

Nikolay A. Atanasov

Contact Information

GRASP Laboratory
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Education

- Ph.D., Electrical and Systems Engineering** Fall 2015
University of Pennsylvania, Philadelphia, PA
Thesis: *Active Information Acquisition with Mobile Robots*
Advisors: George J. Pappas and Kostas Daniilidis
Joseph and Rosaline Wolf Best Dissertation Award
- M.S., Electrical Engineering** Aug. 2012
University of Pennsylvania, Philadelphia, PA
- B.S., Engineering** May 2008
Concentration: Electrical Engineering
Trinity College, Hartford, CT
Salutatorian (ranked 2nd in the graduating class)

Academic Appointments

- Postdoctoral Researcher** Sep. 2015 - Present
Department of Mechanical Engineering and Applied Mechanics
University of Pennsylvania, Philadelphia, PA
Mentors: Vijay Kumar and George J. Pappas

Research Interests

1. Planning, estimation, and control for mobile robot teams with emphasis on information acquisition in applications such as environmental monitoring, security and surveillance, localization and mapping, construction and structure inspection, search and rescue, and object recognition.
 2. Using context and semantic information in robot localization, mapping, and navigation.
- Relevant disciplines:** robotics, control theory, optimization, machine learning, and computer vision.

Teaching Experience

- **Guest Lecturer**, Nonlinear Systems and Control, UPenn, Philadelphia, PA Fall 2015
- **Guest Lecturer**, Linear Systems Theory, UPenn, Philadelphia, PA Fall 2011
- **Teaching Assistant**, Linear Systems Theory, UPenn, Philadelphia, PA Fall 2010, Fall 2011
- **Teaching Assistant**, Calculus I, Trinity College, Hartford, CT Fall 2006, Fall 2007
- **Teaching Assistant**, Calculus II, Trinity College, Hartford, CT Spring 2006, Spring 2007
- **Teaching Assistant**, Intro to Computer Science, Trinity College, Hartford, CT Fall 2005

Honors & Awards

- **Joseph and Rosaline Wolf Award for Best Ph.D. Dissertation in Electrical and Systems Engineering** 2015
Awarded by the School of Engineering and Applied Science, University of Pennsylvania
- **Phi Beta Kappa Society** 2008 - Present
- **President's Fellow**, Trinity College, Hartford, CT 2007 - 2008
Awarded for outstanding work in the Engineering major
- **Thomas Holland Scholarship**, Trinity College, Hartford, CT 2006 - 2008
Awarded for attaining the highest rank in the junior and senior classes
- **The Junior Engineering Book Prize**, Trinity College, Hartford, CT 2007
Awarded by the Engineering Dept. for academic achievement and professional development
- **Phi Gamma Delta Teaching Fellowship**, Trinity College, Hartford, CT 2006, 2007
Awarded for aiding the Department of Mathematics in its instructional endeavors

Journal Articles

- J5. N. Atanasov, J. Le Ny, K. Daniilidis, and G. Pappas, "**Active Information Acquisition with Sensing Robots**", *IEEE Transactions on Robotics (T-RO)*, in preparation.
- J4. N. Atanasov, M. Zhu, K. Daniilidis, and G. Pappas, "**Localization from Semantic Observations via the Matrix Permanent**", *International Journal of Robotics Research (IJRR)*, in press, October 2015.
- J3. N. Atanasov, J. Le Ny, and G. Pappas, "**Distributed Algorithms for Stochastic Source Seeking with Mobile Robot Networks**", *ASME Journal of Dynamic Systems, Measurement, and Control (JDSMC)*, vol. 137(3):031011-031011-9, March 2015.
- J2. N. Atanasov, B. Sankaran, J. Le Ny, G. Pappas, and K. Daniilidis, "**Nonmyopic View Planning for Active Object Classification and Pose Estimation**", *IEEE Transactions on Robotics (T-RO)*, vol. 30(5):1078-1090, October 2014.
- J1. J. Ning and N. Atanasov, "**Delineation of Systolic and Diastolic Heart Murmurs via Wavelet Transform and Autoregressive Modeling**", *International Journal of Bioelectromagnetism*, vol. 12(3):114-120, July 2010.

Conference Proceedings

- C16. J. Fu, N. Atanasov, U. Topcu, and G. Pappas, "**Optimal Temporal Logic Planning in Probabilistic Semantic Maps**", *IEEE International Conference on Robotics and Automation (ICRA)*, Stockholm, Sweden, May 2016, *submitted*.
- C15. M. Lauri, N. Atanasov, G. Pappas, and R. Ritala, "**Myopic Policy Bounds for Information Acquisition POMDPs**", *IEEE International Conference on Robotics and Automation (ICRA)*, Stockholm, Sweden, May 2016, *submitted*.
- C14. R. Ivanov, N. Atanasov, J. Weimer, M. Pajic, A. Simpaio, M. Rehman, G. Pappas, and I. Lee, "**Estimation of Blood Oxygen Content Using Context-aware Filtering**", *ACM/IEEE International Conference on Cyber-Physical Systems (ICCPS)*, Vienna, Austria, April 2016, *submitted*.
- C13. R. Ivanov, N. Atanasov, M. Pajic, G. Pappas, and I. Lee, "**Robust Estimation Using Context-aware Filtering**", *Allerton Conference on Communication, Control, and Computing (Allerton)*, Allerton, IL, USA, October 2015.
- C12. N. Atanasov, J. Le Ny, K. Daniilidis, and G. Pappas, "**Decentralized Active Information Acquisition: Theory and Application to Multi-Robot SLAM**", *IEEE International Conference on Robotics and Automation (ICRA)*, pp. 4775-4782, Seattle, WA, USA, May 2015.

- C11. N. Atanasov, R. Tron, V. Preciado, and G. Pappas, “**Joint Estimation and Localization in Sensor Networks**”, *IEEE Conference on Decision and Control (CDC)*, pp. 6875-6882, Los Angeles, CA, USA, December 2014.
- C10. M. Zhu, N. Atanasov, G. Pappas, and K. Daniilidis, “**Active Deformable Part Models Inference**”, *European Conference on Computer Vision (ECCV)*, vol. 8695, pp. 281-296, Zurich, Switzerland, September 2014.
- C9. N. Atanasov, M. Zhu, K. Daniilidis, and G. Pappas, “**Semantic Localization Via the Matrix Permanent**”, *Robotics: Science and Systems (RSS)*, Berkeley, CA, USA, July 2014.
- C8. N. Atanasov, J. Le Ny, K. Daniilidis, and G. Pappas, “**Information Acquisition with Sensing Robots: Algorithms and Error Bounds**”, *IEEE International Conference on Robotics and Automation (ICRA)*, pp. 6447-6454, Hong Kong, China, June 2014.
- C7. N. Atanasov, B. Sankaran, J. Le Ny, T. Koletschka, G. Pappas, and K. Daniilidis, “**Hypothesis Testing Framework for Active Object Detection**”, *IEEE International Conference on Robotics and Automation (ICRA)*, pp. 4216-4222, Karlsruhe, Germany, May 2013.
- C6. T. Ning, J. Ning, N. Atanasov, and K. Hsieh, “**A Fast Heart Sounds Detection and Heart Murmur Classification Algorithm**”, *IEEE International Conference on Signal Processing (ICSP)*, vol. 3, pp. 1629-1632, Beijing, China, October 2012.
- C5. N. Atanasov, J. Le Ny, N. Michael, and G. Pappas, “**Stochastic Source Seeking in Complex Environments**”, *IEEE International Conference on Robotics and Automation (ICRA)*, pp. 3013-3018, St. Paul, MN, USA, May 2012.
- C4. J. Ning, N. Atanasov, and T. Ning, “**Quantitative Analysis of Heart Sounds and Systolic Heart Murmurs Using Wavelet Transform and AR Modeling**”, *IEEE International Conference on Engineering in Medicine and Biology (EMBC)*, pp. 958-961, Minneapolis, MN, USA, September 2009.
- C3. N. Atanasov and T. Ning, “**Isolation of Systolic Heart Murmurs Using Wavelet Transform and Energy Index**”, *IEEE Congress on Image and Signal Processing (CISP)*, vol. 1, pp. 216-220, Sanya, Hainan, China, May 2008.
- C2. N. Atanasov and T. Ning, “**Quantitative Delineation of Heart Murmurs Using Features Derived from Autoregressive Modeling**”, *IEEE Northeast Bioengineering Conference (NEBC)*, pp. 167-168, Long Island, NY, USA, March 2007.
- C1. T. Ning, S. Bhandari, and N. Atanasov, “**Restoration of Multi-channel Spectral Estimation Affected by Sampling Jitters**”, *IEEE Northeast Bioengineering Conference (NEBC)*, pp. 128-129, Long Island, NY, USA, March 2007.

Reviewed Workshop Papers

- W3. R. Ivanov, N. Atanasov, M. Pajic, I. Lee, and G. Pappas “**Robust Localization Using Context-Aware Filtering**”, Workshop on Multi-view Geometry in Robotics at *Robotics: Science and Systems (RSS)*, Rome, Italy, July 2015.
- W2. M. Lauri, N. Atanasov, G. Pappas, and R. Ritala “**Active Object Recognition via Monte Carlo Tree Search**”, Workshop on Beyond Geometric Constraints at *IEEE International Conference on Robotics and Automation (ICRA)*, Seattle, WA, USA, May 2015.
- W1. M. Zhu, N. Atanasov, G. Pappas, and K. Daniilidis “**Active Deformable Part Models Inference**”, Workshop on Parts and Attributes at *European Conference on Computer Vision (ECCV)*, Zurich, Switzerland, September 2014.

Seminars and Talks

1. "Active Information Acquisition with Mobile Robots", University of California, Berkeley, Feb. 2015.
2. "Active Information Acquisition with Mobile Robots", UCLA, Feb. 2015.
3. "Active Information Acquisition with Mobile Robots", University of Southern California, Feb. 2015.
4. "Active Information Acquisition with Mobile Robots", California Institute of Technology, Feb. 2015.
5. "Distributed Information Acquisition with Mobile Sensors", Workshop on Humans and Sensing in Cyber-Physical Systems, **Robotics: Science and Systems (RSS)** Conference, Berkeley, CA, July 2014.

Professional Activities

Reviewer:

- **Journals:** International Journal of Robotics Research, Elsevier Robotics and Autonomous Systems, IEEE Sensors Journal, IEEE Robotics and Automation Magazine, IEEE Robotics and Automation Letters, IEEE Transactions on Control of Network Systems, ASME Journal of Dynamic Systems, Measurement, and Control
- **Conferences:** IEEE International Conference on Robotics and Automation (ICRA), IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), IEEE Conference on Computer Vision and Pattern Recognition (CVPR), IEEE Conference on Decision and Control (CDC), American Control Conference (ACC), International Conference on Advanced Robotics, IFAC Conference on Analysis and Design of Hybrid Systems, IEEE International Conference on Automation Science and Engineering, IEEE Multi-conference on Systems and Control, IEEE/SICE International Symposium on System Integration

Society Membership:

Phi Beta Kappa Society	2008 - Present
IEEE, Robotics and Automation Society	2014 - Present
IEEE, Student Member	2007 - 2015
IEEE, Communication Society	2012 - 2013
IEEE, Engineering in Medicine and Biology Society	2007- 2008
American Society of Mechanical Engineers (ASME)	2007 -2008

Government Activities:

1. Workshop on Foundations of Intelligent Sensing, Action and Learning sponsored by the Basic Research Office of the Assistant Secretary of Defense for Research and Engineering, Philadelphia, PA, October 2015.
2. NSF Workshop on Learning, Perception and Control, Arlington, VA, August 2015.