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RESEARCH & INTERESTS

Analysis, optimization and distributed control of large-scale systems with limited communication. Topics of interest include distributed optimization with applications to power networks, robotics and Cyber-physical networks.

Areas of specialty – Networked dynamic systems, limited-communication control, distributed algorithms, future energy systems and smart grid.

EDUCATION

Ph.D., Electrical & Systems Engineering, University of Pennsylvania, Philadelphia PA, 2014.

Thesis Topic: *A Convex Framework for Epidemic Control in Networks*

Advisors: George J. Pappas and Ali Jadbabaie

Teaching Certificate, Center for Teaching and Learning, University of Pennsylvania, 2014.

B.S., Mathematics, Gardner-Webb University, Boiling Springs, NC, 2008.

Summa Cum Laude

EXPERIENCE

Massachusetts Institute of Technology, Cambridge MA 12/2016 – Date
Visiting Scholar, Research Laboratory of Electronics

Harvard University, Cambridge, MA 07/2015 – Date
Postdoctoral Fellow, Electrical Engineering

University of Pennsylvania, Philadelphia, PA 01 – 06 /2015
Postdoctoral Researcher, Electrical and Systems Engineering

University of Pennsylvania, Philadelphia, PA 2008 – 2014
Graduate Research Fellow, Electrical and Systems Engineering
Affiliated with the GRASP (robotics) lab and PRECISE (embedded systems computing) center.

Bosch GmbH, Stuttgart, Germany Summer 2008
DAAD RISE Scholar, Corporate Research Division

California Institute of Technology, Pasadena, CA Summer 2007
Moore Foundation Undergraduate Research Fellow, Control and Dynamical Systems

University of Minnesota, Minneapolis, MN Summer 2006
NSF REU Fellow, Electrical and Computer Engineering

FELLOWSHIPS, HONORS & AWARDS

Fellow, Ford Foundation (administered by the NRC of the National Academies) (2008)
William Fontaine Scholar, University of Pennsylvania (2008)
Moore Foundation Undergraduate Fellow, California Institute of Technology (2007)
NSF REU Fellowship, University of Minnesota (2006)
Patterson Award, Mathematical Association of America Southeast section (2008)
Student Leadership, Service and Volunteerism Award, Gardner-Webb University (2007)
Male Resident Advisor of the Year Award, Nominated by Peers, Gardner-Webb University (2007)
Scholastic Achievement Award, Gardner-Webb University (2006 – 2008)
 Honorable Mention, NSF Graduate Research Fellowship (2008 & 2009)
Alpha Chi (Inducted 2008)
Gold Ribbon Award, Sigma Xi, The Scientific Research Society, (Co-recipient) (2006)

PUBLICATIONS

IN PREPARATION

Communication Complexity of Distributed Resource Allocation Optimization
 (with S. Magnusson, N. Li, C. Fischione and V. Tarokh)
 Dynamic Resource Allocation to Control Epidemic Outbreaks A Model Predictive Control Approach
 (with J. Kohler, and F. Allgower)

BOOK CHAPTERS

V. Preciado, M. Zargham, **C. Enyioha**, C. Nowzari, S. Han, M. Ogura, A. Jadbabaie and G.J. Pappas, 'Bio-inspired framework for allocation of protection resources in cyber-physical networks' *Principles of Cyber-Physical Systems: An Interdisciplinary Approach* 1st ed. Sandip Roy and Sajal Das. Cambridge University Press, In press, 2015.

THESIS

C. Enyioha, A Convex Framework for Epidemic Control in Networks, PhD Thesis, *University of Pennsylvania*, 2014.

JOURNAL PAPERS

S. Magnusson, **C. Enyioha**, N. Li, C. Fischione and V. Tarokh, 'Convergence of Limited Communication Gradient Methods'. In *IEEE Transactions on Automatic Control*, 2017 (Accepted).
C. Enyioha, S. Magnusson, K. Heal, N. Li, C. Fischione and V. Tarokh, 'On Variability of Renewable Energy and Online Power Allocation'. In *IEEE Transactions on Power Systems*, 2017.
 V. Preciado, M. Zargham, **C. Enyioha**, A. Jadbabaie and G.J. Pappas 'Optimal Resource Allocation for Network Protection: A Geometric Programming Approach', in *IEEE Transactions on Control of Network Systems*, April 2014.

PEER-REVIEWED CONFERENCE PAPERS

S. Magnusson, **C. Enyioha**, N. Li, C. Fischione and V. Tarokh, 'Practical Coding Schemes For Bandwidth Limited One-Way Communication Resource Allocation'. To appear in *Proceedings of the IEEE Conference on Decision and Control*, Las Vegas, NV 2016.

S. Magnusson, K. Heal, **C. Enyioha**, N. Li, C. Fischione and V. Tarokh, 'Convergence of Limited Communication Gradient Methods', in *Proceedings of the IEEE American Control Conference*, Boston, MA 2016.

C. Enyioha, S. Magnusson, K. Heal, N Li, C. Fischione, and V. Tarokh, 'Robustness Analysis for an Online Decentralized Descent Power Allocation Algorithm', in *Proceedings of the IEEE Workshop on Information Theory and Application*, San Diego, CA 2016.

S. Magnusson, **C. Enyioha**, K. Heal, N Li, C. Fischione, and V. Tarokh, 'Distributed Resource Allocation with limited bandwidth communication for Power networks', in *Proceedings of the IEEE Conference on Information Sciences and Systems*, Princeton, NJ, 2016.

C. Enyioha, A. Jadbabaie, V. Preciado and G.J. Pappas, 'Distributed Resource Allocation for Control of Spreading Processes', in *Proceedings of the IEEE European Control Conference*, Linz, Austria 2015.

C. Enyioha, A. Rahimian, A. Jadbabie, and G.J. Pappas, 'On the Controllability of Locally Bounded Infinite Networks', in *Proceedings of the IEEE Conference on Decision and Control*, Los Angeles, CA 2014.

V. Preciado, M. Zargham, **C. Enyioha**, A. Jadbabaie and G.J. Pappas 'Optimal Vaccine Allocation to Control Epidemic Outbreaks in Arbitrary Networks', in *Proceedings of the 52nd IEEE Conference on Decision and Control*, Florence, Italy, 2013.

C. Enyioha, V. Preciado and G.J. Pappas, 'Bio-inspired Strategy for Control of Viral Spreading in Networks', in *Proceedings of High Confidence Networked Systems (HiCONS)*, Philadelphia, PA, 2013.

J. Chang, K. Venkatasubramanian, **C. Enyioha**, S. Sundaram, G.J. Pappas and I. Lee, 'HMM-based characterization of channel behavior for networked control systems', in *Proceedings of High Confidence Networked Systems (HiCONS)*, Beijing, China, 2012.

S. Sundaram, J. Chang, K. Venkatasubramanian, **C. Enyioha**, I. Lee, I., and G.J. Pappas, 'Reputation-based networked control with data-corrupting channels' in *Proceedings of the 14th international conference on Hybrid Systems: Computation and Control* Chicago, IL, 2011.

C. Enyioha, D.C. Tarraf, L. Li, and J.C. Doyle, 'On the graph of trees', in *Proceedings of the IEEE Multi-conference on Systems and Control*, Saint Petersburg, Russia, 2009.

INVITED TALKS & SEMINARS (excludes conference presentations)

University of California, Los Angeles – Mechanical & Aerospace Engineering Seminar (2017)

Carnegie Mellon University – Mechanical Engineering Seminar (2017)

Brown University – School of Engineering Seminar (2017)

University of Maryland – Electrical & Computer Engineering Seminar (2017)

University of Utah – Electrical & Computer Engineering Seminar (2017)

Boston University – Electrical & Computer Engineering Seminar (2017)

McGill University – Center for Intelligent Machines Invited Seminar (2016)

Massachusetts Institute of Technology – LIDS Tea Seminar Series (2016)

Concordia University – Dept of ECE Seminar (Joint with IEEE Montreal Section) (2015)

Imperial College – Department of Mathematics, Departmental Talk (2014)

Univ. of Bradford – School of Electrical Engineering & Comp Sc. Research Seminar (2014)
 Duke University – Mechanical Engineering and Material Science Dept (Mike Zavlanos' Group) (2014)
 UNC Chapel Hill, Dept of Computer Science and US Army Research Office
 Workshop on *Cyber Security: From Tactics to Strategies and Back* (2014)
 US Army Research Office, Research Triangle Park, NC, Special Presentation (2014)
 NSF *Early-Career Professional Brainstorming Workshop on Cyber-Physical Systems* (2014)
 University of Pennsylvania – Graduate Student Colloquium (Electrical Engineering), (2013)
 University of Pennsylvania – Fontaine Society Fall Research Colloquium Series (2012)
 University of Pennsylvania – Graduate Student Center Navigating the Grant Series (2012)

TEACHING AND OUTREACH

TEACHING

- Teaching Certificate from the Penn Center for Teaching and Learning (obtained over a 3-year period).

Part of my engagement as a Teaching Assistant included planning course content for the semester, guest lecturing, leading class discussions, preparing homework, exams and solutions for grading, and holding recitation and review sessions for students.

Harvard University

Signals and Systems, Electrical Engineering (23 Students) (Spring 2017)
 Signals and Systems, Electrical Engineering (29 Students) (Spring 2016)
 Statistical Inference for Scientists and Engineers, Applied Mathematics (31 Students) (Fall 2015)

University of Pennsylvania

Introduction to Research, School of Engineering and Applied Science (8 Students) (Fall 2013)
 Engineering Probability Electrical and Systems Engineering (Fall 2010)
 Linear Systems Theory, Electrical and Systems Engineering (Fall 2009)

Gardner-Webb University Student Assistant & Grader, Dept of Mathematics, (2006 – 2008)

- Held review sessions for various undergraduate mathematics courses
- Coached students in the Math Lab
- Graded homework problems for Professors

SUPERVISION & OUTREACH

Mentored (designed and supervised) research projects for 6 students in a US Army Research Office High School Apprenticeship Program (HSAP), Harvard (Summer 2016)
 Mentored (designed and supervised) two undergraduate students (SUNFEST Fellow & GRASP REU Fellow) in Summer research, University of Pennsylvania (Summer 2013)
 Volunteer tutor, Science Education Academy, West Philadelphia, PA (2013 – 2014)
 Volunteer tutor, YMCA Girls Club, Shelby NC (with GWU Math Club) (2005 – 2008)

PROFESSIONAL AFFILIATION

Institute of Electrical and Electronics Engineers, IEEE (2008 – Date)

Society of Industrial and Applied Mathematics, SIAM (2010 – Date)

PROFESSIONAL SERVICE

Invited session organizer and co-chair, IEEE American Control Conference (2016)

Reviewer for several ACM and IEEE Journals and Conferences including *Transactions on Automatic Control*, *Transactions on Control of Networked Systems*, *Transactions on Network Science and Engineering*.

Grant Application Advisor, Graduate and Professional Student Assembly (GAPSA) Penn (2009 – 2014)

Member, William Fontaine Society Coordinating Committee, Penn (2012 – 2014)

PennVention Judge, Weiss Tech House, Penn (2010 – 2013)