

# Nipun Batra

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## CURRENT ROLE

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### Assistant Professor

Computer Science and Engineering  
IIT Gandhinagar, Gujarat, India

*July 2018 - Present*

## EDUCATION

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### PhD in Computer Science, IIIT Delhi

Advisor: Amarjeet Singh, Kamin Whitehouse (University of Virginia)

Thesis: Systems and Analytical Techniques Towards Practical Energy Breakdown for Homes  
CGPA: 9.3/10.0

*Jan 2012 - Mar 2017 (submitted Nov 2016, defended Mar 2017)*

### B.E. in Computer Engineering,

Delhi College of Engineering, Delhi, India  
CGPA: 9/10.0

*Aug 2007 - May 2011*

### HSC [Class XII] (CBSE board),

Mount St. Mary's School, Delhi, India  
Percentage: 85.6

*Apr 2007*

### SSC [Class X] (CBSE board),

Mount St. Mary's School, Delhi, India  
Percentage: 92.2

*Apr 2005*

## GRANT, HONOURS AND AWARDS

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Microsoft AI for Earth Grant (USD 15000 in Azure credits)

*2018*

Excellence in Research Grant at IIT Gandhinagar

*2018*

Nvidia GPU grant

*2018*

Best video nominee (acceptance rate: 3.1%) at KDD

*2016*

Finalist in UChicago Delhi urban challenge (acceptance rate: 3.6%)

*2016*

3<sup>rd</sup> position in IoT Hackathon at MSR Summer School

*2016*

Best presentation award at SenSys Doctoral Colloquium

*2015*

Best demo award at Buildsys

*2014*

TCS PhD fellowship

*2012*

Systems engineering prize barrel, AUVSI's student UAS competition

*2010*

Director's award for best effort, AUVSI's student UAS competition

*2009*

Travel grants

AAAI grant for AAAI 2017; Google, MSR and ACM travel grant for KDD 2016; ACM travel grant for SenSys 2015; ACM travel grant for e-Energy 2014; Young scientist travel grant for AUVSI UAS competition from DST (Govt. of India) 2009.

## RESEARCH & INDUSTRIAL EXPERIENCE

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### Postdoctoral Scholar

Mar 2017 - Jun 2018

University of Virginia, Charlottesville.

Advisors: Kamin Whitehouse, Hongning Wang

– *Grants*

Assisted Kamin Whitehouse and Hongning Wang in writing the grant entitled - Collaborative Sensing: An Approach for Immediately Scalable Sensing in Buildings awarded \$425,000 by NSF.

– *Proposal presentations*

Presented our work at the annual NSF Cyber Physical Systems proposals meeting

Nov 2017

### Graduate Research Assistant

Jan 2012 - Mar 2017

IIT Delhi

### Visiting Research Scholar

Jun 2014 - Apr 2015

University of Virginia (with Kamin Whitehouse)

### Software Analyst

Jun 2011 - Nov 2011

Royal Bank of Scotland, Gurgaon, India

### Undergraduate Researcher

Dec 2010 - Jun 2011

Linux Android Network Systems Lab, Delhi College of Engineering

### Software Engineering Intern

Jun 2010 - Aug 2010

Goldman Sachs, Bangalore

### Undergraduate Research Intern

Dec 2008 - Jul 2010

Unmanned Aircraft Systems Lab, Delhi College of Engineering

## TEACHING EXPERIENCE

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### Operating Systems

*Instructor*

Autumn 2019

### Graduate Systems

*Instructor*

Autumn 2019

### Computer Networks (taught by Prof. Dheeraj Sanghi)

*Head Teaching Assistant*

Winter 2016

Class size of 160, took 1 guest lecture, managed other TAs, evaluations, and tutorials.

### Embedded Systems (taught by Dr. Amarjeet Singh)

*Teaching Assistant*

Winter 2013

Class size of 30, managed labs, evaluations, and took 1 guest lecture.

### Introduction to Programming (taught by Dr. Gaurav Gupta)

*Head Teaching Assistant*

Autumn 2012

Class size of 160, managed other TAs, took 4 guest lectures, labs, evaluations.

## PUBLICATIONS (GOOGLE SCHOLAR PROFILE)

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### Selected Peer-reviewed articles<sup>1</sup>

1. **Nipun Batra**, Yiling Jia, Hongning Wang, Kamin Whitehouse  
*Transferring Decomposed Tensors for Scalable Energy Breakdown across Regions*  
\* AAAI 2018. New Orleans, USA (**Acceptance rate: 25%**)
2. **Nipun Batra**, Hongning Wang, Amarjeet Singh, Kamin Whitehouse  
*Matrix Factorisation for Scalable Energy Breakdown*  
\* AAAI 2017. San Francisco, USA (**Acceptance rate: 25%**)

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<sup>1</sup>A\* or A conferences as per 2018 CORE CS rankings are highlighted using \*

3. **Nipun Batra**, Amarjeet Singh, Kamin Whitehouse  
*Gemello: Creating a Detailed Energy Breakdown from just the Monthly Electricity Bill*  
\* KDD 2016. San Francisco, USA (**Acceptance rate: 19%**)
4. **Nipun Batra**, Amarjeet Singh, Kamin Whitehouse  
*If You Measure It, Can You Improve It? Exploring The Value of Energy Disaggregation*  
\* Buildsys 2015. Seoul, Korea (**Acceptance rate: 29%**)
5. **Nipun Batra**, Jack Kelly, Oliver Parson, Haimonti Dutta, William Knottenbelt, Alex Rogers, Amarjeet Singh, and Mani Srivastava  
*NILMTK: An Open Source Toolkit for Non-intrusive Load Monitoring*  
ACM eEnergy 2014. Cambridge, UK (**Acceptance rate: 20%, 200+ citations**)
6. **Nipun Batra**, Manoj Gulati, Amarjeet Singh, and Mani Srivastava  
*It's Different: Insights into home energy consumption in India*  
\* Buildsys 2013, Rome, Italy (**80+ citations**)
7. Pandarasamy Arjunan, **Nipun Batra**, Haksoo Choi, Amarjeet Singh, Pushpendra Singh, and Mani Srivastava  
*SensorAct: A Privacy and Security Aware Federated Middleware for Building Management*  
\* Buildsys 2012, Waterloo, Canada, (**40+ citations**)

#### Other Peer-reviewed articles

1. Oliver Parson, Grant Fisher, April Hersey, **Nipun Batra**, Jack Kelly, Amarjeet Singh, William Knottenbelt, Alex Rogers  
*Dataport and NILMTK: A Building Data Set Designed for Non-intrusive Load Monitoring*  
GlobalSip, Orlando, FL, USA
2. **Nipun Batra**, Haimonti Dutta and Amarjeet Singh  
*INDiC: Improved Non-Intrusive load monitoring using load Division and Calibration*  
ICMLA 2013, Miami, USA
3. **Nipun Batra**, Pandarasamy Arjunan, Amarjeet Singh and Pushpendra Singh  
*Experiences with Occupancy Based Building Management Systems*  
ISSNIP 2013, Melbourne, Australia

#### Posters, Demos, and Doctoral Colloquiums

1. **Nipun Batra**  
*Non Intrusive Load Monitoring: Systems, Metrics and Use Cases*  
🏆 Sensys 2015 (**Best presentation award**)
2. Jack Kelly, **Nipun Batra**, Oliver Parson, Haimonti Dutta, William Knottenbelt, Alex Rogers, Amarjeet Singh, and Mani Srivastava  
*NILMTK v0. 2: A Non-intrusive Load Monitoring Toolkit for Large Scale Data Sets*  
🏆 Buildsys 2014 (**Best demo award**)
3. **Nipun Batra**, Manoj Gulati, Puneet Jain, Kamin Whitehouse and Amarjeet Singh  
*Bits and watts: improving energy disaggregation performance using power line communication modems*  
Buildsys 2014

#### Technical Reports

1. **Nipun Batra**, Rishi Baijal, Amarjeet Singh, Kamin Whitehouse  
*How good is good enough? Re-evaluating the bar for energy disaggregation*
2. **Nipun Batra**, Amarjeet Singh, Kamin Whitehouse  
*Neighbourhood NILM: A Big-data Approach to Household Energy Disaggregation*
3. **Nipun Batra**, Oliver Parson, Mario Berges, Amarjeet Singh, Alex Rogers  
*A comparison of non-intrusive load monitoring methods for commercial and residential buildings*  
(**20+ citations**)
4. **Nipun Batra**, Amarjeet Singh, Pushpendra Singh, Haimonti Dutta, Venkatesh Sarangan, and Mani Srivastava  
*Data Driven Energy Efficiency in Buildings*

## SERVICE

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### Publications Chair

- Buildsys 2018 2018  
Shenzen, China

### PC Chair

- 4th International NILM workshop (Expecting 100+ attendees, 10 oral talks, 20 posters) 2018  
Austin, Texas, USA

### Steering Committee

- 3rd International NILM workshop 2016  
Vancouver, Canada

### Program Committee

- Buildsys 2018 2018  
Shenzen, China
- 2nd International NILM workshop 2014  
Austin, Texas, USA

### External Reviewer

- Transactions on Mobile Computing, Buildsys 2015, Ubicomp 2015, E-Energy2015, E-Energy 2014, ASONAM 2013, E-Energy 2013, ICDM 2013, Buildsys 2013

### Institute Service

- Ph.D. bootcamp organiser and instructor for new Ph.D. admits at IIIT Delhi 2017
- Weekly Ph.D. seminar organiser 2015-2016
- Ph.D. induction 2013, 2014, 2015
- Teaching assistant induction 2014

## INVITED TALKS

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- IIT Gandhinagar, Chaitanya Khoj *AI for school children (300+ students from multiple schools attended)* 2018
- IIT Gandhinagar, Delhi, Bombay, Kanpur; IIIT Hyd; IISC, MSR India *The Billion Building Challenge* 2018
- Aspiring Minds Research, Delhi *The Billion Building Challenge* 2016
- IBM Research, Delhi *Towards practical energy breakdown* 2016
- Stanford University *Towards energy disaggregation for a 100 million homes* 2016
- University of Pennsylvania *If you can measure it, can you improve it?* 2015
- Carnegie Mellon University *If you can measure it, can you improve it?* 2015

## MENTORING

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- Yiling Jia, Ph.D. student at University of Virginia Mar 2017- Present  
*Transfer learning for energy breakdown across regions*  
Co-author
- Anmol Singh, B.Tech. at IIITD Jan 2017 - Aug 2017  
*Factorisation for scalable energy breakdown*  
Independent project
- Rishi Baijal, B.Tech. at IIITD Jan 2015 - Dec 2015  
*Non-intrusive occupancy detection*  
Bachelor's thesis

Ishaan Malhotra, B.Tech. at DTU  
*Smart meter based energy disaggregation*  
Bachelor's thesis

*July 2012 - Dec 2013*

Ayushi Aggarwal, B.Tech. at IITD  
*Reproducible energy disaggregation*  
Independent project

*Jan 2013 - Jul 2013*

Akshit Gupta, B.Tech. at IITD  
*Appliance energy modelling*  
Independent project, IITD

*Aug 2012 - Dec 2012*

## REFERENCES

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### **Kamin Whitehouse**

Associate Professor, University of Virginia  
Contact: whitehouse@virginia.edu

### **Amarjeet Singh**

Assistant Professor, IIT Delhi  
Contact: amarjeet@iiitd.ac.in

### **Hongning Wang**

Assistant Professor, University of Virginia  
Contact: hw5x@virginia.edu

### **Mani Srivastava**

Professor, UCLA  
Contact: mbs@ucla.edu

### **Pankaj Jalote**

Director, IIT Delhi  
Contact: jalote@iiitd.ac.in