Rajesh Kumar Karmani

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Research Webpage

Objective

Statement I am seeking a research position that allows me to solve a challenging problem in the real-world software engineering.

Area of interest Testing and Verification of Concurrent Programs

Education

- **University of Illinois at Urbana-Champaign** — Urbana, IL
  PhD in Computer Science — *Jan. 2006 – Present*
  - Annotations, Algorithms and Tools for Testing and Verification of Concurrent Programs.
  - **ActorFoundry**, a Java-based framework for Actor programming
  - Key Courses: Programming Languages and Compilers, Formal Software Development Methods, Formal Models of Computation, Concurrent Programming Languages and Systems, Programming Language Design, Actor Programming and Languages, Logic in Computer Science

- **NED University of Engineering and Technology** — Karachi, Pakistan
  B.Engg in Computer and Information Systems — *Jan. 2001 - Dec 2004*
  - Senior Project: Real-time Loom Monitoring System for Hussein Textile Mills, Karachi

Conference Publications

- **Thread Contracts for Safe Parallelism.**
  Rajesh Karmani, P Madhusudan and Brandon Moore. To appear in the 16th ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming (PPoPP). 2011.

- **Inferring Ownership Transfer for Efficient Message Passing.**
  Stas Negara, Rajesh Karmani and Gul Agha. To appear in the 16th ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming (PPoPP). 2011.

- **Evaluating Ordering Heuristics for Dynamic Partial-order Reduction Techniques.**
  Steven Lauterburg, Rajesh Karmani, Darko Marinov and Gul Agha. In proceedings of the *Fundamental Approaches to Software Engineering (FASE)*, 308-322, 2010 held with ETAPS 2010.

- **Actor Frameworks for the JVM Platform: A Comparative Analysis.**
  Rajesh Karmani, Amin Shali and Gul Agha. In proceedings of the *7th International Conference on Principles and Practice of Programming in Java (PPPJ)*, 11-20, 2009.

- **On Scaling Multi-Agent Task Reallocation Using Market-based Approach.**
  Rajesh Karmani, Timo Latvala and Gul Agha. In proceedings of the *First IEEE International Conference on Self-Adaptive and Self-Organizing Systems (SASO)*, 173-182, 2007.

Technical Reports

- **Thread Contracts for Race-Freedom.**
  Rajesh Karmani, P Madhusudan and Brandon Moore. Technical Report, Department of Computer Science, University of Illinois at Urbana-Champaign. 2010.

Workshop Publications, Demonstrations, and Posters

- **Basset: A Tool for Systematic Testing of Actor Programs.**
  Steven Lauterburg, Rajesh Karmani, Darko Marinov and Gul Agha. In proceedings of the *18th ACM SIGSOFT Symposium on the Foundations of Software Engineering (FSE)*, 2010.

- **A Contract Language for Race-Freedom.**
  Rajesh Karmani and P Madhusudan. Position Paper, *Workshop on Exploiting Concurrency Efficiently and Correctly (EC2)* with CAV, 2010.

- **Barrier Synchronization Pattern.**
  Rajesh Karmani, Nicholas Chen, Bor-Yiing Su, Amin Shali and Ralph Johnson. *Workshop on Parallel Programming Patterns (ParaPLOP)*, 2009.

- **Collective Communication Patterns.**
  Nicholas Chen, Rajesh Karmani, Bor-Yiing Su, Amin Shali and Ralph Johnson. *Workshop on Parallel Programming Patterns (ParaPLOP)*, 2009.

- **Debugging Wireless Sensor Networks Using Mobile Actors.**
  Rajesh Karmani, and Gul Agha. *14th IEEE Real-Time and Embedded Technology and Applications Symposium (RTAS)*, 2008.

Research Experience

- **Universal Parallel Computing Research Center (UPCRC)** — Urbana, IL
  Research Assistant, University of Illinois — *2008 – Present*

- **Mitsubishi Electric Research Labs** — Cambridge, MA
  Research Intern with Dr Jonathan Yedidia — *Summer 2008*
  - Designed and implemented Active-C, an actor language on top of Objective-C.
  - The project involved implementing a run-time, a compiler as well as toy benchmarks.

- **Open Systems Laboratory, Department of Computer Science** — Urbana, IL
  Research Assistant with Professor Gul Agha, University of Illinois — *2007*

Teaching Experience

- **Software Verification CS598MP** — Urbana, IL
  Guest Lecturer, Dept of Computer Science, University of Illinois — *Fall 2010*

- **Actor Programming and Languages CS598GA** — Urbana, IL
  Guest Lecturer, Dept of Computer Science, University of Illinois — *Fall 2008, 2009*

- **Concurrent Programming Languages and Systems CS524** — Urbana, IL
  Guest Lecturer, Dept of Computer Science, University of Illinois — *Spring 2008, 2010*

- **Software Engineering CS427** — Urbana, IL
  Teaching Assistant, Dept of Computer Science, University of Illinois — *Fall 2009*

- **Java technologies, OOP and UML** — Karachi, Pakistan
  Lecturer, Sir Syed University of Engg and Technology — *2002*

- **Senior Year Project Ideas** — Pakistan
  Visiting Lecturer at NEDUET, MUET and IBA-Sukkur — *2007-2010*

Awards and Achievements

- **Recipient of the Sohaib and Sara Abbasi Fellowship** — Urbana, IL
  Department of Computer Science, University of Illinois — *2006, 2008, 2010*

- **Secured 2nd position in the B.Engg program** — Karachi, Pakistan
  NED University of Engineering and Technology — *2001 – 2004*
  - Secured 4th, 5th, 5th and 1st positions during each of the four years.

- **Secured 3rd overall position across Pakistan** — Islamabad, Pakistan
  Ministry of Science and Technology Pakistan (currently HEC Pakistan) — *2000*
  - In the competitive test for Information Technology Human Resource Development Scholarship.

Presentations

- **ACCORD: A Contract Language for Race-Freedom** — Edinburgh, Scotland
  Workshop on Exploiting Concurrency Efficiently and Correctly (EC2) — July 21, 2010

- **Evaluating Ordering Heuristics for Dynamic Partial Order Reduction** — Paphos, Cyprus
  Fundamental Approaches to Software Engineering (FASE) — Mar. 24, 2010

- **Dynamic Partial Order Reduction** — Urbana, IL
  Formal Methods Seminar, University of Illinois — Mar. 3, 2010

- **ACCORD Annotations for Proving Race-Freedom** — Urbana, IL
  UPCRC Illinois Seminar, University of Illinois — Jan. 28, 2010

- **Actor Frameworks for the JVM Platform** — Calgary, AB, Canada
  Principles and Practice of Programming in Java (PPPJ) — Aug. 27, 2009

- **Annotations for Race-freedom** — Intel Hillsboro, OR
  Workshop on Parallel Programming Correctness and Testing, Intel Symposium — Aug. 18, 2009

- **ActorFoundry - Actors in an OO World** — Urbana, IL
  Software Engineering Seminar, University of Illinois — Fall 2008

- **On Scaling Multi-Agent Task Reallocation using Markets** — MIT, Cambridge, MA
  Self-Adaptive and Self-Organizing Systems (SASO) — July 10, 2007

Professional Activities

- Co-organized the **Workshop on Parallel Programming Correctness and Testing** during Intel Symposium for the Universal Parallel Computing Research Center (UPCRC) at Intel Hillsboro, OR, 2009.

- Reviewer for ICPP 2010, ASE 2010, ABZ 2010, ICDCN 2009, ATSN 2008, QEST 2007, SASO 2007, ISFSE 2007, CCMMS 2007, ATSN 2007, HICSS 2007, WIAS 2007, WI 2006, ITSSA 2006

Skills

Languages: C#, Java, Objective-C, C/C++, Erlang, Assembly (x86), HTML, JavaScript, J2EE, JSP

Others: Object-Oriented Analysis and Design, UML, Design Patterns, Software Testing tools

Professional Associations

UPCRC@Illinois, ACM, IEEE, Mensa USA

Languages

English (fluent), **Urdu** (fluent), **Sindhi**, **Dhatki** (mother tongue)

Activities and Interests

Hobbies Traveling, Long-distance running (marathon), Hiking, Listening to music, Reading

References

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