

# Nipun Batra

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## CURRENT ROLE

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### Postdoctoral Scholar

Mar 2017 - Present

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

## EDUCATION

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### PhD in Computer Science,

Jan 2012 - Present

IIIT Delhi

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

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

### B.E. in Computer Engineering,

Aug 2007 - May 2011

Delhi College of Engineering, Delhi, India

CGPA: 9.1/10.0

## 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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### Graduate Research Assistant

Jan 2012 - Mar 2017

IIIT 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  
Goldman Sachs, Bangalore

Jun 2010 - Aug 2010

Undergraduate Research Intern  
Unmanned Aircraft Systems Lab, Delhi College of Engineering

Dec 2008 - Jul 2010

## TEACHING EXPERIENCE

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### Computer Networks (under Prof. Dheeraj Sanghi)

– Head Teaching Assistant

Winter 2016

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

### Embedded Systems (under Dr. Amarjeet Singh)

– Teaching Assistant

Winter 2013

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

### Introduction to Programming (under 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%**)
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%, 150+ 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 (**60+ 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

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<sup>1</sup>A\* or A conferences as per [2018 CORE CS rankings](#) are highlighted using \*

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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### 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

- 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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|                                |  |      |
|--------------------------------|--|------|
| Aspiring Minds Research, Delhi | <i>The Billion Building Challenge</i>                        | 2016 |
| IBM Research, Delhi            | <i>Towards practical energy breakdown</i>                    | 2016 |
| Stanford University            | <i>Towards energy disaggregation for a 100 million homes</i> | 2016 |
| University of Pennsylvania     | <i>If you can measure it, can you improve it?</i>            | 2015 |
| Carnegie Mellon University     | <i>If you can measure it, can you improve it?</i>            | 2015 |

## MENTORING

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| Yiling Jia, Ph.D. student at University of Virginia          | Mar 2017- Present    |
| <i>Transfer learning for energy breakdown across regions</i> |                      |
| Co-author  |                      |
| Anmol Singh, B.Tech. at IIITD                                | Jan 2017 - Aug 2017  |
| <i>Factorisation for scalable energy breakdown</i>           |                      |
| Independent project  |                      |
| Rishi Baijal, B.Tech. at IIITD                               | Jan 2015 - Dec 2015  |
| <i>Non-intrusive occupancy detection</i>                     |                      |
| Bachelor's thesis  |                      |
| Ishaan Malhotra, B.Tech. at DTU                              | July 2012 - Dec 2013 |
| <i>Smart meter based energy disaggregation</i>               |                      |
| Bachelor's thesis  |                      |
| Ayushi Aggarwal, B.Tech. at IIITD                            | Jan 2013 - Jul 2013  |
| <i>Reproducible energy disaggregation</i>                    |                      |
| Independent project  |                      |
| Akshit Gupta, B.Tech. at IIITD                               | Aug 2012 - Dec 2012  |
| <i>Appliance energy modelling</i>                            |                      |
| Independent project, IIITD                                   |                      |

## REFERENCES

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### Kamin Whitehouse

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

### Amarjeet Singh

Assistant Professor, IIIT Delhi & Founder and CEO, Zenatix  
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, IIIT Delhi  
Contact: jalote@iiitd.ac.in