

# Nishant Sinha

Computer Scientist

I am interested in creating reliable, distributed, interactive and multimodal systems involving human computer symbiosis.

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## EXPERIENCE

### IBM Research India, Bangalore — *Researcher*

Sept 2011 - PRESENT

Architect for an end-to-end cognitive system for performing speech-based data analytics and visualization. Components include speech-to-text, NLP, inferring structured features from web artifacts and multi-screen data visualization. Built using web technologies, low latency message-passing and NoSQL databases.

Identifying core programming abstractions required to get rid of time consuming boilerplate code across the web stack. Developed theory and algorithms for constraint based responsive UI design.

### NEC Labs USA, Princeton — *Research Staff member*

Oct 2007 - Sept 2011

Automated bug-hunting for multi-threaded C/C++ programs using the compiler stack, mathematical modeling and constraint solving.

## EDUCATION

### Carnegie Mellon University, Pittsburgh

Aug 2001 - Sept 2007

Ph.D. in Computer Engineering.

Topic: Learning abstractions for compositional analysis of systems.

Expertise in efficiently analyzing large state-spaces created by executions of concurrent software systems, using mathematical logic techniques and formal methods.

### IIT Kharagpur, Kharagpur

Aug 1997 - May 2001

B. Tech (Hons.) in Computer Science and Engineering.

## SKILLS

Solving tough problems in a structured, divide-conquer fashion

Actively identifying and pursuing problems where technology solutions can have a deep impact

Understanding and picking up new technologies

Rapid prototype building, experimentation and evaluation

A broad, in-depth knowledge of multiple aspects of computer science

Expertise in writing and communicating results

Mentoring students, colleagues towards systematic thinking, developing a problem-solving taste, writing and presenting results

## AWARDS

**Best Paper Award.** Indian Software Engineering Conference. 2015.

**Global Young Scientists Summit Travel Award,** 2012.

**ACM Distinguished Paper Award.** Conf. on Foundations of Software Engineering. 2010.

**Best Student Paper Award.** SRC Symposium. 2006.

## PROJECTS

### **A Multimodal, Distributed Cognitive System**

Designing an intelligent cognitive system with high-bandwidth, speech/gesture based human-machine interaction to enable distributed analytics and data visualization for a team of analysts. Applications to Mergers & Acquisitions and Oil Field Analytics.

### **Simplifying Web Programming — *Identifying the core abstractions needed for full-stack web programming***

### **Automated Bug Hunting — *Use mathematical models of C/C++/Java programs and constraint solving to find bugs***

## PUBLICATIONS

I have authored papers in reputed, top-tier international Computer Science conferences for more than 10 years now (citations: >800, h-index: 16). Have several (~10) patents granted by USPTO. I have worked on a variety of problem areas: formal methods, distributed systems, program verification, compiler design and constraint solving. Recent papers on web UI design, web programming models and formal models for data-parallel computation.

More details at <http://ekshaks.github.io>

## TOOLS and FRAMEWORKS

Familiar with a variety of programming languages and tooling frameworks. My earlier projects were implemented using C/C++ and Java. These days I mostly work with JavaScript/node.js and Python. I've also used R and Go for small projects.

I've implemented reasonable sized, full-stack, systems using JavaScript-based web frameworks -- Meteor, Express together with MongoDB backend. In general, quite familiar with the evolving ecosystem of web.

I've worked with both R and Python libraries for small data analysis projects involving regression, clustering and decision trees. Also familiar with theory and internals of the the Spark platform.

Familiar with deep learning theory. Experimented with DNNs and RNNs using various libraries, e.g., Keras, Torch, DMLC, word2vec.

