

## Renato C. Calleja

Burnside Hall, Room 1005,  
805 Sherbrooke Street West,  
Montreal, Quebec,  
Canada, H3A 2K6

Webpage: <http://www.math.mcgill.ca/calleja/>

Languages: English, Spanish (native), French

Date of Birth: November 12th, 1978

Tel: +1-514-398-3853

Email: [calleja@math.mcgill.ca](mailto:calleja@math.mcgill.ca)

## Education

- Ph.D. *Mathematics*  
University of Texas at Austin  
August 2004 - May 2009  
Advisor: Rafael de la Llave  
Thesis: *Existence and persistence of invariant objects in dynamical systems and mathematical physics*<sup>1</sup>
- B.S. *Applied Mathematics* (honors)  
Instituto Tecnológico Autónomo de México  
August 1999 - June 2004  
Advisor: Héctor E. Lomelí  
Thesis: *Symplectic dynamics and numerical approximations of separatrices and chaotic transport*

## Employment

- *Postdoctoral Fellow*  
August 2009 - August 2012, McGill University, Concordia University, and Centre de Recherches Mathématiques  
Supervisors: Eusebius Doedel and Antony R. Humphries  
Montreal, Canada
- *Visiting Researcher*  
September 2008 - December 2008, Centre de Recerca Matemàtica  
Barcelona, Spain
- *Graduate Research Assistant*  
Summer 2006, 2007, & 2008, The University of Texas at Austin  
Austin, USA
- *Teacher Assistant*  
August 2004 - May 2009, The University of Texas at Austin  
Austin, USA

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<sup>1</sup>Frank Gerth III Dissertation Award

- *Visiting Professor (for a week or less)*
  - Università di Roma (Tor Vergata), December 2008, June 2009 & July 2010
  - University of Toronto, September 2011
  - McMaster University, September 2011

## Publications

- Renato Calleja, Alessandra Celletti, & Rafael de la Llave, *Local behavior near quasi-periodic solutions of conformally symplectic systems*, submitted (2011)  
Preprint available at [http://www.ma.utexas.edu/mp\\_arc-bin/mpa?yn=12-16](http://www.ma.utexas.edu/mp_arc-bin/mpa?yn=12-16)
- Renato Calleja, Alessandra Celletti, & Rafael de la Llave, *KAM theory for conformally symplectic systems*, preprint (2011)  
Preprint available at [http://www.ma.utexas.edu/mp\\_arc-bin/mpa?yn=11-188](http://www.ma.utexas.edu/mp_arc-bin/mpa?yn=11-188)
- Renato Calleja & Jordi-Lluis Figueras, *Collision of invariant bundles of quasi-periodic attractors in the dissipative standard map*, submitted (2011)  
Preprint available at [http://www.ma.utexas.edu/mp\\_arc-bin/mpa?yn=11-182](http://www.ma.utexas.edu/mp_arc-bin/mpa?yn=11-182)
- Renato Calleja, Eusebius Doedel, Antony R. Humphries, & Bart Oldeman, *Computing invariant manifolds and connecting orbits in the restricted three body problem*, submitted (2011), Preprint available at <http://arxiv.org/abs/1111.0032>
- Renato Calleja & Rafael de la Llave, *Computation of the breakdown of analyticity in statistical mechanics models: numerical results and a renormalization group explanation*, *Journal of Statistical Physics* (2010) 141:940-951
- Renato Calleja & Rafael de la Llave, *A numerically accessible criterion for the breakdown of quasi-periodic solutions and its rigorous justification*, *Nonlinearity* 23, (2010) 2029-2058
- Renato Calleja & Alessandra Celletti, *Breakdown of invariant attractors for the dissipative standard map*, *Chaos* 20 0131 21 (2010)
- Renato Calleja & Yannick Sire, *Travelling waves in discrete nonlinear systems with non-nearest neighbor interactions*, *Nonlinearity* 22, (2009) 2583-2605 <sup>2</sup>
- Renato Calleja & Rafael de la Llave, *Fast numerical computation of quasi-periodic equilibrium states in 1-D statistical mechanics models, including twist maps*, *Nonlinearity* 22, (2009) 1311-1336<sup>3</sup>
- Héctor E. Lomelí & Renato Calleja, *Heteroclinic bifurcations and chaotic transport in the two-harmonic Standard Map*, *Chaos* 16, 0231 17 (2006)

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<sup>2</sup>One of the most read papers in *Nonlinearity* as of 2009

<sup>3</sup>One of the most cited papers in *Nonlinearity* as of 2009

## Publications in preparation

- Antony R. Humphries, Daniel A. Bernucci, Renato Calleja, Namdar Homayounfar & Michael Snarski, *Periodic Solutions of a Singularly Perturbed Delay Differential Equation With Two State-Dependent Delays*, in preparation (2011)
- Renato Calleja, Nikolaos Christodoulou, & Antony. R. Humphries, *Hopf Bifurcations under discretization by Runge-Kutta Methods*, in preparation (2011)

## Awards and Fellowships

- *Postdoctoral Fellowships*
  - McGill University, Concordia University, and Centre de Recherches Mathématiques  
September 2009 - August 2010  
September 2011- August 2012
  - Programme de Bourses d'Excellence pour Étudiants Étrangers (PBEEE)  
Fonds de recherche du Qubec – Nature et technologies (FQRNT)  
Hosted by McGill University  
September 2010 - August 2011
- *Frank Gerth III Dissertation Award*  
Department of Mathematics, University of Texas at Austin  
May 2009
- *E.D. Farmer Fellowship*  
The Mexican Center, University of Texas at Austin  
September 2007 - May 2008
- *Burton Fellowship*  
Department of Mathematics, University of Texas at Austin  
September 2004 - May 2005
- *Regents Scholarship*  
Department of Mathematics, University of Texas at Austin  
May 2005

## Teaching

- *University of Texas at Austin*  
Teaching Assistant, Department of Mathematics
  - Calculus I, Fall 2004
  - Real Analysis I, Spring 2005

- Advance Calculus for Applications I, Fall 2005 and 2006, Spring 2006 & 2008
- Probability I, Spring 2007
- Elementary Methods in Statistics, Fall 2007
- Introduction to Mathematics, Spring 2009
- *McGill University*  
Course instructor, Department of Mathematics and Statistics
  - Nonlinear Dynamics and Chaos, Fall 2009 & 2011
  - Honors Nonlinear Dynamics, Fall 2009 & 2011
  - Ordinary Differential Equations for Engineers, Fall 2010

## Undergraduate Students Supervised

- Department of Mathematics and Statistics, McGill University
  - *Robert Gibson*  
Numerical Analysis of Wave Maps (co-supervised with Gantumur Tsogtgerel)  
Summer 2010
  - *Namdar Homayounfar*  
Numerical Analysis of a State-Dependent Delay Equation close to a singular limit. (co-supervised with Antony R. Humphries)  
Summer & Fall 2011

## Conference organizing

- Mini-symposium, *Oscillatory Dynamics in Delay Differential Equations*  
Conference on the Applications of Dynamical Systems, SIAM  
Snowbird, USA. May 25th, 2011

## Recent Conference and Seminar Talks

- *KAM theory for dissipative systems*
  - Dynamical Systems Seminar, University of Toronto  
Toronto, Canada. September 28th, 2011
  - PDE/Analysis Seminar, McMaster University  
Hamilton, Canada. September 30th, 2011
  - Conferencia A y F-M, Universidad Autónoma del Estado de Hidalgo  
Pachuca, Mexico. January 12th, 2011
- *Invariant Tori in Scalar State-dependent DDEs*  
International Conference of Industrial and Applied Mathematics (ICIAM)  
Vancouver, Canada. July 20th, 2011

- *KAM theory for dissipative systems: from rigorous results to numerics*  
Workshop on KAM Theory and Numerical Integration  
Banff, Canada. June 10th, 2011
- *Computing the Boundary of Analyticity of Families of Quasiperiodic Solutions*  
Conference on the Applications of Dynamical Systems, SIAM  
Snowbird, USA. May 25th, 2011
- *La importancia de los objetos invariantes en sistemas dinámicos y matemáticas aplicadas*  
Mathematics Seminar, Instituto Tecnológico Autónomo de México  
Mexico City, Mexico. January 14th, 2011
- *Breakdown of analyticity: From rigorous results to numerics*  
Workshop Bifurcation Analysis and Applications, Concordia University  
Montreal, Canada. July 7th, 2010
- *Travelling waves and advance delay differential equations*  
State-Dependent Delay Equations International Workshop, Max-Planck-Institut für  
Physik komplexer Systeme, Dresden, Germany. October 13 2009.

## References

Rafael de la Llave  
email: [r116@math.gatech.edu](mailto:r116@math.gatech.edu)  
School of Mathematics  
Georgia Institute of Technology  
686 Cherry Street  
Atlanta, GA 30332-0160, USA

Alessandra Celletti  
email: [celletti@mat.uniroma2.it](mailto:celletti@mat.uniroma2.it)  
Dipartimento di Matematica  
Università di Roma “Tor Vergata”  
Via della Ricerca Scientifica  
00133, Roma, Italy

Antony R. Humphries  
email: [tony.humphries@mail.mcgill.ca](mailto:tony.humphries@mail.mcgill.ca)  
Department of Mathematics and Statistics  
McGill University  
805 Sherbrooke West  
Montreal, Quebec H3A 2K6, Canada

Eusebius J. Doedel  
email: [doedel@cse.concordia.ca](mailto:doedel@cse.concordia.ca)  
Computer Science Department  
Concordia University  
1455 boulevard de Maisonneuve O.  
Montreal, Quebec, H3G 1M8, Canada