

Anand Padmanabha Iyer

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Education

MAY 2019 **Ph.D in Computer Science**, *University of California*, Berkeley.
(*expected*) ADVISOR: Ion Stoica

MAY 2008 **Masters in Computer Science**, *University of Texas*, Austin.
ADVISOR: Lili Qiu
THESIS: Efficient Transmissions & Recovery in Wireless LANs.

2003 **Bachelors in Electrical Engineering**, *College of Engineering*, Trivandrum.

Awards & Honors

- *Best Paper*, ACM SIGMOD GRADES 2018
- *Finalist*, ACM Student Research Competition, SOSP 2017
- Highest GPA (4.0/4.0) among all graduating students (≈ 35) in CS department, University of Texas at Austin, May 2008.

Research Projects

- UC Berkeley
- TEGRA enables ad-hoc analytics on evolving graph-structured data by proposing an efficient in-memory state-store for time-evolving graphs and computation states, exposing it via a simple abstraction, and providing a non-monotonic incremental computation model that leverages it. This results in upto an order of magnitude gains compared to state-of-the-art systems.
 - ASAP leverages approximation for graph pattern mining that slashes the time to do pattern mining on billion-edge graphs from hours to minutes.
 - I explored the possibility of automating diagnosis in cellular networks by building detailed performance models at the bearer level.
 - GAP proposes the use of simple machine learning to bring approximate computation capabilities to iterative graph processing.
 - MONARCH speeds up geo-distributed graph computations using a new computation model that significantly reduces the need to shuffle data across WANs.
 - CELLSCOPE uses novel ways of grouping method and multi-task learning to mitigate the effect of latency-accuracy trade-off in mobile data analytics systems.
 - CELLIQ is a system that identifies common real-time analysis tasks in cellular networks and proposes abstractions for efficiently executing them.
 - SIFT is a massively parallel, distributed spatial index that *resists* skews using multiple levels of indexing.
 - Based on extensive survey results that a large fraction of accidents are rear-ends at low speeds, GADFLY uses smartphone sensors and a cloud based service to provide real-time collision warnings.
 - FASTLANE is an in-network drop notification that significantly reduces high percentile flow completion time with minimal effects on bandwidth and buffers.
 - CARAT uses crowd-sourcing (userbase of $\approx 1M$) and statistical techniques to provide per-user reports on which applications are responsible for abnormally heavy battery usage.

- MSR
 - PORTENDER uses machine learning to predict impending hand-offs and then freezes TCP connections to avoid timeouts thereby improving application performance.
 - SPECNET is the first platform that networks spectrum analyzers around the world and provides an API that allows users to implement complex distributed sensing tasks.
 - EZ is one of the first systems to avoid pre-deployment efforts in indoor localization by using a genetic algorithm. It has been incorporated into Microsoft products.

- UT Austin
 - FRJ optimizes wireless performance using a partial recovery aware rate adaptation scheme.
 - ER reduces retransmissions in wireless LANs using network coding techniques.

Publications

(Papers & talks available [here](#). Academic impact in terms of citations can be found on [Google Scholar](#))

In Submission

- S1 **TEGRA: Efficient Ad-hoc Analytics on Time Evolving Graphs** [↗](#),
Anand Padmanabha Iyer, Qifan Pu, Kishan Patel, Joseph E. Gonzalez, Ion Stoica.
- S2 **Enriching Driving Experience with Cloud Assistance** [↗](#),
Anand Padmanabha Iyer, Srikanth Kandula, Victor Bahl, Ion Stoica.

Refereed Conferences & Workshops

- MobiCom '18 **Mitigating the Latency-Accuracy Trade-off in Mobile Data Analytics Systems**,
Anand Padmanabha Iyer, Li Erran Li, Mosharaf Chowdhury, Ion Stoica.
24th ACM Annual International Conference on Mobile Computing and Networking
- OSDI '18 **ASAP: Fast, Approximate Graph Pattern Mining at Scale**,
Anand Padmanabha Iyer, Zaoxing Liu, Xin Jin, Shivaram Venkataraman, Vladimir Braverman, Ion Stoica.
13th USENIX Symposium on Operating Systems Design and Implementation
- HotCloud '18 **Monarch: Gaining Command on Geo-Distributed Graph Analytics**,
Anand Padmanabha Iyer, Aurojit Panda, Mosharaf Chowdhury, Aditya Akella, Scott Shenker, Ion Stoica.
10th USENIX Workshop on Hot Topics in Cloud Computing
- HotCloud '18 **Towards Fast and Scalable Graph Pattern Mining**,
Anand Padmanabha Iyer, Zaoxing Liu, Xin Jin, Shivaram Venkataraman, Vladimir Braverman, Ion Stoica.
10th USENIX Workshop on Hot Topics in Cloud Computing
- GRADES '18 **Bridging the GAP: Towards Approximate Graph Analytics**,
Anand Padmanabha Iyer, Aurojit Panda, Shivaram Venkataraman, Mosharaf Chowdhury, Aditya Akella, Scott Shenker, Ion Stoica.
ACM SIGMOD Joint International Workshop on Graph Data Management Experiences & Systems (GRADES) and Network Data Analytics (NDA)
AWARDED BEST PAPER
- MobiCom '17 **Automating Diagnosis of Cellular Radio Access Network Problems**,
Anand Padmanabha Iyer, Li Erran Li, Ion Stoica.
23rd ACM Annual International Conference on Mobile Computing and Networking
- SoCC '17 **A Scalable Distributed Spatial Index for the Internet-of-Things**,
Anand Padmanabha Iyer, Ion Stoica.
2017 ACM Symposium on Cloud Computing

- GRADES '16 **Time-evolving Graph Processing at Scale,**
Anand Padmanabha Iyer, Li Erran Li, Tathagata Das, Ion Stoica.
 4th ACM SIGMOD International Workshop on Graph Data Management Experiences and Systems
- SoCC '15 **FastLane: Making Short Flows Shorter with Agile Drop Notification,**
David Zats, Anand Padmanabha Iyer, Ganesh Ananthanarayanan, Rachit Agarwal, Randy H. Katz, Ion Stoica, Amin Vahdat.
 2015 ACM Symposium on Cloud Computing
- NSDI '15 **CellIQ: Real-Time Cellular Network Analytics at Scale,**
Anand Padmanabha Iyer, Li Erran Li, Ion Stoica.
 12th USENIX Symposium on Networked Systems Design and Implementation
- SenSys '13 **Carat: Collaborative Energy Diagnosis for Mobile Devices,**
Adam J. Oliner, Anand Padmanabha Iyer, Eemil Lagerspetz, Sasu Tarkoma, Ion Stoica.
 11th ACM Conference on Embedded Networked Sensor Systems
- HotDep '12 **Carat: Collaborative Energy Debugging for Mobile Devices,**
Adam J. Oliner, Anand Padmanabha Iyer, Eemil Lagerspetz, Sasu Tarkoma, Ion Stoica.
 8th USENIX Workshop on Hot Topics in System Dependability
- NSDI '11 **SpecNet: Spectrum Sensing Sans Frontières,**
Anand Padmanabha Iyer, Krishna Chintalapudi, Vishnu Navda, Ramachandran Ramjee, Venkata N Padmanabhan, Chandra R. Murthy.
 8th USENIX Symposium on Networked Systems Design and Implementation
- MobiCom '10 **Indoor Localization Without the Pain,**
Krishna Chintalapudi, Anand Padmanabha Iyer, Venkata N Padmanabhan.
 16th ACM Annual International Conference on Mobile Computing and Networking
- GlobeCom '10 **Cyclostationary-based Architectures for Spectrum Sensing in IEEE 802.22 WRAN,**
Deepa Bhargavi, Anand Padmanabha Iyer, Chandra R. Murthy.
 IEEE Global Communications Conference
- IWQoS '09 **Fast Resilient Jumbo Frames in Wireless LANs,**
Anand Padmanabha Iyer, Gaurav Deshpande, Eric Rozner, Apurv Bhartia, Lili Qiu.
 IEEE/ACM International Symposium on Quality of Service
- IWCMC '09 **Handling Mobility Across WiFi and WiMAX,**
Anand Padmanabha Iyer, Jay Iyer.
 IEEE International Wireless Communications and Mobile Computing Conference
- CoNEXT '07 **ER: Efficient Retransmission Scheme for Wireless LANs,**
Eric Rozner, Anand Padmanabha Iyer, Yogita Mehta, Lili Qiu, Mansoor Jafry.
 ACM International Conference on emerging Networking EXperiments and Technologies

Theses

- Masters **Efficient Transmissions & Recovery in Wireless LANs,**
Anand Padmanabha Iyer.
 University of Texas at Austin, 2008
- Bachelors **GPS based Time Synchronization & Determination of Oscillator Stability by Time-Error Measurement,**
Anand Padmanabha Iyer.
 College of Engineering Trivandrum, 2003
 CARRIED OUT AT INDIAN SPACE RESEARCH ORGANIZATION (ISRO)

Demonstrations

VLDB '12 **Blink and it's Done: Interactive Queries on Very Large Data**,
Sameer Agarwal, Aurojit Panda, Barzan Mozafari, Anand Padmanabha Iyer, Samuel Madden, Ion Stoica.

38th International Conference on Very Large Databases

Technical Reports

TR1 **Fast and Accurate Performance Analysis of LTE Radio Access Networks**,
Anand Padmanabha Iyer, Mosharaf Chowdhury, Li Erran Li, Ion Stoica.

TR2 **Portender: Improving Mobile Applications Through Cellular Handoff Prediction** [↗](#),
Anand Padmanabha Iyer, Vishnu Navda, Venkata N. Padmanabhan, Ramachandran Ramjee.

Talks

- **Mitigating the Latency-Accuracy Trade-off in Mobile Data Analytics Systems**
 - *MobiCom 2018*, November 2018, New Delhi, India

- **ASAP: Fast, Approximate Graph Pattern Mining at Scale**
 - *OSDI 2018*, October 2018, Carlsbad, CA
 - *CapitalOne*, February 2018, San Francisco, CA
 - *Splunk*, February 2018, San Francisco, CA
 - *RISELab Winter Retreat*, January 2018, Santa Cruz, CA
 - *Facebook*, March 2017, Menlo Park, CA
 - *Spark Summit*, 2016, Boston, MA

- **Time-evolving Graph Processing on Commodity Clusters**
 - *CapitalOne*, February 2018, San Francisco, CA
 - *Splunk*, February 2018, San Francisco, CA
 - *ACM Student Research Competition*, Finals, November 2017, SOSR, Shanghai, China
 - *Facebook*, March 2017, Menlo Park, CA
 - *RISELab Winter Retreat*, January 2017, Berkeley, CA
 - *Spark Summit*, 2016, Boston, MA
 - *SIAM Conference*, 2016, Atlanta, GA

- **Monarch: Gaining Command on Geo-Distributed Graph Analytics**
 - *HotCloud 2018*, October 2017, Boston, MA

- **Towards Fast and Scalable Graph Pattern Mining**
 - *HotCloud 2018*, October 2017, Boston, MA

- **Bridging the GAP: Towards Approximate Graph Analytics**
 - *GRADES 2018*, October 2018, Houston, TX

- **Automating Diagnosis of Cellular Radio Access Network Problems**
 - *MobiCom 2017*, October 2017, Salt Lake City, UT

- **A Scalable Spatial Index for the Internet-of-Things**
 - *SoCC 2015*, October 2017, San Jose, CA

- **CellIQ: Real-time Cellular Network Analytics at Scale**
 - *NSDI 2015*, March 2015, Oakland, CA
- **SpecNet: Spectrum Sensing Sans Frontières**
 - *NSDI 2011*, March 2011, Boston, MA
 - *Connecting the Next Billion Summit*, August 2010, Agra, India

Teaching & Mentoring

- 2016-2018 **Research Mentor Undergraduates:** Christopher Ray-Zhang (2016), Kishan Patel (2016-17), Omkar Shanbhag (2018), Dominic Croce (2018), Jack Yang (2018), Eric You (2018), Mohammed Arfeen (2018), Aditya Mishra (2018), Jay Shenoy (2018) **Ph.D.:** Caroline Lemieux (2016), Alex Reinking (2016), Qifan Pu (2016-17), Jeongseok Son (2017), Zaoxing (Alan) Liu (2017-18).
- Fall 2015 **Graduate Student Instructor**, UC Berkeley. TA for CS168: Introduction to the Internet: Architecture and Protocols with Prof. Scott Shenker. Handled homework assignments and helped in and grading exams (class size \approx 360).
- Fall 2012 **Graduate Student Instructor**, UC Berkeley. TA for EE122: Introduction to Communication Networks with Prof. Scott Shenker. Handled twice weekly discussion sections, and weekly office hours. Helped with class projects.
- Spring 2007 **Graduate Teaching Assistant**, University of Texas at Austin. TA for CS310: Computer Organization & Programming with (Late) Prof. Chris Edmondson-Yurkanan. Handled twice weekly discussion sections (each \approx 40 students).

Patents

([Google Patents](#) / [Justia Patents](#))

- Grant 2015 **Enriching driving experience with cloud assistance**,
Paramvir Bahl, Srikanth Kandula, Anand Padmanabha Iyer.
US Patent 9218750
- Grant 2014 **System and method for providing mobility in a network environment**,
Jayaraman Iyer, Anand Padmanabha Iyer.
US Patent 8665819
- Filed 2013 **Collaborative Energy Diagnosis for Mobile Devices**,
Adam J. Oliner, Anand Padmanabha Iyer, Eemil Lagerspetz, Sasu Tarkoma, Ion Stoica.
Filed through UC Berkeley
- Grant 2011 **Simultaneous localization and RF modeling**,
Krishna Kant Chintalapudi, Venkata N. Padmanabhan, Anand Padmanabha Iyer.
US Patent 8077090
- Filed 2011 **Client side cellular handoff prediction**,
Vishnu Navda, Ramachandran Ramjee, Venkata N. Padmanabhan, Anand Padmanabha Iyer.

Service & Leadership

- 2018 **Berkeley EECS Faculty Search Committee**,
Student representative in the 2018 faculty search committee. Reviewed applicant profiles, attended candidate talks, met candidates personally and made recommendation to the search committee.

- 2018 **Berkeley EECS Graduate Admissions Committee**,
Operating Systems & Networking (OSNT) area student representative for Ph.D. and master's admissions. Reviewed applicant profiles, personally presented OSNT area admission recommendation to committee.
- 2016-2018 **Berkeley EECS Graduate Admissions Visit Day**,
OSNT peer advisor for prospective Ph.D. students.
- 2013 **Organizing Committee Member, ACM S3 Workshop** (Co-located with MobiCom)
External reviewer: NSDI, SOSp, OSDI, SIGCOMM, SysML, and others.

Experience

Research

- Summer 2014 **Research Intern**, *Bell Labs*, New Jersey.
Worked under the mentorship of Dr. Li Erran Li on building a system to analyze cellular networks. Published the work at NSDI '15.
- Summer 2012 **Research Intern**, *Microsoft Research*, Redmond.
Worked under the mentorship of Dr. Victor Bahl and Dr. Srikanth Kandula
- 2009-2011 **Assistant Researcher**, *Microsoft Research*, Bangalore, India.
Worked under the mentorship of Dr. Venkata N. Padmanabhan, Dr. Ram Ramjee, Dr. Krishna Chintalapudi & Dr. Vishnu Navda

Industry

- 2008-2009 **Software Engineer II**, *Cisco*, San Jose, CA.
Worked with the Wireless Networking Business Unit (WNBU) on Radio Resource Management (RRM). Implemented leader election protocol on wireless controllers.
- Summer 2007 **Intern**, *Cisco*, San Jose, CA.
Worked with Mobile Wireless Group on handling mobility across WiFi and WiMAX. Filed patent and published the work at IWCMC.
- 2004-2006 **Development Specialist**, *SAP Labs*, Bangalore, India.
Worked on enhancements in the Supply Chain Management module in SAP.
- 2003-2004 **Programmer Analyst**, *Cognizant Technologies*, Chennai, India.
Worked on billing and order management system for AT&T.

References

Available upon request.