Aleksandra Faust

Contact Information

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Research Interests

Adaptive planning algorithms for decision making and motion planning, reinforcement learning for dynamical systems and complex tasks, and learning transfer, adaptation, and reuse.

Education

University of New Mexico, Albuquerque, New Mexico

PhD. Candidate in Computer Science, expected 2014

- GPA 4.00 / 4.00
- Advisor: Lydia Tapia

George Washington University, Washington, DC

Associate's Certificate in Project Management, 2008

University of Illinois, Urbana-Champaign, Illinois

Master of Computer Science, 2004

- GPA 3.89 / 4.00

University of Belgrade, Belgrade, Serbia

Bachelor of Science in Mathematics, concentration in Computer Science, 1997

- GPA 3.82/4.00

Honors and Awards

Tech Fiesta Albuquerque, Tech Talent Showcase 3rd place, 2013

New Mexico Space Grant Consortium Scholarship, 2013 - present

Sandia National Laboratories Doctoral Studies Program Fellow, 2012 - present

Golden Key International Honor Society Nominee, 2012

Sandia National Laboratories Employee Recognition Award Nominee, 2011

Young Scientist Fellow, 1992-1996

Experience

Sandia National Laboratories, Albuquerque, New Mexico

Senior Computer Science R&D Engineer, 2006 - present

As part of the remote sensing group, led and contributed to development of a number of algorithms and systems including multimodal image registration, pointing components, reflective particle tag tampering detection, and a debugger for FPGA devices. Led a satellite ground system test team

through successful system integration and sell-off.

MDC, Southfield, Michigan

Business Analyst, 2005

MDC, a Thomson subsidiary, is a leader in intellectual property management. Architected a new version of IP Master, MDC's flagship product, a highly customizable intellectual property management software focusing on performance, security, maintainability, and internationalization.

Delphi, Troy, Michigan

Technical Lead, 2002 - 2004

Delphi Corporation is a global electronics manufacturer with over 300 locations worldwide. Served as the technical lead in the Global Enterprise Applications Service group. Responsible for all Microsoft-based application development in Delphi. Led a team of eleven developers, simultaneously working on several high-profile multi-million dollar projects. Designed and developed a framework of reusable components that was successfully leveraged in half a dozen projects, cutting cost and delivery time in half.

Edcor, Pontiac, Michigan

Software Engineer, 2002

Edcor Data Services is an ISO 9000 certified provider of learning management and educational portal solutions serving Fortune 100 clients. As a member of the architecture team, contributed to development and architecture design of n-tier, scalable application core components. Architected a framework for flexible object inheritance, allowing code customization with maximum code reuse. Designed and implemented highly configurable modules for e-mail communications, enrollment options, and course versioning.

A. Raymond, Rochester Hills, Michigan

Software Engineer, 2001 - 2002

A. Raymond is a fastener manufacturer for the auto industry with operations in ten countries. As the sole application developer supporting enterprise solutions for A. Raymond's North American operations, re-architected a high-maintenance barcode scanning application, making it object-oriented and expandable. Successful completion of this project allowed A. Raymond to become QS 9000 re-certified and keep Ford Motor Company as a client. Transformed an existing batch application into a transaction-oriented system, providing always accurate and up-to-date information. Engineered and implemented a messaging subsystem that informs relevant users of critical system events and system status.

Silvercube, Inc., Rochester, Michigan

Internet Programmer, 2001 - 2002

Served as software engineering expert in a multidiscipline team developing traditional and mobile web applications. Responsible for all aspects of technical and information systems issues.

AIM Computer Solutions, Sterling Heights, Michigan

Programmer/Analyst, 1997 - 2000

Contributed to development of a large-scale manufacturing application. Integrated the application with a third party financial system. Designed, developed and supported Source Code Control System, a package for managing source code

Publications

Journals

Aleksandra Faust, Peter Ruymgaart, Molly Salman, Rafael Fierro, Lydia Tapia, **"Continuous Action Reinforcement Learning for Control-Affine Systems with Unknown Dynamics,"** Under submission

Technical Report TR13-002, Department of Computer Science, University of New Mexico, September 2013 available at https://cs.unm.edu/amprg/Publications/afaust-TR13-002.pdf

Aleksandra Faust, Ivana Palunko, Patricio Cruz, Rafael Fierro, Lydia Tapia, **"Aerial Suspended Cargo Delivery through Reinforcement Learning,"** Under submission

Technical Report TR13-001, Department of Computer Science, University of New Mexico, August 2013 available at https://cs.unm.edu/amprg/Publications/afaustTR13-001.pdf

Conferences

Aleksandra Faust, Ivana Palunko, Patricio Cruz, Rafael Fierro, Lydia Tapia, "**Learning Swing-free Trajectories for UAVs with a Suspended Load,**" IEEE International Conference on Robotics and Automation (ICRA), Karlsruhe, Germany, May 2013, pages 4887–4894. Available at https://cs.unm.edu/amprg/Publications/afaustICRA13.pdf

Ivana Palunko, Aleksandra Faust, Patricio Cruz, Lydia Tapia, Rafael Fierro, "**A Reinforcement Learning Approach to Suspended Load Manipulation with Aerial Robots,**" IEEE International Conference on Robotics and Automation (ICRA), Karlsruhe, Germany, May 2013, pages 4881–4886. Available at https://cs.unm.edu/amprg/Publications/ipalunkoICRA13.pdf

Selected workshops and posters

Molly Salman, Aleksandra Faust, Lydia Tapia, **"Error Analysis for Autonomous Suspended Load Flight"**, Accepted to ACM Richard Tapia Celebration of Diversity in Computing, Seattle WA, February 2015

Peter Ruymgaart, Lydia Tapia, Rafael Fierro, Aleksandra Faust, **"Redundant Component and Intelligent Computerized Control-System for Multi-rotor VTOL Aircraft"**, Talent Showcase, Tech Fiesta, Albuquerque NM, September 2012

Aleksandra Faust, Ivana Palunko, Patricio Cruz, Rafael Fierro, Lydia Tapia, "**Learning Swing-free Trajectories for UAVs with a Suspended Load in Obstacle-free Environments,**" Autonomous Learning workshop at IEEE International Conference on Robotics and Automation (ICRA),

Karlsruhe, Germany, May 2013

Nick Malone, Aleksandra Faust, Brandon Rohrer, John Wood, Lydia Tapia, "**Efficient Motion-based Task Learning,**" Robot Motion Planning Workshop, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Vilamoura, Portugal, October 2012. Available at https://cs.unm.edu/amprg/Publications/17.pdf

Patents

Peter Ruymgaart, Lydia Tapia, Rafael Fierro, Aleksandra Faust, 2013, **"Redundant Component and Intelligent Computerized Control System for Multi-rotor VTOL Aircraft,"** US Provisional Patent 2014-015, filed on 22 August 2013

Students supervised

Molly Salman, Undergraduate, Austin College, June – August, 2013

Nina Chen, Graduate, Stanford University, May – August, 2010

Selected talks

"**Learning Swing-free Trajectories for UAVs with a Suspended Load,**" IEEE International Conference on Robotics and Automation, Karlsruhe, Germany, May 2013

https://cs.unm.edu/amprg/Publications/afaustICRA2013.pdf

"Espresso Delivery: Automated Motion Planning and Swing-free Control for Aerial Load Transportation," Computer Science Symposium, University of New Mexico, March 2013

"Reinforcement learning," Introduction to Artificial Intelligence, University of New Mexico, November 2012, October 2013

http://www.cs.unm.edu/~tapia/cs427_cs527/SLIDES/RL.pdf

"Efficient Motion-based Task Learning," Robot Motion Planning Workshop, IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Vilamoura, Portugal, October 2012

https://cs.unm.edu/amprg/Publications/17Presentation.pdf