Stephen Lee

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Research Interests

- Distributed systems and cloud computing, Cyber-physical systems, Big-data analytics and data-driven systems, Security and privacy.

Education

- **University of Massachusetts Amherst** — Sept 2013 - Jul 2019 (expected)
  Ph.D. Candidate in Computer Science — *Advisor: Prof. Prashant Shenoy*
- **Chennai Mathematical Institute - Chennai** — July 2009 - July 2012
  M.S. in Computer Science — *Advisor: Prof. Madhavan Mukund*
- **St. Stephen's College - Delhi** — July 2004 - June 2007
  B.S in Computer Science

Journals

1 Prateek Sharma, **Stephen Lee**, Tian Guo, David Irwin, and Prashant Shenoy. Managing Risk in a Derivative IaaS Cloud. In *Proceedings of IEEE Transactions on Parallel and Distributed Systems*, (TPDS '18).

2 David Irwin, Srinivasan Iyengar, **Stephen Lee**, Aditya Mishra, Prashant Shenoy, and Ye Xu. Enabling Distributed Energy Storage by Incentivizing Small Load Shifts. *ACM Transactions on Cyber-Physical Systems*, (ACM TCPS '17).

Publications

(R: Under Review N: Notes)

1 Srinivasan Iyengar, **Stephen Lee**, David Irwin, Prashant Shenoy, and Benjamin Weil. WattHome: A Data-driven Approach for Energy Efficiency Analytics at City-scale. In *Proceedings of the 24th ACM SIGKDD International Conference on Knowledge Discovery and Data Mining*, (KDD '18).

2 Srinivasan Iyengar, **Stephen Lee**, Daniel Sheldon, and Prashant Shenoy. SolarClique: Detecting Anomalies in Residential Solar Arrays. In *Proceedings of the 1st ACM SIGCAS Conference on Computing and Sustainable Societies*, (ACM COMPASS '18).

3 **Stephen Lee**, Prashant Shenoy, Krithi Ramamritham, and David Irwin. vSolar: Virtualizing Community Solar and Storage for Energy Sharing. In *Proceedings of the Ninth International Conference on Future Energy Systems*, (ACM e-Energy '18).

4 John Wamburu, **Stephen Lee**, Prashant Shenoy, and David Irwin. Analyzing Distribution Transformers at City Scale and the Impact of EVs and Storage. In *Proceedings of the Ninth International Conference on Future Energy Systems*, (ACM e-Energy '18).

5 **Stephen Lee**, Srinivasan Iyengar, David Irwin, and Prashant Shenoy. Distributed Rate Control for Smart Solar Arrays. In *Proceedings of the Eighth International Conference on Future Energy Systems*, (ACM e-Energy '17).

6 Akansha Singh, **Stephen Lee**, David Irwin, and Prashant Shenoy. SunShade: Enabling Software-Defined Solar-Powered Systems. In *Proceedings of the 8th ACM/IEEE International Conference on Cyber-Physical Systems*, (ICCPS '17).

7 Srinivasan Iyengar, **Stephen Lee**, David Irwin, and Prashant Shenoy. Analyzing Energy Usage on a City-scale Using Utility Smart Meters. In *Proceedings of the 3rd ACM International Conference on Systems for Energy-Efficient Built Environments*, (ACM BuildSys '16).

8 **Stephen Lee**, Srinivasan Iyengar, David Irwin, and Prashant Shenoy. Shared solar-powered EV charging stations: Feasibility and benefits. In *Proceedings of the Seventh International Green and Sustainable Computing Conference*, (IGSC '16).

9 Vani Gupta, **Stephen Lee**, Prashant Shenoy, Ramesh K. Sitaraman, and Rahul Urgaonkar. How to Cool Internet-scale Distributed Networks on the Cheap. In *Proceedings of the Seventh International Conference on Future Energy Systems*, (ACM e-Energy '16).

10 **Stephen Lee**, Rahul Urgaonkar, Ramesh Sitaraman, and Prashant Shenoy. Cost Minimization Using Renewable Cooling and Thermal Energy Storage in CDNs. In *Proceedings of IEEE International Conference on Autonomic Computing*, (ICAC '15).

11 Aditya Mishra, Ramesh Sitaraman, David Irwin, Ting Zhu, Prashant Shenoy, Bhavana Dalvi, and **Stephen Lee**. Integrating Energy Storage in Electricity Distribution Networks. In *Proceedings of the 2015 ACM Sixth International Conference on Future Energy Systems*, (ACM e-Energy '15).

13 Prateek Sharma, **Stephen Lee**, Tian Guo, David Irwin, and Prashant Shenoy. SpotCheck: Designing a Derivative IaaS Cloud on the Spot Market. In *Proceedings of the Tenth European Conference on Computer Systems*, (EuroSys '15).

N. 12 Vani Gupta, **Stephen Lee**, Prashant Shenoy, Ramesh Sitaraman, and Rahul Urgaonkar. Towards Cooling Internet-Scale Distributed Networks on the Cheap. In *Proceedings of the 2015 ACM SIGMETRICS International Conference on Measurement and Modeling of Computer Systems*, (SIGMETRICS '15). (Extended Abstract)

R. 14 **Stephen Lee**, Srinivasan Iyengar, Menghong Feng, Prashant Shenoy and Subhransu Maji. DeepRoof: A Data-driven Approach For Solar Potential Estimation Using Rooftop Imagery. (In Progress)

R. 15 Phuthipong Bovornkeeratiroj, Srinivasan Iyengar, **Stephen Lee**, David Irwin, Prashant Shenoy. Utility-preserving Privacy for Smart Energy Meters. (In Progress)

PATENTS

1 Shruti Bhattacharya, Swaminathan Natarajan, **Stephen Lee**, Arpit Mandliya, Suman Singh, Kunal Ramdasi. Evaluating Total Cost Of Ownership Based On System Design. Patent No: 1445/MUM/2013

2 **Stephen Lee**, Mariyam L., Makarand K., Anjali G., Rahul Kelkar, Harrick Vin. Analytical method for target state determination of datacenter having heterogeneous sub-systems. Patent No: 3521/MUM/2012

3 Raman Srinvasan, Priyadarshini. Sridhar, Usha Rani, Swarna Srinivasan, **Stephen Lee**, Prema Subramaniam. Personalized Content Generation. Patent Number: 574/MUM/2011

WORK EXPERIENCE

- **University of Massachusetts Amherst** — Research Assistant
  Advisor: Prof. Prashant Shenoy — *Sep 2013 - Present*
  - Thesis on "Software-defined Infrastructure for IoT-based Energy Systems".
  - Designed mechanisms and optimization techniques for distributed CPS systems.
  - Implemented data-driven systems and used machine learning techniques to model IoT data.

- **University of Waterloo** — Research Scholar
  Advisor: Prof. Srinivasan Keshav — *Jul - Aug 2018*
  - Investigated scalability of permissioned blockchains and its applications in the energy domain.
  - Identified bottlenecks and improved the performance of Hyperledger Fabric.
- **Veea** — June - Aug 2017
  Summer Intern. Mentor: Sambit Sahu and Daniel Moreno — *NYC, NY*
  - Research project on deep learning techniques in edge computing devices.
- **Tata Research Development and Design Center** — May 2011 - Aug. 2013
  Research Associate — *Pune, India*
  - Design and implemented tools for data center analysis and consolidation.
- **Ignite, Tata Consultancy Services** — Nov 2007 — Apr 2011
  Software Engineer, R&D Team — *Chennai, India*
  - Developed assessment tools to facilitate learning.
- **Tata Interactive Systems** — Jun 2005 — Jul 2005
  Summer Intern — *Mumbai, India*

Teaching Experience

- **Workshop Assistant, Arduino LED Workshop** — Oct 2015, 2016, 2017
  Organized and helped undergrads debug technical issues during the session. — *UMass Amherst*
- **Teaching Assistant, CS220: Programming Methodology** — Fall 2014
  Duties included weekly office hours, tutorials and graded student work. — *UMass Amherst*
- **Teaching Assistant, CS187: Programming with Data Structures** — Spring 2014
  Classroom discussions and tuorials, had weekly office hours and graded student work. — *UMass Amherst*
- **Teaching Assistant, CS120: Problem Solving with the Internet** — Fall 2013
  Classroom discussions and tutorials, had weekly office hours and graded student work. — *UMass Amherst*
- **Tutor: Java and Web Programming** — Apr 2008 - Apr 2011
  Taught J2EE, CSS/HTML and Javascript for 3 cohorts of trainees. Class size of 24. — *TCS*
- Guest lecture:
  - "Debugging tools for Web Development", Problem Solving with the Internet. Fall 2013.

Service

- **Program Committee**: GREEN 2018
- **External reviewer**: Applied Soft Computing, IEEE Transactions on Mobile Computing (TMC), IEEE Real-Time Systems Symposium (RTSS) 2018, MMSys 2019, IoTDI 2019.

Honors and Awards

- **PhD Portfolio with Distinction**, 2015. (Awarded to two PhD students per year).
- **First Prize**, Third annual HackUMass Hackathon 2015 (> 500 participants).
- **Tata Consultancy Services Scholarship** for Masters education at Chennai Mathematical Institute (CMI).
- Member, Phi Kappa Phi. 2016.
- Awarded *On the Spot Award* in Tata Consultancy Services (TCS) for maintaining high availability of TCS Online Assessment Solution, a tool used for hiring thousands of employees every year.
- Semi-finalist under Promising Innovation category in Tata Innovista, a Tata Forum to showcase innovation efforts. Led an initiative for building the TCS Assessment Platform.
- Travel grant recipient: SIGMETRICS 2015, ACM eEnergy 2015, CompSust 2016, ACM eEnergy 2016, ACM eEnergy 2018.

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