

# Dr. Gerardo Hernández-Dueñas

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CONTACT INFORMATION      *Work Address :*      *Office Phone:* (52) 442-192-6231  
National Autonomous University of Mexico      Ext. 248  
Institute of Mathematics      *Email:*  
UNAM - Juriquilla, Queretaro, Mexico      hernandez at im dot unam dot mx  
Avenida Juriquilla 3001      *Website:*  
Juriquilla, Queretaro, Mexico      <http://www.matem.unam.mx/~gerardo/>

CITIZENSHIP:      Mexican

RESEARCH INTERESTS      Applied Mathematics to Atmospheric Sciences  
Turbulence: Theory, Numerics and Computations  
Numerical Methods for Hyperbolic Conservation Laws  
Geophysical Fluid Dynamics  
Semiclassical Analysis

PRESENT POSITION      National Autonomous University of Mexico- Juriquilla      Since June, 2014  
Institute of Mathematics  
Assistant Professor

PREVIOUS POSITION      University of Wisconsin - Madison      June, 2014 - May 2014  
Department of Mathematics  
Postdoctoral Fellow  
Van Vleck Visiting Assistant Professor

EDUCATION      **University of Michigan**      April 21, 2011  
Ph.D in Mathematics, Rackham Graduate School, Ann Arbor, Michigan.  
Thesis title:  
Numerical Methods for Porous Media and Shallow Water Flows & An Algebra of  
Singular Semiclassical Pseudodifferential Operators  
- Advisor in pure mathematics:      Professor Alejandro Uribe  
*Email:* uribe at umich dot edu  
- Advisor in applied mathematics: Professor Smadar Karni  
*Email:* (karni at umich dot edu )

**University of Guanajuato and**  
                                 **CIMAT (Research Center in Mathematics)**      Aug. 2000 - July 2005  
Bachelors Degree in Mathematics: GPA 9.8 / 10.  
Guanajuato, Mexico  
-Advisor: Xavier Gomez-Mont  
*Email:* gmont at cimat dot mx

HONORS AND AWARDS      **SNI - Level I**      2014 - Present  
Member of the National(Mexican) System of Researchers

**Youth Prize 2011 in the Academic Category**      Oct. 2011  
Secretaria de la Juventud, Colima. Colima, Col.

**Medal for best GPA (9.76/10) of the class of 2005.**      Nov. 2005  
Univerisity of Guanajuato, Mexico

**Medal for Academic Excellence** Oct. 2000  
“Ing. Arq. Rodolfo Chávez Carrillo” (GPA 10.0 / 10)  
Univerisity of Colima, Mexico.

**2nd Place at National Contest, Mexican Mathematics Olympiad**  
Mexican Mathematical Society Nov. 1999

#### GRANTS

- **Convective Instabilities and Hyperbolic Conservation Laws**  
PAPIIT IA103015
- **Numerical analysis for hyperbolic conservation laws and geophysical flows**  
PAPIIT IA104517

#### PUBLICATIONS AND PREPRINTS

##### **Hyperbolic Conservation Laws:**

G. Hernandez-Duenas and A. Beljadid. A central-upwind scheme with artificial viscosity for shallow-water flows in channels. **A central-upwind scheme with artificial viscosity for shallow-water flows in channels.** *Advances in Water Resources*, Volume 96 (2016) 323-338.

J. Balbás and G. Hernández-Dueñas. **Central Schemes for Shallow Water Flows in Channels with Wet-Dry States.** *ESAIM: Mathematical Modelling and Numerical Analysis*, Volume 48 (2014), number 3, p 665-696.

G. Hernández-Dueñas and S. Karni. **Shallow Water Flows in Channels.** *Journal of Scientific Computing.* 48 (2011), no. 1-3, p 190-208.

S. Karni and G. Hernández-Dueñas. **A Hybrid Algorithm for the Baer-Nunziato Model Using the Riemann Invariants.** *Journal of Scientific Computing*, 45, (2010), p 382-403.

##### **Semiclassical Analysis:**

G. Hernández-Dueñas and A. Uribe. **Algebras of semiclassical pseudodifferential operators associated with Zoll-type domains in cotangent bundles** *Journal of Functional Analysis*, 268, number 7, (2015) 1755-1807.

##### **Atmospheric Sciences and Turbulence**

G. Hernandez-Duenas, L.M. Smith, and S. N. Stechmann. **Stability and instability criteria for idealized precipitating hydrodynamics,** *Journal of Atmospheric Sciences*, Vol 72, No. 6 (2015), pp. 2379-2393

G. Hernández-Dueñas, L. M. Smith, and S. N. Stechmann. **Investigation of Boussinesq dynamics using intermediate models based on wave-vortical interactions.** *Journal of Fluid Mechanics*, 747, (2014) 247-287

G. Hernández-Dueñas, A. J. Majda, L. M. Smith, and S. N. Stechmann. **Minimal Models for Precipitating Turbulent Convection** , *Journal of Fluid Mechanics*, 717, (2013) 576-611.

##### **Proceedings:**

S. Karni and G. Hernández-Dueñas. **A Hybrid Scheme for Flows in Porous Media.** *Hyperbolic Problems: Theory, Numerics, Applications.* Proceedings of Symposia in Applied Mathematics, Volume 67, Part 2, (2009), p 715-724. *Amer. Math. Soc., Providence, RI, (2009).*

##### **Extended abstracts:**



### **Mathematics and Modelling in Geophysical Fluid Dynamics**

Special Session at the Mathematical Congress of the Americas August 5-6 2013

Co-organizers:

Paul Milewski (U. Bath), Esteban Tabak (MIT), Pedro Leite Silva Dias (U. São Paulo)

OTHER EVENTS  
ORGANIZED

### **Queretaro Colloquium**

Co-organizers:

Jorge Velasco, Luis Montejano, Marco-Tulio Angulo, Gerardo Hernandez-Duenas (since 2017)

### **Queretaro Colloquium**

Co-organizers: Gabriela Araujo, Gerardo Hernandez-Duenas (since 2015)

### **VI Summer School in Mathematics**

Institute of Mathematics, National University of Mexico

Juriquilla, Querétaro,

June 12 - June 17 2016

Co-organizers: Gabriel Ruiz , Gerardo Hernandez-Duenas.

### **National Conference for Young Mathematicians ENJIM 2015**

Co-organizers:

Miguel Arturo Ballesteros Montero - IIMAS

Nov. 30 - Dec. 4 2015

Noe Bárcenas Torres - CCM

Manuel Domínguez de la Iglesia - IMATE

Gerardo Hernández Dueñas - IMATE

Daniel Labardini Fragoso - IMATE

Adriana Ortiz Rodríguez - IMATE

José Luis Angel Pérez Garmendia - CIMAT

Pablo Suárez Serrato - IMATE

### **V Summer School in Mathematics**

June 28 - July 3 2015

Institute of Mathematics, National University of Mexico

Juriquilla, Querétaro,

June 28 - July 3 2015

Co-organizers: Amanda Montejano, Adolfo Magaldi-Hermosillo, Gabriel Ruiz, Maribel Hernandez, Gerardo Hernandez-Duenas.

TEACHING  
EXPERIENCE

### **Terminal IV (Numerical simulations)**

July - November 2016

Undergraduate Studies in Applied Mathematics

Engineering School

State University of Queretaro

### **Workshop: Modelling of Complex Environmental Systems**

Undergraduate Studies in Earth Sciences

August - December 2016

Multidisciplinary Unit for Teaching and Research

National University of Mexico, Campus Juriquilla

### **Terminal III (Numerical simulations)**

January - June 2016

Undergraduate Studies in Applied Mathematics

Engineering School

State University of Queretaro

### **Workshop: Modelling of Complex Environmental Systems**

Undergraduate Studies in Earth Sciences

February - May 2016

Multidisciplinary Unit for Teaching and Research

National University of Mexico, Campus Juriquilla

### **Selected Topics in Computer Science**

January - May 2015

Undergraduate Studies in Technology

Center for Applied Physics and Advances Technology  
National University of Mexico

**Calculus II** January - May 2015  
Undergraduate Studies in Technology  
Center for Applied Physics and Advances Technology  
National University of Mexico

**Mathematics III - Earth Sciences** Sept. - Dec. 2014  
Undergraduate Studies in Earth Sciences February - May 2016  
Multidisciplinary Unit for Teaching and Research  
National University of Mexico, Campus Juriquilla

**Ordinary Differential Equations** January - May 2014  
University of Wisconsin - Madison  
Undergraduate course  
Coordinator: Fabian Waleffe *email:* waleffe at math dot wisc dot edu

**Applied Mathematical Analysis** January 2013 - April 2013  
University of Wisconsin - Madison  
Undergraduate course  
Coordinator: Fabian Waleffe *email:* waleffe at math dot wisc dot edu

**Differential Equations and Linear Algebra** January 2012 - April 2012  
University of Wisconsin - Madison  
Undergraduate course  
Coordinator: Leslie M. Smith *email:* lsmith at math dot wisc dot edu

**Graduate Student Instructor (GSI)** January 2011 - April 2011  
University of Michigan, Ann Arbor, Michigan.  
Calculus I (Primary instructor), Math 115 Section 011  
20 weekly hours.  
Coordinator: Paul Kessenich *email:* paulkess at umich dot edu

**Graduate Student Instructor (GSI)** Sept. 2010 - December 2010  
University of Michigan, Ann Arbor, Michigan.  
Pre calculus (Primary instructor), Math 105 Section 001  
20 weekly hours.  
Coordinator: Angela Kubena *email:* akubena at umich dot edu

**Teaching Assistant** January 2010 - April 2010  
University of Michigan, Ann Arbor, Michigan.  
Four weekly hours. Graded the problem sets for  
Numerical Methods for Computing Science II.  
Professor: Divakar Viswanath *email:* divakar at umich dot edu

**Course Assistant** September 2009 - December 2009  
University of Michigan, Ann Arbor, Michigan.  
Lectures and graded the problem sets for Math 351  
Eight weekly hours.  
Professor: William Breslin *email:* breslin at umich dot edu

**Teaching Assistant** January-May 2008 and January - April 2009  
University of Michigan, Ann Arbor, Michigan.  
Four weekly hours. Graded the problem sets for  
Numerical Methods for Computing Science II.  
Professor: Smadar Karni. *email:* karni at umich dot edu

**Instructor** July 2004, September 2006 and July 2007  
University of Colima, Mexico.

A series of five lectures and workshops each year in Number Theory and Euclidean Geometry. The lectures were given to the contestant students in the Mexican Mathematics Olympiad.

**Teaching Assistant** January - July 2005

University of Guanajuato and CIMAT, Mexico.

Two weekly hours for an undergraduate advanced course in Mathematical Analysis. Graded the problem sets. Professor: Helga Fetter. *email*: fetter at cimat dot mx

**Teaching Assistant** June - December 2004

University of Guanajuato and CIMAT, Mexico.

Two weekly hours for an undergraduate advanced course in Topology. Graded the problem sets, and wrote lecture notes in LaTeX.

Professor: Victor Nuñez-Hernández. *email*: victor at cimat.mx

SUMMER SCHOOLS **X Foro de Matemáticas del Sureste** August 28 - September 1 2017

División Académica de Ciencias Básicas,

Universidad Juárez Autónoma de Tabasco / Campus Chontalpa

Mini-course:

Modelling complex environmental systems

**VII Summer School in Mathematics** July 23 - 28, 2017

Institute of Mathematics, UNAM - Juriquilla

Organizers:

Jorge Velasco Hernández

Marco Tulio Angulo

Gerardo Hernández Dueñas

**XXVI ENOAN 2017** July 3 - 7, 2017

Universidad Juárez Autónoma de Tabasco

Mini-course:

Hyperbolic conservation laws

**VI Mathematics Summer School**

Institute of Mathematics, National University of Mexico

Juriquilla, Querétaro,

June 12 - June 17 2016

Co-organizers: Gabriel Ruiz, Gerardo Hernandez-Duenas.

**V Mathematics Summer School**

Institute of Mathematics, National University of Mexico

Juriquilla, Querétaro,

June 28 - July 3 2015

Co-organizers: Amanda Montejano, Adolfo Magaldi-Hermosillo, Gabriel Ruiz , Maribel Hernandez, Gerardo Hernandez.

**Course:** Mathematical principles for atmospheric modelling

**Partial Differential Equations of the Atmosphere**

School of Mathematics of Latin America and the Caribbean  
2014

July 21-August 1,

Autonomous University of Chiapas

Tuxtla Gutierrez, Chiapas, Mexico

**Partial Differential Equations of the Atmosphere**

Summer School

June 22-27, 2014

Institute of Mathematics UNAM - Juriquilla

Queretaro, Mexico

FELLOWSHIPS AND TRAVEL AWARDS **SIAM Travel Grant** Agosto 11-14 2014

Partial coverage for travel and local expenses to participate in the:  
“SIAM Conference on Nonlinear Waves and Coherent Structures ”  
Churchill College, University of Cambridge  
United Kingdom

**NSF Travel Grant**

Agosto 5-9 2013

Travel and local expenses to participate in the:  
“Mathematical Congress of the Americas”  
Guanajuato, México.

**SIAM Travel Award**

To attend the International Conference on Industrial and Applied Mathematics  
(ICIAM 2001) July 18-22, 2011  
Vancouver, Canada.

**Conacyt Fellowship (Mexican Bureau of Science and Technology)**

For Ph. D. tuition and expenses Sept. 2005 - Aug. 2010

**IPAM-NSF Travel Grant**

April-May 2010

Travel and local expenses covered for participation in the program on  
“Model and Data Hierarchies for Simulating and Understanding Climate”  
Institute for Pure and Applied Mathematics (IPAM)  
UCLA. Los Angeles, Ca.

**Promep Fellowship (Mexican Program for the Quality Improvement of  
Professor’s Teaching)**

Mexican Government Sept. 2005 - Aug. 2010

**Graduate Student Research Assistant** Fall 2008, Winter 2009, Summer 2009

-Advisor: Professor Smadar Karni

Grant: NSF DMS # 0609766

Department of Mathematics, University of Michigan

**NSF Travel Grant**

Aug. 2006

XV International Congress on Mathematical Physics.

**Rackham Travel Grant**

Sept. 2007, Dec. 2008, July 2009, June 2010.

University of Michigan, Ann Arbor, Michigan.

**CIMAT Fellowship (Research Center in Mathematics)**

For expenses in the Bachelors Program

Aug. 2000 - June 2005

**Colima State Government Fellowship**

For expenses in the Bachelors Program

Aug. 2000 - June 2005

CONFERENCE TALKS

**X Foro de Matemáticas del Sureste**

August 28 - September 1 2017

División Académica de Ciencias Básicas,

Universidad Juárez Autónoma de Tabasco / Campus Chontalpa

Plenary talk:

Numerical analysis of some geophysical flows

**VII Summer School in Mathematics**

July 23 - 28, 2017

Institute of Mathematics, UNAM - Juriquilla

Mini-course:

Hyperbolic conservation laws and fluid dynamics

**XXVI ENOAN 2017**

July 3 - 7, 2017

Universidad Juárez Autónoma de Tabasco

Talk:

Two-layer shallow water flows in channels

#### **IV Joint Meeting RSME-SMM**

Valladolid, Spain

June 19- 22, 2017

Talks:

A positivity preserving central-upwind scheme for blood flow through compliant vessels, S09 Epidemiología y ecología matemática

A positivity-preserving central scheme for two-layer shallow water flows in channels, S19 Modelación matemática y simulación numérica con EDP

#### **IPAM Workshop“Computational Issues in Oil Field Application”**

Institute for Pure and Applied Mathematics

March 21 - June 9, 2017

University of California, Los Angeles

Seminar: “A hybrid scheme for flows in porous media”, April 25, 2017

Workshop 0 “Tutorials” March 21 - 24, 2017

Workshop 1 “Multiphysics, Multiscale, and Coupled Problems in Subsurface Physics” April 3 - 7, 2017

Workshop 2 "Full Waveform Inversion and Velocity Analysis" May 1 - 5, 2017

Workshop 3 "Data Assimilation, Uncertainty Reduction, and Optimization for Subsurface Flow" May 22 - 26, 2017

Workshop 4 "Culminating Workshop at Lake Arrowhead Conference Center " June 4 - 9, 2017

#### **Uncertainty quantification**

Mexican Research Center in Mathematics

January 16-20, 2017

Guanajuato, Mexico

Talk: “Minimal models for precipitating turbulent convection”

#### **International Conference in Mathematics, 20 Years Unidad Cuernavaca del Instituto de Matemáticas UNAM**

Cuernavaca, Morelos

January 12-13, 2017

#### **Frontiers in Applied and Computational Mathematics**

Providence, Rhode Island, United States.

January 4-6, 2017

Poster: “A hybrid algorithm for shallow water flows with horizontal density gradients”

#### **International Symposium on Mathematical Modelling 2016**

Metropolitan Autonomous University

December 7-9, 2016

Mexico City

Talk: “Two-layer shallow water flows in channels”

#### **XLIX National Congress of the Mexican Mathematical Society**

Autonomous University of Aguascalientes

October 24, 2016

Aguascalientes, Mexico

Talk: “A Quantum scheme for shallow water flows”

#### **XIII Summer school in mathematics**

July 1, 2016

Institute of Mathematics

National University of Mexico

Cuernavaca, Morelos

Talk: "Numerical analysis and weather forecasting”

#### **First summer school in atmospheric sciences**

June 29, 2016

Multidisciplinary Unit for Teaching and Research

Research Center for Atmospheric Science

National University of Mexico

Juriquilla, Querétaro

Talk: “Linear stability analysis of mathematical models for atmospheric flows”

#### **Nonequilibrium statistical physics and fluid dynamics**

May 22-25, 2016

Brigham Young University  
Provo, Utah

Talk: “Linear stability analysis of minimal models for precipitating turbulent convection”

**Metropolitan congress for modelling and numerical analysis** May 18-20, 2016

National University of Mexico  
Mexico City

Talk: “Numerical methods for the Saint-Venant equations”

**American Meteorological Society’s 32nd Conference on Hurricanes and Tropical Meteorology**

San Juan, Puerto Rico hfillApril 18-22, 2016

United States

Talk: “Stability and instability criteria for idealized precipitating hydrodynamics”

**Math Biology: A multidisciplinary endeavour** January 11-14, 2016

National University of Mexico  
Juriquilla, Queretaro, Mexico

Talk: “Stability analysis for atmospheric dynamics”

**Meeting of the Conacyt Research Network in Mathematica Modelling**

Course: Application of the finite volume method to the solution of shallow water equations for flooding problems by M. E. Vázquez-Cendón

Universidad Juárez Autónoma de Tabasco

Villahermosa, Tabasco

November 25-27, 2015

Talk: “Roe schemes for shallow water flows with thermodynamics”

**National Congress of the Mexican Mathematical Society**

Hermosillo, Sonora, México

October 18-23, 2015

**Note:** Invited Speaker

Talk: “Atmospheric stability criteria with precipitating hydrodynamics”

**Conacyt Research Network, Analysis Group**

October 15 2015

Singular pseudo-differential operators and numerical applications

Cuernavaca, Morelos

**Mathematical principles in atmospheric modelling**

October 5-9 2015

First school in mathematical modelling: water resources and climatology

Engineering school

San Carlos University of Guatemala

**Conacyt Research Network, Mathematical Modelling**

July 10 2015

Shallow water and porous media flows

Guanajuato, Mexico

**AMS 20th Conference on Atmospheric and Oceanic Fluid Dynamics**

Minneapolis, Minnesota,

June 15-19, 2015

Poster: “Minimal models for precipitating organized convection”

**INRIA-Mexico Seminar InMex 2015 @ UNAM**

Institute of Mathematics, National University of Mexico

Mexico City,

June 3,4, 2015

Talk: “A Hybrid Algorithm for Flows in Porous Media”

**SIAM Conference on Applications of Dynamical Systems 2015**

Snowbird Ski and Summer Resort,

May 17-21, 2015

Talk: “Dissection of Boussinesq non-linear interactions using intermediate models”

**II Encuentro de Matematicos Mexicanos en el Mundo**  
 Guanajuato, Mexico December 15-19, 2014

**67th Annual Meeting go the American Physical Society, Division of Fluid Dynamics**  
 San Francisco, Ca. November 23-25, 2014  
 Talk: "Minimal models for precipitating organized convection"

**National Congress of the Mexican Mathematica Society**  
 Universidad JuGrez del Estado de Durango. October 26-31, 2014

**SIAM Conference on Nonlinear waves and coherent structures**  
 Churchill College, University of Cambridge, United Kingdom Agosto 11-14, 2014  
 Talk: "Dissection of Boussinesq non-linear interactions using intermediate models"

**Mathematical Congress of the Americas**  
 Guanajuato, México. August 5-9, 2013  
 Talk: "Dissection of Boussinesq non-linear interactions using intermediate models"

**9th American Institute of Mathematical Sciences Conference**  
 Orlando, Florida. USA July 1-5, 2012  
 Talk: "Minimal models for precipitating organized convection"

**30th Conference on Hurricanes and Tropical Meteorology**  
 Ponte Vedra Beach, Florida. USA April 15-20, 2012

**International Congress on Industrial and Applied Mathematics**  
 ICIAM 2011, Vancouver, Canada. July 20, 2011  
 Talk: " Shallow Water Flows in Channels with Arbitrary Geometry"

**NSF-CBMS Conference on Global Harmonic Analysis**  
 The University of Kentucky, Lexington, Kentucky. June 20-24, 2011

**Mathematical Aspects of Quantization Conference**  
 University of Notre Dame, Notre Dame, Indiana, USA. June 6-10, 2011

**University of Michigan SIAM Student Conference**  
 Department of Mathematics, University of Michigan  
 Ann Arbor, Mi. Nov. 13 2010  
 Talk: "A Hybrid Scheme for Flows in Porous Media"

**2010 Siam Annual Meeting**  
 Pittsburgh, Pennsylvania July 13 2010  
 Talk: "Shallow Water Flows through Channels"

**AMS-SMM Eighth International Meeting.**  
 University of California, Berkeley. June 3 2010  
 Talk: "Quantum Cutting: A Szegö Limit Theorem and Propagation"

**Workshop on"Model and Data Hierarchies for Sim. and Understanding Climate."**  
 Institute for Pure and Applied Mathematics. May 12 2010  
 University of California, Los Angeles.  
 Talk: "Shallow Water Flows through Channels"

Series of Seminars and Workshops on:  
**Model and Data Hierarchies for Simulating and Understanding Climate**  
 May 1-May 31, 2010  
 Institute for Pure and Applied Mathematics  
 University of California, Los Angeles.

**International Conference on Numerical Analysis and Applied Mathematics**

- Rethymno, Crete, Greece, 18-22 September 2009. September 21 2009  
Talk: "A Scheme for Shallow Flow with Area Variation"
- 12th International Conference on Hyperbolic Problems: Theory, Numerics, Applications** June 2008  
University of Maryland, College Park. Maryland, USA.
- Conference on Mathematical Physics and Geometric Analysis** January 2008  
Fields Institute. Toronto, Canada.
- Joint Mathematics Meeting** January 2008  
San Diego, California.
- Mathematics School in Latin America and the Caribbean (EMALCA)** July 2007  
IMUNAM. Cuernavaca, Mexico.
- XV International Congress on Mathematical Physics** August 2006  
Rio de Janeiro, Brazil.
- Second Symposium of Graduate Student FAMAT - CIMAT** August 2007  
Guanajuato, Mexico  
Talk: "Numerical methods for hyperbolic conservation laws"
- First Symposium of Graduate Student FAMAT - CIMAT** June 2006  
Guanajuato, Mexico  
Talk: "Small dispersion limit of the KdV equation"
- First Joint International Meeting CIMAT-ICIMAF** February 2005  
Institute of Cybernetics, Mathematics and Physics  
Havanna, Cuba  
Talk: "Relationship between the Schrödinger operator and the KdV equation"
- XXXVII Meeting of the Mexican Mathematical Society** October 2004  
Ensenada, BCS Mexico
- COLLOQUIUM AND SEMINAR TALKS
- Computer Science Seminar** May 27, 2016  
On some numerical algorithms for geophysical fluid dynamics  
Mexican Research Center in Mathematics  
Guanajuato, Mexico
- Colloquium Cimat-UADY** April 5, 2016  
Mexican Research Center in Mathematics  
Merida, Yucatan  
Talk: Atmospheric Modelling and Stability
- Mathematical and Computational Modelling Conference**  
By Ismael Herrera  
March 4, 2016  
National University of Mexico  
Mexico City, Mexico.
- University Seminar on Hydrocarbons** February 19, 2016  
National University of Mexico  
Mexico City, Mexico.  
Talk: Porous media flows and analysis of fractured rocks
- Colloquium of Applied Mathematics at IIMAS** December 2, 2015  
National University of Mexico  
Mexico City  
Talk: Storm simulations and atmospheric instabilities
- Colloquium - the Institute of Mathematics - UNAM** August 25, 2015

National University of Mexico  
Mexico City, Mexico

Talk: Semiclassical pseudo-differential operators and numerical applications

**Colloquium - Centers for the Mathematical Sciences** August 21, 2015

Universidad Nacional Autónoma de México

Morelia, Michoacan

Talk: Atmospheric Modelling and Stability

**Colloquium - Academic Department for Mathematics**

technological Autonomous Institute of Mexico (ITAM),

May 8, 2015

Mexico City, Mexico

Talk: Hybrid methods in porous media flows

**Queretaro Colloquium**

Center for Innovations in Mathematics,

March 18, 2015

Juriquilla, QuerÓtaro

Talk:

“Coherent structures in the atmosphere and their wave-vortical interactions”

**Seminar for Computational and Applied Mathematics**

Metropolitan Autonomous University , Iztapalapa Unit, March 12, 2015

Talk:

“Minimal models for precipitating organized convection and Atmospheric Instabilities”

**Seminar on Modelling**

Research Center in Mathematics

Guanajuato, Gto.,

March 2, 2015

Title:

“Minimal models for precipitating organized convection and Atmospheric Instabilities”

**Seminar at the Engineering School, Autonomous University of Queretaro**

Querétaro, Qro.

November 13, 2014

Talk: “Minimal models for precipitating organized convection”

**Seminar at UMDI-UNAM,**

UNAM-Juriquilla, Juriquilla, Qro.,

October, 15, 2014

Talk: “Minimal models for precipitating organized convection”

**Colloquium at the Institute of Mathematics**

August 2, 2013

UNAM - Querétaro, México

Talk: “Shallow Water Flows through Channels”

**Colloquium at the Institute of Mathematics**

UNAM - Cuernavaca, Morelos, Mexico.

July 31, 2013

Talk: “Dissection of Boussinesq non-linear interactions using intermediate models”

**Colloquium at the Institute of Mathematics**

UNAM - Mexico City

July 30, 2013

Talk: “Minimal models for precipitating organized convection”

**Colloquium at the Departamento de Ingeniería Matemática**

Universidad de Concepción, Concepción, Chile.

January 12, 2012

Talk: “A Hybrid Method for Flows in Porous Media”

**Numerical Analysis Seminar at the Departamento de Ingeniería Matemática**

Universidad de Concepción, Concepción, Chile.

January 10, 2012

Talk: “Shallow Water Flows through Channels”

**Applied and Computational Mathematics Seminar**

	University of Wisconsin-Madison Talk: "Shallow Water Flows through Channels"	April 6, 2011
	<b>Seminar at the Department of Mathematics</b> University of Colima, Mexico Talk: "Symplectic Cutting and a Szegő Limit Theorem"	August 27 2009
	<b>Seminar of Mathematical Physics, Institute of Mathematics</b> Campus Cuernavaca of the National University of Mexico. Morelos, Mexico. January 9 2009 Talk: "Symplectic Cutting and a Szegő Limit Theorem"	
	<b>Colloquium in Applied Mathematics at</b> IIMAS (Research Institute in Applied Mathematics) National University of Mexico. Mexico City, Mexico Talk: "A Hybrid Method for Flows in Porous Media"	January 7 2009
	<b>Colloquium at Cimat (Mexican Research Center in Mathematics)</b> Guanaajuato, Mexico. Talk: "Oscillatory Integrals with Singular Symbols"	December 17 2008
STUDENT SUMMER PROJECTS	<b>Advisor for a Summer Student Project on "Numerical Methods for Hyperbolic Conservation Laws"</b> Projects followed by the School of Mathematics of Latin America and the Caribbean August 19-30, 2014 Students: Nanci Pintor, Universidad Michoacana de San Nicolás de Hidalgo Rosa Ibeth Bravo Rojas, Benemérita Universidad Autónoma de Puebla	
OUTREACH	<b>Radio Interview</b> Research opportunities in Mathematics for young students Program: Romántica Radio interviewer: Lorena Portillo Durango, Dgo.	October 30, 2016
	<b>Speaker</b> Exposition of Science and Technology (Expocyteq 2016) Queretaro Council for Science and Technology	October 22, 2016
	<b>Radio Interview</b> Mathematical modelling of hurricanes Program: Panorama Informativo de Grupo Acir Radio Radio interviewer: Luis del Toro Querétaro, Qro.	August 30, 2016
	<b>Radio Interview</b> Math applications in preventing natural disasters Program: Panorama Informativo de Grupo Acir Radio Radio interviewers: Luis del Toro y Xaviera Campuzano Querétaro, Qro.	December 3, 2014
	<b>Introduction to Hyperbolic Conservation Laws</b> Departamento de Ingeniería Matemática Universidad de Concepción, Concepción, Chile.	January 9, 2012
	<b>Hyperbolic Conservation Laws and their Applications</b> Científicos Duranguenses	May , 2011
	<b>Representation Theory for the Heisenberg Group</b>	November 2006

Student Analysis Seminar  
Department of Mathematics, University of Michigan.

**The Small dispersion limit for the KdV equation** September 2006  
First Symposium of Famat Former Undergraduate Students at CIMAT  
Guanajuato, Mexico.

TECHNICAL  
REPORTS

**Undergraduate thesis: The Completeness Theorem for the Schrödinger Operator and its Relationship with the KdV Equation** (not published)  
Advisor: Xavier Gomez-Mont June 2005  
University of Guanajuato and CIMAT. Guanajuato GTO, Mexico.

EXTRACURRICULAR  
ACTIVITIES

**Spanish translation of SIAM posters**  
**“Math Matters, Apply it!”** January 2011

**ELI 994-Teaching and English Language for Classroom Communications**  
The English Language Institute, and July 27 - August 19, 2009  
The Center for Research on Learning and Teaching  
University of Michigan. Ann Arbor, Michigan.

**Spring Internship.** February - June 2004  
Universidad Complutense de Madrid. Madrid, Spain.

**Organization Committee.** November 2002  
XVI Mexican Mathematics Olympiad. Mexican Mathematical Society

COMPUTER SKILLS

- **Mathematical software:** Mathematica, Maple, LaTeX  
- **Programming software:** Fortran, C++ Builder, Matlab.

AFFILIATIONS

- Conacyt Research Network, Mathematical Modelling June 2015 - Present  
- Conacyt Research Network, Analysis and Differential Equations  
. June 2015 - Present  
- Registro Conacyt de Evaluadores Acreditados (RCEA) Abril 14. 2014 - Present  
- National(Mexican) System of Researchers - Level I. September 2013-Present  
- American Mathematical Society. September 2005 - May 2011  
- Society for Industrial and Applied Mathematics. February 2010 - May 2011  
- American Meteorological Society. January - December 2013

LANGUAGE SKILLS

-Fluent in English and Spanish, basic knowledge of French.