

JOANNA C. S. SANTOS

PhD Candidate

Global Cybersecurity Institute & Software Engineering Department
Rochester Institute of Technology (RIT)

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EDUCATION

Ph.D. Computing and Information Sciences

Rochester Institute of Technology (RIT)

Aug/2016 - May/2021 (expected)

GPA: 4.0

Rochester, NY 🇺🇸

Advisor: Dr. Mehdi Mirakhorli

M.Sc. Software Engineering

Rochester Institute of Technology (RIT)

Aug/2014 - May/2016

GPA: 4.0

Thesis: Toward Establishing a Catalog of Security Architecture Weaknesses

Rochester, NY 🇺🇸

Advisor: Dr. Mehdi Mirakhorli

B.Sc. Computer Engineering

Federal University of Sergipe (UFS)

Aug/2014 - May/2016

GPA: 8.9/10

Undergraduate Thesis: JOnline: An Online Judge for Teaching Programming

Aracaju, SE 🇧🇷

Advisor: Dr. Admilson R. L. Ribeiro

RESEARCH AREAS

Software Security

Program Analysis

Vulnerability Analysis & Detection

Software Architecture

Software Traceability

Empirical Software Engineering

Mining Software Repositories

HONORS & AWARDS



JOBS Workshop @MICRO'20

Won Research Pitch Competition



ICSA 2017

Best Paper Award to the paper "Understanding Software Vulnerabilities Related to Architectural Security Tactics: An Empirical Investigation of Chromium, PHP and Thunderbird"



Science Without Borders Scholarship (Fullbright-IIE-CAPES)

Full scholarship to pursue a masters degree at RIT (2014-2016).

Scholarship granted by CAPES (Coordination for the Improvement of Higher Education Personnel) in coordination with IIE and Fullbright.



ERBASE 2013 - WTICG


Published paper ranked at 3rd place in WTICGBASE - XIII ERBASE, 2013.

Paper: A Location Service using the HTML5 Geolocation API

WORK EXPERIENCE

Systems Analyst

ACONE

 Jan. 2014 – Aug. 2014

 Aracaju, SE 

- Designed and developed an Android app to monitor the status of hospitals using Java.
- Developed Web service in C to be used by the Android app to validate, retrieve and store data.
- Maintained their Web system for management of public health using C++.

Java

C/C++

XML

Android development

Web services

Eclipse

SoapUI

Intern in Software Development

ACONE 4

 Apr. 2013 – Oct. 2013

 Aracaju, SE 

- Created the first company's Android application for reporting data about families within a community
- Gathered the requirements for developing the software module used by a patient for requesting medical procedures

C/C++

SQL

Web development

Intern in Informatics

MPF/SE - Office of Federal Prosecution in Sergipe

 May 2012 – Apr. 2013

 Aracaju, SE 

- Developed and deployed its new internal Web site using Python and Plone.
- Maintained legacy internal systems written in PHP.

Python

PHP

Plone

Zope

Web development

RESEARCH EXPERIENCE

Graduate Research Assistant

Rochester Institute of Technology (RIT) *Laboratory of Software Design and Productivity* **PI:** Dr. M. Mirakhorli.

 Aug 2016 – Present

 Rochester, NY 

- Working on using program analysis, empirical research, and machine learning to solve software security and architecture problems.
- Development of techniques for detecting architectural weaknesses in architectural models and source code.

Graduate Research Assistant

Rochester Institute of Technology (RIT) *Laboratory of Software Design and Productivity* **PI:** Dr. M. Mirakhorli.


 Jan. 2015 – May 2016

 Rochester, NY 

- Worked on multiple projects related with software architecture, and security.
- Analyzed data of reported software vulnerabilities to identify problems rooted in the architecture of a software.

Undergraduate Research Assistant

Federal University of Sergipe (UFS) *Research Group on Networks and Distributed Computing* **Lead:** Dr. R. Sagueiro

 Nov. 2012 – Sep. 2013

 São Cristóvão, SE 

- Worked with a group of three students in the research project “Infrastructure for Interoperability of Social Networking Sites” (**PI:** Dr. A. R. L. Ribeiro).

- Worked on creating an academic social network using semantic Web technologies.

Undergraduate Research Assistant

Aug. 2010 – Jul. 2012

 Federal University of Sergipe (UFS)

 São Cristóvão, SE 


- Worked on the research project “ERLAB: a middleware model for remote access laboratories” (PI: Dr. A. R. L. Ribeiro).
- Developed a service-oriented middleware in Java to support the remote control of electronic devices through the Web

TEACHING EXPERIENCE

Course Instructor

Softeam - Empresa Júnior de Informática da UFS

 Session 1: May 2012 – Aug. 2012

 Session 2: Nov. 2012 – Apr. 2013

 São Cristóvão, SE 

Course: An Introduction to Java (**Total Duration:** 48hrs)

- Designed the course materials (syllabus, class slides, lecture notes, weekly assignments, and projects).
- Graded assignments, and projects.
- Taught a class of approximately 20 students the main concepts of software development using Java: classes, objects, inheritance, interfaces, data structures, exception handling, packages, database access, file handling, and Java Swing package.

Course Instructor

CAFIS - Centro Acadêmico de Física da UFS

 Oct. 2011 – Dec. 2011

 São Cristóvão, SE 

Course: An introduction to the C++ language (**Total Duration:** 20hrs)



- Designed the course materials (syllabus, class slides, lecture notes, weekly assignments, and projects).
- Graded assignments, and projects.
- Taught a class of 25 students the main concepts of software development using C++: data types and operators, pointers and references, control flow structures, interfaces, classes, objects, inheritance, polymorphism, exception handling, UI using QtCreator.

Undergraduate Teaching Assistant

UFS - Federal University of Sergipe

 Jan. 2010 – Dec. 2011

 São Cristóvão, SE 

Courses: COMP0197: Imperative programming  Spring 2010, and Spring 2011
COMP0198: Object-oriented programming  Fall 2010, and Fall 2011

- Designed the weekly assignments.
- Graded assignments, and projects.
- Clarification of questions of students during office hours / e-mail.

Journal Articles

- JSS 2019 **J. C. S. Santos**, K. Tarrit, A. Sejfia, M. Mirakhorli, and M. Galster. "An Empirical Study of Tactical Vulnerabilities". *Journal of Systems and Software*. Vol. 149, pp. 263–284. (Received Oct. 2017, Revised Sep. 2018, Accepted Oct. 2018, Available online Oct. 2018.)
- JSS 2016 I. J. Mujhid, **J. C. S. Santos**, R. Gopalakrishnan, and M. Mirakhorli. "A search engine for finding and reusing architecturally significant code". *Journal of Systems and Software*. Vol. 130, pp. 81–93. (Received Feb. 2016, Revised Aug. 2016, Accepted Nov. 2016, Available online Nov. 2016).
- EMSE 2016 W. Zogaan, I. Mujhid, **J. C. S. Santos**, D. Gonzalez, and M. Mirakhorli. "Automated training-set creation for software architecture traceability problem". *Empirical Software Engineering*. Vol. 22, Issue 3. pp. 1028–1062. (Received Nov. 2015, Accepted Oct. 2016, Available online Nov. 2016)

Refereed Conference Articles (Research Track)

- SCAM'20 S. Moshtari, **J. C. S. Santos**, M. Mirakhorli and A. Okutan. "Looking for Software Defects? First Find the Nonconformists". In: *2020 IEEE 20th International Working Conference on Source Code Analysis and Manipulation (SCAM 2020)*, Virtual (due to COVID-19), pp. 75–86.
- ESEC/FSE'19 **J. C. S. Santos**, A. Sejfia, T. Corrello, S. Gadenkanahalli, and M. Mirakhorli. "Achilles' heel of plug-and-Play software architectures: a grounded theory based approach". In: *27th ACM Joint Meeting on European Software Engineering Conference and Symposium on the Foundations of Software Engineering (ESEC/FSE 2019)*, Tallinn, Estonia, pp. 671–682.
- 🏆 ICSA'17 **J. C. S. Santos**, A. Peruma, M. Mirakhorli, M. Galster, J. V. Vidal and A. Sejfia, "Understanding Software Vulnerabilities Related to Architectural Security Tactics: An Empirical Investigation of Chromium, PHP and Thunderbird", In: *2017 IEEE International Conference on Software Architecture (ICSA 2017)*, Gothenburg, Sweden, pp. 69–78. **Best Paper Award**
- MSR'17 D. Gonzalez, **J. C. S. Santos**, A. Popovich, M. Mirakhorli and M. Nagappan, "A Large-Scale Study on the Usage of Testing Patterns That Address Maintainability Attributes: Patterns for Ease of Modification, Diagnoses, and Comprehension", In: *2017 IEEE/ACM 14th International Conference on Mining Software Repositories (MSR 2017)*, Buenos Aires, pp. 391–401.
- ITNG'16 F. M. Ribeiro, T. Rocha, **J. C. S. Santos**, and E. D. Moreno. "A model-driven solution for automatic software deployment in the cloud". In *Information technology: new generations (ITNG 2016)*, pp. 591–601.
- EATIS'12 A. R. Ribeiro, M. T. Chella, L. M. M. Santos, **J. C. S. Santos**, and W. R. Melo. "ERLab: a middleware for remote access electronic laboratories". In *Proceedings of the 6th Euro American Conference on Telematics and Information Systems (EATIS 2012)*, Valencia, Spain, pp. 199–205.

Refereed Short Conference Papers & Workshop Papers

- FTfJP'20 **J. C. S. Santos**, R. A. Jones, and M. Mirakhorli. "Salsa: Static Analysis of Serialization Features". In: *Proceedings of the 22nd ACM SIGPLAN International Workshop on Formal Techniques for Java-Like Programs (FTfJP 2020)*, Virtual (due to COVID-19), pp.18–25.
- EnCyCris'20 **J. C. S. Santos**, S. Suloglu, J. Ye, and M. Mirakhorli. "Towards an Automated Approach for Detecting Architectural Weaknesses in Critical Systems". In: *Proceedings of the IEEE/ACM 42nd International Conference on Software Engineering Workshops (ICSEW'20)*, Virtual (due to COVID-19), pp. 250–253.

- ICSA'20 **J. C. S. Santos**, S. Moshtari and M. Mirakhorli. "An Automated Approach to Recover the Use-case View of an Architecture", In: *2020 IEEE International Conference on Software Architecture Companion (ICSA 2020-NEMI Track)*, Virtual (due to COVID-19), pp. 63–66.
- WoSoCer'20 **J. C. S. Santos**, A. Shokri, and M. Mirakhorli. "Towards Automated Evidence Generation for Rapid and Continuous Software Certification". In: *10th IEEE International Workshop on Software Certification (WoSoCer 2020)*, Virtual (due to COVID-19), pp. 287–294. (To Appear).
- ICSAW'17 **J. C. S. Santos**, K. Tarrit and M. Mirakhorli. "A Catalog of Security Architecture Weaknesses". In: *Proceedings of the 2017 IEEE International Conference on Software Architecture Workshops (ICSAW 2017)*. Gothenburg, Sweden, pp. 220–223. (ICSA 2017 - Early Career Track).
- WICSA'16 **J. C. S. Santos**, M. Mirakhorli, I. Mujhid, and W. Zogaan. "BUDGET: a Tool for Supporting Software Architecture Traceability Research". In: *Proceedings of the 13th Working IEEE/IFIP Conference on Software Architecture (WICSA 2016)*, Venice, Italy, pp. 303–306. (Tool Demo).

Publications in Brazilian Venues

- 🏆 ERBASE'13 **J. C. S. Santos**, S. C. P. Hoentsch, R. A. Nascimento, and A. R. L. Ribeiro. "A Location Service using the HTML5 Geolocation API". In: *XIII Escola Regional de Computação dos Estados da Bahia, Alagoas e Sergipe - Workshop de Trabalhos de IC e de Graduação (ERBASE 2013 - WTICG)*. **Paper ranked in 3rd place.**
- ERBASE'12 S. C. P. Hoentsch, A. R. L. Ribeiro, **J. C. S. Santos**, L. L. B. Menezes. "A Mobile Social Network Approach for Research and Education.". In: *XII Escola Regional de Computação dos Estados da Bahia, Alagoas e Sergipe - X Workshop de Educação e Informática Bahia-Alagoas-Sergipe (ERBASE 2012 - X WEIBASE)*.
- SBIE'11 **J. C. S. Santos** and A. R. L. Ribeiro. "JOnline: a preliminary approach of an online judge for teaching computer programming". In: *22nd Brazilian Symposium on Computers in Education (Simpósio Brasileiro de Informática na Educação-SBIE)*.
- ENINED'11 **J. C. S. Santos** and A. R. L. Ribeiro (2011). "An online judge proposal for teaching computer programming". In *II Encontro Nacional de Informática e Educação (II ENINED)*.
- ENINED'11 A. R. Ribeiro, M. T. Chella, L. M. M. Santos, **J. C. S. Santos**, and W. R. Melo. "LEW: Web Engineering Laboratory for teaching, research and extension". *II Encontro Nacional de Informática e Educação (II ENINED)*.
- ENINED'11 S. C. P. Hoentsch, A. R. L. Ribeiro, **J. C. S. Santos**. "SocialNetLab - A Social Networking Site for Education". *II Encontro Nacional de Informática e Educação (II ENINED)*.

SERVICES

Program Committee Member

- PC member at ECSA'21 (Workshops & Tutorials Track) 15th European Conference on Software Architecture
- PC member at SEAD'20 3rd International Workshop on Software Security from Design to Deployment
- PC member at SEAD'19 2nd International Workshop on Software Security from Design to Deployment

Reviewer

- External Reviewer at Euro S&P'21 6th IEEE European Symposium on Security and Privacy
- Reviewer IEEE Software Special Issue on the Diversity Crisis in Software Development
- Sub-reviewer at ICSME'20 36th IEEE International Conference on Software Maintenance and Evolution
- Sub-reviewer at ECSA'20 14th European Conference on Software Architecture

Student Volunteer

- Student volunteer at SCAM'20 20th IEEE International Working Conference on Source Code Analysis and Manipulation
- Student volunteer at ICSME'20 36th IEEE International Conference on Software Maintenance and Evolution
- Student volunteer at ICSE'19 41st ACM/IEEE International Conference on Software Engineering
- Student volunteer at SBIE'11 22nd Brazilian Symposium on Computers in Education

Other

- Panelist at the 2019 REU Graduate Study and Research Symposium. Panel: "Challenges faced in graduate school and how I overcame them"
- Panelist at the 2018 REU Graduate Study and Research Symposium. Panel: "Challenges faced in graduate school and how I overcame them"
- Member of the Computer Engineering Collegiate Board (2012-2013) Federal University of Sergipe (UFS)

</> SKILLS

Web Development Technologies: Spring MVC Twitter Bootstrap jQuery Django CSS3 HTML

Hibernate SOAP/REST Web services

Web Servers: Apache HTTP Server Tomcat Glassfish Zope

CMS: Drupal WordPress Plone

Languages Java Python C/C++ Javascript PHP R SQL Verilog AADL

Development Tools IntelliJ Eclipse Netbeans Git Subversion QtCreator

Databases SQLite MySQL PostgreSQL SQL Server

Operating Systems: Windows macOS Ubuntu OpenSuse Android OS

Build automation: maven gradle