

Name: Nandivada Venkata Krishna
E-mail: nvk@iitm.ac.in **Phone:** +91-44-2257-4380

Educational Background

Degree	University	Graduation	Dept.
B.E.	R.E.C. Rourkela	May 1998	CSE
M.E.	Indian Institute of Science	Jan 2000	CSA
PhD	Purdue University	Aug 2003(transfer)	CS
PhD	UCLA	Dec 2005	CS
<i>Thesis:</i> Combining Stack Location Allocation with Register Allocation. Advisor: Jens Palsberg			

Work Experience

- October 2011 - : Assistant Professor, IIT Madras, Chennai.
- October 2008 - September 2011: Research Staff Member, IBM Research, Bangalore.
- Feb 2006 - October 2008: Research Staff Member, IBM Research, New Delhi.
- May 2003-Aug 2003: Summer intern at Sun Labs, Burlington in the garbage collection group, under Dr. David Detlefs.
- Feb 2000-Jul 2001: Senior software engineer at Hewlett Packard, Bangalore, in the low level optimization and code generation group of the PA-RISC C and C++ compiler.

Teaching Experience

- IIT Madras: Software Engineering (undergraduate course, even semester 2011, even semester 2012), Principles of Programming languages (graduate course, even semester 2012)
- IIT Delhi: Advanced Compiler Construction (graduate course, even semester 2007).
- University of California, Los Angeles: Compiler Construction (teaching assistant to Prof. Jens Palsberg, Fall 2005)
- University of California, Los Angeles: Programming Languages (teaching assistant to Prof. Jens Palsberg, Fall 2004)

Areas of interest

- Program optimization: High level and low level (architecture specific) optimizations, interaction between optimizations, mathematical models for optimization, issues in static and dynamic code optimizations.
- Program verification: Static and Dynamic program verification for time, memory and threads related properties.
- Program analysis: Reasoning about programs by static analysis, type based analysis.
- Language extensions: For the ease of programming and program analysis.

Publications and Patents

Journal papers / Book Chapters

1. *Dynamic State Restoration Using Versioning Exceptions* with Suresh Jagannathan. In the Journal of Higher Order Symbolic Computation, Vol 19(1), pp:101-124, March **2006**.
2. *Advances in Register Allocation*. Book chapter in 'The Compiler Design Handbook: Optimizations and Machine Code Generation'. Editors: Y. N. Srikant and Priti Shankar. CRC Press, **2007**

Papers in Conference Proceedings

1. *Efficient Spill Code with SDRAM* with Jens Palsberg. In Proceedings of 4th International Conference on Compilers, Architecture and Synthesis for Embedded Systems, pp:24-31, October **2003**. (Acceptance rate 19%.)
2. *Compile-Time Concurrent Marking Write Barrier Removal* with David Detlefs. In the proceedings of the 3rd annual IEEE/ACM international symposium on Code Generation and Optimization, pp: 37-48, March **2005**. (Acceptance rate = 35%.)
3. *Timing analysis of TCP servers for surviving denial-of-service attacks* with Jens Palsberg. In the proceedings of the 11th IEEE Real-Time and Embedded Technology and Applications Symposium, pp: 541-549, March **2005**. (Acceptance rate 33%.)
4. *SARA: Combining Stack Allocation and Register Allocation* with Jens Palsberg. In the proceedings of the 15th International Conference on Compiler Construction, pp: 232-246, April **2006**. (Acceptance rate 24%.)
5. *A framework for end-to-end evaluation of register allocators* with Fernando Pereira and Jens Palsberg. In the proceedings of the 14th International Static Analysis Symposium, pp: 153-169, August **2007**. (Acceptance rate 30%.)
6. *Static Detection of Place Locality and Elimination of Runtime Checks* with Shivali Agarwal, Rajkishore Barik, Rudrapatna K. Shyamasundar, and Pradeep Varma. In the proceedings of the 6th ASIAN Symposium on Programming Languages and Systems, pp: 53-73, December **2008**. (Acceptance rate = 50%.)
7. *Efficient, portable implementation of asynchronous multi-place programs* with Ganesh Bikshandi, Jose G. Castanos, Sreedhar B. Kodali, Igor Peshansky, Vijay Saraswat, Sayantan Sur, and Pradeep Varma. In the proceedings of the 14th ACM SIGPLAN Symposium on Principles and Practice of Parallel Programming, pp: 271-282, February **2009**. (Acceptance rate = 24%.)
8. *Chunking Parallel Loops in the Presence of Synchronization* with Jun Shirako, Jisheng Zhao, and Vivek Sarkar. In the proceedings of the 23rd ACM International Conference on Supercomputing, pp: 181-192, June **2009**. (Acceptance rate = 25%.)
9. *Reducing Task Creation and Termination Operations in Explicitly Parallel Programs* with Jisheng Zhao, Jun Shirako, and Vivek Sarkar. In the proceedings of the 19th International Conference on Parallel Architectures and Compilation Techniques, September **2010**. (Acceptance rate = 17%.)

10. *Inferring Arbitrary Distributions for Data and Computation* with Soham S Chakraborty. In the proceedings of the 5th ACM SIGPLAN SPLASH (previously OOPSLA) Onward!, October **2010**. (Acceptance rate = 25%.)
11. *Fault Localization for Data-Centric Programs* with Diptikalyan Saha, Pankaj Dhoolia, Mangala Gowri Nanda, Vibha Sinha and Satish Chandra. in the ACM SIGSOFT Symposium on the Foundations of Software Engineering **2011**. (Acceptance rate = 17%.)
12. *A framework for analyzing programs written in proprietary languages* with Mangala Gowri Nanda, Pankaj Dhoolia, Diptikalyan Saha, Anjan Nandy, Arup K Ghosh, SPLASH Wavefront, ACM, **2011**. (Acceptance rate = 50%.)
13. *Identifying Services from Business Applications* with Raghavan Komondoor, Saurabh Sinha and John Field, India Software Engineering Conference (to appear), ACM, **2012**. (Acceptance rate = 8%.)

Unrefereed papers/manuscripts under evaluation

1. *Using slicing to extract online services from batch program* with Komondoor Raghavan, Saurabh S Sinha and John Field, IBM Technical Report, RI09001, Jan, 2009
2. *Parallelizing Loops in Asynchronous Programs* with Soham Chakraborty, IBM Research Technical Report RI10007, 2010.
3. *Improved Bitwidth-Aware Variable Packing* with Rajkishore Barik (*under evaluation*).
4. *A Transformation Framework for Optimizing Task-Parallel Programs* with Jisheng Zhao, Jun Shirako and Vivek Sarkar (*manuscript*).
5. *Parallel services inference and extraction* with Komondoor Raghavan (*manuscript*).

Patents

1. System and Method for Dynamic Code Analysis in presence of the “table processing” idiom, with Pankaj Dhoolia, Mangala Gowri, and Diptikalyan Saha. Filed for US patent (Docket no IN920110030).
2. System and Method for Automatically Inferring Grammar Rules, with Pankaj Dhoolia, Mangala Gowri, and Diptikalyan Saha. Filed for US patent (Docket Number IN920110029).
3. System and Method for building and using programming language bridges to analyze problems in proprietary language domains, with Anjan Nandy, Anup K Ghosh, Asidhara Lahiri, Diptikalyan Saha, Mangala Gowri, Pankaj Dhoolia, Sugata Ghosal. Filed for US patent (Docket Number IN920100226).
4. An intermediate form for bitwidth sensitive applications and uses thereof, with Rajkishore Barik. Filed for US Patent (Docket no IN920080085US1).
5. Automatic Identification of MPI Collective Communication Operation from a X10 program, with Ganesh Bikshandi, Igor Peshanski, and Vijay Saraswat. Filed for US Patent (Docket no IN920100180)
6. Selectively eliminating write barriers in snapshot-at-the beginning concurrent-marking garbage collectors, with David Detlefs. (US Patent no: 7685580)

Softwares

1. ATASYN: A static TCP server validator against SYN flooding. (15K lines approx)
2. RALF: A register allocation framework, that allows plug and play of register allocators inside the gcc compiler. (50K lines approx)
3. X10 Compiler: An optimizing compiler that translates X10 code to C++ code (part of X10 Team). (85K lines Approx)
4. XINC: A framework for the creation and sustenance of dynamic communities over mobile phones. (17K lines Approx)

Honours, Awards and Invited talks

- Recipient: 2012 Microsoft Research India Outstanding Young Faculty Award.
- HCP Challenge (Class II) Winner, at Supercomputing Conference year 2008: a joint submission of X10 and UPC teams.
- HCP Challenge (Class II) Winner, at Supercomputing Conference year 2007 (X10 Team submission).
- UCLA fellowship support 2005.
- Member Purdue University Beta Chapter of Upsilon Pi Epsilon, International Honor Society for Computing Sciences.
- GATE Score 99.31 *percentile* All India Rank = 20.
- Among the top 1% of the total applicants in IIT-JEE and Orissa JEE 1994.
- Won National, State and SAIL Scholarships (10th).

- Invited talk at ACM Chennai chapter meeting, held at IMSc, in Feb 2012: Title: “Multicore enablement of legacy code”.
- Invited talk at Ericsson Research Lab Chennai, on the Ericsson research day, in Jan 2012: Title: “Multicore enablement of legacy code”.
- Invited talk at ASPIRE workshop, held at IIT Madras, in Dec 2011. Title: “Role of parallel computing in near future”.
- Invited talk at JNTU Kakinada in Feb 2011. Title: “Optimizing for Multicore systems”.
- Invited talk at IWDS 2009, held at IIT Madras. Title: “Compiling for multi core systems”.
- Invited talk at JNTU Kakinada in Feb 2009. Title: “What, Why and How of Research”.
- Invited speaker at the satellite workshop on compiler techniques and applications (part of FSTTCS 2007): Talk title - “Compiling for Multicore systems”.

Social Activities

1. Program Committee: Member APSEC 2006, Member ICIT 2007, Member IEEE RE 2007, Member QSIC 2010, Member ISED 2010, WHMC 2010, India Publicity Chair PACT 2011, Member I-CARE 2011, Program Committee co-chair ICCCS 2012, Member I-CARE 2012, Member ADCOM 2012, Tutorial co-chair ICDCN 2013.
2. Reviewed papers for: Software Practices and Experiences, Science of Computer Programming, IEICE transactions on information and systems, VLSI Design 2007, PLDI 2010, OOPSLA 2011.
3. Board of Studies member JNTU Kakinada (from Mar 2009).