

## Education

### Indraprastha Institute of Information Technology Delhi

PH.D. SCHOLAR, COMPUTER SCIENCE (GPA 9.3/10)

Delhi, India

Jan 2012-Present

### Delhi College of Engineering

BACHELORS OF ENGINEERING (HONS.), COMPUTER SCIENCE (GPA 9/10)

Delhi, India

Jul 2007 -April 2011

## Honors & Awards

2015	<b>Best presentation award</b> , Sensys 2015 Doctoral Colloquium	Seoul, South Korea
2015	<b>ACM Travel Grant</b> , Sensys 2015	Seoul, South Korea
2014	<b>Best demo award</b> , Buildsys 2014	Memphis, USA
2014	<b>ACM Travel Grant</b> , eEnergy 2014	Cambridge, UK
2012	<b>PhD Fellowship</b> , TCS Research and Development	
2012	<b>Travel and Lodging grant</b> , Microsoft Research Summer School	Bangalore, India
2010	<b>Systems engineering prize barrel</b> , AUVSI's student UAS competition	Maryland, USA
2009	<b>Young scientist travel grant</b> , Department of Science and Technology (Govt. of India)	Delhi, India
2009	<b>Director's award for best effort</b> , AUVSI's student UAS competition	Maryland, USA

## Research Experience

### IIIT Delhi

GRADUATE RESEARCH ASSISTANT

Delhi, India

Jan. 2012 - Present

### University of Virginia (under Prof. Kamin Whitehouse)

VISITING RESEARCHER

Charlottesville, Virginia, USA

Jul. 2014 - Apr. 2015

### Linux Android Network Systems Lab., DCE

UNDERGRADUATE RESEARCH INTERN

Delhi, India

Dec. 2010 - Jun. 2011

### Unmanned Aircraft Systems Lab., DCE

UNDERGRADUATE RESEARCH ENGINEERING INTERN

Delhi, India

Dec. 2008 - Jul. 2010

## Industrial Experience

### Royal Bank of Scotland

SOFTWARE ANALYST

Gurgaon, India

Jun. 2011 - Nov. 2011

### Goldman Sachs

ENGINEERING INTERN

Bangalore, India

Jun. 2010 - Aug. 2010

## Invited Talks

2015	<b>University of Pennsylvania</b> , If you can measure it, can you improve it?	Philadelphia, USA
2015	<b>Carnegie Mellon University</b> , If you can measure it, can you improve it?	Pittsburgh, USA

## Professional Service

2016	<b>Steering committee</b> , 3rd International NILM workshop	Canada
2014	<b>Program committee</b> , 2nd International NILM workshop	Austin, Texas, USA

## Peer-reviewed conferences

- [1] ARJUNAN, P., BATRA, N., CHOI, H., SINGH, A., SINGH, P., AND SRIVASTAVA, M. B. Sensoract: a privacy and security aware federated middleware for building management. In *Proceedings of the Fourth ACM Workshop on Embedded Sensing Systems for Energy-Efficiency in Buildings* (2012), ACM, pp. 80–87.
- [2] ARJUNAN, P., SAHA, M., GULATI, M., BATRA, N., SINGH, A., AND SINGH, P. Sensoract: Design and implementation of fine-grained sensing and control sharing in buildings. *the poster track of 10th USENIX Symposium on Networked Systems Design and Implementation (NSDI'13)* (2013).

- [3] BATRA, N. Non intrusive load monitoring: Systems, metrics and use cases. In *Proceedings of the 13th ACM Conference on Embedded Networked Sensor Systems* (2015), ACM, pp. 501–502.
- [4] BATRA, N., ARJUNAN, P., SINGH, A., AND SINGH, P. Experiences with occupancy based building management systems. *Intelligent Sensors, Sensor Networks and Information Processing, 2013 IEEE Eighth International Conference on* (2013), 153–158.
- [5] BATRA, N., BAIJAL, R., SINGH, A., AND WHITEHOUSE, K. How good is good enough? re-evaluating the bar for energy disaggregation. *arXiv preprint arXiv:1510.08713* (2015).
- [6] BATRA, N., DUTTA, H., AND SINGH, A. Indic: Improved non-intrusive load monitoring using load division and calibration. *12th International Conference on Machine Learning and Applications (ICMLA'13)* (2013).
- [7] BATRA, N., GULATI, M., JAIN, P., WHITEHOUSE, K., AND SINGH, A. Bits and watts: improving energy disaggregation performance using power line communication modems: poster abstract. In *Proceedings of the 1st ACM Conference on Embedded Systems for Energy-Efficient Buildings* (2014), ACM, pp. 210–211.
- [8] BATRA, N., GULATI, M., SINGH, A., AND SRIVASTAVA, M. B. It's different: Insights into home energy consumption in india. In *Proceedings of the 5th ACM Workshop on Embedded Systems For Energy-Efficient Buildings* (2013), ACM, pp. 1–8.
- [9] BATRA, N., KELLY, J., PARSON, O., DUTTA, H., KNOTTENBELT, W., ROGERS, A., SINGH, A., AND SRIVASTAVA, M. Nilmtk: an open source toolkit for non-intrusive load monitoring. In *Proceedings of the 5th international conference on Future energy systems* (2014), ACM, pp. 265–276.
- [10] BATRA, N., PARSON, O., BERGES, M., SINGH, A., AND ROGERS, A. A comparison of non-intrusive load monitoring methods for commercial and residential buildings. *arXiv preprint arXiv:1408.6595* (2014).
- [11] BATRA, N., SINGH, A., SINGH, P., DUTTA, H., SARANGAN, V., AND SRIVASTAVA, M. Data driven energy efficiency in buildings. *arXiv preprint arXiv:1404.7227* (2014).
- [12] BATRA, N., SINGH, A., AND WHITEHOUSE, K. If you measure it, can you improve it?: Exploring the value of energy disaggregation. In *Proceedings of the 2nd ACM International Conference on Embedded Systems for Energy-Efficient Built Environments* (2015), ACM, pp. 191–200.
- [13] BATRA, N., SINGH, A., AND WHITEHOUSE, K. Neighbourhood nilm: A big-data approach to household energy disaggregation. *arXiv preprint arXiv:1511.02900* (2015).
- [14] KELLY, J., BATRA, N., PARSON, O., DUTTA, H., KNOTTENBELT, W., ROGERS, A., SINGH, A., AND SRIVASTAVA, M. Demo abstract: Nilmtk v0. 2: A non-intrusive load monitoring toolkit for large scale data sets. *arXiv preprint arXiv:1409.5908* (2014).
- [15] KELLY, J., BATRA, N., PARSON, O., DUTTA, H., KNOTTENBELT, W., ROGERS, A., SINGH, A., AND SRIVASTAVA, M. Nilmtk v0. 2: a non-intrusive load monitoring toolkit for large scale data sets: demo abstract. In *Proceedings of the 1st ACM Conference on Embedded Systems for Energy-Efficient Buildings* (2014), ACM, pp. 182–183.
- [16] PARSON, O., FISHER, G., HERSEY, A., BATRA, N., KELLY, J., SINGH, A., KNOTTENBELT, W., AND ROGERS, A. Dataport and nilmtk: A building data set designed for non-intrusive load monitoring.

## Tech. reports

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- [1] ARJUNAN, P., BATRA, N., CHOI, H., SINGH, A., SINGH, P., AND SRIVASTAVA, M. B. Sensoract: a privacy and security aware federated middleware for building management. In *Proceedings of the Fourth ACM Workshop on Embedded Sensing Systems for Energy-Efficiency in Buildings* (2012), ACM, pp. 80–87.
- [2] ARJUNAN, P., SAHA, M., GULATI, M., BATRA, N., SINGH, A., AND SINGH, P. Sensoract: Design and implementation of fine-grained sensing and control sharing in buildings. *the poster*

track of 10th USENIX Symposium on Networked Systems Design and Implementation (NSDI'13) (2013).

- [3] BATRA, N. Non intrusive load monitoring: Systems, metrics and use cases. In *Proceedings of the 13th ACM Conference on Embedded Networked Sensor Systems* (2015), ACM, pp. 501–502.
- [4] BATRA, N., ARJUNAN, P., SINGH, A., AND SINGH, P. Experiences with occupancy based building management systems. *Intelligent Sensors, Sensor Networks and Information Processing, 2013 IEEE Eighth International Conference on* (2013), 153–158.
- [5] BATRA, N., BAIJAL, R., SINGH, A., AND WHITEHOUSE, K. How good is good enough? re-evaluating the bar for energy disaggregation. *arXiv preprint arXiv:1510.08713* (2015).
- [6] BATRA, N., DUTTA, H., AND SINGH, A. Indic: Improved non-intrusive load monitoring using load division and calibration. *12th International Conference on Machine Learning and Applications (ICMLA '13)* (2013).
- [7] BATRA, N., GULATI, M., JAIN, P., WHITEHOUSE, K., AND SINGH, A. Bits and watts: improving energy disaggregation performance using power line communication modems: poster abstract. In *Proceedings of the 1st ACM Conference on Embedded Systems for Energy-Efficient Buildings* (2014), ACM, pp. 210–211.
- [8] BATRA, N., GULATI, M., SINGH, A., AND SRIVASTAVA, M. B. It's different: Insights into home energy consumption in india. In *Proceedings of the 5th ACM Workshop on Embedded Systems For Energy-Efficient Buildings* (2013), ACM, pp. 1–8.
- [9] BATRA, N., KELLY, J., PARSON, O., DUTTA, H., KNOTTENBELT, W., ROGERS, A., SINGH, A., AND SRIVASTAVA, M. Nilmtk: an open source toolkit for non-intrusive load monitoring. In *Proceedings of the 5th international conference on Future energy systems* (2014), ACM, pp. 265–276.
- [10] BATRA, N., PARSON, O., BERGES, M., SINGH, A., AND ROGERS, A. A comparison of non-intrusive load monitoring methods for commercial and residential buildings. *arXiv preprint arXiv:1408.6595* (2014).
- [11] BATRA, N., SINGH, A., SINGH, P., DUTTA, H., SARANGAN, V., AND SRIVASTAVA, M. Data driven energy efficiency in buildings. *arXiv preprint arXiv:1404.7227* (2014).
- [12] BATRA, N., SINGH, A., AND WHITEHOUSE, K. If you measure it, can you improve it?: Exploring the value of energy disaggregation. In *Proceedings of the 2nd ACM International Conference on Embedded Systems for Energy-Efficient Built Environments* (2015), ACM, pp. 191–200.
- [13] BATRA, N., SINGH, A., AND WHITEHOUSE, K. Neighbourhood nilm: A big-data approach to household energy disaggregation. *arXiv preprint arXiv:1511.02900* (2015).
- [14] KELLY, J., BATRA, N., PARSON, O., DUTTA, H., KNOTTENBELT, W., ROGERS, A., SINGH, A., AND SRIVASTAVA, M. Demo abstract: Nilmtk v0. 2: A non-intrusive load monitoring toolkit for large scale data sets. *arXiv preprint arXiv:1409.5908* (2014).
- [15] KELLY, J., BATRA, N., PARSON, O., DUTTA, H., KNOTTENBELT, W., ROGERS, A., SINGH, A., AND SRIVASTAVA, M. Nilmtk v0. 2: a non-intrusive load monitoring toolkit for large scale data sets: demo abstract. In *Proceedings of the 1st ACM Conference on Embedded Systems for Energy-Efficient Buildings* (2014), ACM, pp. 182–183.
- [16] PARSON, O., FISHER, G., HERSEY, A., BATRA, N., KELLY, J., SINGH, A., KNOTTENBELT, W., AND ROGERS, A. Dataport and nilmtk: A building data set designed for non-intrusive load monitoring.

## Presentation

### 6th CodeEngn (Reverse Engineering Conference)

Seoul, S.Korea

PRESENTER FOR <DEFCON 20TH : THE WAY TO GO TO LAS VEGAS>

Jul. 2012

- Introduced CTF(Capture the Flag) hacking competition and advanced techniques and strategy for CTF

## Writing

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### **A Guide for Developers in Start-up**

[Facebook Page](#)

FOUNDER & WRITER

*Jan. 2015 - PRESENT*

- Drafted daily news for developers in Korea about IT technologies, issues about start-up.

### **AhnLab**

[S.Korea](#)

UNDERGRADUATE STUDENT REPORTER

*Oct. 2012 - Jul. 2013*

- Drafted reports about IT trends and Security issues on AhnLab Company magazine.