Carmeliza Luna Navasca

Assistant Professor
University of Alabama at Birmingham
Department of Mathematics
cnavasca@uab.edu
1 205 934 8621 (office)

Education

University of California at Davis
PhD in Mathematics, 2002
Advisor: Arthur J. Krener
Thesis: Local Solutions of the Dynamic Programming Equations and the Hamilton-Jacobi-Bellman PDE

University of California at Berkeley
BA in Mathematics, 1997

Employment

University of Alabama at Birmingham, Department of Mathematics, Birmingham, AL
Assistant Professor 2012- present

Clarkson University, Department of Mathematics, Potsdam, NY
Assistant Professor 2008 - 2012

RIT, Department of Mathematics, Rochester, NY
Assistant Professor 2007 - 2008

Centre National de la Recherche Scientifique (CNRS), Signal and Image Processing Laboratory (ETIS), Cergy-Pontoise, FRANCE
Postdoctoral Fellow 2006 - 2007
Mentor: Lieven De Lathauwer

University of California at Los Angeles, Department of Mathematics, Los Angeles, CA
NSF-VIGRE Assistant Professor 2003 - 2006
Mentor: Stanley J. Osher

University of Waterloo, Department of Applied Mathematics, Waterloo, Ontario, CANADA
Postdoctoral Fellow 2002 - 2003
Mentor: Kirsten A. Morris

University of California at Davis, Department of Mathematics, Davis, CA
Research and Teaching Assistant 1997 - 2002

NASA Ames Research Center, Mountain View, CA
Summer Research Assistant 1992 - 1996

Grants

- **NSF DMS 0915100, Computational Mathematics, PI**, *Numerical Multilinear Algebra in Signal Processing and Environmetrics*, 2009-2013, $182,142
- **Institute for a Sustainable Environment, PI**, *Fast Tensor Decomposition Algorithms*, 2010-2011,$2500

ACADEMIC HONORS and FELLOWSHIPS

2006 – 2007	CNRS Postdoctoral Fellowship, France
2003 – 2006	NSF-VIGRE Postdoctoral Fellowship, UCLA
2002	Alice Leung Mathematical Prize, UC Davis Math Department
2001	Best Poster Prize, Richard Tapia Symposium 2001
2000 – 2001	Research Mentorship Fellowship, UC Davis
1999 & 2002	Graduate Assistance in Areas of National Need Fellowship, UC Davis Math Department
1992 – 1996	NASA Junior Fellowship, NASA Ames Research Center, Mountain View, California
1992	Robert Moretti Scholarship, UC Berkeley
1991 – 1992	NASA SHARP Apprenticeship, NASA Ames Research Center, Mountain View, California

PUBLICATIONS

available at http://people.cas.uab.edu/∼cnavasca

Refereed Publications:

1. *Analysis and Approximation of the Hybrid Optimal Control of Play Operators* (with Kirsten Morris), in preparation (likely submission date: Aug 2012)
2. *Randomized Tensor Algorithms for Facial Recognition* (with Ryan Sigurdson), to appear in the Proceedings of the IEEE Asilomar Conference on Signals, Systems, and Computers, November 2012
3. *New Algorithms for Tensor Decomposition based on a Reduced Functional* (with Stefan Kindermann), submitted to Numerical Linear Algebra and Applications (http://arxiv.org/abs/1109.3832)
4. *Block Tensor Decomposition for Source Apportionment to Air Pollution* (with Philip K. Hopke, Kumar Pramod and Na Li), in revision for Chemometrics and Intelligent Laboratory Systems (http://arxiv.org/abs/1110.4133)
5. *Some Convergent Results of the Regularized Alternating Least-Squares for Tensor Decomposition* (with Na Li and Stefan Kindermann), to appear in Linear Algebra and Applications (http://dx.doi.org/10.1016/j.laa.2011.12.002)
6. *Tensor and Matrix Inversion with Applications* (with Michael Brazell, Na Li and Christino Tamon), submitted to SIAM Matrix Analysis (http://arxiv.org/abs/1109.3830)
7. *Tensors as Module Homomorphisms over Group Rings* (with Michael Opperman, Timothy Penderghest and Christino Tamon), submitted to Linear Algebra and Applications (http://arxiv.org/abs/1005.1894)
8. *Sparseness Constraints on Nonnegative Tensor Decomposition* (with Na Li), in the Proceedings of the IEEE Asilomar Conference on Signals, Systems, and Computers, November 2010.
9. *Recovery of Tensor Data from Incomplete Measurement via Compressed Sampling* (with Jason Holloway), in the Proceedings of the IEEE Asilomar Conference on Signals, Systems, and Computers, November 2009.
10. *Low Multilinear Rank Tensor Decomposition via Semidefinite Programming* (with Lieven De Lathauwer), in the Proceedings of the European Signal Processing Conference, Glasgow, Scotland, August 2009.
11. *Approximation of Low Rank Solutions for Linear Quadratic Feedback for Partial Differential Equations* (with Kirsten Morris), Computational Optimization and Applications, 46 (1) (2010), pp. 93-111.
12. *Patchy Cost and Feedback for the HJB PDE* (with Arthur J. Krener), in the Proceedings of the Mathematical Theory of Networks and Systems, Blacksburg, Virginia, July 2008.
13. *Swamp Reducing Technique for Tensor Decomposition* (with Lieven De Lathauwer and Stefan Kindermann), in the Proceedings of the European Signal Processing Conference, Lausanne, Switzerland, Aug 2008.
14. *Patchy Solution of the Hamilton-Jacobi-Bellman PDE* (with Arthur J. Krener), in Chiuso, Ferrante and Pinzoni, eds, Modeling, Estimation and Control, Lecture Notes in Control and Information Sciences, 364, Springer, Berlin, pp. 251-270, 2007.

15. *Implementations of Control Laws of Motion Camouflage in a Pursuit-Evasion System* (with Ani Asatryan, Vatche Attarian, Yuan F. Huang, Kevin K. Leung, Abhijeet Joshi, Vlad Voroninski, Meghdi Aboulian and Krystle McBride), Proceedings of the IFIP Conference on System Modeling and Optimization, Krakow, Poland 2007.

16. *Iterative Solution of Algebraic Riccati Equations for Damped System* (with Kirsten Morris), Proceedings of the IEEE Conference on Decision and Control, San Diego 2006.

17. *Optimal Control as a Regularization Method for Ill-posed Problems* (with Stefan Kindermann), J. Inverse and Ill-posed Problems, 14 (7), pp. 685-703, 2006.

18. *The Lax-Friedrichs Sweeping Method for Optimal Control Problem in Continuous and Hybrid Dynamics* (with Chiu-Yen Kao and Stanley J. Osher), J. Nonlinear Analysis 63 (5-7), pp. 1561-1572, 2005.

19. *Iterative Solution of Algebraic Riccati Equations Using a Modified Newton-Kleinman Method* (with Kirsten Morris), Proceedings of Mathematical Theory of Networks and Systems, Brussels, Belgium 2004.

20. *Solution of Algebraic Riccati Equations Arising in Control of Partial Differential Equations* (with Kirsten Morris), in P. Zolesio and J. Cagnol, eds, Control of Distributed Parameter System, Lecture Notes in Pure and Appl. Math., vol . 240, CRC Press, Boca Raton, 259-281, 2004.

21. *Solution of Hamilton-Jacobi-Bellman equations* (with Arthur J. Krener), Proceedings of the IEEE Conference on Decision and Control, Sydney, 570-574, 2000.

Thesis:

22. *Local Solutions of the Dynamic Programming Equations and the Hamilton-Jacobi-Bellman PDE*, Ph.D. Thesis, University of California, Davis, 2002.

Other Manuscripts:

23. *Parameter Identification in Radio-Frequency Ablation* (with Hanne Tiesler and Christof Büskens), International Association of Applied Mathematiccs and Mechanics (Gesellschaft fur Angewandte Mathematik und Mechanik), March 2008.

24. *Web Hosting Service Level Agreements* (with Alan King et al.), IBM Research Report, RC22301, (2002), Also in Proceedings of the 5th Pacific Institute for Mathematical Sciences 2001 Industrial Problem Solving Workshop, University of Washington, Seattle, 2001.

PRESENTATIONS

Invited Seminars and Colloquia

1. Applied Math Colloquium, Naval Postgraduate School, Monterey, California, July 2012.

2. Math Colloquium, University of Alabama, Birmingham, February 2012.

3. Scientific Computing and Numerics Seminar, Cornell University, Ithaca, October 2011.

4. Research Seminar, School of Mathematics, Institute for Advanced Study, Princeton, New Jersey, May 2011.

5. Center for Research Computing, University of Rochester, March 2011.

6. Optimization Seminar, Department of Mathematics, University of California at Davis, June 2010.

7. Applied Math Colloquium, Radon Institute for Computational and Applied Math, Kepler Universität, Linz, Austria, August 2009.

8. Applied Math Colloquium, University of Waterloo, Canada, February 2009.
9. Math Colloquium, Memorial University of Newfoundland, St. John's, Canada, November 2008.
10. Applied Math Colloquium, Naval Postgraduate School, Monterey, California, July 2008.
11. Mathematics, Informatics, and Decision Sciences Department, Sandia National Lab, Livermore, California, June 2008.
12. Math Colloquium, San José State University, California, March 2008.
13. Math Colloquium, Clarkson University, Potsdam, New York, February 2008.
14. Math Colloquium, Georgetown University, Washington DC, January 2008.
15. Center of Complex Systems and Visualization, Department of Mathematics and Computer Science, Universität Bremen, Germany, August 2007.
16. Math Colloquium, Rochester Institute of Technology, New York, June 2007.
17. Applied Math Colloquium, University of Waterloo, Canada, June 2007.
18. Institute of Industrial Technology and Management, Control Systems and Engineering, Rijksuniversiteit Groningen, The Netherlands, June 2007.
19. Signal and Image Processing Lab (ETIS), CNRS, Ecole National Superieure de l'Electronique et de ses Applications, Cergy-Pontoise, France, September 2006.
20. Applied Math Colloquium, University of Maryland Baltimore County, February 2006.
21. Math Colloquium, Western Washington University, Bellingham, January 2006.
22. Center for Systems, Dynamics, and Control, School of Engineering and Applied Sciences, University of California, Los Angeles, November 2003.
23. Applied Math Colloquium, University of Southern California, Los Angeles, November 2003.
24. Applied Math Colloquium, University of California, Los Angeles, October 2003.
25. Computational and Applied Math Colloquium, Rice University, Houston, February 2003.
26. Applied Math Colloquium, University of Waterloo, Ontario, Canada, March 2002.
27. Center for Control Engineering and Computation, University of California, Santa Barbara, November 2001.

Conferences, Workshops, etc.

28. International Conference on Spectral Theory of Tensor, Chern Institute, Nankai University, Tianjin, China, May 2012.
29. 5th Biennial Regional Meeting on Nonlinear Control and its Applications Meeting, University of Toronto, Canada, May 2012.
30. AFOSR-NSF Workshop on Computational Issues in Nonlinear Control, Monterey, California, November 2011.
31. 9th SIAM Conference on Control and Its Applications, Baltimore, Maryland, July 2011.
32. Workshop on Tensor Decompositions and Applications (TDA 2010), Monopoli, Bari, Italy, Sept 2010.
33. 2010 SIAM Annual Conference, Minisymposium on Tensor Computations and Applications, Pittsburgh, Pennsylvania, July 2010.
34. AFOSR Workshop on Computational Issues in Nonlinear Control, Monterey, California, November 2009.

35. 17th European Signal Processing Conference, Glasgow, Scotland, August 2009.
36. Conference on Applied Inverse Problems, Vienna, Austria, July 2009.
37. 8th SIAM Conference on Control and Its Applications, Minisymposium on Model Development and Control Design for Hysteretic Systems, Denver, Colorado, July 2009.
38. 8th SIAM Conference on Control and Its Applications, Minisymposium on Numerical Solution of Riccati Equations, Denver, Colorado, July 2009.
39. AFOSR Conference on Sensing, Surveillance and Navigation, Arlington, Virginia, June 2009.
40. 16th European Signal Processing Conference, Lausanne, Switzerland, Aug 2008.
41. Mathematical Theory of Networks and Systems, Blacksburg, Virginia, July 2008.
42. Applied and Computational Harmonic Analysis, 5th World Congress of Nonlinear Analysts, Orlando, Florida, July 2008.
43. 3rd Biennial Regional Meeting on Nonlinear Control and its Applications Meeting, Waterloo, Canada, May 2008.
44. International Conference of Modeling, Estimation and Control, *in honor of Giorgio Picci's 65th Birthday*, Venice, Italy, October 2007.
45. 23rd IFIP Conference on System Modeling and Optimization, Krakow, Poland, July 2007.
46. 7th SIAM Conference on Control and Its Applications, San Francisco, California, June 2007.
47. 45th IEEE Conference on Decision and Control, San Diego, California, December 2006.
48. 22nd IFIP Conference on System Modeling and Optimization, Turin, Italy, July 2005.
49. 6th SIAM Conference on Control and Its Applications, New Orleans, Louisiana, July 2005.
50. 4th Annual Systems and Control Symposium, School of Engineering and Applied Sciences, University of California, Los Angeles, May 2005.
51. 10th Southern California Nonlinear Control Workshop, University of California, San Diego, May 2005.
52. Coupled Problems, Processes, and Phenomena: Modelling, Control, and Analysis, 4th World Congress of Nonlinear Analysts, Orlando, Florida, June 2004
53. 21st IFIP Conference on System Modelling and Optimization, INRIA, Sophia Antipolis, France, July 2003.
54. GO++ Winter School on Numerical Methods for HJ/HJB Problems, INRIA, Rocquencourt, France, December 2002.
55. Symposium on New Trends in Nonlinear Dynamics and Control and Their Application, *in celebration of Arthur J. Krener's 60th Birthday*, Monterey, California, October 2002.
56. Richard Tapia Symposium, Houston, Texas, October 2001.
57. 5th PIMS Industrial Problem Solving Workshop, University of Washington, Seattle, June 2001.
58. 2001 SIAM Annual Meeting, San Diego, California, July 2001.

Outreach Talks

59. Science Cafe, Clarkson University, October 2010.
60. NSF-REU Seminar, Department of Mathematics, SUNY Potsdam, June 2009.
61. Graduate Student Outreach Seminar, University of California, Los Angeles, May 2005.

62. Women in Mathematics, University of Waterloo, March 2003.

Schools and Workshops Participation:

63. Women and Mathematics Program: Sparsity and Computation, Institute of Advanced Study, Princeton, May 16-27, 2011.
64. NSF-FRG Workshop on Quantum Spin Systems and Quantum Information Theory, University of Rochester, May 21-25, 2010.
65. 4th Biennual Regional Meeting on Nonlinear Control and its Applications, Queen's University, Kingston, Ontario, May 13-15, 2010.
66. 2010 Computational Optimization for Tensor Decompositions, American Institute of Mathematics, Palo Alto, California, March 29-April 2, 2010.
67. IPAM, Numerical Tools and Fast Algorithms for Massive Data Mining, Search Engines and Applications, University of California, Los Angeles, October 22-25, 2007.
68. IMA, Compressive Sampling and Frontiers of Signal Processing, University of Minnesota, Minneapolis, June 4-15, 2007

TECHNICAL and LANGUAGE SKILLS

- Computer Languages: C/C++, Fortran, Matlab, Maple, Mathematica
- Platforms: Mac OS, Linux, Windows
- Languages: English, French, Spanish, Tagalog

PROFESSIONAL SERVICES

- Organizer: (co-organized with Christino Tamon, Clarkson University) Minisymposia on Tensor Computation and Applications, 2010 SIAM Annual Meeting, Pittsburg, July 12-16, 2010.
- Organizer: (co-organized with Stefan Kindermann, Kepler Universität) Minisymposium on Inverse and Ill-Posed Problems in Tensor Decomposition, 2009 Applied Inverse Problem, Vienna, July 20-24, 2009.
- Organizer: (co-organized with Tobias Presseur, Universität Bremen) Minisymposia on "Optimization in Biomedical Applications," SIAM Conference on Optimization, Boston, May 10 - 13 2008.
- Organizer: (co-organized with Wei Kang, Naval Postgraduate School) Minisymposium on "Partial Differential Equations in Control Theory," SIAM Conference on Control and Its Application, San Francisco, June 29 - July 1st 2007.
- Referee Work: IEEE Transactions on Automatic Control, SIAM Journal of Matrix Analysis, SIAM Journal on Control and Optimization, Linear Algebra and its Applications, Journal of Signal Processing, Chemometrics and Intelligent Laboratory Systems, Electronic Journal Linear Algebra, Proceedings of the European Signal Processing Conference, Proceedings of the American Control Conference, Proceedings IEEE Conference of Control and Decision, Proceedings of European Control Conference, IEEE Transactions on Control Systems Technology, Quarterly Journal of Mechanics and Applied Mathematics, International Journal of Computer Mathematics, American Mathematical Monthly
- AWM Mentor: Mentoring women graduate students, February 2001-present.
- NSF Panel Reviewer

- PhD Thesis Committee Member: Brendan Mascarenhas (2009), Ahmad Almomani (2012)
- External Dissertation Reviewer: Arizona State (2010)
- Clarkson Honors Thesis Committee Member: Matt Parno (2008)
- Annual K-8 Mohawk Science Judge, 2009
- Moody's Mega Math Challenge Judge, 2010, 2011

TEACHING ACTIVITIES

- Topics Courses in Numerical Analysis: Matrix and Tensor Decomposition, Sparse Factorization, Numerical Analysis in High Dimension, and Optimization (Graduate Level). Clarkson (Fall 2009, Spring 2010, Fall 2010, Fall 2011, Spring 2012)
- Seminar: Mathematical Writing (Graduate Level). Clarkson (Spring 2012)
- Matrix Analysis and Computation (Graduate Level). Clarkson (Fall 2011)
- Numerical Analysis (Graduate level). Clarkson (Fall 2010)
- Fundamentals of Scientific Computing (Graduate level). Clarkson (Fall 2009)
- Finite Element Method (Graduate level). Clarkson (Fall 2008)
- Mathematical Control Theory (Graduate level). UCLA (Spring 2005)
- Numerical Differential Equations (Graduate level). UCLA (Fall 2004)
- Applied Linear Algebra. Clarkson (Spring 2010)
- Boundary Value Problems. Clarkson (Spring 2009, Spring 2012)
- Optimization. UCLA (Spring 2006)
- Numerical Methods. UCLA (Fall 2003, Winter 2004, Winter 2005) and Clarkson (Fall 2009, Fall 2010)
- Mathematical Modeling. UCLA (Spring 2004, Winter 2006) and Clarkson (Spring 2010)
- Differential Equations. UC Davis (Spring 1999), UCLA (Fall 2005) and Clarkson (Fall 2011, Spring 2012)
- Vector Calculus (Calculus III). RIT (Winter 2008) and Clarkson (Spring 2009)
- Matrices and Boundary Value Problems. RIT (Spring 2008)
- Calculus II. RIT (Fall 2007)
- Calculus I. UC Davis (Summer 1999), University of Waterloo (Fall 2002) and UAB (Fall 2012)

RESEARCH SUPERVISING

Postdoctoral Fellow

- Pramod Kumar
  Project: Fast Tensor Algorithms with Applications to Environmental Data
  Current Position: Postdoc in Chemical Eng, Clarkson University, 2010-present (Mentor: Philip K. Hopke)

Graduate Students

- Na Li
  PhD Thesis: Tensor Decompositions and Applications
  Current Position: Graduate student in Mathematics, Clarkson University, expected 2013
- Abdoulaye Bagayoko, MS (2007) and PhD (2010) in Electrical Engineering, Université de Cergy-Pontoise and Ecole Nationale Superieure de l'Electronique et de ses Applications (ENSEA), France
  Master's Thesis: Tensor Decomposition in the Presence of Non-Gaussian Noise
  Current Position: Communications System Engineer at NEC Technologies, United Kingdom

Undergraduate Students

- Andrew Doyle, BS in Physics/Chemical Engineering, Clarkson University, 2012
  Project: Tensor Computation in Controlling Nanostructures
  Current Position: Graduate student in Chemical Engineering, Stanford University
- Alexander Thomas
  Project: Tensor Symmetries
  Current Position: High school senior/Undergraduate student in Mathematics and Computer Science, The Clarkson School, Clarkson University, expected 2014
- Ryan Sigurdson, BS in Mathematics and Economics, University of Rochester, 2012
  Project: Randomized Tensor Algorithms for Data Mining
  Current Position: Research Assistant at the University of Rochester Medical Center
- Melissa Shepard
  Project: Higher-Order Tensor Visualization and Representation
  Current Position: Undergraduate student in Mathematics, Clarkson University, expected 2012
- Maggie Leung
  Project: Tensor Computation in Environmetrics
  Current Position: Undergraduate student in Chemical Engineering, Clarkson University, expected 2012
- Jason Holloway, BS in Physics/Electrical Engineering with Math minor, Clarkson University, 2010
  Project: Recovery of Tensor Data via Compressed Sensing
  Current Position: Graduate student in Electrical Engineering, Rice University
- Meghdi Aboulian, BS in Mathematics, UCLA, 2007, M.S. in Mathematics, USC, 2009
  Topic: Mathematical modeling of motion camouflage (NSF-REU Project)
  Current Position: Engineer at Raytheon, Los Angeles
- Ani Asatryan, BS in Mathematics, UCLA, 2007
  Topic: Analysis of pursuit-evasion system (NSF-REU Project)
  Current Position: Graduate student in Mathematics, University of California, Irvine
- Vatche Attarian, BS in Engineering, Harvey Mudd, 2007
  Topic: Numerical methods for solving pursuit-evasion system (NSF-REU Project)
  Current Position: Graduate student in Mechanical Engineering, Imperial College London.
- Krystle McBride, BS in Mathematics, Harvey Mudd College, 2007
  Topic: Dynamic coordinated control laws in multiple agent models (NSF-REU Project)
- Hai Nguyen, BS in Mathematics, UCLA, 2005, PhD in Statistics, UCLA
  Topic: Level set methods
  Current Position: Postdoctoral Scholar at Caltech
- Celeste Velasquez, BS in Mathematics, UCLA, 2005
  Topic: Artificial fish modeling
  Current Position: Engineer at Boeing Company, Los Angeles