

Heleno de Souza Campos Junior

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Research Interests

- **AI for software engineering:** how artificial intelligence can support software engineering tasks and how to improve that support, including how agents based on large language models (LLMs) make decisions and how they compare with one another and with other automated approaches.
- **Software configuration management:** evaluation and improvement of support for version control and merge conflict resolution.
- **Software testing:** evaluation of existing approaches and proposal of new ones.

Academic Appointments

2026–present	Assistant Professor , Systems Engineering and Computer Science Program (PESC), COPPE, Federal University of Rio de Janeiro (UFRJ) Full-time, exclusive dedication.
2025–present	Postdoctoral Researcher , Institute of Computing, Fluminense Federal University (UFF) CNPq Junior Postdoctoral Fellowship (PDJ). Supervisor: Leonardo Murta.
2024–2026	Substitute Professor , Institute of Computing, Fluminense Federal University (UFF) Undergraduate courses in Information Systems and Computer Science.
2018	Lecturer , Centro Universitário Academia (UniAcademia), Juiz de Fora

Education

2019–2025	D.Sc. in Computing , Fluminense Federal University (UFF), Brazil Thesis: <i>Search-Based Merge Conflict Resolution</i> . Advisor: Leonardo Gresta Paulino Murta. Among the three best Ph.D. theses of the Software Engineering Thesis Contest (CTD-ES), SBES 2026.
2016–2018	M.Sc. in Computer Science , Federal University of Juiz de Fora (UFJF), Brazil Dissertation: <i>A Framework for Test Case Prioritization in the Continuous Software Engineering</i> . Advisor: Marco Antônio Pereira Araújo.
2011–2015	B.Sc. in Information Systems , Federal Institute of Southeastern Minas Gerais (IF Sudeste MG), Brazil Sandwich year at the University of Pisa, Italy (2013–2014), through the CAPES Science without Borders program.

Other Professional Experience

2024–2025	Educator , Interinstitutional Laboratory of e-Astronomy (LIneA) Short courses on programming, databases, and scientific software for the astronomy community.
2023–2024	Technical Lead and Research Assistant , Prime Up Soluções em TI Led the software testing team of a web and mobile system; developed ATF, a proprietary end-to-end testing framework based on Selenium, Appium, and Cucumber.
2019	Doctoral Research Fellow , FACC / National Laboratory for Scientific Computing (LNCC) Intelipetro project, a partnership among LNCC, Petrobras, and FACC, on software engineering and artificial intelligence.
2012–2013	Java Web Developer (intern) , Kali Software

Awards and Honors

2026	Distinguished Paper Award, SBES 2026 Research Track For <i>How AI Coding Agents Resolve Merge Conflicts: An Empirical Study</i> . The artifact also received the Available and Functional badges at the CBSOft 2026 Artifact Festival.
2026	Top 3 Ph.D. Theses, Software Engineering Thesis Contest (CTD-ES), SBES 2026
2026	Distinguished Reviewer, SBES 2026 Insightful Ideas and Emerging Results Track
2025	Distinguished Reviewer, SBES 2025 Research Track
2022	Distinguished Paper Award, SBES 2022 For <i>Towards Merge Conflict Resolution by Combining Existing Lines of Code</i> .
2021	FAPERJ “Doutorado Nota 10” Fellowship Awarded to the Ph.D. students with the highest academic performance in the state of Rio de Janeiro.
2019	Best Paper Award, SAST 2019
2016	Outstanding Student Award, Brazilian Computer Society (SBC)
2016	Outstanding Student, IF Sudeste MG – Campus Juiz de Fora
2016	First place, poster presentation in Computer Science, 5th Undergraduate Research Seminar, IF Sudeste MG
2015	Second Best Paper Award, SAST 2015
2015	First place, Innovative Products, Processes and Services Contest, II SIMEPE, IF Sudeste MG

Fellowships and Funding

2025–present	CNPq Junior Postdoctoral Fellowship (PDJ), UFF
2021–2023	FAPERJ “Doutorado Nota 10” Ph.D. Fellowship, UFF
2019–2021	CAPES Ph.D. Fellowship, UFF
2016–2018	CAPES M.Sc. Fellowship, UFJF
2013–2014	CAPES Science without Borders Undergraduate Fellowship, University of Pisa, Italy
2011–2016	Undergraduate Research Fellowships (CNPq, FAPEMIG, IF Sudeste MG)

Research Projects (as team member)

2024–present	<i>Factors that Hinder Software Merge and Strategies for Conflict Resolution</i> Funded by CNPq. Coordinator: Leonardo Murta.
2024–present	<i>Towards Automatic Merge Conflict Resolution</i> Funded by FAPERJ. Coordinator: Leonardo Murta.
2021–2024	<i>Algorithms and Tools for Software Integration, Debugging, and Release</i> Funded by FAPERJ. Coordinator: Leonardo Murta.
2021–2024	<i>Contributions to Software Engineering in the “Last Mile”: Integration, Debugging, and Release</i> Funded by CNPq. Coordinator: Leonardo Murta.
2014–2018	<i>Challenges in Evolutionary Software Maintenance: Evaluation, Impacts, and Research Opportunities</i> Funded by FAPEMIG. Coordinator: Marco Antônio Pereira Araújo.
2011–2012	<i>GRASP and Other Heuristics Applied to the Vehicle Routing Problem</i> Funded by CNPq. Coordinator: Márcia Cristina Valle Zanetti.

Publications

Titles originally published in Portuguese are kept in Portuguese and marked accordingly.

Journal Articles

- [1] **H. S. Campos Junior**, G. G. L. Menezes, M. O. Barros, A. van der Hoek, L. G. P. Murta. Towards a Feasible Evaluation Function for Search-Based Merge Conflict Resolution. *ACM Transactions on Software Engineering and Methodology (TOSEM)*, v. 35, pp. 1–35, 2026. Presented at ICSE 2026 (Journal-First track).

- [2] **H. S. Campos Junior**, G. G. L. Menezes, M. O. Barros, A. van der Hoek, L. G. P. Murta. How Code Composition Strategies Affect Merge Conflict Resolution? *Journal of Software Engineering Research and Development (JSERD)*, v. 12, pp. 13:1–13:17, 2024. doi:10.5753/jserd.2024.3638
- [3] P. Elias, **H. S. Campos Junior**, E. Ogasawara, L. G. P. Murta. Towards Accurate Recommendations of Merge Conflicts Resolution Strategies. *Information and Software Technology (IST)*, v. 164, 107332, 2023. doi:10.1016/j.infsof.2023.107332
- [4] E. S. Prutchi, **H. S. Campos Junior**, L. G. P. Murta. How the Adoption of Feature Toggles Correlates with Branch Merges and Defects in Open-Source Projects? *Software: Practice and Experience*, v. 52, pp. 506–536, 2021.
- [5] N. M. Magalhães, **H. S. Campos Junior**, M. A. P. Araújo. Melhoria da qualidade de software através da eliminação da complexidade desnecessária em código fonte. *Multiverso*, v. 3, 2018. (in Portuguese)
- [6] **H. S. Campos Junior**, L. R. V. Martins Filho, M. A. P. Araújo. Uma abordagem para otimização da qualidade de código fonte baseado na complexidade estrutural. *Multiverso*, v. 2, pp. 13–21, 2017. (in Portuguese)
- [7] **H. S. Campos Junior**, L. R. V. Martins Filho, M. A. P. Araújo. An Approach for Detecting Unnecessary Cyclomatic Complexity on Source Code. *IEEE Latin America Transactions*, v. 14, n. 8, pp. 3777–3783, 2016.
- [8] **H. S. Campos Junior**, A. F. Prado, M. A. P. Araújo. Complexity Tool: Uma Ferramenta para Medir Complexidade Ciclomática de Métodos Java. *Multiverso*, v. 1, pp. 66–76, 2016. (in Portuguese)
- [9] M. C. V. Zanetti, A. P. Marocco, **H. S. Campos Junior**. Adaptação da metaheurística GRASP como alternativa para melhorar o desempenho da logística aplicada ao e-commerce. *Holos*, v. 5, pp. 320–332, 2014. doi:10.15628/holos.2014.2326 (in Portuguese)

Conference and Workshop Papers

- [10] **H. S. Campos Junior**, L. G. P. Murta. How AI Coding Agents Resolve Merge Conflicts: An Empirical Study. In: *XL Brazilian Symposium on Software Engineering (SBES 2026)*, São Paulo, 2026. *Distinguished Paper Award*.
- [11] R. de Almeida, R. M. da Silva, L. S. Serrano, **H. S. Campos Junior**, V. O. Neves. Mock Objects in Software Testing: An Analysis of Usage in Open-Source Projects. In: *XXII Brazilian Symposium on Software Quality (SBQS 2023)*, Brasília. ACM, 2023.
- [12] **H. S. Campos Junior**, G. G. L. Menezes, M. O. Barros, A. van der Hoek, L. G. P. Murta. Towards Merge Conflict Resolution by Combining Existing Lines of Code. In: *XXXVI Brazilian Symposium on Software Engineering (SBES 2022)*. ACM, 2022, pp. 425–434. *Distinguished Paper Award*.
- [13] L. R. Ciribelli, J. P. Lima, **H. S. Campos Junior**, M. O. Barros, A. van der Hoek, L. G. P. Murta, G. Ghiotto. Merge Nature: A Tool to Support Research about Merge Conflicts. In: *X Workshop on Software Visualization, Evolution and Maintenance (VEM 2022)*. SBC, 2022.
- [14] R. M. da Silva, C. Cruz, **H. S. Campos Junior**, L. G. P. Murta, V. O. Neves. What Is the Adoption Level of Automated Support for Testing in Open-Source Ecosystems? In: *IV Brazilian Symposium on Systematic and Automated Software Testing (SAST 2019)*, Salvador. ACM, 2019. *Best Paper Award*.
- [15] D. N. R. Silva, A. Simões, C. Cardoso, D. E. M. Oliveira, J. N. Rittmeyer, K. Wehmuth, H. Lustosa, R. S. Pereira, Y. Souto, L. E. G. Vignoli, R. Salles, **H. S. Campos Junior**, A. Ziviani, E. Ogasawara, F. C. Delicato, P. F. Pires, H. L. C. P. Pinto, L. Maia, F. Porto. A Conceptual Vision Toward the Management of Machine Learning Models. In: *ER Forum and Poster & Demos Session, International Conference on Conceptual Modeling (ER 2019)*, Salvador. CEUR-WS v. 2469, 2019.
- [16] N. M. Magalhães, **H. S. Campos Junior**, M. A. P. Araújo, V. O. Neves. An Automated Refactoring Approach to Remove Unnecessary Complexity in Source Code. In: *2nd Brazilian Symposium on Systematic and Automated Software Testing (SAST 2017)*, Fortaleza. ACM, 2017. doi:10.1145/3128473.3128476
- [17] **H. S. Campos Junior**, M. A. P. Araújo, J. M. N. David, R. Braga, F. Campos, V. Ströele. Test Case Prioritization: A Systematic Review and Mapping of the Literature. In: *XXXI Brazilian Symposium on Software Engineering (SBES 2017)*, Fortaleza. ACM, 2017.
- [18] F. W. Neiva, **H. S. Campos Junior**, J. M. N. David, R. M. Braga, M. A. P. Araújo, F. C. A. Campos, R. S. P. Maciel. Interoperability Requirement to Enhance Collaboration in Software Product Lines: A

Systematic Mapping. In: *XIII Brazilian Symposium on Collaborative Systems (SBSC 2016)*. SBC, 2016, pp. 1320–1334.

- [19] **H. S. Campos Junior**, L. R. V. Martins Filho, M. A. P. Araújo. Uma ferramenta interativa para visualização de código fonte no apoio à construção de casos de teste unitário. In: *9th Brazilian Workshop on Systematic and Automated Software Testing (SAST 2015)*, Belo Horizonte, 2015. (in Portuguese) *Second Best Paper Award*.
- [20] M. C. V. Zanetti, A. P. Marocco, **H. S. Campos Junior**. Adaptation of GRASP Metaheuristics as an Alternative to Improve the Performance of the Logistics Applied to E-Commerce. In: *XLVIII Annual Assembly of CLADEA*, Rio de Janeiro, 2013.
- [21] **H. S. Campos Junior**, M. C. V. Zanetti. GRASP e outras heurísticas aplicadas ao problema de roteamento de veículos. In: *Simpósio Mineiro de Computação (SMC 2012)*, Juiz de Fora, 2012. (in Portuguese)

Short Papers and Extended Abstracts

- [22] **H. S. Campos Junior**, L. G. P. Murta. Search-Based Merge Conflict Resolution. In: *Software Engineering Thesis and Dissertation Contest (CTD-ES), SBES 2026*, São Paulo, 2026. *Among the three best Ph.D. theses*.
- [23] **H. S. Campos Junior**, B. G. B. Legey, V. O. Neves, J. R. S. Blaschek. ATF – An End-to-End Testing Framework: Experience Report. In: *8th Brazilian Symposium on Systematic and Automated Software Testing (SAST 2023)*, Campo Grande. ACM, 2023, pp. 99–101.
- [24] **H. S. Campos Junior**, C. A. de Paiva, R. Braga, M. A. P. Araújo, J. M. N. David, F. Campos. Regression Tests Provenance Data in the Continuous Software Engineering Context. In: *2nd Brazilian Symposium on Systematic and Automated Software Testing (SAST 2017)*, Fortaleza. ACM, 2017. doi:10.1145/3128473.3128483
- [25] **H. S. Campos Junior**, M. A. P. Araújo. Regression Test Case Prioritization in the Continuous Software Engineering Context. In: *VII Workshop on Theses and Dissertations (WTDSoft), CBSoft 2017*, Fortaleza, 2017.

Under Review

- [26] **H. S. Campos Junior**, L. G. P. Murta. LLM-based vs. Search-based Merge Conflict Resolution: An Empirical Study of Competing Paradigms. Submitted to *Empirical Software Engineering*. Preprint: arXiv:2605.16646.

Other Publications

- [27] D. S. Guedes, D. M. Trepim, **H. S. Campos Junior**, M. A. P. Araújo. Plugin Mylyn: conheça o Mantis. *Engenharia de Software Magazine*, v. 88, pp. 23–38, 2016. (practitioner magazine, in Portuguese)

Registered Software (INPI, Brazil)

- *Complexity Tool: A Tool to Measure the Cyclomatic Complexity of Java Methods*. Registration BR512023001952-6, 2023.
- *Optimus: A Tool for Test Case Prioritization in Continuous Software Engineering*. Registration BR512023002866-5, 2023.

Student Supervision

Ongoing

2026–present	Isabelle Mamprim, M.Sc., PESC/COPPE, UFRJ Advisor.
2026–present	Gustavo Oliveira Pessanha da Silva, M.Sc., PESC/COPPE, UFRJ Advisor.
2026–present	Carlos Henrique Ferreira Brito Filho, M.Sc., PESC/COPPE, UFRJ Co-advisor, with Guilherme Horta Travassos.
2025–present	Ygor Wesley Soares Moreira Lima, M.Sc., Graduate Program in Computing (PGC), UFF Co-advisor.
2026–present	Samuel Silva Nascimento, B.Sc. in Computer Science, UFJF Co-advisor.

2025–present Pedro Trinkenreich Henrique, B.Sc. in Computer Science, UFF
Co-advisor.

Completed (undergraduate theses, as co-advisor)

2026 Letícia Quintão Costa, B.Sc. in Exact Sciences, UFJF
Characterizing External Changes in Merge Conflict Resolution: A Preliminary Study.

2025 Luan Reis Ciribelli, B.Sc. in Computational Engineering, UFJF
A Study on the Nature of Software Merge Conflicts in Python.

2025 João Pedro de Carvalho Lima, B.Sc. in Computer Science, UFJF
An Analysis of External Changes in Merge Conflicts.

2024 Samuel Silva Nascimento, B.Sc. in Exact Sciences, UFJF
A Study of Language Constructs in Conflict Regions: Analysis of Resolutions in Java Merges.

2022 Rafael Gonçalves Rodrigues da Cunha Vinhas, Technologist in Computer Systems, UFF
A Preliminary Study on Reported Bugs and Test Metrics in Open-Source JavaScript Projects.

2022 João Pedro de Carvalho Lima, B.Sc. in Exact Sciences, UFJF
A Study on the Nature of Software Merge in C++. Resulted in a VEM 2022 paper.

2022 Luan Reis Ciribelli, B.Sc. in Exact Sciences, UFJF
A Study on the Nature of Software Merge in Python. Resulted in a VEM 2022 paper.

2020 Raphael Silva de Almeida, Technologist in Computer Systems, UFF
An Analysis of the Use of Mock Objects in Open-Source Projects. Resulted in an SBQS 2023 paper.

Teaching

Federal University of Rio de Janeiro (UFRJ)

2026 CPS820 Experimental Software Engineering (graduate, PESC/COPPE), with Guilherme Horta Travassos

2026 COS482 Software Quality (undergraduate)

Fluminense Federal University (UFF), as Substitute Professor

2024–2026 Computer Programming I; Problem-Solving Laboratory; Object-Oriented Programming I; Introduction to Web Development; Special Topics in Software Engineering II (undergraduate)

Other Institutions

2018 Dynamic Web Sites Programming Laboratory (Java EE), UniAcademia

2017–2018 Introduction to Computing (technical high school), IF Sudeste MG

Teaching Assistance and Tutoring

2023–2024 Academic tutor, B.Sc. in Computer Science, UFF (3 semesters)

2021 Teaching internship, Computer Programming, UFF

2019–2021 Distance-learning tutor, Programming Fundamentals (Python), CEDERJ (4 semesters)

2016 Teaching internship, Object-Oriented Programming, UFJF (2 semesters)

Short Courses and Extension

2024–2025 Short courses at LIneA: Python Fundamentals; Version Control with Git, GitHub, and Git-flow; Database Fundamentals; Python and Databases; Developing Scientific Software; Jupyter Notebooks; TOPCAT; Introduction to Machine Learning

2021, 2023 *Python for Beginners*, university extension course, Institute of Computing, UFF (40 hours each)

2014, 2015 *Geoprocessing in Practice: An Introduction to QGIS*, extension course (8 and 5 hours)

Professional Service

Organizing Committees

2026 Proceedings Co-Chair, Brazilian Conference on Software: Theory and Practice (CBSOFT 2026)

2026	Web Presence Co-Chair, International Conference on Mining Software Repositories (MSR 2026), co-located with ICSE 2026
2012	Organizing Committee, Simpósio Mineiro de Computação / Workshop Mineiro de Sistemas de Informação

Program Committees

2026	SBES 2026 – Research Track
2026	SBES 2026 – Insightful Ideas and Emerging Results Track (<i>Distinguished Reviewer</i>)
2026	ESEM 2026 – Registered Reports Track
2025	SBES 2025 – Research Track (<i>Distinguished Reviewer</i>)
2025	SBES 2025 – Insightful Ideas and Emerging Results Track
2021	MSR 2021 – Shadow Program Committee

Journal Reviewing

2020, 2026	IEEE Transactions on Software Engineering (TSE)
2026	Empirical Software Engineering (EMSE)
2019, 2022	Journal of Systems and Software (JSS)
2021	Software Quality Journal (SQJ)

External Reviewer for Conferences

2019–2024	SBES 2024, SBES 2023, QUATIC 2021, ICSME 2020 (NIER Track), ESEM 2019, CHASE 2019
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Other Service

2026	Poster evaluator, mentoring program of the 6th LATAM School on Software Engineering, CBSOFT 2026
2026	COPPE Open Doors outreach event: guided prospective students through the PESC laboratories
2024–2026	Examination committees for 8 undergraduate theses (UFF, UFJF)

Languages

Portuguese (native) · English (fluent) · Italian (intermediate) · Spanish (basic)