John Norman Maidens
Ph.D. Candidate

Electrical Engineering and Computer Sciences
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Education

Doctor of Philosophy in Electrical Engineering and Computer Sciences

August 2012 — Present
University of California, Berkeley — Berkeley, California

Master of Applied Science in Biomedical Engineering

September 2010 — July 2012
The University of British Columbia — Vancouver, Canada

Bachelor of Science (Honors) in Mathematics

September 2006 — April 2010
University of Alberta — Edmonton, Canada

Publications

Refereed Journal Articles and Book Chapters

1. J. Maidens, A. Barrau, S. Bonnabel, M. Arcak. "Symmetry reduction for dynamic programming." Journal paper, in preparation.
2. J. Maidens, A. Packard, M. Arcak. "A Frank-Wolfe algorithm for optimal experiment design in nonlinear systems." Journal paper, in preparation.
3. J. Maidens, M. Arcak, "Optimization for metabolic rate estimation in hyperpolarized carbon-13 MRI," *Emerging Applications of Control and System Theory*, eds. R. Tempo and S. Yurkovichto, Springer, to appear.
4. J. Maidens, J. W. Gordon, M. Arcak, P. E. Z. Larson, "Optimizing flip angles for metabolic rate estimation in hyperpolarized carbon-13 MRI," *IEEE Transactions on Medical Imaging* 35 (11) pp.2403–2412, 2016.
5. J. Maidens, M. Arcak. "Reachability analysis of nonlinear systems using matrix measures," *IEEE Transactions on Automatic Control* 60 (1) 265–270, 2015.
6. J. Maidens, S. Kaynama, I. M. Mitchell, M. Oishi, G. A. Dumont. "Lagrangian methods for approximating the viability kernel in high-dimensional systems," *Automatica* 49 (7) 2017–2029, 2013.

Refereed Conference Papers

1. J. Maidens, A. Barrau, S. Bonnabel, M. Arcak, "Symmetry reduction for dynamic programming and application to MRI," *American Control Conference*, Seattle, WA, submitted.
2. J. Maidens, A. Packard, M. Arcak, "Parallel dynamic programming for optimal experiment design in nonlinear systems," *Conference on Decision and Control*, Las Vegas, NV, 2016, to appear.
3. J. Maidens, M. Arcak, "Semidefinite relaxations in optimal experiment design with application to substrate injection for hyperpolarized MRI," *American Control Conference*, Boston, MA, pp. 2023–2028, 2016.

4. J. Maidens, P. E. Z. Larson, M. Arcak. "Optimal experiment design for physiological parameter estimation using hyperpolarized carbon-13 magnetic resonance imaging," *American Control Conference*, Chicago, IL, pp. 5770–5775, 2015.
5. J. Maidens, M. Arcak. "Trajectory-based reachability analysis of switched nonlinear systems using matrix measures," *Conference on Decision and Control*, Los Angeles, CA, pp. 6358–6364, 2014.
6. J. Maidens, M. Y. Li. "Global Lyapunov functions and a hierarchical control scheme for networks of robotic agents," *American Control Conference*, Washington, DC, pp.4050–4055, 2013.
7. S. Kaynama, J. Maidens, M. Oishi, I. M. Mitchell, G. A. Dumont. "Computing the viability kernel using maximal reachable sets," *Hybrid Systems: Computation & Control*, Beijing, China, pp.55–63, 2012.

Refereed Conference Abstracts

1. J. Maidens, J. W. Gordon, M. Arcak, P. E. Z. Larson, "Spatio-temporally constrained reconstruction for hyperpolarized carbon-13 MRI using kinetic models". *Proceedings of the 25th Annual Meeting of the International Society for Magnetic Resonance in Medicine*, 2017, in preparation.
2. J. Maidens, J. W. Gordon, M. Arcak, P. E. Z. Larson, "Optimizing flip angles for metabolic rate estimation in hyperpolarized carbon-13 MRI," *Proceedings of the 24th Annual Meeting of the International Society for Magnetic Resonance in Medicine*, p.2341, 2016.
3. P. Larson, J. Gordon, J. Maidens, M. Arcak, H.-Y. Chen, G. Reed, I. Park, R. Aggarwal, R. Bok, S. Nelson, J. Kurhanewicz, D. Vigneron. "Robust, Quantitative Methods Applied to Clinical Hyperpolarized C-13 MR of Prostate Cancer Patients," *Proceedings of the 24th Annual Meeting of the International Society for Magnetic Resonance in Medicine*, p.2347, 2016.

Thesis

1. J. Maidens. "Scalable computation of viability kernels and a viability-theoretic approach to guaranteeing safety for closed-loop medical devices," Master of Applied Science Thesis, The University of British Columbia, July 2012.

Awards and Scholarships

2012 **NSERC Postgraduate Scholarship — Doctoral Level (3 years)**

Canadian federal funding to support to high calibre scholars engaged in doctoral programs in the natural sciences or engineering, tenable at institutions outside of Canada

Proposal title: Geometric methods for reachability analysis and formal safety verification in complex, high-dimensional systems

2011 **Faculty of Applied Science Graduate Award**

Recruitment award offered as a top-up to NSERC CGS holders registered in the Faculty of Applied Science at UBC

B.C. Medtech Graduate Award in Biomedical Engineering

Awarded to students in the first year of graduate studies in Biomedical Engineering who demonstrate an entrepreneurial spirit, leadership and communication skills

2010 **NSERC Canada Graduate Scholarship — Master's Level**

Canadian federal funding to support to high calibre scholars engaged in master's programs in the natural sciences or engineering

Proposal title: Equilibria and global stability for networked dynamical systems with applications in epidemiology, ecology and control theory

Institute for Computing Information and Cognitive Systems Scholarship

Graduate scholarship for exceptional students studying ECE, CS or ME at the University of British Columbia

Dr. Ali-Amir Husain Scholarship in Mathematics

Awarded to a student with superior academic achievement convocating with a Bachelor of Science with Honors in Mathematics

Dean's Silver Medal in Science

Awarded annually to top students graduating with an Honors degree in the Faculty of Science

Honors with Distinction

Highest University of Alberta convocation rank for students in Honors programs

2009 **NSERC/CMS Math in Moscow Scholarship**

Awarded each year by the Canadian Mathematical Society to three Canadian undergraduate students for full funding of a semester at the Independent University of Moscow

NSERC Undergraduate Student Research Award

Canadian federal government funding for summer research projects

Murray T. Gibson Memorial Scholarship in Mathematics

For superior academic achievement in the honors mathematics program at the University of Alberta

Jason Lang Scholarship

Awarded by the Government of Alberta on the basis of academic achievement

Mathukumalli Venkata Subbarao Prize

For outstanding academic ability in undergraduate number theory at the University of Alberta

Dean's Honor Roll

For achieving a GPA of at least 3.5 in a Faculty of Science program at the University of Alberta

2008 **NSERC Undergraduate Student Research Award**

Canadian federal government funding for summer research projects

Murray T. Gibson Memorial Scholarship in Mathematics

For superior academic achievement in the honors mathematics program at the University of Alberta

Louise McKinney Scholarship

Awarded by the Government of Alberta to students in the top 2% of their class

Dean's Honor Roll

For achieving a GPA of at least 3.5 in a Faculty of Science program at the University of Alberta

2007 **University of Alberta Undergraduate Scholarship**

For superior academic achievement

Murray T. Gibson Memorial Scholarship in Mathematics

For superior academic achievement in the honors mathematics program at the University of Alberta

Jason Lang Scholarship

Awarded by the Government of Alberta on the basis of academic achievement

Dean's Honor Roll

For achieving a GPA of at least 3.5 in a Faculty of Science program at the University of Alberta

2006 **University of Alberta Academic Excellence Scholarship**

University of Alberta entrance award

Faculty of Science Academic Excellence Scholarship

University of Alberta entrance award for students registered in the Faculty of Science

Advanced Placement Scholarship

University of Alberta entrance award for National AP Scholars

Research Experience

Graduate Student Research Appointment*

August 2012 — Present
The University of California
Advisor: Murat Arcak
* Partial appointment from 2012—2015 due to external fellowship

Research Assistant

September 2012 — July 2012
The University of British Columbia
Advisor: Guy Dumont

Summer Research Assistant

May 2010 — August 2010
The University of Alberta
Advisor: Michael Li

NSERC USRA Summer Student

May — August 2008 & 2009
The University of Alberta
Advisor: Michael Li

Teaching Experience

Graduate Student Instructor (Content)

September 2016 — December 2016
The University of California, Berkeley
EE 16B: Designing Information Devices and Systems II
Professors: Michel Maharbiz and Murat Arcak

Graduate Student Instructor

January 2016 — May 2016
The University of California, Berkeley
EE 222: Nonlinear Systems: Analysis, Stability and Control
Professor: Murat Arcak

Graduate Student Instructor

August 2015 — December 2015
The University of California, Berkeley
EE 120: Signals and Systems
Professor: Murat Arcak

Teaching Assistant

January 2012 — April 2012
The University of British Columbia
CICS 510: Theoretical Foundations of Computer Science
Professor: Thanos Stouraitis

Teaching Assistant

September 2011 — December 2011 & January 2012 — April 2012
The University of British Columbia
EECE 320: Discrete Structures and Algorithms
Professor: Sathish Gopalakrishnan

Exam Solution Writer

University of British Columbia Math Club
MATH 257/316: Partial Differential Equations (November 2010, March 2011)
MATH 215/255: Ordinary Differential Equations (March 2011)

On-line Course Developer

May — August 2007
The University of Alberta
Supervisor: George Peschke
Project: Help design a system to provide online mathematics courses

Student Research Supervison

Undergraduates

Lucas Karahadian, Summer 2015

Non-degree Programs & Short Courses

Bay Area Deep Learning School
September 24 — 25, 2016
Stanford University — Stanford, California

Math in Moscow
September 1 — December 21, 2009
Independent University of Moscow — Moscow, Russia

Summer School on the Mathematics of Invasions in Ecology and Epidemiology
May 10 — 17, 2009
The Banff Centre — Banff, Canada

MITACS-PIMS Summer School on Mathematical Modeling of Infectious Diseases
May 1 — 11, 2008
The University of Alberta — Edmonton, Canada

Service

Reviewer for
American Control Conference, 2015, 2016
Automatica, 2013, 2014
Conference on Decision and Control, 2015, 2016
IEEE Life Sciences Letters, 2015
Knowledge-Based Systems, 2016

UC Berkeley EECS graduate admissions committee
Student Member, 2014, 2015

UC Berkeley Control Theory Seminar Series
Co-organizer, 2015 — 2016

Biomedical Engineering Graduate Association — University of British Columbia
Interim Secretary, January 2011 — October 2011

Undergraduate Mathematical Sciences Society — University of Alberta
Social Convenor, 2006 — 2007
President, 2007 — 2008
Vice President, 2008 — 2009

Professional Associations

Society for Industrial and Applied Mathematics (SIAM)
Institute of Electrical and Electronics Engineers (IEEE)
International Society for Magnetic Resonance in Medicine (ISMRM)