

# Shankha Banerjee

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## SUMMARY

- Masters in Computer Science and Applications
- 6+ years' work experience in software design and development
- Hands on experience with large and complex code bases

## EDUCATION

- **M.S.,** Computer Science - Virginia Tech, Blacksburg, VA 2012  
Advisor: Dr. Srinidhi Varadarajan
- **B.E.,** Computer Science and Engineering Visvesvaraya Technological Univ, India 2006

## TECHNICAL SKILLS

**Programming:** C, Java, x86-64 Assembly, and Python

**Parallel Programming:** Message Passing Interface (MPI), OpenMP, Pthreads, Multi-threading, and CUDA

**Compiler Framework:** Low Level Virtual Machine (LLVM), and Java Development Tools (JDT) Core, GDB

**System Administration:** Linux kernel, and GCC, LLVM compiler tool chain

## PROFESSIONAL EXPERIENCE

- **Senior Software Engineer, IBM Bangalore** *Mar 2012 – Present*
  - Designed and developed a tool to detect binding comparison in the JDT compiler code base. Binding comparisons were required to be modified due to introduction of Type Annotation in Java 8.
  - Implemented section in JLS 8 dealing with choice of most specific method in the scenario of varargs and method overloading.
  - Developed and supported features specified for Type Annotation (JSR 308) and Repeating Annotation (JSR 337).
  - Implemented features in Null analysis to help detect potential null pointer exceptions at compile time.
  - Worked on JDT core sub components: AST, search, error recovery, intermediate code generation, exception handling, type hierarchy and disassembler.
  - Acknowledged in Java Language Specification (SE 8) for contributions to the Eclipse Java compiler.
- **Software Engineer, Qualcomm Incorporated San Diego** *Mar 2012 – Feb 2013*
  - Developed native hardware math calls for OpenCL compiler.
  - Developed test suite in Python to check math algorithms for correctness on X86.
  - Debugged and isolated issues on experimental hardware and helped design performance metrics for the compiler for mobile GPU.
  - Developed a tool to profile the compiler for size on disk.
- **Engineering Intern, Qualcomm Incorporated San Diego** *May 2011 – Aug 2011*

Developed testing framework based on Python for comparing Qualcomm's OpenCL 1.0 compiler with OpenCL compilers from different vendors.
- **System Software Engineer, IBM Bangalore** *Jul 2006 – Jun 2009*
  - Developed and supported instrumentation engine and runtime library for detecting memory access errors, code coverage issues, and performance bottlenecks of UNIX applications.
  - Mentored two students as part of IBM extreme blue internship program.

## RESEARCH EXPERIENCE

- **Graduate Research Assistant, Computer Systems Research Laboratory, Virginia Tech Blacksburg** *Aug 2009 – Feb 2012*

Research in areas of parallel and distributed computing.  
Project: *Weaves*: Design and developed an instrumentation tool based on LLVM for single threaded applications. Weaves architecture independent design modifies single threaded code to run on multi-core machines to take advantage of parallelism. Weaves provides semantics to specify data sharing and mutual exclusion between threads. Weaves instruments the code under observation to modify global variables into thread local variables and subsequently modifies their accesses.

- **Graduate Research Assistant, Advanced Research Computing (ARC),  
Virginia Tech Blacksburg**

*Aug 2010 – Dec 2012*

Programming consultant for high-end computing. Worked in parallelizing, porting, and fine tuning code for supercomputers. Also involved in administering and managing 100+ node clusters.

#### **THESIS/PUBLICATION**

Thesis: A framework to analyze file system performance of MPI application.

Developed and designed MPI I/O replay (MPIOR), an I/O performance modeling and prediction tool used to trace and replay a parallel application to determine application performance under a new I/O sub system. The trace collector deduces synchronization inter-dependencies between nodes and I/O demands placed by each node on the storage subsystem. The re-player mimics the behavior of the application across a variety of storage systems by mapping multiple processes to multiple threads running on a single node.

#### **PROFESSIONAL SERVICE/OPEN SOURCE CONTRIBUTION**

- Active involvement with **Python** community
- Committee member and organizer of Eclipse Day India in Bangalore 2014