Yuanzhang Xiao

Contact Information

Hawaii Advanced Wireless Technologies (HAWT) Institute
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Research Interests

Theory

Deep learning, reinforcement learning, game theory, optimization

Applications

Wireless communications (e.g., 5G, Internet of things)
Smart grids (e.g., electricity markets, demand response, renewable energy, electric vehicles)
Socio-technological networks (e.g., sharing economy, crowdsourcing)

Academic Employment

University of Hawaii at Manoa, USA **Aug. 2017 – present**

Assistant Professor in Hawaii Advanced Wireless Technologies (HAWT) Institute

Northwestern University, USA **May 2015 – Jul. 2017**

Postdoctoral Fellow in Department of Electrical Engineering and Computer Science

- Advisor: Prof. Ermin Wei

University of California, Los Angeles, USA **Jul. 2014 – Apr. 2015**

Postdoctoral Fellow in Department of Electrical Engineering

- Advisor: Prof. Mihaela van der Schaar

Education

University of California, Los Angeles, USA **Sep. 2009 – Jun. 2014**

Ph.D. in Electrical Engineering

- Dissertation: Optimal sequential resource sharing and exchange in multi-agent systems
- Advisor: Prof. Mihaela van der Schaar

Tsinghua University, Beijing, China **Sep. 2006 – Jun. 2009**

M.E. in Electronic Engineering

- Thesis title: Limited-feedback precoding for giga-bit wireless transmission systems
- Advisor: Prof. Shidong Zhou

Tsinghua University, Beijing, China **Sep. 2002 - Jun. 2006**

B.E. in Electronic Engineering

Funding

co-PI, NSF Phase II IUCRC at University of Hawaii: Center for Electromagnetic Compatibility (CEMC); University of Hawaii in Electromagnetic Technologies (Award Number: **1822213**)
PI, Hawaiian Electric Company (HECO), an industry project on on studying customer incentives in participating HECO's demand response programs, Jul. 2019 - Jun. 2020.

Publications

Invited book chapters

[Ch2] Yuanzhang Xiao and Mihaela van der Schaar, "Cognitive Radio Networks for Delay-Sensitive Applications: Games and Learning," *Handbook of Cognitive Radio*, Ed. W. Zhang, J. Huang and X. Chen, Springer, 2017.

[**Ch1**] **Yuanzhang Xiao** and Mihaela van der Schaar, "Optimal Repeated Spectrum Sharing by Delay-Sensitive Users," *Cloud Radio Access Networks: Principles, Technologies, and Applications*, Ed. T. Quek, M. Peng, O. Simeone and W. Yu, Cambridge University Press, 2016.

Journal papers submitted

[**JS3**] Douglas Ellman and **Yuanzhang Xiao**, "Incentives to Game Demand Response Baselines with Uncertain Event Schedules," *submitted to IEEE Transactions on Smart Grid*.

[**JS2**] **Yuanzhang Xiao**, Chaithanya Bandi, and Ermin Wei , "Efficiency of Supply Function Equilibrium in Electricity Markets," *submitted*. Available here. Conference versions in Asilomar 2015 and GlobalSIP 2016.

[**JS1**] *(authors listed alphabetically in this paper)* Mihaela van der Schaar, **Yuanzhang Xiao**, and William Zame, "Endogenous Matching in a Dynamic Assignment Model with Adverse Selection and Moral Hazard," *Submitted*. Available here.

Journal papers accepted

[**JA18**] Qiulin Lin, Hanling Yi, John Pang, Minghua Chen, Adam Wierman, Michael Honig, and **Yuanzhang Xiao**, "Competitive Online Optimization Under Inventory Constraints," *Proceedings of the ACM on Measurement and Analysis of Computing Systems*, vol. 3, no. 1, Article 10, 28 pages, Mar. 2019.

[**JA17**] **Yuanzhang Xiao** and Mihaela van der Schaar, "Dynamic Stochastic Demand Response With Energy Storage," *IEEE Transactions on Smart Grid*, forthcoming. Available here.

[**JA16**] **Yuanzhang Xiao**, Florian Dörfler, and Mihaela van der Schaar, "Incentive Design in Peer Review: Rating and Repeated Endogenous Matching," *IEEE Transactions on Network Science and Engineering*, forthcoming. Available: `http://arxiv.org/abs/1411.2139`

[**JA15**] *(authors are listed alphabetically in this paper)* Mihaela van der Schaar, **Yuanzhang Xiao**, and William Zame, "Efficient Outcomes in Repeated Games with Limited Monitoring," *Economic Theory*, vol. 60, no. 1, pp. 1-34, Sep. 2015. **Featured as the lead article.**

[**JA14**] **Yuanzhang Xiao** and Mihaela van der Schaar, "Socially-Optimal Design of Service Exchange Platforms with Imperfect Monitoring," *ACM Transactions on Economics and Computation*, vol. 3, no. 4, Jul. 2015.

[**JA13**] Kartik Ahuja, **Yuanzhang Xiao**, and Mihaela van der Schaar, "Efficient Interference Management Policies for Femtocell Networks," *IEEE Transactions on Wireless Communications*, vol. 14, no. 9, pp. 4879–4893, Sep. 2015.

[**JA12**] Kartik Ahuja, **Yuanzhang Xiao**, and Mihaela van der Schaar, "Distributed Interference Management Policies for Heterogeneous Small Cell Networks," *IEEE Journal on Selected Areas in Communications, Special Issue on Heterogeneous Cellular Networks*, vol. 33, no. 6, pp. 1112–1126, Jun. 2015. **Featured in IEEE Spotlight on "Clearing the Air for 5G Wireless".**

[**JA11**] **Yuanzhang Xiao** and Mihaela van der Schaar, "Optimal Foresighted Multi-User Wireless Video," *IEEE Journal of Selected Topics in Signal Processing, Special issue on Visual Signal Processing for Wireless Networks*, vol. 9, no. 1, pp. 89–101, Feb. 2015.

[**JA10**] **Yuanzhang Xiao**, William Zame, and Mihaela van der Schaar, "Technology Choices and Pricing Policies in Public and Private Wireless Networks," *IEEE Transactions on Wireless Communications*, vol. 13, no. 12, pp. 6606–6618, Dec. 2014.

[**JA9**] Mahnoosh Alizadeh, **Yuanzhang Xiao**, Anna Scaglione, and Mihaela van der Schaar, "Dynamic Incentive Design for Participation in Direct Load Scheduling Programs," *IEEE Journal of Selected Topics in Signal Processing, Special issue on Signal Processing in Smart Electric Power Grid*, vol. 8, no. 6, pp. 1111–1126, Dec. 2014.

[**JA8**] Linqi Song, **Yuanzhang Xiao**, and Mihaela van der Schaar, "Demand Side Management in Smart Grids using a Repeated Game Framework," *IEEE Journal on Selected Areas in Communications, Special Issue on Smart Grid Communications*, vol. 32, no. 7, pp. 1412–1424, Jun. 2014.

[**JA7**] Jie Xu, Yiannis Andreopoulos, **Yuanzhang Xiao** and M. van der Schaar, "Non-stationary Resource Allocation Policies for Delay-constrained Video Streaming: Application to Video over Internet-of-Things-enabled Networks," *IEEE Journal on Selected Areas in Communications, Special Issue on Adaptive Media Streaming*, vol. 32, no. 4, pp. 782–794, Apr. 2014.

[**JA6**] **Yuanzhang Xiao** and Mihaela van der Schaar, "Energy-efficient Nonstationary Spectrum Sharing," *IEEE Transactions on Communications*, vol. 62, no. 3, pp. 810–821, Mar. 2014. **Selected as Qualcomm Innovation Fellowship Finalist in 2013.**

[**JA5**] Luca Canzian, **Yuanzhang Xiao**, William Zame, Michele Zorzi, Mihaela van der Schaar, "Intervention with Private Information, Imperfect Monitoring and Costly Communication," *IEEE Transactions on Communications*, vol. 61, no. 8, pp. 3192–3205, Aug. 2013.

[**JA4**] Luca Canzian, **Yuanzhang Xiao**, William Zame, Michele Zorzi, Mihaela van der Schaar, "Intervention with Complete and Incomplete Information: Application to Flow Control," *IEEE Transactions on Communications*, vol. 61, no. 8, pp. 3206–3218, Aug. 2013.

[**JA3**] **Yuanzhang Xiao** and Mihaela van der Schaar, "Dynamic Spectrum Sharing Among Repeatedly Interacting Selfish Users With Imperfect Monitoring," *IEEE Journal on Selected Areas in Communications, Special issue on Cognitive Radio Series*, vol. 30, no. 10, pp. 1890–1899, Nov. 2012. **Selected as Qualcomm Innovation Fellowship Finalist in 2012.**

[**JA2**] **Yuanzhang Xiao**, Jaeok Park, and Mihaela van der Schaar, "Repeated Games With Intervention: Theory and Applications in Communications," *IEEE Transactions on Communications*, vol. 60, no. 10, pp. 3123–3132, Oct. 2012.

[**JA1**] **Yuanzhang Xiao**, Jaeok Park, and Mihaela van der Schaar, "Intervention in Power Control Games with Selfish Users," *IEEE Journal of Selected Topics in Signal Processing, Special issue on Game Theory In Signal Processing*, vol. 6, no. 2, pp. 165–179, Apr. 2012.

Conference papers

[**CA30**] Douglas Ellman and **Yuanzhang Xiao**, "Customer Incentives for Gaming Demand Response Baselines," accepted by *IEEE Conference on Decision and Control (CDC)*, 2019.

[**CA29**] **Yuanzhang Xiao**, Zhengqing Yun, and Magdy Iskander, "AoA Estimation with Practical Antenna Arrays Using Neural Networks," accepted by *IEEE AP-S/URSI Conference*, 2019.

[**CA28**] Qiulin Lin, Hanling Yi, John Pang, Minghua Chen, Adam Wierman, Michael Honig, and **Yuanzhang Xiao**, "Competitive Online Optimization Under Inventory Constraints," in *Proc. ACM Sigmetrics*, 2019.

[**CA27**] **Yuanzhang Xiao** and Yin Sun, "A Dynamic Jamming Game for Real-Time Status Updates," in *Proc. IEEE International Conference on Computer Communications (INFOCOM) Workshop on Age of Information*, 2018.

[**CA26**] Chang Liu, **Yuanzhang Xiao**, Ermin Wei and Randall Berry, "Competition and Investment in On-Demand Networking Technology," in *Proc. IEEE/IFIP Wireless On-Demand Network Systems and Services Conference* (WONS), 2017. Available here.

[**CA25**] **Yuanzhang Xiao**, Chaithanya Bandi, and Ermin Wei , 'Supply Function Equilibrium in Power Markets: Mesh Networks," *IEEE Global Conference on Signal and Information Processing* (GlobalSIP), 2016.

[**CA24**] **Yuanzhang Xiao**, Chaithanya Bandi, and Ermin Wei , "Robust Supply Function Bidding in Electricity Markets With Renewables," in *Proc. Allerton Conf. on Communication, Control, and Computing*, 2016.

[**CA23**] **Yuanzhang Xiao** and Mihaela van der Schaar, "Optimal Intervention for Incentivizing the Adoption of Commercial Electric Vehicles," accepted by *IEEE Global Conference on Signal and Information Processing* (GlobalSIP), 2015. **(invited)**

[**CA22**] Chang Liu, **Yuanzhang Xiao**, Ermin Wei and Randall Berry, "Investment and Competition with Positive Externalities in Open Networks," in *Proc. Allerton Conf. on Communication, Control, and Computing*, 2015. **(invited)**

[**CA21**] **Yuanzhang Xiao**, Chaithanya Bandi, and Ermin Wei, "Efficiency of Supply Function Equilibrium in Networked Markets," in *Proc. Allerton Conf. on Communication, Control, and Computing*, 2015. **(invited)**

[**CA20**] **Yuanzhang Xiao** and Mihaela van der Schaar, "Decentralized Foresighted Energy Purchase and Procurement With Renewable Generation and Energy Storage," in *Prof. IEEE Conf. on Decision and Control (CDC)*, 2014.

[**CA19**] **Yuanzhang Xiao**, Florian Dörfler, and Mihaela van der Schaar, "Rating and Matching in Peer Review Systems," in *Proc. Allerton Conf. on Communication, Control, and Computing*, 2014.

[**CA18**] **Yuanzhang Xiao**, K. Ahuja, and Mihaela van der Schaar, "Spectrum Sharing For Delay-Sensitive Applications With Continuing QoS Guarantees," in *Prof. IEEE Globecom*, 2014. **(selected as one of the best 50 papers out of 2000+ submitted papers)**

[**CA17**] **Yuanzhang Xiao** and Mihaela van der Schaar, "Optimal Foresighted Packet Scheduling and Resource Allocation for Multi-user Video Transmission in 4G Cellular Networks," in *Proc. IEEE ICASSP 2014*.

[**CA16**] Linqi Song, **Yuanzhang Xiao**, and Mihaela van der Schaar, "Non-stationary Demand Side Management Method for Smart Grids," in *Proc. IEEE ICASSP 2014*.

[**CA15**] **Yuanzhang Xiao** and Mihaela van der Schaar, "Distributed Demand-Side Management Among Foresighted Decision Makers in Power Networks," in *Proc. Asilomar Conf. on Signals, Systems, and Computers*, 2013 **(invited)**.

[**CA14**] Mahnoosh Alizadeh, **Yuanzhang Xiao**, Anna Scaglione, and Mihaela van der Schaar, "Incentive Design for Direct Load Control Programs," in *Proc. Allerton Conf. on Communication, Control, and Computing*, 2013.

[**CA13**] **Yuanzhang Xiao** and Mihaela van der Schaar, "Spectrum Sharing Policies for Heterogeneous Delay-Sensitive Users: A Novel Design Framework," in *Proc. Allerton Conf. on Communication, Control, and Computing*, 2013.

[**CA12**] **Yuanzhang Xiao** and Mihaela van der Schaar, "Nonstationary Resource Sharing with Imperfect Binary Feedback: An Optimal Design Framework for Cost Minimization," in *Proc. Allerton Conf. on Communication, Control, and Computing*, 2013.

[**CA11**] Luca Canzian, **Yuanzhang Xiao**, M. Zorzi, and M. van der Schaar, "Game Theoretic Design of MAC Protocols: Pricing and Intervention in Slotted-Aloha," in *Proc. Allerton Conf. on Communication, Control, and Computing*, 2013.

[**CA10**] **Yuanzhang Xiao** and Mihaela van der Schaar, "Energy-efficient Nonstationary Power Control in Cognitive Radio Networks," in *Proc. IEEE Globecom*, 2013.

[**CA9**] **Yuanzhang Xiao**, Yu Zhang, and Mihaela van der Schaar, "Socially-Optimal Design of Crowdsourcing Platforms With Reputation Update Errors," in *Proc. IEEE ICASSP*, May 2013.

[**CA8**] **Yuanzhang Xiao*** and Mihaela van der Schaar, "Distributed Spectrum Sharing Policies for Selfish Users with Imperfect Monitoring Ability," in *Proc. Asilomar Conf. on Signals, Systems, and Computers*, 2012 **(invited)**.

[**CA7**] **Yuanzhang Xiao*** and Mihaela van der Schaar, "Repeated Resource Sharing Among Selfish Players With Imperfect Binary Feedback," in *Proc. Allerton Conf. on Communication, Control, and Computing*, 2012.

[**CA6**] **Yuanzhang Xiao**, Jaeok Park, and Mihaela van der Schaar, "Design and Analysis of Intervention Mechanism In Power Control Games," in *Proc. IEEE GLOBECOM*, Dec. 2011.

[**CA5**] **Yuanzhang Xiao**, William R. Zame, and Mihaela van der Schaar, "Technology Choices and Pricing Policies in Wireless Networks," in *Proc. GameNets*, Apr. 2011.

[**CA4**] Yin Sun, **Yuanzhang Xiao**, Ming Zhao, Xiaofeng Zhong, Shidong Zhou, and Ness B. Shroff, "Joint power and channel resource allocation for F/TDMA decode and forward relay networks," in *Proc. IEEE GLOBECOM*, Dec. 2009.

[**CA3**] Peng Xu, **Yuanzhang Xiao**, and Ming Zhao, "ICI analysis of MIMO-OFDM systems with independent phase noise at both transmit and receive antennas," in *Proc. IEEE WiCOM*, Sept. 2009.

[**CA2**] **Yuanzhang Xiao**, Wei Miao, Ming Zhao, Shidong Zhou, and Jing Wang, "Limited-feedback Modified Block Diagonalization for Multiuser MIMO Downlink With Time-Varying Channels," in *Proc. IEEE ICC*, June 2009.

[**CA1**] **Yuanzhang Xiao** and Shidong Zhou, "Downlink Linear Max-MSE Transceiver Design for Multiuser MIMO Systems Via Dual Decomposition," in *Proc. IEEE VTC*, May 2008.

Teaching

Instructor, EE 442 Digital Communications, University of Hawaii (rating: 4.3/5.0)	Spring 2019
Instructor, EE 342 Probability and Statistics, University of Hawaii (rating: 3.9/5.0)	Fall 2018
Instructor, EE 442 Digital Communications, University of Hawaii (rating: 4.2/5.0)	Spring 2018
Instructor, EE 617 Convex Optimization, University of Hawaii (rating: 4.8/5.0)	Fall 2017
Guest Lecturer, EECS 422 Random Processes, Northwestern University	Winter 2016
Guest Lecturer, EE218 Network Economics and Game Theory, UCLA	Winter 2015
Teaching Assistant, EE113 Digital Signal Processing, UCLA	Spring 2011, Spring 2012
Teaching Assistant, EE238 Multimedia Communications and Processing, UCLA	Fall 2011

	Teaching Assistant, EE218 Network Economics and Game Theory, UCLA	Winter 2011

Honors and Awards

Top 50 papers out of 2000+ submissions in IEEE Globecom Conference,	2014
Dissertation Year Fellowship, UCLA,	2013–2014
Qualcomm Innovation Fellowship Finalist,	2012, 2013
University Fellowship, UCLA,	2009
Scholarship for Academic Excellence, Tsinghua University,	2003–2005
Scholarship for Freshmen, Tsinghua University,	2002
First prize, China Mathematics Olympiad in provinces,	2001

Professional Experience

Technical reviewer for IEEE Journal on Selected Areas in Communications, IEEE Transactions on Power Systems, IEEE Transactions on Mobile Computing, IEEE Transactions on Communications, IEEE Transactions on Wireless Communications, IEEE Transactions on Circuits and Systems I, IEEE ICC, IEEE VTC, IEEE WCNC, GameNets, IEEE Globecom, IEEE GlobalSIP.
Volunteer for IEEE ICC 2008.