**PHUTHIPONG (NIKKO) BOVORNKEERATIROJ**
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## EDUCATION

2017 - Present **UNIVERSITY OF MASSACHUSETTS AMHERST** Amherst, MA
*Ph.D. in Computer Science* (Advisor: Prashant Shenoy)
Thesis topic: Accelerating Sustainability of the Electric Grid using Distributed Energy Resources

2013 - 2015 **CHULALONGKORN UNIVERSITY** Bangkok, TH
*M.Sc. in Computer Science* (Advisor: Kultida Rojviboonchai)
Thesis topic: Boat Arrival Time Prediction System using Mobile Phone Sensing

2007 - 2010 **ASSUMPTION UNIVERSITY THAILAND** Bangkok, TH
*B.Sc. in Computer Science*

## HONORS AND AWARDS

- **Best paper award** from the Eleventh International Green and Sustainable Computing Conference (IGSCC), 2020.
- **Best paper runner-up** from BuildSys, 2021.
- UMass CICS's Outstanding Anti-Racism Leadership.
- UMass's Jim Gray Scholarship.

## TEACHING EXPERIENCE

Spring 2023 **CO-INSTRUCTOR, CS453: COMPUTER NETWORKS** UMass Amherst
***Co-instructor for two sections (150 online students + 90 in-person students)***
- Co-taught class with Prof. Jim Kurose. The class had one synchronous and one asynchronous section.
- Helped design and improve course materials and content, including lecture slides, homework, Wireshark lab, and programming assignments.
- Taught ~25% of the classes as the main lecturer and supported Prof. Kurose as a coordinator for other classes.
- Planned and managed all grading workloads. Managed office hours schedules for the teaching assistant team.
- The feedback from the students was very positive. Sample student comments included "*I feel like Nikko put an excellent perspective on multiple things that may be confusing from an undergraduate perspective.", "The fact that he could match Jim in handoffs without the lesson losing momentum or focus is impressive.*".

Fall 2022 **INSTRUCTOR, FIRST YEAR SEMINAR: COMPUTING FOR A SUSTAINABLE FUTURE** UMass Amherst
***Primary instructor, two sections with ~19 students per section***
- Designed, developed, and taught a new course that provides a broad overview of sustainability issues and climate change, and how students can use computing and technology to make a positive impact now and in the future.
- All of the students who filled out the end-of-semester questionnaire found this first-year seminar class useful.
- Sample student comments included "*The teacher is really chill and reliable.*", "*I learned a lot about how technology affects the environment. It made me aware of how my actions could possibly impact the environment.*", "*I learned a lot about climate change which was really fun and exciting, but I also learned a lot about UMass and how it functions*.".
- Received a rating of 4.9/5.0 from course evaluations.

Summer 2022 **CO-INSTRUCTOR, INTRODUCTION TO PYTHON PROGRAMMING** UMass Amherst
***Co-instructor for a Computer Science summer outreach program for high school students in Western Massachusetts.***
- Taught high school students basic Python programming. Focused on sparking the feeling that CS is fun!
- Gave a talk on energy & sustainability research.

2017 - 2023 **TEACHING ASSISTANT, CS453: COMPUTER NETWORKS** UMass Amherst
***Long-serving TA for the Computer Networks course at UMass Amherst (5+ times)***
- Helped design and develop homework, assignments, and exams.
- Spearheaded auto-grader development for programming assignments and exams.
- Mentored new teaching assistants and undergraduate course assistants as a head TA.

Fall 2022 **TEACHING ASSISTANT, CS446: SEARCH ENGINE** UMass Amherst
- Spearheaded auto-grader implementation, held office hours, and graded student assignments.

Spring 2021 **TEACHING ASSISTANT, CS326: WEB PROGRAMMING** UMass Amherst
- Taught weekly lab and graded student projects.

Fall 2019 **TEACHING ASSISTANT, CS691Q: QUANTUM COMPUTING** UMass Amherst
- Graded student assignments and proctored the exams.

## MENTORING EXPERIENCE

Fall 2023 **CO-INSTRUCTOR, INDEPENDENT STUDY: WIRELESS NETWORKS** UMass Amherst

- Mentor two undergraduate and two master's degree students with Prof. Jim Kurose.
- Meet weekly as a group to work on two projects: (i) bringing up an open-source 802.11 wireless access point, and (ii) bringing up a small-cell 5G node running in the CBRS band and connecting it to open-source mobile-packet-core software (Aether), and instrumenting them to dump packet traces taken on all interfaces to a server.

Summer 2023 **MENTOR, UMASS'S UNDERGRADUATE RESEARCH VOLUNTEERS** UMass Amherst

- Mentored four undergraduate students during the summer for two months.
- Met weekly to work on two projects; (i) analyze the carbon emissions from different household appliances and (ii) compare the performance and carbon costs of different NLP models.
- At the end of the program, the students successfully made a poster and presented it at UMass's First Friday Fair.

## RESEARCH EXPERIENCE

2017 - Present **UNIVERSITY OF MASSACHUSETTS AMHERST (CICS)** Amherst, MA

***Research Assistant in the Laboratory for Advanced Software Systems (LASS)***

- Designing, developing, and evaluating optimization algorithms for controlling heterogeneous resources (batteries, EVs, HVACs) in virtual power plants to decarbonize the grid while minimizing user inconvenience.
- Designed and implemented a grid peak reduction and prediction algorithm that controls and coordinates volunteer energy resources to improve grid efficiency by reducing its peak load while limiting the usage of the resources.
- Investigated the relationship between mobile phone battery temperature and ambient temperature; designed and trained a machine learning model to infer ambient temperature given battery temperature, CPU and screen usage.
- Implemented and evaluated a privacy system for smart meters that can prevent adversaries from inferring behavioral patterns (time-of-use) but still preserve utility information (individual appliance usage) in the trace.

## WORK EXPERIENCE

2018 - 2019 **VEEA., INC.** New York City, NY

***Software Development Intern (Summer 2018 & 2019)***

- Developed an Indoor Positioning System using WiFi RTT (802.11mc) and WiFi Fingerprinting to track customers in a convenience store and a train station. The client is one of the biggest retail chains in France. The developed system includes an Android application, web application, and back-end.
- Helped the company prepare a demo for their customers by fine-tuning WiFi positioning accuracy; including configuring routers, and calibrating the input and output (filtering); also improved the UX/UI of the demo app.

2014 - 2015 **NEVERSITUP CO., LTD.** Bangkok, TH

***Lead iOS Application Developer***

- Led and developed one of the most unique personal finance applications in Thailand called Piggipo: it is designed to help users manage their credit cards to lessen the credit card debt problem in Thailand. The app was always in the top 10 in Finance category on App Store Thailand in 2014-2015; reached 100,000 downloads in a year.
- Won DTAC Accelerate in 2014 and got funded by 500 Startups Thailand.
- Spearheaded user behavior analytics which significantly improved user retention and engagement.

2012 - 2013 **I AM CONSULTING.** Bangkok, TH

***Mobile Application Developer***

- Spearheaded iOS application development that can connect to SAP.
- Applied human-centric design into the apps to make hard work easier for the operational employees and visualized important information for executives.

2010 - 2012 **CONNECTED MACHINE** Bangkok, TH and Singapore

***Mobile Application Developer***

- Developed applications on iOS, Android, and Nokia for Singapore companies such as SingTel, StarHub, and Sentosa.
- Got selected to work at the main branch in Singapore for half a year.

## PUBLICATION

1. "**Distributed Rate Control of Smart Solar Arrays with Batteries**". *Phuthipong Bovornkeeratiroj,* Stephen Lee, Srinivasan Iyengar, David Irwin, and Prashant Shenoy. Frontiers in the Internet of Things, 2023.
2. "**Quantifying the Decarbonization Potential of Flexible Loads in Residential Buildings**". *Phuthipong Bovornkeeratiroj,* Noman Bashir, Vivek Deulkar, Bharathan Balaji, Prashant Shenoy, David Irwin, and Mohammad Hajiesmaili. BuildSys 1st Int'l Workshop on Cyber-Physical-Social Infrastructure Systems (CPSIS), 2023.

3. **"PeakTK: An Open Source Toolkit for Peak Forecasting in Energy Systems".** *Phuthipong Bovornkeeratiroj,* John Wamburu, David Irwin, Prashant Shenoy. Proceedings of the ACM SIGCAS & SIGCHI Computing and Sustainable Societies (COMPASS), Seattle, USA, June 2022.
4. "**VPeak: Exploiting Volunteer Energy Resources for Flexible Peak Shaving**". *Phuthipong Bovornkeeratiroj,* John Wamburu, David Irwin, and Prashant Shenoy. Proceedings of the 8th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation (pp. 121-130), Coimbra, Portugal, November 2021. **(Best Paper Runner-Up)**
5. **"Phone-based Ambient Temperature Sensing Using Opportunistic Crowdsensing and Machine Learning.".** Amee Trivedi, *Phuthipong Bovornkeeratiroj*, Joseph Breda, Prashant Shenoy, Jay Taneja, David Irwin. The Eleventh International Green and Sustainable Computing Conference, 2020. **(Best Paper Award)**
6. **"RepEL: A Utility-preserving Privacy System for IoT-based Energy Meters".** *Phuthipong Bovornkeeratiroj*, Srinivasan Iyengar, Stephen Lee, David Irwin, Prashant Shenoy. IEEE/ACM Fifth International Conference on Internet-of-Things Design and Implementation (IoTDI), 2020.
7. **"Hot or not: Leveraging mobile devices for ubiquitous temperature sensing".** Joseph Breda, Amee Trivedi, Chulabhaya Wijesundara, *Phuthipong Bovornkeeratiroj*, David Irwin, Prashant Shenoy, and Jay Taneja. Proceedings of the 6th ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation, 2019.
8. **"Private memoirs of iot devices: Safeguarding user privacy in the IoT era".** Dong Chen, *Phuthipong Bovornkeeratiroj*, Prashant Shenoy, and David Irwin. IEEE 38th International Conference on Distributed Computing Systems (ICDCS), 2018.
9. **"Challenges in Implementing Crowdsourcing on automatic real-time transit tracking system".** *Phuthipong Bovornkeeratiroj,* Kulit Na Nakorn, and Kultida Rojviboonchai. 2015 15th International Symposium on Communications and Information Technologies (ISCIT). IEEE, 2015.
10. **"Boat arrival time prediction system using mobile phone sensing".** *Phuthipong Bovornkeeratiroj*, Kulit Na Nakorn, and Kultida Rojviboonchai. 2015 12th International Conference on Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology (ECTI-CON). IEEE, 2015.

## SERVICE

- **Workshop co-instructor** for a Post-Conference Tutorial on Wireless Internet Technology with special emphasis on software aspects of 5G at AINTEC 2023.
- **Reviewer** for ACM Journal on Computing and Sustainable Societies (JCSS), 2022-2023
- **Ph.D. Application Support Program Committee** at UMass Amherst CICS, 2022-2023
- **Guest Speaker** on Sustainability topic for Exploring Modern Computing Seminar at UMass, 2023.
- **Artifact Evaluation Committee** for EuroSys, 2021

## CERTIFICATION & TRAINING

- **Climate Change Learning for Action** – Terra.do
- **Sustainability: Strategies and Opportunities for Industry** – MIT Professional Education
- **Introduction to Sustainability** by UIUC – Coursera.com
- **Foundations in Design Thinking** – IDEO U
- **Communicating for Impact** – IDEO U
- **Best Teacher Summer Institute** (half-day edition) – Best Teacher Institute

## REFERENCES

**Prof. Prashant Shenoy** (PhD Advisor)
Distinguished Professor and Associate Dean
Manning College of Information and Computer Sciences
University of Massachusetts Amherst, USA
Email: shenoy@cs.umass.edu

**Prof. Jim Kurose** (mentor and co-instructor of the Computer Network course)
Distinguished Professor and Associate Chancellor for Partnerships and Innovation
Manning College of Information and Computer Sciences
University of Massachusetts Amherst, USA
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**Prof. David Irwin** (research co-author)
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**Peter Klemperer** (I was a TA for his Web Programming course)
Senior Teaching Faculty
Manning College of Information and Computer Sciences
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**Parviz Kermani** (I was a TA for his Computer Networks course multiple times)
Senior Teaching Faculty
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Email: parviz@cs.umass.edu