

# Nipun Batra

Date of Birth: 15 Nov 1989

Nationality: Indian

Website: <https://sites.google.com/view/nipunbatra/>

Email: [nipun.batra@iitgn.ac.in](mailto:nipun.batra@iitgn.ac.in)

Address: 6/407D, Academic Block

IIT Gandhinagar, Gujarat, India - 382355

Github: <https://github.com/nipunbatra>

## 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

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

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

Thesis: Systems and Analytical Techniques Towards Practical Energy Breakdown for Homes

CGPA: 9.3/10.0

### 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*

## GRANTS

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**Co-PI:** Physics Guided Data Science Approach for Predictive Understanding of Hydrological Processes.

*2019*

**PI:** Microsoft AI for Earth Grant (USD 30000 in Azure credits (over two years))

*2018*

**PI:** IIT Gandhinagar Internal Grant

*2018*

**PI:** NVidia GPU grant

*2018*

## HONOURS AND AWARDS

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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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### Machine Learning

Instructor

Spring 2019

### Operating Systems

Instructor

Autumn 2018

### Graduate Systems

Instructor

Autumn 2018

### 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. Apoorv Agnihotri, **Nipun Batra**

*Exploring Bayesian Optimization*

Distill 2020

2. Yiling Jia, **Nipun Batra**, Hongning Wang, Kamin Whitehouse

*Active Collaborative Sensing for Energy Breakdown*

\* CIKM 2019

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

3. **Nipun Batra**, Rithwik Kukunuri, Ayush Pandey, Raktim Malakar, Rajat Kumar, Odysseas Krystalakos, Mingjun Zhong, Paulo Meira, Oliver Parson  
*Towards reproducible state-of-the-art energy disaggregation*  
\* Buildsys 2019
4. Yiling Jia, **Nipun Batra**, Hongning Wang, Kamin Whitehouse  
*A Tree-Structured Neural Network Model for Household Energy Breakdown*  
\* WWW 2019
5. Haroon Rashid, **Nipun Batra**, Pushpendra Singh  
*Rimor: Towards Identifying Anomalous Appliances in Buildings*  
\* Buildsys 2018
6. **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%**)
7. **Nipun Batra**, Hongning Wang, Amarjeet Singh, Kamin Whitehouse  
*Matrix Factorisation for Scalable Energy Breakdown*  
\* AAAI 2017. San Francisco, USA (**Acceptance rate: 25%**)
8. **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%**)
9. **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%**)
10. **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%, 225+ citations**)
11. **Nipun Batra**, Manoj Gulati, Amarjeet Singh, and Mani Srivastava  
*It's Different: Insights into home energy consumption in India*  
\* Buildsys 2013, Rome, Italy (**85+ citations**)
12. 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*  
(40+ 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