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**Proceedings of the 21st Brazilian
Symposium on Information Systems**
Innovation with Equity, Diversity and Inclusion in Information Systems

**Research in
Information Systems Track**

**Trilha de Pesquisa em
Sistemas de Informação (TP-SI)**

Proceedings of the 21st Brazilian Symposium on Information Systems (SBSI 2025)

Innovation with Equity, Diversity and Inclusion in Information Systems

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Research in Information Systems Track
Trilha de Pesquisa em Sistemas de Informação (TP-SI)

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Foreword:

Special Committee of Information Systems (CESI) of the Brazilian Computing Society (SBC)

Dear attendees of the 21st Brazilian Symposium on Information Systems (SBSI 2025),

On behalf of the Special Committee of Information Systems (CESI) of the Brazilian Computer Society (SBC), we would like to welcome another edition of our annual symposium. CESI brings together Information Systems (IS) researchers and professionals and manages this area in Brazil in the context of SBC. Its work consists of articulating policies for the dissemination, strengthening, consolidation, and improvement of the quality of education, research, innovation, and performance in IS in Brazil, promoting and proposing important activities for the development and consolidation of this area in our country. SBSI is one of CESI's main actions. For this reason, we are happy that authors submit their work, that evaluators strive to give the best possible feedback on their reviews, and that coordinators can hold memorable moments so that the community can be strengthened, attract more participants, and consolidate in the country. As such, CESI calls on the IS community to be increasingly active and for SBSI participants to get involved and bring new researchers to the event, making the community stronger and solidifying their research.

SBSI is the most important forum on IS in Brazil and annually brings together researchers from all over the country. This year, SBSI takes place in Recife, State of Pernambuco, under the local organization of professors George Valença (UFRPE), Andréza Leite de Alencar (UFRPE), and Ronnie de Souza Santos (CESAR School and University of Calgary), together with professors Williamson Silva (UNIPAMPA) and Allysson Araújo (UFCA), who coordinated the Steering Committee of SBSI 2024-2025, and with professor Mônica Ximenes (IFAL), who coordinated the SBSI 2025 General Program Committee. After several months of intense work and unparalleled dedication by the professors and their local organizing team, we made available to the IS community a rich, diversified, comprehensive, and solid program, communicating the latest research results in the IS area in Brazil. The event has grown considerably in recent years. This achievement is a reflection of the consolidation of the area, which has only been possible due to the growing support of the entire IS community. SBSI 2025 is composed of several parallel activities, which include technical sessions, keynotes, panels, master classes, and five tracks: Research in Information Systems Track; Industry and Innovation in Information System Track; Emerging Themes, Ideas and Results in Information Systems Track; Doctoral Theses, Master's Dissertations, and Undergraduate Works on Information Systems Contest; and Short Courses Track. In addition, an innovation competition was added to stimulate the creation of inclusive and equitable solutions in IS (Ideathon) and GrandSI-BR was run again to discuss the Grand Research Challenges in IS in Brazil for the next ten years (2026-2036). All works accepted to SBSI tracks other than in the Research in Information Systems Track are published in the SBSI Companion Proceedings and also made available to the community, and works accepted in Short Courses in Information Systems Track are published as an ebook.

The Research in Information Systems Track Chairs, Davi Viana (UFMA) and Rita Maciel (UFBA), worked hard and expertly so that the most mature and highest quality works could be brought to the Brazilian IS community. Such rigorous selection work yielded full confidence in the quality of the papers presented at this symposium in 2025. The impact of the work carried out by the program committee and by the authors of the papers, enhancing the scope and reach of the academic publications of SBSI, is also noticed since Proceedings of SBSI are also indexed and accessible worldwide by the DBLP database. In time, it is important to emphasize that the Proceedings of SBSI, SBSI Companion Proceedings and Short Courses in Information Systems ebook are being indexed and made available at the SBC Open Lib - SOL.

Finally, we thank all the participants, collaborators, coordinators, sponsors, supporters, and organizers who once again made this in-person event possible.

We wish you all a great SBSI 2025!

Kind regards,

Célia Ghedini Ralha (UNB)
CESI/SBC Coordinator - 2024-2025

Rodrigo Pereira dos Santos (UNIRIO)
CESI/SBC Vice-Coordinator - 2024-2025



Célia Ghedini Ralha holds a PhD from the University of Leeds, England (1996), a master's degree in Electronics and Computer Engineering from the Instituto Tecnológico de Aeronáutica-ITA (1990), and a post-doctorate from the Brandenburgische Technische Universität Cottbus, Germany (2012-2013). Associate Professor IV at the Department of Computer Science at the University of Brasília (UnB, 2002-2017), where she served as coordinator of the Bachelor's Degree in Computer Science (2004-2006) and head of the department during two terms (2006-2010). She collaborated with the Dean of Research and Postgraduate Studies (DPP) at UnB as the Director of Institutional Development and Innovation (2010-2012). She has been a member of the Postgraduate Program in Informatics at UnB since its creation in 2003, having been coordinator in the 2015-2017 biennium, when the program received a Grade 5 from CAPES. She was a visiting professor in the Postgraduate Program in Informatics at the Department of Computer Science at the Institute of Exact Sciences at UnB (2020-2022). She was a visiting professor at the Australian National University (ANU) in Canberra, Australia (April-May 2024). She is currently a visiting professor in the Postgraduate Program in Computer Science at the Federal University of Bahia (UFBA). She has broad experience in academic supervision, having supervised 48 undergraduate monographs and 30 scientific initiation works, 8 specialization monographs, 34 master's theses, 9 doctoral theses, and one post-doctorate. She has experience in Computer Science with a focus on intelligent systems, particularly using agent-based models, multi-agent systems, and agent-based simulation. According to the SCOPUS classification, her publications focus on the following areas: Computer Science, Mathematics, Engineering, Decision Science, Business and Management, with topics of greatest contribution 2018-2022, heuristics, linear temporal logic, and planning technology. She leads the research group InfoKnow - Computer Systems for Information and Knowledge Treatment (accredited by CNPq). She is a senior member of the Brazilian Computing Society (SBC) and general coordinator of the Special Information Systems Commission (CESI) in 2013-2015 and 2024-2025, having been vice coordinator in the 2010-2011 biennium. She was coordinator of the Thesis and Dissertation Competition (CTD) of the Congress of the Brazilian Computing Society (CSBC'2024) and General Coordinator of the 18th Workshop-School of Agent Systems, their Environments and Applications (WESAAC'2024), financed by the International Foundation for Autonomous Agents and Multiagent Systems (IFAAMAS). She has been editor-in-chief of SBC's Electronic Journal of Initiation Scientific Computation (REIC) since 2024 and associate editor of Springer's Knowledge and Information Systems (KAIS) since 2022.



Rodrigo Pereira dos Santos is an Associate Professor at the Department of Applied Informatics at the Federal University of the State of Rio de Janeiro (UNIRIO, Brazil) and Head of the Complex Systems Engineering Laboratory (LabESC). He is Research Productivity Fellow Level 2 by the Brazilian National Council for Scientific and Technological Development (CNPq, Brazil) and Young Scientist Fellow by the Carlos Chagas Filho Research Support Foundation of the State of Rio de Janeiro (FAPERJ, Brazil). PhD in Software Engineering from the Federal University of Rio de Janeiro (COPPE/UFRJ, Brazil). He was Academic Visitor at University College London (UCL, UK) and Postdoc Researcher at COPPE/UFRJ. His research interests are Complex Systems Engineering (especially software ecosystems and systems-of-systems), Human and Social Aspects in Software Engineering, Software Business, Software Engineering Education and Training, Requirements Engineering, and Research Methods in Software Engineering and Information Systems. He also worked in several projects related to software process improvement and reuse management in large companies at Coppetec Foundation (2008-2017). He was also lecturer at Brazilian Open University, COPPE/UFRJ, UNIRIO, Infnet Institute, and Santa Úrsula University (2007-2017). He has been a member of the Education Evaluating Commission at the Brazilian Ministry of Education since 2011. He is member of the Association for Computing Machinery (ACM) since 2014 and Brazilian Computer Society (SBC) since 2008, in which he is/was member of the Special Commissions of Information Systems (CE-SI, member since 2017, coordinator 2019-2022, and vice-coordinator 2022-2025), Games and Entertainment Computing (CE-Jogos, 2022-2024), Software Engineering (CE-ES, 2021-2022), and Computer Science Education (GIEC, 2020-2024). He is also a steering committee member for WASHES@CSBC, BraSNAM@CSBC, and SBQS, as well as SBGames (2020-2022). He was Editor-in-Chief (2017-2021) and is associate editor (2021-current) of iSys: Brazilian Journal of Information Systems and of JBCS: Journal of the Brazilian Computer Society (2024-current). He was guest editor for special issues/sections in scientific journals such as Information and Software Technology (Elsevier), Journal of Software: Evolution and Process (Wiley), Communications in Computer and Information Science (Springer), Journal of Internet Services and Applications (SBC Springer), and Journal of the Brazilian Computer Society (SBC Springer). He is the steering committee chair for SESoS@ICSE and also served as PC member for ICSE-RT, ICSE-SEET, CSEET, FSE-SEET, FSE-Demonstrations, ICSE-SCORE, SESoS, ECSA, ECSA-Tools, ECSA-DEI, ICSAW, MODELS, ICSOB, CIBSE, IWSiB, ECIS, ISD, ACM MEDES etc., as well as reviewer for IEEE TSE, EMSE, JSS, IST, COMIND, ESWA, SCP, JSEP, FGCS, IJDRR etc. My ORCID (scientific profile with all social/academic networks): <https://orcid.org/0000-0003-4749-2551>.

Foreword:

Research in Information Systems Track of SBSI 2025

Information Systems (IS) crosscut several areas of interest, supporting strategic decisions and enabling humans to deal with information in different moments and scenarios. In addition to enhancing and leveraging businesses, ISs are able to anticipate and provide subsidies to deal with unexpected situations and promote more efficient and transformative management in the most diverse areas, such as health, education, logistics, agribusiness, finance, public management, among others.

The IS research area understands computing as a means for solving problems in the real world, society, and organizations. In that sense, the Brazilian Symposium on Information Systems (SBSI) is the annual event of the IS community of the Brazilian Computer Society (SBC) for the exchange of academic, scientific and professional knowledge and experiences, presentation of scientific papers, discussion of contemporary issues in the IS area and alignment of the community's strategies and actions, bringing students, researchers, professionals, and entrepreneurs closer to the community interested in IS.

In the 21th edition, SBSI 2025 takes place in Recife/Pernambuco, under the coordination of the Federal Rural University of Pernambuco (UFRPE) and CESAR School and will have as its theme “Innovation with Equity, Diversity, and Inclusion in Information Systems”. The choice of this theme reflects the urgency and importance of discussing how information systems can be developed in a way that promotes a fairer and more equal society. Innovation with Equity, Diversity, and Inclusion (EDI) goes beyond the creation of new technologies; it is about ensuring that these innovations are accessible and beneficial to all people, regardless of their backgrounds, identities, or socioeconomic conditions.

This year, we received 248 valid submissions of scientific papers for discussion at the event. Submitted papers received 3-5 reviews from 145 program committee members and 15 external reviewers. In the end, 89 papers were accepted for presentation and debate during the SBSI, with an acceptance rate of 35.8%. Authors come from 37 different institutions in 22 Brazilian states and other countries (Germany, Algeria, Finland, USA, and Portugal). Along with the communications of scientific papers, the event has a robust program and a very high academic-scientific level

We would like to thank the Brazilian Computer Society, the general coordinators of SBSI 2025, and other coordinating colleagues of the events that make up the SBSI. We thank and congratulate the colleagues who made up the program committee and review body for their excellent contributions to the authors in their papers and discussions. To the authors of the papers submitted to the event, we would like to thank you for your interest in the event and in the collective development of the Information Systems area in Brazil. Finally, our sincere thanks to the participating community for the success of this 21st edition of SBSI. Let's all have an excellent event!

Kind regards,

Davi Viana (UFMA) and Rita Suzana Pitangueira Maciel (UFBA)
Research in Information Systems Track Chairs



Davi Viana is Adjunct Professor at the Federal University of Maranhão (UFMA). He is Research Productivity Fellow by FAPEMA, Brazil. PhD in Informatics from Federal University of Amazonas (UFAM). Graduated in Computer Science from the Federal University of Amazonas (UFAM). He is interested in the areas of Information Systems, software quality, software process improvement (SPI), programs with emphasis on the adoption of maturity models, Software Engineering Education, Experimental Software Engineering, Information Systems, Software Engineering for Internet of Things, and Software Startup.



Rita Suzana Pitangueira Maciel holds a PhD in Computer Science from the Federal University of Pernambuco (2005) and an M.Sc. in Computer Science from the Federal University of Rio Grande do Sul (1995). She completed postdoctoral studies at the University of Waterloo, Canada (2014) and the University of São Paulo (2023). She is currently an associate professor at the Federal University of Bahia (UFBA), where she teaches undergraduate and graduate computer science programs at the Institute of Computing. She supervises master's and doctoral students in Software Engineering, Information Systems, Collaborative Systems, and Computing in Education. She was a Visiting Professor at the University of Minho, Portugal (2010) through the Erasmus Mundus Program. She is member of Brazilian Computer Society (SBC) since 2003 and she has served in several roles within the Brazilian Information Systems community, including member of the Special Committee on Information Systems (CESI) (2013-2015, 2019-2020), Chair of the Research Track at SBSI 2013, Chair of the Thesis and Dissertation Competition at SBSI 2020, Chair of the Workshop on Theses and Dissertations in Information Systems in 2017, and General Chair of SBSI 2011. She has also been a member of the Organizing Committee of GranDSI-BR (2016-2026) and is currently a member of the 2017-2027 editions of the Research Challenges initiative.

Foreword: General Chairs and General Program Chair of SBSI 2025

It is with great excitement and anticipation that we welcome you to the 21st Brazilian Symposium on Information Systems (SBSI 2025). Over the years, SBSI has grown into a vibrant forum for discussing the latest advances in Information Systems, bringing together leading researchers, industry professionals, students, and practitioners. This year, the event is even more special as we gather in Recife, Pernambuco, from May 19 to 23, 2025, a city rich in history, culture, and innovation. Organized by the Special Committee of Information Systems (CESI) of the Brazilian Computing Society (SBC), the Federal Rural University of Pernambuco (UFRPE), and CESAR School, this edition promises to be an inspiring and inclusive experience.

At the heart of SBSI 2025 is the theme "Innovation with Equity, Diversity, and Inclusion in Information Systems". This theme reflects a critical commitment: ensuring that technological progress benefits everyone, regardless of background, identity, or socioeconomic condition. Information Systems shape the way we live, work, and interact, influencing societies and economies in profound ways. As researchers and professionals, we have a responsibility to develop systems that foster accessibility, fairness, and inclusivity, ensuring that no one is left behind in the digital era.

This year's symposium is set in the dynamic and historic district of Recife Antigo. Across five days of intense exchange, attendees will explore groundbreaking research, industry trends, and emerging ideas in multiple tracks, ranging from academic research and industrial applications to innovative theses and student projects. In addition to the technical program, SBSI 2025 features an outstanding lineup of keynote speakers, including Jeniffer Rode (University College London), who will address gender diversity in computing; Mariza Ferro (Federal University of Fluminense), discussing the challenges and opportunities of inclusion and equity in Artificial Intelligence; and Monica Tremblay (William & Mary's Raymond A. Mason School of Business), leading a MasterClass on focus groups in design science research.

This event would not be possible without the passion and dedication of an exceptional team. We express our deepest gratitude to the entire organization team involved in SBSI 2025. Thanks to all track chairs, reviewers, committee members, CESI members, and volunteer students whose tireless work has shaped this event into a reality. More than a symposium, SBSI 2025 is an opportunity to connect, collaborate, and inspire. We invite you to engage deeply, share your ideas, explore new perspectives, and take part in building an inclusive and equitable future for Information Systems. Let this be a space for innovation, meaningful discussions, and lasting partnerships. Welcome to SBSI 2025!

Kind regards,

**George Valença (UFRPE), Andrêza Leite de Alencar (UFRPE) and
Ronnie de Souza Santos (CESAR School & University of Calgary)**
General Chairs of SBSI 2025

Mônica Ximenes Carneiro da Cunha (IFAL)
General Program Chair of SBSI 2025



George Valença is an associate professor at the Department of Computing at UFRPE, where he leads the ASPAS group. He currently works as chief scientist for technical cooperation agreements with the Alana Institute, on ethical design in education, and with the Court of Accounts of Pernambuco, on open innovation, information security and AI. His research group investigates the sociotechnical challenges brought about by platforms developed by Big Techs. In recent years, he has dedicated special attention to reflections on ethical and inclusive IT, with studies on the protection of trans and non-binary people, as well as children in the digital environment, analyzing topics such as algorithmic racism and future design, parental control tools, guaranteeing children's rights by design and problems caused by facial recognition for trans people. During his postdoctoral studies, he investigated manipulative design patterns at PUC-SP.



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Ronnie de Souza Santos is a faculty member in the graduate program at CESAR School (Brazil) and an Assistant Professor in the Department of Electrical and Software Engineering at the University of Calgary (Canada), where he leads the SE-ALL Lab (Software Engineering for All). His research focuses on software fairness, with the goal of making software systems more just, accessible, and inclusive. He places particular emphasis on testing practices to identify and mitigate bias in AI-based systems. In recent years, his work has been dedicated to understanding how software development teams navigate the challenges of algorithmic fairness, drawing on software engineering methods in combination with interdisciplinary perspectives.



Mônica Ximenes Carneiro da Cunha holds a degree in Electrical Engineering from the Federal University of Campina Grande, a master's degree in Electrical Engineering from the same institution, and a Ph.D. in Administration from the Federal University of Pernambuco. She is a full professor and works in the Bachelor's program in Information Systems (Maceió Campus) at the Federal Institute of Education, Science, and Technology of Alagoas (IFAL). She is involved in various research and extension projects at IFAL. Her areas of interest include Information Systems for the Public Sector, Computer Science Education, Informatics in Education, Educational Games, Assistive Technologies, Special and Inclusive Education (autism), and Social Technologies. She was the general coordinator of SBSI 2023, the steering committee coordinator for SBSI 2024, and the program committee coordinator for SBSI 2025.

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