

Curriculum Vitae

A. Biographical Information

NAME: Nader Motee

BUSINESS ADDRESS:

19 Memorial Drive West, Bethlehem
552 Packard Laboratory
Department of Mechanical Engineering and Mechanics
Lehigh University PA 18015

Website: <https://dcds.lehigh.edu>

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Phone: (626) 375-6587

EDUCATIONAL HISTORY:

Doctor of Philosophy, Electrical and Systems Engineering

University of Pennsylvania, Philadelphia, PA

Primary Fields: Control Systems and Robotics

Title of Dissertation: Optimal Control of Spatially Distributed Systems (Advisor: Prof. Ali Jadbabaie)

Completion Date: August 16, 2006 – December 31, 2007

Master of Science, Electrical and Systems Engineering

University of Pennsylvania, Philadelphia, PA

Depth Area: Control Systems and Robotics

Completion Date: June 01, 2003 – August 15, 2006

Master of Science, Mechanical Engineering

Louisiana State University, Baton Rouge, LA

Depth Area: Control Systems

Title of Dissertation: Minimization of Power Losses in Active Magnetic Bearing Control

Completion Date: July 01, 2001– May 31, 2003

Bachelor of Science, Electrical Engineering, Sharif University of Technology, Tehran, Iran

Completion Date: September 01, 1995 – February 01, 2000

EMPLOYMENT HISTORY:

Associate Professor, Lehigh University, Bethlehem, PA

Affiliation: Department of Mechanical Engineering and Mechanics

Appointment Duration: May 2017– present

Assistant Professor, Lehigh University, Bethlehem, PA

Affiliation: Department of Mechanical Engineering and Mechanics

Appointment Duration: August 2011– May 2017

Postdoctoral Scholar, California Institute of Technology, Pasadena, CA

Affiliation: Control and Dynamical Systems (CDS) Department (Advisor: Prof. John C. Doyle)

Appointment Duration: November 2008 – August 2011

Visiting Postdoctoral Scholar, University of California at Santa Barbara, Santa Barbara, CA

Affiliation: The Center for Control, Dynamical Sys. & Computation (Advisor: Prof. Bassam Bamieh and Mustafa Khammash)

Appointment Duration: March 23, 2009 – March 23, 2011

Postdoctoral Research Fellow, University of Pennsylvania, Philadelphia, PA

Affiliation: General Robotics, Automation, Sensing, and Perception (GRASP) Laboratory.

Appointment Duration: January 1, 2008 – October 31, 2008

B. Honors and Awards

1. The 2019 Best SICON Paper Prize

This prize is given to one of two outstanding papers that have made significant research contributions to the field of Control and Systems Theory and have been published in SIAM Journal of Control and Optimization (SICON) in one of the three calendar years preceding the year of the award (2017-2019)

2. Best Student Paper: Runner-Up Award (as advisor), IFAC Conference on Distributed Estimation and Control in Networked Systems, Tokyo, Japan, 2016
3. The Office of Naval Research Young Investigator Award (**ONR YIP**), 2016
4. Best Student Paper Award (as advisor), IFAC Conference on Distributed Estimation and Control in Networked Systems, Philadelphia, PA, 2015
5. NSF Faculty Early Career Development (**CAREER**) Award, 2015
6. The Air Force Office of Scientific Research Young Investigator Award (**AFOSR YIP**), 2013
7. The P.C. Rossin Endowed Chair, Lehigh University, 2013-2015
8. IEEE Senior Member, 2013-present
9. O Hugo Schuck Award for Theory, American Automatic Control Council, 2008
Given for the best theory paper published in the proceedings of the 2007 American Control Conference.
10. Joseph, D'16, and Rosaline Wolf Award for Best Dissertation, Penn Engineering, UPenn, 2008
11. Best Student Paper Award, American Control Conference, 2007
12. Best Student Paper Award, Finalist, American Control Conference, 2006
13. Best Poster Award, Research Forum at Penn Engineering, 2006
14. IEEE Best Student Paper Contest, Finalist, IEEE Region 8 (Europe, Africa, and Middle East), 2000

C. Publications and Creative Activities

ARTICLE IN REFEREED JOURNALS:

- [J15] **Authors:** C. Somarakis, Y. Ghaedsharaf and N. Motee.
Title: Time-delay origins of fundamental tradeoffs between risk of large fluctuations and network connectivity.
Journal: IEEE Transactions on Automatic Control. Vol. 64, Issue 9, September 2019. To Appear.
- [J14] **Authors:** Y. Ghaedsharaf, M. Siami, C. Somarakis and N. Motee.
Title: Performance analysis and improvement of time-delay linear consensus networks.
Journal: IEEE Transactions on Automatic Control. Vol. 64, Issue 6, June 2019. To Appear.
- [J13] **Authors:** M. Siami, N. Motee, G. Buzi, B. Bamieh, M. Khammash and J.C. Doyle.
Title: Performance limitations in autocatalytic pathways.
Journal: IEEE Transactions on Automatic Control. Accepted.
- [J12] **Authors:** C. Somarakis, E. Paraskevas, J.S. Baras and N. Motee.
Title: Convergence analysis of classes of asymmetric networks of cuckoo-smale type with deterministic perturbations.
Journal: IEEE Trans. on Control of Network Systems. Vol. 5, Issue 4, pp. 1852-1863, December 2018.
- [J11] **Authors:** M. Siami and N. Motee.
Title: Growing linear dynamical networks endowed spectral systemic performance measures.
Journal: IEEE Transactions on Automatic Control. Vol. 63, Issue 7, pp. 2091-2106, July 2018.
- [J10] **Authors:** M. Siami and N. Motee.
Title: Network Abstraction with guaranteed systemic performance measures.
Journal: IEEE Transactions on Automatic Control. Vol. 63, Issue 10, pp. 3301-3316, October 2018.
- [J9] **Authors:** M. Siami, S. Bolouki, B. Bamieh, and N. Motee.
Title: Centrality measures in linear consensus networks with structured network uncertainties.
Journal: IEEE Trans. on Control of Networks Systems. Vol. 5, Issue 3, pp. 924-934, September 2018.
- [J8] **Authors:** S. Bolouki, R.P. Malhame, M. Siami and N. Motee.
Title: Eminence grise coalitions: on the shaping of public opinion.
Journal: IEEE Transactions on Control of Networks Systems. Vol. 4, Issue 2, pp. 133-145, June 2017.
- [J7] **Authors:** M. Siami and N. Motee.
Title: New spectral bounds on H2-norm of noisy linear dynamical networks.
Journal: Automatica. Vol. 80, pp. 305-312, June 2017.
- [J6] **Authors:** N. Motee and Q. Sun.
Title: Sparsity and spatial localization measures for spatially distributed systems.
Journal: SIAM Journal Control and Optimization. Vol. 55, Issue 1, pp. 200-235, 2017.
Note: **Winner of the 2019 SIAG/CST Best SICON Paper Prize.**
- [J5] **Authors:** M. Siami and N. Motee.
Title: Fundamental limits and tradeoffs on disturbance propagation in large-scale dynamical networks.
Journal: IEEE Transactions on Automatic Control. Vol. 61, Issue 12, pp. 4055-5062, December 2016.

- [J4] **Authors:** N. Motee, B. Bamieh and M. Khammash.
Title: Stability analysis of quasi-polynomial dynamical systems with applications to biological network models.
Journal: Automatica, Vol. 48, Issue 11, pp. 2945-2950, Nov. 2012.
- [J3] **Authors:** N. Motee and A. Jadbabaie.
Title: Distributed multi-parametric quadratic programming.
Journal: IEEE Trans. on Automatic Control, Vol. 54, No. 10, pp. 2279-2289, October 2009.
- [J2] **Authors:** N. Motee and A. Jadbabaie.
Title: Optimal control of spatially distributed systems.
Journal: IEEE Trans. on Automatic Control, Vol. 53, No. 7, pp. 1616-1629, August 2008.
- [J1] **Authors:** A. Karimi, I.D. Landau, and N. Motee.
Title: Effects of the design parameters of multimodel adaptive control on the performance of a flexible transmission system.
Journal: Int. Journal of Adaptive Control and Signal Processing, Vol. 15 (3):335-352, April 2001.

UNDER REVIEW JOURNAL ARTICLES:

- [UJ24] **Authors:** C. Somarakis, Y. Ghaedsharaf and N. Motee.
Title: Risk of collision and detachment in vehicle platooning: time-delay induced limitations and trade-offs.
Journal: IEEE Transactions on Automatic Control. Under Review.
- [UJ23] **Authors:** Y. Ghaedsharaf, M. Siami, C. Somarakis and N. Motee.
Title: Centrality in Time-Delay Consensus Networks with Structured Uncertainties.
Journal: Automatica. Under Review.
- [UJ22] **Authors:** N. Motee and Q. Sun.
Title: Localized stability certificates for spatially distributed systems with sparse graph topologies.
Journal: IEEE Transactions on Automatic Control. Under Review.
- [UJ21] **Authors:** H.K. Mousavi, Q. Sun and N. Motee.
Title: Space-time sampling for network observability.
Journal: IEEE Transactions on Automatic Control. Under Review.
- [UJ20] **Authors:** C. Somarakis and N. Motee.
Title: Aggregate Fluctuations in Networks with Drift-Diffusion Models Driven by Stable Non-Gaussian Disturbances.
Journal: IEEE Transactions on Control of Network Systems. Under Review
- [UJ19] **Authors:** H.K. Mousavi, C. Somarakis and N. Motee.
Title: Koopman performance analysis of nonlinear consensus networks.
Book Chapter: Lecture Notes in Control and Information, Springer. Under Review.
- [UJ18] **Authors:** H. Mousavi and N. Motee.
Title: Spectral performance analysis of a multi-agent systems.
Journal: IEEE Transactions on Automatic Control. Under Review.

- [UJ17] **Authors:** S. Dezfulian, Y. Ghaedsharaf, and N. Motee.
Title: Performance analysis and optimal design of time-delay directed consensus networks.
Journal: IEEE Transactions on Control of Networked Systems. Under Review.
- [UJ16] **Authors:** M. Bahavarnia, H.K. Mousavi and N. Motee.
Title: Sparse sensor, communication, actuator scheduling via self-triggered control algorithms.
Journal: Automatica. Under Review.

REFEREED CONFERENCE PAPERS IN PROCEEDINGS:

- [C66] H.K. Mousavi, Q. Sun and N. Motee. *Measurable Observations for Network Observability*. American Control Conference, Philadelphia, PA, July 2019.
- [C65] C. Somarakis, Y. Ghaedsharaf and N. Motee. *Risk of Collision in Vehicle Platoons in Presence of Time Delay and Exogenous Stochastic Disturbances*. The 57th IEEE Conference on Decision and Control (CDC'2018), Miami, FL, December 2018.
- [C64] C. Somarakis, Y. Ghaedsharaf and N. Motee. *Explicit Expressions and Bounds of Performance and Systemic Risk Measures in Symmetric Linear Systems Driven by Heavy-Tailed Noise*. The 57th IEEE Conference on Decision and Control (CDC'2018), Miami, FL, December 2018.
- [C63] H.K. Mousavi, Q. Sun and N. Motee. *Space-Time Sampling for Network Observability*. The 7th Workshop on Distributed Estimation and Control in Networked Systems (NecSys18), Groningen, the Netherlands, August 2018.
- [C62] C. Somarakis, Y. Ghaedsharaf, F. Dorfler and N. Motee. *Risk of Phase Incoherence in Noisy Power Networks with Delayed Feedback Control*. The 7th Workshop on Distributed Estimation and Control in Networked Systems (NecSys18), Groningen, the Netherlands, August 2018.
- [C61] Y. Ghaedsharaf, C. Somarakis, F. Dorfler and N. Motee. *Large Area Control of Power Networks with Communication Time-Delay*. The 7th Workshop on Distributed Estimation and Control in Networked Systems (NecSys18), Groningen, the Netherlands, August 2018.
- [C60] N. Motee and Q. Sun. *Localized Stability Analysis and Design of Symmetric Spatially Distributed Systems over Sparse Proximity Graphs*, Proceedings of the 23rd International Symposium on Mathematical Theory of Networks and Systems, Hong Kong, July 2018. Accepted.
- [C59] C. Somarakis and N. Motee. *Performance Analysis of Consensus Networks Driven by Levy Motion*. American Control Conference, Milwaukee, WI, June 2018. Accepted.
- [C58] Y. Ghaedsharaf, C. Somarakis and N. Motee. *Performance of Second-Order Platoon of Vehciles in Presence of Time Delay and Exogenous Disturbances*. American Control Conference, Milwaukee, WI, June 2018. Accepted.
- [C57] S. Dezfulian, Y. Ghaedsharaf and N. Motee. *On Performance of Time-Delay Linear Consensus Networks with Directed Interconnection Topologies*. American Control Conference, Milwaukee, WI, June 2018. Accepted.
- [C56] H.K. Mousavi and N. Motee. *Performance of Dynamical Networks over Random Graphs*. American Control Conference, Milwaukee, WI, June 2018. Accepted.
- [C55] H. Mousavi, C. Somarakis and N. Motee. *Spectral Performance Analysis and Design of General Multi-Agent Systems*. The 56th IEEE Conference on Decision and Control (CDC'2017), Melbourne, Australia, December 2017.

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- [C54] Y. Ghaedsharaf, M. Siami, C. Somarakis and N. Motee. *Eminence in Presence of Time-Delay and Structured Uncertainties in Linear Dynamical Networks*. The 56th IEEE Conference on Decision and Control (CDC'2017), Melbourne, Australia, December 2017.
- [C53] M. Bahavarnia, C. Somarakis and N. Motee. *Improving sparsity in time and space via self-triggered sparse optimal controllers*. The 56th IEEE Conference on Decision and Control (CDC'2017), Melbourne, Australia, December 2017.
- [C52] M. Bahavarnia, C. Somarakis and N. Motee. *State feedback controller sparsification via a notion of non-fragility*. The 56th IEEE Conference on Decision and Control (CDC'2017), Melbourne, Australia, December 2017.
- [C51] M. Bahavarnia and N. Motee. *Sparse Memoryless LQR Design for Uncertain Linear Time-Delay Systems*. Proceedings of the IFAC 2017 World Congress, Toulouse, France, July 2017.
- [C50] M. Bahavarnia and N. Motee. *Row-Column Sparse Linear Quadratic Controller Design via Bi-Linear Rank Penalty Technique*. IEEE MED 2017, Malta, July 2017.
- [C49] C. Somarakis and N. Motee. *Aggregate fluctuations in time-delay linear consensus networks: A systemic risk perspective*. American Control Conference, Seattle, WA, May 2017.
- [C48] H.K. Mousavi, C. Somarakis, M. Bahavarnia and N. Motee. *Performance bounds and optimal design of randomly switching linear consensus networks*. American Control Conference, Seattle, WA, May 2017.
- [C47] Y. Ghaedsharaf and N. Motee. *Performance improvement in time-delay linear consensus network*. American Control Conference, Seattle, WA, May 2017.
- [C46] M. Siami, B. Bamieh and N. Motee. *Notions of Centrality in Consensus Protocols with Input Uncertainties*. The 55th IEEE Conference on Decision and Control (CDC'2016), Las Vegas, NV, December 2016.
- [C45] R. Arastoo, M. Bahavarnia, M.V. Kothare, and N. Motee. *Closed-Loop Feedback Sparsification Under Parametric Uncertainties*. The 55th IEEE Conference on Decision and Control (CDC'2016), Las Vegas, NV, December 2016.
- [C44] N. Motee and Q. Sun. *Localized Stability Certificates for Spatially Distributed Systems with Sparse Graph Topologies*. The 55th IEEE Conference on Decision and Control (CDC'2016), Las Vegas, NV, December 2016.
- [C43] H.K. Mousavi, C. Somarakis and N. Motee. *Koopman Performance Analysis of a Class of Nonlinear Dynamical Networks*. The 55th IEEE Conference on Decision and Control (CDC'2016), Las Vegas, NV, December 2016.
- [C42] M. Bahavarnia and N. Motee. *Periodic time-triggered sparse linear quadratic controller design*. The 54th Annual Allerton Conference on Communication, Control, and Computing, Urbana, IL, September 2016.
- [C41] Y. Ghaedsharaf and N. Motee. *Complexities and Performance Limitations in Growing Time-Delayed Linear Consensus Networks*. The 6th IFAC Workshop on Distributed Estimation and Control in Networked Systems (NecSys'16), Tokyo, Japan, September 2016. Note: **Winner of the Best Student Paper: Runner-Up Award**
- [C40] C. Somarakis, M. Siami and N. Motee. *Interplays Between Systemic Risk and Interconnection Topology in Linear Dynamical Networks*. The 6th IFAC Workshop on Distributed Estimation and Control in Networked Systems (NecSys'16), Tokyo, Japan, September 2016.
- [C39] C. Somarakis and N. Motee. *Nonlinear Flocking with Guaranteed Relative Distances*. The 10th IFAC Symposium on Nonlinear Control Systems (NOLCOS 2016), Monterey, CA, August 2016.

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- [C38] C. Somarakis, J.S. Baras, and N. Motee. Consensus and Synchronized Periodicity in Nonlinear Delayed Networks. The 22nd International Symposium on Mathematical Theory of Networks and Systems (MTNS 2016), Minneapolis, MN, July 2016.
- [C37] M. Siami and N. Motee. *Enhancing Systemic Performance in Linear Consensus Networks by Establishing New Interconnections*. American Control Conference, Boston, MA, July 2016.
- [C36] R. Arastoo, Y. Ghaedsharaf, M.V. Kothare, N. Motee. *Optimal State Feedback Controllers with Strict Row Sparsity Constraints*. American Control Conference, Boston, MA, July 2016.
- [C35] C. Somarakis, E.Paraskevas, J.S. Baras, and N. Motee. Synchronization and Collision Avoidance in Nonlinear Flocking Networks of Autonomous Agents. The 24th Mediterranean Conference on Control and Automation (MED 2016), Athens, Greece, June 2016.
- [C34] Y. Ghaedsharaf, M. Siami, C. Somarakis, N. Motee. *Interplay Between Performance and Communication Delay in Noisy Linear Consensus Networks*. European Control Conference, Denmark, June 2016.
- [C33] M. Siami and N. Motee. *Network sparsification with guaranteed systemic performance measures*. The 5th IFAC Workshop on Distributed Estimation and Control in Networked Systems (NecSys'15), Philadelphia, September 2015. Note: **Winner of the Best Student Paper Award**.
- [C32] R. Arastoo, M. Bahavarnia, and N. Motee. *Output feedback controller sparsification via H2-approximations*. The 5th IFAC Workshop on Distributed Estimation and Control in Networked Systems (NecSys'15), Philadelphia, September 2015.
- [C31] M. Siami and N. Motee, "Performance analysis of linear consensus networks with structured stochastic disturbance inputs," *2015 American Control Conference (ACC)*, Chicago, IL, 2015, pp. 4080-4085. doi: 10.1109/ACC.2015.7171967
- [C30] M. Siami and N. Motee. *Systemic measures for performance and robustness of large-scale interconnected dynamical networks*. The 53rd IEEE Conference on Decision and Control, Los Angeles, CA, Dec. 2014.
- [C29] S. Bolouki, R. Malhame, and N. Motee. *A geometric approach towards linear consensus*. The 53rd IEEE Conference on Decision and Control, Los Angeles, CA, Dec. 2014.
- [C28] S. Bolouki, R. Malhame, M. Siami, and N. Motee. *Eminence grise coalitions in opinion dynamics*. The 52nd Annual Allerton Conf. on Communication, Control, and Computing, October 2014.
- [C27] M. Siami and N. Motee. *Schur-convex robustness measures in dynamical networks*. American Control Conference, Portland, OR, June 2014.
- [C26] N. Motee and Q. Sun. *Sparsity measures in spatially decaying systems*. American Control Conference, Portland, OR, June 2014.
- [C25] M. Siami and N. Motee. *Fundamental limits on robustness measures in networks of interconnected systems*. The 52nd IEEE Conference on Decision and Control, Firenze, Italy, Dec. 2013.
- [C24] N. Motee and Q. Sun. *Measuring sparsity in spatially interconnected systems*. IEEE Conference on Decision and Control, Firenze, Italy, Dec. 2013.
- [C23] M. Siami and N. Motee. *Robustness and performance analysis of cyclic interconnected dynamical networks*. The SIAM Conference on Control and Its Applications (CT13), San Diego, July 2013.
- [C22] M. Siami and N. Motee. *Fundamental limits on performance of autocatalytic pathways with chain topologies*. IEEE Mediterranean Conference on Control and Automation, June 2013, Crete, Greece.
- [C21] M. Siami, N. Motee, and G. Buzi. *Characterization of hard limits on performance of autocatalytic pathways*. American Control Conference, Washington, DC, June 2013.

- [C20] M. Siami and N. Motee. *On existence of hard limits in autocatalytic networks and their fundamental limitations*. The 3rd IFAC Workshop on Distributed Estimation and Control in Networked Systems (NecSys'12). Santa Barbara, Sep 2012.
- [C19] N. Motee, F. Chandra, B. Bamieh, M. Khammash, and J.C. Doyle. *Performance limitations in autocatalytic networks in biology*. IEEE Conference on Decision and Control. Dec. 2010.
- [C18] N. Motee, B. Bamieh, and M. Khammash. *Model reduction of polynomial dynamical systems using differential algebra*. IEEE Conference on Decision and Control. Atlanta, GA, December 2010.
- [C17] N. Motee, A. Jadbabaie, G. Pappas. *A duality approach to path planning for multiple robots*. International Conference on Robotics and Automation, Anchorage, AK. May 2010.
- [C16] N. Motee, B. Bamieh, M. Khammash. *Stability analysis of a class of biological network models*. American Control Conference, Baltimore, MD, June 2010.
- [C15] N. Motee, A. Jadbabaie, G. Pappas. *Path planning for multiple robots using duality*. American Control Conference, Baltimore, MD, June 2010.
- [C14] N. Motee and A. Jadbabaie. *Approximation methods and spatial interpolation in distributed control systems*. American Control Conference, St. Louis, Pages: 860-866, June 2009.
- [C13] Ahmadzadeh, N. Motee, A. Jadbabaie, G. Pappas, and V. Kumar. *Multi-vehicle path planning in dynamically changing environments*. International Conference on Robotics and Automation, Kobe, Japan. Pages: 2449-2454, May 2009.
- [C12] N. Motee, A. Jadbabaie, and B. Bamieh. *On decentralized optimal control and information structures*. American Control Conference, Seattle, Pages: 4985-90, June 2008.
- [C11] N. Motee and A. Jadbabaie. *An operator theoretic framework for analysis of large-scale quadratic programming*. IEEE Conference on Decision and Control, New Orleans, LA, Dec 2007.
- [C10] N. Motee and A. Jadbabaie. *Optimal control of spatially distributed systems*. American Control Conference, Pages: 778-783, July 2007. Note: **Winner of the Best Student Paper Award and the O Hugo Schuck Award.**
- [C9] N. Motee and A. Jadbabaie. *Receding Horizon Control of Spatially Distributed Systems over Arbitrary Graphs*. IEEE Conference on Decision and Control, Pages: 3467–3472, Dec. 2006.
- [C8] N. Motee and A. Jadbabaie. *Stability Analysis of Distributed Receding Horizon Control of Spatially Invariant Systems*. International Symposium on Mathematical Theory of Networks and Systems (MTNS), Kyoto, Japan, July, 2006.
- [C7] N. Motee and A. Jadbabaie. *Distributed receding horizon control of spatially invariant systems*. American Control Conference, pp. 731-736, June 2006. Note: **Finalist, Best Student Paper Award.**
- [C6] A. Jadbabaie, N. Motee, M. Barahona. *On the stability of the Kuramoto model of coupled nonlinear oscillators*. American Control Conference, Vol. 5: 4296-4301, May 2004.
- [C5] N. Motee and B. Sayyar-Rodsari. *Optimal partitioning in distributed model predictive control*. American Control Conference, Vol. 6: 5300-5305, June 2003.
- [C4] N. Motee and M.S. de Queiroz. *A switching control strategy for magnetic bearings with a state-dependent bias*. IEEE Conference on Decision and Control, Vol. 1: 245-250, Dec 2003.
- [C3] N. Motee and M.S. de Queiroz. *Control of active magnetic bearings with a smart bias*. IEEE Conference on Decision and Control, Vol. 1: 860-865, December 2002.

- [C2] N. Motee, M.S. de Queiroz, Y. Fang, and D.M. Dawson. *Active magnetic bearing control with zero steady-state power loss*. American Control Conference, Vol. 1: 827-832, May 2002.
- [C1] N. Motee. *Design parameters selection in multimodel adaptive control*. IEEE Mediterranean Electrotechnical Conference, Vol. 3: 1214–1217, May 2000. **Finalist, IEEE R8 Best Student Paper.**

D. Research Funding (Total amount awarded as sole PI: \$2,605,000)

COMPETITIVELY AWARDED RESEARCH FUNDING:

Project Title: Risk Analysis of Stochastic Nonlinear Dynamical Networks via Lifting Operators
Source of Support: DOD- AFOSR
Total Award Amount: \$450,000
Period Covered: 11/01/2018-10/31/2021 (Ongoing)
Role: Sole PI

Project Title: Risk is New Robustness: A Systemic Perspective
Source of Support: DOD-ONR-Young Investigator Program
Total Award Amount: \$510,000
Period Covered: 6/1/2016-5/31/2019 (Ongoing)
Role: Sole PI

Project Title: CAREER: Systemic Performance and Robustness Measures for Large-Scale Dynamical Networks
Source of Support: NSF-Directorate for Engineering
Total Award Amount: \$500,000
Period Covered: 3/15/2015-2/29/2020 (Ongoing)
Role: Sole PI

Project Title: Emergence of Fundamental Limits in Spatially Distributed Dynamical Networks and Their Tradeoffs
Source of Support: DOD-ONR
Total Award Amount: \$450,000
Period Covered: 8/1/2013-01/31/2017 (Completed)
Role: Sole PI

Project Title: Compressive Feedback Control Design for Spatially Distributed Systems
Source of Support: DOD- AFOSR-Young Investigator Program
Total Award Amount: \$360,000
Period Covered: 3/15/2013-07/14/2016 (Completed)
Role: Sole PI

Project Title: Algebraic Methods of Designing Spatially Distributed Control Systems and Their Approximations
Source of Support: NSF-Directorate for Engineering
Total Award Amount: \$335,500
Period Covered: 7/1/2012-6/30/2016 (Completed)
Role: Sole PI

E. Scholarly Presentations

INVITED PRESENTATIONS:

Title: *Koopman Performance Analysis of Nonlinear Networks*. IPAM Workshop on Operator Theoretic Methods in Dynamic Data Analysis and Control, UCLA, February 11-15, 2019.

Title: *Risk of Inter-Vehicle Collisions in Platoons of Autonomous Vehicles*. Electrical and Computer Engineering, Pennsylvania State University, April 26, 2018.

Title: *Network Sparsification with Guaranteed Systemic Performance Measures*. Electrical and Computer Engineering, Northeastern University, March 13, 2017.

Title: *Network Sparsification with Guaranteed Systemic Performance Measures*. Electrical and Computer Engineering, University of Delaware, December 05, 2016.

Title: *Systemic Measures for Performance and Robustness in Large-Scale Dynamical Networks*. The Center for Information and Systems Engineering (CISE), Boston University, April 4, 2014.

Title: *Sparsity Measures in Spatially Distributed Systems*. The Center for Control, Dynamical Systems and Computation, University of California at Santa Barbara. February 28, 2014.

Title: *Sparsity Measures in Spatially Distributed Systems*. Control and Dynamical Systems Department, California Institute of Technology, Pasadena, CA. February 27, 2014.

Title: *Sparsity Measures in Spatially Distributed Systems*. Ming Hsieh Department of Electrical Engineering, USC, Los Angeles, CA. February 26, 2014.

Title: *Robustness Measures in Interconnected Dynamical Networks*. Mechanical Engineering Department, Johns Hopkins University, Baltimore, MD. October 17, 2013.

Title: *Compressive Feedback Control Design for Spatially Distributed Systems*. Mechanical Engineering Department, Drexel University, Philadelphia, PA. December 7, 2012.

Title: *Structural Properties of Complex Interconnected Systems*. Lockheed Martin Space Systems Company, Sunnyvale, CA. May 15, 2011.

Title: *Structural Properties of Complex Interconnected Systems*. Department of Mechanical Engineering, University of Texas at Dallas. Dallas, TX. May 2, 2011.

Title: *Structural Properties of Complex Interconnected Systems*. Department of Mechanical Engineering and Mechanics, Lehigh University. Bethlehem, PA. April, 2011.

Title: *Structural Properties of Complex Interconnected Systems*. Department of Electrical & Computer Engineering, University of New Mexico, Albuquerque, NM. April 7, 2011.

Title: *Structural Properties of Complex Interconnected Systems*. Electrical Engineering Department, University of California, Riverside, Riverside, CA. March 17, 2011.

Title: *Structural Properties of Complex Interconnected Systems*. Mechanical Engineering Department, Boston University. Boston, MA. March 11, 2011.

Title: *A duality theory for path planning for multiple vehicles*. The Mobility and Robotics Systems Section, The Jet Propulsion Laboratory, NASA Center, Pasadena, CA. October 25, 2010.

Title: *A duality approach for path planning for multiple robots*. Institute of Pure and Applied Mathematics, University of California at Los Angeles, Los Angeles, CA. October 19, 2010.

Title: *Performance limitations in autocatalytic networks*. Institute of Pure and Applied Mathematics, Workshop, Internet Multi-Resolution Analysis, Lake arrowhead, CA. June 2010.

Title: *Multi-Vehicle Path-Planning with Spatio-Temporal Constraints*. ICRA 2010 Workshop on Communication, Control, and Perception for Teams of Small Robots, Anchorage, Alaska, May 2010.

Title: *Structural properties of spatially distributed dynamical systems*. Institut de Génie Mécanique, Swiss Federal Institute of Technology (EPFL), Lausanne, Switzerland, March 2010.

Title: *Structural Properties of Spatially Distributed Systems*. Electrical Engineering Department, University of California at Los Angeles, Los Angeles, CA. February 20, 2009.

Title: *Banach Algebra of Spatially Decaying Operators*. Institute of Pure and Applied Mathematics, University of California at Los Angeles, Los Angeles, CA. November 2008.

Title: *Optimal Control of Spatially Distributed Systems*. Electrical and Computer Engineering Department, Carnegie Mellon University, Pittsburgh, PA. March 18th and 20th, 2008.

Title: *Optimal Control of Spatially Distributed Systems*. Mathematical and Algorithmic Sciences Research Center at Bell Laboratories, Alcatel-Lucent, Murray Hill, New Jersey. April 25, 2007.

ORGANIZED OR CHAIRED SESSIONS:

Session Chair/Co-chair:

IEEE Conference on Decision and Control, Regular session on “Autonomous Robots,” Miami, Florida, December 2018

IEEE Conference on Decision and Control, Invited session on “Linear Systems I,” Melbourne, Australia, December 2017

IEEE 25th Mediterranean Conference on Control and Automation, Regular session on “Decentralized Control”, Valletta, Malta, July 2017

IEEE Conference on Decision and Control, Invited session on “Analysis and Synthesis of Dynamical Networks,” Las Vegas, VA, December 2016

IEEE Conference on Decision and Control, Invited session on “Control Synthesis of Infinite Dimensional Systems”, Las Vegas, VA, December 2016

The 10th IFAC Symposium on Nonlinear Control Systems, Regular session on “Multi-Agent and Networked Systems II”, Monterey, CA, August 2016

IEEE 24th Mediterranean Conference on Control and Automation, Regular session on “Agent-Based Systems”, Athens, Greece, June 2016

IEEE conference on Decision and Control, Regular session on “Large-Scale Systems”, Los Angeles, CA, December 2014

IEEE Conference on Decision and Control, December 2006 (San Diego, CA) and December 2010 (Atlanta, GA)

Organized Sessions and Full-day Workshops:

IEEE Conference on Decision and Control, an invited session on “*Analysis and Synthesis of Dynamical Networks*,” Las Vegas, NV, December 2016

American Control Conference, an invited session on “*Sparsity and Localization in Networked Systems*,” Boston, MA, June 2016

The 2016 Modeling and Optimization: Theory and Applications (MOPTA), two invited sessions on “*Applications of Optimization in Networked Control Systems Part I & II*,” Bethlehem, PA, August 2016

The 49th IEEE Conference on Decision and Control, a full-day pre-conference workshop on “*Smart Grids: New Challenges for Control Systems Society*,” Atlanta, Georgia, December 2010

American Control Conference, an invited session on Session on “*Distributed Control Systems*,” St. Louis, MO, June 2009

The 48th IEEE Conference on Decision and Control and 28th Chinese Control Conference, a full-day pre-conference workshop on “*Network Science: New Directions in Control Systems*,” Shanghai, China, December 2009

RESEARCH ADVISING:

Students Completed:

Postdoctoral:

Dr. Sadegh Bolouki (01/14/2014–05/31/2015)

Current Position: Research Assistant Professor at Binghamton University)

Doctoral:

Yaser Ghaedsharaf (01/15/2014-05/31/2019)

Dissertation: *Analysis of Time-Delay Consensus Networks*

Saleh Bahavarnia (08/15/2013-05/31/2018)

Dissertation: *Sparsity-Promoting Optimal Controller Design*

Current Position: *Postdoctoral Scholar, ISR, University of Maryland*

Milad Siami (01/14/2012-12/31/2016)

Dissertation: *Analysis and design of robust and high-performance complex dynamical networks*

Current Position: *Postdoctoral Scholar, IDSS center, MIT*

Reza Arastoo (co-advised with M. Kothare, 09/01/2012-12/31/2015)

Dissertation: *Analysis & synthesis of distributed control systems with sparse interconnection topologies*

Current Position: *Control Systems Engineer, Autonomous Cars Lab, Apple Inc.*

Master of Science:

Daniel Loikits (05/31/2015-05/31/2016)

Title of Dissertation: *Leader-Based Multi-Agent Systems*

Current Position: *Systems Engineer at Lockheed Martin.*

Milad Siami (01/14/2012-05/30/2014)

Title of Dissertation: *Disturbance Propagation in Interconnected Linear Dynamical Networks*

Current Position: *Ph.D. student at Lehigh*

Rozhin Hajian (01/14/2012–05/30/2014)

Title of Dissertation: *Autocatalytic Biochemical Networks and Their Fundamental Limits*

Current Position: *Ph.D. student at Lehigh*

Evan Mucasey (08/15/2012-05/30/2013)

Current Position: *Structures Engineer, Space Exploration Technologies*

Students In Progress:**Postdoctoral:**

Dr. Christoforos Somarakis (01/01/2016-present)

Doctoral:

Hossein K. Mousavi (01/14/2015-present)

Arash Amini (01/14/2017-present)

Gaungyi Liu (01/14/2018-present)

F. Service**UNIVERSITY:****Services to University/College/ Interdisciplinary Programs:**

Co-Chair of Faculty Search Committee, Robotics and Controls, Lehigh College Wide Hiring, 2018-2019

Co-Chair of Faculty Search Committee, Robotics and Controls, Lehigh College Wide Hiring, 2017-2018

Core Faculty Research Council, Institute for Data, Intelligent Systems & Computation. 2017-2018

Faculty Search Committee, Chemical Engineering Department, Lehigh University, 2015-2016

Faculty Search Committee, Smart Energy Search, Lehigh College Wide Cluster Hiring in Smart Grid Area, 2012, 2013, 2014

Graduate Admission Committee Member, Lehigh University, Energy Systems Engineering Institute, 2013-2015.

Services to Department:

Faculty Search Committee, Mechanical Engineering Department, Lehigh University, 2014-2016.

Undergraduate Advising at MEM Lehigh University (2012-present)

Editorial and Committee memberships held in Professional Organizations:

IEEE CSS, Conference Editorial Board (CEB), July 2018-ongoing

Technical Program Committee, IEEE Conference on Decision and Control, Melbourne, Australia, December 12-15, 2017. Associate Editor at Large

Technical Program Committee, American Control Conference, Boston, MA, July 6-8, 2016. Associate Editor for Invited Papers

Technical Program Committee, IFAC Workshop on Distributed Estimation and Control in Networked Systems, September 10-11, 2015. Control Conference, Boston, MA, July 6-8, 2016. Associate Editor for Invited Papers

Technical Program Committee, American Control Conference, Chicago, IL, July 1-4, 2015.

Technical Program Committee, American Control Conference, Washington, DC, June 17-19, 2013.

Technical Program Committee, The 10th International Symposium on Distributed Autonomous Robotics Systems, Lausanne, Switzerland, November 1-3, 2010.