PANDARASAMY ARJUNAN | CURRICULUM VITAE

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RESEARCH INTERESTS

Energy Informatics, Urban Informatics, Anomaly Detection, Fault Detection and Diagnosis, Time series analysis, Applied Machine Learning, Cyber-Physical Systems, Internet of Things, and Energy sustainability

EDUCATION

Indraprastha Institute of Information Technology (IIIT) Delhi — **New Delhi, India**
PhD in Computer Science and Engineering — *July 2010 – April 2018*
Thesis title: Middleware systems and analytics for energy management in buildings.

Madurai Kamaraj University — **Madurai, India**
Master of Computer Applications — *Aug. 2004 – May 2007*

Manonmaniam Sundaranar University — **Tirunelveli, India**
Bachelor of Science in Computer Science — *July 2001 – May 2004*

RESEARCH AND INDUSTRY EXPERIENCE

Berkeley Education Alliance for Research in Singapore (BEARS) Limited — **Singapore**
Postdoctoral Scholar — *June 2018 – Present*
Advisor: Prof. Kameshwar Poolla, University of California, Berkeley, USA

Indraprastha Institute of Information Technology (IIIT) Delhi — **New Delhi, India**
PhD Scholar — *July 2010 – April 2018*

SenSing Private Limited — **Singapore**
Consultant (Data Science) — *Dec. 2017 – May 2018*

DataGlen Technologies Private Limited — **Bangalore, India**
Data Scientist — *June 2016 – May 2017*

IBM India Research Laboratory — **Bangalore, India**
Research Intern — *July 2014 – Oct. 2014*

University of California, Los Angeles — **Los Angeles, USA**
Visiting Graduate Researcher (Advisor: Prof. Mani B. Srivastava) — *Mar 2013 – Nov. 2013*

IBM Global Business Services — **Bangalore, India**
Associate System Engineer — *Jan. 2010 – July 2010*

HCL Technologies — **Cheanni, India**
Software Engineer — *July 2007 – Dec. 2009*

RESEARCH PUBLICATIONS

Refereed Journal articles

[J.8] *BEEM: Data-driven building energy benchmarking for Singapore"*, **Arjunan, Pandarasamy**, Kameshwar Poolla, and Clayton Miller. *Energy and Buildings* 260 (2022): 111869. (**Impact Factor: 4.867**).

[J.7] *Explainable AI for Chiller Fault-Detection Systems: Gaining Human Trust*, Seshadhri Srinivasan, **Arjunan, Pandarasamy**, Baihong Jin, Alberto Sangiovanni-Vincentelli, Zuraimi Sultan, and Kameshwar Poolla, *IEEE Computer 54*, no. 10 (2021): 60-68. (**Impact Factor: 3.564**) **and citations: 4**)

[J.6] *Islands of misfit buildings: Detecting uncharacteristic electricity use behavior using load shape clustering* Quintana, Matias, **Arjunan, Pandarasamy**, and Miller, Clayton, *Building Simulation, Springer, Tsinghua University Press* (Vol. 14, No. 1, pp. 119-130), 2021. (**Impact Factor: 3.751 and citations: 15**)

[J.5] *The Building Data Genome Project 2: Hourly energy meter data from the ASHRAE Great Energy Predictor III competition* Miller, Clayton, Kathirgamanathan, Anjukan, Picchetti, Bianca, **Arjunan, Pandarasamy**, Park, June Young, Nagy, Zoltan, Raftery, Paul, Hobson, Brodie W, Shi, Zixiao, and Meggers, Forrest, *Nature's Scientific Data* 7(1), pp.1-13, 2020. (**Impact Factor: 7.670 and citations: 27**).

[J.4] *EnergyStar++: Towards more accurate and explanatory building energy benchmarking* **Arjunan, Pandarasamy**, Poolla, Kameshwar, and Miller, Clayton, *Applied Energy*, 276:115413, 2020. (**Impact Factor: 9.746 and citations: 44**)

[J.3] *The ASHRAE Great Energy Predictor III competition: Overview and results* Miller, Clayton, **Arjunan, Pandarasamy**, Kathirgamanathan, Anjukan, Fu, Chun, Roth, Jonathan, Park, June Young, Balbach, Chris, Gowri, Krishnan, Nagy, Zoltan, Fontanini, Anthony D, and others, *Science and Technology for the Built Environment*, 24:1-21, 2020. (**Impact Factor: 1.751 and citations: 34**)

[J.2] *Hybrid Ventilation System and Soft-Sensors for Maintaining Indoor Air Quality and Thermal Comfort in Buildings* Vadamalraj, Nivetha, Zingre, Kishor, Seshadhri, Subathra, **Arjunan, Pandarasamy**, and Srinivasan, Seshadhri, *Atmosphere, 11(1):110, 2020.* (**Impact Factor: 2.686 and citations: 5**)

[J.1] *Apples or oranges? Identification of fundamental load shape profiles for benchmarking buildings using a large and diverse dataset* Park, June Young, Yang, Xiya, Miller, Clayton, **Arjunan, Pandarasamy**, and Nagy, Zoltan, *Applied Energy, 236:1280–1295, 2019*. (**Impact Factor: 9.746 and citations: 49**)

Refereed Conference and Workshop papers

[C.7] *LEAD1. 0: A Large-scale Annotated Dataset for Energy Anomaly Detection in Commercial Buildings*, Gulati, Manoj, and **Pandarasamy Arjunan**, *In Proceedings of the Thirteenth ACM International Conference on Future Energy Systems* (*ACM e-Energy 2022*), *2022* (*accepted*)

[C.7] *Operational Characteristics of Residential Cooling Units with Temporally Granular Remote Thermographic Imaging* **Arjunan, Pandarasamy**, Gregory Dobler, Kyungmin Lee, Clayton Miller, Filip Biljecki, and Kameshwar Poolla , *Proceedings of the 8th ACM International Conference on Systems for Energy-Efficient Built Environments* (*BuildSys 2021*) (*accepted*). (**CORE**[1] **Rank: A and citations: 1**)

[C.6] *Multi-User Energy Consumption Monitoring and Anomaly Detection with Partial Context Information* **Arjunan, Pandarasamy**, Khadilkar, Harshad D., Ganu, Tanuja, Charbiwala, Zainul M., Singh, Amarjeet, and Singh, Pushpendra, *Proceedings of the 2nd ACM International Conference on Embedded Systems for Energy-Efficient Built Environments* (*BuildSys '15*), *pages 35–44, 2015*. (**CORE Rank: A and citations: 41**)

[C.5] *OpenBAN: An Open Building ANalytics Middleware for Smart Buildings* **Arjunan, Pandarasamy**, Srivastava, Mani, Singh, Amarjeet, and Singh, Pushpendra, *Proceedings of the 12th EAI International Conference on Mobile and Ubiquitous Systems: Computing, Networking and Services* (*MobiQuitous '15*), *pages 70–79, 2015*. (**CORE Rank: A and citations: 13**)

[C.4] *SensorAct: A Decentralized and Scriptable Middleware for Smart Energy Buildings* **Arjunan, Pandarasamy**, Saha, Manaswi, Choi, Haksoo, Gulati, Manoj, Singh, Amarjeet, Singh, Pushpendra, and Srivastava, Mani B., *Proceedings of the 12th IEEE International Conference on Ubiquitous Intelligence and Computing* (*UIC-ATC-ScalCom '15*), *pages 11–19, 2015*. (**CORE Rank: B and citations: 11**)

[C.3] *Experiences with occupancy based building management systems* Batra, Nipun, **Arjunan, Pandarasamy**, Singh, Amarjeet, and Singh, Pushpendra, *Proceedings of the Eighth IEEE International Conference on Intelligent Sensors, Sensor Networks and Information Processing* (*ISSNIP '15*), *pages 153–158, 2013*. (**CORE Rank: N/A and citations: 34**)

[C.2] *SensorAct: A Privacy and Security Aware Federated Middleware for Building Management* **Arjunan, Pandarasamy**, Batra, Nipun, Choi, Haksoo, Singh, Amarjeet, Singh, Pushpendra, and Srivastava, Mani B., *Proceedings of the Fourth ACM Workshop on Embedded Sensing Systems for Energy-Efficiency in Buildings* (*BuildSys '12*), *pages 80–87, 2012*. (**CORE Rank: A and Citations: 64**)

[C.1] *MELOS: A Low-Cost and Low-Energy Generic Sensing Attachment for Mobile Phones* Bhardwaj, Abhishek, **Arjunan, Pandarasamy**, Singh, Amarjeet, Naik, Vinayak, and Singh, Pushpendra, *Proceedings of the 5th ACM Workshop on Networked Systems for Developing Regions* (*NSDR '11*), *Co-located with MobiSys'11, pages 27–32, 2011*. (**CORE Rank: N/A and Citations: 19**)

Refereed Poster and Demo papers

[P.5] *Collect, Compare, and Score: A Generic Data-Driven Anomaly Detection Method for Buildings* Rashid, Haroon, **Arjunan, Pandarasamy**, Singh, Pushpendra, and Singh, Amarjeet, *Proceedings of the Seventh ACM International Conference on Future Energy Systems* (*e-Energy '16*), *pages 1–2, 2016*.

[P.4] *E-Adivino: A Novel Framework for Electricity Consumption Prediction Based on Historical Trends* Saini, Shubham, **Arjunan, Pandarasamy**, Singh, Amarjeet, and Nambiar, Ullas, *Proceedings of the 2015 ACM Sixth International Conference on Future Energy Systems* (*e-Energy '15*), *pages 213-214, 2015*.

[1] The CORE Conference Ranking provides assessments of major conferences in the computing disciplines. See more details at https://www.core.edu.au/conference-portal

[P.3] *Sensoract: Design and implementation of fine-grained sensing and control sharing in buildings* **Arjunan, Pandarasamy**, Saha, Manaswi, Gulati, Manoj, Batra, Nipun, Singh, Amarjeet, and Singh, Pushpendra, *Proceedings of the 10th USENIX Symposium on Networked Systems Design and Implementation (NSDI), 2013.* **(CORE Rank: B and citations: 9)**

[P.2] *Occupant-Centric Federated Cyber-Physical System for Building Management* **Arjunan, Pandarasamy**, *Proceedings of the 9th ACM Conference on Embedded Networked Sensor Systems (SenSys), PhD Forum, 2012.*

[P.1] *Fine-grained resource (electricity) management in buildings*, **Arjunan, Pandarasamy**, *Proceedings of the Fourth International Conference on Communication Systems and Networks (COMSNETS), 2012.*

INVITED TALKS

- *Outlier detection in big time series*, International E-Conference on Recent Developments in Science, Engineering and Information Technology, Madurai Kamaraj University, India. *Sep. 2020*
- *Introduction to Reproducible Research*, Department of Computer Science and Engineering, Manonmaniam Sundaranar University, Tirunelveli, India. *Mar.2020*
- *BEEM: Towards more accurate and explanatory building energy benchmarking for Singapore*, BEARS Symposium, Singapore. *Aug. 2019*
- *Data-driven Load Profiling and Benchmarking for Commercial Buildings*, BUDS Lab Workshop, National University of Singapore, Singapore. *Jul 2018*
- *SensorAct: A Privacy and Security Aware Federated Middleware for Building Management*, Synergy Lab, University of California, San Diego, USA. *Mar. 2013*
- *MELOS: A Low-Cost and Low-Energy Generic Sensing Attachment for Mobile Phones*, IGIT, GGSIP University, Delhi, India. *Jun. 2011*

HONORS AND AWARDS

- **IBM PhD Fellowship** for two consecutive years (July 2012 – June 2014).
- Certificate of *Honourable Mention*, Poster session, COMSNETS 2012.

SERVICES

General Co-Chair: ACM SIGEnergy Workshop on Fair, Accountable, Transparent, and Ethical (FATE) AI for Smart Environments and Energy Systems (FATEsys), 2021.

Technical Program Committee member: ACM International Conference on Systems for Energy-Efficient Built Environments (BuildSys), 2020 - 2021.

Poster and Demo Co-chair: ACM BuildSys 2018.

Reviewer: ACM Transactions on Cyber-Physical Systems, Pervasive and Mobile Computing, MDPI Energies, ACM BuildSys 2012-2013, ACM eEnergy 2013-2014 and 2020-2021, ICDCIT 2013, and CONECCT 2013.

Web chair: ACM BuildSys 2014-16, ACM eEnergy 2015, ACM SenSys 2016.

TEACHING ASSISTANT

- Probability and Statistics
- System Management
- Mobile Computing
- Computer Networks

GRADUATE COURSES

- Advanced Algorithms
- Embedded Systems
- Adhoc Wireless Networks
- Fundamentals of Computer Security
- Advanced Research Methods
- Machine Learning (Coursera)
- Middleware Systems
- Mobile Computing
- Mobile and Wireless Network Security
- Technical Writing