

# CLAUDIA CASTRO-CASTRO

## PERSONAL INFORMATION

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## QUALIFICATIONS

Recent Ph.D. in Applied and Computational Mathematics from Southern Methodist University.  
Passionate about science and innovation with leadership and team work experience in technical environments.  
Led research analyzing the control of light in fiber optic cables. Worked with engineers and physicists performing data analysis and building numerical models to improve the design of optical fibers.

## RESEARCH INTERESTS

Nonlinear wave phenomena · Nonlinearity and disorder in fiber arrays · Perturbation theory and asymptotics · Numerical methods applied to nonlinear optics and photonics

## EDUCATION

SMU	2013-2017	Southern Methodist University
		Dallas, TX
		<i>Ph. D. Applied and Computational Mathematics</i> Thesis: Nonlinearity, PT-symmetry, twist, and disorder in Discrete Nonlinear Schroedinger Equation
CIMAT	2011-2013	Centro de Investigación en Matemáticas
		Guanajuato, Mexico
		<i>M. S. Applied Mathematics</i> Thesis: Modulation equations of the Peyrard-Bishop model of DNA dynamics
UABC	2006-2010	Universidad Autónoma de Baja California
		Ensenada, Mexico
		<i>B. S. Applied Mathematics</i>

## WORK EXPERIENCE

- 2014-2017* Research Assistant, SMU
- SMU
- Utilized mathematical modeling and numerical simulations to specifically show how nonlinearity, coupling, geometric twists, and balanced gain-loss relate to the existence, stability, and dynamic character of nonlinear optical modes.
  - Explored the effects of the inherent variability on the fiber core diameter (randomness) by building a statistical understanding of the formation of low or high amplitude (localized) states.
- Summer 2015* Intern, LOS ALAMOS NATIONAL LABORATORY
- LANL
- Developed computer code to compute solutions of the one-dimensional Discrete Nonlinear Schrodinger equations. Met with faculty mentors on a semiweekly basis to discuss theoretical implications and limitations of computational results.
  - Demonstrated theoretical rates of dispersion via the second moment when including the effect of randomness using high-order symplectic integration methods.
- 2013-2016* Teaching Assistant, SMU
- SMU
- Led Matlab projects and held discussions on assignments for undergraduate scientific computing.
  - Guest lecturer for undergraduates in the discrete mathematics class.
  - Graded homework and proctored exams for various professors.
    - Advanced Math for Science and Engineering, Fall 2013.
    - Functions of a Complex Variable, Spring 2014.
    - Introduction to Discrete Mathematics, Spring 2015.
    - Linear algebra, Spring 2013-Fall 2015.
    - Introduction to Scientific Computing, Fall 2014-Spring 2016.

## PUBLICATIONS

C. Castro-Castro and A. B. Aceves, "Optical mode stability and dynamics in nonlinear twisted PT-symmetric structures, to appear American Institute of Physics, Conference Proceedings, 2017.

C. Castro-Castro, Y. Shen, G. Srinivasan, P.G. Kevrekidis, and A.B. Aceves, Light dynamics in nonlinear trimers and twisted multicore fibers, Journal of Nonlinear Optical Physics & Materials, Volume No.25, Issue No. 04. 2017 [arXiv](#)

A. B. Aceves, C. Castro-Castro, C. Shtyrina, A. Rubenchik, M. P. Fedoruk, and S. K. Turitsyn, Optical bullets in 2-dimensional fiber arrays, Photonics and Fiber Technology 2016 (ACOFT, BGPP, NP), OSA Technical Digest (online) Optical Society of America, 2016 [OSA](#)

## TECHNICAL AND PERSONAL SKILLS

<i>Programming Languages</i>	Proficient: C++, Matlab, Python, LaTeX, Mathematica; Intermediate: Bash, Maple, R; Novice: MySQL, HTML5
<i>Environments</i>	Windows Microsoft, Linux
<i>Spoken Languages</i>	French (elementary reading and conversation). Spanish (native speaker)
<i>Leadership</i>	Member of Toastmasters International since Oct. 2015 (Treasurer since Oct. 2016-April 2017) Vice-president of Society of Industrial and Applied Mathematics student chapter Co-organizer Graduate Student Seminar, Aug. 2016-May 2017

## HONORS &amp; AWARDS

<i>2017-2018</i>	Postdoctoral Research Fellowship ConTeX, (CONACyT and University of Texas at Austin)
<i>2016-2017</i>	Dissertation Fellowship School of Graduate Studies, Southern Methodist University
<i>May 2016</i>	Edwin & Carrie Mouzon Teaching Award Department of Mathematics, Department Southern Methodist University
<i>Aug. 2011- Jul. 2013</i>	National Scholarship for a Master's Degree National Council for Science and Technology (CONACyT)
<i>Spring 2010</i>	Santander Bank Scholarship of National Mobility Santander Group

## CONFERENCES &amp; WORKSHOPS

<i>March 2017</i>	Novel optical materials Workshop Presented poster IMA, University of Minnesota, Minneapolis, Minnesota
<i>July 2016</i>	2016 SIAM Conference Annual Meeting Boston, Massachusetts
<i>April 2016</i>	Workshop for Women in Math Sciences Presented poster at SAMSI Spring Opportunities , Research Triangle Park, NC.
<i>Sep. 2015</i>	Conference on Waves, Spectral Theory & Applications

Presented poster, Princeton University

*Summer 2014* SMU High Performance Computing Summer Workshop  
SMU, Dallas, TX

*Oct. 2013* Conference on Integrable Systems, Random Matrix Theory, and  
Combinatorics  
The University of Arizona at Tucson, AZ

#### TALKS

*Nov. 2016* Nonlinearity, disorder, and uncertainty quantification in dDNLS  
Graduate Student Seminar, Department of Mathematics, SMU

*Aug. 2015* Nonlinearity, disorder, and uncertainty quantification in discrete  
models  
Student Seminar, CNLS, Los Alamos National Laboratory

*Sep. 2014* Modulation equations of the Peyrard-Bishop model of DNA  
dynamics  
Graduate Student Seminar, Department of Mathematics, SMU

*Oct. 2011* Vector fields on the upper triangular algebra  
XLIV National Meeting of the Mexican Mathematical Society, San Luis Potosí, Mexico, 2011.

#### GRADUATE COURSES

Real analysis	Linear and Nonlinear waves
Numerical methods	Finite Element Analysis
Linear Algebra Ordinary Differential equations I	Numerical Linear Algebra
Applied Mathematics I	Mathematical Models in Biology
Modeling I	Numerical Solution of Ordinary Differential
Partial Differential Equations	Equations
Selected topics of Differential equations: Completely	Topics in Applied Mathematics: Photonics Modeling
Integrable Evolution Equations	and Simulations
Dynamical Systems	

OTHER INFORMATION

*Other interests* Toastmasters International · Women who code · References upon request

*References* Upon request



October 5, 2017