

Curriculum Vitae

Fabio Morbidi

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Generalities

Birth date: August 17, 1981
Birthplace: Siena, Italy
Citizenship: Italian
Current visa status: J1, research scholar.
Civil status: Single
Military service: Exempted
Driving licence: Italian B

Research interests

Formation control, distributed control of multi-agent systems, geometric control theory, vision-based control, mobile robotics, medical applications of robotics.

1 Education

L1 Laurea degree (equivalent to B.S.), Magna cum Laude, Computer Engineering, specialization in Automation and Systems for Industrial Automation, University of Siena, Italy, October 20, 2003.

Thesis: *Visual Servoing for Mobile Robots based on Multiple Views Geometry*.
Advisor Prof. Domenico Prattichizzo.

L2 Laurea degree (equivalent to M.S.), Magna cum Laude, Computer Engineering, specialization in Robotics and Automation, University of Siena, Italy, September 26, 2005.

Thesis: *Nonlinear localizability and Panoramic Cameras: Applications to Robot Teams*.

Advisor: Prof. Domenico Prattichizzo.

Co-Advisor: Prof. Antonio Vicino.

Qualifying exam for engineer's profession: Held in January 2006, University of Florence, Italy.

Ph.D.: In October 2005, I started my Ph.D. program in Automation and Control (cycle XXI), at Dipartimento di Ingegneria dell'Informazione, Università di Siena, Italy. I received my Ph.D. degree on March 27, 2009.

Thesis: *Leader-Follower Formation Control and Visibility Maintenance of Nonholonomic Mobile Robots*. Ph.D. thesis committee: Prof. K.M. Linch, Prof. G. Antonelli and Prof. A. Garulli.

Classes attended during the Ph.D.:

- First year (summer 2006):
 - *Functional Analysis*, instructor Prof. P. Nistri.
 - *Numerical Calculus*, instructor Prof. P. Costantini.
 - *Introduction to Chaos and Applications*, instructor Prof. L. Kocarev.
 - *Dynamic Vision*, instructor Prof. F. Chaumette.
- Second year (summer 2007):
 - *Constrained Optimization*, instructor Prof. P. Palagi,
 - *Nonlinear Filtering*, instructor Prof. F. Gustafsson.

- Third year (summer 2008):
 - *Sensorimotor Computation*, instructor Prof. D. Pai.
 - *Algorithmic Distributed Robotics*, instructor Prof. E. Frazzoli.
 - *Passive Systems for Robotics*, instructor Prof. E. Colgate.

Research experience abroad: Visiting researcher at University of California, Santa Barbara (UCSB), advisor Prof. Francesco Bullo, from October 1, 2007 to March 31, 2008. Graduate courses attended at UCSB:

- *Cooperative Control of Robotic Networks*, instructor Prof. Francesco Bullo, Fall 2007, 3 Units.
- *Introduction to Differential Geometry - Riemannian Geometry*, instructor Prof. Xianzhe Dai, Winter 2008, 4 Units.

Past academic positions: Postdoctoral fellow at the Dipartimento di Ingegneria dell'Informazione, Università di Siena, from January 1st, 2009 to January 1st, 2011.

Current academic position: Postdoctoral fellow, at Department of Computer Science and Engineering, University of Texas at Arlington, Arlington, Tx. Advisor: Dr. G.L. Mariottini.

2 Teaching employment

- **Teaching assistant:** Assisted in teaching the graduate course *Multivariable and Robust Control* (May-June 2006), given by Prof. A. Vicino. Total: 10 hours.
- **Instructor:** Matlab laboratory, (July 2006). Total: 20 hours.
- **Teaching assistant:** Assisted in teaching the graduate course *Robotics and Vision*, (February-April 2007), given by Prof. D. Prattichizzo. Total: 15 hours.
- **Teaching assistant:** Assisted in teaching the graduate course *Multivariable and Robust Control* (May-June 2007), given by Prof. A. Vicino. Total: 10 hours.
- **Instructor:** Matlab laboratory, (July 2007). Total 20 hours.

- **Teaching assistant:** Assisted in teaching the undergraduate course *Linear Systems* (May-June 2008), given by Prof. D. Prattichizzo. Total: 20 hours.
- **Teaching assistant:** Assisted in teaching the graduate course *Multivariable and Robust Control* (May-June 2008), given by Prof. A. Vicino. Total: 5 hours.
- **Teaching assistant:** Assisted in teaching the undergraduate course *Linear Systems* (May-June 2009), given by Prof. D. Prattichizzo. Total: 20 hours.
- **Teaching assistant:** Assisted in teaching the graduate course *Multivariable and Robust Control* (May-June 2009), given by Prof. A. Vicino. Total: 2 hours.

3 Publications

Refereed Journal Publications

- J8. F. Morbidi, F. Bullo, D. Prattichizzo, “*Visibility maintenance via controlled invariance for leader-follower vehicle formations*”, *Automatica*, accepted December 8th, 2010, to appear.
- J7. F. Chinello, S. Scheggi, F. Morbidi, D. Prattichizzo, “*The KUKA Control Toolbox : motion control of KUKA robot manipulators with MATLAB*”, *IEEE Robotics and Automation Magazine*, accepted November 3rd, 2010, to appear.
- J6. F. Morbidi, G.L. Mariottini, D. Prattichizzo, “*Observer design via Immersion and Invariance for vision-based leader-follower formation control*”, *Automatica*, vol. 46, n. 1, pp. 148-154, January 2010.
- J5. G.L. Mariottini, F. Morbidi, D. Prattichizzo, N. Vander Valk, N. Michael, G.J. Pappas, K. Daniilidis, “*Vision-based Localization for Leader-Follower Formation Control*”, *IEEE Transactions on Robotics*, vol. 25, n. 6, pp. 1431-1438, December 2009.
- J4. L. Consolini, F. Morbidi, D. Prattichizzo, M. Tosques, “*Stabilization of a hierarchical formation of unicycle robots with input constraints*”, *IEEE Transactions on Robotics*, vol. 25, n. 5, pp. 1176-1184, October 2009.

- J3. F. Morbidi, A. Garulli, D. Prattichizzo, C. Rizzo, S. Rossi, “*Application of Kalman filter to remove TMS-induced artifacts from EEG recordings*”, IEEE Transactions on Control Systems Technology, vol. 16, n. 6, pp. 1360-1366, November 2008.
- J2. L. Consolini, F. Morbidi, D. Prattichizzo, M. Tosques, “*Leader-Follower Formation Control of Nonholonomic Mobile Robots with Input Constraints*”, Automatica, vol. 44, n. 5, pp. 1343-1349, May 2008.
- J1. F. Morbidi, A. Garulli, D. Prattichizzo, C. Rizzo, P. Manganotti, S. Rossi, “*Off-line removal of TMS-induced artifacts on human electroencephalography by Kalman filter*”, Journal of Neuroscience Methods, vol. 162, pp. 293-302, May 2007.

Refereed Book Chapters

- B3. G.L. Mariottini, S. Scheggi, F. Morbidi and D. Prattichizzo, “*Catadioptric Stereo with Planar Mirrors: Multiple-View Geometry and Camera Localization*”, in Visual Servoing via Advanced Numerical Methods, G. Chesi and K. Hashimoto, Eds., Lecture Notes in Computer Science, Springer-Verlag, pp. 3-22, 2009.
- B2. G.L. Mariottini, S. Scheggi, F. Morbidi and D. Prattichizzo, “*A Robust Uncalibrated Visual Compass Algorithm from Paracatadioptric Line Images*”, in Proc. First Workshop on Omnidirectional Robot Vision, E. Menegatti and T. Pajdla, Eds., Lecture Notes in Computer Science, Springer-Verlag, pp. 242-255, November 2008.
- B1. F. Morbidi and D. Prattichizzo, “*Sliding mode formation tracking control of a tractor and trailer-car system*”, in Robotics: Science and Systems III, Wolfram Burgard, Oliver Brock and Cyrill Stachniss Editors, MIT press, Cambridge MA, pp. 113-120, March 2008.

Refereed Conference Proceedings

- C18 L. Consolini, F. Morbidi, D. Prattichizzo, M. Tosques, “*On internal dynamics of formations of unicycle robots*”, in Proc. 49th IEEE Conference on Decision and Control, pp. 5462–5467, Atlanta, GA, USA, December 15-17, 2010.
- C17 F. Morbidi, A. Giannitrapani, D. Prattichizzo, “*Maintaining connectivity among multiple agents in cyclic pursuit: a geometric approach*”, in

- Proc. 49th IEEE Conference on Decision and Control, pp. 7461–7466, Atlanta, GA, USA, December 15-17, 2010.
- C16. G. Marro, F. Morbidi, L. Ntogramatzidis, D. Prattichizzo, “*Geometric Control Theory for Linear Systems: a Tutorial*”, in Proc. 19th International Symposium on Mathematical Theory of Networks and Systems, pp. 1579–1590, Budapest, Hungary, July 5-9, 2010.
- C15. L. Consolini, F. Morbidi, D. Prattichizzo, M. Tosques, “*Non-rigid Formations of Nonholonomic Robots*”, in Proc. IEEE International Conference on Robotics and Automation, pp. 4976-4981, Anchorage, AK, USA, May 3-8, 2010.
- C14. F. Chinello, S. Scheggi, F. Morbidi, D. Prattichizzo, “*KCT: a MATLAB toolbox for motion control of KUKA robot manipulators*”, in Proc. IEEE International Conference on Robotics and Automation, pp. 4603-4608, Anchorage, AK, USA, May 3-8, 2010.
- C13. G. Marro, F. Morbidi, D. Prattichizzo, “*A Geometric Solution to the Cheap Spectral Factorization Problem*”, in Proc. European Control Conference, pp. 814-819, Budapest, Hungary, August 23-26, 2009.
- C12. F. Morbidi, G. Ripaccioli, D. Prattichizzo, “*On Connectivity Maintenance in Linear Cyclic Pursuit*”, in Proc. IEEE International Conference on Robotics and Automation, pp. 363-368, Kobe, Japan, May 12-17, 2009.
- C11. F. Morbidi and D. Prattichizzo, “*Range estimation from a moving camera: an I&I approach*”, in Proc. IEEE International Conference on Robotics and Automation, pp. 2810-2815, Kobe, Japan, May 12-17, 2009.
- C10. G.L. Mariottini, S. Scheggi, F. Morbidi, D. Prattichizzo, “*Planar Catadioptric Stereo: Single and Multi-View Geometry for Calibration and Localization*”, in Proc. IEEE International Conference on Robotics and Automation, pp. 1510-1515, Kobe, Japan, May 12-17, 2009.
- C9. F. Morbidi, F. Bullo, D. Prattichizzo, “*On leader-follower visibility maintenance for Dubins-like vehicles via controlled invariance*”, in Proc. 47th IEEE Conference on Decision and Control, pp. 1821-1826, Cancun, Mexico, December 9-11, 2008.
- C8. F. Morbidi, G.L. Mariottini, D. Prattichizzo, “*Vision-based range estimation via Immersion and Invariance for robot formation control*”, in

- Proc. of the IEEE International Conference on Robotics and Automation, pp. 504-509, Pasadena, CA, May 19-23, 2008.
- C7. L. Consolini, F. Morbidi, D. Prattichizzo, M. Tosques, “*Steering hierarchical formations of unicycle robots*”, in Proc. 46th IEEE Conference on Decision and Control, pp. 1410-1415, New Orleans, LA, USA, December 12-14, 2007.
- C6. G. Marro, F. Morbidi, D. Prattichizzo, “*H₂-Pseudo Optimal Model Following: A Geometric Approach*”, in Proc. 3rd IFAC Symposium on System, Structure and Control, Foz do Iguacu, Brazil, October 17-19, 2007.
- C5. F. Morbidi, L. Consolini, D. Prattichizzo, M. Tosques, “*Leader-Follower Formation Control as a Disturbance Decoupling Problem*”, in Proc. European Control Conference, pp. 1492-1497, Kos, Greece, July 2-5, 2007.
- C4. F. Morbidi, A. Garulli, D. Prattichizzo, C. Rizzo, S. Rossi, “*A Kalman filter approach to remove TMS-induced artifacts from EEG recordings*”, in Proc. European Control Conference, pp. 2201-2206, Kos, Greece, July 2-5, 2007.
- C3. L. Consolini, F. Morbidi, D. Prattichizzo, M. Tosques, “*A Geometric Characterization of Leader-Follower Formation Control*”, in Proc. of the IEEE International Conference on Robotics and Automation, pp. 2397-2402, Rome, April 10-14, 2007.
- C2. G.L. Mariottini, F. Morbidi, D. Prattichizzo, G.J. Pappas, K. Daniilidis, “*Leader-Follower Formations: Uncalibrated Vision-Based Localization and Control*”, in Proc. of the IEEE International Conference on Robotics and Automation, pp. 2403-2408, Rome, April 10-14, 2007.
- C1. L. Consolini, F. Morbidi, D. Prattichizzo, M. Tosques, “*On the Control of a Leader-Follower Formation of Nonholonomic Mobile Robots*”, in Proc. 45th IEEE Conference on Decision and Control, pp. 5992–5997, San Diego, CA, USA, December 13-15, 2006.

Papers under review

- J9. L. Consolini, F. Morbidi, D. Prattichizzo, M. Tosques, “*On unicycles formations and their internal dynamics*”, IEEE Transactions on Automatic Control, regular paper, second submission: November 19, 2010.

- J10. G.L. Mariottini, S. Scheggi, F. Morbidi, D. Prattichizzo, “*Planar mirrors for image-based robot localization and 3-D reconstruction*”, *Mechatronics*, Special Issue on Visual Servoing, submitted: November 30, 2010.
- C19. F. Morbidi, R.A. Freeman, K.M. Lynch, “*Estimation and Control of UAV Swarms for Distributed Monitoring Tasks*”, American control conference, submitted: September 27, 2010.

4 Others

Society membership

- IEEE Student Member since January 2007; IEEE Associate Member since October 2009.
- Member of IEEE Robotics and Automation Society (RAS).
- Secretary of the Italian Chapter of IEEE Robotics and Automation Society from October 2006 to October 2010.

Activity as peer-reviewer

Peer-reviewer of several Journals in the area of Robotics, Automation and Control, Computer Vision, including *IEEE Transactions on Robotics*, *IEEE Transactions on Automatic Control*, *Automatica*, *IEEE Transactions on Control Systems Technology*, *International Journal of Robust & Nonlinear Control*, *Robotics and Autonomous Systems*, *International Journal of Robotics & Automation*, *International Journal of Control*, *International Journal of Computer Vision*.

Knowledge of foreign languages

- Italian: Mother tongue.
- English: Fluent.
- French: Good knowledge of the spoken and written language.