

Marcos M. Vasconcelos

University of Southern California
508 EEB, 3740 McClintock Avenue
Los Angeles, CA 90089

Tel: (301) 326-5635

Email: mvasconc@usc.edu

Web: <https://mullervasconcelos.github.io>

Education

- **University of Maryland** College Park, MD
Ph.D. Electrical Engineering 2016
 - Thesis: Optimality of event-based policies for decentralized estimation over shared networks
 - Advisor: Prof. Nuno C. Martins
- **Federal University of Pernambuco** Recife, Brazil
M.Sc. Electrical Engineering 2006
 - Thesis: Iterative decoding of Low-Density Parity-Check codes
 - Advisor: Prof. Valdemar C. da Rocha, Jr.
- **Federal University of Pernambuco** Recife, Brazil
B.Sc. Electrical Engineering 2004
 - Thesis: A Matlab toolbox for signal processing over finite fields
 - Advisors: Profs. Hélio Magalhães de Oliveira and Ricardo M. Campelo de Souza

Employment

- **Dept. of Electrical Engineering** University of Southern California
Postdoctoral research associate Sep. 2016 -
– Adviser: Prof. Urbashi Mitra
- **Dept. of Electrical and Computer Engineering** University of Maryland, College Park
Research assistant Jan. 2012 - Aug. 2016
- **Dept. of Electrical and Computer Engineering** University of Maryland, College Park
Teaching assistant Jan. 2010 - Dec. 2011
- **Dept. of Electrical and Computer Engineering** University of Hawaii at Manoa
Teaching assistant Sep. 2006 - Dec. 2007
- **Laboratory of Devices and Nanostructures** Federal University of Pernambuco
Intern Jan. 2004 - Mar. 2004

Research interests

- Networked decision systems
- Distributed estimation, control and optimization
- Systems Biology
- Cyber-physical systems (CPS) and the internet of things (IoT)

Publications

Journal Articles

5. **M. M. Vasconcelos** and U. Mitra, “Data-driven sensor scheduling for remote estimation in wireless networks,” (**submitted**) *IEEE Transactions on Control of Network Systems*, 2019.
4. **M. M. Vasconcelos**, M. Gagrani, A. Nayyar, and U. Mitra, “Optimal scheduling for networked estimation with energy harvesting,” (**under review**) *IEEE Transactions on Control of Network Systems*, 2019.
3. **M. M. Vasconcelos** and U. Mitra. “Observation-driven scheduling for remote estimation of two Gaussian random variables.” (**accepted**) *IEEE Transactions on Control of Network Systems*, 2019.
2. **M. M. Vasconcelos** and N. C. Martins. “Optimal remote estimation of discrete random variables over the collision channel,” *IEEE Transactions on Automatic Control*, vol. 64, no. 4, pp. 1519–1534, 2019.
1. **M. M. Vasconcelos** and N. C. Martins. “Optimal estimation over the collision channel,” *IEEE Transactions on Automatic Control*, vol. 62, no. 1, pp. 321–336, 2017.

Book Chapters

1. **M. M. Vasconcelos** and N. C. Martins. “A survey on remote estimation problems,” *Principles of Cyber-physical Systems*, S. Roy and S. Das, Eds., Cambridge University Press (**in press**).

Working papers

3. **M. M. Vasconcelos**, U. Mitra, O. Camara and J. Boedicker. “Optimal control of bacterial growth via quorum sensing.” (**to be submitted**) *PLOS Computational Biology*, 2019.
2. X. Zhang, **M. M. Vasconcelos**, W. Cui and U. Mitra. “Remote estimation over the collision channel with and without local communication.” (**to be submitted**) *IEEE Transactions on Control of Network Systems*, 2020.
1. **M. M. Vasconcelos** and U. Mitra. “Implicit communication over collision networks.” (**to be submitted**) *IEEE Transactions on Communications*, 2019.

Conference Proceedings

13. X. Zhang, **M. M. Vasconcelos**, W. Cui and U. Mitra, “An optimal symmetric threshold strategy for remote estimation over the collision channel” (**submitted**) *IEEE International Conference on Acoustics, Speech and Signal Processing Systems and Computers*, Barcelona - Spain, 2020.
12. **M. M. Vasconcelos** and U. Mitra, “Optimization for data-driven wireless sensor scheduling” *Asilomar Conference on Signals, Systems and Computers*, Pacific Grove - California, 2019. (**invited**)
11. **M. M. Vasconcelos**, O. Camara, U. Mitra, M. Gangan and J. Boedicker, “A continuous-time decision-making model for bacterial growth via quorum sensing: theory and evidence” *International Conference on Nanoscale Computing and Communication*, Dublin - Ireland, 2019. (**invited**)
10. **M. M. Vasconcelos**, O. Camara, U. Mitra, and J. Boedicker, “A sequential decision making model of bacterial growth via quorum sensing” *Asilomar Conference on Signals, Systems and Computers*, Pacific Grove - California, 2018. (**invited**)
9. M. Gagrani, **M. M. Vasconcelos**, A. Nayyar, “Scheduling and estimation strategy design in a sequential networked estimation problem” *56th Allerton Conference on Communication, Control and Computing*, Monticello - Illinois, 2018.
8. **M. M. Vasconcelos**, U. Mitra, O. Camara, K. P. Silva, and J. Boedicker, “Bacterial quorum sensing as a networked decision system” *IEEE International Conference on Communications*, Kansas City - Missouri, 2018.

7. **M. M. Vasconcelos**, A. Nayyar and U. Mitra. "Optimal sensor scheduling strategies in networked estimation," *IEEE Conference on Decision and Control*, Melbourne - Australia, 2017.
6. **M. M. Vasconcelos** and U. Mitra. "The multiple-access collision channel without feedback: capacity region and a mutual information game," *55th Allerton Conference on Communication, Control and Computing*, Monticello - Illinois, 2017.
5. **M. M. Vasconcelos** and U. Mitra. "Observation-driven sensor scheduling," *IEEE International Conference on Communication*, Paris - France, 2017.
4. **M. M. Vasconcelos** and N. C. Martins. "The structure of optimal communication policies for remote estimation over the collision channel with private and common observations," *55th IEEE Conference on Decision and Control*, Las Vegas - Nevada, 2016.
3. **M. M. Vasconcelos** and N. C. Martins. "Optimal threshold strategies for estimation over the collision channel with communication costs," *54th IEEE Conference on Decision and Control*, Osaka - Japan, 2015.
2. **M. M. Vasconcelos** and N. C. Martins. "Remote estimation games over shared networks," *51st Annual Allerton Conference on Communication, Control, and Computing*, Monticello - Illinois, 2014. (**invited**)
1. **M. M. Vasconcelos** and N. C. Martins. "Estimation over the collision channel: structural results," *50st Annual Allerton Conference on Communication, Control, and Computing*, Monticello - Illinois, 2013. (**invited**)

Research Experience

- **Modeling of bacterial quorum sensing as a networked decision system** USC
Research Associate *Fall 2016 -*
 - Developement of a mathematical decision-making model, experimental data analysis
 - PI's: Profs. Urbashi Mitra and James Boedicker
- **Energy and delay: network optimization in CPS human sensing systems** USC
Research Associate *Fall 2016 - Fall 2018*
 - Optimal design of observation-driven sensor scheduling policies
 - PI's: Profs. Urbashi Mitra and Ashutosh Nayyar
- **Optimization-based modeling of bat-prey capture dynamics** UMD/Johns Hopkins U.
Research Assistant *Spring 2015 - Summer 2016*
 - Model predictive control in denied sensing areas
 - PI's: Profs. Nuno C. Martins (UMD) and Cindy Moss (JHU)
- **Distributed estimation over shared networks** UMD
Research Assistant *Spring 2012 - Summer 2016*
 - Policy design and optimization algorithms for decentralized estimation
 - PI: Prof. Nuno C. Martins
- **Stochastic teams and optimization** Queen's University
Visiting Student *Summer 2012*
 - Host: Prof. Serdar Yüksel
- **Iterative decoding of low-density parity-check codes** UH
Research Assistant *Fall 2006 - Fall 2007*
 - Graphical models and the belief propagation algorithm
 - PI: Marc P. C. Fossorier
- **Design, analysis and implementation of low-density parity-check codes** UFPE
Research Assistant *Spring 2004 - Spring 2006*
 - PI: Prof. Valdemar C. da Rocha, Jr.

Awards & Honors

- **Travel Award to Japan**
54th IEEE Conference on Decision and Control 2015
- **Distinguished Teaching Assistant Award**
U. of Maryland 2012
- **Fulbright fellowship**
Fulbright Commission 2006–2010
- **Distinguished Undergraduate Student Award**
Federal University of Pernambuco 1999

Technical Skills

- Mathematical modeling
- Statistical data analysis
- Public speaking
- Programming Languages
 - Matlab, Mathematica, C, R, Python

Invited Talks

- **Observation-driven sensor scheduling** Riverside - California
University of California, Riverside May 2019
- **Observation-driven sensor scheduling** Princeton - New Jersey
Siemens Corporate Technology April 2019
- **Estimation over the collision channel & Observation-driven scheduling** Sta. Barbara - California
University of California, Sta. Barbara April 2018
- **Estimation of discrete random variables over the collision channel** Princeton - New Jersey
IEEE Conference on Information Sciences and Systems March 2018
- **Estimation over the collision channel & Observation-driven scheduling** Pittsburgh - Pennsylvania
Carnegie Mellon University March 2018
- **Optimal sensor scheduling strategies in networked estimation** San Diego - California
Information Theory and Applications Workshop February 2018
- **Collaborative estimation over the collision channel** Las Vegas - Nevada
Communication Aware Control and Robotics Workshop December 2016
- **Optimal remote estimation over the collision channel**
CommNetS Seminar (USC) September 2016
- **Optimal remote estimation over the collision channel**
Prof. George Pappas' Group Meeting (UPenn) April 2016
- **Estimation over the collision channel with minimum probability of error**
Communication, Control and Signal Processing Seminar (U. of Maryland) April 2016
- **Estimation over the collision channel with communication costs** YouTube video
ECEGSA Academic Seminar (U. of Maryland) December 2015
- **Distributed estimation over the collision channel**
Communication, Control and Signal Processing Seminar (U. of Maryland) November 2014

Participation in Workshops and Conferences

- **9th NSF Cyber-Physical Systems PI Meeting**
Poster Alexandria - Virginia
November 2018
- **8th NSF Cyber-Physical Systems PI Meeting**
Lightning Talk + Poster Alexandria - Virginia
November 2017
- **Communication Aware Control and Robotics Workshop**
Speaker + round table panelist Las Vegas - Nevada
November 2016
- **Workshop on Future Trends in Networks, Optim. and Controls**
Lightning Talk + Poster Los Angeles - California
December 2014

Academic Service and Contributions

- Reviewer for the following journals:
 - IEEE Transactions on Automatic Control
 - SIAM Journal on Controls and Optimization
 - Automatica
 - Systems and Control Letters
 - IEEE Transactions on Wireless Communications
 - IEEE Transactions on Information Theory
- Reviewer for the following conferences:
 - Conference on Decision and Control
 - American Control Conference
 - International Symposium on Information Theory

Teaching Experience

- **Signals and Systems (ENEE 322)** UMD
Teaching Assistant *Spring 2010 – Fall 2011*
 - Instructors: Profs. Anthony Ephremides, Steven A. Tretter, Nuno C. Martins and Carol Espy-Wilson
- **Programming for Engineers (EE 160)** UH
Teaching Assistant *Fall 2007*
 - Instructor: Prof. David Y. Y. Yun
- **Probability and Statistics (EE 342)** UH
Teaching Assistant *Fall 2006 – Spring 2007*
 - Instructors: Profs. James Yee and Anthony Kuh

Languages

- Portuguese (native)
- English (fluent)
- Spanish (basic)

References

Prof. Nuno C. Martins (PhD advisor)
Professor
Dept. of Electrical and Computer Engineering
University of Maryland
A.V. Williams, Room 2321
College Park, MD 20742
Phone: (301) 405-9198
nmartins@umd.edu

Prof. Bruno Sinopoli
Professor, Dept. Chair
Department of Electrical and Systems Engineering
Washington University in St. Louis
Green Hall, Room 1100A
St. Louis, MO
Phone: (314) 935-5565
bsinopoli@wustl.edu

Prof. Mihailo Jovanovic
Professor
Dept. of Electrical Engineering
University of Southern California
3740 McClintock Avenue EEB 324
Los Angeles, CA 90089
Phone: (213) 740-4474
mihailo@usc.edu

Prof. Urbashi Mitra
Professor
Depts. of Electrical Eng. and Computer Science
University of Southern California
3740 McClintock Avenue EEB 536
Los Angeles, CA 90089
Phone: (213) 740-4667
ubli@usc.edu

Prof. James Boedicker
Assistant Professor
Dept. of Physics and Biological Sciences
University of Southern California
920 Bloom Walk SSC 223
Los Angeles, CA 90089
Phone: (213) 740-1104
boedicke@usc.edu

Prof. Prakash Narayan
Professor
Dept. of Electrical and Computer Engineering
University of Maryland
2353 A.V. Williams Building
College Park, MD 20742
Phone: (301) 405-3661
prakash@umd.edu