PROF. ALEJANDRO RIBEIRO

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Dept. of Electrical & Systems Engineering
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Philadelphia, PA 19104

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TEACHING INTERESTS

Engineering education is ailed by excitement, challenge, and discipline gaps. Students are excited about technology but do not pursue careers in engineering. Material taught in engineering classes becomes less challenging every year. Compartmental experience offered to students does not match reality of hazy separation between disciplines. Teaching goal is to contribute to the closing of these gaps through the development of new curricula.

RESEARCH INTERESTS

Application of Signal Processing tools and methods to the study of networks. Topics of interest include optimal design of wireless networks, statistical signal processing in networks, distributed network optimization, game theoretic models of network behavior, collaboration in autonomous robot teams, networked control systems, and abstract representations of networked data structures.

APPOINTMENTS

University of Pennsylvania
Professor
Electrical & Systems Engineering
Philadelphia, Pennsylvania
July 2018 - present

University of Pennsylvania
Rosenbluth Associate Professor
Electrical & Systems Engineering
Philadelphia, Pennsylvania
July 2014 - June 2018

University of Pennsylvania
Assistant Professor
Electrical & Systems Engineering
Philadelphia, Pennsylvania
July 2008 - June 2014

EMPLOYMENT

University of Minnesota
Research Associate
Electrical & Computer Engineering
Twin Cities, Minnesota
December 2006 - June 2008

University of Minnesota
Research Assistant
Electrical & Computer Engineering
Twin Cities, Minnesota
May 2003 - December 2006

Bellsouth
Systems Engineer
Montevideo, Uruguay
November 1998 - April 2003

Universidad de la República Oriental del Uruguay
Research Assistant
Electrical Engineering
Montevideo, Uruguay
March 1997 - December 1998

Universidad de la República Oriental del Uruguay
Research Assistant
Physiscs
Montevideo, Uruguay
August 1995 - February 1997

EDUCATION | **University of Minnesota**   Twin Cities, Minnesota
Ph. D. in Electrical & Computer Engineering   December 2006
"Wireless Cooperative Communications and Networking"
Prof. Georgios B. Giannakis

University of Minnesota   Twin Cities, Minnesota
M. Sc. in Electrical & Computer Engineering   September 2005
"Distributed Estimation in Wireless Sensor Networks"
Advisor: Prof. Georgios B. Giannakis

Universidad de la República Oriental del Uruguay   Montevideo, Uruguay
B. Sc. in Electrical Engineering   December 1998

ACADEMIC
HONORS

- Best student paper award for S. Paternain at the Conference on Decision and Control (2017) for the paper "Safe Online Navigation of Convex Potentials in Spaces with Convex Obstacles."
- 2017 Christian R. and Mary F. Lindback Award for Distinguished Teaching presented by the University of Pennsylvania.
- Best paper award at the 2016 IEEE Sensor Array and Multichannel Signal Processing Workshop (SAM) for the paper "Stationary Graph Processes: Nonparametric Power Spectral Estimation" (co-authored with S. Segarra, A. Garcia Marques, and G. Leus).
- Best student paper award for S. Segarra at the 2016 Statistical Signal Processing Workshop for the paper "Network Topology Identification from Spectral Templates" (co-authored with G. Mateos and A. Garcia Marques).
- Best student paper award for S. Segarra at the 2015 Asilomar Conference on Signals Systems and Computers for the paper "Sampling of graph signals: Successive local aggregations at a single node" (co-authored with A. Garcia Marques and G. Leus).
- Penn fellow, class of 2015.

- 2014 O. Hugo Schuck best paper award for the paper "Optimal power management in wireless control systems" (co-authored with K. Gatsis and G. Pappas).
- Best student paper award for K. Gatsis at the American Control Conference (ACC) 2013 for the paper "Optimal power management in wireless control systems" (co-authored with G. Pappas).
- 2012 S. Reid Warren, Jr. Award presented by Penn's undergraduate student body for outstanding teaching.
- 2010 National Science Foundation CAREER award for project "Towards a formal theory of wireless networking." Award No: 0952867.
- Best student paper award at the International Conference on Acoustics, Speech and Signal Processing 2006 for the paper "SOI-KF: Distributed Kalman filtering with low-cost communications using the sign of innovations" (co-authored with Georgios B. Giannakis and Stergios I. Roumeliotis).
- Best student paper award at the International Conference on Acoustics, Speech and Signal Processing 2005 for the paper "Non-parametric distributed quantization-estimation using wireless sensor networks" (co-authored with Georgios B. Giannakis).
- Fulbright scholar, class of 2003.

EDITORIAL
ACTIVITIES

- Asilomar Conference on Signals Systems and Computers. Networks track. Technical area chair (2018).
- International Workshop on Signal Processing Advances in Wireless Communications. Special Session on Wireless Autonomous Systems. Chair (2018).
- Graph Signal Processing Workshop. École Polytehcnique Fédérale de Lausanne. Organizing Committee (2018).
- Data Science Workshop. École Polytehcnique Fédérale de Lausanne. Special Session on Convolutional Neural Networks for Graph Data. Chair (2018).
- DIMACS Workshop on Distributed Optimization, Information Processing, and Learning. Rutgers University. Organizing Committee (2017).
- Graph Signal Processing Workshop. Carnegie Mellon University. Organizing Committee (2017).
- IPAM Workshop on Emerging Wireless Networks. University of California at Los Angeles. Organizing Committee (2017).
- Special Issue on Graph Signal Processing. IEEE Journal of Selected Topics in Signal Processing and IEEE Transactions on Signal and Information Processing over Networks (joint issue). Guest Editor (2017).
- Special Issue on Cooperative Signal Processing for Heterogeneous and Multi-Task Wireless Sensor Networks. IEEE Journal of Selected Topics in Signal Processing. Guest Editor (2017).
- Asilomar Conference Signals Systems Computers. Networks track. Technical area chair (2016).
- IEEE Sensor Array and Multichannel Signal Processing Workshop. Special Session on Graph Signal Processing. Chair (2016).
- Graph Signal Processing Workshop. University of Pennsylvania. Chair (2016).
- International Conference Acoustics, Speech, Signal Processing Special Session on Recent Advances in the Emerging Field of Signal Processing on Graphs. Chair (2016).
- IEEE International Workshop. on Computational Advances in Multi-Sensor Adaptive Processing Special Session on Network Data and Graph Signal Processing. Chair (2015).
- Allerton Conference on Communication, Control and Computing. Special Session on Graph Signal Processing. Chair (2015).
- IEEE Transactions on Signal and Information Processing over Networks. Associate editor (2015-2018).
- Signal Processing Society. Signal Processing for Communications Technical Committee. Member (2014-2016).
- Global Signal and Information Processing Conference Network Theory Symposium. Chair (2014).
- Global Signal and Information Processing Conference Network Theory Symposium. Chair (2013).
- Signal Processing Society. Signal Processing for Communications Technical Committee. Member (2011-2013).
- Asilomar Conference Signals Systems Computers. Networks track. Technical area chair (2011).
- International Conference on Acoustics, Speech and Signal Processing. External expert reviewer (2011).
- International Conference on Acoustics, Speech and Signal Processing. External expert reviewer (2010).
- Special Issue on Cooperative Communications in Wireless Networks. EURASIP Journal on Wireless Communications and Networking. Guest Editor (2009).

- International Conference on Acoustics, Speech and Signal Processing. External expert reviewer (2009).
- First Workshop on Distributed Estimation and Control in Networked Systems. Technical Program Committee (2009).

UNIVERSITY
SERVICE

- Ph.D. Colloquium. Host (2015-2018).

- Electrical and Systems Engineering Graduate Group. Chair (2015-2018).
- Student Disciplinary System. Hearing Officer (2015-2017).
- Faculty Search Committee for Information and Decision Sciences. Member (2013-2016).
- Faculty Senate. Elected Representative for the Departments of Computer and Information Sciences and Electrical and Systems Engineering (2013-2015).
- Systems Engineering Undergraduate Program. Chair (2013-2015).

PUBLICATIONS   **Journal papers**

1. S. Paternain, D. E. Koditschek, and A. Ribeiro, "Navigation functions for convex potentials in a space with convex obstacles," *IEEE Trans. Automatic Control*, vol. (to appear), September 2018.

2. F. Gama, A. G. Marques, G. Leus, and A. Ribeiro, "Convolutional Neural Network Architectures for Signals Supported on Graphs," *arXiv:1805.00165v1 [eess.SP]*, May 2018.

3. F. Gama, S. Segarra, and A. Ribeiro, "Hierarchical Overlapping Clustering of Network Data Using Cut Metrics," *IEEE Trans. Signal, Information Process. Networks*, vol. 4, pp. 392–406, May 2018.

4. K. Gatsis, A. Ribeiro, and G. J. Pappas, "Random Access Design for Wireless Control Systems," *Automatica*, vol. 91, pp. 1 – 9, May 2018.

5. W. Huang, T. A. W. Bolton, J. D. Medaglia, D. S. Bassett, A. Ribeiro, and D. V. D. Ville, "A graph signal processing perspective on functional brain imaging," *Proc. IEEE*, vol. 106, pp. 868 – 885, May 2018.

6. W. Huang, R. Ghrist, and A. Ribeiro, "Network representation and filtering in the homological domain," *IEEE Trans. Signal Process.*, vol. (submitted), May 2018.

7. M. Calvo-Fullana, C. Anton-Haro, J. Matamoros, and A. Ribeiro, "Stochastic Routing and Scheduling Policies for Energy Harvesting Communication Networks," *IEEE Trans. Signal Processing*, vol. (to appear), April 2018.

8. M. Eisen, K. Gatsis, G. J. Pappas, and A. Ribeiro, "Learning in Wireless Control Systems over Non-Stationary Channels," *IEEE Trans. Signal Processing*, April 2018.

9. W. Huang, A. G. Marques, and A. Ribeiro, "Rating prediction via graph signal processing," *IEEE Trans. Signal Process.*, vol. (revised), April 2018.

10. A. Koppel, S. Paternain, C. Richard, and A. Ribeiro, "Decentralized Online Learning with Kernels," *IEEE Trans. Signal Process.*, April 2018.

11. G. Carlsson, F. Memoli, A. Ribeiro, and S. Segarra, "Hierarchical Clustering of Asymmetric Networks," *Adv. Data Analysis and Classification*, vol. 12, pp. 65–105,

March 2018.

12. F. Gama and A. Ribeiro, "Ergodicity in Stationary Graph Processes: A Weak Law of Large Numbers," *arXiv:1803.04550v1 [eess.SP]*, March 2018.

13. W. Huang and A. Ribeiro, "Hierarchical clustering given confidence intervals of metric distances," *IEEE Trans. Signal Process.*, vol. 66, pp. 2600 – 2615, March 2018.

14. A. Koppel, E. Tolstaya, E. Stump, and A. Ribeiro, "Nonparametric Stochastic Compositional Gradient Descent for Q-Learning in Continuous Markov Decision Problems," *IEEE Trans. Automatic Control.*, vol. (submitted), March 2018.

15. C. Eksin, H. Deliç, and A. Ribeiro, "Demand response with communicating rational consumers," *IEEE Trans. Smart Grid*, vol. (to appear), February 2018.

16. J. D. Medaglia, W. Huang, E. Karuza, A. Kelkar, S. Thompson-Schill, A. Ribeiro, and D. S. Bassett, "Functional alignment with anatomical networks is associated with cognitive flexibility," *Nature Human Behavior*, vol. 2, p. 156, February 2018.

17. A. Mokhtari, M. Eisen, and A. Ribeiro, "IQN: An Incremental Quasi-Newton Method with Local Superlinear Convergence Rate," *SIAM Journal on Optimization*, vol. (to appear), February 2018.

18. M. Calvo-Fullana, C. Anton-Haro, J. Matamoros, and A. Ribeiro, "Random Access Communication for Wireless Control Systems with Energy Harvesting Sensors," *IEEE Trans. Automatic Control*, vol. (submitted), January 2018.

19. L. F. O. Chamon and A. Ribeiro, "Greedy sampling of graph signals," *IEEE Trans. Signal Process.*, vol. 66, pp. 34–47, January 2018.

20. W. Huang and A. Ribeiro, "Network comparison: Embeddings and interiors," *IEEE Trans. Signal Process.*, vol. 66, pp. 412–427, January 2018.

21. G. Carlsson, F. Memoli, A. Ribeiro, and S. Segarra, "Admissible Hierarchical Clustering Methods and Algorithms for Asymmetric Networks," *IEEE Trans. Signal and Info. Process. over Networks*, vol. 3, pp. 711–727, December 2017.

22. M. Eisen, A. Ribeiro, S. Segarra, and G. Egan, "Stylometric analysis of Early Modern period English plays," *Digital Scholarship in the Humanities*, December 2017.

23. A. Koppel, G. Warnell, E. Stump, P. Stone, and A. Ribeiro, "Policy Evaluation in Continuous MDPs with Efficient Kernelized Gradient Temporal Difference," *IEEE Trans. Automatic Control*, vol. (submitted), December 2017.

24. S. Paternain and A. Ribeiro, "Stochastic Artificial Potentials for Online Safe Navigation," *IEEE Trans. Automatic Control.*, vol. (under review), December 2017.

25. A. G. Marques, S. Segarra, G. Leus, and A. Ribeiro, "Stationary Graph Processes and Spectral Estimation," *IEEE Trans. Signal Process.*, vol. 65, pp. 5911–5926, November 2017.

26. A. Simonetto, A. Koppel, A. Mokhtari, G. Leus, and A. Ribeiro, "Decentralized Prediction-Correction Methods for Networked Time-Varying Convex Optimization," *IEEE Trans. Automatic Control.*, vol. 62, pp. 5724–5738, November 2017.

27. B. Swenson, C. Eksin, S. Kar, and A. Ribeiro, "Fictitious play with inertia learns pure equilibria in distributed games with incomplete information," *IEEE Trans. Automatic*

Control., vol. (revised), p. 14, November 2017.

28. M. Fazlyab, A. Koppel, V. Preciado, and A. Ribeiro, "A Variational Approach to Dual Methods for Constrained Convex Optimization," *IEEE Trans. Automatic Control.*, vol. (submitted), October 2017.

29. M. Fazlyab, S. Paternain, V. M. Preciado, and A. Ribeiro, "Prediction-Correction Interior-Point Method for Time-Varying Convex Optimization," *IEEE Trans. Automatic Control*, vol. PP, pp. 1–1, October 2017.

30. A. Koppel, G. Warnell, E. Stump, and A. Ribeiro, "Parsimonious Online Learning with Kernels via Sparse Projections in Function Space," *J. Machine Learning Research*, vol. (revised), October 2017.

31. A. Mokhtari, M. Eisen, and A. Ribeiro, "IQN: An Incremental Quasi-Newton Method with Local Superlinear Convergence Rate," *SIAM Journal on Optimization*, vol. (revised), October 2017.

32. A. Mokhtari, M. Gurbuzbalaban, and A. Ribeiro, "Surpassing Gradient Descent Provably: A Cyclic Incremental Method with Linear Convergence Rate," *SIAM Journal on Optimization*, vol. (revised), October 2017.

33. S. Paternain, A. Mokhtari, and A. Ribeiro, "A Second Order Method for Nonconvex Optimization," *SIAM J. Optimization.*, vol. (submitted), October 2017.

34. J. D. Medaglia, W. Huang, S. Segarra, C. Olm, J. Gee, M. Grossman, A. Ribeiro, C. T. McMillan, and D. S. Bassett, "Brain network efficiency is influenced by the pathologic source of corticobasal syndrome," *Neurology*, vol. 89, pp. 1373–1381, September 2017.

35. S. Segarra, A. G. Marques, G. Mateos, and A. Ribeiro, "Network Topology Inference from Spectral Templates," *IEEE Trans. Signal and Info. Process. over Networks*, vol. 3, pp. 467–483, September 2017.

36. C. Eksin and A. Ribeiro, "Distributed Fictitious Play for Multi-Agent Systems in Uncertain Environments," *IEEE Trans. Automatic Control*, vol. (to appear), August 2017.

37. S. Segarra, A. G. Marques, and A. Ribeiro, "Optimal Graph-Filter Design and Applications to Distributed Linear Network Operators," *IEEE Trans. Signal Process.*, vol. 65, pp. 4117–4131, August 2017.

38. T. Chen, A. Mokhtari, X. Wang, A. Ribeiro, and G. B. Giannakis, "Stochastic Averaging for Constrained Optimization with Application to Online Resource Allocation," *IEEE Trans. Signal. Process.*, vol. 65, pp. 3078–3098, June 2017.

39. A. Mokhtari, A. Koppel, and A. Ribeiro, "A Class of Parallel Doubly Stochastic Algorithms for Large-Scale Learning," *J. Machine Learning Research*, vol. (submitted), June 2017.

40. J. Stephan, J. Fink, V. Kumar, and A. Ribeiro, "Concurrent Control of Mobility and Communication in Multi-Robot Systems," *IEEE Trans. Robotics*, vol. 33, pp. 1248–1254, June 2017.

41. M. Eisen, A. Mokhtari, and A. Ribeiro, "Decentralized Quasi-Newton Methods," *IEEE Trans. Signal. Process.*, vol. 65, pp. 2613–2628, May 2017.

42. M. Fazlyab, A. Ribeiro, M. Morari, and V. M. Preciado, "Analysis of Optimization

Algorithms via Integral Quadratic Constraints: Nonstrongly Convex Problems," *SIAM J. Optimization.*, vol. (submitted), May 2017.

43. A. Koppel, B. M. Sadler, and A. Ribeiro, "Proximity Without Consensus in Online Multiagent Optimization," *IEEE Trans. Signal Processing*, vol. 65, pp. 3062–3077, March 2017.

44. S. Segarra, G. Mateos, A. G. Marques, and A. Ribeiro, "Blind Identification of Graph Filters," *IEEE Trans. Signal Process.*, vol. 65, pp. 1146–1159, March 2017.

45. A. Koppel, G. Warnell, E. Stump, and A. Ribeiro, "D4L: Decentralized Dynamic Discriminative Dictionary Learning," *IEEE Trans. Signal Info. Process. over Networks*, vol. 3, pp. 728–743, February 2017.

46. W. Huang and A. Ribeiro, "Persistent homology lower bounds on high order network distances," *IEEE Trans. Signal Process.*, vol. 65, pp. 319–334, January 2017.

47. A. Mokhtari, Q. Ling, and A. Ribeiro, "Network Newton Distributed Optimization Methods," *IEEE Trans. Signal. Process.*, vol. 65, pp. 146–161, January 2017.

48. A. Mokhtari, W. Shi, Q. Ling, and A. Ribeiro, "A Decentralized Second-Order Method with Exact Linear Convergence Rate for Consensus Optimization," *IEEE Trans. Signal and Info. Process. over Networks*, vol. 2, pp. 507–522, December 2016.

49. S. Paternain, , and A. Ribeiro, "Online Learning of Feasible Strategies in Unknonw Environments," *IEEE Transactions on Automatic Control*, vol. 62, pp. 2807–2822, November 2016.

50. W. Huang, L. Goldsberry, N. Wymbs, S. Grafton, D. Bassett, and A. Ribeiro, "Graph frequency analysis of brain signals," *IEEE J. Sel. Topics Signal Process.*, vol. 10, pp. 1189–1203, October 2016.

51. A. Mokhtari, W. Shi, Q. Ling, and A. Ribeiro, "DQM: Decentralized Quadratically Approximated Alternating Direction Method of Multipliers," *IEEE Trans. Signal Process.*, vol. 64, pp. 5158–5173, October 2016.

52. S. Segarra, M. Eisen, G. Egan, and A. Ribeiro, "Attributing the Authorship of the Henry VI Plays by Word Adjacency," *Shakespeare Quarterly*, vol. 67, pp. 232–256, October 2016.

53. A. Simonetto, A. Mokhtari, A. Koppel, G. Leus, and A. Ribeiro, "A Class of Prediction-Correction Methods for Time-Varying Convex Optimization," *IEEE Trans. Signal Process.*, vol. 64, pp. 4576–4591, September 2016.

54. S. Segarra, A. G. Marques, G. Leus, and A. Ribeiro, "Reconstruction of Graph Signals through Percolation from Seeding Nodes," *IEEE Trans. Signal Process.*, vol. 64, pp. 4363–4378, August 2016.

55. A. G. Marques, S. Segarra, G. Leus, and A. Ribeiro, "Sampling of Graph Signals with Successive Local Aggregations," *IEEE Trans. Signal Process.*, vol. 64, pp. 1832–1843, April 2016.

56. A. Mokhtari and A. Ribeiro, "DSA: Decentralized Double Stochastic Averaging Gradient Algorithm," *J. Machine Learning Research*, vol. 17, pp. 1–35, March 2016.

57. W. Huang and A. Ribeiro, "Metrics in the space of high order networks," *IEEE Trans. Signal Process.*, vol. 64, pp. 615–629, February 2016.

58. S. Segarra and A. Ribeiro, "Stability and Continuity of Centrality Measures in Weighted Graphs," *IEEE Trans. Signal Process.*, vol. 64, pp. 543–555, February 2016.

59. K. Gatsis, M. Pajic, A. Ribeiro, and G. Pappas, "Opportunistic control over shared wireless channels," *IEEE Trans. Autom. Control*, vol. 60, pp. 3140–3155, December 2015.

60. A. Mokhtari and A. Ribeiro, "Global convergence of online limited memory BFGS," *J. Machine Learning Research*, vol. 16, pp. 3151–3181, December 2015.

61. P. Molavi, C. Eksin, A. Ribeiro, and A. Jadbabaie, "Learning to coordinate in social networks," *Operations Research*, vol. 64, pp. 605–621, November 2015.

62. C. Eksin, H. Delic, and A. Ribeiro, "Demand response management in smart grids with heterogeneous consumer preferences," *IEEE Trans. Smart Grid*, vol. 6, pp. 3082 – 3094, November 2015.

63. S. Segarra, M. Eisen, and A. Ribeiro, "Authorship attribution through function word adjacency networks," *IEEE Trans. Signal Process.*, vol. 63, pp. 5464–5478, October 2015.

64. A. Koppel, F. Jakubiec, and A. Ribeiro, "A saddle point algorithm for networked online convex optimization," *IEEE Trans. Signal Process.*, vol. 63, pp. 5149 – 5164, October 2015.

65. Q. Ling, W. Shi, G. Wu, and A. Ribeiro, "DLM: Decentralized linearized alternating direction method of multipliers," *IEEE Trans. Signal Process.*, vol. 63, pp. 4051–4064, August 2015.

66. S. Segarra, W. Huang, and A. Ribeiro, "Diffusion and superposition distances for signals supported on networks," *IEEE Trans. Signal Info Process. over Networks*, vol. 1, pp. 20–032, March 2015.

67. A. Mokhtari and A. Ribeiro, "RES: Regularized stochastic BFGS algorithm," *IEEE Trans. Signal Process.*, vol. 62, pp. 6089–6104, December 2014.

68. K. Gatsis, A. Ribeiro, and G. Pappas, "Optimal power management in wireless control systems," *IEEE Trans. Autom. Control*, vol. 59, pp. 1495–1510, June 2014.

69. C. Eksin, P. Molavi, A. Ribeiro, and A. Jadbabaie, "Bayesian quadratic network game filters," *IEEE Trans. Signal Process.*, vol. 62, pp. 2250 – 2264, May 2014.

70. M. Zargham, A. Ribeiro, A. Jadbabaie, and A. Ozdaglar, "Accelerated dual descent for network optimization," *IEEE Trans. Autom. Control*, vol. 59, pp. 905 – 920, April 2014.

71. Q. Ling and A. Ribeiro, "Decentralized dynamic optimization through the alternating direction method of multipliers," *IEEE Trans. Signal Process.*, vol. 62, pp. 1185 – 1197, March 2014.

72. Y. Hu and A. Ribeiro, "Optimal wireless communications with imperfect channel state information," *IEEE Trans. Signal Process.*, vol. 61, pp. 2751–2766, June 2013.

73. C. Eksin, P. Molavi, A. Ribeiro, and A. Jadbabaie, "Learning in network games with incomplete information," *IEEE Signal Process. Mag.*, vol. 30, pp. 30–42, May 2013.

74. J. Fink, A. Ribeiro, and V. Kumar, "Algorithms for controlling mobility while maintaining robust wireless connectivity," *IEEE Access*, vol. 1, pp. 290–309, May

2013.

75. F. Jakubiec and A. Ribeiro, "D-MAP: Distributed maximum a posteriori probability estimation of dynamic systems," *IEEE Trans. Signal Process.*, vol. 61, pp. 450–466, February 2013.

76. M. Zavlanos, A. Ribeiro, and G. Pappas, "Network integrity in mobile robotic networks," *IEEE Trans. Autom. Control*, vol. 58, pp. 3–18, January 2013.

77. C. Eksin and A. Ribeiro, "Distributed network optimization with heuristic rational agents," *IEEE Trans. Signal Process.*, vol. 60, pp. 5396–5411, October 2012.

78. Y. Hu and A. Ribeiro, "Optimal wireless networks based on local channel state information," *IEEE Trans. Signal Process.*, vol. 60, pp. 4913–4929, September 2012.

79. A. Ribeiro, "Optimal resource allocation in wireless communication and networking," *EURASIP J. Wireless Commun., Networking*, vol. 2012, August 2012.

80. J. LeNy, A. Ribeiro, and G. Pappas, "Adaptive communication-constrained deployment of unmanned vehicle systems," *IEEE J. Sel. Areas Commun.*, vol. 30, pp. 923–934, June 2012.

81. J. Fink, A. Ribeiro, and V. Kumar, "Robust control for mobility and wireless communication in cyber-physical systems with application to robot teams," *Proc. of the IEEE*, vol. 100, pp. 164–178, January 2012.

82. Y. Hu and A. Ribeiro, "Adaptive distributed algorithms for optimal random access channels," *IEEE Trans. Wireless Commun.*, vol. 10, pp. 2703–2715, August 2011.

83. A. Ribeiro, "Ergodic stochastic optimization algorithms for wireless communication and networking," *IEEE Trans. Signal Process.*, vol. 58, pp. 6369–6386, December 2010.

84. A. Ribeiro and G. Giannakis, "Separation principles in wireless networking," *IEEE Trans. Inf. Theory*, vol. 56, pp. 4488–4505, September 2010.

85. N. Gatsis, A. Ribeiro, and G. Giannakis, "A class of convergent algorithms for resource allocation in wireless fading networks," *IEEE Trans. Wireless Commun.*, vol. 9, pp. 1808–1823, May 2010.

86. A. Ribeiro, I. Schizas, S. Roumeliotis, and G. Giannakis, "Kalman filtering in wireless sensor networks – Incorporating communication cost in state estimation problems," *IEEE Control Systems Mag.*, vol. 30, pp. 66–86, April 2010.

87. A. Ribeiro, N. Sidiropoulos, and G. Giannakis, "Optimal distributed stochastic routing algorithms for wireless multihop networks," *IEEE Trans. Wireless Commun.*, vol. 7, pp. 4261–4272, November 2008.

88. E. Msechu, S. Roumeliotis, A. Ribeiro, and G. Giannakis, "Decentralized Quantized Kalman Filtering with Scalable Communication Cost," *IEEE Trans. Signal Process.*, vol. 56, pp. 3727–3741, August 2008.

89. A. Cano-Pleite, T. Wang, A. Ribeiro, and G. Giannakis, "Link-adaptive distributed coding for multi-source cooperation," *EURASIP J. Advances Signal Process.*, vol. 2008, p. 12 pages Article ID 352796, June 2008.

90. I. Schizas, G. Giannakis, S. Roumeliotis, and A. Ribeiro, "Consensus in ad hoc WSNs with noisy links - part II: distributed estimation and smoothing of random signals,"

IEEE Trans. Signal Process., vol. 56, pp. 1650–1666, April 2008.

91. I. Schizas, A. Ribeiro, and G. Giannakis, "Consensus in ad hoc WSNs with noisy links - part I: distributed estimation of deterministic signals," *IEEE Trans. Signal Process.*, vol. 56, pp. 350–364, January 2008.

92. A. Ribeiro, R. Wang, and G. Giannakis, "Multi-source cooperation with full-diversity spectral-efficiency and controllable-complexity," *IEEE J. Sel. Areas Commun.*, vol. 25, pp. 415–425, February 2007.

93. A. Ribeiro, N. Sidiropoulos, G. Giannakis, and Y. Yu, "Achieving wireline random access throughput in wireless networking via user cooperation," *IEEE Trans. Inf. Theory*, vol. 53, pp. 732–758, February 2007.

94. A. Ribeiro, G. Giannakis, and S. Roumeliotis, "SOI-KF: Distributed Kalman filtering with low-cost communications using the sign of innovations," *IEEE Trans. Signal Process.*, vol. 54, pp. 4782–4795, December 2006.

95. A. Ribeiro, X. Cai, and G. Giannakis, "Opportunistic multipath for bandwidth-efficient cooperative multiple access," *IEEE Trans. Wireless Commun.*, vol. 5, pp. 2321–2327, September 2006.

96. A. Ribeiro and G. Giannakis, "Bandwidth-constrained distributed estimation for wireless sensor networks - part II: unknown pdf," *IEEE Trans. Signal Process.*, vol. 54, pp. 2784–2796, July 2006.

97. J.-J. Xiao, A.Ribeiro, T. Luo, and G. Giannakis, "Distributed compression-estimation using wireless sensor networks," *IEEE Signal Process. Mag.*, vol. 23, pp. 27–41, July 2006.

98. A. Ribeiro and G. Giannakis, "Bandwidth-constrained distributed estimation for wireless sensor networks - part I: Gaussian case," *IEEE Trans. Signal Process.*, vol. 54, pp. 1131–1143, March 2006.

99. A. Ribeiro and G. Giannakis, "Fixed and random access cooperative networks," *EURASIP Newsletter*, vol. 17, pp. 3–24, March 2006.

100. A. Ribeiro, X. Cai, and G. Giannakis, "Symbol error probabilities for general cooperative links," *IEEE Trans. Wireless Commun.*, vol. 4, pp. 1264–1273, May 2005.

Conference papers

1. S. Paternain, M. Morari, and A. Ribeiro, "A Prediction-Correction Method for Model Predictive Control," in *Proc. American Control Conference*, Milwaukee, WI, June 27-29 2018.

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123. Y. Hu and A. Ribeiro, "Cognitive access algorithms for multiple access channels," in *Proc. IEEE Workshop on Signal Process. Advances in Wireless Commun.*, pp. 120–124, Darmstadt Germany, June 16-19 2013.

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Predictable Rates in Wireless Mesh Networks.," in *Proc. Int. Conf. on Network Protocols*, pp. 1–10, Austin TX, October 30 - November 2 2012.

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134. M. Zargham, A. Ribeiro, and A. Jadbabaie, "A distributed line search for network optimization," in *Proc. American Control Conf.*, pp. 472–477, Montreal Canada, June 27-29 2012.

135. J. Fink, A. Ribeiro, and V. Kumar, "Motion planning for robust wireless networking," in *Proc. Int. Conf. Robotics Autom.*, vol. 2419-2426, Saint Paul, MN, May 14-18 2012.

136. C. Eksin and A. Ribeiro, "Heuristic rational models in social networks," in *Proc. Int. Conf. Acoustics Speech Signal Process.*, pp. 3077–3080, Kyoto Japan, March 25-30 2012.

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145. M. Zavlanos, A. Ribeiro, and G. Pappas, "Distributed control of mobility and routing in networks of robots," in *Proc. IEEE Workshop on Signal Process. Advances in Wireless Commun.*, pp. 236–240, San Francisco CA, June 26-29 2011.

146. Y. Hu and A. Ribeiro, "Optimal wireless networks based on local channel state information," in *Proc. Int. Conf. Acoustics Speech Signal Process.*, pp. 3124–3127, Prague

Czech Republic, May 22-27 2011.

147. M. Zavlanos, A. Ribeiro, and G. Pappas, "Mobility and routing control in networks of robots," in *Proc. Conf. on Decision Control*, vol. (to appear), pp. 7545–7550, Atlanta GA, December 15-17 2010.

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150. A. Ribeiro, "Stochastic learning algorithms for optimal design of wireless fading networks," in *Proc. IEEE Workshop on Signal Process. Advances in Wireless Commun.*, pp. 1–5, Marakech Morocco, June 20-23 2010.

151. A. Ribeiro, "Ergodic stochastic optimization algorithms for wireless communication and networking," in *Proc. Int. Conf. Acoustics Speech Signal Process.*, pp. 3326–3329, Dallas TX, March 14-19 2010.

152. A. Ribeiro, "Stochastic soft backpressure algorithms for routing and scheduling in wireless ad-hoc networks," in *Proc. of the third IEEE Int. Workshop on Computational Advances in Multi-Sensor Adaptive Process.*, pp. 137–140, Aruba Dutch Antilles, December 13-16 2009.

153. A. Ribeiro, "Layers and layer interfaces in wireless networks," in *Proc. Int. Conf. Acoustics Speech Signal Process.*, pp. 2557–2560, Taipei Taiwan, April 19-24 2009.

154. N. Gatsis, A. Ribeiro, and G. Giannakis, "Cross-layer optimization of wireless fading ad-hoc networks," in *Proc. Int. Conf. Acoustics Speech Signal Process.*, pp. 2353–2356, Taipei Taiwan, April 19-24 2009.

155. A. Ribeiro and G. Giannakis, "Optimal layered architectures of wireless networks," in *Proc. Asilomar Conf. on Signals Systems Computers*, pp. 2147–2151, Pacific Grove CA, November 4-7 2008.

156. A. Ribeiro and G. Giannakis, "Robust stochastic routing and scheduling for wireless ad-hoc networks," in *Proc. Wireless Commun. Mobile Computing Conf.*, pp. 50–55, Crete Island Greece, August 6-8 2008.

157. E. Msechu, A. Ribeiro, S. Roumeliotis, and G. Giannakis, "Distributed Kalman filtering based on quantized innovations," in *Proc. Int. Conf. Acoustics Speech Signal Process.*, pp. 3293–3296, Las Vegas NV, March 31 - April 4 2008.

158. A. Ribeiro and G. Giannakis, "Optimal FDMA over wireless fading mobile ad-hoc networks," in *Proc. Int. Conf. Acoustics Speech Signal Process.*, pp. 2765–2768, Las Vegas NV, March 31 - April 4 2008.

159. A. Ribeiro and G. Giannakis, "Layer separability of wireless networks," in *Proc. Conf. on Info. Sciences and Systems*, pp. 821–826, Princeton Univ. Princeton NJ, March 19-21 2008.

160. E. Msechu, S. Roumeliotis, A. Ribeiro, and G. Giannakis, "Distributed iterativelly quantized Kalman filtering for wireless sensor networks," in *Proc. Asilomar Conf. on*

Signals Systems Computers, pp. 646–650, Pacific Grove CA, November 4-7 2007.

161. I. Schizas, G. Giannakis, S. Roumeliotis, and A. Ribeiro, "Anytime optimal distributed Kalman filtering and smoothing," in *Proc. IEEE Workshop on Statistical Signal Process.*, pp. 368–372, Madison WI, August 26-29 2007.

162. I. Schizas, G. Giannakis, and A. Ribeiro, "Distributed MAP and LMMSE estimation of random signals using ad hoc wireless sensor networks with noisy links," in *Proc. IEEE Workshop on Signal Process. Advances in Wireless Commun.*, pp. 1–5, Helsinki Finland, June 17-20 2007.

163. A. Ribeiro and G. Giannakis, "Joint stochastic routing and scheduling for multihop wireless ad-hoc networks," in *Proc. IEEE Workshop on Signal Process. Advances in Wireless Commun.*, pp. 1–5, Helsinki Finland, June 17-20 2007.

164. A. Ribeiro, T. Luo, N. Sidiropoulos, and G. Giannakis, "Modelling and optimization of stochastic routing for wireless multihop networks," in *Proc. IEEE Int. Conf. on Computer Commun.*, pp. 1748–1756, Anchorage AK, May 6-12 2007.

165. I. Schizas, A. Ribeiro, and G. Giannakis, "Consensus-based distributed parameter estimation in ad hoc wireless sensor networks with noisy links," in *Proc. Int. Conf. Acoustics Speech Signal Process.*, vol. 2, pp. 849–852, Honolulu HI, April 15-20 2007.

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167. Y. Wu, A. Ribeiro, and G. Giannakis, "Robust routing in wireless multi-hop networks," in *Proc. Conf. on Info. Sciences and Systems*, pp. 637–642, Johns Hopkins Univ. Baltimore MD, March 14-16 2007.

168. A. Cano-Pleite, T. Wang, A. Ribeiro, and G. Giannakis, "Link-adaptive distributed coding for multi-source cooperation," in *Global Telecommun. Conf.*, pp. 1–5, San Francisco CA, November 27 - December 1 2006.

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170. I. Schizas, A. Ribeiro, and G. Giannakis, "Distributed estimation with ad hoc wireless sensor networks," in *Proc. of European Signal. Process. Conf.*, pp. 1–5, Florence Italy, September 4-8 2006.

171. A. Ribeiro, R. Wang, and G. Giannakis, "Multi-source cooperation with full-diversity spectral-efficiency and controllable-complexity," in *Proc. IEEE Workshop on Signal Process. Advances in Wireless Commun.*, pp. 1–5, Cannes France, July 2-5 2006.

172. A. Ribeiro, G. Giannakis, and S. Roumeliotis, "SOI-KF: distributed Kalman filtering with low-cost communications using the sign of innovations," in *Proc. Int. Conf. Acoustics Speech Signal Process.*, vol. 4, pp. 153–156, Toulouse France, May 14-19 2006.

173. A. Ribeiro, R. Wang, and G. Giannakis, "Linear complex-field coding for cooperative networking," in *Proc. of the first IEEE Int. Workshop on Computational Advances in Multi-Sensor Adaptive Process.*, pp. 48–51, Puerto Vallarta Mexico, December 13-15 2005.

174. A. F. Sha, A. Ribeiro, and G. Giannakis, "Bandwidth-constrained MAP estimation for wireless sensor networks," in *Proc. Asilomar Conf. on Signals Systems Computers*, pp. 215–219, Pacific Grove CA, October 28 - November 1 2005.

175. X. Wang, Y. Yu, and A. Ribeiro, "Performance analysis of cooperative random access with long PN spreading codes," in *Proc. Asilomar Conf. on Signals Systems Computers*, pp. 499–503, Pacific Grove CA, October 28 - November 1 2005.

176. A. Ribeiro and G. Giannakis, "Distributed Kalman filtering based on severely quantized WSN data," in *Proc. of IEEE Workshop on Statistical Signal Process.*, pp. 1250–1255, Bordeaux France, July 17-20 2005.

177. A. Ribeiro, N. Sidiropoulos, and G. Giannakis, "Achieving wireline random access throughput in wireless networking via user cooperation," in *Proc. IEEE Workshop on Signal Process. Advances in Wireless Commun.*, pp. 1033–1037, New York NY, June 5-8 2005.

178. A. Ribeiro and G. Giannakis, "Distributed quantization-estimation using wireless sensor networks," in *Proc. IEEE Int. Conf. Commun.*, vol. 2, pp. 730–736, Seoul Korea, May 16-20 2005.

179. A. Ribeiro, Y. Yu, G. Giannakis, and N. Sidiropoulos, "Increasing the throughput of spread-Aloha protocols via long PN spreading codes," in *Proc. IEEE Int. Conf. Commun.*, vol. 5, pp. 3628–3631, Seoul Korea, May 16-20 2005.

180. A. Ribeiro and G. Giannakis, "Non-parametric distributed quantization-estimation using wireless sensor networks," in *Proc. Int. Conf. Acoustics Speech Signal Process.*, vol. 4, pp. 61–64, Philadelphia PA, March 18-23 2005.

181. Y. Yu, A. Ribeiro, N. Sidiropoulos, and G. Giannakis, "Cooperative random access with long PN spreading codes," in *Proc. Int. Conf. Acoustics Speech Signal Process.*, vol. 3, pp. 517–520, Philadelphia PA, March 18-23 2005.

182. A. Ribeiro and G. Giannakis, "Distributed estimation in Gaussian noise for bandwidth-constrained wireless sensor networks," in *Proc. Asilomar Conf. on Signals Systems Computers*, vol. 2, pp. 1407–1411, Pacific Grove CA, November 7-10 2004.

183. A. Ribeiro, X. Cai, and G. Giannakis, "Symbol error probabilities for general cooperative links," in *Proc. IEEE Int. Conf. Commun.*, vol. 6, pp. 3369–3373, Paris France, June 20-24 2004.

184. A. Ribeiro, X. Cai, and G. Giannakis, "Opportunistic multipath for bandwidth-efficient cooperative networking," in *Proc. Int. Conf. Acoustics Speech Signal Process.*, vol. 4, pp. 549–552, Montreal Canada, May 17-21 2004.

Book chapters

1. A. Ribeiro, I. Schizas, J. J. Xiao, G. Giannakis, and T. Luo, "Distributed estimation under bandwidth and energy constraints," in *Wireless Sensor Networks: Signal Processing and Communications Perspectives* (A. Swami, Q. Zhao, Y. Hong, and L. Tong, eds.), Wiley, February 2007.

2. I. Schizas, A. Ribeiro, and G. Giannakis, "Dimensionality reduction compression and quantization for distributed estimation with wireless sensor networks," in *Wireless Communications* (P. Agrawal, D. Andrews, P. Fleming, G. Yin, and L. Zhang, eds.),

vol. 143 of *IMA Volumes in Mathematics and its Applications*, pp. 259–296, Springer, New York, April 2006.

Theses

1. A. Ribeiro, *Wireless cooperative communications and networking*. PhD thesis, University of Minnesota, Twin cities, April 2007.

2. A. Ribeiro, "Distributed quantization-estimation for wireless sensor networks," Master's thesis, University of Minnesota, Twin cities, August 2005.

TALKS   **Seminars, Colloquia, Plenaries, Keynotes and Tutorials**

1. New York University University, Center for Data Science and Courant Institute, Seminar, *Convolutional Neural Networks Architectures for Signals Supported on Graphs*, March 29, 2018.

2. Harvard University, Seminar, *Statistical Signal Processing on Graphs*, October 20, 2017.

3. Intel Science and Technology Center for Wireless Autonomous Systems, Kickoff meeting, *Wireless Autonomous Systems*, October 2, 2017.

4. Lehigh University, Seminar, *High Order Methods for Empirical Risk Minimization*, September 19, 2017.

5. Army Research Laboratory, Micro Autonomous Systems and Technology Collaborative Technology Alliance, Capstone meeting, *Mobile Autonomous Wireless Networks*, August 22, 2016.

6. DIMACS Workshop on Distributed Optimization, Information Processing, and Learning, Rutgers University, Invited talk, *High-order Methods In Empirical Risk Minimization*, August 21, 2017.

7. ONR Basic Research Challenge on Decentralized Online Optimization, Review meeting, *Incremental Quasi-Newton Methods with Local Superlinear Convergence Rate*, April 28, 2017.

8. Quintile IMS, Seminar, *Rating Prediction via Graph Signal Processing*, April 18, 2017.

9. IEEE International Conference on Acoustics, Speech and Signal Processing, Tutorial, *Graph Signal Processing*, March 5, 2017.

10. IPAM Workshop on Emerging Wireless Networks, University of California at Los Angeles, Invited talk, *High order methods in empirical risk minimization*, February 7, 2017.

11. Global Signal Processing Conference, Plenary, *Statistical Signal Processing on Graphs*, December 9, 2016.

12. European Signal Processing Conference, Tutorial, *Graph Signal Processing*, August 29, 2016.

13. Heterogeneity, Diversity and Resilience in Multi-Robot Systems, Invited talk, *Online Learning for Characterizing Unknown Environments in Robotic Vehicle Models*, August 15, 2016.

14. Centre Tecnológic de Telecomunicacions de Catalunya (CTTC), Seminar, *Graph Signal Processing: Stationary Graph Signals and Topology Inference*, July 13, 2016.

15. SIAM Annual Meeting, Invited talk, *Stability and continuity of centrality measures in weighted graphs*, July 13, 2016.

16. IEEE Sensor Array and Multichannel Signal Processing Workshop, Tutorial, *Graph Signal Processing*, July 10, 2016.

17. École Polytehcnique Fédérale de Lausanne (EPFL), Seminar, *Graph signal processing tools for distributed sampling and topology inference*, July 7, 2016.

18. ENS Lyon Thematic Semester on Network Science: Dynamics On and Of Networks, Plenary, *Graph signal processing tools for distributed sampling and topology inference*, June 20, 2016.

19. Signal Processing Workshop, Invited talk, *Stationarity and power spectral density estimation of graph signals*, May 26, 2016.

20. Informs Optimization Society Conference, Invited talk, *Stochastic quasi-newton methods for large-scale optimization*, March 19, 2016.

21. Army Research Laboratory, Micro Autonomous Systems and Technology Collaborative Technology Alliance, Review meeting, *Augmenting local control with statistical learning*, March 21, 2016.

22. IBM research, Seminar, *Distributed optimization: Beyond first order methods*, October 28, 2015.

23. Workshop on Foundations of Intelligent Sensing, Action and Learning, Invited talk, *Information, Complexity, and Representation of Autonomous Operation*, October 20, 2015.

24. International Symposium on Optimization, *Convergence of stochastic quasi-Newton methods, Invited talk*, July 17, 2015.

25. Yahoo research, Seminar, *Stochastic Quasi-Newton Methods*, June 30, 2015.

26. Rutgers University, ECE Colloqium, *Axiomatic construction of hierarchical clustering in asymmetric networks*, March 25, 2015.

27. Army Research Laboratory, Micro Autonomous Systems and Technology Collaborative Technology Alliance, Review meeting, *Decentralized network deployment for micro autonomous systems*, March 23, 2015.

28. Information Theory and Applications Workshop, University of California at San Diego, Invited talk, *Network Newton*, February 5, 2015.

29. University of Delaware, Seminar, *Axiomatic construction of hierarchical clustering in asymmetric networks*, October 6, 2014.

30. Army Research Laboratory, Micro Autonomous Systems and Technology Collaborative Technology Alliance, Review meeting, *Decentralized network deployment for micro autonomous systems*, April 1, 2014.

31. Information Theory and Applications Workshop, University of California at San Diego, Invited talk, *Hierarchical quasi-clustering methods for asymmetric networks*, February 13, 2014.

32. Princeton University, Seminar, *Axiomatic construction of hierarchical clustering in asymmetric networks*, November 12, 2013.

33. University of California at Los Angeles, Seminar, *Bayesian network games*, October 23, 2013.

34. Army Research Laboratory, Micro Autonomous Systems and Technology Collaborative Technology Alliance, Review meeting, *Robust wireless networks for connectivity management*, March 29, 2013.

35. 1st IEEE/ACM Workshop on Signal Processing Advances in Sensor Networks (CPSWeek), Keynote, *Bayesian network games*, April 8, 2013.

36. Bellairs workshop on Signal Processing and Networks, McGill University, Invited talk, *Axiomatic construction of hierarchical clustering in asymmetric networks*, February 20, 2013.

37. Information Theory and Applications Workshop, University of California at San Diego, Invited talk, *Bayesian quadratic network game filters*, February 14, 2013.

38. Universidad de la Republica Oriental del Uruguay, Seminar, *Axiomatic construction of clustering in asymmetric networks*, December 12, 2012.

39. Universidad de la Republica Oriental del Uruguay, Seminar, *Algorithms for controlling mobility while maintaining robust wireless connectivity*, December 11, 2012.

40. Air Force Office of Scientific Research, Science of Information, Computation and Fusion, Review meeting, *MURI highlight technical talk: Asymmetric clustering*, December 5, 2012.

41. Army Research Laboratory, Micro Autonomous Systems and Technology Collaborative Technology Alliance, Review meeting, *Robust wireless networks for connectivity management*, March 29, 2012.

42. Pennsylvania State University, Seminar, *Optimal resource allocation in wireless communication and networking*, March 1, 2012.

43. MAST Sensing, Perception, and Processing Thrust Research Directions Workshop, University of Michigan, Invited talk, *Communication issues in mobile micro autonomous systems*, February 24, 2012.

44. Information Theory and Applications Workshop, University of California at San Diego, Invited talk, *Circles of trust: An axiomatic theory of clustering in asymmetric networks*, February 6, 2012.

45. State University of New York at Buffalo, Seminar, *Optimal resource allocation in wireless communication and networking*, February 3, 2012.

46. Air Force Office of Scientific Research, Science of Information, Computation and Fusion, Review meeting, *Hierarchical clustering of asymmetric data*, November 9, 2011.

47. Stanford University, Seminar, *Optimal resource allocation in wireless communication and networking*, October 6, 2011.

48. Cornell University, Seminar, *Optimal resource allocation in wireless communication and networking*, October 6, 2011.

49. IEEE new technologies conference at Boeing, Plenary, *Robust control of mobility and*

communications in autonomous robot teams, August 9, 2011.

50. University of Delaware, Seminar, *Optimal resource allocation in wireless communication and networking*, May 2, 2011.

51. Army Research Laboratory, Micro Autonomous Systems and Technology Collaborative Technology Alliance, Review meeting, *Robust wireless networks for connectivity management*, April 1, 2011.

52. Princeton University, Seminar, *Optimal resource allocation in wireless communication and networking*, March 31, 2011.

53. Northwestern University, Seminar, *Optimal resource allocation in wireless communication and networking*, March 11, 2011.

54. Carnegie Mellon University, Seminar, *Optimal resource allocation in wireless communication and networking*, February 24, 2011.

RESEARCH
FUNDING

1. *Distributed Collaborative Intelligent Systems Technology (Contract No: W911NF-17-2-0181)*, Army Research Lab. A. Ribeiro (Program Manager). Awarded amount: $27,000,000, December 2017 - December 2022.

2. *Intel Science and Technology Center for Wireless Autonomous Systems (ISTC-WAS)*, Intel. A. Ribeiro (Center Director), F. Aflatouni, D. Lee, D. Katabi, V.Kumar, R. Mangharam, G. Pappas. Awarded amount: $1,500,000, October 2017 - October 2020.

3. *Metric Representations of Network Data (Award No: 1717120)*, National Science Foundation. A. Ribeiro. Awarded amount: $450,000, August 2017 - August 2020.

4. *Geometric and Graph Structures in Information Characterization and Extraction (Award No: W911NF1710438)*, Army Research Office. A. Ribeiro (principal investigator) and Joan Bruna. Awarded amount: $750,000, August 2017 - August 2020.

5. *Optimal Communication for faster sensor network coordination (Award No: 1302222)*, National Science Foundation. M. Zavlanos (principal investigator), V. Preciado, and A. Ribeiro. Awarded amount: $774,000, October 2013 - October 2016.

6. *CoDoN: Categorification of Data over Networks (Award No: 1304-560288)*, DARPA Defense Sciences Office. R. Ghrist (principal investigator) and A. Ribeiro. Awarded amount: $1,300,000, July 2012 - June 2016.

7. *New Paradigms for Scalable, Online, Decentralized Optimization (Award No: N00014-12-1-0997)*, Office of Naval Research. A. Jadbabaie (principal investigator), A. Ozdaglar, A. Rahklin, and A. Ribeiro. Awarded amount: $1,500,000, July 2012 - July 2017.

8. *Circles of Trust: An Axiomatic Construction of Clustering in Asymmetric Networks (Award No: 1217963)*, National Science Foundation, Division: Computer and Communications Foundations. A. Ribeiro (principal investigator). Awarded amount: $305,215, August 2012 - July 2015.

9. *Control Science for Next Generation Sensing (Award No: FA9550-10-1-0567)*, Air Force Office of Scientific Research, Multi-University Research Initiative. D. Koditschek (principal investigator), A. Jadbabie, V. Kumar, A. Ribeiro, University of Minnesota,

University of California at Berkeley. Awarded amount: $7,000,000, November 2010 - October 2015.

10. *CAREER: Towards a formal theory of wireless networking (Award No: 0952867)*, National Science Foundation, Division: Computer and Communications Foundations, Program: Communication and Information Theory. A. Ribeiro (principal investigator). Awarded amount: $400,000, September 2010 - August 2015.

11. *Distributed statistical inference of dynamic systems with sensor networks (Award No: 1017454)*, National Science Foundation, Division: Computer and Communications Foundations, Program: Sensor Networks. A. Ribeiro (principal investigator). Awarded amount: $300,000, September 2010 - August 2013.

12. *Theoretical foundations of wireless networks (Award No: W911NF-10-1-0388)*, Army Research Office, Network Sciences Division. A. Ribeiro (principal investigator). Awarded amount: $300,000, August 2010 - July 2013.

13. *Micro Autonomous Systems and Technology Collaborative Technology Alliance, Center for Communication, Networking and Coordination (Contract No: W911NF-08-2-0004)*, Army Research Laboratory. A. Ribeiro (Deputy Program Manager). Awarded amount: $22,000,000, November 2009 - October 2017.

14. *Quantitative analysis and design of control networks (Award No: 0931239)*, National Science Foundation, Division: Computer and Network Systems, Program: Computer Systems, Information Technology Research. G. Pappas (principal investigator), R. Alur, I. Lee, R. Mangharam, and A. Ribeiro. Awarded amount: $1,509,319, September 2009 - August 2013.

TEACHING

1. *Signal and Information Processing (ESE 224)*, University of Pennsylvania, Spring 2018. Class rating: 3.06/4, instructor rating: 3.16/4, difficulty rating: 2.30/4. Enrollment: 75.

2. *Stochastic systems analysis and simulation (ESE 303)*, University of Pennsylvania, Fall 2017. Class rating: 2.51/4, instructor rating: 2.83/4, difficulty rating: 2.62/4. Enrollment: 86.

3. *Signal and Information Processing (ESE 224)*, University of Pennsylvania, Spring 2017. Class rating: 2.58/4, instructor rating: 2.90/4, difficulty rating: 2.49/4. Enrollment: 98.

4. *Stochastic systems analysis and simulation (ESE 303)*, University of Pennsylvania, Fall 2016. Class rating: 2.11/4, instructor rating: 2.56/4, difficulty rating: 2.78/4. Enrollment: 75.

5. *Signal and Information Processing (ESE 224)*, University of Pennsylvania, Spring 2016. Class rating: 2.81/4, instructor rating: 3.11/4, difficulty rating: 2.29/4. Enrollment: 91.

6. *Stochastic systems analysis and simulation (ESE 303)*, University of Pennsylvania, Fall 2015. Class rating: 2.71/4, instructor rating: 3.04/4, difficulty rating: 2.73/4. Enrollment: 72.

7. *Signal and Information Processing (ESE 224)*, University of Pennsylvania, Spring 2015. Class rating: 2.73/4, instructor rating: 2.88/4, difficulty rating: 2.77/4.

Enrollment: 35.

8. *Stochastic systems analysis and simulation (ESE 303)*, University of Pennsylvania, Fall 2014. Class rating: 2.18/4, instructor rating: 2.41/4, difficulty rating: 3.12/4. Enrollment: tbd.

9. *Modern convex optimization (ESE 605)*, University of Pennsylvania, Spring 2014. Class rating: 2.97/4, instructor rating: 2.92/4, difficulty rating: 3.32/4. Enrollment: 40.

10. *Stochastic systems analysis and simulation (ESE 303)*, University of Pennsylvania, Fall 2013. Class rating: 2.57/4, instructor rating: 2.76/4, difficulty rating: 3.26/4. Enrollment: 47.

11. *Optimal design of wireless systems (ESE 675)*, University of Pennsylvania, Spring 2013. Class rating: 3.00/4, instructor rating: 3.56/4, difficulty rating: 2.67/4. Enrollment: 3.

12. *Stochastic systems analysis and simulation (ESE 303)*, University of Pennsylvania, Fall 2012. Class rating: 2.93/4, instructor rating: 3.24/4, difficulty rating: 3.49/4. Enrollment: 47.

13. *Optimal design of wireless systems (ESE 675)*, University of Pennsylvania, Spring 2012. Class rating: 3.00/4, instructor rating: 3.56/4, difficulty rating: 2.67/4. Enrollment: 9.

14. *Stochastic systems analysis and simulation (ESE 303)*, University of Pennsylvania, Fall 2011. Class rating: 3.16/4, instructor rating: 3.36/4, difficulty rating: 3.38/4. Enrollment: 49.

15. *Special topics in Electrical and Systems Engineering: Optimal design of wireless networks (ESE 680)*, University of Pennsylvania, Spring 2011. Class rating: 2.75/4, instructor rating: 3.05/4, difficulty rating: 3.17/4. Enrollment: 10.

16. *Stochastic systems analysis and simulation (ESE 303)*, University of Pennsylvania, Fall 2010. Class rating: 2.65/4, instructor rating: 3.16/4, difficulty rating: 3.34/4. Enrollment: 43.

17. *Special topics in Electrical and Systems Engineering: Optimal design of wireless networks (ESE 680)*, University of Pennsylvania, Spring 2010. Class rating: 3.21/4, instructor rating: 3.57/4, difficulty rating: 2.71/4. Enrollment: 14.

18. *Stochastic systems analysis and simulation (ESE 303)*, University of Pennsylvania, Fall 2009. Class rating: 2.61/4, instructor rating: 2.94/4, difficulty rating: 3.44/4. Enrollment: 37.

19. *Data communications (ESE 408)*, University of Pennsylvania, Spring 2009. Class rating: 4/4, instructor rating: 4/4, difficulty rating: 3.50/4. Enrollment: 2.

DOCTORAL STUDENTS

Yichuan Hu   University of Pennsylvania
Distributed Algorithms for Optimal Design of Wireless Networks   *December 2013*

Ceyhun Eksin   University of Pennsylvania
Bayesian Network Games   *January 2015*

James Stephan   University of Pennsylvania
Communication Aware Mobile Robot Teams   *July 2015*

Santiago Segarra   University of Pennsylvania

Metric Representations of Networks   *September 2016*

Aryan Mokhtari   University of Pennsylvania
Second order methods for empirical risk minimization   *May (2017)*

Alec Koppel   University of Pennsylvania
Online and decentralized statistical learning   *May (2017)*

Weiyu Huang   University of Pennsylvania
Homological analysis of high order networks   *April 2018*

Santiago Paternain   University of Pennsylvania
Fitness in navigation of autonomous agents   *June 2018*

Mark Eisen   University of Pennsylvania
To be defined   *May 2019*

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To be defined   *May 2019*

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