

# Donald Nguyen

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## Research Interest

To develop high-performance implementations and programming models for irregular algorithms. Irregular algorithms are the majority of algorithms in use, but most compiler and program analysis techniques are focused on regular algorithms, which are algorithms with regular program dependencies over dense data structures. Irregular algorithms are qualitatively different in two ways: (1) they operate over pointer-based data structures and (2) their dependencies are a function of input data.

## Education

- 9/2007–                    Ph.D. in Computer Science (in progress)  
The University of Texas at Austin  
Austin, TX
- 9/2000–5/2004        B.S. in Computer Science with honors  
Yale University  
New Haven, CT

## Research Experience

- 2008–                    With Keshav Pingali, I am developing programming languages, program analysis and optimizations for irregular algorithms with multiple coordinating kernels.

## Publications

Milind Kulkarni, Donald Nguyen, Dimitrios Proutzos, Xin Sui, and Keshav Pingali. Exploiting the commutativity lattice. In *PLDI*, 2011.

Keshav Pingali, Donald Nguyen, Milind Kulkarni, Martin Burtscher, M. Amber Hassaan, Rashid Kaleem, Tsung-Hsien Lee, Andrew Lenharth, Roman Manevich, Mario Méndez-Lojo, Dimitrios Proutzos, and Xin Sui. The tao of parallelism in algorithms. In *PLDI*, 2011.

Donald Nguyen and Keshav Pingali. Synthesizing concurrent schedulers for irregular algorithms. In *ASPLOS '11: Proceedings of International Conference on Architectural Support for Programming Languages and Operating Systems*, 2011.

Xin Sui, Donald Nguyen, Martin Burtscher, and Keshav Pingali. Parallel graph partitioning on multicore architectures. In *LCPC '10: Proceedings of the International Workshop on Languages and Compilers for Parallel Computing*, 2010.

Mario Mendez-Lojo, Donald Nguyen, Martin Burtscher, Muhammad Hassaan, Milind Kulkarni, Dimitrios Proutzos, Xin Sui, and Keshav Pingali. Structure-driven optimizations for amorphous data-parallel programs. In *PPoPP '10: Proceedings of the 2010 ACM SIGPLAN conference on Principles and Practice of Parallel Computing*, 2010.

Keshav Pingali, Milind Kulkarni, Donald Nguyen, Martin Burtscher, Mario Mendez-Lojo, Dimitrios Proutzos, Xin Sui, and Zifei Zhong. Amorphous data-parallelism in irregular algorithms. regular tech report TR-09-05, The University of Texas at Austin, 2009.

Shih wei Liao, Tzu-Han Hung, Donald Nguyen, Hucheng Zhou, Chinyen Chou, and Chiaheng Tu. Machine learning-based prefetch optimization for data center applications.

In SC '09: *Proceedings of the 2009 ACM/IEEE conference on Supercomputing*, New York, NY, USA, 2009. ACM Press.

## Fellowships and Awards

2009	National Science Foundation Graduate Research Fellowship Honorable Mention
2008	National Science Foundation Graduate Research Fellowship Honorable Mention
2007	University of Texas Microelectronics and Computer Development (MCD) Fellowship
2007	University of Texas Dean's Excellence Award

## Professional Experience

5/2008–8/2008	Software Engineer Intern, Google, Seattle, WA  Designed tools for optimizing memory performance of data-center applications via machine learning.
7/2004–5/2007	Engineer, Reservoir Labs, New York, NY  Designed tools for verification of software and advanced cognitive systems. Developed a bounded model-checking system for specifying properties of C programs and verifying their correctness with respect to program assertions.  Wrote Alef, a Boolean satisfiability solver that targets problems a hundred times the size of currently solvable instances. Developed an architecture for parallel computation of Boolean satisfiability problems.  Implemented program transformation algorithms for an optimizing and auto-parallelizing C compiler.

## Teaching Experience

8/2008-12/2008	Teaching Assistant, University of Texas at Austin, Austin, TX  Teaching assistant for undergraduate compilers course.
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## Skills

Proficient	C, C++, SQL, Perl, Python, Linux, ML, Java
Familiar	Objective C, Macromedia Flash, Lisp

## References

Keshav Pingali, Professor, University of Texas at Austin, pingali@cs.cornell.edu  
Shih-wei Liao, Researcher, Google, sliao@google.com  
Richard Lethin, President, Reservoir Labs, lethin@reservoir.com

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