

# Dejan Milutinović

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## POSITIONS

<b>Assistant Professor</b> , Applied Mathematics and Statistics Dept., School of Engineering, <b>UC Santa Cruz</b> , CA	2009-present
<b>Term Graduate Faculty</b> , Duke University Graduate School, Durham, NC	2008-2012
<b>Postdoctoral Associate</b> , Mechanical Engineering and Materials Science Dept., School of Engineering, <b>Duke University</b> , Durham, NC	2008-2009
<b>Research Associate</b> , Biostatistics and Bioinformatics Dept., School of Medicine, <b>Duke University</b> , Durham, NC	2006-2008
<b>Postdoctoral Researcher</b> , Theoretical Biology Department, School of Biology, <b>Utrecht University</b> , The Netherlands	2004-2006
<b>PhD Student Researcher</b> , Institute for Systems and Robotics, Instituto Superior Tecnico, <b>Technical University of Lisbon</b> , Portugal	2000-2004
<b>Scientific Engineer</b> , Automation and Control Division Mihajlo Pupin Institute, Belgrade, Serbia	1995-2000

## EDUCATION

Doctoral degree in Electrical and Computer Engineering Instituto Superior Tecnico, Technical University of Lisbon, Portugal Doctoral Thesis: Stochastic Model of Micro-Agent Populations	2004
Magister's degree in Control Systems* Note: Average mark 10.0 (scale 0 – 10.0) Department of Electrical Engineering, University of Belgrade, Yugoslavia Thesis: Digital Controller With Parameter Estimation	1999
Dipl.-Ing. Electronics and Control (five-year university degree, equivalent to M.Sc*) Note: Average mark 9.1 (scale 0 – 10.0), top 5% student Department of Electrical Engineering, University of Belgrade, Yugoslavia	1995

\*See Individual country variants before Bologna section at link [http://en.wikipedia.org/wiki/Engineer%27s\\_degree](http://en.wikipedia.org/wiki/Engineer%27s_degree)  
and Former territories of Yugoslavia section at link [http://en.wikipedia.org/wiki/Magister\\_%28degree%29](http://en.wikipedia.org/wiki/Magister_%28degree%29)

## INDUSTRIAL EXPERIENCE

### **Automatic Generation Control Software for the Power System of Serbia:View6000 SCADA.**

This Real Time Control Software package send production demand to power plants based on measurement of frequency and power flows through power system interchange links.

**Role:** Negotiation of the software design and software development group leading.

**DIGIAUDIO:** FPGA development kit: A/D(96kHz), D/A(192kHz), 24bit, SPDIF- AES/EBU I/Os, on board clock generator and PLL for clock synthesis and synchronization with external word clock.

Application: digital audio standard I/O interfaces, format converters, sample rate converters, audio effects processors,etc. **Role:** Hardware design, PCB layout and prototyping.

**Energy Management System (EMS)** software for the water supply system of West Serbia, "Rzav"- Arilje: View6000 SCADA a Linux OS. This software calculates an optimal number of working pumps and valves position in the water supply system. **Role:** Software development with the main responsibility for control algorithm, user interface and communication with the SCADA.

**Chlorine Concentration Measuring/Controller Device** for water treatment plants. **Role:** Design of the high sensitive/low noise interface electronics between chlorine detector and A/D converter; the hardware design, user interface and control software.

**Automatic Weighing System:** Data base software that collects data from the electronic weighing device, which measures the weight of goods transported by trucks, provides the supervision of working persons, protects the data from illegal use and accidental loss. **Role:** Negotiation of the software design, software and data base design, communication protocol with the weighing device.

## PUBLICATIONS

### BOOKS

B-2. (2012) **Milutinovic D.**, Rosen J. (Eds), Redundancy in Robot Manipulators and Multi-Robot Systems, *Springer (in preparation)*

B-1. (2007) **Milutinovic D.**, Lima P. (2007): Cells and Robots: Modeling and Control of Large-Size Agent Populations”, Springer Tracts in Advanced Robotics, *Springer*

### BOOK CHAPTERS

BC-1. (2012) **Milutinović, D.**, Lima, P., Stochastic Models and Control in Microbiorobotics, In Microbiorobotics: Biologically Inspired Microscale Robotic Systems, Elsevir (*in press*)

### JOURNAL PUBLICATIONS

J-10. (2012) Anderson, R., **Milutinović, D.**, An approach to optimization of airport taxiway scheduling and traversal under uncertainty, Proceedings of the Institution of Mechanical Engineers, Part G: Journal of Aerospace Engineering (*in press*)

J-9. (2010) **Milutinović, D.**, Garg, D. P., Kalman Smoother Based Force Localization and Mapping Using Intravital Video Microscopy, ASME Journal of Dynamic Systems, Measurement, and Control, Vol. 132, No. 6, pp. 061503

- J-8. (2007) **Milutinovic D.**, De Boer, R. J., Process noise: an explanation for the fluctuations in the immune response during viral infection., *Biophysical Journal*, vol. 92, pp. 3358-67
- J-7. (2007) Ganusov V. V., **Milutinovic D.**, De Boer R. J., IL-2 regulates expansion of CD4 T cell populations by affecting cell death: insights from modeling CFSE data. *Journal of Immunology*, vol. 179, pp 950-957
- J-6. (2007) **Milutinovic D.**, Carneiro J., Athans M., Lima P., Modeling dynamics of cell population molecule expression distribution, *Nonlinear Analysis: Hybrid Systems* , vol. 1, pp. 81-94
- J-5. (2006) **Milutinovic D.**, Lima P., Modeling and Optimal Centralized Control of a Large-Size Robotic Population, *IEEE Transactions on Robotics*, vol. 22, No. 6, pp. 1280-1285
- J-4. (2006) De Boer R. J., Ganusov V.V., **Milutinovic D.**, Hodgkin P.D., Perelson A.S., Estimating lymphocyte division and death rates from CFSE data, *Bulletin of Mathematical Biology*, vol. 68, pp. 1011-1031
- J-3. (2005) Dowling M. R., **Milutinovic D.**, Hodgkin P.D., Modelling cell lifespan and proliferation: Is likelihood to die or to divide independent of age?, *Journal of the Royal Society Interface*, vol. 2, No. 5, pp. 517 - 526
- J-2. (2005) Carneiro J., Paixão T., **Milutinovic D.**, Sousa J., Leon K., Gardner R., Faro J., Immunological Self-Tolerance: Lessons from Mathematical Modeling, *Journal of Computational and Applied Mathematics*, vol. 184, pp. 77-100
- J-1. (2000) Furundzic S., **Milutinovic D.**, Active Structural Control of Frame Vibrations (in Serbian), *Materijali i Konstrukcije*, vol. 43 (No.1-2), pp. 20-27

#### PEER-REVIEWED CONFERENCE PUBLICATIONS

- C-30. (2012) Kim, H., Li, Z., **Milutinović D.**, Rosen, J., Resolving the Redundancy of a Seven DOF Wearable Robotic System Based on Kinematic and Dynamic Constraint, accepted for *Proceedings of the 2012 IEEE International Conference on Robotics and Automation (ICRA)*, St.Paul, MN
- C-29. (2011) Anderson, R., **Milutinović, D.**, Dubins Vehicle Tracking of a Target With Unpredictable Trajectory, *Proceedings of the 2011 ASME Dynamic Systems and Control Conference*, Arlington, VA
- C-28. (2011) Anderson, R., **Milutinović, D.**, A stochastic approach to Dubins feedback control for target tracking, *Proceeding of the 2011 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, San Francisco, CA
- C-27. (2011) Palmer, A., **Milutinović, D.**, Hamiltonian Approach Using Partial Differential Equations for Open-Loop Stochastic Optimal Control, *Proceedings of the 2011 American Control Conference (ACC)*, San Francisco, CA
- C-26. (2011) Li, Z., Glozman, D., **Milutinović, D.**, Rosen, J., Maximizing Dexterous Workspace and Optimal Port Placement of a Multi-Arm Surgical Robot, *Proceedings of the 2011 IEEE International Conference on Robotics and Automation (ICRA)*, Shanghai, China

- C-25. (2010) **Milutinović, D.**, Utilizing Stochastic Processes for Computing Distributions of Large-Size Robot Population Optimal Centralized Control, 10th International Symposium on Distributed Autonomous Robotic Systems (DARS 2010), Lausanne, Switzerland
- C-24. (2010) **Milutinović, D.**, Garg, D. P., Parameters and Driving Force Estimation of Cell Motility via Expectation-Maximization (EM) Approach, *Proceedings of the 2010 ASME Dynamic Systems and Control Conference, Boston, MA*
- C-23. (2010) **Milutinović, D.**, Garg, D. P., A Sampling Approach to Modeling and Control of a Large-size Robot Population, *Proceedings of the 2010 ASME Dynamic Systems and Control Conference, Boston, MA*
- C-22. (2010) Ross, A., **Milutinović, D.**, Optimization of Taxiway Traversal at Congested Airports, *Proceedings of the 10th AIAA Aviation Technology, Integration, and Operations (ATIO) Conference, Fort Worth, Texas*
- C-21. (2009) Fricke G., **Milutinovic D.**, Garg D., Robotic Pose Estimation via an Adaptive Kalman Filter Using State-varying Noise, *Proceedings of the 14th IASTED International Conference on Robotics and Applications – RA 2009*, Cambridge, Massachusetts, USA
- C-20. (2009) Fricke G., **Milutinovic D.**, Garg D., Sensing and Estimation on a Modular Testbed for Swarm Robotics, *Proceedings of the 2009 Dynamic Systems and Control Conference – DSCC '09*, Hollywood, California, USA
- C-19. (2008) Kumar M., **Milutinovic D.**, Garg D., Role of Stochasticity in Self-Organization of Robotic Swarms, *Proceedings of American Control Conference 2008*, Seattle, Washington, USA
- C-18. (2007) **Milutinovic D.**, Force Localization and Mapping in Immunology Context, *Proceedings of the Athans 70 Symposium*, Florida, USA
- C-17. (2003) **Milutinovic D.**, Carneiro J., Athans M., Lima P., A Hybrid Automata Model of TCR Triggering Dynamics, *Proceedings of the 11th Mediterranean Conference on Control and Automation – MED 2003*, Rhodes, Greece
- C-16. (2003) **Milutinovic D.**, Lima P., Athans M., Biologically Inspired Stochastic Hybrid Control of Multi-Robot Systems, *Proceedings of the 11th International Conference on Advanced Robotics – ICAR 2003*, Coimbra, Portugal
- C-15. (2002) **Milutinovic D.**, Lima P., Petri Net Models of Robotic Tasks, *Proceedings of the 2002 IEEE International Conference on Robotics and Automation - ICRA 2002*, Washington, D.C., USA, vol. 4, pp. 4059-4064
- C-14. (1999) **Milutinovic D.**, Furundzic S., Active Structural Control of Frame Seismic Vibrations, *Proceedings of 16th IAARC/IFAC/IEEE International Symposium on Automation and Robotics in Construction-ISARC'99*, Madrid, Spain, pp. 631-636
- C-13. (1998) Furundzic S., **Milutinovic D.**, Frame Active Control, *Proceedings of 15th ECPD International Conference on Material Handling and Warehousing*, Belgrade, pp. 4.53-4.57

- C-12. (2000) Jakupovic G., Tomca-Andrijanic N., **Milutinovic D.**, Cukalevski N., Organization and Implementation of a Software Package for Power System Generation Control (in Serbian), *Proceedings of XLIV ETRAN conference on Electronics, Telecomm. Comp. and Nuclear Engineering*, Soko Banja, Yugoslavia
- C-11. (2000) Jakupovic G., Tomca-Andrianic N., **Milutinovic D.**, Cukalevski N., Software for Power System Control (in Serbian), *Proceedings of 10th symposium on Telecommunications and Control in Power Systems JUKO-CIGRE*, III&V.9
- C-10. (2000) Jakupovic G., Cukalevski N., Tomca-Andrianic N., **Milutinovic D.**, New Version of the Software Package for Secondary Control of Power System Based on Client-Server Architecture (in Serbian), *Proceedings of XXVII Yugoslav Symposium on Operational Research*, Belgrade, 2000, pp. 29-32
- C-9. (1998) **Milutinovic D.**, Furundzic S., An Example of Frame Active Control (in Serbian), *Proceedings of XXV Yugoslav Symposium on Operational Research*, Belgrade, pp. 635-638
- C-8. (1998) Furundzic S., **Milutinovic D.**, Active Control of Frame Deformation (in Serbian), *Proceedings of XXV Yugoslav Symposium on Operational Research*, Belgrade, pp. 611-614
- C-7. (1998) **Milutinovic D.**, Mitrovic M., Robust IMC controller for Feedback Linearized DC/DC Converter (in Serbian), *Proceedings of XLII ETRAN conference on Electronics, Telecommunications, Computers and Nuclear Engineering*, Belgrade, pp. 576-579
- C-6. (1997) Jakupovic G., **Milutinovic D.**, Robust Analysis of BI Parametrized PI Controller (in Serbian), *Proceedings of XLI ETRAN conference on Electronics, Telecommunications, Computers and Nuclear Engineering*, Belgrade, pp. 425-427
- C-5. (1997) **Milutinovic D.**, Applying Forecast in Optimal Control of Water Supply Systems (in Serbian), *Proceedings of XLI ETRAN conference on Electronics, Telecommunications, Computers and Nuclear Engineering*, Belgrade, pp. 460-463
- C-4. (1997) **Milutinovic D.**, Applying Forecast in Water System Control (in Serbian), *Proceedings of XXIV Yugoslav Symposium on Operational Research*, Belgrade, pp. 825-828
- C-3. (1997) Jakupovic G., **Milutinovic D.**, Sufficient Conditions for Robust Stability of BI parameterised PI controller (in Serbian), *Proceedings of XXIV Yugoslav Symposium on Operational Research*, Belgrade
- C-2. (1996) Car A., **Milutinovic D.**, Pasic B., NA\_TREG86 BI controller with discrete model estimation (in Serbian), *Proceedings of XL ETRAN conference on Electronics, Telecommunications, Computers and Nuclear Engineering*, Belgrade, pp. 560-562
- C-1. (1996) Filipovic V., **Milutinovic D.**, Optimal Control of Water Production System "RZAV"-Arlje (in Serbian), *Proceedings of XL ETRAN conference on Electronics, Telecommunications, Computers and Nuclear Engineering*, Belgrade, pp. 508-510

## TECHNICAL REPORTS

TR5. (2010) [Final Technical Report] Anderson, R., **Milutinović, D.**, NASA UARC Aligned Research Program Grant number NAS2-03144

TR4. (2009) **Milutinovic D.**, Garg D., Stochastic Model-Based Control of Multi-Robot Systems  
Journal publications, Final Technical Report, DU-RAMA-ARO-103

TR3. (2002) **Milutinovic D.**, Athans M., Lima P., Carneiro J., Application of Nonlinear Estimation Theory in T-Cell Receptor Triggering Model Identification, *Technical Report RT-401-02, RT-701-02*, Institute for System and Robotics, Instituto Superior Tecnico, Lisbon

TR2. (1999) Jakupovic G., **Milutinovic D.**, Tomca-Andrijanic N., Cukalevski N., Functional design of AGC/IS software package ver.4.0, Document No FD200 (in Serbian), Mihajlo Pupin Institute, Belgrade

TR1. (1999) Jakupovic G., Cukalevski N., **Milutinovic D.**, Tomca- Andrijanic N., AGC Programmer's reference ver.3.05, Doc. No. PU100 (in Serbian), Mihajlo Pupin Institute, Belgrade

## TALKS

T-18. (2011) “Stochastic Optimal Control in Probability Space” NASA AFH seminar, NASA Ames

T-17. (2011) “Cells and Robots: Stochastic Models and Control”, Drexel University

T-16. (2010) “Cells and Robots”, Department of Mechanical & Aerospace Engineering, UC San Diego

T-15. (2010) “Stochasticity in Biology and Robotics”, Mihajlo Pupin Institute, Belgrade, Serbia

T-14. (2010) “Stochastic Component of the Immune System Response”, Condensed Matter Seminar, Physics Department, UC Santa Cruz, CA

T-13. (2006) “Stochastic Model of Micro-Agent Populations”, MITACS Math Biology Seminar, University of British Columbia, Vancouver, Canada

T-12. (2006) “Fitting the LCMV CD8+ Data Based on Measurement and Process Noise Models”, Radiology Sciences Laboratory, Stanford University School of Medicine, USA

T-11. (2005) “Stochastic Model of Micro-Agent Populations”, Applied Mathematics Department, University of Twente, the Netherlands

T-10. (2004) “Stochastic Model of Micro-Agent Populations”, public talk organized at Mihajlo Pupin Institute, Belgrade, Serbia and Montenegro

T-9 (2004) “Stochastic Micro-Agents”, Partial Differential Equations Seminar 2004, Mathematics Department, Instituto Superior Tecnico, Lisbon, Portugal

## WORK PRESENTED AT PROFESSIONAL MEETINGS

T-8. (2011) “Information Theory Approach to Redundant Robotic Systems”, Workshop on Redundancy in Robot Manipulators and Multi-Robot Systems, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)

T-7. (2011) “Force Localization and Mapping (FLAM) from Intravital Video Microscopy”, Investigative workshop on Mathematical Modeling of Intracellular Movements, National Institute for Mathematical and Biological Synthesis, NIMBioS, Knoxville, TN

T-6. (2010) “A Step Towards An Ultimate Processor: Utilizing Stochastic Processes for Computing Robot Control, *Stochasticity in Robotics and Biological Systems, Workshop at the 2010 IEEE International Conference on Robotics and Automation (ICRA), Anchorage, AK*

T-5. (2010) Poster presentation, Anderson, R., Milutinovic D., Optimization of Airport Taxiway Traversal under Uncertainty, UCSC Graduate research symposium

T-4. (2009) Poster presentation, Milutinovic D., Garg, D., Force Localization and Mapping from Intravital Video Microscopy, CMPI Symposium on Multi-Scale Modeling of Host/Pathogen Interactions, Pittsburgh, PA

T-3. (2007) Workshop on Multi-agent Systems in Biology and Robotics, 9<sup>th</sup> Conference on Artificial Life, ECAL 2007, Lisbon, Portugal

T-2. (2007) “Cell Populations and Robot Swarms”, Workshop on Collective Behaviors inspired by Biological and Biochemical Systems, IEEE 2007 International Conference on Robotics and Automation, ICRA 2007, Rome, Italy (given by my PhD supervisor, Prof. Pedro Lima)

T-1. (2005) “Fitting the LCMV CD8+ Data Based on Measurement and Process Noise Models”, Workshop on Applications of Methods of Stochastic Systems and Statistical Physics in Biology, Interdisciplinary Center for the Study of Biocomplexity, University of Notre Dame

## REVIEWS FOR JOURNALS AND CONFERENCES

IEEE Transactions on Automatic Control,  
Journal of Theoretical Biology, Journal of Royal Society,  
Journal of Mathematical Biology, Journal of Neuroscience,  
Mathematical Biosciences,  
Engineering Applications of Artificial Intelligence,  
International Journal of Computational Methods,  
IMA Journal of Mathematical Control and Information  
IEEE International Conference on Robotics and Automation (ICRA),  
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS),  
International Symposium on Distributed Autonomous Robotic Systems (DARS)  
International Conference on Autonomous Agents and Multiagent Systems (AAMAS),  
American Control Conference (ACC), ASME Dynamic Systems and Control Conference (DSCC),  
IEEE Conference on Decision and Control (CDC),  
International Symposium on Flexible Automation (ISFA),  
Taylor & Francis Group LLC