

# Guna Prasaad

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## INTERESTS

I am interested in data-intensive systems research. I like to build principled systems using techniques from databases, distributed systems and programming languages research. My current research focuses on building efficient state management solutions to power cloud applications.

## EDUCATION

**University of Washington, Seattle** 2016-  
Graduate Student, Computer Science & Engineering  
*Advisors: Dan Suciu, Alvin Cheung*

**Indian Institute of Technology Bombay, Mumbai** 2011-15  
B.Tech., Computer Science & Engineering  
*Advisor: S. Sudarshan*

## INDUSTRY EXPERIENCE

**Research Intern** Jun '17 - Sep '17  
*Microsoft Research, Redmond*

**Research Assistant** Jul '15 - Sep '16  
*Microsoft Research India, Bangalore*

**Research Intern** May '14 - Aug '14  
*Adobe Advanced Technologies Lab*

## HONORS

- Awarded CSE Research Fellowship, University of Washington, 2016
- Recipient of Narotam Sheksharia Scholarship for Undergraduate Studies, 2012
- Recipient of the KVPY Scholarship by the Government of India (2011), with All India Rank 13
- Certificate of Merit in CS (2011); Awarded to top 1% students by CBSE (India)
- All India Rank 326 in IIT-JEE 2011, among 500,000 candidates

## RESEARCH PROJECTS

**Improving OLTP Performance via Transaction Scheduling** Winter '17-  
*Advisors: Dan Suciu, Alvin Cheung (University of Washington)*

- Proposed a *novel scheme* that batches together transactions; partitions them into several conflict-free clusters and executes each cluster on a single core without any concurrency control.
- Developed a low-overhead parallel clustering algorithm that is an *order-of-magnitude faster* than off-the-shelf graph partitioning and data clustering algorithms.
- Average *speedup of 2×* on high-contention workloads over traditional protocols.

**Fast Checkpointing of Databases & Key-Value Stores** Summer '17-  
*Mentor: Badrish Chandramouli (Microsoft Research Redmond)*

- Developed a new consistency called *concurrent prefix recovery* (CPR) that allows for low-overhead transactionally-consistent checkpointing of databases without any concurrency bottleneck.
- Presented algorithms for obtaining CPR checkpoint of a transactional database and a highly concurrent key-value store (FASTER) with *speedup of upto 10×* compared to state-of-the-art.

**FASTER: Concurrent Key-Value Store with In-Place Updates** Summer '17  
*Mentor: Badrish Chandramouli (Microsoft Research Redmond)*

- Developed a cache-optimized concurrent hash index along with a hybrid log-structured allocator spanning memory and secondary storage that exploits fast in-place updates in memory.
- Achieves *orders-of-magnitude* better throughput - up to 160M ops/sec on a single multicore machine on standard benchmarks.
- Internal project successfully *open-sourced* by Microsoft on Github (more than 2k ★)

### Scaling Ordered Stream Processing on Shared-Memory Multicores

2015-16

Advisors: G. Ramalingam, Kaushik Rajan (Microsoft Research India)

- Designed scalable low-latency concurrent data structures for ordered stream processing, along with strong theoretical guarantees on non-blocking properties.
- Explored a variety of dynamic scheduling techniques for adaptive stream processing and to efficiently exploit the latency throughput trade-off

### Buffer Trees as Index Structures for Larger-than-Memory Data

Spring '15

Advisor: S. Sudarshan (IIT Bombay)

- Designed and implemented an optimized version of *Buffer Trees* (Lars Arge, 1995). Improved design for primary key-inserts using bloom filters.
- Compared the implementation against B-Tree and LSM trees, both analytically and empirically on larger-than-memory workloads.

### Automated Linguistic Personalization of Email Campaigns

Summer '14

Mentor: Rishiraj Saha Roy (Adobe Advanced Technologies Lab India)

- Developed a novel method of personalizing email campaign messages using linguistic style of target segment and proved its usefulness using crowd-sourced experiments
- Designed an automated personalization tool for email marketing messages based on linguistic personality mined from social media content.

## PUBLICATIONS

### Pre-Print (or) Under Submission

- G. Prasaad, A. Cheung, D. Suci  
[Improving High Contention OLTP Performance via Transaction Scheduling](#)
- C. Yan, G. Prasaad, A. Cheung, D. Suci  
[All you need is ASK: Leveraging Application-Specific Knowledge to Build Databases](#)
- G. Prasaad, B. Chandramouli, D. Kossmann  
[Concurrent Prefix Recovery: Performing CPR on a Database](#)
- G. Prasaad, G. Ramalingam, K. Rajan  
[Scaling Ordered Stream Processing on Shared-Memory Multicores](#)

### Peer-reviewed Conferences

- B. Chandramouli, G. Prasaad, D. Kossmann, J. Levandoski, J. Hunter, M. Barnett  
[FASTER: A Concurrent Key-Value Store with In-Place Updates](#)  
*ACM Special Interest Group on Management of Data (SIGMOD 2018)*
- R. S. Roy, A. Padmakumar, G. P. Jeganathan, and P. Kumaraguru  
[Automated Linguistic Personalization of Targeted Marketing Messages Mining User-Generated Text on Social Media](#)  
*Computational Linguistics and Intelligent Text Processing (CICLing 2015)* **[Best Paper Award]**

### Demonstrations

- B. Chandramouli, G. Prasaad, D. Kossmann, J. Levandoski, J. Hunter, M. Barnett  
[FASTER: An Embedded Concurrent Key-Value Store for State Management](#)  
*International Conference on Very Large Data Bases (VLDB 2018)*

### Patents

- B. Chandramouli, G. Prasaad, D. Kossmann, J. Levandoski, J. Hunter, M. Barnett  
[FASTER Key-Value Store System](#)  
*USPTO Appl. No. 15/917,352 (Pending)*
- R. S. Roy, G. P. Jeganathan, A. Padmakumar, and P. Kumaraguru  
[Linguistic Personalization of Messages for Targeted Campaigns](#)  
*USPTO App No. 14/566,181 (Pending)*

## TEACHING & MENTORING

- Head Teaching Assistant, Intro to CS (CS101), IIT Bombay** 2014-15  
Headed a team of 10 teaching assistants responsible for assignments, exams and projects for a class of 500 freshmen taking introductory course on computer science.
- Teaching Assistant, Undergrad Programming Languages (CS302), IIT Bombay** Spring '15  
Responsible for helping with creation and evaluation of homework assignments and grading of exams for the undergraduate programming languages course.
- Department Academic Mentor, IIT Bombay** 2014-15  
Mentored a group of 14 junior students on academic issues and helped cope up with academic pressure and complete the course of study successfully.

## LEADERSHIP & SERVICE

- Databases & Blockchains Seminar, University of Washington** Winter '18  
Organized a series of 10 talks by academics and practitioners on blockchains and databases.
- Deep Learning Meets Databases Seminar, University of Washington** Fall '17  
Curated topics and papers to guide a quarter-long discussion on deep learning and databases.
- Manager of Programming Club, IIT Bombay** 2013-2014  
Organized 22 events comprising talks, workshops and competitions over a wide range of programming topics. Promoted open source contributions through GSOC and participation in programming contests such as ACM-ICPC.

## TALKS & SEMINARS

- **Mechanics of Blockchains**  
*Databases and Blockchains Seminar, University of Washington (Winter '18)*
- **How Can Machine Learning Help Databases**  
*UWDB Seminar (Fall '17)*
- **FASTER: A Concurrent Key-Value Store with In-Place Updates**  
*Microsoft Research Redmond (Summer '17)*
- **FAQ: Questions Asked Frequently (PODS 2016)**  
*UWDB Seminar (Fall '16)*
- **Designing a Stream Processing Engine for Shared-Memory Multicores**  
*Microsoft Research India, Bangalore (Feb '16)*
- **Buffer Trees: Index Structure for Read-Write Balanced Workloads**  
*Microsoft Research India, Bangalore (Mar '15)*
- **Linguistic Personalization using Social Media**  
*Adobe Advanced Technologies Lab, Bangalore, India (May '14)*  
*NLP-AI Group Seminar, IIT Bombay (Fall '14)*

## REFERENCES

- Dan Suciu** | Professor, University of Washington  
[suciu@cs.washington.edu](mailto:suciu@cs.washington.edu)
- Alvin Cheung** | Assistant Professor, University of Washington  
[akcheung@cs.washington.edu](mailto:akcheung@cs.washington.edu)
- Badrish Chandramouli** | Principle Researcher, Microsoft Research Redmond  
[badrishc@microsoft.com](mailto:badrishc@microsoft.com)
- G. Ramalingam** | Principle Researcher, Microsoft Research India  
[grama@microsoft.com](mailto:grama@microsoft.com)
- S. Sudarshan** | Professor, IIT Bombay  
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