

# Roberto S. Silva Filho

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## EXPERTISE

Experienced researcher and practitioner in the areas of Software Engineering & Groupware. Development of industrial Web, mobile and wearable apps. Research contributions to: automated and collaborative software engineering, software architecture, model-driven systems development & testing, event-driven middleware, workflow management systems and groupware. Production of patents & research papers.

## WORK EXPERIENCE

2013 – present. **GE Research**, San Ramon, CA

**Lead Scientist**, [Human Systems Interaction Lab](#).

Full stack R&D of industrial applications applying UX, IoT, AI services & Software Engineering techniques to automate and optimize industrial workflows.

*Keywords:* Web, mobile & wearable industrial apps, distributed simulation platforms and UX.

2009 – 2013. **SIEMENS Corporate Technology**, Princeton, NJ

**Software Engineer/Researcher**, Software Architecture Development Lab.

Full stack R&D of advanced software engineering tools & methods for the automation and optimization of industrial systems across SIEMENS businesses.

*Keywords:* Software Architecture Analysis and Improvement, Software Quality Assurance [[AOSD'11](#)],

Model-Driven Development & Testing [[ICST'12](#)], Workflow Automation [[LJCIS'15](#)], [[HFES'12](#)].

Summer 2004. **IBM T. J. Watson Research Center**, Cambridge, MA

**Research Intern**, Collaborative User Experience Lab.

Developed, benchmarked and compared different architectural approaches for the construction of contextual collaboration servers used within IBM products.

*Keywords:* Contextual collaboration servers, performance simulation and benchmarking [[JUCS'08](#)].

2000 – 2009. **University of California**, Irvine, CA

(2002-2009): **Graduate Research Assistant**

(2000-2002): **Teaching Assistant**

## EDUCATION

2009. **Ph.D. Information and Computer Sciences**. UC, Irvine, CA, USA. GPA: 3.974/4.0

*Concentration areas:* **Empirical Software Engineering, Event-Based Middleware, CSCW**

*Dissertation Title:* An Empirical Study of Publish/Subscribe Middleware Versatility [[UCI'09](#)]

2003. **M.Sc. Information and Computer Sciences**. UC, Irvine, CA, USA. GPA: 3.906/4.0

*Concentration area:* **Software Engineering**

2000. **M.Sc. Computer Science**. University of Campinas (UNICAMP), Brazil, GPA: 3.857/4.0

*Thesis Title:* Distributed Software Architectures for Large-scale Workflow using CORBA [[CLEI'01](#)]

1998. **B.Sc. Computer Engineering**. University of Campinas (UNICAMP), Brazil, GPA: 0.748/1.0

## SELECTED PROJECTS

2014 – present. GE Global Research.

- **Digital Ghost.** Developed the Web app used to visualize cyber-attacks on industrial assets. Built the infrastructure to log and analyze high-frequency time series data produced by the Digital Ghost agents, allowing users to rapidly detect and respond to cyber threats to critical industrial infrastructure [[GE'20](#)].
- **Distributed Platform for Rapid Simulation Prototyping.** Developed an event-driven services coordination framework to facilitate the development of next generation train handling and controls. Used the framework to develop human-in-the-loop remote train handling simulator [[WSC'17](#)].
- **Machining Cost Optimization.** Developed Web app to optimize CNC drilling & milling tools, allowing aviation workshop workers to and share their expertise throughout the organization & reduce workshop operational costs.

- **Fieldwork Automation:** Developed mobile apps used by GE Power field engineers as a single point of access to all their information needs including: project management, time keeping, schematics & documents, reporting, and collaboration. Implemented server-side API gateway and offline disconnected operation [MS'15] [HCI'15].
- **Model-based robotic inspection.** Implemented middleware connecting UI and drone controls, allowing supervised semi-autonomous robotic inspections of industrial assets [EDGE'18].
- **Wearables@GE.** Applied speech-driven wearable computing in support of hands-free workflow applications including: wireless measurements, photo documentation, real-time video communication.

2009 – 2013. SIEMENS Corporate Research.

**IDE for model-based test automation:** Project manager & developer for TEDES0/UML, a model-based testing IDE. Lead, for 4 years, a small team of interns in the development of extensions and core capabilities including requirements-driven regression and prioritization of tests [STA10]. TEDES0 can achieve high degrees of test coverage, by automatically generating tests based on UML system specification, at a fraction of time of conventional manual testing approaches [ASE'13].

*Technologies:* Java, Eclipse RCP, GEF, UML, model-based testing, Jenkins, Cruise Control.

2007 – 2009. UC, Irvine (UCI). **Analysis of Flexibility Trade-offs in Publish/Subscribe**

**Infrastructures:** Developed YANCEES, a versatile pub/sub middleware evaluating it against different research and industrial message-oriented middleware, measuring and comparing their performance, maintainability, reusability, usability and flexibility. Produced different versatile software design principles and best practices [ISR09].

*Technologies:* Java, CORBA-NS, JMS, JavaSpaces, Siena, YANCEES, OO metrics and analysis.

1998 – 2000. University of Campinas, São Paulo, Brazil (UNICAMP): **Agent-based Workflow on**

**Distributed Environment:** Developed and evaluated a scalable peer-to-peer workflow automation framework with more traditional centralized approaches. Discussed the scalability, performance, security and management trade-offs of each approach [ISADS'99].

*Technologies:* Java, DSL, CORBA, Workflow Management Systems, Mobile Agents, benchmarking.

## TEACHING EXPERIENCE

Fall 2001 – Spring 2002. **Introduction to Computer Science II.** UC, Irvine (UCI)

*Topics:* Data Structures, Software Complexity, Java and Scheme programming.

Fall. 2000. **Introduction to Software Engineering.** UC, Irvine (UCI)

*Topics:* Software Engineering fundamental principles, techniques and processes.

## HONORS AND AWARDS

2007. Bren School Summer Dissertation Fellowship, UC, Irvine, CA.

2001. **Best thesis award** (second place): VIII CLEI-UNESCO Latin American M.Sc. Thesis Context.

1998 – 2000. Scholarships to support M.Sc. Studies from FAPESP and CNPq, Brazil Research Agencies.

## SKILLS

**Programming Languages:** Java, JavaScript, SQL, C#, Python, Go, LISP, Pascal, Prolog, C, C++, others.

**Technologies:** UI frameworks: Polymer, Vue.js, React, AngularJS; Mobile computing: Android, Cordova;

Distributed Systems: REST Web Services, Docker, Event-based middleware, Distributed Network

Objects (RMI, CORBA); Software Engineering: Software Product Line Engineering, UML Modeling,

Software Architecture and ADLs, Aspect-Oriented Programming, Eclipse RCP and OSGi.

**Processes:** Agile Methods and Object-Oriented design principles and metrics, Rational Unified Process.

**Operating Systems:** Unix/Linux and Windows administration.

## PATENTS & PUBLICATIONS

Author of more than [35 peer-reviewed publications](#); [6 US patents](#) and 12 technical reports.

More details at the website: <https://rsilvafi.github.io/publications.html>