

SECOND SÃO CARLOS SCHOOL ON GLASSES AND GLASS-CERAMICS



Vitreous Materials Lab (LaMaV) at Federal University of São Carlos (lamav.weebly.com).

Instructors and attendees of the **First School** (2016) with 70 international students and 30 Brazilians.

SCHOOL OBJECTIVES

Following the successful **First International School on Glasses and Glass-ceramics** (2016), the **CeRTEV** team will organize the second School from **April 29 to May 4, 2024**. The main goals are:

- provide state-of-art information on the structure and dynamic processes (diffusion, viscous flow, relaxation, and crystallization), as well as on optical, electrical, mechanical, and bio properties of glasses and glass-ceramics. The instructors are well-known experts on experimental, theoretical, and computer simulation techniques.
- disseminate **CeRTEV**'s faculty, infrastructure, and facilities to Brazilian and international students;
- strengthen the international network of **CeRTEV** collaborators;
- attract future students, post-docs, and visiting faculty.

LOGISTICS

Up to 60 Ph.D. students worldwide will be accepted (in the former School we had many more applicants)

40 hours of classes, poster presentations, and discussions during 6 days.

The post-graduate program of the Federal University of São Carlos validates the course (**still pending**). Students can register officially and receive course credits if they wish officially.

REGISTRATION

There is no registration fee; we will cover the hotel for 6 nights and the meal expenses for one student per supervisor. The students or their thesis advisors/home institutions must cover transportation, health insurance, VISA fees, and other related costs.

Interested students must contact us by **email** before **November 30, 2023**, and provide:

1. Documental proof to be officially registered in a *Ph.D.* program.
2. An abstract of their thesis project.
3. A letter of recommendation from the thesis advisor as well as commitment to cover transportation, health insurance, and other costs related to the trip to São Carlos.

ORGANIZERS

Prof. Edgar D. **Zanotto** – CeRTEV director (dedz@ufscar.br)

Prof. Hellmut **Eckert** – CeRTEV Vice-director

Prof. Ana C.M. **Rodrigues** – Education and Science Outreach coordinator

Prof. Eduardo B. **Ferreira** – Technology and Innovation coordinator

Administrative assistant: Laurie Leonardo (certev@gmail.com)

TENTATIVE PROGRAM

Monday, 29/04/2024	Tuesday, 30/04/2024	Wednesday, 01/05/2024	Thursday, 02/05/2024	Friday, 03/05/2024	Saturday, 04/05/2024	
1.5 min fire talks by the students	Glass Structure by Raman- P. S. Pizani	Glass Sintering R. Müller	Machine Learning D. Cassar	Optical properties de Camargo	Wrap-up session	
Coffee Break						
Poster presentations Students	Glass Crystallization E. D. Zanotto	Glass-ceramics E. B. Ferreira	<i>Ab initio</i> Simulations G. Dalpian	Bio properties O. Peitl	Departure to the airport	
Lunch Break						
Glass Structure by EPR – H. Eckert	Visit to IFSC and EESC USP Labs	Free for shopping or tour	MD simulations J. P. Rino	Electrical properties A. Rodrigues	Travel	
Coffee Break						
Glass Structure by NMR – M. Oliveira	Visit to UFSCar glass Labs	Free for shopping or tour	Photonic glasses M. Nalin	Mechanical properties F. Serbena		
Welcome reception	Free	Free	Free	Farewell Dinner		

INSTRUCTORS



Ana Candida M. **Rodrigues** is a Professor at the Department of Materials Engineering of the Federal University of São Carlos. She has been teaching basic Materials Science and topics related to glass and electrical properties in both graduate and undergraduate courses, for 30 years. Her broader research interest includes **electrical properties of oxide glasses and glass-ceramics, glass crystallization, and solid electrolytes for solid state batteries**. Currently she is the chair of the Technical Committee TC23 “Glass Education” of the International Commission of Glass, and Education and Outreach Coordinator of the Center for Research, Technology, and Education in Vitreous Materials (CeRTEV).



Andréa S. S. **de Camargo** holds a B.Sc. and M.Sc. in Chemistry and a PhD in Applied Physics. In 2008 she became an Alexander von Humboldt fellow in a 2-year research stay at the University of Münster. For 17 years she worked as a professor at the University of São Paulo in Brazil, where she led a productive lab focused on the development of **luminescent and optical materials**. In 2023 she accepted a new joint position in Germany, as Professor of University of Jena and the Head of Division 5.6 – Glass at the Federal Institute for Materials Research and Testing (BAM) in Berlin. She is an editor of J. Materials Science since 2020.



Edgar Dutra **Zanotto** is a Professor of Materials Science and Engineering and Director of the Center of Education, Research, and Technology in Vitreous Materials - CeRTEV (www.certev.ufscar.br), at the Federal University of São Carlos, Brazil. He was a visiting professor at the University of Arizona, University of Central Florida, and Université Libre de Bruxelles. Prof. Zanotto has been working on the **fundamentals of relaxation, crystal nucleation, growth and crystallization of glasses** for 47 years. His applied research projects focus on **glass-ceramics, bioactive materials, and machine-learning-driven understanding and development of novel glasses**. He has published over 400 articles on these subjects. He is a former chair and member of the Technical Committee 7 of the International Commission

on Glasses, former chair of the GOMD-ACerS, an editor of the *Journal of Non-crystalline Solids* (Elsevier) and an advisory board member of nine other scientific journals.



Eduardo **Bellini Ferreira** is an Associate Professor in the Materials Engineering Department, Engineering School of São Carlos, University of São Paulo (USP), São Carlos, Brazil, where he is a lecturer on Ceramic Materials Properties and Applications and Materials Thermodynamics. He is the Coordinator of Technology Transfer at the Center of Education, Research, and Technology in Vitreous Materials- CeRTEV (www.certev.ufscar.br),. Prof. Bellini's research interests are in **glass sintering, glass forming ability, glass crystallization, phase transformation of glasses by DSC**, and the **development and applications of glasses and glass-ceramics**.



Daniel R. **Cassar** is an assistant professor at the Ilum School of Science, part of the Brazilian Center for Research in Energy and Materials (CNPEM). He began his scientific career investigating kinetic processes in glasses, including crystallization, viscosity, and relaxation. His current research interests lie at the interface between Materials Science and Computer Science, particularly on **artificial intelligence tools to accelerate the development of new materials**. Daniel has published more than 30 peer-reviewed papers in internationally indexed journals and is the developer of free software tools for glass scientists (GlassPy being the most popular).

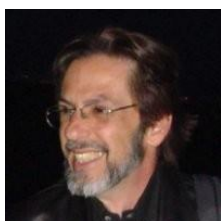


Gustavo **Dalpian** is a Professor of Physics at the Institute of Physics of the University of São Paulo (USP), São Paulo, SP, Brazil. His research focuses on the use of computational methodologies, including *ab initio* electronic structure calculations and machine learning to understand the properties of materials. His current main research topics include the study of **materials for energy, halide perovskites, quantum materials and materials informatics**.

Prof. Dalpian is a director at the Brazilian Physical Society, associate editor of the *Discover Materials* journal (Springer) and member of the Coordination Panel in Physics of FAPESP.



Hellmut **Eckert** is a Professor at the São Carlos Institute of Physics (IFSC) of the University of São Paulo and CeRTEV Vice Chair and Research Coordinator. He held professorships in Chemistry at the at the University of California Santa Barbara and the WWU Münster, before joining IFSC in 2011. He has published about 600 articles on the **methodology of solid-state nuclear magnetic resonance techniques and its application in materials science**, with a particular focus on structural studies of glasses and ion-conducting materials. In 2016 he received the George Morey Award of the American Ceramic Society. He is a member of the Coordination Panel in Physics of FAPESP.



José Pedro **Rino** is a Professor at Physics Department of the Federal University of São Carlos – UFSCar, São Carlos -Brazil. He has been working on the development of **interatomic potentials to describe the properties of diverse materials, including glass-formers, using molecular dynamics simulations**. Structural phase transformation induced by pressure, crystal growth, intermediate range order in amorphous solids, and its dynamical properties are some subjects of his interest.



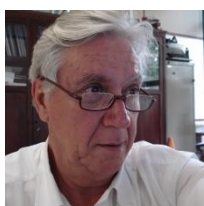
Marcos de **Oliveira Junior** is an assistant professor at the São Carlos Institute of Physics, University of São Paulo, Brazil, since 2019. He is interested in the **structural study of amorphous materials**, such as glasses, xerogels, and metal-organic compounds, by magnetic resonance techniques, such as: solid state Nuclear Magnetic Resonance, cw- and pulsed-Electron Paramagnetic Resonance and Dynamic Nuclear Polarization.



Francisco **Serbena** is a professor at the Department of Physics, State University of Ponta Grossa, Brazil. He has always worked with the mechanical properties of materials, including the brittle-ductile transition and fracture strength and toughness of glasses and glass-ceramics. His main research focuses on the understanding of the underlying **mechanisms that control the mechanical behavior of glass-ceramics and its link with the microstructure.**



Marcelo **Nalin** holds a *Ph.D.* in Chemistry. His postdoctoral training were at University of Paris XI, France (2003), Institute of Physics University of Campinas (2007), and Department of Physics at the Sciences Faculty of UNESP Bauru (2009), Visiting professor at University of Bordeaux, France (2020). He was an associated professor at the Department of Chemistry of the Federal University of São Carlos from 2009 to 2013. Since then, he is an associate professor at the Chemistry Institute of UNESP Araraquara. His research fields are the synthesis of **new glasses and glass-ceramics for photonics, including the development of new synthesis routes and characterization of luminescent and magneto-optical materials and nanoparticles.** He is a member of the Technical Committee 20 of the International Commission on Glasses (TC-20-ICG) and of of the Coordination Panel in Chemistry of FAPESP.



Paulo S. **Pizani** is a Professor at the Physics Department of the Federal University of São Carlos – UFSCar, São Carlos -Brazil since 1974. He has been working on optical and vibrational properties of materials using mainly **Raman scattering** to explore **temperature and hydrostatic pressure (diamond anvil cell – DAC) structural phase transformations, vibrational anharmonicity of glasses and crystals and crystallization kinetics.**



Ralf **Müller** started his research in 1981 before he joined the Bundesanstalt für Materialforschung und -prüfung (BAM) in Berlin, where he headed the glass group and the glass division. His interests are focused on **surface-induced glass crystallization, sintering, degassing, and glass strength**. Since 1992 he was member and former chair of the ICG TC-7 “Nucleation, Crystallization & Glass Ceramics”. He coordinated the joint working group Glassy-Crystalline Multifunctional Materials of the German Glass Society and the German Ceramic Society 2003-2022. He has been a visiting lecturer at the Stanford University Bing Overseas Studies Program in Berlin since 2012.



Oscar **Peitl** is an associate professor at the Department of Materials Engineering, Federal University of São Carlos, Brazil, and a principal investigator of CeRTEV. He did a specialization training on optical glasses at the Otto Schott Institut and the Carl Zeiss Company in Germany in the mid 80s. He was a Larry Hench *Ph.D.* student and became a biomaterials researcher. He helped creating two **new biomaterials, the "Biosilicate" glass-ceramic and a glass denominated F18**. Prof. Peitl has also been working with **ion exchange** on a low sodium content glass, **crystallization** of several oxide glasses, and **developing scientific equipment**, such as glass viscometers, roller quenching device, etc.

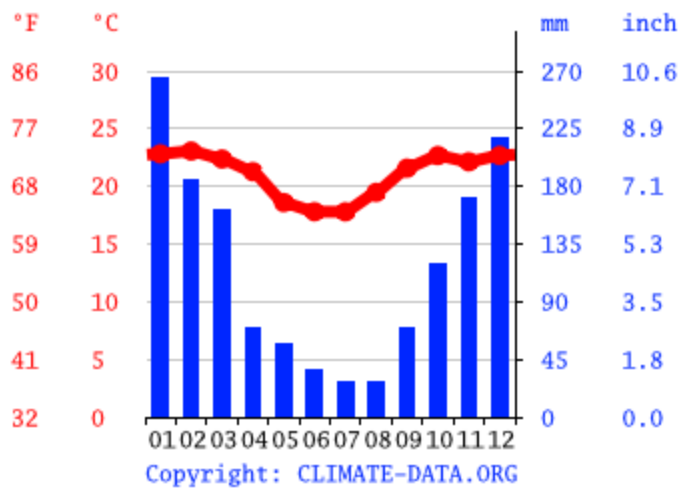
DATE and VENUE

April 29-May 4, 2024

São Carlos, São Paulo State, Brazil

According to a survey by the Chemistry Institute of the University of São Paulo (USP), São Carlos (SP) has one *Ph.D.* for

every 100 residents. The city, known as Brazil's capital of science and technology, has approximately 2,500 *Ph.D.* and 250,000 inhabitants. This proportion is 10 times higher than the national average. The public universities (USP and UFSCar) and the Embrapa Research Center are among Brazil's best. The city holds over 100 high-tech companies, mainly in informatics, materials, optics, biotech, and chemistry. Finally, the weather is excellent, as shown by the figure below, with over 320 sunny days per year and many rivers, waterfalls, and natural forest areas around the city.



São Carlos, SP, Brazil. Average temperature and rainfall per month.

[São Carlos climate: Temperature São Carlos & Weather By Month \(climate-data.org\)](http://climate-data.org)

Nearest international airports: Viracopos (Campinas) and Guarulhos (São Paulo). São Carlos is distant approximately 180 Km from Viracopos and 260 Km from Guarulhos airport.





