

Nikhil D. Hegde

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RESEARCH INTERESTS

I am interested in the areas of parallel and distributed computing, and programming languages. Specifically, I am interested in developing techniques to bridge the gap between performance and ease of programming of irregular applications on heterogeneous systems.

EDUCATION

| | | |
|--------|---|------|
| Ph.D | Electrical and Computer Engineering, Purdue University , West Lafayette, USA <i>Thesis: Distributed Execution of Recursive Irregular Applications</i> Advisor: Prof. Milind Kulkarni | 2019 |
| M.Tech | Computer Science and Engineering, Indian Institute of Technology , Madras, India <i>Thesis: Mobility Management and the Role of Mobile Node in Meghadoot Architecture</i> Advisor: Prof. C. Siva Ram Murthy | 2005 |
| B.E | Computer Science and Engineering, B.M.S.College of Engineering , Bangalore, India | 2002 |

POSITIONS SUMMARY

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|------------------------|---|----------------|
| Assistant Professor | Indian Institute of Technology Dharwad, Karnataka, India | 08/19 -present |
| Graduate Instructor | Purdue University, West Lafayette, USA | 06/19 - 08/19 |
| Teaching Assistant | Purdue University , West Lafayette, USA | 01/19 - 05/19 |
| Research Assistant | Purdue University , West Lafayette, USA | 2017 – 2018 |
| Summer Intern | Technology Manufacturing Group, AQS, Intel Corp. , Hillsboro, USA | 2017 |
| Research Assistant | Purdue University , West Lafayette, USA | 2014 – 2017 |
| Teaching Assistant | Purdue University , West Lafayette, USA | 2013 – 2014 |
| Senior Engineer | Mobile Communications Group, Intel India Pvt. Ltd. , Bangalore | 2012 – 2013 |
| Senior Engineer | Symbian Technology Group, Nokia India Pvt. Ltd. , Bangalore | 2010 – 2012 |
| Senior Engineer | AdsFLO India Pvt. Ltd. , Bangalore | 2007 – 2010 |
| Software Engineer – II | HPC Connectivity Group, STMicroelectronics India Pvt. Ltd. , Greater Noida | 2005 – 2007 |
| Software Engineer | Infosys Technologies Ltd. , Bangalore | 2002 – 2003 |

PUBLICATIONS

CONFERENCES

- **Nikhil Hegde**, Qifan Chang, and Milind Kulkarni. 2019. D2P: From Recursive Formulations to Distributed-Memory Codes. In *Proceedings of the International Conference for High Performance Computing, Networking, Storage, and Analysis (SC)*. <https://doi.org/10.1145/3295500.3356205>. Acceptance Rate: 23%
- **Nikhil Hegde**, Jianqiao Liu, and Milind Kulkarni. 2017. SPIRIT: A Framework for Creating Distributed Recursive Tree Applications. In *Proceedings of the International Conference on Supercomputing (ICS)*. ACM, New York, NY, USA, Article 3, 11 pages. <https://doi.org/10.1145/3079079.3079095>. Acceptance rate: 16%.
- **Nikhil Hegde**, Jianqiao Liu, Kirshanthan Sundararajah, and Milind Kulkarni. 2017. Treelogy: A benchmark suite for tree traversals. In *2017 IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS)*. 227-238. <https://doi.org/10.1109/ISPASS.2017.7975294>. Acceptance rate: 30%.

- Jianqiao Liu, **Nikhil Hegde**, and Milind Kulkarni. 2016. Hybrid CPUGPU Scheduling and Execution of Tree Traversals. In *Proceedings of the 2016 International Conference on Supercomputing (ICS'16)*. ACM, New York, NY, USA, Article 2, 12 pages. <https://doi.org/10.1145/2925426.2926261> Acceptance rate: 24%.
- K. Balaji, **N. Hegde**, B. V. Ramana, B. S. Manoj, and C. S. R. Murthy. 2005. Performance evaluation of a hybrid wireless network architecture for rural communication. In *2005 IEEE International Conference on Personal Wireless Communications, 2005. ICPWC 2005.* 212-216. <https://doi.org/10.1109/ICPWC.2005.1431334>
- **N. Hegde**, K. Balaji, B. V. Ramana, B. S. Manoj, and C. S. R. Murthy. 2005. Implementation and Performance Evaluation of a Hybrid Wireless Network Architecture for Rural Communication. In *Proceedings of the Eleventh National Conference on Communications: NCC-2005*. ISBN: 8177647350 9788177647358

TECHNICAL REPORTS

- **Nikhil Hegde**, Qifan Chang, and Milind Kulkarni. 2018. *D2P: Automatically generating distributed dynamic programming codes*. School of Electrical and Computer Engineering Technical Report TR-ECE-18-09. Purdue University, West Lafayette, IN, USA. <https://docs.lib.purdue.edu/ecetr/492>

AWARDS, GRANTS, and SERVICE

- Invited to be a member of the Technical Program Committee for the Software track of the International Conference on Parallel Processing (ICPP20), Edmonton, Alberta, Canada. 2020
- “D2P: A framework for code generation and distributed-memory parallelization of dynamic programming algorithms”. Allocation Manager: (PI: Milind Kulkarni), 11/18 - 11/19, XSEDE Startup Grant TG-ASC170007 2018
- NSF travel grant to attend ISPASS, Santa Rosa, CA. 2017
- NSF travel grant to attend IISWC, Providence, RI. 2016

TALKS AND PRESENTATIONS

- SPIRIT: A runtime system for distributed irregular tree applications
International Conference on Supercomputing (ICS), Chicago 2017
- Treelogy: a benchmark suite for tree traversal applications
IEEE International Symposium on Performance Analysis of Systems and Software (ISPASS), Santa Rosa 2017
- Implementation and Performance Evaluation of a Hybrid Wireless Network Architecture for Rural Communication
National Conference on Communications (NCC), IIT Kharagpur, India 2005

POSTERS

- SPIRIT: A runtime system for distributed irregular tree applications
Principles and Practice of Parallel Programming (PPoPP), Barcelona 2016
- Treelogy: a benchmark suite for tree traversal applications
IEEE International Symposium on Workload Characterization (IISWC), Providence 2016

SOFTWARE CREATED

- SPIRIT and Treelogy - <https://bitbucket.org/plcl/treelogy>
- D2P - <https://bitbucket.org/plcl/d2p>

OTHER PROJECTS

- WaSP: Ensemble-based Warm-Starting Parameter Initialization for Training of Neural Network Models (Purdue University, Research project, 2/2016).
- A compiler for the LITTLE programming language (Purdue University, ECE573 project, 12/2013).

TEACHING EXPERIENCE

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|---------------------|---|------------------------------------|
| Graduate Instructor | Electrical and Computer Engineering, Purdue University Advanced C Programming (ECE264) <ul style="list-style-type: none">Fully responsible for teaching the course: updating the course content, delivering lectures to a large class, holding office hours, preparing exams, managing tools (GitHub Classroom, Piazza), designing and updating the course webpage for efficient realization of course objectives; https://hegden.github.io/ece264 | 6/2019 – 8/2019 |
| Teaching Assistant | Electrical and Computer Engineering, Purdue University Introduction to Data Science (ECE29595) Introduction to ASIC Design (ECE337) <ul style="list-style-type: none">Delivered short lectures at the beginning of the lab session, assisted students on their programming tasks, graded assignments and exams, advised on project execution and presentation. | 1/2019 – 5/2019 8/2013 – 5/2014 |
| Lab Assistant | Computer Science and Engineering, Indian Institute of Technology, Madras Paradigms of Programming (CS3100) Introduction to Computer Science and Engineering (CS1300) <ul style="list-style-type: none">Assisted students on their programming tasks. | 8/2004 – 4/2005 |

PROFESSIONAL EXPERIENCE

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|-----------------|---|------------------|
| Intern | Advanced Quality Systems, MTD, Intel Corp., Hillsboro, USA <ul style="list-style-type: none">Built predictive models using machine learning techniques to accurately predict yield and quality in Intel's chip manufacturing lines | 5/2017 – 8/2017 |
| Senior Engineer | Mobile Communications Group, Intel India Pvt. Ltd., Bangalore <ul style="list-style-type: none"><i>Development, and integration of GPS receiver software modules on cellular platform.</i> Designed and developed modules to support different positioning protocols: OTDOA, Assisted-GPS (AGPS), Network-based, and LTE Positioning Protocol. | 7/2012 – 8/2013 |
| Senior Engineer | Nokia India Pvt. Ltd., Bangalore <ul style="list-style-type: none"><i>Creation of hardware adaptation and OS layer for GPS receiver chips used in Nokia smartphones.</i> Ported I2C driver for SMP compliance, improved Symbian OS scheduler, developed location services protocols (RRLP, RRC, SUPLV1.0) and tested for GCF and PTCRB compliance, developed modules to support Assisted-GPS and network-based positioning technologies.<i>Creation of robust authentication methods for Mobile Device Management (DM)</i> Developed modules to support mutual-authentication of mobile device and DM server. | 6/2010 – 6/2012 |
| Senior Engineer | AdsFLO India Pvt. Ltd., Bangalore <ul style="list-style-type: none"><i>Creation of targeted mobile advertising solutions for iOS, WinCE, Symbian based smartphones, and DVB-H based devices.</i> Supported demonstration of the product at MWC (2007 – 2009), and CES (2008 – 2009), developed Ad-scheduling algorithms to ensure fairness, optimize fill rate, and minimize Ad fatigue, developed Electronic Service Guide (ESG), and applied basic image-processing and error-correction algorithms.<i>Recruitment for the mobile devices team</i> Conducted technical interviews and mentored new employees | 10/2007 – 5/2010 |

- Software Engineer – II **STMicroelectronics India Pvt. Ltd.**, Greater Noida 7/2005 – 10/2007
- *Design and development of link-layer software for the DVB-H receiver chip.*
Modeled memory controller, Reed-Solomon encoder, and DVB-H traffic decoder in software.
Performed link layer validation of DVB-H IP on FPGA, Implemented drivers for taped-out chip.
- Software Engineer **Infosys Technologies Ltd.**, Bangalore 12/2002 – 7/2003
- Tested MPLS enabled network switches.

SKILLS

Programming: C, C++, Symbian C++, Objective C, Perl, Python, Shell, OpenGL-ES, Linux Kernel, MPI, OpenMP, Pthreads, Boost Graph Libraries.

Debuggers: Lauterbach, Trace-32, Fastrace, ARM extended debugger (AXD), Multi-ICE, gdb.

Others: Spirent ULTS, Cadence SimVision, WireShark Network Traffic Analyzer, OpenSSL, JBoss, and Tomcat, LaTeX.

Versioning and Quality: Rational tool chain, SVN, CVS, Git, Bugzilla.