

Hermann Mena

Prof. Dr. habil.

Yachay Tech
Department of Mathematics
San Miguel de Urcuquí, Ecuador
☎ +593 6 299 9130
✉ mena@yachaytech.edu.ec
🌐 <http://www.hermann-mena.org>



Personal Information

Date of Birth April 9, 1979
Place of Birth Otavalo, Ecuador
Citizenship Ecuadorian

Education

- 06/2016 **Habilitation (habil.)** in Mathematics at University of Innsbruck, Austria
Title of Habilitation Thesis: *Linear Quadratic Optimization of Stochastic Partial Differential Equations: Theory and Numerical Approximation.*
First Reviewer: Prof. Dr. Gianmario Tessitore,
Second Reviewer: Prof. Dr. Stevan Pilipović,
Third Reviewer: Prof. Dr. Tobias Damm,
Fourth Reviewer: Prof. Dr. Volker Mehrmann.
- 08/2007 **Doctor of Philosophy (Ph.D./Dr. rer. nat.)** in Applied Mathematics at Escuela Politécnica Nacional, Ecuador; partnership program with Technische Universität Berlin, Germany
Title of Dissertation: *Numerical Solution of Differential Riccati Equations Arising in Optimal Control Problems for Parabolic Partial Differential Equations.*
Adviser: Prof. Dr. Peter Benner,
Second Examiner: Prof. Dr. Heike Faßbender.
- 03/2003 **Diploma** in Pure Mathematics at Escuela Politécnica Nacional, Ecuador
Title of Thesis: *Multiple solutions for some inhomogeneous nonlinear elliptic problems.*

Research Interests

Applied Mathematics, Numerical analysis, Computational Science, Linear Quadratic Optimization, Optimization Under Uncertainty, Parallel and Distributed Systems.

Professional Record

- 09/2016 – **Associate Professor**, *Tenure track, Department of Mathematics, Yachay Tech*, present San Miguel de Urucuquí, Ecuador.
- 09/2016 – **Principal Investigator**, *P 27926 Einzelprojekte FWF, Univeristy of Innsbruck*, present Innsbruck, Austria.
- 01/2013 – **Universitätsassistent**, *Assitant Professor, Numerical Analysis, Department of Mathematics, University of Innsbruck*, Innsbruck, Austria.
08/2016
- 01/2008 – **Associate Professor**, *Tenure granted in 01/2009, Department of Mathematics*, 12/2012 *Escuela Politécnica Nacional*, Quito, Ecuador.
- 01/2009 – **Visiting Professor**, *Long term visit*.
04/2009 Massachusetts Institute of Technology (MIT), Cambridge (MA) USA. Department of Mathematics, Applied Mathematics and Scientific Computing, Host: Prof. Gilbert Strang (Spring term 2009)
- 2008 – 2017 **Visiting Professor**, *Short term visits*.
- University of Kaiserslautern, Kaiserslautern, Germany, October 2017 (two weeks), October 2014 (one week).
 - Technische Universität Berlin, Berlin, Germany, July 2017 (one week), October 2016 (one week) and February 2015 (one week).
 - Max Planck Institute for Dynamics of Complex Technical Systems, Magdeburg, Germany, August 2017 (one week), May 2016 (one week), May 2014 (one week), August 2013 (one week), June 2012 (two months) and June 2011 (two months).
 - Universidad de Buenos Aires, Buenos Aires, Argentina, March 2017 (two weeks) and October 2009 (one week).
 - Massachusetts Institute of Technology (MIT), Cambridge, USA, March 2017 (one week).
 - Temple University, Philadelphia, USA, February 2017 (one week) and October 2015 (one week).
 - RICAM, Austrian Academy of Sciences, Linz, Austria, February 2017 (one week) and February 2016 (one week).
 - Universidad Carlos III, Madrid, Spain, April 2016 (one week).
 - Université Paris Dauphine, Paris, France, March 2016 (one week).
 - University of Electronic Science and Technology of China, Chengdu, China, July 2015 (Guest Lecturer for two weeks).
 - Eötvös Loránd University, Budapest, Hungary April 2015 (two weeks) and March 2014 (one week).
 - Universidad de la República, Montevideo, Uruguay, December 2014 (Guest Lecturer for two weeks), September 2011 (one week).
 - Serbian Academy of Sciences and Arts, Belgrade, Serbia, November 2014 (three days).
 - Lund University, Lund, Sweeden, May 2014 (one week).
 - Josip Juraj Strossmayer University of Osijek, Croatia October 2013 (Guest Lecturer for two weeks).
 - Chemnitz University of Technology, Chemnitz, Germany May 2010 (two months), May 2009 (two months) and May 2008 (two months).
 - Universidad Jaime I, Castellón, Spain February 2010 (one month).

01/2007 – **Postdoctoral Position**, *Chemnitz University of Technology*, Chemnitz, Germany.
12/2007

2003 – 2007 **Visiting Researcher**, *Short term visits*.

- Weierstrass Institute for Applied Analysis and Stochastics WIAS, Berlin, Germany August 2007 (one week).
- Universidad Jaime I, Castellón, Spain, October 2007 (two weeks).
- Chemnitz University of Technology, Chemnitz, Germany May 2006 (two months), May 2005 (two months) and May 2004 (two months).
- Technische Universität Berlin, Berlin, Germany May 2003 (two months).

10/2001 – **Teaching Assistant, Scientific Assistant and Lecturer**, *Department of Mathematics, Escuela Politécnica Nacional*, Quito, Ecuador.
12/2006

10/1999 – **Teacher of Mathematics**, *“Gonzalo Zaldumbide” High School*, Quito, Ecuador.
09/2000

Funded Research Projects as Principal Investigator

10/2015– **Solution of large-scale Lyapunov differential equations.**

09/2018 Funded by: FWF Austrian Science Foundation (P 27926 Einzelprojekte)
Developed at: University of Innsbruck, Innsbruck, Austria
Grant: 157 529,40 Euros
Url: <http://pf.fwf.ac.at/en/research-in-practice/project-finder/35070>

09/2016– **Startup grant.**

present Funded by: Yachay Tech
Developed at: Yachay Tech, Urcuquí, Ecuador
Grant: 50 000 USD

Under Revision Projects as Co-Principal Investigator

01/2018 **Modelling and Advanced Numerics for Differential-Algebraic Equations.**

Call: H2020-MSCA-ITN-2018 (Marie Skłodowska-Curie Innovative Training Networks)
Type of action: MSCA-ITN-ETN (European Training Networks)
Proposal number: 812694
Proposal acronym: **MANDAE**
To be developed at: Yachay Tech, Ecuador
Partners: Cardiff University (UK), Rheinisch-Westfaelische Technische Hochschule Aachen (DE), ESI ITI GMBH (DE), Forschungszentrum Julich GMBH (DE), Institut National de Recherche en Informatique et Automatique (FR), Universitaet Paderborn (DE), Technische Universitaet Berlin (DE), Universidad de Zaragoza (ES).
Total Grant: 3 767 916.6 Euros
Grant for Yachay: 431 256.96 Euros

Completed Projects as Principal Investigator

10/2014– **Numerical methods in Simulation and Optimal Control.**

12/2015 Funded by: University of Innsbruck, Innsbruck, Austria
Developed at: University of Innsbruck, Innsbruck, Austria
Partner: Department of Sport Science, University of Innsbruck, Innsbruck, Austria
Grant: 7 040 Euros

03/2014–
12/2015 **Numerical solution of optimal control problems for the Shallow water equation.**

Funded by: AKTION research sterreich-Ungarn Wissenschafts- und Erziehungskooperation
Developed at: University of Innsbruck, Innsbruck, Austria
Partner: Eötvös Loránd University, Budapest, Hungary
Grant: 3 500 Euros

06/2009 –
12/2011 **Simulation of the Glyphosate Aerial Spray Drift at the Ecuador-Colombia Border.**

Funded by: SENESCYT and Escuela Politécnica Nacional, Quito, Ecuador
Developed at: Escuela Politécnica Nacional, Quito, Ecuador
Partner: Chemnitz University of Technology, Chemnitz, Germany
Grant: 203 026.8 USD
(part of this grant served to set up a Supercomputing Center for the Department of Mathematics at Escuela Politécnica Nacional)

05/2012 –
12/2012 **Visualization and Diagnosis of Pigmented Lesions.**

Funded by: Escuela Politécnica Nacional, Quito, Ecuador
Developed at: Escuela Politécnica Nacional, Quito, Ecuador
Partner: Department of Dermatology, Hospital "Carlos Andrade Marin", Quito, Ecuador
Grant: 7 190.07 USD

Teaching

2016-2017 **Courses taught at Yachay Tech, Ecuador:**

- Advance Linear Algebra*
- Discrete Mathematics*
- Research Seminar

*undergraduate level.

2013 –2016 **Courses taught at University of Innsbruck, Austria:**

- 702871 Numerical Methods for Linear Control Systems SS13*
- 702711 Numerische Mathematik WS13 *
- 702826 Optimal Control: Principles and Computation SS14*
- 702117 PS Analysis 1 WS14** (two groups),
- 702561 Seminar mit Bachelorarbeit WS14**,
- 706011 Computational Methods in Physics and Astrophysics SS15*,
- 702432 Numerische Mathematik 2 SS15*.
- 702117 PS Analysis 1 WS15** (two groups),
- 702561 Seminar mit Bachelorarbeit WS15**,
- 706011 Computational Methods in Physics and Astrophysics SS16*,
- 702117 PS Analysis 2 SS16** (two groups),
- 702561 Seminar mit Bachelorarbeit SS16**,

*graduate level, **undergraduate level, WS: winter semester, SS: summer semester.

07/2015 **Courses taught at University of Electronic Science and Technology of China, Chengdu, China:**

- Optimal Control of Systems Governed by (S)PDEs: Theory and Numerical Solution. Guest lecturer at the Summer International School 2015.
Twenty two courses where given by foreign professors from eleven countries in all areas. I was appointed to give a two-week course at the Department Mathematics.
(40 hours course in two weeks. It included lectures, excercises and evaluation)

12/2014 **Courses taught at Universidad de la República, Uruguay:**

- Large-Scale Linear Quadratic Optimization.
Guest lecturer at the Department of Computer Science within the PhD and Master program.
(20 hours course in one week. It included lectures, excercises and evaluation)

10/2013 **Courses taught at Josip Juraj Strossmayer University of Osijek, Croatia:**

- Large-Scale Simulation and Control.
Guest lecturer at the Department of Mathematics within the PhD and Master program.
(30 hours course in two weeks. It included lectures, excercises and evaluation)

2003 – 2012 **Courses taught at Escuela Politécnica Nacional, Ecuador:**

- Analysis II (2004-I),
- Logic and Set Theory (2005-I),
- Logic and Set Theory (2005-II),
- Numerical Analysis II (2006-I, two groups),
- Logic and Set Theory (2005-II),
- Functional Analysis (2007-I)
- Linear Algebra (2008-II),
- Numerical Linear Algebra (2008-II),
- Seminar for Bachelor thesis (2008-II),
- Functional Analysis (2009-I),
- Introduction to Number Theory (2009-I),
- Numerical Analysis II (2009-II),
- Biomathematics (2009-II)
- Math for the Environment (2010-I),
- Seminar for Bachelor thesis (2010-I),
- Topics in Econometrics (2010-I),
- Functional Analysis (2010-II),
- Numerical Analysis for PDEs (2010-II),
- Math for the Environment (2010-II),
- Functional Analysis (2011-I),
- Numerical Analysis for PDEs (2011-I),
- Functions of a Complex Variable (2011-II),
- Numerical Analysis II (2012-I),
- Biomathematics (2012-I),
- Functions of a Complex Variable (2012-A),
- Functional Analysis (2012-A),

I: first semester , II: second semester, A: first semester, of the academic year.

All courses where either six or four hours per week. They included lectures and exercises.

Journal Review Activities

- SIAM Journal on Matrix Analysis and Applications,
- SIAM Journal on Scientific Computing,
- IEEE Transactions on Control Systems Technology,
- IEEE Transactions on Automatic Control,
- IEEE Transactions on Neural Networks and Learning Systems,
- Computational and Applied Mathematics,
- Optimization Methods and Software
- Numerical Algorithms,
- International Journal of Computer Mathematics,
- Computer Physics Communications,
- Journal of Computational and Applied Mathematics,
- Electronic Transitions on Numerical Analysis ETNA,
- Advances in Difference Equations,
- Applicable Algebra in Engineering Communication and Computing,
- Algorithms,
- The Journal of Supercomputing-Springer.

Publications

Books

1. T. Levajković and H. Mena, *Equations Involving Malliavin Calculus Operators: Applications and Numerical Approximation*, Springer Briefs, 125 pages, ISBN: 978-3-319-65678-6, (2017).
2. P. Benner, H. Mena and R. Schneider, *Modelo para las aspersiones con glifosato: frontera Ecuador-Colombia* (in Spanish), Shaker-Verlag, Aachen, 208 pages, ISBN: 978-3-8440-3061-7, (2014).
3. H. Mena, *Numerical Solution of Differential Riccati Equations Arising in Optimal Control Problems for Parabolic Partial Differential Equations*, Unidad de Publicaciones de la Facultad de Ciencias, First edition, Quito-Ecuador, 175 pages, ISBN: 978-9978-383-09-4, (2012).

Refereed Articles in Journals

4. H. Mena, L. Pfurtscheller, C. Piazzola and A. Ostermann, *Numerical low-rank approximation of matrix differential equations*, Accepted for publication in: Journal of Computational and Applied Mathematics (2018).
5. P. Csomos and H. Mena, *Fourier-Splitting Method for Solving Hyperbolic LQR Problems*, Accepted for publication in: Numerical Algebra, Control and Optimization (2017).
6. I. Lasiecka, T. Levajković, H. Mena, A. Tuffaha and C. Hafizoglu, *The Stochastic Linear Quadratic Control Problem with Singular Estimates*, SIAM Journal on Control and Optimization, 55(2), 595 - 626 (2017). DOI: 10.1137/16M1056183

7. T. Damm, H. Mena and T. Stillfjord, *Numerical Solution of the Finite-Time Stochastic Linear Quadratic Control Problem*, Numer Linear Algebra with Applications. (2017); e2091, DOI: 10.1002/nla.2091
8. T. Levajković, H. Mena and M. Zarfl, *Lévy processes, Subordinators and Crime Modelling*, Novi Sad Journal of Mathematics NSJOM, 46(2) (2016), pp. 65–86.
9. R. Altmann, H. Mena and T. Levajković, *Operator Differential Algebraic Equations with Noise Arising in Fluid Dynamics*, Monatshefte für Mathematik, Springer Online First, Open Access (2016), DOI: 10.1007/s00605-016-0931-z
10. P. Benner and H. Mena, *Numerical solution of the infinite-dimensional LQR-problem and the associated Riccati differential equations*, J. Numer. Math., De Gruyter just accepted, (2016), DOI: 10.1515/jnma-2016-1039.
11. T. Levajković, H. Mena and A. Tuffaha, *A Numerical Approximation Framework for the Stochastic Linear Quadratic Regulator Problem on Hilbert Spaces*, Applied Mathematics and Optimization, Springer online first, (2016), DOI: 10.1007/s00245-016-9339-3.
12. T. Levajković, H. Mena and A. Tuffaha, *The Stochastic Linear Quadratic Control Problem: A Chaos Expansion Approach*, Evolution Equations and Control Theory, 5(1) (2016), pp. 105 - 134, DOI: 10.3934/eect.2016.5.105.
13. P. Benner, H. Mena and R. Schneider, *Modelling of the Glyphosate Aerial Spray Drift at the Ecuador-Colombia border*, Applied Mathematical Modelling, 40 (2016), pp. 373–387, DOI:10.1016/j.apm.2015.04.057.
14. P. Benner, H. Mena and R. Schneider, *Drogen, Herbizide und numerische Simulation*, Mitteilungen der Deutschen Mathematiker-Vereinigung. Volume 23, Issue 4, (2015), pp. 222–225, DOI: 10.1515/dmvm-2015-0084.
15. H. Mena, N. Lang and J. Saak, *On the benefits of the LDL factorization for large-scale differential matrix equation solvers*, Linear Algebra and its Applications, Vol. 480 (2015), pp. 44-71, DOI:10.1016/j.laa.2015.04.006.
16. H. Mena and P. Fuenmayor, *Fuzzy Hybrid System for Forecasting Financial Time Series*, AESTIMATIO The IEB International Journal of Finance, (2015), II: pp. : 78-91, DOI:10.5605/IEB.11.3.
17. P. Benner, P. Ezzatti, H. Mena, E.S. Quintana-Ortí and A. Remón, *Solving Matrix Equations on Multi-core and Many-core Architectures*, Algorithms (2013), 6(4), pp. 857-870, DOI:10.3390/a6040857.
18. P. Benner and H. Mena, *Rosenbrock methods for solving differential Riccati equations*, IEEE Transactions on Automatic Control, Vol. 58, No. 11, (2013), pp. 2950-2957, DOI:10.1109/TAC.2013.2258495.
19. P. Benner, P. Ezzatti, H. Mena, E.S. Quintana-Ortí and A. Remón, *HPC en simulación y control a gran escala*, Revista ELEMENTOS, Vol. 3, No. 3, (2013), pp. 1-27, ISSN: 2248-5252.
20. P. Benner, H. Mena and J. Saak, *On the parameter selection problem in the Newton-ADI iteration for large scale Riccati equations*, Electronic Transitions on Numerical Analysis ETNA, Vol. 19 (2008), pp. 136-149, ISSN 1068-9613.
21. H. Mena and M. Calahorrano, *Remarks on nonlinear inhomogeneous elliptic problems arising in astrophysics*, E. J. of Qualitative Theory of Diff. Equ., No. 19 (2005), pp. 1-12, ISSN 1417-3875.
22. H. Mena and M. Calahorrano, *Multiple solutions for inhomogeneous nonlinear elliptic problems arising in astrophysics*, Electron. J. Diff. Eqns., Vol. 2004 No. 49 (2004), pp. 1-10, ISSN 1072-6691.

Book Chapters

23. T. Levajković, H. Mena and A. Tuffaha, *The Stochastic LQR Optimal Control with Fractional Brownian Motion*, Generalized Functions and Fourier Analysis, Operator Theory: Advances and Applications, accepted for publication Springer 2016.
24. P. Csomos and H. Mena, *Innovative Integrators for Computing the Optimal State in LQR Problems*, Lecture Notes in Computer Science, accepted for publication Springer International Publishing 2016.
25. T. Levajković and H. Mena, *Equations involving Malliavin derivative: a chaos expansion approach*, In S. Pilipovic, J. Toft (Eds.), Pseudo-Differential Operators and Generalized Functions, Operator Theory: Advances and Applications, Vol. 245, pp. 197-214, Springer International Publishing 2015.
26. T. Levajković and H. Mena, *On Deterministic and Stochastic Linear Quadratic Control Problems*, Current Trends in Analysis and Its Applications, Trends in Mathematics, Research Perspectives, pp. 315-322, Springer International Publishing Switzerland 2015.

Refereed Articles in Conference Proceedings

27. P. Benner, E. Dufrechou, P. Ezzatti, H. Mena, E.S. Quintana-Ortí and A. Remón, *Numerical Solution of Finite-Time Linear-Quadratic Control Problems on Hybrid CPU-GPU Platforms*, Computational Science and Its Applications – ICCSA 2017, Proceedings Part I, Springer International Publishing (2017) pp. 116–132, DOI: 10.1007/978-3-319-62392-4_9
28. R. Bayá, I. Decia, P. Ezzatti and H. Mena, *Accelerating the resolution of generalized Lyapunov matrix equations on hybrid architectures*, The 2016 International Conference on High Performance Computing & Simulation (HPCS 2016), Innsbruck, 2016, pp. 653-658, DOI: 10.1109/HPCSim.2016.7568397
29. J. Denißen, H. Mena, A. Koskela and Z. Tomljanović, *Damping optimization in vibrational systems based on amplitude*, Proceedings of the 21st International Symposium on Mathematical Theory of Networks and Systems MTNS 2014, (2014), pp. 1222-1227, ISBN: 978-90-367-6321-9.
30. P. Benner, P. Ezzatti, H. Mena, E.S. Quintana-Ortí and A. Remón, *Solving Differential Riccati Equations on Multi-GPU Platforms*, In J. Vigo-Aguilar (Ed.), Proceedings of the 11th International Conference on Computational and Mathematical Methods in Science and Engineering, CMMSE 2011, Vol. 1 (2011), pp. 178-188, ISBN: 978-84-614-6167-7.
31. P. Benner, P. Ezzatti, H. Mena, E.S. Quintana-Ortí and A. Remón, *Numerical Solution of Differential Riccati Equations on Hybrid CPU-GPU Platforms*, In Proceedings of ALAMA2010 - 2nd Meeting on Linear Algebra, Matrix Analysis, and Applications, (2010), pp. 1-7, ISBN: 978-84-8363-544-5.

32. P. Benner and H. Mena, *BDF Methods for Large-Scale Differential Riccati Equations*, In B. De Moor, B. Motmans, J. Willems, P. Van Dooren, V. Blondel (editors), Proceedings Sixteenth International Symposium on: Mathematical Theory of Network and Systems MTNS 2004, (2004), ISBN 90-5682-517-8.

Theses

33. *Linear Quadratic Optimization of Stochastic Partial Differential Equations: Theory and Numerical Approximation*, Habilitation Thesis, Department of Mathematics, University of Innsbruck, Austria, June 2016.
34. *Numerical Solution of Differential Riccati Equations Arising in Optimal Control Problems for Parabolic Partial Differential Equations*, Dissertation, Department of Mathematics, Escuela Politecnica Nacional, Ecuador; partnership program with TU Berlin, Germany, August 2007.
35. *Soluciones múltiples para cierto tipo de problemas elípticos no lineales que aparecen en Astrofísica*, Diploma Thesis, Department of Mathematics, Escuela Politecnica Nacional, Ecuador, March 2003.

Submitted Publications

36. A. Koskela and H. Mena, *Analysis of Krylov subspace approximation to Large Scale Differential Riccati Equations*, (2017).
37. H. Mena and L. Pfurtscheller, *An efficient SPDE approach for El Niño*, (2017).

Other Publications

38. P. Benner, H. Mena and R. Schneider, *Drugs, Herbicides, and Numerical Simulation*, Snapshots of modern Mathematics from Oberwolfach, No. 11/2013, 9 pages, September (2014), DOI 10.14760 / SNAP-2013-011-EN.
39. H. Mena, N. Lang and J. Saak, *LDL-ADI based algorithms for large scale differential matrix equations*, Proceedings in Applied Mathematics and Mechanics : Volume 14, Issue 1, pp. 827–828, WILEY-VCH Verlag, (2014), DOI: 10.1002/pamm.201410394.
40. H. Mena and R. Cajamarca, *Modelación de series económicas mediante métodos automáticos de regresión difusa*, Analitika, Revista de Análisis Estadístico, 3 (2012), Vol. 3(1): 19-38.
41. H. Mena and J. Saak, *Simulación numérica de circuitos eléctricos a gran escala*, Proceedings of the XXII Jornadas de Ingeniería Eléctrica y Electrónica, (2009), pp. 147-155, ISBN 978-9978-383-00-1.
42. H. Mena and R. Cajamarca, *Métodos automáticos de regresión difusa aplicados a datos económicos*, Memorias del Primer Congreso Científico Internacional en Economía y Finanzas, (2009).

43. H. Mena and P. Fuenmayor, *Inteligencia computacional en la modelación de series financieras: enfoque de la lógica difusa*, Memorias del Primer Congreso Científico Internacional en Economía y Finanzas, (2009).
44. H. Mena, *Computational Challenges in Simulation and Control of Industrial Process*, Proceedings of the IV Jornadas de Informática ISIC 2008, (2008), pp. 49-56, ISBN 978-9978-92-592-8).
45. P. Benner and H. Mena, *Numerical Solution of Differential Riccati Equations arising in Optimal Control for parabolic PDEs*, Proceedings in Applied Mathematics and Mechanics: Vol. 7, Issue 1; Wiley InterScience; (2008), ISSN 1617-7061.

Software

Visualization and Diagnosis of Pigmented Lesions VDPL 1.0.

Free-portable software, which can be used with or without a dermatoscope and a personal photo camera to visualize, monitor and diagnosis pigmented lesions.

Automated Fuzzy Regression Methods.

In the script for R some automated fuzzy regression methods are implemented. Particularly, it contains routines for: Batch Least Squares, Recursive Batch Least Squares, Modified Learning from Example and Combined Recursive Batch Least Squares. The methods were implemented exploiting the structure of some applications in Economy which are usually modeled by standard regression.

Fuzzy Hybrid System for Modelling Time Series.

In the script for R a Fuzzy Hybrid System for Modelling Time Series is implemented. The system is based on SARIMA models and uses the forecast package from R. The best model is chosen considering the forecasting of the models after clustering them using fuzzy c-means algorithm. The system has given good results in Finance applications

Honors

- 2015 Appointed as lecturer at the Summer International School, University of Electronic Science and Technology of China, Chengdu (twenty two courses were given by international professors from eleven countries in all areas. I was uncharged of the course at the Department of Mathematics)
- 2015 Invited to the 3rd Heidelberg Laureate Forum.
- 2014 Invited to give a talk at the 2nd Heidelberg Laureate Forum within Hot Topic session.
- 2009 First Ecuadorian Professor invited to Massachusetts Institute of Technology (MIT), Cambridge (MA), USA.
- 2007 First Ecuadorian receiving the Ph.D. in Mathematics from a University of Ecuador.
- 2003 The results of my Diploma thesis were published in refereed journals. I am the first graduated student from the Department of Mathematics at Escuela Politecnica Nacional (Ecuador) accomplishing this since the Department was founded in 1979.
- 2012 Member of the Imbabura province triathlon team (Ecuador).

Scholarships, Stipends and Travel Awards

For short term research visits.

- German Academic Exchange Service DAAD (3x),
- International Mathematical Union (3x),
- Spanish National Science Foundation (Spain) (2x),
- Uruguay Science Foundation (Uruguay) (2x),
- Ecuadorian Science Foundation (Ecuador),
- National Science Foundation (USA).

For summer schools and conferences.

- International Mathematical Union,
- Latin America Mathematical Union UMALCA (4x),
- CIMPA (3x)

Awards

Research

- 09/2002 **UNESCO prize and French Embassy prize.**
Best research at 10th Encuentro de Cálculo Numérico, Quito, Ecuador.
- 06/1993 **Best Research.**
Contest of Science at "Spellman" High School, Quito, Ecuador.

Sport Activities

- 04/2012 **6th place overall.**
Cojimíes Triathlon 113 km (Ironman 70.3), Cojimíes, Manabí, Ecuador. Second place in the age group 30-34.
- 10/2011 **Bronze medal.**
IV Galapagos Triathlon, Puerto Ayora, Galápagos, Ecuador. Age group 30-34.
- 07/1999 **Vice-champion Chess.**
Tournament of Escuela Politécnica Nacional, Quito, Ecuador (500 participants).
- 06/1995 **Best Sportsman.**
"Spellman" High School, Quito, Ecuador. I won medals in the Quito High School Championship of: Basketball, Swimming and Chess.
- 05/1993 **Silver and bronze medal.**
"Copa Batán" (selection process for the national swimming team), Quito, Ecuador.

Supervision of Ph.D. theses

- since 12/2016 Lena-Maria Pfurtscheller, *Simulation and Optimal Control of Linear Partial Differential Equations*, University of Innsbruck, Innsbruck, Austria
- since 10/2015 Chiara Piazzola, *Numerical Solution of large-scale Lyapunov Differential Equations*, University of Innsbruck, Innsbruck, Austria

Review of Ph.D. theses

- 09/2017 Yolanda Rocío Rodríguez Cruz, *Model Reduction for Stochastic and Bilinear Systems*, Technische Universität Kaiserslautern, Germany

09/2011 Pablo Ezzati, *Aceleración de métodos para la resolución de problemas de reducción de modelos mediante procesadores gráficos*, Universidad de la República, Montevideo, Uruguay

Supervision of Master theses

- 2018 Christoph Reiser*, *Musculoskeletal Modeling and Simulation in Climbing* (co-supervised with D. Heinrich), University of Innsbruck, Austria. * currently working
- 11/2016 Lena Pfurtscheller, *A Comparison of Stochastic Models for El Niño*, University of Innsbruck, Austria.
- 10/2015 Johannes Schwaighofer, *Optimal Control for the Shallow Water Equations*, University of Innsbruck, Austria.
- 07/2012 Paúl Cajamarca, *Regresión automática difusa aplicada a datos económicos*, Escuela Politécnica Nacional, Quito, Ecuador.
- 11/2012 Patricio Fuenmayor, *Inteligencia computacional en la modelación de series financieras: enfoque de la lógica difusa*, Escuela Politécnica Nacional, Quito, Ecuador.

Review of Master theses

10/2014 Ernesto Dufrechou, *Aceleración de métodos de reducción de modelos dispersos en arquitecturas multi/many-core*, Universidad de la República, Montevideo, Uruguay

Supervision of Bachelor theses

- 08/2016 Hannes Claut, *Malliavin Calculus and its Applications to Finance*, University of Innsbruck, Austria.
- 08/2016 Lukas Lamplmayr, *Simulation and Optimal Control for Crime Modelling*, University of Innsbruck, Austria.
- 08/2015 Martin Zarfl, *Crime Modelling with Lévy Flights*, University of Innsbruck, Austria.
- 02/2016 Lila Petroccki, *Hermite Polynomials and Wiener Chaos Expansions*, University of Innsbruck, Austria.

Membership in Professional Societies

- Society of Industrial and Applied Mathematics SIAM.
- American Mathematical Society.
- Co-founder (together with Prof. Andreas Griewank) and Faculty Adviser of the SIAM Student Chapter at Yachay Tech (2018).

Activities as Organizer

- 07/2017 **Minisymposium on Closed-Loop Control for Infinite Dimensional Systems and Applications.**
2017 SIAM Conference on Control and Its Applications, Pittsburg, USA, July 2017.
- 07/2016 **Minisymposium on Matrix Equations: Solvers and Applications.**
7th European Congress of Mathematics, Berlin, Germany, July 2016.

10/2015 **Minisymposium on Matrix Equations in Control Theory Optimal Control.**
SIAM Conference on Applied Linear Algebra, Atlanta, USA, October 2015.

07/2010 **XII Encuentro de Matemáticas y sus Aplicaciones.**
The conference was organized by the Department of Mathematics of Escuela Politécnica Nacional, Quito Ecuador, July 2010.

Relevant Invited Lectures

06/2017 Optimal Control of Stochastic PDEs: Theory, Numerical Approximation and Applications, Semiplenary talk at XXI Congreso Colombiano de Matemáticas, Bogota, Colombia.

03/2017 Optimal Control of Stochastic PDEs with Applications, SIAM-CCE Invited Speaker, Massachusetts Institute of Technology (MIT), Cambridge (MA), USA.

05/2016 Drugs, Herbicides, and Numerical Simulation: How Mathematical Research was applied in a Political Conflict, Magdeburg Long Night of Sciences, Max Planck Institute, Magdeburg, Germany.

09/2014 How Herbicides Advanced Applied Math in Ecuador, Hot Topic session at the Heidelberg Laureate Forum HLF, Heidelberg, Germany.

Since 2002 I gave more than seventy talks at conferences, workshops, minisymposia, colloquiums and seminars in Europe and USA, e.g. at the Applied Math Colloquium of the Massachusetts Institute of Technology, the Heidelberg Laureate Forum, etc. A complete list of talks can be found in my personal website.

Press Releases

Due to my academic achievements, projects and sport victories twenty two press releases have appeared on *German Regional Newspapers, Research Magazines, Online Magazines, Ecuadorian National Magazines, Ecuadorian National Newspapers and University Magazines*. *Links to these press releases can be found in my personal website.*

01/2017 **All about Passion for Mathematics and Ecuador.**
[Yachay Tech News](#), Ecuador.

02/2016 **A mathematician finds his way through adversity.**
[Sciences Careers](#), Online Magazine.

02/2016 **On Hermann Mena, Ecuadorian optimal control mathematician.**
[Math in the Media](#), American Mathematical Society.

03/2015 **FWF genehmigt acht Projekte.**
[iPoint](#), Innsbruck, Austria.

09/2014 **Maths, coca, and talent.**
[Heidelberg Laureate Forum Blog](#), Heidelberg, Germany.

09/2014 **Schlangenbeschwörern zu Python Programmierern.**
[Heidelberg Laureate Forum Blog](#), Heidelberg, Germany.

- 01/2014 **Drogen, Herbizide und Mathematik.**
[Zukunft Forschung](#) , Innsbruck, Austria.
- 01/2014 **Mathematics in Borderlands.**
[Max Planck RESEARCH](#), Germany.
- 04/2013 **Mathematik im Grenzbereich.**
[Max Planck FORSCHUNG](#) , Germany.
- 02/2013 **Inevitable partida de un PhD.**
[Magazin Vanguardia](#), Ecuador.
- 10/2012 **Los nuevos retos de un deportista politécnico.**
[Informativo Politécnico](#), Ecuador.
- 08/2012 **Ein Indianer im Fussballtrikot.**
[Freie Presse](#), Chemnitz, Germany.
- 06/2012 **La ciencia de hacer deporte, Hermann Mena PhD.**
[Informativo Politécnico](#), Ecuador.
- 11/2011 **Politécnico Investigador y deportista.**
[Informativo Politécnico](#), Ecuador.
- 05/2010 **Los algoritmos patrios.**
[Diario El Telégrafo](#), Ecuador.
- 02/2010 **Drogen, Pflanzengift und jede Menge Mathematik.**
[TU Spektrum](#), Chemnitz, Germany.
- 06/2009 **El estudio y la investigación marcan la vida de Hermann Mena.**
[Informativo Politécnico](#) , Ecuador.
- 02/2008 **La ciencia ecuatoriana.**
[Diario Hoy](#) , Ecuador.
- 10/2007 **Chemntzer helfen bei Promotion in Ecuador.**
[Freie Presse](#), Chemnitz, Germany.
- 09/2007 **Mathematische Premiere in Ecuador.**
[TU Spektrum](#), Chemnitz, Germany.
- 09/2007 **Erster Mathematiker mit Dokortitel.**
[DAAD-magazin](#), Germany.
- 10/2003 **Querdenker aus Quito gesucht.**
[TU Berlin intern](#) , Berlin, Germany.

Foreign Language Skills

- Spanish native speaker
- English C2 level
- German B2 level
- French B1 level

Computer Skills

Mathematical Software: Matlab, Mathematica, Maple, SPSS, SAS, Stata, R

Programming Languages: C, C++

Office Software for Linux and Windows, L^AT_EX

Hobbies

Triathlon.

Personal records: sprint (1h05'), olympic (2h23'), Ironman 70.3 (5h03')

Swimming.

Personal records: 50m free style (25"), 100m free style (58"), 1.9 km open water (25')

Running.

Personal records: 5.5km (19'25"), 8km (29'2"), 21km (1h35'15"), 42.195 km (3h43'50")

Scuba Diving.

PADI Advanced Open Water

Mountaineering, Chess, Basketball, Photography, Painting.

References

Available upon request

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