Duong Tung Nguyen

Contact Information

PhD Candidate
Department of Electrical and Computer Engineering
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Research Interests

My research lies at the intersection of operations research, economics, and engineering, with a specific focus on employing game theory, microeconomics, and optimization techniques to develop mathematical models for decision-making and economic analysis of large-scale networked systems. My other interests include secure computation, optimization, and learning over distributed data sources.

- **Research Areas**: Network Economics, Market Design, Optimization under Uncertainty, Mechanism Design, Online Learning and Optimization, Game Theory, Secure Computation.
- **Application Areas:** Cloud/Edge/Fog Computing, Internet of Things, Smart Grids, Network Slicing, Network Virtualization, Crowdsourcing, Sharing Economy, Smart Transportation.

Education

The University of British Columbia (UBC) — Vancouver, BC, Canada
PhD Candidate, Electrical and Computer Engineering — September 2015 - Present
Expected Graduation Date: May 2020
- Research Topic: *"Pricing and Resource Allocation in Edge Computing"*
- Supervisor: Prof. Vijay K. Bhargava

INRS-EMT, University of Quebec — Montreal, QC, Canada
M.Sc., Electrical Engineering — January 2012 – April 2014.
- Thesis: *"Optimal Energy Management for SmartGrids Considering Thermal Load and Dynamic Pricing"*
- Supervisor: Prof. Long Bao Le

Center for Training of Excellent Students — Hanoi, Vietnam
Hanoi University of Science and Technology (HUST), — September 2006 - June 2011
B.Sc., Electronics and Telecommunications
- Thesis: *"Optimizing Energy Consumption of Network Devices in Data Centers"*
- Supervisor: Prof. Thanh H. Nguyen

Research Experiences

Research Assistant — September 2015 to Present
Department of Electrical and Computer Engineering,
The University of British Columbia (UBC), Vancouver, BC, Canada
Research topics: edge computing, network slicing, market design, game theory, mechanism design.

Researcher (Team Leader) — October 2014 to August 2015
Information Systems Technology and Design (ISTD),
Singapore University of Technology and Design (SUTD), Singapore
Research topics: SDN, network security, network intrusion detection/prevention systems, testbed.

Research Assistant — January 2012 to August 2014
Networks and Cyber Physical Systems Lab (NECPHY-Lab),
Institut National de la Recherche Scientifique (INRS)
University of Quebec, Montreal, QC, Canada
Research topics: smart grids, microgrids, demand side management, optimization.

Internship July 2011 to August 2011

Networking and Distributed System Laboratory,
Department of Computer Science and Engineering
Pohang University of Science and Technology (POSTECH), Korea
Research topic: medium access control (MAC) in wireless networks.

Research Assistant (Team Leader) May 2010 to June 2011

Mobile Communication Lab,
School of Electronics and Telecommunications
Hanoi University of Science and Technology
Research topics: traffic engineering, SDN, data center, energy efficiency, Openflow, virtualization.

Funding Experience

• *Pricing and resource allocation in the edge computing marketplace*, $106000 (net amount), funded by Rogers Communications ($84,000) and Mitacs ($56,000), Canada, 2019–2020. I was the sole writer of the proposal that helps Prof. Vijay Bhargava (PI) win this project. I am currently leading this project.

• *Energy and QoS aware cooperative caching design for 5G wireless systems*, $150000, 2016–2018, funded by the Natural Sciences and Engineering Research Council of Canada (NSERC). This is my proposal for my Vanier Canada Graduate Scholarship.

Publications

(Google Scholar Citations: 921, h-index: 9, i10-index: 9, as of February 14, 2020)

Manuscripts in Submission:

C.6. Duong Nguyen and Ni Trieu, "TBD," submitted to USENIX Security Symposium.

J.10. Duong Nguyen and Vijay Bhargava, "TBD", submitted for potential journal publication.

J.9. Duong Nguyen and Vijay Bhargava, "TBD", submitted for potential journal publication.

J.8 Duong Nguyen, Hieu Nguyen, and Vijay Bhargava, "TBD", submitted for potential journal publication.

Journals/Transactions:

J.7. Duong Nguyen, Long Le, and Vijay Bhargava, "A market-based framework for multi-resource allocation in fog computing," *IEEE/ACM Transactions on Networking*, vol. 27, no. 3, pp. 1151–1164, June 2019.

J.6. Duong Nguyen, Long Le, and Vijay Bhargava, "Price-based resource allocation for edge computing: a market equilibrium approach," *IEEE Transactions on Cloud Computing*, accepted, 2018.

J.5. Duong Nguyen, Hieu Nguyen, and Long Le, "Dynamic pricing design for demand response integration in power distribution networks," *IEEE Transactions on Power Systems*, vol. 31, no. 5, pp. 3457–3472, Sept. 2016.

J.4. Duong Nguyen and Long Le, "Risk-constrained profit maximization of microgrid aggregators with demand response," *IEEE Transactions on Smart Grid*, vol. 6, no. 1, pp. 135–146, Jan. 2015.

J.3. Hieu Nguyen, **Duong Nguyen**, and Long Le, "Energy management for households with solar assisted thermal load considering renewable energy and price uncertainty ," *IEEE Transactions on Smart Grid*, vol. 6, no. 1, pp. 301–314, Jan. 2015.

J.2. Duong Nguyen and Long Le, "Optimal bidding strategy for microgrids considering renewable energy and building thermal dynamics ," *IEEE Transactions on Smart Grid*, vol. 5, no. 4, pp. 1608–1620, Jul. 2014.

J.1. Duong Nguyen and Long Le, "Joint optimization of electric vehicle and home energy scheduling considering user comfort preference," *IEEE Transactions on Smart Grid*, vol. 5, no. 1, pp. 188–199, Jan. 2014.

Conferences:

C.5. Duong Nguyen, Long Le, and Vijay Bhargava, "Edge computing resource procurement: an online optimization approach," in *Proc. IEEE 4th World Forum on Internet of Things (WF-IoT)*, pp. 807–812, Singapore, 2018.

C.4. Duong Nguyen, Hieu Nguyen, and Long Le, "Coordinated dispatch of renewable energy sources and HVAC load using stochastic programming," in *Proc. of the IEEE Conference on Smart Grid Communications (SmartGridComm'14)*, Venice, Italy, Nov. 2014.

C.3. Duong Nguyen and Long Le, "Optimal energy trading for building microgrid with electric vehicles and renewable energy resources," in *Proc. IEEE PES Innovative Smart Grid Technologies Conference (ISGT'14)*, Washington, DC, Feb. 2014.

C.2. Hieu Nguyen, **Duong Nguyen** and Long Le, "Home energy management with generic thermal dynamics and user temperature preference," in *Proc. of the IEEE Conference on Smart Grid Communications (SmartGridComm'13)*, Vancouver, Canada, Oct. 2013.

C.1. Duong Nguyen and Long Le, "Optimal energy management for cooperative microgrids with renewable energy resources," in *Proc. of the IEEE Conference on Smart Grid Communications (SmartGridComm'13)*, Vancouver, Canada, Oct. 2013.

Project Reports:

R.1. Duong Nguyen, Quyen Vu, Guillaume Buffier, and David Yau, "CISDeM: Cross-functional Information System for Decision Making", *Track 7: Testbed implementation*, Annual Meeting Report, Singapore, Aug. 2015.

Talks and Conference Presentations

- Edge computing resource procurement: an online optimization approach, *IEEE 4th World Forum on Internet of Things (WF-IoT)*, Singapore, Feb. 2018.
- SDN-based network security testbed demos, *CISDeM Annual Project Meeting*, Singapore, 2015.
- Optimal energy management for cooperative microgrids with renewable energy resources, *IEEE Conference on Smart Grid Communications (SmartGridComm'13)*, Vancouver, Canada, Oct. 2013.

Honors and Awards

- Best Reviewer Award, IEEE Transactions on Smart Grid, 2019
- Outstanding Reviewer Award, IEEE Transactions on Sustainable Energy, 2 years (2016, 2018)
- **Vanier Canada Graduate Scholarship**, 2016-2019. This is the most competitive and prestigious PhD scholarship in Canada, which is awarded to only 2-5 ECE PhD students across Canada each year
- UBC Four Year Doctoral Fellowship (FYF), Department of Electrical and Computer Engineering, UBC, for the best PhD students (around 10 ECE PhD students each year), 2015-2019
- Graduate Support Initiative (GSI) Award, Department of Electrical and Computer Engineering, the University of British Columbia, 2016
- **Best Master Thesis Award**, EMT-INRS, University of Quebec, 2014
- Master Scholarship, EMT-INRS, University of Quebec, 2012-2014
- **Best Student Award**, School of Electronics and Telecommunications, Hanoi University of Science and Technology (HUST), 2011
- Summer Internship Scholarship, Pohang University of Science and Technology, Korea, 2011
- Ranked in top 0.1% in the University Entrance Examination (score 29.5/30), 2006

Leadership, Mentoring, and Student Advising

• Jiaming Chen, Master student at the University of British Columbia, September 2019 to Present
Project: Decision making under uncertainty and its applications in edge computing and network slicing.

• Tarannum Nisha, Master student at the University of British Columbia, September 2019 to Present
Project: Online optimization and bandit learning algorithms for resource allocation in edge computing.

• Guillaume Buffier, Research Engineer at Singapore University of Technology and Design, 2014–2015
Project: SDN-based network security testbed implementation, which is a part the big project "*CISDeM: Cross-functional Information System for Decision Making*".

Professional Services

Technical Program Committee: IEEE VTC 2018/2019/2020, IEEE ISAECT, IEEE PEOCO.

Session Chair: IEEE WF-IoT 2018.

Journal Reviewer for: IEEE/ACM Transactions on Networking, IEEE Transactions on Mobile Computing, IEEE Transactions on Network Science and Engineering, IEEE Transactions on Parallel and Distributed Systems, IEEE Transactions on Network and Service Management, IEEE Transactions on Sustainable Computing, IEEE Transactions on Power Systems, IEEE Transactions on Smart Grid, IEEE Transactions on Sustainable Energy, IEEE Transactions on Transportation Electrification, IEEE Transactions on Industrial Electronics, IEEE Transactions on Industrial Informatics, IEEE Transactions on Industry Applications, IEEE Transactions on Communication, IEEE Internet of Things Journal, IEEE Systems Journal, IEEE Wireless Communication Letters, IEEE Communication Letters, IEEE Network Magazine, Applied Energy, Energy and Buildings.

Membership: Student Member of IEEE.

Technical Skills

• Programming Languages: MATLAB, Python, C/C++/C#, Java

• Optimization and Statistics Tools: GAMS, Cplex, Gurobi, CVX, R

• Development Tools: LaTex, Wireshark, MS Visual Studio, Java Eclipse, OpenFlow, Mininet, NIST-SIP, Tomcat, Ant, OpenCV, IMS, Bro, Snort, Suricata

• Platforms: Windows, Linux (Ubuntu, Debian, CentOS), VMware

• MS Office: Word, Excel, PowerPoint, Visio, Acsess.