Efstathios G. Charalampidis

Contact Information

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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
  - ▷ **B.Sc. in Physics**, September 2002 - September 2007
    - ⋆ 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
  - ▷ 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: $800,000, July 1, 2025 - June 31, 2028
- Centre National de la Recherche Scientifique (CNRS), France
  - ▷ Visiting Professorship at Laboratoire de Mathématiques Raphaël Salem, University of Rouen Normandy, amount: 9,000 Euros (≈ $9,679.68), June 15 - September 14, 2023

- National Science Foundation
  - ▷ 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
- US AFOSR (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
  - ▷ 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[1]
  - ▷ MATH 252 - Calculus III (F24, S25)
- California Polytechnic State University San Luis Obispo[1]
  - ▷ 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)
- University of Massachusetts Amherst[1]
  - ▷ 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)

[1] F=Fall; S=Spring; W=Winter

- ▷ 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
  - ▷ **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"
    - ⋆ 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**:
    - ⋆ 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**:
⋆ 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 and C. Chong) 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 A. Saxena) of the special session on "Analysis and numerics of nonlinear dynamical systems", XLIV Dynamics Days Europe, Bremen, Germany, July 29 - August 2, 2024
  - ▷ 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 "Nonlinear 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 Structures, 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 Evo-

lution Equations and Wave Phenomena: Computation and Theory, University of Georgia, Athens, GA, March 29 - April 1, 2017.
  - ▷ Co-organizer (with C. Chong) of the special session on "Analysis and Applications of the Nonlinear Schrödinger Equation", SIAM Conference on Nonlinear Waves and Coherent Structures, Philadelphia, PA, August 8 - 11, 2016
  - ▷ 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
  - ▷ *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 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
- 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

- 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
  - ▷ "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[2]

[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
arXiv:2412.10551 (submitted to Wave Motion)

[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)

[2] Superscripts ∗ and ∗∗ denote undergraduate and graduate student coauthors, respectively.

[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)

[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-$\mathcal{PT}$ 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, $\mathcal{PT}$- and supersymmetric potential***
E.G. Charalampidis, J. Dawson, F. Cooper, A. Khare and A. Saxena
J. Phys. A: Math. and Theor. **53**, 455702 (2020)

[22] ***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 $t^{-1/2}$ 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

61. Conference 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: TBA

60. Conference on "Waves dynamics, integrability and beyond", Sardinia, Italy, May 26 - May 30, 2025. Talk title: TBA

59. SIAM Conference on Applications of Dynamical Systems, Denver, CO, May 11 - 15, 2025. Talk title: "*Existence and stability of rogue waves in discrete models*"

58. Colloquium, Department of Mathematics and Statistics, University of Massachusetts Amherst, Amherst, MA, April 29, 2025. Talk title: "*Computing self-similar solutions to nonlinear dispersive PDEs*"

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: Theorey 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 Rogue 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 Rogue 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*"

39. 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*"

27. 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*"

25. 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*"

20. 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*"

10. Colloquium, Department of Mathematics, Miami University, Oxford, OH, January 25, 2017. Talk title: "*Nonlinear waves in NLS systems and beyond: Theory and Computation*"

9. 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*"

6. 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*"

5. 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*"

Conference presentations & participation

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 rogue 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 rogue 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