Rifat Shahriyar

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Research Interests

My research interests are memory management specially garbage collection, virtual machine, and programming language implementation.

Employment

- **Bangladesh University of Engineering and Technology** — Dhaka, Bangladesh
  Assistant Professor, Department of Computer Science and Engineering — *May 2010 - Date*
- **Bangladesh University of Engineering and Technology** — Dhaka, Bangladesh
  Lecturer, Department of Computer Science and Engineering — *June 2007 - May 2010*

Education

- **Australian National University** — Canberra, Australia
  Ph.D. in Computer Science — *September 2010 - April 2015*
  - Thesis: High Performance Reference Counting and Conservative Garbage Collection
  - Supervisors: Prof. Steve Blackburn and Prof. Kathryn McKinley
- **Bangladesh University of Engineering and Technology** — Dhaka, Bangladesh
  M.Sc. in Computer Science and Engineering — *October 2007 - December 2009*
  - Thesis: A Distributed Optimized Resource Reservation Scheme for Grid Computing
  - Supervisor: Prof. Md. Mostofa Akbar
- **Bangladesh University of Engineering and Technology** — Dhaka, Bangladesh
  B.Sc. in Computer Science and Engineering — *April 2002 - May 2007*
  - Thesis: Controlling Remote Systems using Mobile Telephony
  - Supervisor: Prof. Md. Mostofa Akbar

Publications

- **R. Shahriyar**, S. M. Blackburn, and K. S. McKinley, **"Fast Conservative Garbage collection'**, in Proceedings of the 25th ACM SIGPLAN conference on Object Oriented Programming Systems, Languages and Applications, OOPSLA '14, Portland, USA, 2014.
- **R. Shahriyar**, S. M. Blackburn, X. Yang, and K. S. McKinley, **"Taking Off the Gloves with Reference Counting Immix"**, in Proceedings of the 24th ACM SIGPLAN conference on Object Oriented Programming Systems, Languages and Applications, OOPSLA '13, Indianapolis, USA, 2013.

- **R. Shahriyar**, S. M. Blackburn, and D. Frampton, **"Down for the Count? Getting Reference Counting Back in the Ring"**, in Proceedings of the Eleventh ACM SIGPLAN International Symposium on Memory Management, ISMM '12, Beijing, China, June 15-16, 2012.
- A. Sultana, M. Naznin, and **R. Shahriyar**, **"Conflicting Goal Constrained Architecture of a Heterogeneous Mobile Sensor Network"**, in Proceedings of the 2nd International Conference on Networking Systems and Security, NSysS 2016, Dhaka, Bangladesh, 2016.
- M. R. Haque, M. Naznin, and **R. Shahriyar**, **"Distributed Low Overhead ID in a Wireless Sensor Network"**, in Proceedings of the 17th International Conference on Distributed Computing and Networking, ICDCN 2016, Singapore, 2016.
- **R. Shahriyar**, M. M. Akbar, M. S. Rahman, M. F. Bari, and S. Shahriyar, **"CORS - A Cost Optimized Resource Reservation Scheme for Grid"**, in Proceedings of the International Conference on Parallel and Distributed Processing Techniques and Applications, PDPTA '11, Las Vegas, Nevada, USA, July 18-21, 2011.
- **R. Shahriyar**, M. F. Bari, G. Kundu, S. I. Ahamed, and M. M. Akbar, **"Intelligent Mobile Health Monitoring System (IMHMS)"**, International Journal of Control and Automation (IJCA), vol. 2, iss. 3, 2009.
- **R. Shahriyar**, M. F. Bari, G. Kundu, S. I. Ahamed, and M. M. Akbar, **"Intelligent Mobile Health Monitoring System (IMHMS)"**, in Proceedings of Second International ICST Conference on Electronic Healthcare for the 21st century, eHealth 2009, Istanbul, Turkey, September 23-15, 2009.
- S. Sultana, R. Karim, **R. Shahriyar**, M. M. Akbar, and S. I. Ahamed, **"Ubiquitous Secretary: A Ubiquitous Computing Application based on Web Services Architecture"**, International Journal of Multimedia and Ubiquitous Engineering (IJMUE), vol. 4, iss. 4, 2009.
- M. F. Bari, M. S. Rahman, and **R. Shahriyar**, **"Finding all covers of an indeterminate string in O(n) time on average"**, in Proceedings of the Prague Stringology Conference, PSC 2009, Prague, Czech Republic, August 31 - September 2, 2009.
- **R. Shahriyar**, E. Hoque, I. Naim, S. Sohan, M. M. Akbar, and M. Khan, **"Controlling Remote Systems using Mobile Telephony"**, International Journal of Smart Home (IJSH), vol. 2, iss. 3, 2008.
- **R. Shahriyar**, E. Hoque, I. Naim, S. Sohan and M. M. Akbar, **"Controlling Remote Systems using Mobile Telephony"**, in Proceedings of the 1st International Conference on MOBILe Wireless MiddleWARE, Operating Systems, and Applications, Mobilware 2008, Innsbruck, Austria, February 13 - 15, 2008.

Awards and Honours

- ACM SIGPLAN PAC Grant to attend ASPLOS 2015
- ACM SIGPLAN PAC Grant to attend OOPSLA 2013
- ANU Vice-Chancellor's HDR Travel Grant to attend ISMM and PLDI 2012
- ANU University Research Scholarship (2010 - 2014)
- ANU Research Supplementary Scholarship (2010 - 2014)

- Endeavour International Postgraduate Research Scholarship from University of Melbourne (2010 - 2014, Not Availed)
- University of Melbourne International Research Scholarship (2010 - 2014, Not Availed)
- University Merit Scholarships in Bangladesh University of Engineering and Technology for academic results
- Dean's Award in Bangladesh University of Engineering and Technology for academic results
- Board Scholarships from Board of Secondary and Higher Secondary Education, Dhaka, Bangladesh

Research Experiences

- **Australian National University** Canberra, Australia
  Ph.D. in Computer Science *September 2010 - April 2015*
  - Designed and implemented several optimizations for reference counting. Reference counting is almost completely ignored in implementations of high performance systems today. We find that an existing modern implementation of reference counting has average 30% overhead compared to tracing. Our optimizations completely eliminate that overhead and brings the performance of reference counting on par with that of a well-tuned mark-sweep collector. (**ISMM 2012**)
  - Designed and implemented our improved reference counting in Immix heap organization. Reference counting generally use free list for allocation. Immix is a mark-region based garbage collector that uses bump pointer for allocation, tracing for identification and sweep-to-region for reclamation. The proposed RC Immix collector will use bump pointer for allocation, reference counting for identification, sweep-to-region for reclamation, and performs defragmentation both proactively and reactively. It outperforms the production garbage collector of Jikes RVM. (**OOPSLA 2013**)
  - Designed and implemented a conservative garbage collector for managed languages based on RC Immix. The existing conservative garbage collectors like Boehm-Demers-Weiser (BDW) and Mostly Copying (MCC) suffer significant performance overhead compared to exact generational tracing collectors. Our conservative RC Immix collector uses a low overhead object map to validate ambiguous references and pin their referents with Immix line granularity. It matches the performance of the production garbage collector of Jikes RVM. (**OOPSLA 2014**)
- **Oracle Labs** California, USA
  Research Intern *May 2013 - August 2013*
  - Designed and implemented a garbage collector for Oracle's Substrate VM.

Teaching Experiences

- Structured Programming Language (Reference Language: C)
- Object Oriented Programming Language (Reference Language: C++ and Java)
- Data Structures
- Database

- Computer Architecture
- Programming Languages and Systems (Graduate Course)

Community Services

- **Program Committee Member**
  - ISMM 2015