Baishakhi Ray

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Research Interest

My primary research interest is Software Engineering with a focus on empirical studies, program analysis, and software evolution. Using techniques from diverse domains including machine learning, natural language processing, and rigorous statistical modeling, I analyze large scale software repositories to understand on-going software engineering practices. This data-driven knowledge helps me to build novel program analysis techniques and development tools to improve software quality and programmer productivity.

Education

Ph. D., Electrical & Computer Engineering, University of Texas, Austin.
August 2013 (GPA: 3.97)
Thesis: *Analysis of Cross-System Porting and Porting Errors in Software Projects*
Advisor: Miryung Kim

MS, Computer Science, University of Colorado, Boulder.
August 2009 (GPA: 4.0)
Thesis: *SecureWear: Securing Wearable Mobile Social Networks*
Advisor: Richard Han

B.Tech. & B.Sc., Computer Science & Physics, Calcutta University.
July 2004 (GPA: 3.84, Top 1% in University)

Honors

- Best Practical Paper Award, IEEE Symposium on Security and Privacy 2014
- Google Summer of Code 2012
- SIGSOFT FSE 2012 CAPS travel award
- Selected for admission to Indian Institute of Technology (IIT) for graduate study in Physics.
- Jawaharlal Nehru Summer Scholarship for Advanced Research, India 2001. (100 students are selected Nationwide).
- Ranked 6 out of 15,000 students in B.Sc. Physics(Hons.) examination.

Research & Work Experience

University of California Davis, CA, USA
Postdoctoral Research Fellow — October 2013 - present
Mentor: Prem Devanbu

Microsoft Research, Redmond, USA
Research Intern — May 2013–August 2013
Mentors: Christian Bird, Nachiappan Nagappan, Thomas Zimmermann

Google Summer Code, Google Inc.
Research Intern — May 2012 – August 2012
Mentors: Suzette Person, Neha Rungta, NASA

The University of Texas at Austin, TX, USA
Graduate Student Researcher — January 2011–May 2013
Adviser: Miryung Kim

Avaya Research Lab, Westminster, CO, USA
Research Intern — May 2008 – Aug 2008

Ericsson Pvt. Ltd. Boulder, CO, USA
Software Engineer — February 2009–June 2010

Ixia, **Sasken**, and **Texas Instruments, India**
Software Engineer — August 2004–July 2007

Selected Publications

Full Length Research Papers

1. *A Large Scale Study of Programming Languages and Code Quality in Github*. **B. Ray** , D. Posnett , V. Filkov, P. T. Devanbu. In ACM SIGSOFT, 22^{nd} International Symposium on the Foundations of Software Engineering (FSE'14), acceptance rate: 22%
2. *Using Frankencerts for Automated Adversarial Testing of Certificate Validation in SSL/TLS Implementations*. C. Brubaker, S. Jana, **B. Ray**, S. Khurshid, and V. Shmatikov
In 35^{th} IEEE Symposium on Security and Privacy, MAY, 2014 (S&P (Oakland) '14), acceptance rate: 13%, **Best Practical Paper Award**
3. *Detecting and Characterizing Semantic Inconsistencies in Ported Code*. **B. Ray**, M. Kim, S. Person, N. Rungta. In 28^{th} IEEE/ACM International Conference on Automated Software Engineering, November, 2013 (ASE'13), acceptance rate: 23%, **Nominated for Distinguished Paper award, invited for ASE journal special issue.**
4. *An Empirical Study of API Stability and Adoption in the Android Ecosystem*. T. McDonnell, **B. Ray**, M. Kim. In 29^{th} IEEE International Conference on Software Maintenance, April, 2013 (ICSM'13), acceptance rate: 22%
5. *A Case Study of Cross-System Porting in Forked Projects*. **B. Ray**, M. Kim. In ACM SIGSOFT, the 20^{th} International Symposium on the Foundations of Software Engineering (FSE'12), acceptance rate: 17%
6. *An Empirical Study of Supplementary Bug Fixes*. J. Park, M. Kim, **B. Ray**, D. Bae. In The 9^{th} IEEE Working Conference on Mining Software Repositories (MSR'12), acceptance rate: 28% **Invited to the Special Issue of Journal of Empirical Software Engineering (EMSE)**.

7. *PTask: Operating System Abstractions To Manage GPUs as Compute Devices*. CJ. Rossbach, J. Currey, M. Silberstein, **B. Ray**, E. Witchel. In Proceedings of the 23^{rd} ACM Symposium on Operating System Principles (SOSP'11), acceptance rate: 17%.
8. *A Protocol for Building Secure and Reliable Covert Channel*. **B. Ray** and S. Mishra. In 6^{th} Annual Conference on Privacy, Security and Trust, 2008. (PST'08).
9. *WhozThat?: Evolving an Ecosystem for Context-Aware Mobile Social Networks*. A. Beach, **B. Ray**, et al., In IEEE Network Magazine Special Issue on Composable context aware services, 2008.
10. *SecureWear: A Framework for Securing Mobile Social Networks*. **B. Ray**, R. Han. In Advances in Computer Science and Information Technology. Computer Science and Engineering, Lecture Notes of the Institute for Computer Sciences, Social Informatics and Telecommunications Engineering, 2012.

Under Submission

11. *The Uniqueness of Changes: Characteristics and Applications*. **B. Ray**, M. Nagappan, C. Bird, N. Nagappan, T. Zimmermann.
12. *Assert Use in GitHub Projects*. C. Casalnuovo, P. Devanbu, A. Oliveira, V. Filkov, **B. Ray**
13. *Detecting and Characterizing Semantic Porting Inconsistencies in Copy and Paste Code*. **B. Ray**, M. Kim, S. Person, N. Rungta.

Short Papers

14. *Repertoire: A Cross-System Porting Analysis Tool for Forked Software Projects*. **B. Ray**, C. Wiley, M. Kim. In ACM SIGSOFT the 20^{th} International Symposium on the Foundations of Software Engineering, Formal Research Tool Demonstration (FSE'12).
15. *Touch Me wE@r: Getting Physical with Social Networks*, A. Beach, **Baishakhi Ray**, L. Buechley. In 2009 Workshop on Sensor-based Models and Feedback Systems for Social Computing. associated with SocialCom 2009.

Software Releases

- Frankencerts, https://github.com/sumanj/frankencert.
  Has received 51 github 'stars' as of October 2014.
- Repertoire, https://github.com/baishakhir/RepertoireTool.
  Forked 5 times in github, published in FSE'12 tool demo track

Teaching Experience

Mentoring:

- Saheel Godhane, Graduate Student, University of California, Davis.
- Casey Casalnuovo, Graduate Student, University of California, Davis.
- Vincent Hellendoorn, Visiting Graduate Student, University of California, Davis.
- Connie Nguyen, Undergraduate Student, University of California, Davis.
- Abilio Oliveira, Undergraduate Student, University of California, Davis.
- Lisa Hua, Graduate Student, The University of Texas at Austin.

- Tyler McDonnell, Undergraduate Student, The University of Texas at Austin.

Guest Lecturer:

- Introduction to Programming and Problem Solving, Fall 2014, University of California, Davis
- Software Engineering, Fall 2013, University of California, Davis
- Software Engineering and Design Laboratory, Fall 2013, The University of Texas at Austin

Teaching Assistant: Mobile Computing, Fall 2010, The University of Texas at Austin

Grader: Operating Systems (Spring'08), Networking (Fall'08), University of Colorado, Boulder.

Academic Services

Program Committee.

- Mining Software Repositories, 2015 (MSR)
- Mining Software Repositories mining challenge, 2015 (MSR challenge)
- India Software Engineering Conference, 2015 (ISEC)
- Foundation of Software Engineering Artifact, 2014 (FSE Artifact)
- OOPSLA Artifact, 2013

Journal Reviewer.

- Transactions on Software Engineering (TSE)
- CSI Journal Computer Standards & Interfaces
- Information and Software Technology

External Reviewer.

- Automated Software Engineering, 2014 (ASE)
- Mining Software Repository, 2012 (MSR)
- OOPSLA 2012

Other.

- Vice President, Graduate Women in Engineering, ECE Department, The University of Texas at Austin

Invited Talks

- *Detecting and Characterizing Semantic Inconsistencies in Ported Code*. NASA Ames, Mountain View, CA, November 2013.
- *Analysis of Cross-System Porting and Porting Errors in Software Projects*, Fujitsu Laboratories America, Sunnyvale, CA, January 2014

Media Coverage

- *Language Study* [1]: SlashDot, The Register, Reddit, InfoWorld, Hacker News.
- *Frankencerts* [2]: Reddit, Golem, Heise.

References

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