

CURRICULUM VITAE

Chandan Raj Rupakheti

Computer Science and Software Engineering
Rose-Hulman Institute of Technology
5500 Wabash Ave. CM 100, Terre Haute, IN 47803

Work: (812) 877-8390
Email: rupakhet@rose-hulman.edu
Web: <https://serg.csse.rose-hulman.edu/rupakheti>

EDUCATION

- **PhD in Computer Engineering**, Clarkson University, Potsdam, NY, Dec 2012
Thesis Topic: A Critic for API Client Code Using Symbolic Execution
GPA: 3.963/4.0
Advisor: Dr. Daqing Hou
- **MS in Computer Science**, Clarkson University, Potsdam, NY, Dec 2010
Thesis Topic: *A Path-Based Approach for Analyzing Object Equality in Java*
GPA: 3.963/4.0
Advisor: Dr. Daqing Hou
- **BE in Computer Engineering**, Kathmandu University, Dhulikhel, Nepal, June 2005
Capstone Project: *Nepali Spellchecker*
GPA: 3.48/4.0
Advisor: Dr. Sanat K. Bista

PEER-REVIEWED PUBLICATIONS

(A pre-print version of all of the following papers can be found at: https://serg.csse.rose-hulman.edu/site/?page_id=23.)

1. **C. R. Rupakheti**, M. Hays, S. Mohan, S. Chenoweth, and A. Stouder, *On a Pursuit for Perfecting an Undergraduate Requirements Engineering Course*, In Proceedings of IEEE Conference on Software Engineering Education and Training, Savannah, Georgia, USA, November 2017. (To Appear)
2. K. Zimmerman, **C. R. Rupakheti**, *An Automated Framework for Recommending Program Elements to Novices*, In Proceedings of IEEE/ACM International Conference on Automated Software Engineering (ASE), Lincoln, Nebraska, USA, November 2015, pp. 283-288.
3. **C. R. Rupakheti**, S. Chenoweth, *Teaching Software Architecture to Undergraduate Students: An Experience Report*, In Proceedings of IEEE/ACM International Conference on Software Engineering (ICSE), Florence, Italy, May 2015, pp. 445-454.
4. **C. R. Rupakheti**, D. Hou, *Finding Errors from Reverse-Engineered Equality Models Using a Constraint Solver*, In Proceedings of IEEE International Conference on Software Maintenance (ICSM), Riva del Garda, Terentino, Italy, September 2012, pp.77-86.
5. **C. R. Rupakheti**, D. Hou, *Evaluating Forum Discussions to Inform the Design of an API Critic*, In Proceedings of IEEE International Conference on Program Comprehension (ICPC), Passau, Germany, June 2012, pp. 53-62.
6. **C. R. Rupakheti**, D. Hou, *CriticAL: A Critic for APIs and Libraries*, In Proceedings of IEEE International Conference on Program Comprehension (ICPC), Passau, Germany, June 2012, pp. 241-243. (**Best Tool Demo Paper Award**)

7. **C. R. Rupakheti**, D. Hou, *EQ: Checking the Implementation of Equality in Java*, In Proceedings of IEEE International Conference on Software Maintenance (ICSM), Williamsburg, Virginia, USA, September 2011, pp. 590-593.
8. **C. R. Rupakheti**, D. Hou, *Satisfying Programmers' Information Needs in API-Based Programming*, In Proceedings of IEEE International Conference on Program Comprehension (ICPC), Kingston, Ontario, Canada, June 2011, pp. 250-253.
9. **C. R. Rupakheti**, D. Hou, *An Abstraction-Oriented, Path-Based Approach for Analyzing Object Equality in Java*, In Proceedings of IEEE Working Conference on Reverse Engineering (WCRE), Boston, MA, USA, October 2010, pp. 205-214.
10. **C. R. Rupakheti**, D. Hou, *An Empirical Study of Design and Implementation of Object Equality in Java*, In Proceedings of IBM Center for Advanced Studies on Collaborative Research Conference (CASCON), ACM, Toronto, Canada, October 2008, pp. 111-125.
11. D. Hou, **C. R. Rupakheti**, H. J. Hoover, *Documenting and Evaluating Scattered Concerns for Framework Usability: A Case Study*, In Proceedings of IEEE Asia-Pacific Software Engineering Conference (APSEC), Beijing, China, December 2008, pp. 213-220.

OTHER PUBLICATIONS

12. D. Shah, **C. R. Rupakheti**, The Backbone Project, ACM SIGCSE, March 2015 (Poster)
13. S. Chenoweth, **C. R. Rupakheti**, S. Mohan, S. Bohner, Multi-team Projects for Introducing Software Engineering, In Proceedings of ASEE IL-IN Section Conference, Terre Haute, IN, March 8, 2014, 11 pages. (**Honorable Mention – Top 4 Faculty Papers**)
14. **C. R. Rupakheti**, *A Critic for API Client Code using Symbolic Execution*, PhD Thesis, Clarkson University, May 2012.
15. **C. R. Rupakheti**, *A Path-Based Approach For Analyzing Object Equality in Java*, Master's Thesis, Clarkson University, May 2010.

TEACHING EXPERIENCE

Assistant Professor

Rose-Hulman, August 2012 – Present

- Taught the following courses:
 - CSSE 120 – Introduction to Software Development (Winter 12/13 and 13/14)
 - CSSE 220 – Object-Oriented Software Development (Spring 16/17)
 - CSSE 371 – Software Requirements Engineering (Fall 13/14, 14/15, and 15/16)
 - CSSE 373 – Formal Methods in Specification and Design (Spring 12/13, 13/14, 14/15, 15/16, and 16/17)
 - CSSE 374 – Software Design (Winter 12/13, 13/14, 14/15, 15/16, and 16/17)
 - CSSE 477 – Software Architecture (Fall 12/13, 13/14, Winter 14/15, Spring 14/15, Fall 15/16, and Winter 16/17)
 - CSSE 490 – Enterprise Software Development (Winter 15/16)
 - CSSE 490 – Artificial Neural Network (Winter 15/16)
 - CSSE 491 – DevOps (Spring 15/16)
 - CSSE 491 – Multi-Tier Development (Spring 12/13)
 - CSSE 491 - Designing for Scale (Winter 16/17)
 - CSSE 491 - Advanced Networking (Winter 16/17)
 - CSSE 494, 495, and 496 - Senior Thesis I, II, and III (12/13 and 14/15)
- Achieved an overall performance rating of 4.42/5
- Advised three senior theses
- Served as a client for two senior project teams (15/16 and 16/17) and serving as a client for three more in 17/18

Instructor, Computer Networks

Clarkson University, August 2011 – December 2011

- Taught 40 students at the undergraduate (CS 455 / EE 407) as well as the graduate (CS 555 / EE 507) level
- Achieved an overall performance rating of 4.7/5

Teaching Assistant, Multiple Undergraduate Courses

Clarkson University, August 2006 – May 2012

- Served as a Teaching Assistant for Introduction to Programming (EE 261), Software Systems Architecture (EE 462), Introduction to Digital Design (EE 264), and Computer Networks (EE 407)
- Instructed labs, mentored projects, graded assignments and exams, and maintained office hours

RESEARCH EXPERIENCE

Founding Director, Software Engineering Research Group (SERG)

Rose-Hulman Institute of Technology, August 2012 – Present

- Founded the group to research on Software Engineering tools and techniques at Rose-Hulman
- Details about SERG can be found online: <https://serg.csse.rose-hulman.edu>

Software Engineering Research Laboratory (SERL)

Clarkson University, August 2006 – August 2012

Supervisor: Dr. Daqing Hou

- **Case Studies of the Swing Framework and its Usage**
 - Carried out an extensive analysis on the design and implementation of the Swing *JTree* API and identified several scattered concerns related to its usage
 - Performed analysis of the Swing Forum discussions in order to assess recurring problems related to GUI layout and opportunities for a tool support
- **Program Analysis, Reverse Engineering, and Bug Detection**
 - Developed a theory behind different kinds of equalities in Java in the presence of a type hierarchy
 - Reverse-engineered Alloy models from the Jimple (SOOT) representation of Java for the analysis of domain-specific semantic bugs pertaining to the implementation of object equality
 - Detected 171 verified violations related to the *equals()* method in four production code viz. *JDK 1.5*, *JFreeChart 1.0.13*, *Lucene 3.0*, and *Tomcat 6.0* by developing a static checker called **EQ**
 - Software available online: <http://eqchecker.sourceforge.net/>
- **Algorithm Recognition**
 - Investigated a path-based feature detection framework for supporting algorithm recognition and developed a tool called Path-Sensitive Framework (PSF)
 - Software available online: <http://sourceforge.net/projects/serlpsf/>
- **Program Comprehension, Symbolic Execution, and Design Inference**
 - Developed a program analysis framework called CriticAL (A **Critic** for **APIs** and **Libraries**) to perform symbolic execution of users' code and provide explanations, recommendations, and criticisms on the suboptimal use of APIs
 - Software available online: <http://sourceforge.net/p/critical/>

Information and Language Processing Research Lab

Kathmandu University, August 2004 – June 2005

Supervisor: Dr. Sanat K. Bista

- **Natural Language Processing and Localization**
 - Developed a Java based spellchecker for Nepali Language by extending the Lavensthein Edit Distance technique as a part of the undergraduate capstone project
 - Extended the spellchecker to support other languages that require multi-byte encoding (Unicode) as well as the English language
 - Awarded with the best project award in Kathmandu University Project Exhibition (KUPEX '05)

INDUSTRY / SOFTWARE DEVELOPMENT EXPERIENCE

Co-founder and Chief Technology Officer, Foursteps Inc.

Chicago, Illinois, April 2017 – Present

- Helped develop a business plan for Foursteps – worked extensively on the Business Model Canvas and the Value Proposition Canvas
- Recruited, trained, and managed five software engineers at Foursteps
- Developed a cloud-based architecture for Foursteps performing an in-depth trade-off analysis
- Designed and implemented many features of the Foursteps app utilizing Firebase's real-time database, storage, hosting, and other cloud-based solutions
- Configured Continuous Integration and Delivery pipeline for Foursteps using Gitlab and Google Cloud Platform
- Established automated testing and code-coverage process utilizing frameworks such as Jasmine, Karma, and Istanbul
- Introduced, configured, and managed the code review process
- Managed source code and build artifacts
- Introduced SCRUM for project management and evolved the process to suit the company's needs

Project Lead, The RoseBuild Project, Rose-Hulman

Terre Haute, Indiana, December 2015 – Present

- Configured Gitlab-based continuous integration and delivery pipeline for Rose students integrating more than a dozen production servers (VMs)
- Enabled project runners for languages and frameworks like C, C++, XCode, Microsoft Build, Node.js, Ruby, Python, Java supporting build systems such as Make, Maven, Gradle, Rake, and Angular CLI
- Configured JArtifactory server to cache JCeter and MavenCentral, the two popular online build repositories for faster build time. Enabled in-house hosting of students' build artifacts on the Artifactory server
- Architected a grading system to run on top of RoseBuild for manual as well as unit-testing-based automated grading
- Integrated the grading system with Moodle for automated grade syncing
- Maintained the RoseBuild infrastructure and supported several CSSE courses and many senior projects with their specific build pipeline requests

Software Engineer Intern, Environmental System Research Institute (ESRI)

Redlands, California, May 2007 – August 2007

Supervisors: Marwa Mabrouk and Sergey Bokovikov

- Learned and programmed ESRI's Java based SOAP and REST API for retrieving online maps
- Developed part of ESRI's ArcCache server using JMX, JGroup, JSP, JSF, AJAX, and Servlet technologies
- Compared various open source Java serialization libraries based on their efficiency to be used in ESRI's AXL IO project
- Tested ArcCache Admin tool for bugs
- Learned work sharing and working as a team in a project

Software Engineer, Data Analysis and Software Solution (DASS) Pvt. Ltd.

Kathmandu, Nepal, August 2005 – July 2006

- Lead developer and architect of a Shopping Mall Management System developed using C# - MSSQL technologies
- Programmed various CMS and database projects using PHP – MySQL, C# - MSSQL, and Java – Oracle technology
- Obtained in-depth knowledge of Software Development Life Cycle and underlying developmental processes

HONORS, AWARDS, AND GRANTS

- **KEEN Course Development Award**, approx. \$15,000 (stipend, hardware, and travel), for developing a new course on DevOps, March 2017
- **KEEN Course Development Award**, approx. \$24,500 (stipend, hardware, and travel), for introducing DevOps in the Software Architecture course project and for developing the RoseBuild infrastructure, February 2017
- **KEEN Course Development Award**, approx. \$18,000 (stipend, hardware, and travel), shared with Dr. Sriram Mohan for infusing Enterprenerial Minded Learning to the Requirements Engineering course, March 2015
- **ACM Student Research Competition Travel Award**, \$500, in collaboration with my thesis advisee - Dharmin Shah, March 2015
- **IPROP Best Project Travel Award**, \$5000, in collaboration with my thesis advisee - Dharmin Shah, February 2015
- **Honorable Mention – Top 4 Faculty Papers** at ASEE IL-IN RoseEvaluation Conference, Terre Haute, IN, March 2014
- **Faculty Appreciation Dinner** – Men of Triangle Fraternity, 2013/14
- **Best Tool Demo Paper** at International Conference on Program Comprehension 2011 for *CriticAL: A Critic for APIs and Libraries*, Passau, Germany, June 2012
- **NSF ICSM 2011 Travel Grant**, 1000 USD, September 2011
- **Teaching and Graduate Assistantship**, Clarkson University, 2006 - 2012
- **Best Project Award**, Kathmandu University Project Exhibition (KUPEX '05) for a Java based Nepali Spellchecker, July 2005
- **Best Project Award**, KUPEX '03, for a C++ based Shooter Shuttle Arcade Game, August 2003

PROFESSIONAL SERVICES, AFFILIATIONS, AND LEADERSHIP SKILLS

- **Co-Founder and CTO**, Foursteps Inc., Chicago, Illinois, April 2017 – Present
- **Project Lead**, The RoseBuild Project, Rose-Hulman, December 2015 - Present
- **Founding Director**, Software Engineering Research Group (SERG) at Rose-Hulman, 2012 – Present
- **CASO Member**, Rose-Hulman, 2013 – Present
- **Rose Summer Undergraduate Research Program (RSURP)**, Advisory Board Member, 2014 – Present
- **Independent Research / Project Opportunity (IP/ROP)**, Rose-Hulman, Advisory Board Member, 2015 – Present
- **Awards and Honors Committee Member**, 2014/15
- **Program Committee Member and Reviewer**
 - IEEE Conference on Software Engineering Education and Training (CSEET), 2012 – Present (Research Track)
 - International Conference on Software Engineering and Application (ICSOFTEA), 2013 – Present (Research Track)
 - IEEE International Conference on Program Comprehension (ICPC) 2013 (Research Track)
 - IEEE ICPC 2012 (Poster Track)
 - IEEE ICPC 2011 (External Reviewer)
- **IEEE-CS Member**, 2013 – Present
- **ACM Member**, 2010 – Present
- **IEEE Member**, 2010 – Present
- **Founding Chairman**, Kathmandu University Open Source Community, 2005
- **Vice-Chairman**, Kathmandu University Computer Club, 2004-2005