Juan Carlos De los Reyes

CONTACT INFORMATION

Research Center for Mathematical Modelling (MODEMAT)
Escuela Politécnica Nacional de Ecuador
Ladrón de Guevara E11-253
170525 Quito, Ecuador

Phone: (593)(2) 2976-300
Extension: 1531
juan.delosreyes@epn.edu.ec

PERSONAL INFORMATION

First name	Juan Carlos
Last names	De los Reyes Bueno
Date of birth	October 14, 1976
Place of birth	Quito, Ecuador
Citizenship	Ecuadorian
Homepage	http://www.modemat.epn.edu.ec/~jcdelosreyes

PROFESSIONAL RECORD

Nov 2011 - present	Full Professor, Research Center for Mathematical Modelling (MODEMAT) & Department of Mathematics, Escuela Politécnica Nacional de Ecuador.
Aug 2022 - Oct 2022	Visiting Academic, Courant Institute of Mathematical Sciences, New York University.
Nov 2021 - April 2022	Visiting Scientist, Weierstrass Institute for Applied Analysis and Stochastics (WIAS), Berlin.
Feb 2013 - Oct 2021	Founding Director of the Research Center for Mathematical Modelling (MODEMAT).
Jan 2019 - Oct 2021	University Director of Research, Escuela Politécnica Nacional de Ecuador.
Dec 2016 - April 2019	Chair of the PhD Program in Applied Mathematics at Escuela Politécnica Nacional de Ecuador.
May 2013 - July 2013	Visiting Professor, Department of Mathematics, University of Hamburg.
April 2010 - March 2011	Alexander von Humboldt-Fellow at the Technical University of Berlin.
Jan 2011 - Feb 2011	J.T. Oden Visiting Fellow, Institute for Computational Engineering & Sciences (ICES), University of Texas at Austin.
Oct 2009 - March 2010	BMS Substitute Professor, Institut für Mathematik, Humboldt-Universität zu Berlin.
Apr 2009 - Sep 2009	Alexander von Humboldt-Fellow at the Technical University of Berlin.
June 2008 - Oct 2011	Associate Professor, Department of Mathematics, Escuela Politécnica Nacional de Ecuador.
March 2006 - May 2008	Assistant Professor (tenured), Department of Mathematics, Escuela Politécnica Nacional de Ecuador.

Feb 2005 - Feb 2006	Postdoctoral Researcher at the DFG Sonderforschungsbereich 557 "Control of complex turbulent shear flows", Technical University of Berlin. Group of Prof. Fredi Tröltzsch.
May 2003 - Dec 2006	Adjunct Professor, Latin American Social Sciences Institute (FLACSO).
May 2003 - Feb 2006	Assistant Professor, Department of Mathematics, Escuela Politécnica Nacional de Ecuador
Oct 2000 - April 2003	Researcher at the Special Research Center (SFB) 03 "Optimization and Control" (Area II: Continuous Optimization and Control: Suboptimal control of nonlinear problems with emphasis on fluids), Karl-Franzens University of Graz.

Education

March 2003	Ph.D. in Mathematics, Karl-Franzens Universität Graz, Austria. Advisor: Prof. Karl Kunisch
Sept. 2002	Summer school: "FEM for PDE's with Multiple Scales", ETH Zürich (Swiss Federal Institute of Technology)
Oct 2000 - Mar 2003	Graduate studies in Applied Mathematics, Karl-Franzens Universität Graz
August 2000	Ingeniero Matemático, Escuela Politécnica Nacional de Ecuador
July 1999	Summer school "Scientific and parallel computing", Université Jean Monnet de Saint-Etienne and Universidad Central del Ecuador
Oct 1994 - Aug 2000	Studies in Applied Mathematics at Escuela Politécnica Nacional de Ecuador.
Oct 1980 -July 1994	Primary and secondary school at the German School of Quito.

Offers and Awards

November 2016	Fellow of The World Academy of Sciences (TWAS)
February 2015	Member of the Ecuadorian Academy of Sciences (ACE)
May 2013	Visiting Professorship at the Department of Mathematics, University of Hamburg
October 2012	Offer of a W2-Professorship for "Applied Mathematics" at the University of Greifswald, Germany (declined)
October 2010	J. Tinsley Oden Faculty Fellowship (ICES, The University of Texas at Austin)
September 2010	Visiting Fellowship of the Isaac Newton Institute for Mathematical Sciences (Cambridge, UK)
September 2009	Offer of a BMS Substitute Professorship (Berlin Mathematical School) at the Humboldt-Universität zu Berlin

December 2008	Humboldt Research Fellowship for Experienced Researchers (Alexander von Humboldt Foundation)	
April 2005	Postdoctoral Fellowship from the Portuguese Ministry of Science, Technology and Higher Education (declined)	

Short term research stays

October 2019	Johann Radon Institute for Computational and Applied Mathematics, Linz - Austria.	2 weeks
March 2019	Institut Henri Poincaré, Paris.	2 weeks
March 2017	Hausdorff Center for Mathematics, Bonn.	2 weeks
February 2017	University of Cambridge, United Kingdom.	2 weeks
July 2016	University of Cambridge, United Kingdom.	1 week
June 2015	Universität Duisburg-Essen, Germany.	3 weeks
December 2013	Technische Universität Dortmund, Germany.	1 week
January 2013	University of Cambridge, United Kingdom.	1 week
June 2012	Technische Universität Dortmund, Germany.	1 month
April 2012	Universidad de Los Andes, Colombia.	1 week
January 2012	University of Cambridge, United Kingdom.	2 weeks
September 2011	Technische Universität Berlin, Germany.	2 weeks
May 2011	Humboldt-Universität zu Berlin, Germany.	3 weeks
February 2011	Universität Frankfurt, Germany.	1 week
November 2010	University of Cambridge, United Kingdom.	1 week
November 2010	Universidad Técnica Federico Santa María, Valparaíso - Chile.	1 week
May 2010	Universität Duisburg-Essen, Germany.	1 week
April 2010	Technische Universität Chemnitz, Germany.	1 week
September 2008	START Project: Interfaces and Free Boundaries, Graz - Austria.	1 month
February 2008	Karl Franzens Universität Graz, Austria.	1 month
September 2007	Weierstraß-Institut für Angewandte Analysis und Stochastik, Germany.	1 month
September 2006	Technische Universität Berlin, Germany.	1 month
February 2006	Universidad de Cantabria, Spain.	1 week
December 2005	Karl Franzens Universität Graz, Austria.	1 week
May 2005	Johann Radon Institute for Computational and Applied Mathematics, Linz - Austria.	1 week
May 2005	ETH Zürich, Switzerland.	1 week
February 2004	Karl Franzens Universität Graz, Austria.	1 month
November 2001	Erwin Schrödinger International Institute of Mathematical Physics (ESI), Vienna - Austria.	1 week

Activities in Professional Societies

Ecuadorian Academy of Sciences (ACE)

- Member, since February 2015.

Ecuadorian Mathematical Society (SEdeM)

- President, May 2012 – June 2014.
- Representative at the 16^{th} General Assembly of the International Mathematical Union (IMU), Bangalore, India. August 2010.
- Representative at the 5^{th} Asamblea General de la Unión de Matemáticos de América Latina y del Caribe (UMALCA), Santiago de Chile, September 2009.
- Vice President, November 2008 – February 2010.
- Secretary, November 2006 – November 2008.
- Invited observer to the 15^{th} General Assembly of the International Mathematical Union (IMU), Santiago de Compostela, Spain. August 2006.
- Board member. March – November 2006.

International Mathematical Union (IMU)

- Reviewer for the NANUM 2014 program, International Congress of Mathematicians 2014.

Humboldt-Alumni-Vereinigung Ecuador

- Founding Member, since 2014.

Society for Industrial and Applied Mathematics (SIAM)

- Member, since 2006.

Courses Taught

Escuela Politécnica Nacional de Ecuador.
Ph.D. Studies: Advanced Topics in Analysis, Advanced Topics in Computational Mathematics, Analysis and Control of Distributed Systems, Nonsmooth Analysis, Seminar on Numerical Methods for Optimal Control of PDEs.
Master Studies: Constrained Optimization, Matrix Computations, Optimization for Machine Learning and Data Science, Nonlinear Optimization I, Nonlinear Optimization II, Large Scale Optimization, Numerical Methods for Engineers, Differential and Integral Calculus.
Diploma Studies: Analysis III, Analysis IV, Biomathematics, Numerical Analysis I, Numerical Analysis II, Numerical Algorithms, Numerical Approximation of PDEs, Optimal Control, Optimization, Optimization in Economics, Scientific Computing Laboratory.

Humboldt-Universität zu Berlin: Numerical methods for PDE constrained optimization, Mathematik für Infomatiker III, Seminar Numerical methods for PDE constrained optimization.

University of Hamburg: Optimization of complex systems.

FLACSO Ecuador: Advanced mathematics, Applications of optimal control to economics.

Short Courses

- *Theory and Practice of PDE-Constrained Optimization*. Sixth International Conference on Continuous Optimization (ICCOPT). Berlin, August 2019.
- *Optimización Dispersa*. XXII Congreso Colombiano de Matemáticas. Popayán,

Colombia, June 2019.

- *Course on Sparse Optimization*. PhD Program in Mathematics, Universidad del Centro de la Provincia de Buenos Aires. Tandil, Argentina, February 2019.
- *Optimal Control of Variational Inequalities of the Second Kind*. SPP 1962 Summer School on Complementarity Problems in Applied Mathematics. Dortmund, Germany, July 2018
- *Nonsmooth Optimization with Partial Differential (In)Equations*. CIMPA School on Algorithmic Nonsmooth Optimization. Yahuarcocha, Ecuador, September 2017.
- *Estimación de parámetros reológicos de flujos volcánicos*. Segundo Congreso Internacional de Matemática Aplicada en El Salvador. El Salvador, September 2016.
- *Sparse Optimization*. Latin-American Summer School on Operations Research (ELAVIO). Quito, February 2015.
- *Sparse Optimization*. Segunda Escuela de Control y Optimización (ECOPT), organized by MODEMAT and AM2V (Chile). Santiago de Chile, November 2015.
- *Optimización y Control con Ecuaciones en Derivadas Parciales*. Primera Escuela de Control y Optimización (ECOPT), organized by MODEMAT and AM2V (Chile). Quito, October 2013.

Organization of Meetings

- SIAM Conference on Control and Its Applications (CT21). USA. July 2023 (Organizing Committee).
- Segunda Conferencia Colombiana de Matemáticas Aplicadas e Industriales. Medellín, Colombia. June 2022 (Scientific Committee).
- IFIP TC7 Conference on System Modelling and Optimization. Quito, Ecuador. September 2021 (Chair of the Organizing Committee).
- VI Latin American Workshop on Optimization and Control (LAWOC). Quito, Ecuador. September 2018 (Organizing and Scientific Committee).
- Minisymposium "Imaging models with non-linear constraints". SIAM Conference on Imaging Science, Bologna, 2018 (co-organized with Tuomo Valkonen).
- Minisymposium "Computational learning and model optimization". 8th International Congress on Industrial and Applied Mathematics. Beijing, August 2015 With M. Chung and C.-B. Schönlieb.
- Minisymposium "Optimising inversion models". Applied Inverse Problems (AIP) Conference. Helsinki-Finland, May 25-29, 2015 (co-organized with E. Haber and C.-B. Schönlieb).
- Minisymposium "Numerical weather prediction". XIV Encuentro de Matemática y sus Aplicaciones. Quito, September 2014.
- First Congress on Biomedical Engineering and Mathematical Modelling in the Biosciences, Quito, 2014 (Organizing and Scientific Committee)
- Minisymposium "Nonsmooth PDE-constrained optimization". SIAM Conference on Optimization, San Diego, 2014 (co-organized with Christian Clason).
- Minisymposium "Noise estimation, model selection & bilevel optimisation". IFIP TC7 Conference on "System Modelling and Optimization", Klagenfurt, 2013 (co-organized with Carola-Bibiane Schönlieb).
- Minisymposium "Optimization of free boundary problems". International Conference on Continuous Optimization, Lisboa, 2013 (co-organized with Christian Meyer).
- Special session on "Optimization with Differential Equations". GAMM Annual Meet-

ing, Novisad, 2013 (co-organized with W. Wollner).
- Minisymposium "Numerical Methods for Optimzation and Control of PDEs". Fourth Chilean Workshop on Numerical Analysis of Partial Differential Equations, Concepción, 2013 (co-organized with Erwin Hernández).
- Minisymposium "Numerical PDE-Constrained Optimization". International Congress on Industrial and Applied Mathematics, Vancouver, 2011 (co-organized with Irwin Yousept).
- Latin American School of Mathematics (EMALCA), Quito, Ecuador. October 2010 (Organizing and Scientific Committee).
- CIMPA School on Dynamic Optimization, Tandil, Argentina. August 2010 (Scientific Committee).
- Second Latin American Workshop on Optimization and Control. Rosario, Argentina. July 2010 (Organizing and Scientific Committee).
- First Latin American Workshop on Optimization and Control (LAWOC). Quito, Ecuador. July 2008 (Conception and Coordination).
- IX Ecuadorian Congress on Mathematics. Quito, Ecuador. July 2004 (Organizing Committee).

Reviewer of projects for

- Air Force Office of Scientific Research (AFOSR)
- Chilean National Commission for Scientific and Technological Research (CONICYT)
- Deutsche Forschungsgemeinschaft (DFG)
- French National Research Agency (ANR)
- Hong Kong Research Grants Council (RGC)
- Institut de recherche pour le développement (IRD)

Reviewer for

- Applied Mathematical Modelling
- Bulletin of the Belgian Mathematical Society
- Bulletin of the Brazilian Mathematical Society
- Calcolo
- Computational Optimization and Applications
- Computer Methods in Applied Mechanics and Engineering
- Computers and Mathematics with Applications
- Communications in Mathematical Sciences
- ESAIM: Mathematical Modelling and Numerical Analysis
- IMA Journal of Mathematical Control and Information
- Inverse Problems
- International Journal of Control, Automation, and Systems
- Journal of Applied Analysis
- Journal of Computational and Applied Mathematics
- Journal of Mathematical Imaging and Vision
- Journal of Optimization Theory and Applications
- Journal of Visual Communication and Image Representation
- Mathematical Control and Related Fields
- Mathematical Reviews.
- Nonlinear Analysis: Theory, Methods and Applications

- Numerical Algebra, Control and Optimization
- Numerical Methods for Partial Differential Equations
- Numerische Mathematik
- Optimal Control Applications and Methods
- Optimization and Engineering
- Optimization Methods and Software
- Set-Valued and Variational Analysis
- SIAM Journal on Applied Mathematics (SIAP)
- SIAM Journal on Control and Optimization (SICON)
- SIAM Journal on Imaging Sciences (SIIMS)
- SIAM Journal on Mathematical Analysis (SIMA)
- SIAM Journal on Optimization (SIOPT)
- SIAM Journal on Numerical Analysis (SINUM)
- SIAM Journal on Scientific Computing (SISC)

Editorial Activities

- Member of the Editorial Board of *Orbita Mathematicae*, since April 2022.
- Associate Editor of *Journal of Nonsmooth Analysis and Optimization*, since February 2019.
- Associate Editor of *Optimization and Engineering*, since April 2016.
- Editor-in-Chief of *Revista Politécnica*, April 2016 - March 2018.
- Guest Editor of the special issue of the journal *Inverse Problems* on "Learning in Inverse Problems", 2017.

Research Interests

Bilevel Learning Methods for Imaging and Inverse Problems, PDE-Constrained Optimization, Optimization with Variational Inequality Constraints, Variational Data Assimilation, Optimal Control of Non-Newtonian Fluid Flow.

Projects

- Desarrollo de una aplicación móvil para el pronóstico meteorológico geolocalizado.
  Juan C. De los Reyes (PI).
  Project funded by Escuela Politécnica Nacional de Ecuador (Proyecto de Transferencia de Tecnología) ($14.873), April 2021 - March 2023.

- Mathematical Modelling of the SARS-CoV-2 Epidemic in Ecuador.
  Juan C. De los Reyes (PI).
  Project funded by Escuela Politécnica Nacional de Ecuador (Proyecto de Investigación en torno a la COVID-19), March - August 2020.

- Mathematical Modelling and Control of Magneto- and Electro-Rheological Fluids.
  Juan C. De los Reyes (PI).
  Project funded by Escuela Politécnica Nacional de Ecuador ($200.000), March 2017 - December 2020.

- Optimization Methods with Nonlocal Operators for Image Restoration.
  M. Yangari (PI), Juan C. De los Reyes (Co-PI).
  Project funded by Escuela Politécnica Nacional de Ecuador ($80.000), April 2016-

March 2018.

- Sparse Optimal Control of Differential Equations: Algorithms and Applications.
  Juan C. De los Reyes (International Coordinator), P. Gajardo (Chilean Coordinator) and P. Combettes (French Coordinator).
  Project funded by the MATHAmSud international network, January 2015 - December 2016.

- AM2V-MODEMAT Network on Optimization and Control.
  Joint project between the Centro de Modelización Matemática (MODEMAT) and the Grupo de Análisis y Modelamiento Matemático (AM2V) from the Universidad Técnica Federico Santa María (Chile).
  Project funded by CONICYT Chile.

- Numerical Weather Prediction System for Ecuador: Mathematical and Statistical Modelling. Phase 2: Data Assimilation and Operational System.
  Juan C. De los Reyes (PI).
  Project funded by the Ecuadorian Ministry of Higher Education, Science, Technology and Innovation ($431.160), June 2015 - December 2017.

- Parameter Estimation of Volcanic Flow by means of High-Resolution Images.
  S. Hidalgo (PI), Juan C. De los Reyes (Co-PI).
  Multidisciplinary project between the Geophysics Institute (IGEPN) and the Research Center for Math. Modeling (MODEMAT), funded by Escuela Politécnica Nacional de Ecuador ($80.000), April 2015 - March 2018.

- Data Assimilation of Satellite and In-situ Observations for Wave Prediction Models on the Ecuadorian Coast.
  J. Portilla (PI), Juan C. De los Reyes (Co-PI).
  Multidisciplinary project between the Fac. of Mechanical Engineering and the Research Center for Math. Modeling (MODEMAT), funded by the Escuela Politécnica Nacional de Ecuador ($79.570), April 2015 - March 2018.

- Numerical Weather Prediction System for Ecuador: Mathematical and Statistical Modelling. Phase 1: Modelling and Parametrization.
  Juan C. De los Reyes (PI) and M. Hidalgo (INAMHI) (Co-PI).
  Project funded by the Ecuadorian Ministry of Higher Education, Science, Technology and Innovation ($2.131.152), October 2013 - March 2015.

- Numerical simulation of the cardiac and circulatory system.
  S. González (PI) and Juan C. De los Reyes, P. Merino (Co-PIs).
  Project funded by the Ecuadorian Ministry of Higher Education, Science, Technology and Innovation ($54.000), since August 2013.

- Optimal control of the two-phase Stefan problem based on an entalpy formulation.
  Juan C. De los Reyes (PI) and P. Merino (Co-PI).
  Project funded by Escuela Politécnica Nacional de Ecuador ($21.152), October 2012 - September 2013.

- Optimization methods for learning noise distribution in medical images.
  Juan C. De los Reyes (PI).
  Project funded by Escuela Politécnica Nacional de Ecuador ($10.000), August 2012 - July 2013.

- Mathematical modeling and numerical simulation of non-Newtonian shear thickening fluids.
  Juan C. De los Reyes (PI).
  Project funded by Escuela Politécnica Nacional de Ecuador ($14.140) and the Alexander von Humboldt Foundation (€6.500), November 2011 - October 2012. 2011.

- Optimal control of variational inequalities of the second kind.
  Juan C. De los Reyes (PI).
  Project funded by the Alexander von Humboldt Foundation, Berlin - Germany, €60.500, April 2009 - Sept. 2009 & April 2010 - March 2011.

- Numerical simulation of time-dependent visco-plastic Bingham flow.
  Juan C. De los Reyes (PI) and S. González (Co-PI).
  Project funded by Escuela Politécnica Nacional de Ecuador, Quito - Ecuador, $4.700, December 2008 - March 2009.

- Numerical simulation and control of mixing fluids in pipe joints.
  Juan C. De los Reyes (PI).
  Project funded by Escuela Politécnica Nacional de Ecuador, Quito - Ecuador, $9.428, October 2007 - March 2009 & April 2011 -July 2011.

- Optimal control of fluids with pointwise state constraints.
  Juan C. De los Reyes (PI).
  Project funded by Escuela Politécnica Nacional de Ecuador, Quito - Ecuador, $10.800, October 2004 - February 2005 & March 2006 - June 2008.

Reviewer for PhD Theses

- Jorge Sebastián Aguayo Araneda: *An inverse problem in Fluid Mechanics applied in Biomedicine*. University of Groningen, 2022.

Advisor

Postdocs

- Cao Van Chung: *Optimal Spatially Dependent Parameters for Image Denoising*. September 2013 - August 2014 & February 2015 - January 2016.

- Tuomo Valkonen: *Bilevel Optimization for Image Restoration with Higher-Order Regularizers*. April 2014 - October 2014.

- Daniel González: *Convergence of the Semismooth Newton Method in Banach Spaces via Kanthorovich Techniques*. September 2013- August 2014.

Ph.D. Dissertations

- Paula Castro: *Analysis of Variational Data Assimilation Problems using Maximal Parabolic Regularity*. Escuela Politécnica Nacional de Ecuador, ongoing.
- David Villacís: *Bilevel Imaging Learning with Total Variation Regularization: Optimality Conditions and Trust Region Solution Algorithms*. Escuela Politécnica Nacional de Ecuador, 2022.
- Lena Kaland: *The One-Shot Method: Function Space Analysis and Algorithmic Extension by Adaptivity*. Rheinisch-Westfaelische Technische Hochschule Aachen, 2013. Co-advised with Prof. N. Gauger.
- Sergio González: *Semi-smooth Newton and Path Following Methods for the Numerical Simulation of Bingham Fluids*. Escuela Politécnica Nacional de Ecuador, 2008.
- Pedro Merino: *Optimal Control of Semilinear PDE with Finite Dimensional Control Spaces*. Escuela Politécnica Nacional de Ecuador, 2008. Co-advised with Prof. F. Tröltzsch.

Master Theses

- Paola Quiloango: *Análisis de un problema de control óptimo no-suave asociado a un fluido dilatante*. Escuela Politécnica Nacional de Ecuador, ongoing.
- Kateryn Herrera: *Optimización binivel del parámetro de regularización con dependencia espacial del modelo de variación total generalizada para el filtrado de ruido en imágenes*. Escuela Politécnica Nacional de Ecuador, 2017.
- Estefanía Loayza: *Regularización de variación total generalizada para el problema mal condicionado de asimilación de datos*. Escuela Politécnica Nacional de Ecuador, 2017.
- Paula Castro: *Solución de un problema de asimilación de datos y un problema de localización óptima mediante métodos de optimización binivel*. Escuela Politécnica Nacional de Ecuador, 2017.

Diploma Theses

- Paola Quiloango: *Análisis de un problema de control óptimo de fluidos dilatantes*, 2018.
- María José Castellano: *Numerical solution of shallow water equations*. Escuela Politécnica Nacional de Ecuador, 2016.
- Kateryn Herrera: *Métodos variacionales para la restauración de dominios perdidos de imágenes y su resolución numérica mediante métodos de segundo orden*. Escuela Politécnica Nacional de Ecuador, 2015.
- Diego Garzón: *Eliminación del ruido en imágenes a través de un problema de optimización variacional binivel con parámetro polinomial*. Escuela Politécnica Nacional de Ecuador, 2015.

- Evelyn Cueva: *Métodos de optimización para la segmentación numérica de imágenes usando el modelo de Chan-Vese*. Escuela Politécnica Nacional de Ecuador, 2015
- Javier Núñez: *Método de Newton para la simulación numérica del modelo de Houska*. Escuela Politécnica Nacional de Ecuador, 2015.
- Gabriela Noroña: *Resolución de un problema inverso para la actividad eléctrica del corazón usando el modelo de Beeler-Reuter*. Escuela Politécnica Nacional de Ecuador, 2014.
- Paúl Acevedo: *Finite element error estimates for distributed optimal control of the Burgers equation*. Escuela Politécnica Nacional de Ecuador, 2009.
- Gabriela García and Rolando Mantilla: *A semismooth Newton method for the numerical solution of the Black & Scholes variational inequality*. Escuela Politécnica Nacional de Ecuador, 2006.
- Nadia Carrillo and Ximena Jácome: *Economic growth models with endogenous technological change: asymptotic analysis and optimal growth strategies for the Ecuadorian case*. Escuela Politécnica Nacional de Ecuador, 2004.

Publications

Book

73. Juan Carlos De los Reyes
Numerical PDE-Constrained Optimization
SpringerBriefs in Optimization
Springer-Verlag, 2015.

Submitted Articles

72. J.C. De Los Reyes
Bilevel Imaging Learning Problems as Mathematical Programs with Complementarity Constraints: Reformulation and Theory.

71. J.C. De Los Reyes and P. Quiloango
Optimal control of a nonsmooth PDE arising in the modeling of shear–thickening fluids.

Peer Reviewed Articles

70. J.C. De Los Reyes and D. Villacís
Optimality Conditions for Bilevel Imaging Learning Problems with Total Variation Regularization.
SIAM Journal on Imaging Sciences, to appear, 2022.

69. J.C. De Los Reyes and D. Villacís
Bilevel Optimization Methods in Imaging.
In *Handbook of Mathematical Models and Algorithms in Computer Vision and Imaging*, K. Chen, C.-B. Schönlieb, X.-C. Tai, L. Younces (Eds.), Springer, DOI:10.1007/978-3-030-03009-4_66-1, 2022.

68. J.C. De Los Reyes and K. Herrera
Parameter space study of optimal scale-dependent weights in TV image denoising.
Applicable Analysis, DOI: 10.1080/00036811.2022.2033231, 2022.

67. M. D'Elia, J.C. De Los Reyes and A. Miniguano
Bilevel parameter learning for nonlocal image denoising models.
Journal of Mathematical Imaging and Vision, 63(6), 753-775, 2021.

66. P. Castro, J.C. De Los Reyes, P. Merino, S. González
Parameter estimation for a SARS-CoV-2 model in Ecuador in presence of uncertainty.
Revista Politécnica, 47(1), 7-16, 2020.

65. F. Sherry, M. Benning, J.C. De los Reyes, M.J. Graves, G. Maierhofer, G. Williams, C.-B. Schönlieb and M.J. Ehrhardt
Learning the Sampling Pattern for MRI.
IEEE Transactions on Medical Imaging, 39(12), 4310-4321, 2020.

64. C. Christof, J.C. De Los Reyes and C. Meyer
A nonsmooth trust-region method for locally Lipschitz functions with application to optimization problems constrained by variational inequalities.
SIAM Journal on Optimization, 30(3), 2163-2196, 2020.

63. P. Castro and J.C. De Los Reyes
A bilevel learning approach for optimal observation placement in variational data assimilation.
Inverse Problems, Vol. 36, No. 3, 2020.

62. J.C. De Los Reyes and E. Loayza
Total generalized variation regularization in data assimilation for Burgers' equation.
Inverse Problems and Imaging, Vol. 13, No. 4, 755-786, 2019.

61. J.C. De Los Reyes
On the optimal control of some nonsmooth distributed parameter systems arising in mechanics.
GAMM-Mitteilungen, Vol. 40(4), 268-286, 2018.

60. L. Calatroni, J.C. De Los Reyes and C.-B. Schönlieb
Infimal convolution of data discrepancies for mixed noise removal.
SIAM Journal on Imaging Sciences, Vol. 10(3), 1196-1233, 2017.

59. C. Cao, J.C. De Los Reyes and C.-B. Schönlieb
Learning optimal spatially-dependent regularization parameters in total variation image denoising.
Inverse Problems, Vol. 33(7), 2017.

58. J.C. De los Reyes, E. Loayza and P. Merino
Second-order orthant-based methods with enriched Hessian information for sparse ℓ_1-optimization.
Computational Optimization and Applications, Vol. 67(2), 225-258, 2017.

57. J.C. De Los Reyes, C.-B. Schönlieb and T. Valkonen
Bilevel parameter learning for higher-order total variation regularisation models.
Journal of Mathematical Imaging and Vision, Vol. 57(1), 1-25, 2017.

56. L. Calatroni, C. Cao, J.C. De Los Reyes, C.-B. Schönlieb and T. Valkonen
Bilevel approaches for learning of variational imaging models
In *Variational Methods in Imaging and Geometric Control*, M. Bergounioux, G. Peyré, C. Schnörr, J.-P. Caillau, T. Haberkorn (Eds.), De Gruyter, 252-290, 2017.

55. Juan Carlos De los Reyes, Roland Herzog and Christian Meyer
Optimal control of static elastoplasticity in primal formulation.
SIAM Journal on Control and Optimization, Vol. 54(6), 3016-3039, 2016.

54. J.C. De Los Reyes, C.-B. Schönlieb and T. Valkonen
The structure of optimal parameters for image restoration problems.
Journal of Mathematical Analysis and Applications, Vol. 434, 464-500, 2016.

53. Juan Carlos De Los Reyes and Vili Dhamo
Error estimates for optimal control problems of a class of quasilinear equations arising in variable viscosity fluid flow.
Numerische Mathematik, Vol. 132(4), 691-720, 2016.

52. Juan Carlos De los Reyes and Christian Meyer
Strong stationarity conditions for a class of optimization problems governed by variational inequalities of the second kind.
Journal of Optimization Theory and Applications, Vol. 108(2), 375-409, 2016.

51. Juan Carlos De Los Reyes and Georg Stadler
A nonsmooth model for discontinuous shear thickening fluids: Analysis and numerical solution.
Interfaces and Free Boundaries, Vol. 16, 575-603, 2014.

50. Juan Carlos De Los Reyes and Irwin Yousept
Optimal control of electrorheological fluids through the action of electric fields.
Computational Optimization and Applications, Vol. 62, 241-270, 2015.

49. L. Calatroni, J.C. De los Reyes and C.B. Schönlieb
Dynamic sampling schemes for optimal noise learning under multiple nonsmooth constraints.
In *System Modeling and Optimization*, C. Pötzsche, C. Heuberger, B. Kaltenbacher, F. Rendl (Eds.), 85-95, Springer Verlag, 2014.

48. L. Kaland, J.C. De Los Reyes and N. Gauger
One shot methods in function space for PDE-constrained optimal control problems.
Optimization Methods and Software, Vol. 29, 376–405, 2014.

47. Juan Carlos De Los Reyes and Carola-Bibiane Schönlieb
Image denoising: learning the noise model via nonsmooth PDE-constrained optimization.
Inverse Problems and Imaging, Vol. 7, 1183–1214, 2013.

46. Juan Carlos De Los Reyes and Sergio González
Numerical simulation of thermally convective viscoplastic fluids by semismooth second order type methods.
Journal of Non-Newtonian Fluid Mechanics, Vol. 193, 43-48, 2013.

45. Juan Carlos De Los Reyes
Optimization of mixed variational inequalities arising in flow of viscoplastic materials.
Computational Optimization and Applications, Vol. 52, 757–784, 2012.

44. Juan Carlos De Los Reyes and Sergio González
A combined BDF-semismooth Newton approach for time dependent Bingham flow.
Numerical Methods for Partial Differential Equations, Vol. 28, 834–860, 2012.

43. Juan Carlos De Los Reyes and Michael Hintermüller
A duality based semismooth Newton framework for solving variational inequalities of the second kind.
Interfaces and Free Boundaries, Vol. 13, 437–462, 2011.

42. Juan Carlos De Los Reyes
Optimal control of a class of variational inequalities of the second kind.
SIAM Journal on Control and Optimization, Vol. 49, 1629–1658, 2011.

41. J.C. De Los Reyes and T. Stykel
A balanced truncation based strategy for optimal control of evolution problems.
Optimization Methods and Software, Vol. 26, 671–692, 2011.

40. J.C. De Los Reyes
On the optimization of steady Bingham flow in pipes.
In *Recent Advances in Optimization and its Applications in Engineering*, M. Diehl, F. Glineur, E. Jarlebring and W. Michiels (Eds.), 379-388, Springer Verlag, 2010.

39. Juan Carlos De Los Reyes and Sergio González
Numerical simulation of two-dimensional Bingham fluid flow by semismooth Newton methods.
Journal of Computational and Applied Mathematics, Vol. 235, 11–32, 2010.

38. Juan Carlos De Los Reyes and Karl Kunisch
Optimal control of partial differential equations with affine control constraints.
Control and Cybernetics, Vol. 38, 1217–1250, 2009.

37. Juan Carlos De Los Reyes and Karl Kunisch
On some nonlinear optimal control problems with vector-valued affine control constraints.
In *Optimal Control of Coupled Systems of PDE*, K. Kunisch, G. Leugering, J. Sprekels and F. Tröltzsch (Eds.), 105-122, Birkhäuser Verlag, 2009.

36. J.C. De Los Reyes and I. Yousept
Regularized state constrained boundary optimal control of the Navier-Stokes equations.
Journal of Mathematical Analysis and Applications, Vol. 356, 257–279, 2009.

35. Juan Carlos De Los Reyes and Sergio González
Path following methods for steady laminar Bingham flow in cylindrical pipes.
ESAIM: Mathematical Modelling and Numerical Analysis, Vol. 43, 81–117, 2009.

34. J.C. De Los Reyes, C. Meyer and B. Vexler
Finite element error analysis for state-constrained optimal control of the Stokes equations.
Control and Cybernetics, Vol. 37, 251–284, 2008.

33. J.C. De Los Reyes, P. Merino, J. Rehberg and F. Tröltzsch
Optimality conditions for state-constrained PDE control problems with time dependent controls.
Control and Cybernetics, Vol. 37, No. 1, 5-38, 2008.

32. Eduardo Casas, Juan Carlos De Los Reyes and Fredi Tröltzsch
Sufficient second-order optimality conditions for semilinear control problems with pointwise state constraints.
SIAM Journal on Optimization, Vol. 19, 616–643, 2008.

31. J.C. De Los Reyes and R. Griesse
State constrained optimal control of the three-dimensional stationary Navier-Stokes equations.
Journal of Mathematical Analysis and Applications, Vol. 343, 257-272, 2008.

30. A. Carnarius, J.C. De Los Reyes, B. Günther, F. Thiele, F. Tröltzsch and D. Wachsmuth
Numerical study of the optimization of separation control.
AIAA 2007-0058, 45th AIAA Aerospace Sciences Meeting and Exhibit, 2007.

29. J.C. De Los Reyes and F. Tröltzsch
Flow control with regularized state constraints.
In *Active Flow Control*, R. King (Ed.), 353–366, Springer Verlag, 2007.

28. J.C. De Los Reyes and F. Tröltzsch
Optimal control of the stationary Navier-Stokes equations with mixed control-state constraints.
SIAM Journal on Control and Optimization, Vol. 46, 604–629, 2007.

27. J.C. De Los Reyes and K. Kunisch
A semi-smooth Newton method for regularized state-constrained optimal control of the Navier-Stokes equations.
Computing, Vol. 78, 287–309, 2006.

26. J.C. De Los Reyes
Primal-dual active set method for control constrained optimal control of the Stokes equations.
Optimization Methods and Software, Vol. 21, 267–293, 2006.

25. A. Ponce, J. C. Izquierdo, F. Sandoval and J.C. De Los Reyes
Comparison between cold lateral compaction and System B obturation techniques in apical filtration.
Revista Odontológica Mexicana, Vol. 9, 65-72, 2005.

24. J.C. De Los Reyes and K. Kunisch
A semi-smooth Newton method for control constrained boundary optimal control of the Navier-Stokes equations.
Nonlinear Analysis: Theory, Methods and Applications, Vol. 62, 1289–1316, 2005.

23. J.C. De Los Reyes and K. Kunisch
A comparison of algorithms for control constrained optimal control of the Burgers equation.
Calcolo, Vol. 41, 203–225, 2004.

22. J.C. De Los Reyes
A primal-dual active set method for bilaterally control constrained optimal control of the Navier-Stokes equations.
Numerical Functional Analysis and Optimization, Vol. 25, 657–683, 2004.

Conference Proceedings

21. Juan Carlos De Los Reyes and Irwin Yousept
Boundary optimal flow control with state constraints.
Proceedings in Applied Mathematics and Mechanics, Vol. 7, No. 1, 2060029-2060030, 2008.

20. Juan Carlos De Los Reyes and Sergio González
Flow of Bingham fluids in a bounded channel
Proceedings EXPRIME, México, 2008.

Theses

19. J.C. De Los Reyes
Constrained Optimal Control of Stationary Viscous Incompressible Fluids by Primal-Dual Active Set Methods, Ph.D. Dissertation, Karl-Franzens Universität Graz, 2003.

18. J.C. De Los Reyes
Localización óptima de instalaciones: una aplicación a los servicios de emergencia, Diploma Thesis, Escuela Politécnica Nacional de Ecuador, 2000.

Lecture Notes

17. J.C. De los Reyes
Continuous Numerical Optimization, Lecture notes, 2014.

16. J.C. De Los Reyes
Análisis numérico para la resolución de ecuaciones diferenciales parciales, Cuadernos de Matemática de la Escuela Politécnica Nacional, 2012.

15. J.C. De Los Reyes
Optimización en Economía, Lecture notes, 2012.

14. J.C. De Los Reyes
Control óptimo, Cuadernos de Matemática de la Escuela Politécnica Nacional, 2011.

13. J.C. De Los Reyes
Biomatemática, Lecture notes, 2008.

12. J.C. De los Reyes
Análisis Numérico, Lecture notes, 2006.

Further documents

11. Paula Castro, Juan C. De los Reyes, Sergio González, Pedro Merino, Joan Ponce
Modelización y simulación de la propagación del virus SARS-Cov-2 en Ecuador, *Technical Report,*, 2020.

10. J.C. De Los Reyes and K. Herrera
Métodos variacionales para la restauración de dominios perdidos de imágenes y su resolución numérica mediante métodos de segundo orden, *Technical Report,*, 2015.

9. J.C. De Los Reyes and D. Garzón
Eliminación del ruido en imágenes a través de un problema de optimización binivel con parámetro polinomial, *Technical Report,*, 2015.

8. J.C. De Los Reyes and E. Cueva
Métodos de Optimización para la Segmentación Numérica de Imágenes usando el Modelo de Chan-Vese, *Technical Report,*, 2015.

7. J.C. De Los Reyes and J. Núñez
Método de Newton para la simulación numérica del Modelo de Houska, *Technical Report,*, 2015.

6. J.C. De Los Reyes and G. Noroña
Resolución de un problema inverso para la actividad eléctrica del corazón usando el modelo de Beeler Reuter, *Technical Report,*, 2014.

5. J.C. De Los Reyes, G. García and R. Mantilla
Método de newton generalizado para la resolución numérica de la desigualdad variacional de Black-Scholes, *Technical Report,*, 2006.

4. J.C. De Los Reyes and G. Noroña
Modelo de crecimiento económico con desarrollo tecnológico endógeno: análisis histórico y estrategias de crecimiento de largo plazo para el caso ecuatoriano, *Technical Report,*, 2004.

3. J.C. De Los Reyes
A SQP method for constrained optimal control of the Burgers equation, *I+D Innovación,* Vol. 13, 115-129, 2004.

2. J.C. De Los Reyes and P. Vaca
A model for the emergency services location problem over a dynamic network and a genetic algorithm for its numerical solution, (paper presented at the X Latin-Ibero-American Conference on Operations Research and Systems, Mexico, September 2000).

1. J.C. De Los Reyes
Un ranking matemático de los vehículos, *Revista Gestión*, Vol. 37, 1997.

Conferences and Presentations

Talks at Meetings and Conferences

114. Bilevel Learning for Variational Nonlocal Image Denoising Models, *SIAM Annual Meeting*, July 2022.

113. Bilevel Learning for Inverse Problems, *Segunda Conferencia Colombiana de Matemáticas Aplicadas e Industriales, MAPI*, June 2022.

112. Bilevel imaging learning: A new viewpoint on optimality conditions and solution methods, *INI Workshop on Deep learning and inverse problems*, September 2021.

111. Optimal observation placement in variational data assimilation models, *Mathematical Congress of the Americas*, July 2021.

110. Bilevel learning for inverse problems, *Mathematical Congress of the Americas*, July 2021.

109. Modelización matemática: del teorema a la aplicación, *II Simposio científico internacional "Ciencia, innovación y desarrollo sostenible"*, June 2021.

108. On the structure of bilevel imaging learning problems, *Oberwolfach Workshop: Deep Learning for Inverse Problems*, March 2021.

107. Bilevel Parameter Optimization for Learning Nonlocal Image Denoising Models, *SIAM Conference on Computational Science and Engineering*, March 2021.

106. Bilevel learning methods in imaging, *Imaging & Inverse Problems (IMAGINE) OneWorld SIAM-IS Virtual Seminar*, November 2020.

105. Parameter estimation for SARS-CoV-2 models under uncertainty in the data: the Ecuadorian case, *FAPESP Webinars on COVID-19: Focusing maths of COVID-19 on South America*, June 2020.

104. Modelización de la propagación del SARS-Cov-2 en Ecuador, *MatCovid-19 Latam*, Sociedad Colombiana de Matemáticas, May 2020.

103. Algunos aspectos teóricos y prácticos de la asimilación de datos en la predicción meteorológica, *XVI Encuentro de Física*, Quito, November 2019.

102. Optimal parameters selection in nonlocal image denoising, *Workshop: Optimal control and optimization for nonlocal models*, Linz, October 2019.

101. Some challenges of four-dimensional data assimilation problems, *Workshop: New trends in PDE constrained optimization*, Linz, October 2019.

100. Optimal parameters selection in nonlocal image denoising, *International Conference on Continuous Optimization*, Berlin, August 2019.

99. Optimal parameters selection in nonlocal image denoising, *9th International Congress on Industrial and Applied Mathematics*, Valencia, July 2019.

98. Second Order Methods for the Solution of Anisotropic Total Variation Denoising Models, *9th International Congress on Industrial and Applied Mathematics*, Valencia, July 2019.

97. Optimising the optimisers - what is the right image and data model?, *XXII Congreso Colombiano de Matemáticas*, Popayán, June 2019. **Plenary Speaker**.

96. Variational image processing: from theory to practical implementation, *Humboldt Kolleg Measuring America*, Barranquilla, March 2019. **Invited Speaker**.

95. Optimal Control of Nonsmooth Distributed Parameter Systems Modeled by Variational Inequalities of the Second Kind, *XVI Encuentro de Matemática y sus Aplicaciones*, Quito, October 2018. **Invited Speaker**.

94. A semi-infinite bilevel optimization approach for spatially-dependent parameter selection in TGV image denoising, *SIAM Conference on Imaging Science*, Bologna, June 2018.

93. Some theoretical and practical aspects of variational data assimilation in numerical weather prediction, *Congreso Anual de Meteorología y Calidad del Aire, CAMCA 2018*, Quito, April 2018. **Invited Speaker**.

92. Second-order orthant-based methods for the numerical solution of sparse optimization problems, *Workshop on Optimization for Learning*, Santiago de Chile, January 2018. **Invited Speaker**.

91. Optimal Control of Nonsmooth Distributed Parameter Systems Modeled by Variational Inequalities of the Second Kind, *Workshop on Optimization of Infinite Dimensional Non-Smooth Distributed Parameter Systems*, Darmstadt, Germany, October 2017. **Invited Speaker**.

90. Learning optimal observation placement in variational data assimilation models, *Workshop on Optimal Control of Partial Differential Equations*. Castro-Urdiales, September, 2017.

89. Bilevel learning approaches in variational image processing: From local to nonlocal models, *Workshop on Non-local Material Models and Concurrent Multiscale Methods*, Hausdorff Research Institute for Mathematics, Bonn, April 2017.

88. Bilevel optimization approaches for learning the noise model in variational image processing, *Workshop on Mathematical Imaging for Partially Known Models*, Cambridge, February 2017. **Plenary Speaker**.

87. Bilevel optimization approaches for learning the noise model in variational image processing, *International Symposium on Mathematical Modeling (ISMM-2016)*, México, December 2016. **Keynote Speaker**.

86. Estimación de parámetros reológicos de flujos volcánicos, *Segundo Congreso Internacional de Matemática Aplicada en El Salvador*, El Salvador, September 2016. **Keynote Speaker**.

85. Second-order orthant-based methods for the numerical solution of sparse optimization problems, *V Latin-American Workshop on Optimization and Control*, Tandil, July 2016. **Keynote Speaker**.

84. Bilevel Parameter Learning for Higher-Order Total Variation Regularisation Models, *SIAM Conference on Imaging Science*. Albuquerque, May 23-26, 2016.

83. Optimal Learning Approaches for the Determination of Noise Models in Image Restoration, *SIAM Conference on Imaging Science*. Albuquerque, May 23-26, 2016.

82. Bilevel optimization approaches for learning the noise model in variational image processing, *Workshop on Analysis and Applications of Stochastic Systems*. IMPA-Rio de Janeiro-Brazil, March 28-April 1, 2016.

81. A nonsmooth (yield stress) model for discontinuous shear thickening fluids, *BIRS Workshop. Viscoplastic Fluids: From Theory to Application*, Banff, October 2015.

80. Optimality conditions for control problems with variational inequality constraints involving the TV-seminorm, *From Open to Close Loop Control*, Graz, June 2015.

79. Optimization-based learning methods in imaging, *Applied Inverse Problems*, Helsinki, May 2015.

78. Procesamiento matemático de imágenes: de la teoría a la práctica. *Jornadas Rodrigo Fierro. Fronteras de la Investigación Científica en el Ecuador*. Quito, January 2015

77. Sistema de Pronóstico del Clima y el Tiempo para todo el Territorio Ecuatoriano: Modelización Numérica. *Miniworkshop sobre Modelización Numérica de Fenómenos Meteorológicos, XIV Encuentro de Matemática y sus Aplicaciones*. Quito, September 2014.

76. Optimization-based learning methods in imaging, *IV Latin-American Workshop on Optimization and Control*, Lima, July 2014.

75. Understanding and predicting: on how computational mathematics is shaping medicine, *First Congress on Biomedical Engineering and Mathematical Modelling in the Biosciences*, Quito, June 2014. **Keynote Speaker**.

74. On the use of second order information in sparse PDE-constrained optmization. Invited talk, *SIAM Conference on Optimization*, San Diego, May 2014.

73. Optimización con EDP: métodos y aplicaciones. *XXVII Jornada de Matemática de la Zona Sur*, Temuco-Chile, April 2014. **Keynote Speaker**

72. Image denoising: learning the noise model via nonsmooth PDE-constrained optimization. Invited talk, *IFIP TC7 Conference on Systems Modelling and Optimization*. Klagenfurt-Austria, September 2013.

71. Image denoising: learning noise distribution via nonsmooth PDE-constrained optimization. Invited talk, *Mathematical Congress of the Americas*. Guanajuato-México, August 2013.

70. Optimality conditions for optimization constrained by variational inequalities. Invited talk, *International Conference on Continuous Optimization*. Lisboa, July 2013.

69. Image denoising: learning noise distribution via VI-constrained optimization. Invited talk, *European Conference on Computational Optimization*. Chemnitz-Germany, July 2013

68. Error estimates for optimal control problems of a class of quasilinear equations arising in variable viscosity fluid flow. Invited talk, *Fourth Chilean Workshop on Numerical Analysis of Partial Differential Equations*. Concepción-Chile, January 2013.

67. Optimality conditions for control problems of variational inequalities of the second kind. Invited talk, *International Symposium on Mathematical Programming*. Berlin-Germany, August 2012.

66. Técnicas de optimización con EDP para la resolución de problemas no diferenciables en mecánica de fluidos y procesamiento de imágenes. *13. Encuentro de Matemática y sus Aplicaciones*. Quito-Ecuador, July 2012. **Keynote Speaker**

65. An optimization based numerical approach for free boundary problems modeled by variational inequalities of the second kind. Invited talk, *12. International Conference on Free Boundary Problems Theory and Applications*. Chiemsee-Germany, June 2012.

64. *3th Latin American Workshop on Optimization and Control*. Valparaíso - Chile, January 2012.

63. PhD program in Applied Mathematics in Ecuador: history and future perspectives. *VI Workshop DIES-DAAD on Strategic Faculty Management*. Temuco - Chile, December 2011.

62. Numerical optimal control of electrorheological fluids. Invited talk, *IFIP TC7 Conference*. Berlin - Germany, September 2011.

61. Some aspects on the optimal control of variational inequalities. Invited talk, *7th International Congress on Industrial and Applied Mathematics*. Vancouver - Canada, July 2011.

60. Numerical optimization of electrorheological fluids. Invited talk, *7th International Congress on Industrial and Applied Mathematics*. Vancouver - Canada, July 2011.

59. Optimal control of mixed variational inequalities of the second kind. Invited talk, *SIAM Conference on Optimization*. Darmstadt - Germany, May 2011.

58. Optimization of Mixed Variational Inequalities. Contributed talk, *Workshop on Numerical Methods for Optimal Control and Inverse Problems*. München - Germany, March 2011.

57. Optimal control of mixed variational inequalities. Invited talk, *Mini-Workshop on Optimization*. Temuco - Chile, November 2010.

56. Research Group on Optimization in Quito. *IV Workshop DIES-DAAD on Strategic Faculty Management*. Temuco - Chile, November 2010.

55. Some aspects on the optimal control of mixed variational inequalities. Invited talk, *International Conference of Numerical Analysis and Applied Mathematics 2010 (ICNAAM 2010)*. Rhodes - Greece, September 2010.

54. Optimal control of variational inequalities of the second kind. Invited talk, *Second Latin American Workshop on Optimization and Control*. Rosario - Argentina, July 2010. **Keynote Speaker**

53. Numerical simulation of viscoplastic fluid flow by semismooth Newton methods. Contributed talk, *1st Workshop on Coupled Models in Energy, Hydrological And Climate Research Optimization*. Weierstrass Institute for Applied Analysis and Stochastics (WIAS). Berlin, October 2009.

52. Optimal control of variational inequalities with application to viscoplastic fluid flow. Invited talk, *14th Belgian-French-German Conference on Optimization*. Leuven - Belgium, September 2009.

51. Regularized state-constrained boundary optimal control of the Navier-Stokes equations. Invited talk, *14th Belgian-French-German Conference on Optimization*. Leuven - Belgium, September 2009.

50. Finite element error analysis for state-constrained optimal control of the Stokes equations. Contributed talk, *IV Meeting on Numerical Analysis of Partial Differential Equations: Santiago Numérico*. Santiago de Chile - Chile, January 2009.

49. *Workshop on Optimal Control of Coupled Systems of PDE*. Mathematisches Forschungsinstitut Oberwolfach. Oberwolfach, March 2008.

48. Boundary optimal flow control with state constraints. Contributed talk, *VI International Congress on Industrial and Applied Mathematics*. Zürich - Switzerland, July 2007.

47. Optimal flow control with regularized state constraints. Invited talk, *Conference on Active Flow Control*. Berlin, September 2006.

46. *Workshop on Model Reduction*. Berlin, November 2005.

45. A semi-smooth Newton method for state constrained optimal control of the Navier-Stokes equations. Contributed talk, *Workshop on PDE Constrained Optimization*. Tomar - Portugal, July 2005.

44. *Workshop on Optimal Control of Coupled Systems of PDE*. Mathematisches Forschungsinstitut Oberwolfach. Oberwolfach, April 2005.

43. State Constrained Optimal Control of the Navier-Stokes Equations. Contributed talk, *X French Latin-American Conference on Applied Mathematics*. Santiago de Chile - Chile, January 2005.

42. Método de Newton semi-suave para el control óptimo de fluidos. Contributed talk, *IX Ecuadorian Congress on Mathematics*. Quito - Ecuador, July 2004.

41. Comparison of algorithms for control constrained optimal control of the Burgers and Navier-Stokes equations. Contributed talk *European Conference on Computational Optimization*. Dresden, March 2004.

40. *Conference on Control and Estimation of Distributed Parameter Systems*. Graz - Austria, July 2001.

39. *Workshop on Numerical Methods for Nonlinear Problems in Optimization and Control*. Cortona - Italy, June 2001.

38. A model for the emergency services location problem over a dynamic network and a genetic algorithm for its numerical solution. Contributed talk, *X Latin-Ibero-American Conference on Operations Research and Systems*. Mexico D.F. - Mexico, September 2000.

Invited Talks at Seminars and Colloquia

37. Bilevel learning for Inverse Problems. *Numerical Analysis and Scientific Computing Seminar*, Courant Institute of Mathematical Sciences, New York University. September 2022.

36. Bilevel learning for Inverse Problems. *Seminario matemáticas aplicadas y computación*, Centro de Investigación en Matemáticas (CIMAT) September 2022.

35. La modelización matemática y su importancia en la sociedad. *Universidad del Azuay*, May 2022.

34. Bilevel learning for Inverse Problems. *SFB 1060 Seminar, Mathematisches Institut, Universität Bonn*, April 2022.

33. Bilevel learning for Inverse Problems. *Differential Equations and Nonlinear Analysis Seminar at NC State University*, March 2022.

32. Bilevel learning for Inverse Problems. *Berlin Oberseminar: Optimization, Control and Inverse Problems*, December 2021.

31. Algunos aspectos teóricos y prácticos de la asimilación de datos en la predicción meteorológica, *Seminario AML-CS*, Universidad del Norte, Barranquilla, Colombia, July 2020.

30. Seminario del Programa de Doctorado en Ingeniería de Sistemas Complejos, Universidad Adolfo Ibáñez, Chile, April 2017.

29. Seminar in Imaging Science, Department Mathematics, Loughborough University, United Kingdom, February 2017.

28. Seminario, Departamento de Matemáticas, Universidad Autónoma Metropolitana, México, December 2016.

27. Seminar in Applied and Computational Analysis, Department of Applied Mathematics and Theoretical Physics, University of Cambridge, July 2016.

26. Seminar in Applied and Computational Analysis, Department of Applied Mathematics and Theoretical Physics, University of Cambridge, January 2016.

25. Oberseminar Analysis. Fakultät für Mathematik, Universität Duisburg-Essen, June 2015.

24. Lothar Collatz Kolloquium, Institut für Mathematik, Universität Hamburg, June 2013.

23. Institut für Mathematik, Humboldt-Universität zu Berlin, February 2013.

22. Institut für Mathematik und Informatik, Universität Greifswald, December 2012.

21. Center for Computational Engineering Science (Mathematics Division), Rheinisch-Westfaelische Technische Hochschule Aachen, July 2012.

20. Fakultät für Mathematik, Technische Universität Dortmund, July 2012.

19. Seminario de Optimización, Universidad de Los Andes, Bogotá-Colombia, April 2012.

18. Seminar in Applied and Computational Analysis, Department of Applied Mathematics and Theoretical Physics, University of Cambridge, January 2012.

17. Institut für Mathematik und Informatik, Universität Greifswald, January 2012.

16. International Research Training Group (IGK 1529) (Internationales Graduiertenkolleg) Mathematical Fluid Dynamics, TU Darmstadt, May 2011.

15. Institut für Mathematik, Julius-Maximilians-Universität Würzburg, March 2011.

14. Institut für Mathematik, Goethe-Universität Frankfurt am Main, February 2011.

13. Institut für Angewandte Mathematik, Ruprecht-Karls-Universität Heidelberg, January 2011.

12. Seminar in Applied and Computational Analysis, Department of Applied Mathematics and Theoretical Physics, University of Cambridge, November 2010.

11. Institut für Mathematik, Universität Hamburg, July 2010.

10. Forschungsseminar Optimierung bei partiellen Differentialgleichungen. Institut für Mathematik, Technische Universität Berlin, June 2010.

9. Forschungsseminar Optimierung. Fakultät für Mathematik, Universität Duisburg-Essen, May 2010.

8. Forschungsseminar Scientific Computing. Fakultät für Mathematik, Technische Universität Chemnitz, April 2010.

7. Forschungsseminar Optimierung. Institut für Mathematik, Humboldt-Universität zu Berlin, June 2009.

6. Weierstraß-Institut für Angewandte Analysis und Stochastik (WIAS). Berlin, September 2007.

5. Forschungsseminar Optimierung bei partiellen Differentialgleichungen. Institut für Mathematik, Technische Universität Berlin, May 2005.

4. Johann Radon Institute for Computational and Applied Mathematics, Österreichische Academie der Wissenschaften. Linz - Austria, May 2005.

3. Kolloquium über Angewandte und Numerische Mathematik. Seminar for Applied Mathematics, Department of Mathematics, ETH Zürich. Switzerland, May 2005.

2. Seminar of the Research Group on Optimal Control and Inverse Problems. Institut für Mathematik, Universität Graz. Österreich, Juni 2002.

1. Seminar of the Research Group on Optimal Control and Inverse Problems. Institut für Mathematik, Universität Graz. Österreich, Februar 2001.

Consulting

- Advisor on *Computer Science Curricula* for Yachay University/Yachay City of Knowledge, October 2013 - April 2014.
- Advisor on *Risk Management Techniques* for the financial institution "Corporación de desarrollo de mercado secundario de hipotecas CTH", June 2006 - December 2006.
- Advisor on *Socio-environmental variable analysis for the Sangay National Park* for the N.G.O. "Fundación Natura", 1999.
- Consultant on *Analysis of the automobile market in Quito*, for the "Gestión" magazine, 1997.

Languages

- Spanish: native language.
- German: fluent.
- English: fluent.