## Efstathios G. Charalampidis

#### CONTACT Information

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 $Google\ scholar: https://scholar.google.com/citations?user=pGrs2YIAAAAJ\&hl=en\ ResearchGate: https://www.researchgate.net/profile/Efstathios_Charalampidis$ 

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#### RESEARCH INTERESTS

Computational and Applied Mathematics, Numerical Analysis, Ordinary and Partial Differential Equations, Mathematical Physics, Gravitation, Nonlinear Waves

#### EDUCATION

- Aristotle University of Thessaloniki, Department of Mathematical, Physical and Computational Sciences, Thessaloniki, Greece
  - ▶ Ph.D. in Applied Mathematics, November 2009 October 2013 Thesis title: "Skyrmions, Topology and Geometry"

Advisor: Professor Theodora I. Ioannidou

- Aristotle University of Thessaloniki, Physics Department, Thessaloniki, Greece
  - ▶ M.Sc. in Computational Physics, September 2007 October 2009
  - $\triangleright$  B.Sc. in Physics, September 2002 September 2007
    - $\star$  Major: Theoretical Physics

### ACADEMIC EMPLOYMENT & POSITIONS

- San Diego State University, Department of Mathematics and Statistics
  - ▶ Assistant Professor, August 2024 present
- California Polytechnic State University San Luis Obispo, Mathematics Department
  - ▷ Assistant Professor, September 2019 August 2024
- University of Rouen Normandy, Laboratoire de Mathématiques Raphaël Salem
  - ▷ CNRS Visiting Professor, June 2023 September 2023
- University of Massachusetts Amherst, Department of Mathematics and Statistics
  - ▷ Lecturer and Chief Undergraduate Advisor, September 2018 August 2019
  - $\,\triangleright\,$  Visiting Assistant Professor, September 2015 August 2018
  - ⊳ Postdoctoral Research Associate, November 2013 June 2015

# Grants & Fellowships

- Department of Defense
  - ▶ Quantum simulation of multi-component droplets: Many-body phases and correlated non-equilibrium dynamics, amount: \$679,834 (submitted, PI)
- Department of Energy
  - ▷ DE-SC0025726 (co-PI): "Building Capacity for Novel High-Temperature Plasma Research at San Diego State University", amount: \$644,000, July 1, 2025 - June 31, 2028
- Centre National de la Recherche Scientifique (CNRS), France

- National Science Foundation
  - ▷ DMS-2527314 (PI): "Collaborative Research: Collapse, Rogue Waves and their Applications: From Theory to Computation and Beyond", amount: \$142,798, March 1, 2025 - August 31, 2026
  - DMS-2204782 (PI): "Collaborative Research: Collapse, Rogue Waves and their Applications: From Theory to Computation and Beyond", amount: \$142,798, September 1, 2022 August 31, 2025
- California Polytechnic State University, San Luis Obispo
  - ▶ Research, Scholarly and Creative Activities (RSCA) grant (PI), amount: \$17,976, July 2020
     March 2022
- United States Air Force of Scientific Research (FA9550-12-1-0332) grant
  - ▷ Postdoctoral fellowship, November 2014 June 2015
- European Commission, Community Research: "FP7, Marie Curie Actions, International Research Staff Exchange Scheme (IRSES-605096)" grant
  - ▷ Postdoctoral fellowship, November 2013 November 2014
- DFG Research Training Group 1620 "Models of Gravity", Institüt für Physik, Universität Oldenburg, Germany
  - ▶ Research fellowship, August 4 October 5, 2013
- Department of Mathematical, Physical and Computational Sciences, Aristotle University of Thessaloniki, Greece
  - ⊳ Research studentship, September 2010 June 2011
  - $\,\triangleright\,$ Research studentship, March 2010 July 2010

# Honors & Awards

- California Polytechnic State University, San Luis Obispo
  - ▶ Nominated twice for the "Distinguished Scholarship Award", 2022 & 2023
- Institute of Physics (IOP), Journal of Optics
  - ▷ "Emerging Leaders in Optics 2021"
- University of Massachusetts Amherst
  - ▷ Finalist for the "Distinguished Teaching Award", November 2017
- Aristotle University of Thessaloniki, Greece
  - ▷ "Scholarship of Excellence" awarded by University's Research Committee, 2012

#### TEACHING EXPERIENCE

- San Diego State University<sup>1</sup>
  - ▶ MATH 252 Calculus III (F24, S25)
  - ▶ MATH 542 Introduction to Computational Ordinary Differential Equations (F25)
  - ▷ COMP 605 Scientific Computing (S26)
- California Polytechnic State University San Luis Obispo<sup>1</sup>
  - ▶ MATH 143 Calculus III (F19, W20, S20, F20, W22, F22)
  - ▶ MATH 241 Calculus IV (F21, S22)
  - ▶ MATH 244 Linear Analysis I (W23, W24, S24)
  - ▶ MATH 344 Linear Analysis II (S21, F22, F23)
  - ▶ MATH 451 Numerical Analysis I (W20, W21, W22, W23)
  - ▶ MATH 452 Numerical Analysis II (S21, S23)
  - ▷ MATH 453 Numerical Optimization (S20, S22)
  - ▶ MATH 501 Analytic Methods in Applied Mathematics (F23)
  - ▷ MATH 502 Numerical Methods in Applied Mathematics (W24)

<sup>&</sup>lt;sup>1</sup>F=Fall; S=Spring; W=Winter

- University of Massachusetts Amherst<sup>1</sup>
  - ▶ MATH 552 Applications of Scientific Computing (S18, S19)
  - ▶ MATH 551 Introduction to Scientific Computing (S17, F17, S18, S19)
  - ▶ MATH 456 Mathematical Modeling (Fall 2018)
  - ▶ MATH 331 Ordinary Differential Equations for Scientists & Engineers (F15, S16, F17, F18)
  - ▶ MATH 233 Multivariate Calculus (F16)
- Aristotle University of Thessaloniki, Department of Mathematical, Physical and Computational Sciences, Thessaloniki, Greece
  - ▷ Teaching Assistant for Linear Algebra and Partial Differential Equations, September 2010-June 2013

#### MENTORING EXPERIENCE

• San Diego State University

#### ▶ PhD Theses:

\* August 2025 - present: Samuel Andersen Project title: TBA

#### ▶ Master Theses:

★ February 2025 - present: Harshith Das Project title: TBA

• California Polytechnic State University San Luis Obispo

#### ▶ Undergraduate Students:

\* September 2020 - March 2022: Marisa Lee Project title: "A Roadmap to Energy Harvesting using Granular Crystal Chains" funded by RSCA

#### ▶ Master Theses:

★ November 2023 - December 2024: Lindsey Langton

Project title: "Circular restricted three body manifold trajectories via Koopman operator theory"

 $\star$  September 2023 - June 2024: Madison Lytle

Project title: "Going Rogue: Existence, spectral stability and bifurcations of rogue waves in integrable and non-integrable lattice models"

\* September 2021 - June 2022: Zachary Gelber

Project title: "An optimization model for minimization of systemic risk in financial portfolios"

★ September 2021 - June 2023: Scott Plantenga

Project title: "Distributed control of servicing satellite fleet using horizon simulation framework"

### ▷ Senior Projects:

★ January 2024 - June 2024: Aria Devries

Project title: "Computing quantum droplets in two-component Gross-Pitaevskii systems"

★ January 2021 - June 2021: Maeve Calanog

Project title: "Time-periodic solutions in granular materials"

#### ▶ FROST funded research:

★ Summer 2022: Kate Davis, Olivia Hartnett, and Connor Leipelt

Project title: "The interplay of boundary conditions and spatial discretization in computing matter waves"

★ Summer 2021: Andy Chiv, Riley Prendergast, and Alexis Saucerman

Project title: "Computation of matter waves in atomic physics"

\* Summer 2020: Marisa Lee, Rachel Loh, and Harry Yan

Project title: "Energy localization in granular crystals for energy harvesting"

#### ▶ Independent study:

 $\star$  Fall 2023: Pablo Flores

Topic: "Numerical methods for PDEs"

\* Spring 2021: Scott Plantenga

Topic: "Numerical Optimization methods for controlling lunar landers"

★ Summer 2020: Wesley Khademi

Topic: "Artificial Neural Networks and Differential Equations"

- University of Massachusetts Amherst
  - ▶ Chief Undergraduate Advisor (CUA) for the Department of Mathematics and Statistics, September 2018 - August 2019
  - ▷ Graduate Students:
    - ★ September 2016 September 2017: Christian Hoffmann
  - ▶ Undergraduate Theses:
    - \* September 2019 May 2020: Jimmy Hwang Honors Thesis title: "Formation of Bursting Events in a Lattice Dynamical System"
    - \* September 2018 May 2019: Jennifer Sullivan Honors Thesis title: "On the stability of localized solutions in the Ablowitz-Ladik model"
    - \* September 2018 May 2019: Fiona McCann Honors Thesis title: "Dynamical Research into Bipolar Disorder: A Theoretical Approach"

#### ▶ REU students:

- $\star$  Summer 2018: Katherine Donoghue
  - Project title: "The formation of rogue waves in granular crystals"
- ★ Summer 2017: Sydney Hauver and Xinyi He Project title: "Study of solitary wave propagation in woodpile chains"
- ★ Summer 2016: Anya Conti Project title: "Modeling rogue waves in the nonlinear Schrödinger equation and Ablowitz-Ladik lattice system"

#### Synergistic Activities

- Conference and seminar organization
  - ▷ Co-organizer (with P. Kevrekidis, C. Chong, and Sathya Chandramouli) of the webinar series on "Nonlinear Waves and Coherent Structures", since September 2020
  - ▷ Co-organizer (with P. Kevrekidis and R. Carretero-González) of the special session on "Recent developments in nonlinear waves: From rogue waves and blow-ups to shocks, vortices and beyond", The 13th IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, University of Georgia, Athens, GA, April 14 -16, 2025

  - ▷ Co-organizer (with N. Karachalios) of the special session on "Analysis and Numerical Computations of Evolutionary Equations: Applications and Experiments", SIAM Conference on Nonlinear Waves and Coherent Structures, Baltimore, MD, June 24 27, 2024
  - ▶ Member of the Scientific Program Committee of the "Second CSU Mathematical Conference", Bakersfield, CA, November 10 - 11, 2023
  - ▶ Member of the Scientific Program Committee the "First CSU Mathematical Conference", Woodland Hills, CA, November 11 12, 2022
  - Co-organizer (with E. Kirr) of the special session on "Waves in inhomogeneous media", SIAM Conference on Nonlinear Waves and Coherent Structures, Bremen, Germany, August 30 -September 2, 2022
  - ▷ Co-organizer (with P. Kevrekidis and R. Carretero-González) of the special session on "Non-linear Waves in Bose-Einstein Condensates: Recent developments", The 12th IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, University of Georgia, Athens, GA, March 29 April 1, 2022
  - Co-organizer (with S. Xing) of the special session on "Nonlinear Vibrations and Waves", 2nd Online Conference on Nonlinear Dynamics and Complexity, October 4 6, 2021
  - ▷ Co-organizer (with P. Kevrekidis) of the special session on "Nonlinear Waves in Lattice Dynamical Systems", SIAM Annual Meeting, Spokane, WA, July 19 23, 2021
  - ▷ Co-organizer (with R. Parker and F. Tsitoura) of the special session on "Existence and stability of nonlinear waves: theory and numerical computations", SIAM Conference on Applications of Dynamical Systems, Snowbird, UT, May 19 23, 2019
  - Co-organizer (with F. Tsitoura) of the special session on "Nonlinear Evolutionary and Lattice Equations: Theory, Numerics and Experiment", The 11th IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, University of Georgia, Athens, GA, April 17 - 19, 2019

- ▶ Member of the Scientific Program Committee of the IMACS International conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, University of Georgia, Athens, GA, since 2018
- Co-organizer (with J. Bramburger and R. Goh) of the Brown/BU/UMass PDE Seminar, 2018
   2019
- Co-organizer (with V. Rothos) of the special session on "Localized Structures in Nonlinear Evolution and Lattice Equations", SIAM Conference on Nonlinear Waves and Coherent Struc-tures, Orange, CA, June 11 - 14, 2018
- ▷ Co-organizer (with V. Rothos) of the special session on "Nonlinear Waves: Mathematical Methods and Applications", The 10th IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, University of Georgia, Athens, GA, March 29 April 1, 2017.
- ▷ Accompanying REU students from UMass for the 2016 Summer Undergraduate Research Conference, Department of Mathematics and Statistics, Williams College, Williamstown, MA, July 29, 2016
- ▷ Organizer of the Nonlinear Waves Seminar, Department of Mathematics and Statistics, University of Massachusetts Amherst, MA, September 2015 September 2017
- Referee/reviewer for scientific journals, books, and funding agencies:
  - ▶ Wave Motion, since 2024
  - ▷ Chaos, since 2024
  - ▷ Studies in Applied Mathematics, since 2023
  - ▷ Computer Physics Communications, since 2023
  - ▷ Physical Review Letters, since 2022
  - ▷ National Science Foundation, since 2021
  - ▷ Physical Review E, since 2021
  - ▷ Physica D: Nonlinear Phenomena, since 2021
  - ▷ European Physical Journal Plus, since 2021
  - ▷ Journal of Scientific Computing, since 2021
  - ▶ Mathematical Reviews (AMS), since 2021
  - ▷ Communications in Nonlinear Science and Numerical Simulation, since 2021
  - ▷ Nonlinear Dynamics (Springer), since 2021
  - ▶ Frontiers in Physics, since 2020
  - ▷ Chaos. Solitons & Fractals. since 2020
  - ▷ American Institute of Mathematical Sciences, since 2020
  - ▷ Springer, Applied Sciences, since 2018
  - ▷ European Physical Journal B, since 2017
  - ▷ Journal of Applied Physics (AIP), since 2017
  - $\triangleright$  Physics Letters A, since 2014

#### Professional Memberships

- Society for Advancement of Chicanos/Hispanics and Native Americans in Science (SACNAS), since 2021
- Society for Industrial and Applied Mathematics (SIAM), since 2014
- American Mathematical Society (AMS), since 2014

#### RESEARCH VISITS

- Department of Mathematics, North Carolina State University, Raleigh, NC, September 23 26, 2025
- Department of Mathematics, Texas A&M, College Station, TX, August 5 8, 2025
- Department of Mathematics and Statistics, University of Massachusetts Amherst, Amherst, MA, April 27 30, 2025
- Department of Mathematics, Texas A&M, College Station, TX, April 24 26, 2025

- Center for Nonlinear Studies, Los Alamos National Laboratory, Los Alamos, NM, November 18 -22, 2024
- Department of Physics, Missouri University of Science and Technology, Rolla, MO, October 30 -November 1, 2024
- Laboratoire de mathématiques Raphaël Salem, Université de Rouen Normandie, France, June 15
   September 14, 2023
- Joint visit: Center for Nonlinear Studies, Los Alamos National Laboratory, Los Alamos, NM;
   Santa Fe Institute, Santa Fe, NM, February 6 13, 2023
- Isaac Newton Institute for Mathematical Sciences, Cambridge, UK, September 5 16, 2022
- Laboratoire de mathématiques Raphaël Salem, Université de Rouen Normandie, France, July 3 -July 31, 2022
- Joint visit: Center for Nonlinear Studies, Los Alamos National Laboratory, Los Alamos, NM; Santa Fe Institute, Santa Fe, NM, March 9 12, 2020
- Department of Mathematics, University of Illinois at Urbana-Champaign, IL, August 26 28, 2019
- Center for Nonlinear Studies, Los Alamos National Laboratory, Los Alamos, NM, July 11 12, 2019
- Division of Applied Mathematics, Brown University, RI, June 26 29, 2018
- The Program in Applied & Computational Mathematics, Princeton University, NJ, January 16 -18, 2017
- The Program in Applied & Computational Mathematics, Princeton University, NJ, September 15 21, 2016
- Department of Mathematics and Statistics, San Diego State University, CA, May 15 19, 2016
- $\bullet$  The Iby and Aladar Fleischman Faculty of Engineering, Tel Aviv University, Israel, July 5 10, 2015
- Institüt für Physik, Universität Oldenburg, Germany, August 4 October 5, 2013
- Department of Mathematics and Statistics, University of Massachusetts Amherst, MA, September
   October, 2012
- Institüt für Physik, Universität Oldenburg, Germany, July, 2012

### Schools, Seminars & Workshops

- Banff International Research Station for Mathematical Innovation and Discovery (BIRS) & Institute of Mathematics at the University of Granada (IMAG), University of Granada, Spain:
  - $\triangleright$  "Dynamics of Coherent Structures in Discrete and Continuum Nonlinear Systems", June 8 June 13, 2025
- Institut d'Etudes Scientifiques de Cargése, Corsica, France
  - ▷ "Bridging Classical and Quantum Turbulence", July 4 14, 2023
- Isaac Newton Institute for Mathematical Sciences, Cambridge, UK
  - ⊳ "Analysis of dispersive systems", September 5 9, 2022
  - ▷ "Dispersive hydrodynamics: mathematics, simulation and experiments, with applications in nonlinear waves", September 9 16, 2022
  - $\,\rhd\,$  "Integrable systems and applications", September 12 16, 2022
- Summer School for Graduate Students, Wolfersdorf, Germany

- ▶ 17th Saalburg Summer School on "Foundations and New Methods in Theoretical Physics", August 29 - September 09, 2011
- The Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste, Italy
   "School on Computational Methods in Dynamics", June 20 July 1, 2011
- School of Mathematics, Statistics and Actuarial Sciences, University of Kent, UK
  - ▷ "Classical and Quantum Integrable Models", July 19 23, 2010

# Publications & Preprints<sup>2</sup>

- [49] Multi-hump Collapsing Solutions in the Nonlinear Schrödinger Problem: Existence, Stability and Dynamics
  - S. Jon Chapman, M. Kavousanakis, E.G. Charalampidis, I.G. Kevrekidis and P.G. Kevrekidis arXiv:2504.09746
- [48] On the proximity of Ablowitz-Ladik and discrete Nonlinear Schrödinger models: A theoretical and numerical study of Kuznetsov-Ma solutions

M.L. Lytle\*\*, E.G. Charalampidis, D. Mantzavinos, J. Cuevas-Maraver, P.G. Kevrekidis, N. Karachalios

Wave Motion 137, 103547 (2025)

[47] On the discrete Kuznetsov-Ma solutions for the defocusing Ablowitz-Ladik equation with large background amplitude

E.C. Boadi, E.G. Charalampidis, P.G. Kevrekidis, N.J. Ossi, B. Prinari *Wave Motion* **134**, 103496 (2025)

- [46] Two-component droplet phases and their spectral stability in one dimension E.G. Charalampidis and S.I. Mistakidis Phys. Rev. A 111, 013318 (2025)
- [45] CombOpNet: A Neural-Network Accelerator for SINDy
   S. Xing, Q. Han, and E.G. Charalampidis
   J. Vib. Tes. and Sys. Dyn. 9(1) (2025)
- [44] Parallel finite-element codes for the Bogoliubov-de Gennes stability analysis of Bose-Einstein Condensates

G. Sadaka, P. Jolivet, E.G. Charalampidis and I. Danaila *Comput. Phys. Commun.* **306**, 109378 (2025)

- [43] Learning Traveling Solitary Waves Using Separable Gaussian Neural Networks S. Xing and E.G. Charalampidis Entropy 26(5), 396 (2024)
- [42] Self-similar blowup solutions in the generalized Korteweg-de Vries equation: Spectral analysis, normal form and asymptotics
   S. Jon Chapman, M. Kavousanakis, E.G. Charalampidis, I.G. Kevrekidis and P.G. Kevrekidis Nonlinearity 37, 095034 (2024)
- [41] The application of the "inverse problem" method for constructing confining potentials that make N-soliton waveforms exact solutions in the Gross-Pitaevskii equation

F. Cooper, A. Khare, J. Dawson, E.G. Charalampidis and A. Saxena *Chaos* **34**, 043138 (2024)

- [40] Existence, stability and spatio-temporal dynamics of time-quasiperiodic solutions on a finite background in discrete nonlinear Schrödinger models
   E.G. Charalampidis, G. James, D. Hennig, N. Karachalios and P.G. Kevrekidis Wave Motion 128, 103324 (2024)
- [39] Discovering Governing Equations in Discrete Systems Using PINNs
   S. Saqlain, W. Zhu, E.G. Charalampidis and P.G. Kevrekidis
   Commun. Nonlinear Sci. Numer. Simulat. 126, 107498 (2023)

<sup>&</sup>lt;sup>2</sup> Superscripts \* and \*\* denote undergraduate and graduate student coauthors, respectively.

- [38] Uniform-density Bose-Einstein condensates of the Gross-Pitaevskii equation found by solving the inverse problem for the confining potential
   F. Cooper, A. Khare, J. Dawson, E.G. Charalampidis and A. Saxena
   Phys. Rev. E 107, 064202 (2023)
- [37] Breathers in lattices with alternating strain-hardening and strain-softening interactions
   M. Lee\*, E.G. Charalampidis, S. Xing, C. Chong and P.G. Kevrekidis
   Phys. Rev. E 107, 054208 (2023)
- [36] The stability of the b-family of peakon equations E.G. Charalampidis, R. Parker, P.G. Kevrekidis and S. Lafortune Nonlinearity 36, 1192 (2023)
- [35] Stability of exact solutions of the (2+1)-dimensional nonlinear Schrödinger equation with arbitrary nonlinearity parameter κ
   F. Cooper, A. Khare, E.G. Charalampidis, J. Dawson and A. Saxena
   Phys. Scr. 98, 015011 (2022)
- [34] A Spectral Analysis of the Nonlinear Schrödinger Equation in the Co-Exploding Frame
   S. Jon Chapman, M. Kavousanakis, E.G. Charalampidis, I.G. Kevrekidis and P.G. Kevrekidis Physica D: Non. Phen. 439, 133396 (2022)
- [33] Existence, Stability and Dynamics of Monopole and Alice Ring Solutions in Anti-Ferromagnetic Spinor Condensates Thudiyangal Mithun, R. Carretero-González, E.G. Charalampidis, D.S. Hall and P.G. Kevrekidis Phys. Rev. A 105, 053303 (2022)
- [32] Neural Networks Enforcing Physical Symmetries in Nonlinear Dynamical Lattices: The Case Example of the Ablowitz-Ladik Model
   W. Zhu, W. Khademi\*, E.G. Charalampidis and P.G. Kevrekidis Physica D: Non. Phen. 434, 133264 (2022)
- [31] Wave manipulation using a bistable chain with reversible impurities H. Yasuda, E.G. Charalampidis, P.K. Purohit, P.G. Kevrekidis and J.R. Raney Phys. Rev. E 104, 054209 (2021)
- [30] Stability of trapped solutions of a nonlinear Schrödinger equation with a nonlocal nonlinear self-interaction potential
  E.G. Charalampidis, F. Cooper, A. Khare, J. Dawson and A. Saxena
  J. Phys. A: Math. and Theor. 55, 015703 (2021)
- [29] Numerical bifurcation and stability for the capillary-gravity Whitham equation E.G. Charalampidis and V.M. Hur Wave Motion 106, 102793 (2021)
- [28] Nonlinear Localized Modes in Two-Dimensional Hexagonally-Packed Magnetic Lattices
   C. Chong, Y. Wang, D. Maréchal, E.G. Charalampidis, M. Molerón, A.J. Martínez, M.A. Porter, P.G. Kevrekidis and C. Daraio
   New J. Phys. 23, 043008 (2021)
- [27] Behavior of solitary waves of coupled nonlinear Schrödinger equations subjected to complex external periodic potentials with odd-PT symmetry
   E.G. Charalampidis, F. Cooper, J. Dawson, A. Khare and A. Saxena
   J. Phys. A: Math. and Theor. 54, 145701 (2021)
- [26] Dark-dark soliton breathing patterns in multi-component Bose-Einstein condensates
   W. Wang, L.-C. Zhao, E.G. Charalampidis and P.G. Kevrekidis

J. Phys. B: At. Mol. Opt. Phys. 54, 055301 (2021)

- [25] Kuznetsov-Ma breather-like solutions in the Salerno model J. Sullivan\*, E.G. Charalampidis, J. Cuevas-Maraver, P.G. Kevrekidis and N. Karachalios Eur. Phys. J. Plus 135, 607 (2020)
- [24] Deflation-based Identification of Nonlinear Excitations of the three-dimensional Gross-Pitaevskii equation
   N. Boullé, E.G. Charalampidis, P.E. Farrell and P.G. Kevrekidis
   Phys. Rev. A 102, 053307 (2020)
- [23] Stability and response of trapped solitary wave solutions of coupled nonlinear Schrödinger equations in an external, PT- and supersymmetric potential
  E.G. Charalampidis, J. Dawson, F. Cooper, A. Khare and A. Saxena
  J. Phys. A: Math. and Theor. 53, 455702 (2020)
- Bifurcation analysis of stationary solutions of two-dimensional coupled Gross-Pitaevskii equations using deflated continuation
   E.G. Charalampidis, N. Boullé, P.E. Farrell and P.G. Kevrekidis
   Commun. Nonlinear Sci. Numer. Simulat 87, 105255 (2020)
- [21] Breathers and other time-periodic solutions in an array of cantilevers decorated with magnets
  C. Chong, A. Foehr, E.G. Charalampidis, P.G. Kevrekidis and C. Daraio Math. Engin. 1(3), 489 (2019)
- [20] Origami-based impact mitigation via rarefaction solitary wave creation H. Yasuda, Y. Miyazawa, E.G. Charalampidis, C. Chong, P.G. Kevrekidis and J. Yang Sci. Adv. 5, eaau2835 (2019)
- [19] Phononic rogue waves
  E.G. Charalampidis, J. Lee, P.G. Kevrekidis and C. Chong
  Phys. Rev. E 98, 032903 (2018)
- [18] Lattices with internal resonator defects
  S. Hauver\*, X. He\*, D. Mei, E.G. Charalampidis, P.G. Kevrekidis, E. Kim, J. Yang and A. Vainchtein
  Phys. Rev. E 98, 032902 (2018)
- [17] Peregrine solitons and gradient catastrophes in discrete nonlinear Schrödinger systems
   C. Hoffmann\*\*, E.G. Charalampidis, D.J. Frantzeskakis and P.G. Kevrekidis
   Phys. Lett. A 382, 3064 (2018)
- [16] Computing stationary solutions of the two-dimensional Gross-Pitaevskii equation with deflated continuation
   E.G. Charalampidis, P.G. Kevrekidis and P.E. Farrell
   Commun. Nonlinear Sci. Numer. Simulat. 54, 482 (2018)
- [15] Rogue waves in ultracold bosonic seas
  E.G. Charalampidis, J. Cuevas-Maraver, D.J. Frantzeskakis and P.G. Kevrekidis
  Rom. Rep. Phys. 70, 504 (2018)
- [14] Discrete BPS Skyrmions
  M. Agaoglou, E.G. Charalampidis, T.A. Ioannidou and P. G. Kevrekidis
  J. Math. Phys. 58, 091501 (2017)
- [13] Revisiting Diffusion: Self-similar Solutions and the t<sup>-1/2</sup> Decay in Initial and Initial-Boundary Value Problems
   P.G. Kevrekidis, M.O. Williams, D. Mantzavinos, E.G. Charalampidis, M. Choi and I.G. Kevrekidis
   Quart. Appl. Math. 75, 581 (2017)
- [12] SO(2)-induced breathing patterns in multi-component Bose-Einstein condensates E.G. Charalampidis, W. Wang, P.G. Kevrekidis, D.J. Frantzeskakis and J. Cuevas-Maraver Phys. Rev. A 93, 063623 (2016)

[11] Vortex-soliton complexes in coupled nonlinear Schrödinger equations with unequal dispersion coefficients

E.G. Charalampidis, P.G. Kevrekidis, D.J. Frantzeskakis and B.A. Malomed *Phys. Rev. E* **94**, 022207 (2016)

[10] Nonlinear vibrational-state excitation and piezoelectric energy conversion in harmonically driven granular chains

C. Chong, E. Kim, E.G. Charalampidis, H. Kim, F. Li, P.G. Kevrekidis, J. Lydon, C. Daraio and J. Yang

Phys. Rev. E 93, 052203 (2016)

[9] Formation of rarefaction waves in origami-based metamaterials
 H. Yasuda, C. Chong, E.G. Charalampidis, P.G. Kevrekidis and J. Yang
 Phys. Rev. E 93, 043004 (2016)

[8] Wormholes from chiral fields

E.G. Charalampidis, T.A. Ioannidou, B. Kleihaus and J. Kunz J. Phys. Conf. Ser. 574, 012058 (2015)

[7] Time-Periodic Solutions of Driven-Damped Trimer Granular Crystals
 E.G. Charalampidis, F. Li, C. Chong, J. Yang and P.G. Kevrekidis
 Math. Prob. in Eng. 2015, 830978 (2015)

[6] Lattice three-dimensional skyrmions revisited
 E.G. Charalampidis, T.A. Ioannidou and P.G. Kevrekidis
 Phys. Scr. 90, 025202 (2015)

[5] Dark-bright solitons in coupled nonlinear Schrödinger equations with unequal dispersion coefficients

E.G. Charalampidis, P.G. Kevrekidis, D.J. Frantzeskakis and B.A. Malomed *Phys. Rev. E* **91**, 012924 (2015)

[4] Vector rogue waves and dark-bright boomeronic solitons in autonomous and non-autonomous settings

R. Babu Mareeswaran, E.G. Charalampidis, T. Kanna, P.G. Kevrekidis and D.J. Frantzeskakis *Phys. Rev. E* **90**, 042912 (2014)

[3] Rogue waves in nonlinear Schrödinger models with variable coefficients: Application to Bose-Einstein condensates

J.S. He, E.G. Charalampidis, P.G. Kevrekidis and D.J. Frantzeskakis *Phys. Lett. A* **378**, 577 (2014)

[2] Wormholes threaded by chiral fields

E.G. Charalampidis, T.A. Ioannidou, B. Kleihaus and J. Kunz *Phys. Rev. D* 87, 084069 (2013)

[1] Skyrmions, rational maps and scaling identities

E.G. Charalampidis, T.A. Ioannidou and N.S. Manton J. Math. Phys. **52**, 033509 (2011)

Invited talks & seminars

- 62. Department of Mathematics, North Carolina State University, Raleigh, NC, September 25, 2025. Talk title: "From Nonlinear Optics to Atomic Physics, From Rogue Waves to Collapse: Adventures in Applied and Computational Mathematics"
- 61. Conference & Workshop on "Dynamics of Coherent Structures in Discrete and Continuum Nonlinear Systems", Banff International Research Station for Mathematical Innovation and Discovery (BIRS) & Institute of Mathematics at the University of Granada (IMAG), University of Granada, Spain, June 8 June 13, 2025. Talk title: "Spectral stability of Kuznetsov-Mabreathers in discrete models"

- 60. Conference on "Wave dynamics, integrability and beyond", Sardinia, Italy, May 26 May 30, 2025. Talk title: "Numerical spectral analysis of blow-up solutions to nonlinear dispersive equations"
- 59. SIAM Conference on Applications of Dynamical Systems, Denver, CO, May 11 15, 2025. Talk title: "Existence and stability of roque waves in discrete models"
- 58. Colloquium, Department of Mathematics and Statistics, University of Massachusetts Amherst, MA, April 29, 2025. Talk title: "From Nonlinear Optics to Atomic Physics, From Rogue Waves to Collapse: Adventures in Applied and Computational Mathematics"
- 57. Colloquium, Department of Mathematics, Texas A&M, College Station, TX, April 25, 2025. Talk title: "Computing self-similar solutions to nonlinear dispersive PDEs"
- 56. The 13th IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, University of Georgia, Athens, GA, April 14 16, 2025. Talk title: "On the blow-up of 1D nonlinear dispersive equations: Theory and computations"
- 55. AMS 2025 Spring Central Sectional Meeting, University of Kansas, Lawrence, KS, March 29 30, 2025. Talk title: "Spectral analysis of blow-up in nonlinear dispersive PDEs: Theory and computations"
- 54. 2024 CMS Winter Meeting, Kwantlen Polytechnic University, Richmond Campus, Richmond, BC, Canada, November 29 December 2, 2024. Talk title: "Computational Analysis of self-similar blow-up in nonlinear dispersive PDEs"
- 53. Colloquium, Computational Science Research Center, San Diego State University, San Diego, CA, November 8, 2024. Talk title: "From Nonlinear Optics to Ultra-Cold Atomic Physics and Roque Waves: Adventures in Applied and Computational Mathematics"
- 52. Colloquium, Department of Physics, Missouri University of Science and Technology, Rolla, MO, October 31, 2024. Talk title: "From Nonlinear Optics to Ultra-Cold Atomic Physics and Rogue Waves: Adventures in Applied and Computational Mathematics"
- 51. AMS Fall Southeastern Sectional Meeting, Georgia Southern University, Savannah, GA, October 5 6, 2024. Talk title: "Computational Analysis of self-similar blow-up in nonlinear dispersive PDEs"
- 50. XLIV Dynamics Days Europe, Bremen, Germany, July 29 August 2, 2024. Talk title: "Computing self-similar solutions to NLS equations: A computational/bifurcation analysis approach"
- 49. 11th European Nonlinear Dynamics Conference, Delft, Netherlands, July 22 26, 2024. Talk title: "The computation and spectral analysis of blow-up solutions to nonlinear dispersive PDEs"
- 48. SIAM Conference on Nonlinear Waves and Coherent Structures, Baltimore, MD, June 24 27, 2024. Talk title: "Self-similar collapse to nonlinear dispersive PDEs: A computational/bifurcation analysis approach"
- 47. Colloquium, Department of Mathematics, University of Kansas, Lawrence, KS, April 10, 2024. Talk title: "From Nonlinear Optics to Ultra-Cold Atomic Physics and Rogue Waves: Adventures in Applied and Computational Mathematics"
- 46. Colloquium, Department of Mathematics and Statistics, San Diego State University, San Diego, CA, February 15, 2024. Talk title: "From Nonlinear Optics to Ultra-Cold Atomic Physics and Roque Waves: Adventures in Applied and Computational Mathematics"

- 45. Colloquium, Department of Mathematics, Kennesaw State University, Marietta, GA, October 13, 2023. Talk title: "Recent advances in atomic Bose-Einstein Condensates: From Theory to Computation"
- 44. "Bridging Classical and Quantum Turbulence", Institut d'Études Scientifiques, Cargese, Corsica, France, July 4 July 14, 2023. Talk title: "The Computation of Vortical Patterns in Bose-Einstein Condensates with Deflation: Existence, stability, and dynamics
- 43. Colloquium, Department of Mathematics, University of California Santa Barbara, Santa Barbara, CA, June 9, 2023. Talk title: "The computation of matter waves in Bose-Einstein Condensates: Existence, stability, and bifurcations"
- 42. The 13th AIMS Conference on Dynamical Systems and Differential Equations, University of North Carolina Wilmington, May 31 June 4 2023. Talk title: "Extreme nonlinear excitations in lattice and continuum models"
- 41. SIAM Conference on Applications of Dynamical Systems, Portland, OR, May 14 18, 2023. Talk title: "Self-similar collapse to the NLS: A bifurcation analysis approach"
- 40. Colloquium, Department of Mathematics, University of Alabama, Birmingham, AL, February 17, 2023. Talk title: "Computing Nonlinear Waves in Bose-Einstein Condensates and Beyond: Adventures in Applied Mathematics"
- Colloquium, Center for Nonlinear Studies, Los Alamos National Laboratory, Los Alamos, NM, February 7, 2023. Talk title: "Rogue Waves in Continuous and Discrete Models"
- 38. Colloquium, Department of Mathematics and Statistics, Amherst College, Amherst, MA, February 2, 2023. Talk title: "From Newton's method and Eigenvalue Problems to Deflation and Bose-Einstein Condensates: Adventures in Applied Mathematics"
- 37. Colloquium, Mathematics Department, California Polytechnic State University, San Luis Obispo, CA, November 18, 2022. Talk title: "Recent advances on extreme events in discrete and continuous models"
- 36. AMS Fall Eastern Sectional Meeting, University of Massachusetts Amherst, Amherst, MA, October 1 2, 2022. Talk title: "Recent advances on Rogue waves in continuous and discrete models"
- 35. SIAM Conference on Nonlinear Waves and Coherent Structures, Bremen, Germany, August 30 September 2, 2022. Talk title: "Novel coherent structures to single- and multi-component NLS systems: Theory and Computation"
- 34. Conference on "Nonlinear waves and networks", Institut National des Sciences Appliquées (INSA) de Rouen Normandie, France, July 4 July 5, 2022. Talk title: "Recent Advances on Localized Solutions in NLS systems: Theory and Computation"
- 33. The 12th IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, University of Georgia, Athens, GA, March 30 April 1, 2022. Talk title: "Recent advances in single and multi-component NLS systems"
- 32. Colloquium, Mathematics Department, California Polytechnic State University, San Luis Obispo, CA, November 19, 2021. Talk title: "Recent Advances in Nonlinear Waves: Theory and Computation"
- 31. SIAM Annual Meeting, Spokane, WA, July 19 23, 2021. Talk title: "Rogue waves in integrable and non-integrable systems: Existence, stability and dynamics"

- 30. 2021 Application of Mathematics in Technical and Natural Sciences (AMiTaNS) conference, Albena, Bulgaria, June 24 29, 2021. Talk title: "Bifurcation analysis tools for Nonlinear Complex Dynamical Systems"
- 29. SIAM Conference on Applications of Dynamical Systems, Portland, OR, May 23 27, 2021. Talk title: "Rogue waves in continuous and discrete models: Existence, stability and dynamics"
- 28. SIAM Conference on Analysis of Partial Differential Equations, La Quinta, CA, December 11 14, 2019. Talk title: "Bifurcation analysis of nonlinear PDEs using deflated continuation"
- Colloquium, Mathematics Department, California Polytechnic State University, San Luis Obispo, CA, October 25, 2019. Talk title: "Deflated Continuation: A bifurcation analysis tool for Nonlinear Complex Dynamical Systems"
- 26. Colloquium, Department of Mathematics, University of Illinois at Urbana-Champaign, IL, August 27, 2019. Talk title: "Deflated Continuation: A bifurcation analysis tool for Nonlinear Schrödinger (NLS) Systems"
- Colloquium, Center for Nonlinear Studies, Los Alamos National Laboratory, Los Alamos, NM, July 12, 2019. Talk title: "Deflated Continuation: A bifurcation analysis tool for Nonlinear Schrödinger (NLS) Systems"
- 24. SIAM Conference on Applications of Dynamical Systems, Snowbird, UT, May 19 23, 2019. Talk title: "Bifurcation analysis in NLS systems using deflated continuation"
- 23. The 11th IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, University of Georgia, Athens, GA, April 17 19, 2019. Talk title: "Formation of extreme events in nonlinear Schrödinger (NLS) systems"
- 22. Colloquium, Department of Mathematics, New York Institute of Technology, Old Westbury, NY, February 26, 2019. Talk title: "Nonlinear waves: From optics to matter waves and beyond"
- 21. Colloquium, Department of Applied Mathematics and Statistics, Johns Hopkins University, Baltimore, MD, February 15, 2019. Talk title: "Nonlinear waves: From optics to matter waves and beyond"
- Colloquium, Department of Mathematics and Statistics, San José State University, San José,
   CA, February 11, 2019. Talk title: "Nonlinear waves: From optics to matter waves and beyond"
- 19. Colloquium, Mathematics Department, California Polytechnic State University, San Luis Obispo, CA, February 8, 2019. Talk title: "Nonlinear waves: From optics to matter waves and beyond"
- 18. Nonlinear Waves Seminar, Department of Mathematics and Statistics, University of Massachusetts Amherst, MA, December 7, 2018. Talk title: "Rogue waves in ultracold physics: from continuous to discrete models"
- 17. Colloquium, Department of Mathematics, Bowdoin College, Brunswick, ME, May 3, 2018. Talk title: "Nonlinear waves in atomic Bose-Einstein Condensates: Theory and Computation"
- 16. Brown/Boston University Dynamics and PDEs Seminar, Brown University, Providence, RI, April 19, 2018. Talk title: "Formation of rogue waves in continuous and discrete models: Theory and Computation"
- 15. AMS Spring Central Sectional Meeting, Ohio State University, Columbus, OH, March 17 18, 2018. Talk title: "Formation of rogue waves in continuous and discrete models: Theory and Computation"

- 14. Colloquium, William E. Boeing Department of Aeronautics & Astronautics, University of Washington, Seattle, WA, October 6, 2017. Talk title: "Nonlinear waves in Granular Crystals"
- 13. The IV AMMCS International Conference, Wilfrid Laurier University, Waterloo, ON, Canada, August 20 25, 2017. Talk title: "Nonlinear waves in nonlinear Schrödinger (NLS) systems"
- 12. The 10th IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, University of Georgia, Athens, GA, March 29 April 1, 2017. First talk title: "Formation of rogue waves in nonlinear Schrödinger (NLS) systems: Theory and Computation"; second talk title: "Multi-component nonlinear waves in nonlinear Schrödinger (NLS) systems"
- 11. AMS Spring Southeastern Sectional Meeting, College of Charleston, Charleston, SC, March 10 12, 2017. Talk title: "Multi-component nonlinear Schrödinger (NLS) systems: From Theory to Numerical Computations"
- Colloquium, Department of Mathematics, Miami University, Oxford, OH, January 25, 2017.
   Talk title: "Nonlinear waves in NLS systems and beyond: Theory and Computation"
- AMS Fall Eastern Sectional Meeting, Bowdoin College, Brunswick, ME, September 24 25, 2016. Talk title: "Multi-component nonlinear waves in one and two dimensional coupled nonlinear Schrödinger (NLS) systems: Theory and Numerical Computations"
- 8. Colloquium, Department of Mathematics and Statistics, San Diego State University, San Diego, CA, May 16, 2016. Talk title: "Dark-bright solitons and their two-dimensional counterparts in coupled nonlinear Schrödinger (NLS) Systems"
- 7. Colloquium, Department of Mathematics, Bowdoin College, Brunswick, ME, March 8, 2016. Talk title: "Dark-bright solitons and their two-dimensional counterparts in coupled nonlinear Schrödinger (NLS) Systems"
- Emergent Paradigms in Nonlinear Complexity: From PT-Symmetry to Nonlinear Dirac Systems, From Polaritons to Skyrmions, Santa Fe Institute, Santa Fe, NM, June 8 10, 2015. Talk title: "Skyrmions, Topology and Geometry"
- SIAM Conference on Applications of Dynamical Systems, Snowbird, UT, May 17 21, 2015.
   Talk title: "Vector Rogue Waves and Dark-Bright Boomeronic Solitons in Autonomous and Non-Autonomous Settings"
- 4. The 9th IMACS International Conference on Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, University of Georgia, Athens, GA, April 1 4, 2015. Talk title: "Dark-bright solitons in coupled nonlinear Schrödinger (NLS) equations with unequal dispersion coefficients"
- 3. Colloquium, Institüt für Physik, Universität Oldenburg, Germany, September 27, 2013. Talk title: "Topological properties of the Skyrme model"
- 2. Nonlinear Waves Seminar, Department of Mathematics and Statistics, University of Massachusetts Amherst, MA, September 28, 2012. Talk title: "Skyrmions, rational maps and scaling identities"
- 1. IMA's Conference on Nonlinearity and Coherent Structures, University of Reading, UK, July 6 8, 2011. Talk title: "Skyrmions, rational maps and scaling identities"
- 12. Second CSU Mathematical Sciences Conference, Bakersfield, CA November 10 11, 2023. Talk title: "Spectral analysis of self-similar collapsing solutions to the NLS"

- 11. 2nd Online Conference on Nonlinear Dynamics and Complexity, October 4 6, 2021. Talk title: "Formation of roque waves in continuous and discrete models"
- 10. 2019 Joint Mathematics Meeting (AMS & MAA), Baltimore, MD, January 16 19, 2019. Talk title: "Peregrine solitons and gradient catastrophes in continuous and discrete NLS systems"
- 9. SIAM Conference on Nonlinear Waves and Coherent Structures, Orange, CA, June 11 14, 2018. Talk title: "Formation of roque waves in continuum and discrete models: Theory and Computation"
- 8. SIAM Conference on Nonlinear Waves and Coherent Structures, Philadelphia, PA, August 8 -11, 2016. Talk title: "Dark-bright solitons and their two-dimensional counterparts in coupled nonlinear Schrödinger (NLS) Systems"
- 7. Nonlinear Waves Seminar, Department of Mathematics and Statistics, University of Massachusetts Amherst, MA, February 12, 2016. Talk title: "Skyrmions, Topology and Geometry"
- 6. Conference on Computational Methods in Dynamics, The Abdus Salam International Centre for Theoretical Physics, Trieste, Italy, July 4 - 8, 2011
- 5. Young Researchers in Mathematics 2011, Mathematics Institute, University of Warwick, UK, April 14 - 16, 2011. Talk title: "Skyrmions, rational maps and scaling identities"
- 4. Department of Mathematical, Physical and Computational Sciences, Aristotle University of Thessaloniki, Greece, December 2010. 1st meeting of PhD candidates. Talk title: "Skyrmions, rational maps and scaling identities"
- 3. Geometry and Physics in Cracow, Institute of Mathematics, Jagiellonian University, Cracow, Poland, September 21 - 25, 2010. Poster presentation
- 2. 10th Hellenic School and Workshops on Elementary Particle Physics and Gravity, Corfu, Greece, September 8 - 12, 2010
- 1. 2010 Workshop on Recent Advances in Particle Physics, Aristotle University of Thessaloniki, Thessaloniki, Greece, March 25 - 28, 2010

- Computer Skills Computer proficient: Operating systems Linux, Unix, MacOS, Windows
  - Programming Languages: Fortran, C/C++, Python, Bash scripting, Java
  - Software: Mathematica, MATLAB, Julia, Maple, FreeFem++, PETSc, SLEPc, continuation and bifurcation software AUTO, COCO, and pde2path, REDUCE algebra system, ROOT
  - Parallel Programming: OpenMP & MPI

#### OTHER ACTIVITIES & Interests

- Jazz and classical harmony; degree in jazz guitar, June 2008
- Acoustic and electric guitar instructor at the Conservatory of Municipality of Ampelokipoi, Thessaloniki, Greece, October 2007 - January 2008
- Electronics: Design and construction of hi-fi tube amplifiers
- Sports: Participated in weightlifting competitions (Gold medal in the Northern Greece Championship), 1997 - 2000
- Philosophy of Science, history of music and physics; literature