

# CRISTI DARLEY GUEVARA

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CONTACT INFORMATION	Louisiana State University Mathematics, College of Science Lockett 110 Baton Rouge, LA 70806 USA	Work: +1-225-578-7866 Fax: +1-225-578-4276 E-mail: <a href="mailto:crisdarley@gmail.com">crisdarley@gmail.com</a> Webpage: <a href="http://crisdarley.tk">http://crisdarley.tk</a>
RESEARCH INTERESTS	<b>Nonlinear phenomena and applications:</b> Analysis of Nonlinear Partial Differential Equations, Real Analysis, Harmonic Analysis, Microlocal Analysis, Control theory, Mathematical Physics, Dynamical Systems, Anomalous Diffusion on Fractals, Fluid dynamics and Mathematics Education.	
CURRENT ACADEMIC APPOINTMENTS	<b>Postdoctoral Scholar</b> , Louisiana State University, Baton Rouge, LA Mathematics, College of Science	Aug 2014 to present
	<b>Visiting Researcher</b> , Arizona State University, Tempe, AZ Simon A. Levin Mathematical, Computational and Modeling Sciences Center	Dec 2011 to present
PREVIOUS ACADEMIC APPOINTMENTS	<b>Visiting Professor</b> , Universidad Autónoma Metropolitana-I, Mexico Departamento de Matemáticas	Sep 2013 to Sep 2014
	<b>Postdoctoral Researcher</b> , Mexican Institute of Petroleum, Mexico City	Jun 2012 to Aug 2013
EDUCATION	<b>Ph.D. Mathematics</b> Arizona State University, Tempe, AZ – Topic: “ <i>Global behavior of finite energy solutions to the focusing NLS in <math>d</math>-dimensions</i> ” – Adviser: Prof. Svetlana Roudenko	May 2011
	<b>MS. Mathematics</b> University of Arizona, Tucson, AZ – Topic: “ <i>Scattering and Bound States of the 2d Dirac Equation</i> ” – Adviser: Prof. John Palmer	Dec 2004
	<b>BS. Mathematics</b> Universidad Pedagógica Nacional, Bogotá Colombia	Dec 1996
PUBLICATIONS	[1] <b>C. Guevara</b> and P. Nguyen, “ <i>Leray’s self-similar solutions to the Navier–Stokes equations with profiles in Marcinkiewicz and Morrey spaces.</i> ” To appear: SIAM Journal of Mathematical Analysis (2017) 16 pages	
	[2] <b>C. Guevara</b> and S. Shipman, “ <i>Short-Time Nonlinear Effects in the Exciton-Polariton System.</i> ” Journal of Nonlinear Science doi: 10.1007/s0032-017-9419-9 (2017) 20 pages	
	[3] A. Carrasco, <b>C. Guevara</b> and H. Leiva, “ <i>Controllability of the Impulsive Semilinear Beam Equation with Memory and Delay.</i> ” To appear: IMA Journal of Mathematical Control and Information (2017)10 pages	
	[4] <b>C. Guevara</b> and P. Nguyen, “ <i>Local energy bounds and <math>\epsilon</math>-regularity criteria for the 3D Navier-Stokes system.</i> ” Calculus of Variations and PDE. 56: 68. doi:10.1007/s00526-017-1151-7 (2017) 16 pages	
	[5] <b>C. Guevara</b> and H. Leiva, “ <i>Controllability of the Impulsive Semilinear Heat Equation with Memory and Delay.</i> ” Journal of Dynamical and Control Systems. doi:10.1007/s10883-016-9352-5 (2016) 11 pages	
	[6] <b>C. Guevara</b> and S. Shipman, “ <i>Short-Time Behavior for the Exciton-Polariton Equations.</i> ” To appear: XXXV Workshop on Geometric Methods in Physics proceedings (2016) 6 pages	

- [7] **C. Guevara**, “Global behavior of finite energy solutions to the focusing Nonlinear Schrödinger Equation in  $d$ -dimensions.” Appl Math Res Express Vol. 2014 177-243 (2014) 67 pages, doi:10.1093/amrx/abt008
- [8] F. Carreon and **C. Guevara**, “Scattering and Blow-up for the two dimensional quintic Nonlinear Schrödinger Equation.” Contemporary Mathematics. volume 581 (2012) 117-153
- [9] M. Alleksaht-Snider, M. Civil and **C. Guevara**, “Mathematics for Parents: Facilitating Parent’s and Children’s Understanding in Mathematics.” PME-NA XXIV (2002) 1755-1766
- [10] **C. Guevara** and M. Montero, “Art and Geometry with Geometer’s Sketchpad.” Geometría y sus Aplicaciones. XIII (2001) 111-120
- [11] **C. Guevara**, S. López and J. Martinez, “Afianzamiento de algunos conceptos y procesos algebraicos con el uso de los paquetes Mathematica y Maple.” (Reinforcement of concepts and algebraic reasoning using Mathematica and Maple). Memorias XV Coloquio Distrital de Matemáticas y Estadística. Volumen 29 (1998)
- [12] **C. Guevara** and J. Paez-Ortegon, “Cálculo en Multivariado con el Programa Mathematica.” (“Multivariable Calculus with Mathematica”). Geometría y sus Aplicaciones. VIII (1997) 65-90.
- DIGITAL PRODUCTS [13] “A tool for parameters estimation of the Warren-Root Telegraphic model.” Copyrights through Mexican Institute of Petroleum. Mexico, Nov 11, 2013
- i. “Manual de Usuario de la Herramienta de Estimación de Parámetros para el Modelo Telegráfico de Warren-Root” ©03-2013-110512384500-01.
  - ii. “Modulo de presentación” ©03-2013-110512481700-01.
  - iii. “Modulo soluciones al modelo” ©03-2013-110512433900-01.
  - iv. “Modulo comparación de soluciones” ©03-2013-110512405300-01.
  - v. “Mensajes de error y advertencias” ©03-2013-110512384900-01.
  - vi. “Modulo ajuste Jujo-Teco” ©03-2013-110512372600-01.
  - vii. “Modulo ajuste pozo aleatorio” ©03-2013-110512360400-01.
- SUBMITTED PAPERS [14] **C. Guevara** and H. Leiva, “Controllability of the Strongly Damped Impulsive Semilinear Wave Equation with Memory and Delay.” <https://arxiv.org/abs/1704.02561> (Submitted - 2017) 12 pages
- PAPERS IN PREPARATION [15] Controllability of the Impulsive Semilinear Equations with Memory (with Dr. Leiva)
- [16] Critical norm concentration phenomena for mass-supercritical energy-subcritical NLS
- [17] Blow-up and singularity formations for the Exciton-Polariton Equations (with Dr. Shipman)
- [18] Bifurcation on the exciton-polariton system equations (with Dr. Delgado )
- [19] Bifurcation on the complex quintic-cubic Ginzburg-Landau equation (with Dr. Delgado )
- RESEARCH TALKS [1] “Nonlinear Effects in the Exciton-Polariton System”. French-American Conference on Non-linear Dispersive PDEs. Centre International de Rencontres Mathématiques (CIRM), Marseille, France. June 15, 2017
- [2] “On the controllability of Diffusion-reaction systems”. French-American Conference on Non-linear Dispersive PDEs. Centre International de Rencontres Mathématiques (CIRM), Marseille, France. June 12, 2017

- [3] “*Nonlinear Effects for the Exciton-Polariton System.*” Applied mathematics and computational seminar. Universidad Autónoma Metropolitana de Iztapalapa. Mexico City, Mexico. April 20, 2017
- [4] “*Short-time Nonlinear Effects in the Exciton-Polariton System.*” Mathematics Colloquium. Yachay Tech University. San Miguel de Urcuqui, Ecuador March 7, 2017
- [5] “*Short-Time Behavior for the Exciton-Polariton Equations.*” XXXV Workshop on Geometric Methods in Physics. Białowieza, Poland - July 2, 2016
- [6] “*The complex Cubic-Quintic Ginzburg–Landau equation.*” Conference on Partial Differential Equations. München, Germany - March 2015
- [7] “*Characterization of finite energy solutions to the Focusing 2D Quintic NLS Equation.*” LSU Applied Analysis seminar. Baton Rouge, Sep 29, 2014
- [8] “*Global Behavior of Finite Energy Solutions to the  $d$ –dimensional Focusing Mass-supercritical Energy-subcritical Nonlinear Schrödinger Equation.*” International workshop on Analysis and its Applications. ISAA 2014 Metepec Puebla, México. Jan 3-5, 2014
- [9] “*Global Behavior of Finite Energy Solutions to the  $d$ –dimensional Focusing Nonlinear Schrödinger Equation.*” 2012 Spring Eastern Sectional Meeting. George Washington University, Washington, DC March 17-18, 2012.
- [10] “*Characterization of Finite Energy Solutions to The Focusing  $d$ -dimensional NLS Equation.*” Math Colloquium. Georgia Southern University. Statesboro, GA. Dec 1, 2011
- [11] “*Characterization of solutions for the focusing 2D quintic NLS.*” Applied Mathematics and PDE seminar. University of California Santa Barbara. Santa Barbara, CA. Feb 5, 2010.
- [12] “*Concentration Compactness for the Focusing 2d Quintic NLS.*” Analysis and PDE seminar. Arizona State University. Tempe, AZ. Oct 30 and Nov 5, 2009
- [13] “*Behaviors of  $H^1$  Solutions for the Focusing Quintic NLS in 2d.*” Los Alamos Days. Tempe, AZ. Jan 29-31, 2009
- [14] “*Scattering For the Focusing 2D Quintic Nonlinear Schrödinger Equation.*” 2008 Symposium on Research in Interdisciplinary Science & Engineering. Arizona State University. Tempe, AZ. Oct 17, 2008
- [15] “*Dynamics of solutions to the 2D Focusing Quintic Nonlinear Schrödinger Equation.*” Analysis and PDE seminar. Arizona State University. Tempe, AZ. Sep 5, 2008
- [16] “*The Two Dimensional Dirac Operator.*” Graduate Student Colloquium. Department of Mathematics. University of Arizona. Tucson, AZ. May 2004
- [17] “*The Shape of the Drum: Dirichlet and Neumann Eigenvalues problem.*” Micro-analysis presentation. Department of Mathematics. University of Arizona. Tucson, AZ. Dec 2003
- [18] “*Mathematics for Parents: Facilitating Parent’s and Children’s Understanding in Mathematics.*” PME 2002. Georgia University. Athens, GA. Oct 2002
- [19] “*MAPPS: Mathematics for Parents Mathematics Instruction Colloquium.*” University of Arizona. Tucson, AZ. Feb 26, 2002

POSTER  
PRESENTATIONS

- [1] “*The complex cubic-quintic Ginzburg-Landau equation.*” Waves, Spectral Theory, and Applications, September 10-11, 2015
- [2] “*Diffusion equation on the Sierpiński Gasket.*” Blackwell-Tapia Conference 2012, Nov 5-7 2012
- [3] “*Global Behavior of Finite Energy Solutions to The Focusing Nonlinear Schrödinger Equation in  $d$  dimension.*” AWM 40 Years and Counting. Brown University, September 17-18, 2011.
- [4] “*Scattering of  $H^1$  solutions for the focusing quintic NLS in 2D.*” Career Options for Women in Mathematical Sciences. Minneapolis, MN. April 2-4, 2009.
- [5] “*Scattering for the Focusing 2D Quintic NLS Equation.*” Conference on Non-linear Phenomena in Mathematical Physics: Dedicated to Cathleen Synge Morawetz on her 85th birthday. The field institute. Toronto, Canada. Sep 17-20, 2008
- [6] “*Fourier restriction problem.*” Los Alamos Days. Albuquerque, NM. Feb 28-29, 2008
- [7] “*Fourier restriction problem and its relation to PDE.*” Infinite Possibilities Conference. North of Caroline State University. Raleigh, NC. Nov 2-3, 2007
- [8] “*Fourier restriction problem and its relation to PDE.*” The NSF Joint Annual PI Meeting. Washington, DC. Aug 2007
- [9] “*Fourier restriction problem and PDE.*” More Graduate Education at Mountain States Alliance (MGE@MSA) Student Research Conference. Arizona State University. Tempe, AZ. April 2007
- [10] “*Fourier restriction problem and its relation to PDE.*” Blackwell-Tapia Conference. November 2006.
- [11] “*The Two-Dimensional Dirac Equation.*” 2006 SACNAS National Conference. Tampa, FL. Oct 2006.
- [12] “*Scattering and Bounded states of the 2-Dimensional Dirac Equation.*” Women in Mathematics: the legacy of Ladyzhenskaya and Oleinik. MSRI. Berkeley, CA. May 2006
- [13] “*Two Dimensional Dirac Equation.*” More Graduate Education at Mountain States Alliance (MGE@MSA) Student Research Conference. Arizona State University. April 2006
- [14] “*The Two Dimensional Dirac Operator: Scattering and Bounded States.*” The NSF Joint Annual PI Meeting. Washington, DC. Mar 2006
- [15] “*Parents Recreating New Relationships with themselves, their Children and Mathematics through the Learning of Mathematics.*” MAPPS February Conference. Department of Mathematics. University of Arizona. Tucson, AZ. Feb 2003

RESEARCH  
AWARDS &  
FELLOWSHIPS

- [1] School of Mathematical and Statistical Sciences (ASU). Research Award. Summer 2010
- [2] SLOAN Scholarship. Spring 2009 and Spring 2010
- [3] Research fellowship under NSF-DMS grant # 0808081 and NSF-DUE grant # 0633033 (under Dr. Svetlana Roudenko)
- [4] Travel & research stipends MGE@MSA (ASU Hispanic Research Center). Fall 05-May 11.
- [5] Best Graduate Poster Presentation. Infinite Possibilities Conference. NCSU. Raleigh, NC. Nov 2-3, 2007
- [6] Department of mathematics (ASU). Research Award. Summer 2008
- [7] Fellowship. Postbachelor. Secretaría de Educación de Colombia 2000-2001

TRAVEL  
GRANTS

**Awarded**

- [1] French-American Conference on Nonlinear Dispersive PDEs. CIRM: Centre International de Rencontres Mathématiques, Marseille, France June 11-17, 2017
- [2] Riviere-Fabes symposium 2017, April 28-30, 2017
- [3] XXXV Workshop on Geometric Methods in Physics and V school on Geometry and Physcs. Białowieza, Poland June 26 - July 9, 2016
- [4] Waves, Spectral Theory, and Applications, September 10-11, 2015
- [5] MSRI. Connections for Women: Dispersive and Stochastic PDE. August 19-21, 2015
- [6] "DC summer workshop in PDE" Washington DC, July 26- 31, 2015
- [7] Conference on Partial Differential Equations. München, Germany - March 2015
- [8] ICERM. "IdeaLab 2014: Program for Early Career Researchers". Providence. RI. Aug 11-15, 2014
- [9] International workshop on Analysis and its Applications. ISAA 2014 Metepec Puebla, México. Jan 3-5, 2014
- [10] AMS. Mathematical Congress of the Americas 2013. August 5-9, 2013
- [11] Institute Henri Poincare. "Trimester Non-linear Waves and Dispersion". Paris, France. Apr 18- Jul 10, 2009.
- [12] Clay Mathematics Institute. Summer School on "Evolution Equations" 2008. Zurich, Switzerland. Jun 23- Jul 18. 2008.
- [13] Universidad Autonoma de Madrid. "8th international Conference on Harmonic Analysis and PDE". El Escorial, Madrid Spain. Jun 16-20,2008.
- [14] Universidad Autonoma de Mexico. WHAPDE 08. Workshop on Harmonic Analysis and PDE 2008. Feb 3-9,2008.
- [15] Princeton University. Summer Program in Analysis and Geometry. Jul-Aug 2006.
- [16] University of Utah. Summer  $SL(2,R)$  Minicourse. May 2006.
- [17] MSRI. Women in Mathematics: The Legacy of Ladyzhenskaya and Oleinik workshop. May 18 - 20, 2006.

**Not Awarded**

- [18] 2015 AMS-Simons Travel Grants.
- [19] 2016 SEARCDE : Southeastern-Atlantic Regional Conference on Differential Equations

ADVISING AND  
MENTORING

**Graduate Students**

- *Daniel Espinosa*, PhD Student, Universidad Autonoma Metropolitana-Iztapalapa, 2014  
Co-advised by: Joaquin Delgado

**Undergraduate Research**

- *Dulce Maldonado*, Universidad Autónoma Metropolitana-Iztapalapa, Mar-May 2014  
Topic: Calculus and Analysis on Fractals
- *Luis Enrique Ascencio Gorozpe*, Universidad Autónoma Metropolitana-Iztapalapa, Nov 2013-May 2014  
Topic: Difusion on Fractals

TEACHING  
EXPERIENCE

**Instructor of Record**

- At Louisiana State University, Baton Rouge, LA
  - *Math 2025. Integral transforms* Fall 2016
  - *Math 1552. Calculus II* Spring 2016
  - *Math 2090. Elementary differential equations and Linear algebra* Fall 2015
  - *Math 2065. Elementary differential equations* Spring 2015
  - *Math 1550. Calculus I* Fall 2014
- At Universidad Autónoma Metropolitana-Iztapalapa, México
  - *Real analysis I* Spring 2014
  - *Ordinary differential equations* Winter 2014
  - *Calculus II* Fall 2013
- At Arizona State University, Tempe, AZ
  - *Math 170. Pre-Calculus* Spring 2008 & Summer 2009
- At University of Arizona, Tucson, AZ
  - *Math 110. College Algebra* Spring 2003 & Spring 2004
- At Universidad Pedagógica Nacional, Bogotá, Colombia
  - *Programming* Spring 1997 - Fall 1999
  - *PC architecture* Fall 1998 & Spring 1999
  - *Topics: Software development* Fall 1999
  - *Calculus I* Spring 1997 & Fall 1997
  - *Calculus II* Spring 1998 & Fall 1999

**Teacher Assistant**

- At Arizona State University, Tempe, AZ
  - *Math 371. Ordinary Differential Equations* Spring 2011
  - *Math 472. Real Analysis* Fall 2010
  - *Math 211. Calculus for Business* Fall 2006 - Spring 2007

RESEARCH  
EXPERIENCE

**Postdoctoral Researcher** at Instituto Mexicano del Petróleo. Jul 2012- Jul 2013

- Conducted research and modeled data for pressure transient analysis on porous media. Explored fluid dynamics simulations on fractals and compared with pressure transient data. As a result I developed a user-friendly computational tool (GUI-Matlab) for well parameters estimation.

**Research Assistant** at Arizona State University, Tempe, AZ

- *Mathematical Introduction to Medical Imaging*<sup>1</sup> Fall 2008  
I mentored graduate and undergraduate students as the assistant in the Mathematical Introduction to Medical Imaging course. I held recitation sessions, reviewed and graded projects and assignments and corrected simulation code for image recognition reconstruction, signal processing, sampling and imaging. Additionally, we collected statistical data on students' behaviors and their learning process, designed surveys, and interviewed students. And finally, I help writing the final report for the National Science Foundation who sponsored the study in the MRI course.

<sup>1</sup>NSF-DMS grant # 0808081 and NSF-DUE grant # 0633033

- *CRESMET*<sup>2</sup> Summer 2005 - Summer 2006  
I analyzed middle and high school teachers' knowledge of precalculus. Through observation of prerecorded interviews we assessed the teachers' knowledge of the subject and helped designed a new questionnaire for interviews with a smaller group. With this data analysis, a pilot program was created to reduce any teachers' deficiencies found during the interviews. I helped designing in-class activities for the training and interact with the teachers to help them overcome their difficulties.

**Research Assistant** at University of Arizona, Tucson, AZ

- *SYSTEM*<sup>3</sup>, *MAPPS*<sup>4</sup> and *CEMELA*<sup>5</sup> Fall 2001 - Spring 2005  
In the three projects I helped organize and conduct focus groups. I also designed and conducted interviews with parents and children of Hispanic, Mexican American, and Afro-Americans minorities. I helped training parents to assist their children learning Mathematics in a class specifically designed for them as instructor and facilitator. In addition, I would attend the class as another peer, I would work along the group helping to solve the assigned problems, challenging them with probing questions while collecting data from my observations. Furthermore, I helped with the data analysis, mostly focusing in the different roles that parents played: parents as parents, parents as teachers of other parents and their children. I coauthored a paper with the findings.
- *Teaching Toward Algebra*<sup>6</sup> Fall 2001  
I conducted interviews, collected and analyzed data to gauge the teachers' performance after attending a summer program according to their ethnical background.

SERVICE

- *Communicating Mathematics Mentor* at LSU Spring 2015  
I mentored a first year graduate student for a mini-lecture in my classroom. She observed my class several times, and prepare a mini-lecture for my students.
- *High School Mathematics Contest* at LSU Spring 2015 and Spring 2016  
I proctored and grade exams for the team sessions and discussed teaching techniques with high school mathematics students and faculty.
- *Organizer, Applied Mathematics and Computational Seminar* at Universidad Autónoma Metropolitana de Iztapalapa. Mexico. Fall 2013 - Spring 2014
- *Outreach workshop: "Fractals and Nature", Instituto Carlos Graef. Jóvenes hacia la ciencia y la ingeniería 2014.* Universidad Autónoma Metropolitana de Iztapalapa. Mexico City, Jun 21, 2014
- *Mentor talk. "Charlas de Café Matemático".* Universidad Autónoma Metropolitana de Iztapalapa. Mexico City Feb 25, 2014
- *Invited graduate mentor.* 12th annual Nebraska Conference for Undergraduate Women in Mathematics. Lincoln, Nebraska January 29 - 31, 2010
- *Volunteer. Mathematics Tutor Amphitheater Middle School, Tucson AZ,* Sep 2000 - May 2001

REFEREE  
SERVICE

- *Archive for Rational Mechanics and Analysis*
- *Journal of Differential Equations*

<sup>2</sup>Center for Research on Education in Science, Mathematics, Engineering and Technology

<sup>3</sup>Sustaining Youth in Science, Technology, Engineering and Mathematics

<sup>4</sup>Mathematics and Parent Partnerships in the Southwest

<sup>5</sup>Center for the Mathematics Education of Latinos/as

<sup>6</sup>The project trained teachers of Elementary and Middle Schools in methods of teaching pre-algebra and algebra.

TECHNICAL SKILLS      MATHEMATICA, MAPLE and MATLAB experience.  
Programming: C, C++, Pascal, Visual Basic and others  
Applications: T<sub>E</sub>X, L<sub>A</sub>T<sub>E</sub>X, B<sub>I</sub>B<sub>T</sub>E<sub>X</sub>, Microsoft Office, and other common productivity packages for Windows, OS X, and Linux platforms  
Operating Systems: Microsoft Windows XP/2000/Vista, Apple OS X, Linux, and UNIX

LANGUAGE SKILLS      Fluent in Spanish and English

REFERENCES

- \* Prof. Stephen Shipman, Louisiana State University  
shipman@math.lsu.edu
- \* Prof. Nguyen Cong Phuc, Louisiana State University  
pcnguyen@math.lsu.edu
- \* Prof. Hugo Leiva, Yachay Tech, Ibarra -Ecuador  
hleiva@yachaytech.edu.ec
- \* Prof. Joaquin Delgado, Universidad Autonoma Metropolitana-Iztapalapa, Mexico city  
jdf@xanum.uam.mx
- \* Prof. Svetlana Roudenko, The George Washington University  
roudenko@gwu.edu
- \* Prof. Carlos Castillo, Director of the Simon A. Levin Mathematical, Computational and Modeling Sciences Center, Arizona State University  
ccchavez@asu.edu
- \* Dr. Manuel Romero, Instituto Mexicano del Petroleo, Mexico city  
mromeros@imp.mx
- \* Dr. Fernando Carreon, University of Michigan  
carreonf@umich.edu
- \* Prof. Marta Civil, University of Arizona  
civil@math.arizona.edu (*Teaching and Mathematics Education Research*)
- \* Prof. James Oxley, Louisiana State University  
oxley@math.lsu.edu (*Teaching*)

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