

CURRICULUM VITAE

Kirsten A. Morris

Department of Applied Mathematics
University of Waterloo,
200 University Ave. W.,
Waterloo, Ontario N2L 3G1, Canada
kmorris@uwaterloo.ca
519-888-4567 ext. 36218

RESEARCH INTERESTS

Controller and estimator design for partial differential equations, optimal sensor and actuator placement, dissipative systems, smart materials.

APPOINTMENTS

2018-2019	Visiting scholar	Institut de Mathématiques de Bordeaux, Bordeaux
2003-present	Professor	Dept. of Applied Mathematics, University of Waterloo (cross-appointment Mechanical and Mechatronics Engineering)
2016-2016	Long-term visitor	Institute for Mathematics & Applications, Univ. of Minnesota
2012-2014	Assoc. chair (Grad.)	Dept. of Applied Mathematics, University of Waterloo
2005-2008	Assoc. dean (Grad.&Research)	Math. Faculty, University of Waterloo
2003-2004	Visiting member	Fields Institute
2000-2002	Assoc. chair (U.grad)	Dept. of Applied Mathematics, University of Waterloo
1997-1998	Visiting professor	Dept. of Mathematics, University of Guelph
1995-2003	Associate professor	Dept. of Applied Mathematics, University of Waterloo
1993-1993	Visiting member	Fields Institute, Toronto, Ontario, Canada
1990-1992	Scientific consultant	ICASE, NASA Langley Research Center,
1990-1995	Assistant professor	Dept. of Applied Mathematics, University of Waterloo
1989-1990	Staff scientist	ICASE, NASA Langley Research Center
1984-1985	Engineer	CAE Electronics Ltd.

EDUCATION

Ph.D., Elec. Eng., 1989, Faculty of Engineering, University of Waterloo, Waterloo, Ontario, Canada

Thesis: *Finite-Dimensional Control of Infinite-Dimensional Systems*

Supervisor: Prof. M. Vidyasagar

M.Math, App. Math., 1984, Faculty of Mathematics, University of Waterloo, Waterloo, Ontario, Canada

Thesis: *Time-Optimal Control of Systems Governed by Partial Differential Equations*

Supervisor: Prof. B. Forte

B.Sc. (Hons.), Math. & Eng., 1982, Faculty of Applied Science, Queen's University, Kingston, Ontario, Canada

Awards

Outstanding Performance Award, University of Waterloo, 2006, 2013; Faculty of Mathematics Fellowship, 2004-2007.

Professional Memberships

Institute for Electrical and Electronic Engineers (IEEE), senior member; Society of Industrial and Applied Mathematicians (SIAM); Waterloo Institute for Computer Research.

SERVICE

Boards

- Chair, SIAM Control & Systems Activity Group, 2018-2019, Vice-chair, 2016-2017
- Vice-President, Technical Activities (2015-2016) Vice-President, Membership (2013-2014), Board of Governors (2010-2016), IEEE Control Systems Society
- Associate Editor, *Mathematics of Control, Signals and Systems*, 2016-
- Associate Editor, *SIAM Journal on Control and Optimization*, 2010-2013, 2016-
- Associate Editor, *IEEE Trans. on Automatic Control*, 2008-2013
- Board of Governors, IEEE Control Systems Society, 2010-2016
- Editorial Board, SIAM book series *Advances in Design & Control* , 2005-
- Editor, book reviews, *IEEE Control Systems Magazine*, 2005
- Associate Editor, IEEE Control Systems Society Conference Editorial Board, 2000-2007

Conference Organization

- Program co-chair, *3rd IFAC Workshop on Control of Partial Differential Equations*, Oaxaca, May 2019
- Co-organizer, *Sensor Location in Distributed Parameter Systems*, Institute for Mathematics & Applications, September 2017
- Co-organizer, *Women in Control: New Trends in Infinite Dimensions*, Banff, July 2017
- Co-organizer, *Control of Distributed Parameter Systems*, Institute for Mathematics & Applications, March 2016
- Co-organizer, *International Workshop on Controller Design of Infinite-Dimensional Systems*, Waterloo, July, 2005 (funded by the Fields Institute and University of Waterloo)
- International Program Committees: *IFAC Workshop Lagrangian and Hamiltonian Methods for Non Linear Control* (2016,2018), *IFAC workshop on Control of Systems Governed by Partial Differential Equations* (2013,2016), *6th IFAC Symposium on System Structure and Control* (2010,2016), *International Symposium on the Mathematical Theory of Networks and Systems* (2012,2014, 2016), *3rd International Conference on Control and Optimization with Industrial Applications* (2011), *IEEE Multi-Conference on Systems & Control* (2010,2011), *Joint IEEE Conference on Decision and Control/ European Control Conference* (2005)
- Scientific Committee, *Workshop on Control of Distributed Parameter Systems*, Bordeaux, 2017
- Steering Committee, *International Symposium on Mathematical Theory of Networks and Systems*, 2016-
- Steering Committee, *Conference on Distributed Parameter Systems*, 2005-
- Organizing Committees: *SIAM Conference on Control and its Applications* (2015), *8th Conference on Differential Equations and Dynamical Systems* (2010), *SIAM Conference on Control and Applications* (2005,2007)

Other Service

- IEEE Control Systems Award Committee, 2019-
- Chair, CSS George S. Axelby Best Paper Prize, 2017-
- Chair, SIAM Control & Systems Theory Prize, 2016
- IFAC Technical Committee on Partial Differential Equations 2011-
- IEEE Technical Committee on Distributed Parameter Systems 2009-
- Panelist “Future Directions in Control and Systems Theory”, SIAM Conference on Control and its Applications, 2007
- Selection Committee, *SIAM Control & Systems Theory Prize*, 2005

INVITED SEMINARS (since 2008)

(Expenses provided by inviting organization)

- *Issues in estimator and sensor design for PDEs*, Workshop on Analysis, Control and Inverse Problems for PDEs, Naples, Italy, Nov. 28, 2018.
- *Optimal sensor location*, 2nd Workshop on Stability and Control of Infinite-Dimensional Systems (SCINDIS-2018), Wurzburg, Germany, Oct. 11, 2018.
- *Actuators and sensors in control of distributed parameter systems*, Institute for Systems Research, University of Maryland, USA, October 19, 2017.
- *Optimal actuator/sensor location in distributed parameter systems*, Workshop on Emerging Applications in Control and Systems Theory, University of Texas (Dallas), September 28, 2017.
- *Optimal sensor design*, Workshop on Control of Distributed Parameter Systems, Bordeaux, France, July 5, 2017.
- *The role of sensors and actuators in control of infinite-dimensional systems*, KAUST, Saudi Arabia, April 19, 2017.
- *The role of actuators and sensors in control of distributed parameter systems*, University of Groningen, Netherlands, May 17, 2016.
- *Using approximations in controller synthesis for systems modeled by partial differential equations*, Institute for Mathematics and Applications, Minneapolis, USA, Feb. 4, 2016.
- *Sensors & actuators in control of distributed parameter systems*, 3 week series of lectures and visits in China, at Tsinghua University, Chinese Academy of Science, Xi’an University, Taiyuan University, Beijing Institute of Technology, November 2015.
- *Control of distributed parameter systems*, keynote talk, Recent developments on approximation methods for controlled evolution equations, Oberwolfach Research Institute, Germany, November 1, 2015.
- *Optimal Hardware Placement for Control*, Univ. of Florida, Gainesville, U.S.A., October 23, 2015.
- *Zero dynamics of port-Hamiltonian systems*, Univ. of Twente, Netherlands, September 25, 2015.
- *The Role of Actuators and Sensors in Control of Partial Differential Equations*, Sorbonne Université (Paris VI), Paris, France, May 22, 2015.

- *Sensors and Actuators in Control of Distributed Parameter Systems*, colloquium talk, University of Nevada, Reno, U.S.A., April 23, 2015.
- *Sensors and Actuators in Control of Distributed Parameter Systems*, keynote talk, Workshop on Control Systems and Identification Problems, Valparaiso, Chile, January 12-16, 2015.
- *Optimal Actuator/Sensor Placement*, plenary talk, 21st International Symposium on Mathematical Theory of Networks and Systems, Groningen, Netherlands, July 10, 2014.
- *Control of Infinite-Dimensional Systems: Overview*, keynote talk, Workshop on Port-Hamiltonian Systems: Approximation, Theory and Practice, Leiden, Netherlands, March 24, 2014.
- *Optimal Actuator Location*, Mathematics Department Colloquium, University of Groningen, Groningen, Netherlands, October 1, 2013.
- *Optimal Actuator Location*, plenary talk, IFAC Conference on Control of Systems Modelled by Partial Differential Equations, Paris, France, September 26, 2013.
- *Second-Order Systems with Acceleration Measurements*, Mathematics Department Colloquium, University of Wuppertal, Wuppertal, Germany, May 16, 2013.
- *Control of Systems Governed by Partial Differential Equations*, Mathematics Department Colloquium, University of Alabama, Birmingham, U.S.A. April 5, 2013.
- *Optimal Actuator Location*, Fields Institute Industrial Optimization Colloquium, Toronto, Canada, February, 2012.
- *Computation of Optimal Actuator Locations*, 2nd Workshop on Computational Issues in Nonlinear Control, Monterey, U.S.A., November, 2011.
- *H_∞ -optimal Actuator/sensor Locations*, International Workshop on Control of Distributed Parameter Systems, Wuppertal, Germany, July, 2011
- *Controller Design for Infinite-dimensional Systems*, Workshop on Quantum Control, Banff International Research Station, April, 2011.
- *What is Control?*, Applied Mathematics Colloquium, University of Guelph, March, 2011.
- *Acceleration Measurements*, Virginia Polytechnic Institute and State University, Blacksburg, USA, November, 2010
- *Controller Design for Systems Modelled by Partial Differential Equations*, University of Toronto, Toronto, Canada, February, 2010
- *Controller Design for Systems Modelled by Partial Differential Equations*, SIAM Conf. on Control & Applications plenary address, Denver, U.S.A., July 2009
- *Optimal Actuator Location*, University of Paderborn, Paderborn, Germany, May 2009
- *Controller Design for Infinite-Dimensional Systems*, Clarkson University, Potsdam, U.S.A., November 2008
- *Minimum-Phase Infinite-Dimensional Systems*, Technical University of Delft, Delft, Netherlands, May 2008
- *Robust Control of Smart Material Based Actuators*, Workshop on New Frontiers in Control Theory and Applications, Hyderabad, India, January 2008

PATENT

1. A. Khajepour, K.A. Morris and S. Behjat, *Stroke Amplification in Inchworm Mechanisms Using Hydraulic Booster*, U.S. Patent U.S. Patent 7,218,035, 2007.

PUBLICATIONS

Books

2. K. A. Morris, *An Introduction to Controller Design for Distributed Parameter Systems*, Springer, 2019. (325 pages)
3. K.A. Morris, *An Introduction to Feedback Controller Design*, Harcourt-Brace Ltd., 2001. (366 pages)
4. K.A. Morris, ed., *Control of Flexible Structures*, AMS, 1993. (243 pages)

Refereed Journal Publications

5. Carolina Bergeling, Kirsten Morris and Anders Rantzer, “Closed Form Optimal H-infinity Control for Parabolic Systems”, *Automatica*, 2019.
6. Sepideh Afshar, Kirsten Morris and Amir Khajepour, “Efficient electrochemical model for lithium-ion cells”, *Jour. of Eng. Math.*, submitted 2017.
7. M. S. Edaletzadeh and K. A. Morris, “Optimal Actuator Design for Semi-linear Systems”, *SIAM Jour. of Control and Optimization*, to appear.
8. B. J. Jacob, K. A. Morris and H. J. Zwart, “Zero Dynamics for Waves on Networks”, *Automatica*, to appear.
9. A. O. Ozer and K. A. Morris, “Modeling and stabilization of current-controlled piezoelectric beams with dynamic electromagnetic field”, *ESAIM: Control, Optimisation and Calculus of Variations*, to appear.
10. J. Auriol, K. A. Morris and F. Di Meglio, “Late-lumping backstepping control of partial differential equations”, *Automatica*, to appear.
11. S. Afshar, K. A. Morris and A. Khajepour, “State of charge estimation using an adaptive EKF-based filter”, *IEEE Trans. on Control Systems Technology*, to appear.
12. S. Afshar, K. A. Morris and A. Khajepour, “A modified sliding-mode observer design with application to the diffusion equation”, *International Journal of Control*, to appear.
13. M. S. Edaletzadeh and K. A. Morris, “Stability and Well-posedness of Nonlinear Railway Track Model”, *IEEE Control and Systems Letters*, Vol. 3, Issue 1, 2019.
14. Minxin Zhang and Kirsten Morris, “Sensor Choice for Minimum Error Variance Estimation”, *IEEE Trans. on Automatic Control*, vol. 63-2, pg. 315-330, 2018.
15. R. al Jamal and K. A. Morris, “Linearized stability of partial differential equations with application to stabilization of the Kuramoto-Sivashinsky equation”, *SIAM Jour. on Control and Optimization*, vol. 56, pg. 120-147, 2018.
16. A. N. F. Chow and K. A. Morris, “Control of Hysteresis in the Landau-Lifshitz Equation”, *Automatica*, vol. 67, pg. 200-204, 2016.

17. A. Shum, K. A. Morris and A. Khajepour, "Convergence Rate for the Ordered Upwind Method", *SIAM Jour. on Scientific Computing*, Vol. 68, No. 3, 2016.
18. B. Jacob and K. A. Morris, "Root Loci for Systems Defined on Hilbert Spaces", *IEEE Trans. on Auto. Control*, Vol. 61, pg. 116-128, 2016.
19. S. D Yang and K. A. Morris, "Comparison of Actuator Placement Criteria for Control of Structural Vibrations", *Jour. of Sound and Vibration* Vol. 353, pg. 1-18, 2015.
20. A. Shum, K. A. Morris and A. Khajepour, "Direction-Dependent Optimal Path Planning for Autonomous Vehicles," *Jour. of Robotics and Autonomous Systems*, Vol. 70, pg. 202-214, 2015.
21. B. Jacob, K. A. Morris and H. Zwart, C_0 -semigroups for hyperbolic partial differential equations on a one-dimensional spatial domain, *Jour. of Evolution Equations*, Vol. 15, No. 2, pg. 493-502, 2015.
22. K.A. Morris, M. Demetriou and S.D. Yang, "Using H_2 -control performance metrics for infinite-dimensional systems", *IEEE Trans. on Auto. Control*, Vol. 60, No. 2, pg. 450 - 462, 2015.
23. K. A. Morris and A. O. Ozer, "Modeling and stabilizability of voltage-actuated piezoelectric beams with magnetic effects", *SIAM Jour. on Control*, Vol. 52, No. 4, pg. 2371-2398, 2014.
24. D. Kasinathan and K. A. Morris and S. D. Yang, "Solution of large descriptor H_∞ -algebraic Riccati equations", *Jour. of Computational Science*, Vol. 5, No. 3, pg. 517-526, 2014.
25. D. Kasinathan and K. A. Morris, " H_∞ -optimal actuator location", *IEEE Trans. on Auto. Control*, vol. 58, no. 10, pg. 2522 - 2535, 2013.
26. N. Darivandi, K. A. Morris and A. Khajepour, "An algorithm for LQ optimal actuator location", *Smart Materials and Structures*, vol. 22, no. 3, 2013.
27. K. A. Morris, "What is Hysteresis?", *Applied Mechanics Reviews*, vol. 64, no. 5, 2012.
28. B. Jacob and K. A. Morris, "Second-Order Systems with Acceleration Measurements", *IEEE Trans. on Auto. Control*, vol. 57, pg. 690-700, 2012.
29. K. A. Morris, "Linear-Quadratic Optimal Actuator Location", *IEEE Trans. on Auto. Control*, vol. 56, pg. 113 - 124, 2011.
30. K.A. Morris and R. E. Rebarber, "Zeros of SISO Infinite-Dimensional Systems", *International Journal of Control*, vol. 83, no. 12, pg. 2573-2579, 2010.
31. S. Valadkhan, K. A. Morris and A. Shum, "A new load-dependent hysteresis model for magnetostrictive materials", *Smart Materials and Structures*, vol. 19, 125003, 2010.
32. S. Valadkhan, K. A. Morris and A. Khajepour, "Stability and robust position control of hysteretic systems", *Robust & Nonlinear Control*, vol. 20, pg. 460-471, 2010.
33. K.A. Morris and C. Navasca, "Approximation of linear quadratic feedback control for partial differential equations", *Computational Optimization and Applications*, vol. 46, pg. 93-111, 2010.
34. R.B. Gorbet, K.A. Morris and R.C. Chau, "Mechanism of bandwidth improvement in passively cooled SMA position actuators", *Smart Materials and Structures*, vol. 18, no. 9, 095013 (9 pg.), 2009.
35. R. F. Curtain and K.A. Morris, "Transfer Functions of Distributed Parameter Systems", *Automatica*, vol. 45, no. 5, pg. 1101-1116, 2009.

36. S. Valadkhan, K. A. Morris and A. Khajepour, "A Review and Comparison of Hysteresis Models for Magnetostrictive Materials", *Jour. of Intelligent Materials and Smart Structures*, vol. 20, no. 2, 2009, pp. 131-142.
37. S. A. Campbell, S. Crawford and K.A. Morris, "Friction and the Inverted Pendulum Stabilization Problem", *ASME Jour. of Dynamic Systems, Measurement and Control*, Vol. 30, No. 5, pg. 054502-1-054502-7, 2008.
38. K.A. Morris and R. Rebarber, "Feedback Invariance of SISO Infinite-Dimensional Systems", *Mathematics of Control, Signals and Systems*, Vol. 19, pg. 313-335 2007.
39. S. Valadkhan, K. A. Morris and A. Khajepour, "Passivity of Magnetostrictive Materials", *SIAM Jour. on Applied Mathematics*, Vol. 67, No. 3, 2007, pp. 667-686.
40. B. Jacob, K.A. Morris and C. Trunk, "Minimum-Phase Infinite-Dimensional Second-Order Systems", *IEEE Trans. on Auto. Control*, Vol. 52, No. 9, pg. 1654-1665, 2007.
41. B. Jacob, K. A. Morris and C. Trunk, "Minimum-Phase Second-Order Systems and the Spectrum of the Semigroup Generator", *Proc. Appl. Math. Mech.*, Vol. 6, pg. 631-632, 2006.
42. M. Landry, S.A. Campbell, K.A. Morris and C. Aguilar, "Dynamics of an Inverted Pendulum with Delayed Feedback", *SIAM Jour. on Applied Dynamical Systems, SIAM Jour. on App. Dyn. Sys.*, vol. 4, no. 2 pg. 333-351, 2005.
43. R.B. Gorbet and K.A. Morris "Closed-Loop Position Control of Preisach Hystereses", *Jour. of Intelligent Materials and Smart Structures*, vol. 14, no. 8, pg. 473-538, 2003.
44. J.R. Grad and K.A. Morris, "Calculation of Achievable Broadband Noise Reduction using Approximations", *Dyn. Contin. Discrete Impuls. Syst. Ser. B Appl. Algorithms*, suppl., pg. 438-443, 2003.
45. B.J. Zimmer, S.P. Lipshitz, K.A. Morris, J. Vanderkooy and E.E. Obasi, "An Improved Acoustic Model for Active Noise Control in a Duct", *ASME Journal of Dynamic Systems, Measurement and Control*, vol. 125, no. 3, pg. 382-395, 2003.
46. A. Cheng and K.A. Morris, "Well-Posedness of Boundary Control Systems", *SIAM Jour. on Control and Optimization*, vol. 42, no. 4, pg. 1244-1265, 2003.
47. K.A. Morris, " H_∞ Output Feedback Control of Infinite-Dimensional Systems via Approximation", *Systems and Control Letters*, vol. 44, pg. 211-217, 2001.
48. R.B. Gorbet, K.A. Morris and D. Wang, "Passivity-Based Stability and Control of Hysteresis in Smart Actuators", *Special Issue on Dynamics and Control of Smart Structures, IEEE Journal on Control Systems Technology*, vol. 9, No. 1, pg. 5-16, 2001.
49. N. Baddour and K.A. Morris "A New Full Car Model", *Trans. of the Canadian Society of Mechanical Engineering*, Vol. 24, No. 3&4, pp 493-514, 2000.
50. K.A. Morris, "Justification of Input/Output Methods for Systems with Unbounded Control and Observation", *IEEE Trans. on Automatic Control*, Vol. 44, No. 1, pg 81-85, 1999.
51. K.A. Morris, "Noise Reduction Achievable by Point Control", *ASME Journal on Dynamic Systems, Measurement and Control*, Vol. 120, No. 2, 1998, pg. 216-223.
52. K. Ito and K.A. Morris, "An Approximation Theory for Solutions to Operator Riccati Equations for H_∞ Control", *SIAM Jour. on Control and Optimization*, Vol 36, No. 1, Jan. 1998, pg. 82-99.

53. A. Khajepour, M.F. Golnaraghi and K.A. Morris, "Modal Coupling Controller Design Using Normal Form Methods I: Dynamics", *Journal of Sound and Vibration*, vol. 205, 1997, pg. 657-670.
54. A. Khajepour, M.F. Golnaraghi and K.A. Morris, "Modal Coupling Controller Design Using Normal Form Methods II: Control", *Journal of Sound and Vibration*, vol. 205, 1997, pg. 671-688.
55. A. Khajepour, M.F. Golnaraghi and K. A. Morris, "Application of Center Manifold Theory to Regulation of a Flexible Beam", *Journal of Vibration and Acoustics*, Vol. 119, 1997, pg. 158-165.
56. J.R. Grad and K.A. Morris, "Solving the Linear Quadratic Control Problem for Infinite-Dimensional Systems", *Computers and Mathematics with Applications*, Vol. 32, No. 9, 1996, pg. 99-119.
57. K.A. Morris and K.J. Taylor, "A Variational Calculus Approach to the Modelling of Flexible Manipulators", *SIAM Review*, Vol. 38, No. 2, 1996, pg. 294-305.
58. K.A. Morris, "State Feedback and Estimation of Well-Posed Systems", *Mathematics of Control, Signals and Systems*, Vol. 7, 1994, pg. 351-388.
59. K.A. Morris, "Design of Finite-Dimensional Controllers for Infinite-Dimensional Systems by Approximation", *Journal of Mathematical Systems, Estimation and Control*, Vol. 4, No. 2, 1994, pg. 1-30.
60. K.A. Morris, "Convergence of Controllers Designed Using State-Space Techniques", *IEEE Trans. on Automatic Control*, Vol. 39, No. 10, 1994, pg. 2100-2104.
61. K.A. Morris and J.N. Juang, "Dissipative Controller Designs for Second-Order Dynamic Systems", *IEEE Trans. on Automatic Control*, Vol. 39, No. 5, 1994, pg. 1056-1063.
62. H.T. Banks and K.A. Morris, "Input-Output Stability of Accelerometer Control Systems", *Control: Theory and Advanced Technology*, Vol. 10, No. 1, 1994, pg. 1-17.
63. K.A. Morris and M. Vidyasagar, "A Comparison of Different Models for Beam Vibrations from the Standpoint of Controller Design", *ASME Journal of Dynamic Systems, Measurement and Control*, September, 1990, Vol. 112, pg. 349-356.

Invited Contributions to Books

64. K.A. Morris, The Role of Sensor and Actuator Models in Control of Distributed Parameter Systems, *Emerging Applications in Control and Systems Theory*, ed. P. Misra and S. Yurkovich, Springer, 2017.
65. K. A. Morris, "Control of Systems Governed by Partial Differential Equations", *The Control Handbook*, ed. W. S. Levine, CRC Press, 2010.
66. S. Valadkhan, K. A. Morris and A. Khajepour, "Robust Control of Smart Material Based Systems", *Lecture Notes in Control and Information Science*, ed. Vincent Blondel, Stephen Boyd, Hidenori Kimura, Springer-Verlag, pg. 249-262, 2008.
67. K.A. Morris and C. Navasca, "Solution of Algebraic Riccati Equations Arising in Solution of Partial Differential Equations", *Control and Boundary Analysis*, ed. J. Cagnol and J.-P. Zolesio, Marcel Dekker, 2004, pg. 259-281.
68. R.B. Gorbet, K.A. Morris and D.W.L. Wang, "Control of Hysteretic Systems: A State-space Approach", *Learning, Control and Hybrid Systems*, ed. Yutaka Yamamoto and Shinji Hara, Springer-Verlag, 1999, pg. 432-451.

69. A. Khajepour, M.F. Golnaraghi and K.A. Morris, "Internal Resonance Controller Design Using Normal Forms", in *Nonlinear and Stochastic Dynamics*, ed. A.K. Bajaj, N.S. Namachchivaya and R.A. Ibrahim, ASME, 1994, pg. 143-150.
70. K.A. Morris, "Perturbation of Well-Posed Systems by State-Feedback", in *Identification and Control of Partial Differential Equations*, ed. H.T. Banks, R. Fabiano and K. Ito, SIAM, 1993, pg. 141-154.
71. K.A. Morris, "The Well-Posedness of Accelerometer Control Systems", in *Analysis and Optimization of Systems: State and Frequency Domain Approaches for Infinite-Dimensional Systems*, ed. R. F. Curtain, Springer-Verlag, 1993, pg. 378-387.
72. J.D. Aplevich and K.A. Morris, "Algebraic Controller Design: Solution Parameterization and Recursive Design Using Implicit Systems", in *Linear Algebra in Systems and Control*, ed. B.N. Datta *et al*, SIAM, 1988, pg. 287-299.
73. K.A. Morris and M. Vidyasagar, "Modelling of Beam Vibrations for the Purpose of Controller Design", in *Symposium on Robotics*, ed. K. Youcef-Toumi and H. Kazerooni, ASME, 1988, pg. 17-26.
74. M. Vidyasagar and K.A. Morris, "An Analysis of Euler-Bernoulli Beams from the Standpoint of Controller Design", in *Modelling and Control of Robotic Manipulators and Manufacturing Processes*, ed. R. Shoureshi, K. Youcef-Toumi and H. Kazerooni, ASME, 1987, pg. 297-306.

Articles in Refereed Conference Proceedings

75. Shu-xia Tang and Kirsten Morris, "Optimal Sensor Design for Infinite-Time Kalman Filters", *2017 Conference on Decision & Control*.
76. Sepideh Afshar, Kirsten Morris and Amir Khajepour, "State of charge estimation via extended Kalman Filter designed for electrochemical equations", *2017 IFAC World Congress*.
77. Sepideh Afshar, Kirsten Morris and Amir Khajepour, "Fully dynamical representation of a LFP battery cell", *2017 American Control Conference*.
78. Weiwei Hu, Kirsten Morris and Yangwen Zhang, "Sensor Location in a Controlled Thermal Fluid", *2016 Conference on Decision & Control*.
79. Carolina Lidstrom, Anders Rantzer and Kirsten Morris, " H_∞ - Optimal Control for Infinite-Dimensional Systems with Strictly Negative Generator", *2016 Conference on Decision & Control*.
80. Kirsten Morris and Ambroise Vest, "Design of damping for optimal energy dissipation of vibrations", *2016 Conference on Decision & Control*.
81. K. A. Morris and S. D. Yang, "A study of optimal actuator placement for control of diffusion", *2016 American Control Conference*.
82. S. Afshar, K. A. Morris and A. Khajepour, "Hysteresis in PDE model of a Li-ion battery", *2016 American Control Conference*.
83. R. al Jamal and K. A. Morris, "Output Feedback Control of the Kuramoto-Sivashinsky Equation", *54th IEEE Conference on Decision and Control*, 2015.
84. S. Afshar, K.A. Morris and A. Khajepour, "Comparison of different observer designs for nonlinear diffusion", *54th IEEE Conference on Decision and Control*, 2015.

85. B. Jacob, K. A. Morris and H. Zwart, "Zero dynamics for waves on networks", *5th IFAC Workshop on Lagrangian and Hamiltonian Methods for Nonlinear Control*, 2015
86. R. Al Jamal and K. A. Morris, "Bounded Control of the Kuramoto-Sivashinsky Equation Using Approximations", *2015 American Control Conference*.
87. T. Khan, K. A. Morris and M. Stastna, "Computation of the Optimal Sensor Location for the Estimation of a Linear Dispersive Wave Equation", *2015 American Control Conference*.
88. R. Al Jamal, K. A. Morris and A. N. F. Chow, "Linearized Stability Analysis of Nonlinear Partial Differential Equations", *21st International Symposium on Mathematical Theory of Networks and Systems*, 2013.
89. A. O. Ozer and K. A. Morris, "Modeling an elastic beam with piezoelectric patches by including magnetic effects", *Proceedings of the American Control Conference*, 2014.
90. A. Chow and K. A. Morris, "Hysteresis in the Linearized Landau-Lifshitz Equation", *Proceedings of the American Control Conference*, 2014.
91. S. D. Yang and K. A. Morris, "Comparison of Linear-Quadratic and Controllability Criteria for Actuator Placement on a Beam", *Proceedings of the American Control Conference*, 2014.
92. K. A. Morris and A. O. Ozer, "Strong Stabilization of Piezoelectric Beams with Magnetic Effects", *IEEE Conf. on Decision & Control*, Florence, Italy, 2013.
93. D. Kasinathan, K. A. Morris and S. D. Yang, "Calculation of H_∞ -optimal actuator locations for distributed parameter systems", *American Control Conference*, 2013.
94. N. Darivandi, K. A. Morris and A. Khajepour, "Optimal Active Vibration Control of Beams", *American Control Conference*, 2012.
95. B. Jacob and K.A. Morris, "Root Locus for SISO Infinite-dimensional systems", *50th IEEE Conf. on Dec. & Cont.*, Orlando, USA, 2011.
96. D. Kasinathan and K.A. Morris, "Convergence of H_∞ -Optimal Actuator Locations' ", *50th IEEE Conf. on Dec. & Cont.*, Orlando, USA, 2011.
97. B. Jacob and K.A. Morris, "Acceleration Measured by Micro-Electrical Mechanical Systems", *49th IEEE Conf. on Dec. & Cont.*, Atlanta, USA, 2010.
98. M. Demetriou and K. A. Morris, "Using H_2 -control metrics for the optimal actuator location of infinite-dimensional systems", *IEEE American Control Conference*, Baltimore, USA, June 2010.
99. K.A. Morris, "LQ-Optimal Actuator Locations and Norm Convergence of Riccati Operators", *47th IEEE Conf. on Dec. & Cont.*, Cancun, Mexico, 2008.
100. S. Valadkhan, K.A. Morris and A. Khajepour, "Robust PI Control of Hysteretic Systems", *47th IEEE Conf. on Dec. & Cont.*, Cancun, Mexico, 2008.
101. K.A. Morris, "Convergence in Trace of LQ-Optimal Actuator Locations", *18th International symposium on Mathematical Theory of Networks and Systems*, Blacksburg, USA, 2008.
102. S. A. Campbell, S. Crawford and K. A. Morris, Time Delay and Feedback Control of an Inverted Pendulum with Stick Slip Friction, *ASME International Design Engineering Technical Conference*, Las Vegas, Na, 2007.
103. K.A. Morris and C. Navasca, "Iterative Solution of Algebraic Riccati Equations for Damped Systems" *45th IEEE Conf. on Dec. & Cont.*, San Diego, USA, 2006.

104. B. Jacobs, K. A. Morris and C. Trunk, "Minimum-Phase Behaviour of Damped Second-Order Systems with Position Measurements", *17th International symposium on Mathematical Theory of Networks and Systems*, Kyoto, Japan, 2006.
105. B. Jacobs and K. A. Morris, "Minimum-Phase SISO Second-Order Infinite-Dimensional Systems", *44rd IEEE Conf. on Dec. & Cont.*, Sevilla, Spain, 2005.
106. K. A. Morris and R. Rebarber, "Feedback-Invariant Subspaces in Infinite-Dimensional Systems", *44rd IEEE Conf. on Dec. & Cont.*, Sevilla, Spain, 2005.
107. R. Amjadifard, K. A. Morris, M. T. H. Beheshti, H. Khaloozadeh, "Robust Stabilization of an Inverted Pendulum using a Slow-Fast Decomposition Approach", *2005 International Federation on Automatic Control Conference*, June 2005.
108. A. Cheng and K.A. Morris, "Well-Posedness of Boundary Control Systems", *43rd IEEE Conference on Decision and Control*, Paradise Island, Bahamas, 2004.
109. K. Morris and C. Navasca, "Iterative Solution of Algebraic Riccati Equations using a Modified Newton-Kleinman Method", *16th International symposium on Mathematical Theory of Networks and Systems*, Leuven, Belgium, 2004.
110. A. Cheng and K.A. Morris, "Accurate Zeros Approximation for Infinite-Dimensional Systems", *42nd IEEE Conference on Decision and Control*, Honolulu, Hawaii, 2003.
111. S. Behjat, A. Khajepour and K.A. Morris, "A New Inchworm Mechanism with Hydraulic Booster", *27th ASME Biennial Mechanisms and Robotics Conference*, Montreal, PQ, 2002.
112. K.A. Morris and R. Rebarber, "Zeros of SISO Infinite-Dimensional Systems", *15th International symposium on Mathematical Theory of Networks and Systems*, South Bend, Indiana, 2002.
113. K.A. Morris, " H_∞ -Control of Acoustic Noise in a Duct with a Feedforward Configuration", *15th International symposium on Mathematical Theory of Networks and Systems*, South Bend, Indiana, 2002.
114. A. Cheng and K.A. Morris "Well-Posedness of Boundary Control Systems with Dirichlet Control", *14th International symposium on Mathematical Theory of Networks and Systems*, Perpignan, France, 2000.
115. A. Cheng and K.A. Morris, "Transfer Functions for Boundary Control Systems", *38th IEEE Conference on Decision and Control*, Phoenix, Arizona, 1999.
116. K.A. Morris, "Noise Reduction in Ducts Achievable by Feedforward Control", *37th IEEE Conference on Decision and Control*, Tampa, Florida, 1998, pg. 1552-1557.
117. R.B. Gorbet and K.A. Morris, "Generalized Dissipation in Hysteretic Systems", *37th IEEE Conference on Decision and Control*, Tampa, Florida, 1998, pg. 4133-4138.
118. R.B. Gorbet, K.A. Morris, D.W.L. Wang, "Preisach Model Identification of a Two-wire SMA Actuator", *Proc. of the 1998 IEEE Conference on Robotics & Automation*, Leuven, Belgium, 1998, pg. 2161-2167.
119. R.B. Gorbet, K.A. Morris, D.W.L. Wang, "Stability of Control for the Preisach Hysteresis Model", *Proc. of the 1997 IEEE Conference on Robotics & Automation*, New Mexico, 1997, pg. 241-247.
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125. A. Khajepour, M.F. Golnaraghi and K.A. Morris, "Vibration Suppression of a Flexible Beam Using Center Manifold Theory", *15th ASME Design Engineering Technical Conference: Symposium on Nonlinear Vibrations*, Boston, MA, 1995, DE-Vol. 84-1, Vol. 3, pg. 477-485.
126. K.A. Morris, "State-space Realizations of Coprime Factorizations of Well-posed Systems", *33rd IEEE Conference on Decision and Control*, Lake Buena Vista, Florida, 1994, pg. 3973-3974.
127. Kazufumi Ito and K.A. Morris, "An Approximation Theory of Solutions to Operator Riccati Equations for H_∞ -Control", *33rd IEEE Conference on Decision and Control*, Lake Buena Vista, Florida, 1994, pg. 3961-3966.
128. K.A. Morris, "Convergence of Controllers Designed Using State-Space Methods", *31st IEEE Conference on Decision and Control*, Tucson, Arizona, 1992, pg. 3521-3522.
129. H.T. Banks and K.A. Morris, "Input-Output Stability of Accelerometer Control Systems", *30th IEEE Conference on Decision and Control*, Brighton, England, December 1991, pg. 2676-2681.
130. K.A. Morris and J.N. Juang, "Robust Controller Design for Structures with Displacement Sensors", *30th IEEE Conference on Decision and Control*, Brighton, England, December 1991, pg. 1625-1626.
131. K.A. Morris, "Robustness of Controllers Designed Using Galerkin Type Approximations", *28th IEEE Conference on Decision and Control*, Tampa, Florida, December 1989, pg. 2679-2684.

CURRICULUM DEVELOPMENT

- Developed and taught 3 graduate courses: Introduction to Infinite-dimensional Systems Theory, Advanced Robust Control, Applied Functional Analysis
- Developed and taught interdisciplinary course in Mathematics & Music
- Developed online course for teachers in Mathematics & Music
- Established and maintain a Dynamics and Control Laboratory. This lab is used in our senior mathematics control course and for undergraduate research projects. It has been very successful in helping students learn the material. It is also used in outreach activities.
- Developed Control Theory course, an introduction for mathematics students to feedback control
- Redesignated Variational Calculus course to include applications to mechanics and optimal control

STUDENT SUPERVISION

Post-Doctoral Fellows and Graduate Students Supervised

Name	Degree/Year	Thesis	Position
Bradley Hedges	M.Math 2019-	to be determined	in progress
Bogdan Sherbak	M.Math 2018-	to be determined	in progress
Xuanri Li	M.Math. 2018-	joint actuator/sensor placement	in progress
Fabian Germ	M. Math 2017-	estimation of nonlinear PDEs	in progress
Stan Zonov	M. Math 2017-	Optimal estimation in lakes	in progress
M. Sajjad Edaletzadeh	Ph. D. 2015-	Optimal control of semilinear PDEs	in progress
Matthias de Jong	Ph.D. 2015-	Structural Modelling	in progress
Shuxia Tang	PDF 2017- 2018	Optimal sensor shape	PDF, Berkeley
Minxin Zhang	M.Math 2014-2016	Optimal sensor design	UC-San Diego
LuLu Wang	PhD 2015 (visiting)	Stabilization of coupled Diffusion/Schrodinger Equation	Beijing Inst. Tech.
Ambroise Vest	PDF 2014-2015	Optimal Damping	lecturer, France
Tawsif Khan	M.Math 2013-2015	Optimal Sensing of Lake Temperature	Senior Data Analyst, Rubikloud Technologies
Sepideh Afshar	PhD 2012-2017	Estimation in Lithium-Ion Batteries	PDF, Harvard
Amir Issaei	M.Math 2012-2014	Optimal Filtering	MDA Corp.
Arman Tavakoli	M.Math 2012-2014	H_2 -optimal Sensor Location	MDA Corp.
Ahmet Ozkan Ozer	PDF 2011-2013	Stabilization of Nonlinear Plates	Univ. of Nevada
Neda Darivandi	PhD 2009-2013	Shape Control of Structures	research, Hatch Inc.
Tyler Holden	M.Math. 2009-2011	Computation of quantum controls	doctoral student
Rasha al Jamal	PhD 2009-2013	Bounded Control of the Kuramoto-Sivashinsky Equation	assist. professor U Kuwait
Amenda Chow	PhD 2008-2013	Control of Hysteresis in the Landau-Lifshitz equation	assist. professor York Univ.
Alex Shum	Ph.D. 2009-2014	Optimal Path Planning	lect., Univ. Hong Kong
Dhanaraja Kasinathan	PhD 2007-2012	Optimal Actuator Location for H_∞ -Control	Senior research scientist, United Tech. Research
Alex Shum	M.Math 2009-2012	PID Control of Systems with Hysteresis	lect., Univ. Hong Kong
Robert Huneault	M.Math 2008-2010	Time-Optimal Control of Closed Quantum Systems	analyst Millennium Research
Sina Valadkhan	PDF 2007	Robust Nano-Positioning Control	control engineer Corning Inc.
Ramesh Periasamy	M.App.Sc. 2005-2007	Optimal Sensor/Actuator Placement for Shape Control	doctoral student

Post-Doctoral Fellows and Graduate Students Supervised (cont.)

Name	Degree/Year	Thesis	Position
Sina Valadkhan	Ph.D. 2004-2007 (Outstanding Achievement Award)	Nano-Positioning Control of Magnetostrictive Actuators	control engineer Corning Inc.
Roger Chau	M.Math 2005-2007	Controller Gain Optimization for Position Control of an SMA Wire	academic consultant, Alpha Academy
Elham Monifi	M.Math 2006-2007	Root-Locus Theory for Infinite-Dimensional Systems	lecturer, Iran
Sina Valadkhan	M.App.Sc. 2003-2004	Inchworm Micro-Positioning Devices	control engineer Corning Inc.
Andrei Titouura	M.Math. 2002-2004	Dissipative Controller Design	senior pension specialist, Fidelity HRS
Carmeliza Navasca	PDF 2002-2003	Solution of Large Riccati Equations	assoc. professor, Univ. Memphis
Sara Behjat	M.App.Sc., 2001-2003	New Inchworm Mechanism with Hydraulic Booster	industry
Edmund Obasi	M.Math. 2000-2002	Improved Duct Model and H_∞ -Control Design	Acoustical Analyst, Jacques Whitford Ltd
Ada Cheng	Ph.D. 1995-2000	Boundary Control Systems	assoc. professor, Kettering University
Kun-er Liao	M.Math. 1997-1999	Modelling of Acoustic Noise	Technical analyst, Infinity Corp.
Ben Zimmer	M.Math. 1997-1999	Improved Duct Model for Active Noise Control	owner, Enable Training & Consulting, Inc
Robert Gorbet	Ph.D. 1994-1997	Control of Hysteretic Systems with Preisach Representations	associate professor, Waterloo
Natalie Baddour	M.Math. 1994-1996	Modelling & Control of Automotive Suspensions	professor, U. of Ottawa
Ada Cheng	M.Math. 1993-1995	Convergence of Finite-Dimensional Approximations	assoc. professor, Kettering University
Janet Grad	Ph.D. 1993-1997	H_∞ -Control of Acoustic Noise	Senior Analyst, Petro-Canada Ltd.
Amir Khajepour	Ph.D. 1992-1995	Center Manifold & Normal Forms applied to Nonlinear Control	professor, Mech.Eng. Dept., Waterloo
Janet Grad	M.Math. 1991-1993	Numerical Linear Quadratic Control of Infinite-Dimensional Systems	Senior Analyst, Petro-Canada Ltd.
Krista Taylor	M.Math. 1991-1993	Modelling of Flexible Slewing Beams	quality control,