Chirag Sangani

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Education

Year	Degree	Institute	CGPA/Percentage
2012 (expected)	B. Tech., Computer Science and Engineering	Indian Institute of Technology Kanpur	9.2/10 (upto 6th semester)
2008	XII	Central Academy Sr. Sec. School, Dadabari, Kota (CBSE)	92.2%
2006	X	Bhavan's A. H. Wadia High School, Mumbai (Maharashtra State Board)	90.93%

Research Papers

- **"Skynet: Parallelized Simulation of Neural Network Architectures"** *(Nov '11)*
  Independent Research Paper: http://www.chiragsangani.com/assets/PDF/Skynet.pdf
  - » This paper proposes a framework architecture for the efficient simulation of large feed-forward neural networks by exploiting the inherent parallelism present in the nature of the problem.
  - » Simulation data from an implementation of the reference framework design shows promising results with marked improvements in performance, often limited only by the system on which the simulation is run.

- **"ComP2P: Application of Distributed Hash Tables to Distributed Computing"** *(Apr '11)*
  Independent Research Paper (under review): http://www.chiragsangani.com/assets/PDF/ComP2P.pdf
  - » This paper proposes a protocol for distributed computing called "ComP2P", which utilizes Distributed Hash Tables (DHTs) at its core to provide a general purpose distributed computing platform.
  - » The resulting platform is a distributed swarm of nodes sharing computational resources in a provably reliable and efficient manner.

Projects

- **A Memory Hierarchy Simulator for Multicore Processors** *(Jul '11 - ongoing)*
  B. Tech. Project. Guide: Dr. Mainak Chaudhuri, Dept. of Computer Sci. and Engg., IIT Kanpur.
  - » A simulation framework consisting of multiple modules for the analysis of the characteristics and performance of different memory hierarchy models.
  - » Contains a custom cache simulator that supports writeback type set-associative caches with configurable associativity, capacity, block size, replacement policy and inclusivity.
  - » Analysis of SPECInt2006 CPU benchmark traces through the use of PinPoints.
  - » *Technologies:* Intel PIN Binary Instrumentation Tool, PinPoints, multi2sim, C++.

- **Skynet: A Distributed Neural Network Simulation Framework** *(Jun '11 - ongoing)*
  Project for CS698o: Machine Learning - Tools and Techniques. Guide: Dr. Krithika Venkataramani, Dept. of Computer Sci. and Engg., IIT Kanpur.
  - » A framework for training and simulation of large architectures distributed over multiple nodes.
  - » Skynet utilizes the concept of distributed computing using distributed hash tables as explained in ComP2P.
  - » *Technologies:* Java, Neo4J Graph Database, Distributed Hash Tables, ComP2P.

- **Campus Information and Management Automation System** *(Jul '11 - ongoing)*
  Project for CS455: Software Engineering. Guide: Dr. Sanjeev Aggarwal, Dept. of Computer Sci. and Engg., IIT Kanpur.
  - » A large-scale project for automation of campus hostel, housing, departmental and facility information and management systems.
  - » Development by a team of 16 people following industrial best practices and a formal development model.
  - » Contribution to the project comprises of an interactive mapping interface and development of automation module for campus facilities.

- **Cloud Services Implemented on Android** *(May '11 - Jul '11)*
  Internship, Samsung India Software Operations, Bangalore. Mentor: Shrikant K., Chief Architect, Mobile Web Division.
  - » Implementation of a client-server model for cloud-based services which streamline the process of accessing a user's online content, deployed as an Android application.
  - » Contribution to the project comprised of the development of the server infrastructure, consisting of deploying a graph database for storage, OAuth for accessing services and implementation of an algorithm for personalization of user content.
  - » Awarded a Pre-Placement Offer for the quality of the work delivered during the internship period.
  - » *Technologies:* Java EE with Glassfish, Neo4J Graph Database, MySQL, OAuth, JSON and XML.

- **AVR Wizard: A Configuration Code Generator for Atmel AVR Microcontrollers** *(Apr '11)*
  Independent Project: http://sourceforge.net/projects/avrwizard
  - » AVR Wizard is an open-source Windows software developed using the .Net framework.
  - » It generates C configuration code for various devices of the Atmel AVR ATmega microcontroller family.
  - » It is in active use in the Electronics Club of IIT Kanpur.
  - » *Technologies:* Microsoft .Net Framework, Visual C#, InstallShield.

- **A Simulated Five-Stage Pipelined MIPS-I Processor** *(Feb '11 - May '11)*
  Project for CS422: Computer Architecture. Guide: Dr. Mainak Chaudhuri, Dept. of Computer Sci. and Engg., IIT Kanpur.
  - » Designed a simulation with a half-clock precision for a processor implementing the complete MIPS-I ISA for the assessment of various architectural techniques.
  - » The simulation featured a single-level instruction and data cache, branch target buffer, various types of branch predictors such as GAg, SAg, gshare, bimodal, etc., and a full pipeline bypass network.
  - » *Technologies:* C++.

- **An ANSI C compiler for the MIPS-I Platform** *(Feb '11 - May '11)*
  Project for CS335: Compiler Design. Guide: Dr. Amey Karkare, Dept. of Computer Sci. and Engg., IIT Kanpur.
  - » A compiler designed with the aid of JFlex and BYACC/J implementing a majority of the ANSI C specifications.
  - » It supports static type-checking, recursive functions, multi-level indirection, complex types such as arrays, structs and unions, and has an inbuilt documentation generator.
  - » *Technologies:* Java, JFlex, BYACC/J.

- **A Parallelized Implementation of the Chord P2P Distributed Lookup Service** *(Oct '10)*
  Project for CS425: Computer Networks. Guide: Dr. Dheeraj Sanghi, Dept. of Computer Sci. and Engg., IIT Kanpur.
  - » A complete implementation of the Chord distributed hash table on the Java platform.
  - » A passive, daemon-based approach allows for reduced bandwidth utilization coupled with greater reliability and scalability.
  - » *Technologies:* Java.

- **"Digital Design Using Verilog and FPGAs: An Experiment Manual"** *(May '10)*
  Research Project. Guide: Dr. Rajat Moona, Director General, Center for Development of Advanced Computing (C-DAC).
  - » A lab manual for an undergraduate-level course on computer organization.
  - » It consists of a series of experiments that culminate in the design of a two-stage pipelined processor which is compatible with a subset of the MIPS-I instruction set architecture.
  - » *Technologies:* Xilinx ISE, Verilog, Xilinx Spartan-3E FPGA development kit, Xilinx Virtex-5 FPGA development kit.

- **An Operating System Based on the Nachos Framework** *(Aug '10 - Nov '10)*
  Project for CS330: Operating Systems. Guide: Dr. Sumit Ganguly, Dept. of Computer Sci. and Engg., IIT Kanpur.
  - » An operating system consisting of a multi-threaded, multitasking capable kernel.
  - » The kernel uses priority scheduling, clock-algorithm based memory paging and implements complete user virtual memory isolation and protection.
  - » *Technologies:* Java, Nachos.

- **Portable Digital Assistant** *(May '09 - Jun '09)*

  Independent Project: http://www.chiragsangani.com/projects/electronics/DigitalNotepad

  » A personal digital assistant based on the Atmel AVR platform, featuring a monochrome graphical display, custom QWERTY keypad, internal storage, communication port and custom firmware.

  » The device provides features such as text notes, calendar, communication terminal, etc.

  » The firmware provides an API for easy development and installation of applications by integration with the firmware.

  » *Technologies:* C, Atmel AVR ATmega platform.

- **Capacitive Touchpad** *(Sep '09)*

  Independent Project.

  » Designed a seven-segment capacitive touchpad based on a custom Darlington amplifier design.

  » Bagged the 3rd prize in "Embedded" in "Takneek", an intra-college science and technology competition.

  » *Technologies:* C, Atmel AVR ATmega platform.

Academic Achievements

- Awarded a Certificate of Merit for academic excellence in the Bachelor of Technology Programme in Computer Science and Engineering for the year 2008-09 by IIT Kanpur.
- Secured All India Rank 96 out of 375000 students in IIT Joint Entrance Examination (IIT-JEE), 2008.
- Secured 2nd rank in institute in XII.
- Secured 1st rank in institute in X.

Relevant Courses

- **Advanced Graduate Courses**
  - » Advanced Computer Architecture *
  - » Advanced Computer Networks
  - » Machine Learning - Tools and Techniques *
- **Undergraduate Courses**
  - » B. Tech. Project *
  - » Computer Architecture
  - » Computer Organization
  - » Computer Networks
  - » Software Engineering *
  - » Compiler Design
  - » Operating Systems Design
  - » Principles of Programming Languages
  - » Programming Tools and Techniques
  - » Algorithm Design
  - » Theory of Computation
  - » Discrete Mathematics
  - » Introduction to Mathematical Logic
  - » Datastructures and Algorithms
  - » Microelectronics I

** Ongoing Course*

Positions of Responsibility

- **Head of Design, Science and Technology Council, Student's Gymkhana, IIT Kanpur (2011 - present)**
  - » The head of the design cell is responsible for overseeing the management of the council's design and production of the council's media messages.
  - » The head is also responsible for the overall management of the design involved in "Takneek", an intra-IIT science and technology competition.
- **Coordinator (2010 - 11) and Secretary (2009 - 10), Electronics Club, IIT Kanpur**
  - » The Electronics Club is a hobby group that explores modern-day electronics and sees participation from more than 300 students annually.
  - » My tenure in the club ushered in multiple new technologies into mainstream use such as FPGAs, monochrome graphical LCDs, EEPROM, etc.

- **Coordinator, FPGA Design Challenge, Techkriti '11 and '10**
  - » This competition is an initiative to introduce digital logic design using FPGAs into mainstream use at IIT Kanpur.
  - » It involved the implementation of an encryption block for AES (Techkriti '11) and the acceleration of the Black-Scholes Algorithm (Techkriti '10).
- **Webmaster, Electronics Club (2009 - 11)**
  http://students.iitk.ac.in/eclub
  - » My tenure as a webmaster witnessed a complete redesign of the club website, in addition to regular maintenance.
- **Web Designer and Webmaster, Takneek (2009)**
  http://students.iitk.ac.in/takneek/backup/2009
  - » Takneek is the annual intra-college science and technology competition of IIT Kanpur.
- **Designer, Meander (2009 - 10)**
  - » Meander is the college-level student magazine of IIT Kanpur.
  - » The design team collaborates in the design of the magazine covers as well as the layout of the entire magazine.
  - » The tools used include Adobe Photoshop and Microsoft Publisher.

Extra-Curricular Activities

- Attended a workshop on Windows Phone 7 Application Development conducted by Microsoft India Software Development Center, Hyderabad in Techkriti '11.
- Attended a workshop on Cypress PSoC1 development conducted by Cypress India, Bangalore.
- Won the 2nd prize in "Embedded Design" in Techkriti '09, IIT Kanpur's annual national science, technology and management festival.
- Won the 3rd prize in "Embedded" in Takneek '09, IIT Kanpur's annual intra-college science and technology competition.
- Won the 2nd prize in "Electromania" in Takneek '08, IIT Kanpur's annual intra-college science and technology competition.

Technical Skills

- **Programming Languages**
  C, C++, C#, Verilog, Java, Python, Oz, SML, Prolog, HTML, CSS, PHP, JSP, Javascript, jQuery, XML, SQL, LaTeX, IA32 Assembly, MIPS Assembly.
- **Softwares and Software Development Platforms**
  Microsoft Visual Studio, .Net, Java EE, Xilinx ISE, Adobe Photoshop, Adobe InDesign, Microsoft Expression Web, Autodesk AutoCAD, MathWorks MATLAB.
- **Hardware Development Platforms**
  Atmel AVR microcontrollers, Cypress PSoC1 microcontrollers, Xilinx Spartan-3E FPGA, Xilinx Virtex-5 FPGA.

Interests and Hobbies

- **Digital Art and Wallpaper Design**
  Gallery: http://www.chiragsangani.com/creativity/art
  - » I enjoy designing abstract art and wallpapers using digital tools such as Adobe Photoshop and DAZ 3D Bryce.
- **Website Design**
  Gallery: http://www.chiragsangani.com/creativity/websites
  - » I enjoy designing websites with abstract artistic imagery using tools such as Microsoft Expression Web, Adobe Photoshop, PHP and jQuery.

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