamental and applied research in chalcogenide, halide, metallic, phosphate, molecular glasses, metal-organic framework glasses as well as in mixed oxy-sulfide and oxy-nitride networks. Topics of interest include structural characterization, structure-property relationship, novel processing methods, compositional trends, and advances in physical properties such as optical, thermal, electrical, and mechanical behaviors.

Technological applications of these glasses and glass-ceramics will be covered, including the field of energy, sensing, optics, biomedical, phase change materials, and microelectronics.

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Session 9: Glass Under Extreme Conditions

Organizers: **Dominique de Ligny**, FAU Erlangen-Nürnberg, Erlangen, Germany
dominique.de.ligny@fau.de

Anindya Ghoshal, Army Research Laboratory, USA
anindya.ghoshal.civ@mail.mil

Anamul Haq Mir, University of Huddersfield, UK
a.h.mir@hud.ac.uk

This session will cover the recent progress in understanding structure and properties of glass under extreme conditions, such as high pressure, high stress, high temperature, high radiation, highly reactive conditions, etc. Many manufacturing processes such as fiber drawing, laser writing, irradiation aging, are concerned with these conditions. New knowledge of glass structure and properties under extreme conditions can help design glass for these applications, as well as in utilizing such conditions to synthesize glass with superior properties. Experimental studies, novel in situ analysis methods and computational approaches are within the scope of this session.

SYMPOSIUM 2: GLASS AND INTERACTIONS WITH ITS ENVIRONMENT – FUNDAMENTALS AND APPLICATIONS

This symposium is dedicated to fundamentals and applications of how glass is used in contact with specific environments, e.g., with the human body, how glass surface and interfaces evolve or can be modified in different environments, and how glass can be used to contain other materials and prevent their release in the environment.

Session 1: Glasses and glass-ceramics for healthcare

Organizers: **Hrishikesh Kamat**, Glidewell Dental Laboratories, USA
Hrishikesh.Kamat@glidewelldental.com

Delia Brauer, University of Jena, Germany
delia.brauer@uni-jena.de

Saurabh Kapoor, Sterlite Technologies Ltd, India
saurabh.kapoor1@stl.tech

With ongoing research producing promising results for the expanded use of various glasses and glass-ceramics in bone regeneration and dental applications, this has also inspired the investigation of a wide array of novel glass-based materials for contemporary applications such as wound healing, soft tissue engineering, cancer treatment, and bacterial/fungal-resistance. This session will cover each of these areas, and will focus on the examination of the compositions, processing methods, structures, and targeted cellular and biological responses of biomedical glasses, which warrant their candidacy for further use across the medical fields.

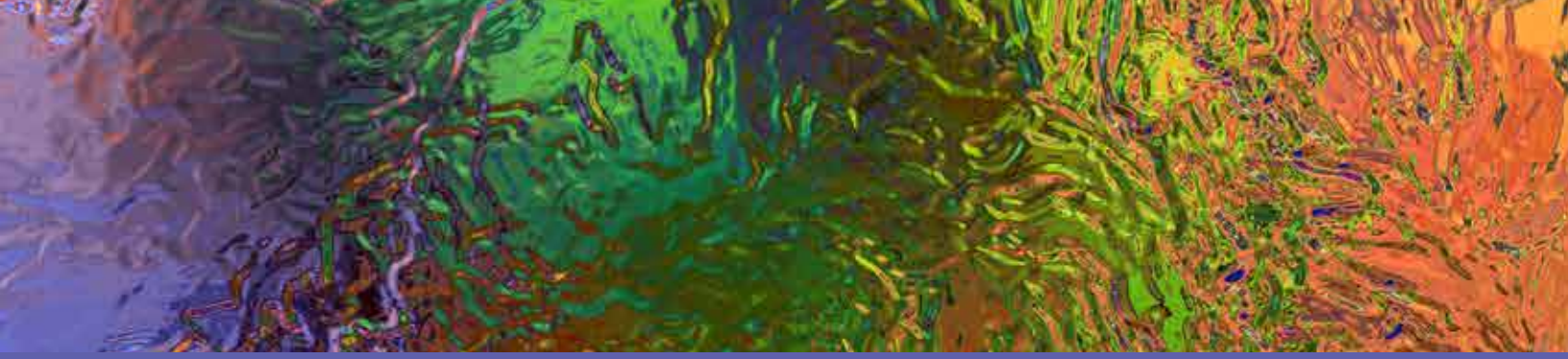
Session 2: Nuclear Waste Immobilization

Organizers: **Sophie Schuller**, CEA Marcoule, France
sophie.schuller@cea.fr

Kai Xu, Wuhan University of Technology, China
kaixu@whut.edu.cn

Michael Ojovan, The University of Sheffield, UK
m.ojovan@sheffield.ac.uk

Topics in this session will address new developments and innovative applications for materials, and materials processing methods, for the immobilization of nuclear and hazardous wastes. Progress in the processing and testing of materials for immobilization is critical to the efficient and safe treatment and disposition of nuclear wastes around the world. This session will focus on characterization, testing, and modeling techniques that quantify and allow understanding of waste form behavior. Materials of interest may include glass, ceramics, glass-ceramics, and other composite matrices.



Session 3: Dissolution and interfacial reactions

Organizers: **Nicholas Stone-Weiss**, Corning Inc., USA
StoneWeNM3@corning.com
Stephane Gin, CEA Marcoule, France
stephane.gin@cea.fr
Jincheng Du, University of North Texas
Jincheng.Du@unt.edu

This session will focus on the dissolution and degradation of glasses and glass-ceramics in aqueous environments including both the intermediate role of interfacial reactions between aqueous environments and glasses including, hydrolysis reactions, cation inter-diffusion, and incorporation of water into the glass matrix, condensation and precipitation reactions, and longer time frame aspects of glass dissolution. Studies which focus on glass surface and water reaction mechanisms, interfacial structures and transport behaviors using either computational or experimental methodologies are particularly encouraged. Elucidation of the mechanisms and kinetics of glass degradation in studies conducted under various conditions are also welcomed, for example those which investigate the influence of solution composition, temperature, glass composition, reactive surface area, gel layers, secondary phases, environmental materials, and radiation on glass dissolution.

Session 4: Surfaces and Coatings

Organizers: **Matthew Linford**, Bingham Young University, USA
mrlinford@chem.byu.edu
Joy Banerjee, Corning Inc, USA
banerjeej@corning.com
Adam Polcyn, Vitro Architectural Glass, USA
apolcyn@vitro.com

Glass surfaces remain an enduring area of scientific and technological challenges for applications of glass, and approaches to understand, and customize, surface and interfacial behaviors with glass modifications and value-added coatings represent a critical direction for glass' future. This session will focus on surfaces and interfaces in glassy and film-related systems, with a scope that includes fundamental studies of intrinsic glass surfaces, structure-property relations at surfaces/interfaces, innovations in glass surface characterization, novel methods for modifying surfaces, emerging concepts around functional coatings on glass, and properties of glassy/amorphous thin films.

SYMPOSIUM 3: OPTICAL AND ELECTRONIC MATERIALS AND DEVICES — FUNDAMENTALS AND APPLICATIONS

Optical and electronic materials and devices are of critical importance for applications, including sustainable energy, information technology, nonvolatile memory, sensing, medical diagnostics and treatment, and national defense. This symposium will address processing and properties of optical and electronic materials as well as design, fabrication, and performance of functional devices.

Session 1. Laser Interactions with Glasses

Organizers: **Casey Schwarz**, Ursinus College, USA
cschwarz@ursinus.edu
Keith J. Veenhuizen, Lebanon Valley College, USA
veenhuiz@lvc.edu

The field of light interaction with matter has attracted increased attention with advances in ultrashort pulse lasers and high-power fiber lasers, and the need to design and fabricate structures for use in low loss applications. New phenomena have been observed and new applications have been developed whereby lasers are employed in diverse areas such as cutting, welding and engraving of glass, fabrication of waveguides, gratings and micro-channels, etc. inside the bulk of glass, and most recently, 3D printing through additive or subtractive laser-assisted processing. Lasers have been shown to be versatile in other applications of phase change, whereby glass or amorphous media are 'converted' in a controlled way to crystalline or composites (glass ceramics). These advances have been realized in optical phase change materials, laser induced crystallization such as seen in the fabrication of active single crystal architecture, strengthening of glass and other applications where a knowledge of not only the material, but the light/matter interaction mechanism is required. This session will focus on the most recent and advanced issues pertaining to the science and applications of laser-glass interactions, such as laser irradiation effects, compositional and structural changes, dynamics and mechanisms of laser-induced modifications.

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Session 2. Charge and Energy Transport in Disordered Materials

Organizers: **Caio Bragatto**, Coe College, Iowa, USA
cbragatto@coe.edu

Understanding and predicting of the transport phenomena in disordered media is still an open problem for scientists in the field and is essential for the development of more efficient and cheap materials for a broad range of applications, including energy storage. Increased application of glassy and nano-heterogeneous (glass-ceramics, nanostructured composites) including energy storage materials in areas such as energy generation and storage (photovoltaics, fuel cells, thermo-electrics, batteries), thermal isolation or conduction media, low-loss dielectrics, and electronic conduction (microelectronics, nanoelectronics), has encouraged research into the fundamental nature and control of transport processes. This session is intended to provide a general forum for the discussion of the mechanisms, properties, and application of charge and energy transport phenomena in such disordered systems. Contributions on the experimental, theoretical, and modeling aspects of these topics are encouraged. Topics of interest include but are not limited to:

- New material synthesis and characterization
- Novel experimental methods and instrumentation
- Charge transport theory and modeling (ionic and electronic transport)
- Thermal transport (including photonic systems and processes)
- Computational modeling of energy and charge transport

Session 3: Optical Fibers and Waveguides

Organizers: **Jiawei Luo**, OFS Laboratories, New Jersey, USA
jluo@ofsoptics.com

Sylvain Danto, ICMCB, University of Bordeaux, France
sylvain.danto@u-bordeaux.fr

Saurabh Kapoor, Sterlite Technologies Ltd, India
saurabh.kapoor1@stl.tech

The field of optical fibers application is not confined to telecommunication technologies. Optical fibers can be used in numerous other applications such as: sensing, new laser source, biomedicine, defense, and security. This session will be an opportunity for discussions about the state of the art and recent advances in the design, fabrication, characterization and applications of innovative and exotic fibers.

Topics of interest but not limited to are:

- New optical fibers design
- Optical fibers for communication
- Microstructure optical fibers
- Mechanical Reliability of optical fibers
- Optical waveguides for sensing
- Heavy metal oxide optical fibers
- Multicore fibers
- Multimaterial fibers
- Optical fibers for health
- Optical fibers for new laser sources
- Optical fibers for supercontinuum generation

Session 4: Glass-based Optical Devices and Detector Applications

Organizers: **Juejun Hu**, Massachusetts Institute of Technology, USA
hujuejun@mit.edu

Hongtao Lin, Zhejiang University, China
hometown@zju.edu.cn

Badri Gomatam, Sterlite Technologies Ltd., India
badri.gomatam@stl.tech

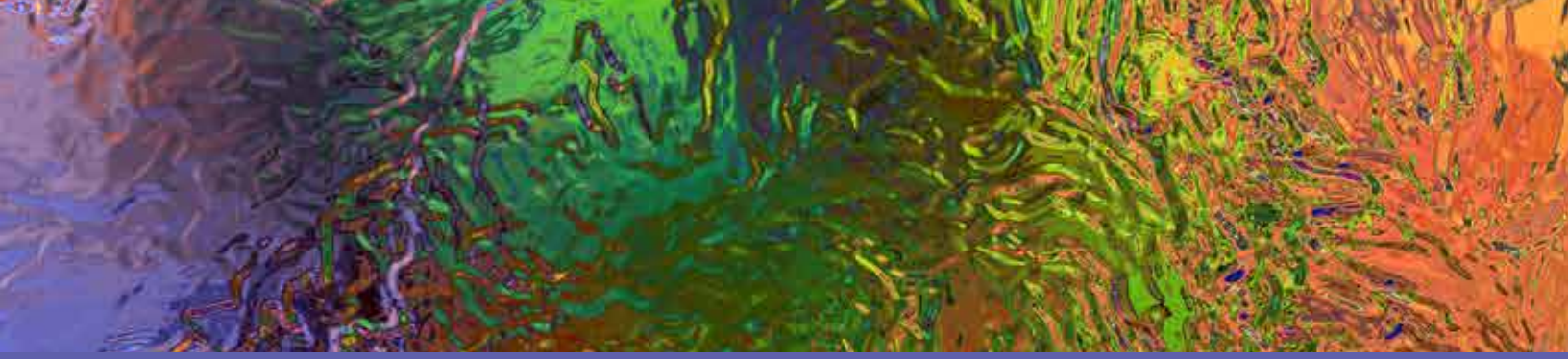
Glasses are important materials for optical components and devices given their excellent optical transparency and versatile processing. Novel oxide and non-oxide glass compositions and fabrication technology development have further enabled emerging applications such as light emission, infrared imaging, nonlinear optical signal processing, and sensing. This session will cover material synthesis and processing as well as device fabrication and applications of innovative device architectures including, but not limited to, molded optics, diffractive optics, thin film optical coatings, fiber-optic devices, metamaterials/metasurfaces, and integrated photonic components

Session 5: Optical and Photonic glasses and glass-ceramics

Organizers: **Laeticia Petit**, Tampere University, Finland
laeticia.petit@tuni.fi

Over the past decades, research on the spectroscopic properties of rare earths and transition-metal doped materials has quickly grown in importance as rare-earth and transition-metal ions play a fundamental role in various optical applications, from telecommunication to sensing, from medical diagnosis to energy. Intense levels of research have been focused on the development of new materials and designs. This session will cover the topics on:

- Glass and transparent ceramic lasers
- Ceramic phosphors for solid-state lighting
- Wavelength converters for photovoltaic systems
- Nanoprobe phosphors for bio-photonics
- Energy transfer or light storage mechanisms in solids
- d-d, f-f and f-d transitions in glass and ceramics
- Optical amplifiers for telecommunication



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SYMPOSIUM 4: GLASS TECHNOLOGY AND CROSS-CUTTING TOPICS

Glass technology and manufacture and the constant progresses in its different aspects play a key role in our society, and presents its own set of challenges and innovations, from the raw materials to the melt, from glass furnaces to the sustainability of the process, and from traditional forming processes to new techniques such as glass 3D printing. This symposium welcomes papers on these topics in the following sessions:

Session 1: Sol-gel Processing of Glasses and Ceramic Materials

Organizers: **Lisa Klein**, Rutgers University, USA
licklein@soe.rutgers.edu
John Kieffer, University of Michigan, USA
kieffer@umich.edu

Sol-gel processing uses low-temperature processing approaches to produce glass, ceramic and hybrid organic-inorganic materials with high purity, excellent homogeneity, and well-controlled morphology. This session will focus on all aspects of sol-gel derived and nanostructured materials prepared by liquid synthesis, including:

- Sol-gel routes to bulk, film, glass coating, colloidal, nanoparticle, porous, and hybrid organic-inorganic materials
- Structural characterization using spectroscopic, scattering, and imaging techniques
- Computer simulations through the molecular dynamics, Monte-Carlo, and reverse Monte-Carlo simulation methods
- New functionalities based on the optical, electrical, thermal, mechanical, chemical, and biomedical properties
- New sol-gel materials and products for energy and other applications

Session 2: Challenges in Glass Manufacturing

Organizers: **Irene Peterson**, Corning Research and Development Corporation, USA
PetersonIM@corning.com

The glass industry requires constant innovation to meet the needs for new compositions, new products, and sustainable manufacturing processes. This session will cover the spectrum of new research, development and engineering advances from the lab to the factory, including:

- Physics and chemistry of glass melting and forming – modeling and experiments
- Energy efficiency strategies
- New furnace designs and process control methods
- Furnace materials – new materials, corrosion and wear studies
- New concepts for melting and forming
- Post-forming treatments

Session 3: 3D printing of glass

Organizers: **S K Sundaram**, Alfred University, USA
sundaram@alfred.edu
Qiu Jianrong, Zhejiang University, China
qjr@zju.edu.cn

This session provides a forum for the exchange and discussion of current issues and trends in 3D printing of glasses. The session will cover recent theoretical and experimental advances in processing and characterization of 3D printed glasses for optical, architectural, and artistic applications. The session will also provide a forum to a broader audience for emerging technological applications of 3D printed glasses. All contributions from academia, national laboratories, and industries that address recent advances and new applications are welcome. Topics include:

- Oxide and non-oxide glasses
- Polymeric systems
- 3D printing methods
- Optical and electrical properties
- Glass structural characterizations