

# Enrique Mallada | Associate Professor

## Johns Hopkins University

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### Academic Appointments

<b>Johns Hopkins University</b> <i>Associate Professor, Electrical and Computer Engineering</i> Secondary Appointments: <i>MechE, AMS, CS</i> Institutes: <i>MINDS, LCSR, ROSEI</i>	<b>Baltimore, MD – U.S.A.</b> <i>Jul 2022 – Present</i>
<b>Johns Hopkins University</b> <i>Assistant Professor, ECE</i>	<b>Baltimore, MD – U.S.A.</b> <i>Jan 2016 – Jun 2022</i>
<b>Johns Hopkins University</b> <i>Assistant Research Professor, ECE</i>	<b>Baltimore, MD – U.S.A.</b> <i>Jun 2015 – Dec 2015</i>
<b>California Institute of Technology</b> <i>CMI Postdoctoral Fellow</i> Mentors: Prof. Steven H. Low and Prof. Adam Wierman	<b>Pasadena, CA – U.S.A.</b> <i>Oct 2013 – Sep 2015</i>
<b>Cornell University</b> <i>Graduate Research Assistant</i> Advisor: Prof. A. Kevin Tang	<b>Ithaca, NY – U.S.A.</b> <i>Aug 2008 – Oct 2013</i>
<b>Universidad ORT Uruguay</b> <i>Research Assistant</i> Advisor: Prof. Fernando Paganini	<b>Montevideo – Uruguay</b> <i>Aug 2005 – Aug 2008</i>

### Education

<b>Cornell University</b> <i>Ph.D. in Electrical and Computer Engineering</i> Advisor: Prof. A. Kevin Tang Thesis: “Distributed synchronization of engineering networks: The Internet and electric power grids” – <b>Cornell ECE Director’s Research Thesis Award 2014</b> –	<b>Ithaca, NY</b> <i>Aug 2008 – Aug 2013</i>
<b>Universidad ORT Uruguay</b> <i>Ingeniero en Telecomunicaciones (B.S. in Telecommunications Engineering)</i> Advisor: Prof. Álvaro Sánchez Thesis: “TCP para redes inalámbricas: Mallomo” (TCP for wireless networks: Mallomo)	<b>Montevideo, Uruguay</b> <i>Mar 2000 – Jul 2005</i>

### Student Awards and Recognitions

<b>Tianqi Zheng</b> <i>MINDS Fellowship</i>	<b>Mathematical Institute for Data Science</b> <i>2023</i>
<b>Agustin Castellano</b> <i>MINDS Fellowship</i>	<b>Mathematical Institute for Data Science</b> <i>2022</i>
<b>Hancheng Min</b> <i>MINDS Fellowship</i>	<b>Mathematical Institute for Data Science</b> <i>2020, 2021</i>
<b>Elijah Pivo</b> <i>NSF Graduate Fellowship</i>	<b>National Science Foundation</b> <i>2020</i>
<b>Tianqi Zheng</b> <i>Travel Award</i>	<b>American Control Conference</b> <i>2020</i>
<b>Eliza Cohn</b> <i>The Muly Family Undergraduate Research Award</i>	<b>Johns Hopkins University</b> <i>2019</i>

<b>Eliza Cohn</b> <i>Provost's Undergraduate Research Award</i>	<b>Johns Hopkins University</b> 2018
<b>Eliza Cohn</b> <i>Huggins ECE Fellowship</i>	<b>Johns Hopkins University</b> 2018
<b>Jesse Rines &amp; Aurik Sarker</b> <i>Honorable Mention for Undergraduate Research</i>	<b>Johns Hopkins University</b> 2018

## Personal Awards and Recognitions

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<b>Alumni Association Excellence in Teaching Award</b> <i>Johns Hopkins University</i>	2021
<b>Catalyst Award</b> <i>Johns Hopkins University</i>	2020
<b>Discovery Award</b> <i>Johns Hopkins University</i>	2019
<b>NSF CAREER Award</b> <i>National Science Foundation</i>	2018
<b>Cornell ECE Director's Research Thesis Award</b> <i>Cornell University</i> Given annually to a Ph.D. student in the School of ECE recognizing the novelty and impact of her/his thesis research.	2014
<b>CMI Fellowship</b> <i>California Institute of Technology</i>	2013 – 2015
<b>Jacobs Fellowship</b> <i>Cornell University</i>	2011
<b>Academic Scholarship</b> <i>Organization of American States</i> Ranked 3rd across all disciplines in Uruguay	2008 – 2010
<b>Universidad ORT Uruguay</b> <i>Academic Excellence Award</i>	2005

## Grants

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My group has received **\$2.79M** in funding, out of a total of **\$8.98M** (JHU only).

### Current

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<b>NSF Global Centers (Co-PI, PI Ben Hobbs) (Total 18M, JHU 5M, share 660K)</b> Title: Electric Power Innovation for a Carbon-free Society (EPICS) Person Months: 1.00	Nov 2023 – Oct 2028
<b>JHU Institute for Assured Autonomy (PI) (JHU+APL 150K, share 50%)</b> Title: S3-RL: Safe, Scalable, and Secure RL Algorithms for Critical Infrastructures Person Months: 1.0	Oct 2023 – Mar 2025
<b>NSF CPS (Lead PI) (Total 1.2M, JHU 400K, share 50%)</b> Title: Enabling DER integration via Redesign of Information Flows Person Months: 1.00	Aug 2021 – Jul 2024
<b>NSF Career Award (PI) (JHU 500K, share 100%)</b> Title: Control, Optimization, and Market Design for Efficient and Reliable Integration of Renewable Energy Sources in Electric Power Systems Person Months: 1.00	Mar 2018 – Feb 2023

## Past

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### NSF HDR TRIPODS (Co-PI, PI: R. Vidal) (JHU 1.5M, share 50K)

Sep 2019 – Aug 2023

Title: Institute for the Foundations of Graph and Deep Learning

Person Months: 0.12

### JHU Catalyst Award (PI) (75K)

Jul 2020 – Jun 2022

Title: A Reinforce-Penalize Framework for Assured Reinforcement Learning

Person Months: 0.50

### JHU Discovery Award (PI) (JHU 100K, share 50%)

Oct 2019 – Sep 2021

Title: A Data-Driven Approach for Electricity Market Design

Person Months: 0.25

### NSF AMPS (PI) (JHU 230K, share 95%)

Sep 2017 – Aug 2021

Title: Dynamics-aware Algorithms for Real-time Structured Fault Detection in Power Systems

Person Months: 0.40

### NSF EPCN (PI) (JHU 350K, share 50%)

Sep 2017 – Aug 2021

Title: An Optimization Decomposition Framework for Principled Multi-Timescale Market Design and Co-Optimization

Person Months: 0.60

### Army Research Office (PI) (312K, share 100%)

Feb 2017 – Sep 2020

Title: Beyond Consensus: A Distributed Optimization Approach for Complex Coordination in Large-scale Dynamic Networks

Person Months: 1.0

### DoE ENERGISE (Co-PI, PI: M. Almassalkhi, UVM) (JHU 600K, share 350K)

Sep 2017 – Aug 2020

Title: Robust and resilient coordination of feeders with uncertain distributed energy resources: from real-time control to long-term planning

Person Months: 1.0

### NSF CPS (PI D. Gayme, JHU, Co-PI) (share 94K)

Jul 2015 – Jun 2020

Title: Beyond Stability: Performance, Efficiency and Disturbance Management for Smart Infrastructure Systems

### E<sup>2</sup>SHI Seed Grant (PI) (25K, share 100%)

Jul 2016 – Dec 2017

Title Leveraging Dynamics, Sparsity and Nonlinearities for Secure and Reliable Power Grid Operation

## Submitted Articles and Working Papers

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Group members in **bold**. Papers led by my group members have *me as last author*.

- [P7] **H. Min**, R. Pates, and **E. Mallada**, “A frequency domain analysis of slow coherency in networked systems”, *Automatica*, pp. 1–15, Feb. 2024, revised, submitted Feb 2022.
- [P6] **R. K. Bansal**, **P. You**, Y. Chen, and **E. Mallada**, “Intercept function and quantity bidding in two-stage electricity market with market power mitigation”, *IEEE Transactions on Energy Markets, Policy and Regulation*, pp. 1–14, Nov. 2023, under revision, submitted Aug 2023.
- [P5] **T. Zheng**, J. W. Simpson-Porco, and **E. Mallada**, “Closed-loop motion planning for differentially flat systems: A time-varying optimization framework”, *IEEE Transactions on Automatic Control*, pp. 1–14, Oct. 2023, submitted.
- [P4] **P. You**, **Y. Jiang**, E. Yeung, D. Gayme, and **E. Mallada**, “On the stability, economic efficiency and incentive compatibility of electricity market dynamics”, *IEEE Transactions on Automatic Control*, pp. 1–16, Oct. 2023, under revision, submitted Dec 2021.
- [P3] **P. You**, M. Fernandez, D. F. Gayme, and **E. Mallada**, “Mixed supply function and quantity bidding in two-stage settlement markets”, *Operations Research*, pp. 1–45, Aug. 2023, under revision, submitted Mar 2023.
- [P2] **H. Min**, S. Tarmoun, R. Vidal, and **E. Mallada**, “Convergence and implicit bias of gradient flow on overparametrized linear networks”, *Journal of Machine Learning Research*, Feb. 2023, submitted.

[P1] **P. You** and **E. Mallada**, “Analysis and regularization of saddle flow dynamics”, *IEEE Transactions on Automatic Control*, pp. 1–12, Nov. 2021, in preparation.

## Journal Publications

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Group members in **bold**. Papers led by my group members have *me as last author*.

- [J30] **R. K. Bansal**, Y. Chen, **P. You**, and **E. Mallada**, “Market power mitigation in two-stage electricity market with supply function and quantity bidding”, *IEEE Transactions on Energy Markets, Policy and Regulation*, vol. 1, no. 4, pp. 512–522, Dec. 2023. DOI: 10.1109/TEMPR.2023.3318149.
- [J29] **A. Castellano**, **H. Min**, J. Bazerque, and **E. Mallada**, “Learning to act safely with limited exposure and almost sure certainty”, *IEEE Transactions on Automatic Control*, vol. 68, no. 5, pp. 2979–2994, May 2023. DOI: 10.1109/TAC.2023.3240925.
- [J28] B. K. Poolla, Y. Lin, A. Bernstein, **E. Mallada**, and **D. GroSS**, “Frequency shaping control for weakly-coupled grid-forming ibrs”, *IEEE Control Systems Letters (L-CSS)*, pp. 937–942, Dec. 2022. DOI: 10.1109/LCSYS.2022.3228855.
- [J27] H. G. Oral, **E. Mallada**, and D. Gayme, “On the role of interconnection directionality in the quadratic performance of double-integrator networks”, *IEEE Transactions on Automatic Control*, vol. 67, no. 11, pp. 6211–6218, Nov. 2022. DOI: 10.1109/TAC.2021.3135358.
- [J26] **R. K. Bansal**, **P. You**, D. F. Gayme, and **E. Mallada**, “A market mechanism for truthful bidding with energy storage”, *Electric Power Systems Research*, vol. 211, no. 108284, pp. 1–7, Oct. 2022, also in PSCC 2022. DOI: <https://doi.org/10.1016/j.epsr.2022.108284>.
- [J25] R. Pates, A. Ferragut, **E. Pivo**, **P. You**, F. Paganini, and **E. Mallada**, “Respect the unstable: Delays and saturation in contact tracing for disease control”, *SIAM Journal on Control and Optimization*, vol. 60, no. 2, S196–S220, Apr. 2022. DOI: <https://doi.org/10.1137/20M1377825>.
- [J24] **Y. Jiang**, A. Bernstein, P. Vorobev, and **E. Mallada**, “Grid-forming frequency shaping control in low inertia power systems”, *IEEE Control Systems Letters (L-CSS)*, vol. 5, no. 6, pp. 1988–1993, Dec. 2021, also in ACC 2021. DOI: 10.1109/LCSYS.2020.3044551.
- [J23] **H. Min**, F. Paganini, and **E. Mallada**, “Accurate reduced order models for coherent heterogeneous generators”, *IEEE Control Systems Letters (L-CSS)*, vol. 5, no. 5, pp. 1741–1746, Nov. 2021, also in ACC 2021. DOI: 10.1109/LCSYS.2020.3043733.
- [J22] L. S. P. Lawrence, J. W. Simpson-Porco, and **E. Mallada**, “Linear-convex optimal steady-state control”, *IEEE Transactions on Automatic Control*, pp. 5377–5385, Nov. 2021. DOI: 10.1109/TAC.2020.3044275.
- [J21] **Y. Jiang**, **E. Cohn**, P. Vorobev, and **E. Mallada**, “Storage-based frequency shaping control”, *IEEE Transactions on Power Systems*, vol. 36, no. 6, pp. 5006–5019, Nov. 2021. DOI: 10.1109/TPWRS.2021.3072833.
- [J20] **Y. Jiang**, R. Pates, and **E. Mallada**, “Dynamic droop control in low inertia power systems”, *IEEE Transactions on Automatic Control*, vol. 66, no. 8, pp. 3518–3533, Aug. 2021. DOI: 10.1109/TAC.2020.3034198.
- [J19] **M. D. Kaba**, M. Zhao, R. Vidal, D. R. Robinson, and **E. Mallada**, “What is the largest sparsity pattern that can be recovered by 1-norm minimization?”, *IEEE Transactions on Information Theory*, vol. 67, no. 5, pp. 3060–3074, May 2021. DOI: 10.1109/TIT.2021.3067280.

- [J18] M. Almassalkhi, S. Brahma, N. Nazir, H. Ossareh, P. Racherla, S. Kundu, S. P. Nandanoori, T. Ramachandran, A. Singhal, D. Gayme, C. Ji, **E. Mallada**, **Y. Shen**, **P. You**, and D. Anand, "Hierarchical, grid-aware, and economically optimal coordination of distributed energy resources in realistic distribution systems", *Energies*, vol. 13, no. 23, pp. 1–35, Dec. 2020. DOI: 10.3390/en13236399.
- [J17] F. Paganini and **E. Mallada**, "Global analysis of synchronization performance for power systems: Bridging the theory-practice gap", *IEEE Transactions on Automatic Control*, vol. 67, no. 7, pp. 3007–3022, Jul. 2020. DOI: 10.1109/TAC.2019.2942536.
- [J16] L. Yang, **M. H. Hajiesmaili**, R. Sitaraman, A. Wierman, **E. Mallada**, and W. S. Wong, "Online linear optimization with inventory management constraints", *Proceedings of ACM on Measurement and Analysis of Computing Systems (POMACS)*, vol. 3, no. 2, Jun. 2020, also in ACM Sigmetrics 2020. DOI: 10.1145/3379482.
- [J15] A. Bahram, **M. H. Hajiesmaili**, Z. Lee, N. Crespi, and **E. Mallada**, "Online ev scheduling algorithms for adaptive charging networks with global peak constraints", *IEEE Transactions on Sustainable Computing*, Jan. 2020. DOI: 10.1109/TSUSC.2020.2979854.
- [J14] E. Weitenberg, **Y. Jiang**, C. Zhao, **E. Mallada**, C. De Persis, and F. Dorfler, "Robust decentralized secondary frequency control in power systems: Merits and trade-offs", *IEEE Transactions on Automatic Control*, vol. 64, no. 10, pp. 3967–3982, Oct. 2019. DOI: 10.1109/TAC.2018.2884650.
- [J13] R. Pates and **E. Mallada**, "Robust scale free synthesis for frequency regulation in power systems", *IEEE Transactions on Control of Network Systems*, vol. 6, no. 3, pp. 1174–1184, Sep. 2019. DOI: 10.1109/TCNS.2019.2922503.
- [J12] C. Zhao, **E. Mallada**, S. H. Low, and J. W. Bialek, "Distributed plug-and-play optimal generator and load control for power system frequency regulation", *International Journal of Electric Power and Energy Systems*, vol. 101, pp. 1–12, Oct. 2018. DOI: <https://doi.org/10.1016/j.ijepes.2018.03.014>.
- [J11] A. Cherukuri, **E. Mallada**, S. H. Low, and J. Cortes, "The role of convexity on saddle-point dynamics: Lyapunov function and robustness", *IEEE Transactions on Automatic Control*, vol. 63, no. 8, pp. 2449–2464, Aug. 2018. DOI: 10.1109/TAC.2017.2778689.
- [J10] **E. Mallada**, C. Zhao, and S. H. Low, "Optimal load-side control for frequency regulation in smart grids", *IEEE Transactions on Automatic Control*, vol. 62, no. 12, pp. 6294–6309, Dec. 2017. DOI: 10.1109/TAC.2017.2713529.
- [J9] D. Cai, **E. Mallada**, and A. Wierman, "Distributed optimization decomposition for joint economic dispatch and frequency regulation", *IEEE Transactions on Power Systems*, vol. 32, no. 6, pp. 4370–4385, Nov. 2017. DOI: 10.1109/TPWRS.2017.2682235.
- [J8] K. Dvijotham, **E. Mallada**, and J. W. Simpson-Porco, "High-voltage solution in radial power networks: Existence, properties, and equivalent algorithms", *IEEE Control Systems Letters*, vol. 1, no. 2, pp. 322–327, Oct. 2017. DOI: 10.1109/LCSYS.2017.2717578.
- [J7] A. Gushchin, **E. Mallada**, and A. Tang, "Phase-coupled oscillators with plastic coupling: Synchronization and stability", *IEEE Transactions on Network Science and Engineering*, vol. 3, no. 4, pp. 240–256, Sep. 2016. DOI: 10.1109/TNSE.2016.2605096.
- [J6] **E. Mallada**, R. A. Freeman, and A. Tang, "Distributed synchronization of heterogeneous oscillators on networks with arbitrary topology", *IEEE Transactions on Control of Network Systems*, vol. 3, no. 1, pp. 12–23, Mar. 2016. DOI: 10.1109/TCNS.2015.2428371.
- [J5] A. Cherukuri, **E. Mallada**, and J. Cortes, "Asymptotic convergence of constrained primal–dual dynamics", *Systems & Control Letters*, vol. 87, pp. 10–15, Jan. 2016. DOI: 10.1016/j.sysconle.2015.10.006.

- [J4] **E. Mallada**, X. Meng, M. Hack, L. Zhang, and A. Tang, “Skewless network clock synchronization without discontinuity: Convergence and performance”, *IEEE/ACM Transactions on Networking (TON)*, vol. 23, no. 5, pp. 1619–1633, Oct. 2015. DOI: 10.1109/TNET.2014.2345692.
- [J3] M. Wang, W. Xu, **E. Mallada**, and A. Tang, “Sparse recovery with graph constraints”, *IEEE Transactions on Information Theory*, vol. 61, no. 2, pp. 1028–1044, Feb. 2015. DOI: 10.1109/TIT.2014.2376955.
- [J2] **E. Mallada** and A. Tang, “Synchronization of weakly coupled oscillators: Coupling, delay and topology”, *Journal of Physics A: Mathematical and Theoretical*, vol. 46, no. 50, p. 505101, Dec. 2013. DOI: 10.1088/1751-8113/46/50/505101.
- [J1] F. Paganini and **E. Mallada**, “A unified approach to congestion control and node-based multipath routing”, *IEEE/ACM Transactions on Networking (TON)*, vol. 17, no. 5, pp. 1413–1426, Oct. 2009. DOI: 10.1109/TNET.2008.2011902.

## Conference Proceedings

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Group members in **bold**. Papers led by my group members have *me as last author*.

- [C70] **H. Min**, R. Vidal, and **E. Mallada**, “Early neuron alignment in two-layer relu networks with small initialization”, in *International Conference on Representation Learning (ICLR)*, Jan. 2024, to appear, submitted Sep 2023.
- [C69] H. Sibai and **E. Mallada**, “Recurrence of nonlinear control systems: Entropy and bit rates”, in *Proceedings of the 27th ACM International Conference on Hybrid Systems: Computation and Control (HSCC)*, Jan. 2024, pp. 1–8, accepted, submitted Nov 2023.
- [C68] K. Poe, **E. Mallada**, and R. Vidal, “Necessary and sufficient conditions for simultaneous state and input recovery of linear systems with sparse inputs by  $\ell_1$ -minimization”, in *62nd IEEE Conference on Decision and Control (CDC)*, Dec. 2023, to appear, accepted Jul 2023, submitted Mar 2023.
- [C67] **R. Siegelmann**, **Y. Shen**, F. Paganini, and **E. Mallada**, “A recurrence-based direct method for stability analysis and gpu-based verification of non-monotonic lyapunov functions”, in *62nd IEEE Conference on Decision and Control (CDC)*, Dec. 2023, to appear, accepted Jul 2023, submitted Mar 2023.
- [C66] **A. Castellano**, **H. Min**, J. Bazerque, and **E. Mallada**, “Learning safety critics via a non-contractive binary bellman operator”, in *57th Asilomar Conference on Signals, Systems, and Computers*, Nov. 2023, pp. 1–8.
- [C65] **H. Min** and **E. Mallada**, “Spectral clustering and model reduction for weakly-connected coherent network systems”, in *American Control Conference (ACC)*, Jun. 2023, pp. 2957–2962. DOI: 10.23919/ACC55779.2023.10156212.
- [C64] **H. Min**, R. Vidal, and **E. Mallada**, “On the convergence of gradient flow on multi-layer linear models”, in *International Conference on Machine Learning (ICML)*, Apr. 2023, pp. 1–8, accepted, submitted Jan 2023.
- [C63] Z. Xu, **H. Min**, S. Tarmoun, **E. Mallada**, and R. Vidal, “Linear convergence of gradient descent for overparametrized finite width two-layer linear networks with general initialization”, in *International Conference on Artificial Intelligence and Statistics (AISTATS)*, F. Ruiz, J. Dy, and J.-W. van de Meent, Eds., ser. Proceedings of Machine Learning Research, vol. 206, PMLR, Apr. 2023, pp. 2262–2284.
- [C62] **H. Min** and **E. Mallada**, “Learning coherent clusters in weakly-connected network systems”, in *Proceedings of The 5th Annual Learning for Dynamics and Control Conference*, PMLR, Mar. 2023, pp. 1–27, accepted, submitted Nov 2022.

- [C61] B. K. Poolla, Y. Lin, A. Bernstein, **E. Mallada**, and **D. GroSS**, “Frequency shaping control for weakly-coupled grid-forming ibrs”, in *American Control Conference (ACC)*, Jan. 2023, pp. 1–6.
- [C60] **Y. Shen**, M. Bichuch, and **E. Mallada**, “Model-free learning of regions of attraction via recurrent sets”, in *61st IEEE Conference on Decision and Control (CDC)*, Dec. 2022, pp. 4714–4719. DOI: 10.1109/CDC51059.2022.9993280.
- [C59] **T. Zheng**, **P. You**, and **E. Mallada**, “Constrained reinforcement learning via dissipative saddle flow dynamics”, in *56th Asilomar Conference on Signals, Systems, and Computers*, Dec. 2022, pp. 1362–1366. DOI: 10.1109/IEEECONF56349.2022.10052060, presented, accepted Sep 2022, submitted Apr 2022.
- [C58] **R. K. Bansal**, **P. You**, D. F. Gayme, and **E. Mallada**, “A market mechanism for truthful bidding with energy storage”, in *Power Systems Computation Conference (PSCC)*, Jul. 2022, pp. 1–9.
- [C57] **R. K. Bansal**, Y. Chen, **P. You**, and **E. Mallada**, “Equilibrium analysis of electricity markets with day-ahead market power mitigation and real-time intercept bidding”, in *Proceedings of the Thirteenth ACM International Conference on Future Energy Systems (e-Energy)*, Jun. 2022, pp. 47–62. DOI: <https://doi.org/10.1145/3538637.3538839>.
- [C56] **J. Guthrie**, M. Kobilarov, and **E. Mallada**, “Closed-form minkowski sum approximations for efficient optimization-based collision avoidance”, in *American Control Conference (ACC)*, Jun. 2022, pp. 3857–3864. DOI: 10.23919/ACC53348.2022.9867524, presented.
- [C55] **A. Castellano**, **H. Min**, J. Bazerque, and **E. Mallada**, “Reinforcement learning with almost sure constraints”, in *Proceedings of The 4th Annual Learning for Dynamics and Control Conference*, ser. Proceedings of Machine Learning Research, PMLR, vol. 168, Jun. 2022, pp. 559–570, presented, Feb 2022 accepted, submitted Dec 2021.
- [C54] **T. Zheng**, **J. Guthrie**, and **E. Mallada**, “Inner Approximations of the Positive-Semidefinite Cone via Grassmannian Packings”, in *60th IEEE Conference on Decision and Control (CDC)*, Dec. 2021, pp. 981–986. DOI: 10.1109/CDC45484.2021.9682923.
- [C53] **M. D. Kaba**, **C. You**, D. R. Robinson, **E. Mallada**, and R. Vidal, “Characterization of subspace-preserving recovery by a nullspace property”, in *International Conference on Machine Learning (ICML)*, ser. Proceedings of Machine Learning Research, (21.5% acceptance), vol. 139, PMLR, Nov. 2021, pp. 5180–5188.
- [C52] **H. Min**, S. Tarmoun, R. Vidal, and **E. Mallada**, “On the explicit role of initialization on the convergence and implicit bias of overparametrized linear networks”, in *International Conference on Machine Learning (ICML)*, ser. Proceedings of Machine Learning Research, (21.5% acceptance), vol. 139, PMLR, Jul. 2021, pp. 7760–7768.
- [C51] **R. K. Bansal**, **P. You**, D. F. Gayme, and **E. Mallada**, “Storage degradation aware economic dispatch”, in *American Control Conference (ACC)*, May 2021, pp. 589–595. DOI: 10.23919/ACC50511.2021.9482838.
- [C50] **A. Castellano**, J. Bazerque, and **E. Mallada**, “Learning to be safe, in finite time”, in *American Control Conference (ACC)*, May 2021, pp. 909–916. DOI: 10.23919/ACC50511.2021.9482829.
- [C49] **J. Guthrie** and **E. Mallada**, “Outer approximations of minkowski operations on complex sets via sum-of-squares optimization”, in *American Control Conference (ACC)*, May 2021, pp. 2367–2373. DOI: 10.23919/ACC50511.2021.9482940.
- [C48] **Y. Jiang**, A. Bernstein, P. Vorobev, and **E. Mallada**, “Grid-forming frequency shaping control in low inertia power systems”, in *American Control Conference (ACC)*, May 2021, pp. 4184–4189. DOI: 10.23919/ACC50511.2021.9482678.



- [C47] **H. Min**, F. Paganini, and **E. Mallada**, “Accurate reduced order models for coherent heterogeneous generators”, in *American Control Conference (ACC)*, May 2021, pp. 570–575. DOI: 10.23919/ACC50511.2021.9483031.
- [C46] **P. You** and **E. Mallada**, “Saddle flow dynamics: Observable certificates and separable regularization”, in *American Control Conference (ACC)*, May 2021, pp. 4817–4823. DOI: 10.23919/ACC50511.2021.9483346.
- [C45] **T. Zheng**, J. W. Simpson-Porco, and **E. Mallada**, “Implicit trajectory planning for feedback linearizable systems: A time-varying optimization approach”, in *American Control Conference (ACC)*, Jul. 2020, pp. 4677–4682. DOI: 10.23919/ACC45564.2020.9147997.
- [C44] L. Yang, **M. H. Hajiesmaili**, R. Sitaraman, A. Wierman, **E. Mallada**, and W. S. Wong, “Online linear optimization with inventory management constraints”, in *ACM Sigmetrics*, Jun. 2020, pp. 1–19. DOI: 10.1145/3393691.3394207.
- [C43] **J. Guthrie** and **E. Mallada**, “Minimum-time charging of energy storage in microgrids via approximate conic relaxation”, in *19th IEEE European Control Conference (ECC)*, May 2020, pp. 1713–1718. DOI: 10.23919/ECC51009.2020.9143992.
- [C42] **Y. Shen**, M. Bichuch, and **E. Mallada**, “On the value of energy storage in generation cost reduction”, in *19th IEEE European Control Conference (ECC)*, May 2020, pp. 1526–1532. DOI: 10.23919/ECC51009.2020.9143772.
- [C41] **J. Guthrie** and **E. Mallada**, “Adversarial Model Predictive Control via Second Order Cone Programming”, in *58th IEEE Conference on Decision and Control (CDC)*, Dec. 2019, pp. 1403–1409. DOI: 10.1109/CDC40024.2019.9029244.
- [C40] **H. Min** and **E. Mallada**, “Dynamics Concentration of Tightly-Connected Large-Scale Networks”, in *58th IEEE Conference on Decision and Control (CDC)*, Dec. 2019, pp. 758–763. DOI: 10.1109/CDC40024.2019.9029796.
- [C39] **P. You**, D. F. Gayme, and **E. Mallada**, “The Role of Strategic Load Participants in Two-Stage Settlement Electricity Markets”, in *58th IEEE Conference on Decision and Control (CDC)*, Dec. 2019, pp. 8416–8422. DOI: 10.1109/CDC40024.2019.9029514.
- [C38] **C. Avraam**, **J. Rines**, **A. Sarker**, F. Paganini, and **E. Mallada**, “Voltage Collapse Stabilization in Star DC Networks”, in *American Control Conference (ACC)*, Jun. 2019, pp. 1957–1964. DOI: 10.23919/ACC.2019.8814708.
- [C37] C. Ji, **M. H. Hajiesmaili**, D. F. Gayme, and **E. Mallada**, “Coordinating distribution system resources for co-optimized participation in energy and ancillary service transmission system markets”, in *American Control Conference (ACC)*, Jun. 2019, pp. 1315–1322. DOI: 10.23919/ACC.2019.8815242.
- [C36] C. Ji, **E. Mallada**, and D. Gayme, “Evaluating robustness of consensus algorithms under measurement error over digraph”, in *57th IEEE Conference on Decision and Control (CDC)*, Dec. 2018, pp. 1238–1244. DOI: 10.1109/CDC.2018.8619283.
- [C35] L. S. P. Lawrence, **Z. Nelson**, **E. Mallada**, and J. W. Simpson-Porco, “Optimal Steady-State Control for Linear Time-Invariant Systems”, in *57th IEEE Conference on Decision and Control (CDC)*, Dec. 2018, pp. 3251–3257. DOI: 10.1109/CDC.2018.8619812.
- [C34] M. Zhao, **M. D. Kaba**, R. Vidal, D. R. Robinson, and **E. Mallada**, “Sparse Recovery over Graph Incidence Matrices”, in *57th IEEE Conference on Decision and Control (CDC)*, Dec. 2018, pp. 364–371. DOI: 10.1109/CDC.2018.8619666.



- [C33] R. Pates and **E. Mallada**, “Damping, inertia, and delay robustness trade-offs in power systems”, in *23rd International Symposium on Mathematical Theory of Networks and Systems*, Jul. 2018.
- [C32] **Z. Nelson** and **E. Mallada**, “An integral quadratic constraint framework for steady state optimization of linear time invariant systems”, in *American Control Conference (ACC)*, Jun. 2018. DOI: 10.23919/ACC.2018.8431231.
- [C31] E. Weitenberg, **Y. Jiang**, C. Zhao, **E. Mallada**, F. Dorfler, and C. De Persis, “Robust decentralized frequency control: A leaky integrator approach”, in *17th IEEE European Control Conference (ECC)*, Jun. 2018. DOI: 10.23919/ECC.2018.8550060.
- [C30] **M. H. Hajiesmaili**, D. Cai, and **E. Mallada**, “Understanding the Inefficiency of Security-Constrained Economic Dispatch”, in *56th IEEE Conference on Decision and Control (CDC)*, Dec. 2017, pp. 2035–2040. DOI: 10.1109/CDC.2017.8263947.
- [C29] **Y. Jiang**, R. Pates, and **E. Mallada**, “Performance tradeoffs of dynamically controlled grid-connected inverters in low inertia power systems”, in *56th IEEE Conference on Decision and Control (CDC)*, Dec. 2017, pp. 5098–5105. DOI: 10.1109/CDC.2017.8264414.
- [C28] H. G. Oral, **E. Mallada**, and D. Gayme, “Performance of first and second order linear networked systems over digraphs”, in *56th IEEE Conference on Decision and Control (CDC)*, Dec. 2017, pp. 1688–1694. DOI: 10.1109/CDC.2017.8263893.
- [C27] F. Paganini and **E. Mallada**, “Global performance metrics for synchronization of heterogeneously rated power systems: The role of machine models and inertia”, in *55th Allerton Conference on Communication, Control, and Computing*, Oct. 2017, pp. 324–331. DOI: 10.1109/ALLERTON.2017.8262755.
- [C26] R. Pates and **E. Mallada**, “Decentralised robust inverter-based control in power systems”, in *IFAC World Congress*, vol. 50, Jul. 2017, pp. 5548–5553. DOI: <https://doi.org/10.1016/j.ifacol.2017.08.1097>.
- [C25] **M. H. Hajiesmaili**, M. Chen, **E. Mallada**, and C.-K. Chau, “Crowd-sourced storage-assisted demand response in microgrids”, in *Proceedings of the Eighth International Conference on Future Energy Systems*, ser. e-Energy '17, Shatin, Hong Kong: ACM, May 2017, pp. 91–100. DOI: 10.1145/3077839.3077841.
- [C24] **E. Mallada**, “iDroop: A dynamic droop controller to decouple power grid's steady-state and dynamic performance”, in *55th IEEE Conference on Decision and Control (CDC)*, Dec. 2016, pp. 4957–4964. DOI: 10.1109/CDC.2016.7799027.
- [C23] A. Cherukuri, **E. Mallada**, S. H. Low, and J. Cortes, “The role of strong convexity-concavity in the convergence and robustness of the saddle-point dynamics”, in *54th Allerton Conference on Communication, Control, and Computing*, Sep. 2016, pp. 504–510. DOI: 10.1109/ALLERTON.2016.7852273.
- [C22] C. Zhao, **E. Mallada**, S. H. Low, and J. W. Bialek, “A unified framework for frequency control and congestion management”, in *Power Systems Computation Conference*, Jun. 2016, pp. 1–7. DOI: 10.1109/PSCC.2016.7541028.
- [C21] D. Cai, **E. Mallada**, and A. Wierman, “Distributed optimization decomposition for joint economic dispatch and frequency regulation”, in *54th IEEE Conference on Decision and Control (CDC)*, Dec. 2015, pp. 15–22. DOI: 10.1109/CDC.2015.7402081.
- [C20] A. Cherukuri, **E. Mallada**, and J. Cortes, “Convergence of caratheodory solutions for primal-dual dynamics in constrained concave optimization”, in *SIAM Conference on Control and its Applications*, Jul. 2015. DOI: 10.1137/1.9781611974072.40.

- [C19] A. Gushchin, **E. Mallada**, and A. Tang, "Synchronization of heterogeneous Kuramoto oscillators with arbitrary topology", in *American Control Conference (ACC)*, Jul. 2015. DOI: 10.1109/ACC.2015.7170807.
- [C18] C. Zhao, **E. Mallada**, and F. Dorfler, "Distributed frequency control for stability and economic dispatch in power networks", in *American Control Conference (ACC)*, Jul. 2015, pp. 2359–2364. DOI: 10.1109/ACC.2015.7171085.
- [C17] A. Gushchin, **E. Mallada**, and A. Tang, "Synchronization of heterogeneous Kuramoto oscillators with graphs of diameter two", in *Conference on Information Sciences and Systems*, Mar. 2015. DOI: 10.1109/CISS.2015.7086426.
- [C16] C. Zhao, **E. Mallada**, and S. H. Low, "Distributed generator and load-side secondary frequency control in power networks", in *Conference on Information Sciences and Systems*, Mar. 2015. DOI: 10.1109/CISS.2015.7086825.
- [C15] A. Gushchin, **E. Mallada**, and A. Tang, "Synchronization of phase-coupled oscillators with plastic coupling strength", in *Information Theory and Applications Workshop (ITA)*, Feb. 2015, pp. 291–300. DOI: 10.1109/ITA.2015.7309003.
- [C14] **E. Mallada**, C. Zhao, and S. H. Low, "Optimal load-side control for frequency regulation in smart grids", in *52nd Allerton Conference on Communication, Control, and Computing*, Oct. 2014, pp. 731–738. DOI: 10.1109/ALLERTON.2014.7028527.
- [C13] **E. Mallada** and S. H. Low, "Distributed frequency-preserving optimal load control", in *IFAC World Congress*, Aug. 2014, pp. 5411–5418. DOI: 10.3182/20140824-6-ZA-1003.02012.
- [C12] **E. Mallada** and A. Tang, "Dynamics-aware optimal power flow", in *52nd IEEE Conference on Decision and Control (CDC)*, Dec. 2013. DOI: 10.1109/CDC.2013.6760118.
- [C11] **E. Mallada**, X. Meng, M. Hack, L. Zhang, and A. Tang, "Skewless network clock synchronization", in *21st IEEE International Conference on Network Protocols (ICNP)*, Oct. 2013, pp. 1–10. DOI: 10.1109/ICNP.2013.6733612.
- [C10] M. Wang, W. Xu, **E. Mallada**, and A. Tang, "Sparse recovery with graph constraints: Fundamental limits and measurement construction", in *Proceedings of IEEE Infocom*, Mar. 2012, pp. 1871–1879. DOI: 10.1109/INFCOM.2012.6195562.
- [C9] **E. Mallada** and A. Tang, "Distributed clock synchronization: Joint frequency and phase consensus", in *50th IEEE Conference on Decision and Control and European Control Conference (CDC-ECC)*, Dec. 2011, pp. 6742–6747. DOI: 10.1109/CDC.2011.6161231.
- [C8] —, "Improving damping of power networks: Power scheduling and impedance adaptation", in *50th IEEE Conference on Decision and Control and European Control Conference (CDC-ECC)*, Dec. 2011, pp. 7729–7734. DOI: 10.1109/CDC.2011.6161287.
- [C7] W. Xu, M. Wang, **E. Mallada**, and A. Tang, "Recent results on sparse recovery over graphs", in *Conference Record of the Forty Fifth Asilomar Conference on Signals, Systems and Computers (ASILOMAR)*, Nov. 2011, pp. 413–417. DOI: 10.1109/ACSSC.2011.6190031.
- [C6] W. Xu, **E. Mallada**, and A. Tang, "Compressive sensing over graphs", in *Proceeding of IEEE Infocom*, IEEE, Mar. 2011, pp. 2087–2095. DOI: 10.1109/INFCOM.2011.5935018.
- [C5] **E. Mallada** and A. Tang, "Weakly pulse-coupled oscillators: Heterogeneous delays lead to homogeneous phase", in *49th IEEE Conference on Decision and Control (CDC)*, Dec. 2010, pp. 992–997. DOI: 10.1109/CDC.2010.5717864.

- [C4] —, “Synchronization of phase-coupled oscillators with arbitrary topology”, in *2010 American Control Conference (ACC)*, Jun. 2010, pp. 1777–1782. DOI: 10.1109/ACC.2010.5531468.
- [C3] **E. Mallada** and F. Paganini, “Stability of node-based multipath routing and dual congestion control”, in *47th IEEE Conference on Decision and Control (CDC)*, Dec. 2008, pp. 1398–1403. DOI: 10.1109/CDC.2008.4739209.
- [C2] —, “Optimal congestion control with multipath routing using TCP-FAST and a variant of RIP”, in *NET-COOP*, also in Lecture Notes in Computer Science 4465, Springer-Verlag, Berlin-Heidelberg, Jun. 2007, pp. 205–214. DOI: 10.1007/978-3-540-72709-5\_22.
- [C1] F. Paganini and **E. Mallada**, “Congestion pricing for flow control and multipath routing in TCP/IP networks”, in *Congreso Latinoamericano de Investigación Operativa*, Nov. 2006.

## Patents

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- [P2] **E. Mallada**, C. Zhao, and S. H. Low, “Load-side frequency control for power systems”, No CIT-6945-P, Jul. 2014.
- [P1] **E. Mallada** and A. Tang, “System and method for skewless network clock synchronization”, No 61/878,105, Sep. 2013.

## Theses

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- [T2] **E. Mallada**, “Distributed synchronization in engineering networks: The Internet and electric power grids”, Ph.D. dissertation, Electrical and Computer Engineering, Cornell University, Jan. 2014.
- [T1] **E. Mallada**, J. Mosca, and P. Llorach, “TCP para redes inalámbricas: Mallomo (TCP for wireless networks: Mallomo)”, BS thesis, Universidad ORT Uruguay, May 2005.

## Student Theses

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- [T6] **R. K. Bansal**, “Efficiency and market power in electricity markets with inelastic demand, energy storage, and hybrid energy resources”, Ph.D. dissertation, Mechanical Engineering, Johns Hopkins University, Sep. 2023.
- [T5] **H. Min**, “Exploiting structural properties in the analysis of high-dimensional dynamical systems”, Ph.D. dissertation, Electrical and Computer Engineering, Johns Hopkins University, Aug. 2023.
- [T4] **T. Zheng**, “Online decision making for dynamical systems: Model-based and data-driven approaches”, Ph.D. dissertation, Electrical and Computer Engineering, Johns Hopkins University, Sep. 2023.
- [T3] **J. Guthrie**, “Novel representations of semialgebraic sets arising in planning and control”, Ph.D. dissertation, Electrical and Computer Engineering, Johns Hopkins University, Oct. 2022.
- [T2] **C. Avraam**, “Designing resilient interdependent infrastructures across spatial and temporal scales”, Ph.D. dissertation, Civil Engineering, Johns Hopkins University, Jul. 2021.
- [T1] **Y. Jiang**, “Leveraging inverter-interfaced energy storage for frequency control in low-inertia power systems”, Ph.D. dissertation, Electrical and Computer Engineering, Johns Hopkins University, Jul. 2021.

## Invited Talks

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**02-16-2024: Invited Lecture**, *George Mason University*. Host(s): Ningshi Yao (GMU)

**01-11-2024: Invited Lecture**, *Applied Physics Laboratory, JHU*. Host(s): Jared Markowitz

**12-11-2023: Invited Speaker**, *IHPC's Workshop of Power and Energy Systems of the (near) Future, ASTAR*. Organizer(s): John Pang (ASTAR)

**11-04-2023: Invited Lecture**, *FIND Seminar, Cornell University*. Host(s): Kevin A. Tang (Cornell)

**10-12-2023: Invited Speaker**, *MURI Workshop*. Organizer(s): Mario Sznaier (Northeastern)

**09-07-2023: Invited Speaker**, *6th Workshop on Autonomous Energy Systems*. Organizer(s): Andrey Berstein (NREL), Guido Carvaro (NREL)

**09-07-2023: Invited Speaker**, *GE EDGE Symposium*. Organizer(s): Aditya Kumar (GE)

**07-19-2023: Invited Panelist**, *Panel on Future electricity systems: How to handle millions of power electronic-based devices and other emerging technologies, IEEE PES General Meeting*. Host(s): Claudia Andrea Rahmann (UCHile), Amarsagar Reddy Ramapuram Matavalam (ASU)

**07-06-2023: Invited Speaker**, *Workshop on Uncertain Dynamical Systems*. Organizer(s): Mario Sznaier (Northeastern), Fabrizio Dabbene (PoliTo), Constantino Lagoa (Penn State)

**05-30-2023: Invited Speaker**, *Workshop on Online optimization Methods for Data-Driven Feedback Control, American Control Conference*. Organizer(s): Gianluca Bianchin (UCLouvain), Emiliano Dall'Anese (UC Boulder), Jorge Cortés (UCSD), Miguel Vaquero (IE University)

**01-18-2023: Invited Speaker**, *2023 ROSEI Summit, Johns Hopkins University*. Organizer(s): Ben Schaffer, Ben Link

**01-05-2023: Invited Speaker**, *Joint Mathematics Meeting, Special Session*. Organizer(s): Josué Tonelli Cueto, Hitesh Gakhar, Harlin Lee

**12-19-2022: Invited Speaker**, *Topologa y Probabilidad en análisis de datos, Universidad de la Republica*. Organizer(s): Nicolás Frevenza (UdelaR), Soledad Villar (JHU)

**11-02-2022: Invited Lecture**, *Data Science Seminar, Johns Hopkins University*. Host(s): Fei Lu (JHU), Mauro Maggioni (JHU)

**09-07-2022: Invited Speaker**, *Workshon on Human Dimension of Energy Systems, NREL*. Organizer(s): Andrey Berstein (NREL)

**08-26-2022: Invited Lecture**, *Massachusetts Institute of Techonology*. Host(s): Navid Azizan (MIT)

**08-25-2022: Invited Lecture**, *Massachusetts Institute of Techonology*. Host(s): Ali Jadbabaie (MIT)

**07-14-2022: Invited Speaker**, *Workshop on Autonomous Energy Systems, National Renewable Energy Laboratory*. Organizer(s): Andrey Berstein (NREL), Ahmed Zamzam (NREL), Bai Cui (NREL)

**05-27-2022: Invited Speaker**, *Information Theory and Applications Workshop*. Organizer(s): Christina Yu (Cornell)

**05-26-2022: Invited Lecture**, *University of California San Diego*. Host(s): Jorge Cortés (UCSD)

**05-04-2022: Invited Panelist**, *MURI Workshop*. Host(s): Mario Sznaier (Northeastern), Necmiye Ozay (UMich)

**04-25-2022: Invited Lecture**, *University of California Berkeley*. Host(s): Murat Arcaç (Berkeley)

**04-11-2022: Invited Lecture**, *ECE Seminar, University of Michigan*. Host(s): Johanna Mathieu

**03-30-2022: Invited Speaker**, *Workshop on Synchronization in Complex Systems, Army Research Office*. Organizer(s): Derya Cansever (ARO), Jorge Cortés (UCSD), Fabio Pasqualetti (UCR)

**11-03-2021: Invited Speaker**, *NSF TRIPODS PI Meeting*. Organizer(s): Maryam Fazel (UW), Rene Vidal (JHU)

**10-27-2021: Invited Speaker**, *Data-based Diagnosis of Networked Dynamical Systems, CCS 2021 Satellite Symposium*. Organizer(s): Melvyn Tyloo, Laurent Pagnier, Robinn Delabays

**09-09-2021: Invited Speaker**, *Resilient Autonomous Energy Systems Workshop, National Renewable Energy Laboratory*. Organizer(s): Andrey Berstein (NREL), Bai Cui (NREL)

**05-11-2021: Invited Lecture, *The Global Power System Transformation Consortium*.** Host(s): Mark O'Malley (Imperial), Janusz Bialek (Imperial)

**04-09-2021: Invited Lecture, *ECSE Seminar, RPI*.** Host(s): Joe Chow, Meng Wang

**03-25-2021: Invited Lecture, *ECE Seminar, New York University*.** Host(s): Yury Dvorkin

**03-12-2021: Plenary Lecture, *Argentine Conference of Electronics*.** Host(s): Pedro Julian

**03-05-2021: Invited Lecture, *ML Seminar, Johns Hopkins University*.** Host(s): Raman Arora

**02-16-2021: Invited Lecture, *ECE Research Colloquium, University of Washington*.** Host(s): Brian Johnson, and Baosen Zhang

**01-27-2021: Invited Lecture, *ECE Seminar, University of Iowa*.** Host(s): Weiyu Xu

**01-14-2021: Invited Speaker, *4th Grid Science Winter School and Conference, Los Alamos National Laboratory*.** Host(s): Russell Bent, Misha Cherkov, Deepjyoti Deka, Harsha Nagarajan, Anatoly Zlotnik

**07-21-2020: Invited Lecture, *Oxford University, UK*.** Host(s): Antonis Papachristodoulou

**12-09-2019: Invited Lecture, *KTH Royal Institute of Technology, Sweden*.** Host(s): Henrik Sandberg

**09-03-2019: Invited Lecture, *University of Colorado Boulder*.** Host(s): Emiliano Dall'Anese

**08-05-2019: Invited Lecture, *Beijing Institute of Technology*.** Host(s): Yuan Zou

**08-02-2019: Invited Lecture, *Tsinghua University*.** Host(s): Feng Liu

**07-31-2019: Invited Lecture, *Zhejiang University*.** Host(s): Jimming Cheng and Junfeng Wu

**07-29-2019: Invited Lecture, *Hong Kong University*.** Host(s): David Hill

**05-22-2019: Invited Lecture, *Universidad ORT Uruguay*.** Host(s): Fernando Paganini

**05-02-2019: Invited Speaker, *Issac Newton Institute for Mathematical Sciences (Cambridge, UK): The Mathematics of Energy Systems (Workshop)*.** Organisers: Bert Zwart (Technische Universiteit Eindhoven), Dennice Gayme (Johns Hopkins University), Danny Ralph (University of Cambridge), Adam Wierman (Caltech)

**02-19-2019: Invited Speaker, *IEEE PES Innovative Smart Grid Technology Conference 2019*.** Panelist. Host(s): David Copp, Sandia National Laboratory

**02-07-2019: Invited Speaker, *Future of Electric Power Systems and the Energy Transition*.** Host(s): Phillippe Jacquod (HEVS), Florian Dorfler (ETHz)

**11-09-2018: Invited Lecture, *Control Seminar, University of Michigan*.** Host(s): Johanna Mathieu and Ian Hiskens

**11-05-2018: Invited Speaker, *Inform's Annual Meeting, Phoenix, Arizona*.** Session Organizer: Adam Wierman

**07-31-2018: Invited Lecture, *ECE Seminar, University of Waterloo*.** Host(s): John Simpson-Porco

**06-11-2018: Invited Speaker, *PNNL HECT Workshop, MIT*.** Host(s): Don Hammerstrom

**03-13-2018: Invited Lecture, *University of Pennsylvania*.** Host(s): Alejandro Ribeiro

**03-07-2018: Invited Lecture, *LCSR Seminar, Johns Hopkins University*.** Host(s): Louis Whitcomb

**01-24-2018: Invited Lecture, *Decision and Control Laboratory Seminar, University of Illinois Urbana-Champaign*.** Host(s): Rayadurgam Srikant

**11-30-2017: Invited Lecture, *Applied Mathematics and Statistics Department, Johns Hopkins University*.** Host(s): Daniel Robinson

**10-24-2017: Invited Speaker, *Inform's*, Houston TX**

**10-22-2017: Invited Speaker, *Inform's*, Houston TX**

**10-05-2017: Invited Speaker, *55th Annual Allerton Conference, Monticello IL*.** Host(s): Alejandro Dominguez-Garcia, Subhonmesh Bose

**05-23-2017: Invited Speaker, *PNNL CCSI ACC Workshop, Seattle WA***

**04-27-2017: Invited Speaker, *Transactive Systems Program Review Meeting, Arlington VA***

**02-15-2017: Invited Speaker, *ITA Workshop, San Diego CA***

**01-13-2017: Invited Lecture**, *ARL Seminar*, Army Research Laboratory. Host(s): Alfredo Garcia  
**11-01-2016: Invited Speaker**, *NSF CPS PI Meeting*, Alexandria VA  
**10-24-2016: Invited Lecture**, *Environmental Science and Management Seminar*, Johns Hopkins University. Host(s): Ben Hobbs  
**08-15-2016: Invited Lecture**, *Universidad ORT Uruguay*. Host(s): Fernando Paganini  
**06-17-2016: Invited Lecture**, *ETH Zürich*. Host(s): Florian Dörfler  
**03-04-2016: Invited Speaker**, *LCSR Industry Day*, Johns Hopkins University.  
**10-30-2015: Invited Lecture**, *Stanford University*. Host(s): Ram Rajagopal  
**10-28-2015: Invited Lecture**, *VEG Seminar, University of California, Berkeley*. Host(s): Kameshwar Poola  
**09-30-2015: Invited Speaker**, *53rd Annual Allerton Conference*, Monticello IL  
**07-20-2015: Invited Speaker**, *22nd International Symposium on Mathematical Programming*, Pittsburgh  
**03-27-2015: Invited Lecture**, *Electrical Computer Engineering Department, Johns Hopkins University*  
**03-12-2015: Invited Lecture**, *Electrical Engineering and Computer Science Department, Massachusetts Institute of Technology*  
**03-05-2015: Invited Lecture**, *Electrical Engineering Department, Princeton University*  
**02-18-2015: Invited Lecture**, *Electrical and Computer Engineering Department, University of California, Santa Barbara*  
**02-10-2015: Invited Lecture**, *Electrical and Computer Engineering Department, Virginia Tech*  
**01-22-2015: Invited Lecture**, *Mechanical and Aerospace Engineering Department, University of California, San Diego*  
**11-07-2014: Invited Speaker**, *27th Southern California Control Workshop*, University of California, Riverside  
**10-02-2014: Invited Speaker**, *52nd Annual Allerton Conference, University of Illinois, Urbana-Champaign*  
**09-30-2014: Invited Speaker**, *Mathematics of Planet Earth 2013+*, University of California, San Diego  
**02-25-2014: Invited Lecture**, *Thesis Award Competition*, Cornell University  
**01-08-2014: Invited Speaker**, *KAUST-NSF Conference on Electronic Materials, Devices and Systems for Sustainable Future*, Saudi Arabia  
**01-09-2014: Invited Lecture**, *CCDC Seminar, University of California, Santa Barbara*  
**04-05-2013: Invited Lecture**, *Dynamics Seminar*, Math Department, Cornell University  
**06-25-2012: Invited Lecture**, *Columbia University*  
**09-23-2011: Invited Lecture**, *Electron Devices Society Seminar*, Cornell University  
**07-21-2011: Invited Lecture**, *T. J. Watson IBM Research Center*, Hawthorne  
**10-12-2009: Invited Lecture**, *T. J. Watson IBM Research Center*, Hawthorne

## Professional Service

### Technical Reviewer.....

**Journals:** IEEE Transactions on Automatic Control, Automatica, IEEE Transactions on Power Systems, IEEE Power Engineering Letters, IEEE Transactions on Networking, EURASIP Journal on Advances in Signal Processing, Proceedings of the National Academy of Science, Mathematical Programming, Springer, IEEE Transaction on Control of Network Systems, Journal of Physics A: Mathematical and Theoretical, Journal of Computer Science and Technology, IEEE Transactions on Network Science and Engineering, Systems and Control Letters

**Conferences:** Conference on Decision and Control, Infocom, American Control Conference, European Signal Processing Conference, IFAC World Congress

### Technical Society Activites.....

**2016 – Present: Member:** IEEE Control System Society's Technical Committee on Smart Grids

**2018 – 2020: Member:** Transactive Systems Hybrid Economic-Control Theory Experts Panel

**2010 – 2011: Organizer:** Information, Systems, and Networks Seminar, Cornell University

### Conference Organization and Technical Program Committees.....

**2022: TPC Member:** ACM International Conference on Future Energy Systems (ACM e-Energy)

**2021: Lead Organizer:** TRIPODS Winter School & Workshop on Graph Learning and Deep Learning, MINDS, Johns Hopkins University

Program Included: 8 tutorials, 2 practicums, and 12 research talks.

**2017, 2019, 2021: TPC Member:** Conference on Information, Sciences and Systems, Johns Hopkins University

**2019: Co-Chair:** Conference on Information, Sciences and Systems, Johns Hopkins University

Program Included: 14 sessions, including sessions in *Sparse Signal Processing*, *Machine Learning*, *Medical Imaging*, *Power Systems*, and *Optimization and Control*.

**2019: TPC Member:** Associate Editor (Invited Sessions), American Control Conference 2019

**2017, 2018: TPC Member:** IEEE International Conference on Smart Grid Communications (IEEE SmartGrid-Comm)

### Invited Sessions

- ACC 2021, one session; in *Learning, Optimization, and Control for Safety-critical Systems*
- CISS 2021, three sessions; in *Learning in Control*, *Power Systems Optimization*, and *Power Systems Economics*
- Informs 2018, one session, *Real-time Optimization for Power Systems*
- ISMP 2018, one session, in *Emerging Energy Markets*
- CISS 2017, two sessions, in *Optimization and Control in Power Systems*

### Community Service and Outreach.....

**2016 – Present: Faculty Advisor:** JHU Chapter of the Society of Hispanic Professional Engineers (SHPE)

**Spr 2020: WISE Program:** Hosted one female student for the entire semester.

**Spr 2020: SABES Program** Students in his group participated in the program.

**Feb 2019: Panelist:** NSBE-SHPE Faculty Panel

### University Service.....

#### Graduate Board Oral Examination

- Jingy Zhu, Jun 2017
- Brent Elderige, Nov 2017
- Debojyoti Biswas, Apr 2018
- Long Wang, Mar 2020
- Yan Jiang, Apr 2020
- Chengda Ji, May 2020
- Paul Stankiewicz, May 2020
- Ali Ebrahimi, May 2020
- Genevive Starke, Nov 2020
- Phillip Rivera Ortiz, Dec 2020
- James Guthrie, Apr 2021
- Tianqi Zheng, Aug 2021
- Hancheng Min, Aug 2021
- Rajni K. Bansal, Sep 2021

#### PhD Thesis Committee Member



- Chong You, ECE, Proposal Feb 2017, Defense Sep 2018
- Carl Shapiro, MechE, Defense Sep 2018
- Sayak Battacharya, ECE, Proposal Sep 2017, Defense Sep 2019
- Hasan Oral, MechE, Defense Aug 2020
- Brent Eldridge, EHE, Defense Oct 2020
- Claire Zurn, BME, Proposal Mar 2021
- Sanjukta Nandi Bose, ECE, Proposal Apr 2021
- Yan Jiang, ECE, Proposal Nov 2020, Defense Jun 2021
- Charalampos Avraam, CSE, Defense Jun 2021
- Debojyoti Biswas, ECE, Proposal Feb 2019, Defense Aug 2021
- Sanjukta Nandi Bose, ECE, Proposal Apr 2021, Defense Oct 2021

**2021 – Present: University Committee Member:** ROSEI Institute Faculty Search

**2021 – Present: ECE Committee Member:** PhD Requirements Committee

**2021 – Present: ECE Committee Member:** Areas of Research Committee

**2019, 2021 – Present: University Committee Member:** MINDS Fellowship

**2020 – 2021: University Committee Member:** ECE Department Head Search

**2021: Organizer:** MINDS Winter School and Workshop

**2016 – 2021: ECE Committee Member:** ECE Seminar Series Organizing Committee

**2019 – 2020: ECE Committee Member:** Strategic Planning Committee

**Oct. 2020: Panelist:** Explore Hopkins Engineering Panel

**2020: University Committee Member:** MINDS Faculty Search

**Oct. 2019, Oct. 2020: Panelist:** Explore Hopkins Engineering Panel

**Spr. 2019: Panelist:** WSE Office of Graduate Academic Affairs

## Teaching

### In-Person

<b>520.637 Foundations of Reinforcement Learning</b>	<b>Johns Hopkins University</b>
<i>Lecturer (grad)</i>	<i>Fall 2020, 2021, 2022</i>

<b>520.353 Control Systems</b>	<b>Johns Hopkins University</b>
<i>Lecturer (ugrad, junior level)</i>	<i>Spring 2017, 2018, 2019, 2020, 2021, 2022</i>

<b>520.629 Networked Dynamical Systems</b>	<b>Johns Hopkins University</b>
<i>Lecturer (grad)</i>	<i>Fall 2016, 2017, 2018, 2019</i>

<b>Control and Optimization of Information Networks</b>	<b>Cornell University</b>
<i>Office hours and grading (grad)</i>	<i>Spring 2012, 2011</i>

<b>Computer Networks and Telecommunications</b>	<b>Cornell University</b>
<i>Office hours, grading and laboratory lectures (undergrad)</i>	<i>Fall 2010</i>

### Online

<b>525.637 Foundations of Reinforcement Learning</b>	<b>Johns Hopkins University</b>
<i>Lecturer (grad), Engineering Professional Program</i>	<i>Fall 2021, 2022</i>

## Advising and Mentoring

### Research Scientists and Postdocs

<b>Dhananjay Anand</b>	<b>Johns Hopkins University</b>
<i>Research Scientist</i>	<i>Jul 2022 – Present</i>
Research: Power System Stability, IBR Interoperability, Synchronization.	

**Pengcheng You***Postdoc*

Co-Mentor: Dennice Gayme

Research: Electricity Markets, Dynamical Systems, Game Theory.

**Next:** Assistant Professor, Pekin University, Industrial and Management Engineering**Johns Hopkins University***Oct 2018 – Dec 2021***M. Devrim Kaba***Research Scientist*

Research: Sparse recovery and subspace clustering.

**Next:** Applied Researcher, eBay**Johns Hopkins University***Oct 2017 – Jun 2020***Mohammad Hajiesmaili***Postdoc*

Research: Online Optimization in Power Systems.

**Next:** Assistant Professor, UMASS Amherst, Computer Science**Johns Hopkins University***Nov 2016 – Jun 2018***Ph.D. Students****Roy Siegelmann***Ph.D. Student, AMS*

Research: Recurrence-based Stability Analysis

AMS Candidacy Exam Jul 2023

**Johns Hopkins University***Aug 2022 – Present***Agustin Castellano***Ph.D. Student, ECE*

Research: Reinforcement Learning and Control

DQE Spring 2022

**Johns Hopkins University***Aug 2021 – Present***Yue Shen***Ph.D. Student, ECE*

Research: Learning for Control, Optimal Control of Energy Storage Systems

DQE Spring 2020; GBO Sep 2022

**Johns Hopkins University***Aug 2019 – Present***Tianqi Zheng***Ph.D. Student, ECE*

Research: Optimal Steady State Control of Dynamical Systems; Reinforcement Learning

DQE Fall 2019; GBO Aug 2021; Thesis Proposal Feb 2023

**Thesis:** Online decision-making for dynamical systems: Model-based and data-driven approaches**Next:** Amazon, Applied Scientist**Johns Hopkins University***Aug 2018 – Sep 2023***Rajni Bansal***Ph.D. Student, MechE*

Co-Advisor: Dennice Gayme Research: Energy Storage Bidding in Electricity Markets

DQE Fall 2019; GBO Sep 2021

**Thesis:** Efficiency and Market Power in Electricity Markets with Inelastic Demand, Energy Storage, and Hybrid Energy Resources**Next:** UCSD, MechE, Postdoc**Johns Hopkins University***Aug 2018 – Sep 2023***Hancheng Min***Ph.D. Student, ECE*

Research: Foundations of Deep Learning, Dynamics Concentrations in Networks, Reinforcement Learning

DQE Spring 2019; GBO Sep 2021; Thesis Proposal Mar 2023

**Thesis:** Exploiting Structural Properties in the Analysis of High-dimensional Dynamical Systems**Next:** UPenn, ESE, Postdoc**Johns Hopkins University***Aug 2018 – July 2023***James Guthrie***Ph.D. Student, ECE*

Research: Adversarial Model Predictive Control

DQE Fall 2019; GBO Apr 2021; ECE Department Seminar Feb 2022

**Thesis:** Novel Representations of Semialgebraic Sets Arising in Planning and Control**Next:** Apple Special Projects Group (SPG), Engineer**Johns Hopkins University***Jan 2018 – Oct 2022*

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<b>Charalampos Avraam</b> <i>Ph.D. Student, CSE</i> Co-Advisor: Sauleh Siddiqui Research: Voltage Collapse Stabilization DQE Fall 2017; GBO Dec 2018; Defense Jun 2021 <b>Thesis:</b> Designing Resilient Interdependent Infrastructures Across Spatial and Temporal Scales <b>Next:</b> NYU, Center of Urban Science + Progress, Postdoc	<b>Johns Hopkins University</b> <i>Aug 2017 – Jul 2021</i>
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<b>Yan Jiang</b> <i>Ph.D. Student, ECE</i> Research: Inverter-based Control for Low Inertia Systems DQE Spring 2018; GBO Apr 2020; ECE Department Seminar Nov 2020; Defense Jun 2021 <b>Thesis:</b> Leveraging Inverter-Interfaced Energy Storage for Frequency Control in Low-Inertia Power Systems <b>Next:</b> UW and ASU, ECE, joint Postdoc	<b>Johns Hopkins University</b> <i>Aug 2016 – Jul 2021</i>
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<b>Andrey Gushchin</b> <i>Ph.D. Applied Math</i> Co-Mentor, Advisor: A. Kevin Tang <b>Thesis:</b> Synchronization and Learning in Complex Networks <b>Next:</b> Waltze Networks	<b>Cornell University</b> <i>Oct 2013 – Aug 2016</i>
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## M.S. Students.....

<b>Rui Liu</b> <i>M.S.E. Student, AMS, Data Sciences</i> Research: Reinforcement Learning with Almost Sure Constraints	<b>Johns Hopkins University</b> <i>Jan 2022 – Present</i>
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<b>Yifei (Gary) Gao</b> <i>M.S.E. Student, ECE</i> Research: Autonomous Car Racing	<b>Johns Hopkins University</b> <i>Jan 2021 – Present</i>
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<b>Yue Shen</b> <i>M.S.E. Student, ECE</i> Research: Optimal Control of Storage <b>Next:</b> Ph.D. Program, Johns Hopkins University	<b>Johns Hopkins University</b> <i>May 2018 – May 2019</i>
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<b>Mengnan Zhao</b> <i>M.S.E. Student, ECE</i> Research: Sparse Recovery on Networks <b>Next:</b> Ph.D. Program, RICE University	<b>Johns Hopkins University</b> <i>Aug 2016 – May 2018</i>
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<b>Zachary Nelson</b> <i>M.S.E. Student, ECE</i> Research: Interfacing Dynamical System Theory and Optimization Theory <b>Next:</b> Lockheed Martin	<b>Johns Hopkins University</b> <i>May 2016 – May 2018</i>
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<b>Master of Engineering Student Mentor</b> Students: Nitish Dube and Rohan Patankar M Eng Thesis: "Distributed clock synchronization in data networks" Co-Supervisor: Prof. A. Kevin Tang  Students: Sichao Zhang and Youchun Zhang M Eng Thesis: "Fairness vs efficiency in data networks" Co-Supervisor: Prof. A. Kevin Tang	<b>Cornell University</b> <i>2010 – 2011</i>
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## Undergraduate Students.....

<b>Eli Pivo</b> <i>Undergraduate, EE</i> Research: Control of Disease Spread <b>Next:</b> Ph.D. Program, Massachusetts Institute of Technology	<b>Johns Hopkins University</b> <i>Jun 2019 – Aug 2020</i>
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<b>Eliza Cohn</b> <i>Undergraduate, EE and Math</i> Research: Storage-based Dynamic Droop Control <b>Next:</b> Data Scientists & Software Engineer, Optum	<b>Johns Hopkins University</b> Aug 2017 – May 2020
<b>Aurik Sarker</b> <i>Undergraduate, EE</i> Research: Voltage Collapse Stabilization <b>Next:</b> JHU Applied Physics Laboratory	<b>Johns Hopkins University</b> Aug 2016 – May 2018
<b>Jesse Rines</b> <i>Undergraduate, EE</i> Research: Voltage Collapse Stabilization <b>Next:</b> Naval Reactors	<b>Johns Hopkins University</b> Aug 2016 – May 2018
<b>Graduate Resident Fellow</b> Member of a group of six graduate students, two undergraduate students and a professor, living in a university residence for 400 undergraduate students (Rose House) and working together to achieve the following goals: <ul style="list-style-type: none"> <li>creating a positive, vibrant and academically engaging residential community</li> <li>serving as mentors, and role models to undergraduate residents</li> <li>serving in a leadership role for academic enrichment by promoting a variety of programs</li> </ul>	<b>Rose House, Cornell University</b> 2011-2013
<b>Visiting Students</b>	
<b>Agustin Castellano</b> <i>M.S. Student</i>	<b>Universidad de la Republica, Uruguay</b> Apr 2020 – May 2020
<b>Amir Daneshmand</b> <i>Ph.D. Student</i>	<b>Purude University</b> May 2019 – Aug 2019
<b>Engineering Experience</b>	
<b>IBM T. J. Watson Research Center</b> <i>Research Intern</i> Mentor: Dr. Xiaoqiao Meng Manager: Dr. Li Zhang Analysis and development of a distributed synchronization algorithm for computer networks	<b>Hawthorne, NY</b> May 2011 – Jul 2011
<b>Administración Nacional de Telecomunicaciones</b> <i>Telecommunications Engineer</i> Project: Traffic Management and Fraud Detection Member of the team in charge of early detection of subscribers' fraudulent behavior	<b>Montevideo, Uruguay</b> Apr 2007 – Jul 2008
<b>IBM Uruguay</b> <i>IT Specialist, Developer</i> Project: ICD ANTEL (Intercomunicación de Centrales Digitales). Member of the mixed C/Java provisioning system project that centralizes the command execution of ANTEL's wired, wireless and pre-paid telecommunication systems	<b>Montevideo, Uruguay.</b> Jul 2004 – Mar 2007
<b>Geocom</b> <i>Point of Sale (PoS) Technician</i> Member of the PoS support team	<b>Montevideo, Uruguay</b> May 2004 – Jul 2004