

JIAN LI

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RESEARCH INTERESTS

Machine learning, data analytics, economics and game theory, and stochastic control, with applications to computer networks and systems, edge and cloud computing systems, and Internet of Things.

EDUCATION

- **Ph.D.** in Computer Engineering 08/2012 – 12/2016
Texas A&M University, College Station, TX, USA
Thesis: “In Pursuit of Desirable Equilibria in Large Scale Networked Systems”
Advisor: Srinivas Shakkottai
Committee: P. R. Kumar, Vijay Subramanian, J.-F. Chamberland, Anxiao Andrew Jiang
- **B.E.** in Information Engineering 09/2008 – 06/2012
Shanghai Jiao Tong University, Shanghai, China

ACADEMIC APPOINTMENTS

- **Postdoctoral Research Associate** 01/2017 – Present
College of Information and Computer Sciences
University of Massachusetts Amherst, Amherst, MA
Mentor: Prof. Don Towsley
- **Graduate Research Assistant** 08/2012 – 12/2016
Department of Electrical and Computer Engineering
Texas A&M University, College Station, TX
Advisor: Prof. Srinivas Shakkottai
- **Visiting Scholar** 05/2016 – 08/2016
Department of Computer Science and Engineering
The Chinese University of Hong Kong, Hong Kong
Advisor: Prof. John C.S. Lui

PUBLICATIONS

Journal Papers:

- [J1] D. Kumar, **Jian Li**, A. Chandra and R. Sitaraman, “A TTL-based Approach for Data Aggregation in Geo-distributed Streaming Analytics”, *Proceedings of the ACM on Measurement and Analysis of Computing Systems (POMACS)*, vol. 3, no. 2, article 29, June 2019.
- [J2] F. Zafari*, **Jian Li***, K. K. Leung, D. Towsley and A. Swami, “Optimal Energy Consumption for Communication, Computation, Caching and Quality Guarantee”, to appear in *IEEE Transactions on Control of Network Systems (IEEE TCNS)*, 2019.
- [J3] L. Turner, R. M. Whitaker, S. M. Allen, D. E. J. Linden, K. Tu, **Jian Li** and D. Towsley, “Evidence to Support Common Human App-switching Behavior on Smartphones”, *Royal Society Open Science*, vol. 6, no. 3, March 2019.
- [J4] **Jian Li**, S. Shakkottai, J. C.S. Lui and V. Subramanian, “Accurate Learning or Fast Mixing? Dynamic Adaptability of Caching Algorithms”, *IEEE Journal on Selected Areas in Communications (IEEE JSAC)*, vol. 36, no. 6, pp. 1314-1330, June 2018.
- [J5] **Jian Li**, B. Xia, X. Geng, H. Ming, S. Shakkottai, V. Subramanian and L. Xie, “Mean Field Games in Nudge Systems for Societal Networks”, *ACM Transactions on Modeling and Performance Evaluation of Computing Systems (ACM TOMPECS)*, vol. 3, no. 4, article 15, August 2018.

[J6] **Jian Li**, R. Bhattacharyya, S. Paul, S. Shakkottai and V. Subramanian, “Incentivizing Sharing in Real-time D2D Streaming Networks: A Mean Field Game Perspective”, *IEEE/ACM Transactions on Networking (IEEE/ACM TON)*, vol. 25, no. 1, pp. 3-17, February 2017.

[J7] N. K. Panigrahy*, **Jian Li*** and D. Towsley, “Hit Rate vs. Hit Probability Based Cache Utility Maximization”, *ACM Performance Evaluation Review*, vol. 45, no. 2, pp. 21-23, September 2017.

[J8] **Jian Li**, B. Xia, X. Geng, H. Ming, S. Shakkottai, V. Subramanian and L. Xie, “Energy Coupon: A Mean Field Game Perspective on Demand Response in Smart Grids”, *ACM Performance Evaluation Review*, vol. 43, no. 1, pp. 455-456, June 2015.

Conference Papers:

[C1] D. Kumar, **Jian Li**, A. Chandra and R. Sitaraman, “A TTL-based Approach for Data Aggregation in Geo-distributed Streaming Analytics”, *Proceedings of ACM SIGMETRICS International Conference on Measurement and Modeling of Computer Systems (ACM SIGMETRICS)*, Phoenix, AZ, June 2019. [**Acceptance rate:** 17%]

[C2] S. Zou, V. V. Veeravalli, **Jian Li**, D. Towsley and A. Swami, “Distributed Quickest Detection of Significant Events in Networks”, *Proceedings of International Conference on Acoustics, Speech, and Signal Processing (IEEE ICASSP)*, Brighton, UK, May 2019. (**invited paper**)

[C3] **Jian Li***, T. K. Phan*, W. K. Chai, D. Tuncer, G. Pavlou, D. Griffin and M. Rio, “DR-Cache: Distributed Resilient Caching with Latency Guarantees”, *Proceedings of IEEE International Conference on Computer Communications (IEEE INFOCOM)*, Honolulu, HI, April 2018. [**Acceptance rate:** 19%]

[C4] **Jian Li***, F. Zafari*, D. Towsley, K. K. Leung and A. Swami, “Joint Data Compression and Caching: Approaching Optimality with Guarantees”, *Proceedings of ACM/SPEC International Conference on Performance Engineering (ACM/SPEC ICPE)*, Berlin, Germany, April 2018. [**Acceptance rate:** 24%]

[C5] K. Tu, **Jian Li**, D. Towsley, D. Braines and L. Turner, “Network Classification in Temporal Networks Using Motifs”, *Proceedings of ECML/PKDD Workshop on Advanced Analytics and Learning on Temporal Data (AALTD)*, Dublin, Ireland, September 2018.

[C6] N. K. Panigrahy, **Jian Li** and D. Towsley, “Network Cache Design under Stationary Requests: Exact Analysis and Poisson Approximation”, *Proceedings of IEEE International Symposium on the Modeling, Analysis, and Simulation of Computer and Telecommunication Systems (IEEE MASCOTS)*, Milwaukee, WI, September 2018. (**Best Paper Candidate, one of three nominated papers**)

[C7] K. Tu, **Jian Li**, D. Towsley, D. Braines and L. Turner, “Classifying Types of Network Communities Using Motifs”, *Machine Learning, Data Analytics and Modeling Workshop (DATAM)*, Thessaloniki, Greece, September 2018. (co-located with Conference on Complex Systems)

[C8] S. Zou, V. V. Veeravalli, **Jian Li** and D. Towsley, “Quickest Detection of Significant Events in Structured Networks”, *Proceedings of Asilomar Conference on Signals, Systems, and Computers*, Pacific Grove, CA, October 2018. (**invited paper**)

[C9] F. Zafari, **Jian Li**, K. K. Leung, D. Towsley and A. Swami, “A Game-Theoretic Approach to Multi-Objective Resource Sharing and Allocation in Mobile Edge Clouds”, *Proceedings of ACM Mobicom Workshop on Technologies for the Wireless Edge (EdgeTech)*, New Delhi, India, October 2018.

[C10] F. Zafari*, **Jian Li***, K. K. Leung, D. Towsley and A. Swami, “Optimal Energy Tradeoff among Communication, Computation and Caching with QoI-Guarantee”, *Proceedings of IEEE Global Communications Conference (IEEE GLOBECOM)*, Abu Dhabi, United Arab Emirates, December 2018.

[C11] N. K. Panigrahy*, **Jian Li*** and D. Towsley, “Hit Rate vs. Hit Probability Based Cache Utility Maximization”, *Proceedings of ACM Workshop on Mathematical Performance Modeling and Analysis (ACM MAMA)*, Urbana-Champaign, IL, June 2017.

[C12] **Jian Li**, B. Xia, X. Geng, H. Ming, S. Shakkottai, V. Subramanian and L. Xie, “Energy Coupon: A Mean Field Game Perspective on Demand Response in Smart Grids”, *Proceedings of ACM SIGMETRICS International Conference on Measurement and Modeling of Computer Systems (ACM SIGMETRICS)* (short paper), Portland, OR, June 2015. [**Acceptance rate:** 23%]

[C13] **Jian Li**, R. Bhattacharyya, S. Paul, S. Shakkottai and V. Subramanian, “Incentivizing Sharing in Realtime D2D Streaming Networks: A Mean Field Game Perspective”, *Proceedings of IEEE International Conference on Computer Communications (IEEE INFOCOM)*, Hong Kong, April 2015. [**Acceptance rate:**

19%]

[C14] **Jian Li**, J. Zhang, L. Fu, X. Wang, “Capacity in Arbitrary Wireless Ad Hoc Networks with MIMO and Power Constraint”, *Proceedings of IEEE Global Communications Conference (IEEE GLOBECOM)*, Anaheim, CA, December 2012.

[C15] C. Xie, **Jian Li**, X. Wang, “Multicast Capacity of Wireless Ad Hoc Networks with Infrastructure Support”, *Proceedings of IEEE International Conference on Communications (IEEE ICC)*, Ottawa, Canada, June 2012.

Poster Paper:

[P1] D. Kumar, **Jian Li**, A. Chandra and R. Sitaraman, “TTL-based Approach for Data Aggregation in Streaming Analytics”, poster at *USENIX Symposium on Operating Systems Design and Implementation (USENIX OSDI)*, Carlsbad, CA, October 2018.

* indicates co-primary authors.

PROPOSAL EXPERIENCE

- Helped draft proposal for biennial program plan under the International Technology Alliance in Distributed Analytics and Information Sciences (DAIS-ITA) initiated by the UK Ministry of Defence (UK MoD) and the US Army Research Laboratory (ARL)
 - <https://en.wikipedia.org/wiki/DAIS-ITA>
 - Funded \$16,000,000 for 2018 – 2019
- Helped draft proposal for biennial program plan under the interdisciplinary Alliance for IoBT Research on Evolving Intelligent Goal-driven Networks (IoBT REIGN) initiated by the US Army Research Laboratory (ARL)
 - <http://iobt.illinois.edu/>
 - Funded \$25,000,000 for 2018 – 2022

PATENT

Patent (No. 201210070065.4) on A Data Transmission Technique Based on Network Coding.

AWARDS AND HONORS

- **Best Paper Candidate, IEEE MASCOTS** 09/2018
- Invited for Microsoft Research Faculty Summit (Systems: Fueling Future Disruptions) 08/2018
- Session Chair, IEEE INFOCOM 04/2018
- Nominated and selected for ITA Graduation Day 02/2017
- NSF Student Travel Award, ACM SIGMETRICS 06/2015
- TAMU Dwight Look College of Engineering, Graduate Travel Grant: ACM SIGMETRICS 06/2015
- TAMU Dwight Look College of Engineering, Graduate Travel Grant: IEEE INFOCOM 04/2015
- Scholarships acknowledging excellent academic record (top 5%), SJTU 2009 – 2012
- Second Prize of ALTERA Electronic Design Contest in SJTU (top 2%) 2010
- National Second Prizes in Physics and Mathematical Olympic Games 2007

SELECTED TALKS

Network Classification in Temporal Networks Using Motifs

- ECML/PKDD Workshop on Advanced Analytics and Learning on Temporal Data (AALTD), Dublin, Ireland, September 2018

DR-Cache: Distributed Resilient Caching with Latency Guarantees

- IEEE INFOCOM, Honolulu, HI, April 2018

Accurate Learning or Fast Mixing? Dynamic Adaptability of Caching Algorithms

- Poster at Graduation Day at ITA, UCSD, February 2017

- Future Information Technology International Form for Young Scholars, Shanghai Jiao Tong University, Shanghai, May 2018

Energy Coupon: A Mean Field Game Perspective on Demand Response in Smart Grids

- Institute Seminar, Institute for Interdisciplinary Information Sciences (IIIS), Tsinghua University, Beijing, May 2015
- Department Seminar, Department of Computer Science, City University of Hong Kong, August 2015
- Department Seminar, Department of Electrical and Electronic Engineering, The University of Hong Kong, August 2015
- Poster at ACM SIGMETRICS, Portland, OR, June 2015
- Poster at the Third Annual Smart Grids Workshop, Texas A&M University, April 2015

Mean Field Games in Societal Networks

- Research Group Seminar, Department of Computer Science and Engineering, The Chinese University of Hong Kong, August 2015

Incentivizing Sharing in Realtime D2D Streaming Networks: A Mean Field Game Perspective

- IEEE INFOCOM, Hong Kong, April 2015
- Poster at Winedale Workshop, co-organized by UT Austin, Texas A&M University and Rice University, October 2014
- Poster at Computer Engineering and Systems Group Research Pow-wow, ECE, Texas A&M University, November 2014

PROFESSIONAL ACTIVITIES AND SERVICES

- Conference Technical Program Committee: IEEE INFOCOM (2018, 2019, 2020), IEEE/IFIP WiOpt (2018, 2019), IEEE MASCOTS (2018), NIPS (2018, 2019), AAAI (2019), IEEE/ACM ASONAM (2018)
- Reviewer for journals: IEEE Journal on Selected Areas in Communications (JSAC) (2018), IEEE/ACM Transactions on Networking (TON) (2016, 2017, 2018, 2019), ACM Transactions on Modeling and Performance Evaluation of Computing Systems (TOMPECS) (2018), IEEE Transactions on Mobile Computing (TMC) (2015), IEEE Transactions on Wireless Communication (TWC) (2012, 2013, 2014, 2017), IEEE Transactions on Vehicular Technology (TVT) (2016)
- Reviewer for conferences: ACM SIGMETRICS/IFIP Performance (2016), ACM MOBIHOC (2016), IEEE ISIT (2017), IEEE WCNC (2017)
- IEEE member, ACM member