

William G. Newton

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Born: March 6, 1978 – Blackpool, UK
Nationality: UK; US Permanent resident.

Current position

2017-present *Associate Professor*, Texas A&M University-Commerce.

Areas of specialization

nuclear physics, astrophysics, STEM education

Appointments held

2008-2009 *Postdoctoral Researcher*, Texas A&M University-Commerce.
2009-2012 *Adjunct Assistant Professor*, Texas A&M University-Commerce.
2012-2017 *Assistant Professor*, Texas A&M University-Commerce.

Education

2002-2008 DPHIL in Physics, University of Oxford
Thesis Title: “The phase transition to uniform nuclear matter in supernovae and neutron stars”
Supervisor: Dr. Jirina Rikovska Stone

2000-2002 MSC in Physics, University of Tennessee
Thesis Title: “Giant resonances in argon isotopes”
Supervisor: Prof. Michael Strayer

1996-2000 MPhys, University of Oxford
Final honours school of natural science: Physics, 2:1
MPhys project: “The diffusion of stars near the sun”
Supervisor: Prof. James Binney

Grants and Proposals

Funded

- 2019-2022 “Physics Teacher Preparation at Texas A&M University-Commerce”,
PhysTEC Comprehensive Sites (NSF/APS), \$288,397
PIs Robynne Lock, co-PI **W.G. Newton**
0.5 person months/summer
- 2018-2022 “The Noyce Teacher Scholarship Program at Texas A&M-Commerce”,
NSF Noyce Teacher Scholarship Program, \$1,199,473
PI **W.G. Newton**, co-PIs Robynne Lock, Joanna Delgado-Avecedo, Rebecca Dibbs, Stephen Starnes, Melanie Fields, Katherine Price-Blount
- 2019-2021 “Lattice Boltzmann Simulations of soft nuclear astro-materials in neutron star crusts”,
NASA ATP, \$357,056
PI: **W.G. Newton**
- 2016-2017 “A Community-Based Approach to Building the Capacity of Physics Teacher Preparation at Texas A&M University-Commerce”,
NSF Noyce Teacher Scholarship Program, \$74,948
PI **W.G. Newton**, co-PIs Robynne Lock and Gilbert Naizer
- 2014-2017 “The impact of short-range correlations in nuclear matter on the equation of state, composition and dynamics of neutron stars”,
Cottrell College Science Award 22741, \$35,000
PI: **W.G. Newton**
- 2011-2014 “Extracting the Symmetry Energy of Dense Neutron-Rich Nuclear Matter from Astrophysical Observations”,
NASA Astrophysics Theory Program, Grant number 10-ATP10-0095, \$399,870,
PI: Bao-An Li; Science-PI **W.G. Newton**

Awards and Fellowships

- 2019 Neill Humfeld Distinguished Faculty Award for Service, Texas A&M University-Commerce
- 2019 Research Mentor of the Year, Texas A&M University-Commerce
- 2019 Researcher of the Year, Texas A&M University-Commerce
- 2018 Faculty Senate Award for Teaching Innovation, Texas A&M University-Commerce
- 2017-2019 PhysTEC Fellow, PhysTEC/American Physical Society
- 2014 Junior Faculty Research Award, Texas A&M University-Commerce
- 2014 Center for Faculty Excellence & Innovation 2014-2015 Faculty Fellowship in Teaching & Learning,
Project Title: “Innovative Online Master’s Courses in Physics for Teachers.”, Texas A&M University-Commerce

Teaching

Bolded courses were developed as face-to-face classes from scratch.

Bolded, italicized courses were developed from scratch as face-to-face classes and then as online classes.

- 2009-present Texas A&M University-Commerce. Courses taught:
IS 351 and IS 352: Integrated science (General science classes for elementary education majors). In 2018, Next Gen PET Curriculum was implemented in IS351.
ASTR 102 - Stars and the Universe
PHYS 2426 Calculus Based Physics II (Electricity and Magnetism), redeveloped as a studio physics class
PHYS 515 (General Relativity, graduate level)
PHYS 420 (Quantum Mechanics, redeveloped as a studio physics class)
PHYS 561 (Astronomy and Astrophysics for Educators, graduate level for in-service teachers)
PHYS 526 (Quantum Mechanics for Educators, graduate level for in-service teachers)
PHYS 565 (Thermodynamics for Educators, graduate level for in-service teachers)
- 2008 Oxford Tutors UK - Tutored high school students in physics and math in preparation for their A-level exams (final high school exams)
- 2003-2008 University of Oxford: College Tutor
Organized and gave tutorials; set and marked tutorial work and exams.
Courses taught by undergraduate year (out of the four-year course):
1st Mathematical Methods; Electromagnetism; Mechanics; Optics
2nd Mathematical Methods; Quantum Mechanics; Thermodynamics
3rd Condensed Matter Physics; Astrophysics; Special Relativity
4th General Relativity
- 2000-2002 University of Tennessee: Teaching Assistant,
Gave brief lectures and ran labs. Set and graded mid-term and final exams.
Courses: Third-year undergraduate electromagnetism; Astronomy (course meeting science requirements for non-science students):

Physics/STEM Education Experience

- 2013-present Led the creation of a new Master's program for in-service high school physics teachers. Created and taught 3 out of the 6 new core physics classes for this degree, combining advanced physics content with pedagogical activities aimed at engaging high school students in advanced physics concepts. Implementation as a fully online program began in Spring 2015. Program currently has 60 in-service teachers involved and 40 in-service teachers have graduated.
- 2013-present Led the creation of a community of high school physics teachers in rural North-East Texas (CAPE - Community for the Advancement of Physics Education) and its expansion to all STEM teachers (COSINE-TX - The Community of Science Instructors in North-East TX). Currently we have 20 rural physics teachers who regularly attend our teacher workshops.
- 2019-present co-PI on NSF/APS-Sponsored PhysTEC Comprehensive Site Implementation, aimed at increasing the number of certified physics teachers produced to 3/year by 2022.
- 2018-present PI on NSF-Sponsored Noyce Track 1 scholarship program, aimed at awarding and preparing 8 exemplary physics, math, chemistry and biology teachers each year.

- 2017-present Member of NSF-sponsored *Next Generation Physics and Everyday Thinking* Faculty Online Learning Community, devoted to implementing the Next Gen PET curriculum in classes for pre-service elementary education majors.
- 2015-present Involved in conducting research into how to form (i) effective online communities of in-service teachers, and (ii) how to promote effective group work in studio physics classes.
- 2017-2019 PhysTEC Fellow: working to increase the capacity of our physics teacher preparation program by improving recruitment and retention. Activities are based around creating materials to better inform students about teaching careers, and improving mentoring at all levels.
- 2016-2017 Led NSF-Sponsored Noyce Capacity Building Project. Together with a Teacher-in-Residence, we mentored learning assistants, through developing new inquiry-based labs for high school and introductory college level students, and developed a community of high school physics teachers in rural Northeast Texas. Held a 3-day summer workshop involving learning assistants and high school teachers.
- 2014-present Co-created Learning Assistant program in Integrated Science Classes for EC-8 pre-service teachers, and secured internal funding to expand into Calculus-based physics courses PHYS 2425 and PHYS 2426 starting Fall 2015.
- 2015-present Redeveloped PHYS 2426 (Calculus based physics II - Electricity and Magnetism) as a studio physics class.
- 2013-present Spearheaded creation of new Master's program for in-service high school physics teachers. Created and taught 3 out of the 6 new core physics classes for this degree, combining advanced physics content with pedagogical activities aimed at engaging high school students in advanced physics concepts. Implementation as a fully online program began in Spring 2015.
- 2013-present Overseen improvements of Integrated Science courses for EC-8 pre-service teachers, including redevelopment of lab manual to align with specific competencies on the TExES certification exam.
- 2012-2017 Redeveloped curriculum of undergraduate physics teacher preparation program at Texas A&M University-Commerce, integrating it with departmental objectives of improving recruitment and retention of undergraduate physics students.
- 2013-2014 Prepared and delivered 4-8 grade science TExES reviews (Texas teacher certification exams).
- 2013 Served on Educational Testing Center committee to review Texas Education Agency's TExES exam questions.

University Service

- 2015-present Chair, Physics and Astronomy "Doubling Committee" (charged with implementing activities that will double undergraduate enrollment.)
- 2015 Chair of Master's thesis committee.
- 2014-present Advisor for the Society of Physics Students.
- 2014-present Member of Faculty Senate Curriculum Committee.
- 2014-present Mentor to new faculty members.
- 2014-present Advisor for BS and MS in Physics with Teaching Emphasis.
- 2014 Judge at Spring Celebration of Student Writing Workshop.
- 2013-2014 Department SACS co-ordinator.
- 2013-present Served on 5 Faculty Search Committees.
- 2012-present Member of LeoTeach council (co-ordinating science education activities between science and education departments).

Professional Service

- 2009-present Reviewer on NASA Astrophysics Theory Program Grant Panel Referee for Physical Review, Astrophysical Journal, Monthly Notices of the Royal Astronomical Society, Journal of Physics, and Nature Physics.
- 2014 Reviewer for 3 chapters of “[Teaching High School Physics](#)” by Carl Wenning and Rebecca Vieyra.
- 2013 TExES 4-8 Science Test Question reviewer.

Supervisory Experience

- 2012-present Texas A&M University-Commerce; REU students
Supervised 5 REU students. Three refereed publications have resulted from my REU mentoring with a further two in preparation. Four of the REU students presented posters or oral presentations on their work at the Emerging Researchers National Conference in Washington, DC, with one winning second place physics poster. They have also presented their work at regional APS meetings, the Gulf Coast Undergraduate Research Symposium (where one of my students won best nuclear physics presentation) and at Conferences for Undergraduate Women in Physics.
- 2014-present Texas A&M University-Commerce; undergraduate students
Supervised 10 undergraduate students (5 graduated).
- 2009-present Texas A&M University-Commerce; Graduate students
Supervised 8 Masters students (5 graduated) on projects related to symmetry energy effects on neutron star models; four published papers, one submitted paper, a book chapter and two refereed conference proceedings have resulted to date.
- 2007 University of Oxford:
Co-supervised Master’s student on the project “Equation of State of Proto-Neutron Stars.”

Publications

Refereed journal articles

h-index = 12 (refereed publications)

- 2018 “Testing the formation scenarios of binary neutron star systems with measurements of the neutron star moment of inertia”,
W. G. Newton, A.W. Steiner and K. Yagi,
The Astrophysical Journal 856(1),
[arXiv:1611.09399](#)
- 2017 “Examining the factors that impact group work effectiveness in studio physics”,
Robynne Lock, Melanie Schroers and **W.G.Newton**
2017 Proceedings of Physics Education Research Conference, 252
- 2017 “The state of matter in simulations of core-collapse supernovae - reflections and recent developments”,
T.Fischer, N. Bastian, D. Blaschke, M. Cerniak, M. Hempel, T. Klähn, G. Martinez-Pinedo, **W.G.Newton**,
G. Röpke and S. Typel
Proceedings of the Astronomical Society of Australia
- 2017 “How tightly is nuclear symmetry energy constrained by unitary Fermi gas?”,
Nai-Bo Zhang, Bao-Jun Cai, Bao-An Li, **W.G. Newton**, and Jun Xu

Accepted for publication in Nuclear Science and Techniques,
[arXiv:1704.02687](#)

- 2016 “Nuclear pasta and supernova neutrinos at late times”,
C.J.Horowitz, D.K.Berry, M.E.Caplan, T.Fischer, Zidu Lin, **W.G.Newton**, E. O’Connor and L.F. Roberts,
Submitted to Physical Review Letters,
[arXiv:1611.10226](#)
- 2016 “Testing the formation scenarios of binary neutron star systems with measurements of the neutron star moment of inertia”,
W. G. Newton, A.W. Steiner and K. Yagi,
Submitted to Astrophysical Journal,
[arXiv:1611.09399](#)
- 2015 “Observational constraints on neutron star crust-core coupling during glitches”,
W. G. Newton, S. Berger and B. Haskell,
MNRAS 454, 4400
[arXiv:1506.01445](#)
- 2015 “Critical Density and Impact of $\Delta(1232)$ Resonance Formation in Neutron Stars”,
Bao-Jun Cai, F.J. Fattoyev, Bao-An Li and **W.G. Newton**,
Phys. Rev. C92, 015802
[arXiv:1501.01680](#)
- 2015 “Efficacy of crustal superfluid neutrons in pulsar glitch models”,
J. Hooker, **W.G. Newton** and Bao-An Li,
MNRAS 449, 3559
[arXiv:1308.0031](#)
- 2015 “Neutron-proton effective mass splitting in neutron-rich matter at normal density from analyzing nucleon-nucleus scattering data within an isospin dependent optical model”,
Xiao-Hua Li, Wen-Jun Guo, Bao-An Li, Lie-Wen Chen, F.J. Fattoyev and **W.G. Newton**
Phys. Lett. B 743, 408
[arXiv:1403.5577](#)
- 2015 “Impact of the equation-of-state-gravity degeneracy on constraining the nuclear symmetry energy from astrophysical observables”,
Xiao-Tao He, F.J. Fattoyev, Bao-An Li and **W.G. Newton**,
Phys. Rev. C91, 015810 (2015)
[arXiv:1408.0857](#)
- 2015 “Using neutron star observations to determine crust thicknesses, moments of inertia, and tidal deformabilities”,
A.W. Steiner, S. Gandolfi, F.J. Fattoyev and **W.G. Newton**,
Phys. Rev. C91, 015804 (2015)
[arXiv:1403.7546](#)
- 2014 “Phase transitions in core-collapse supernova matter at sub-saturation densities”,
Helena Pais, **W.G. Newton** and Jirina R. Stone,
Phys. Rev. C90, 065802 (2014)
[arXiv:1411.1885](#)

- 2014 “Quantifying Correlations Between Isovector Observables and the Density Dependence of Nuclear Symmetry Energy away from Saturation Density”,
F.J. Fattoyev, **W.G. Newton** and Bao-An Li,
[Phys. Rev. C90, 022801\(R\) \(2014\)](#)
[arXiv:1405.0750](#)
- 2014 “Stellar oscillations induced by the passage of a fast stellar object”,
C. A. Bertulani, M. Naizer and **W. G. Newton**,
[Int. J. Mod. Phys. D23, 10, 1450084 \(2014\)](#)
[arXiv:1405.0764](#)
- 2014 “Constraints on the symmetry energy from observational probes of the neutron star crust”,
W.G. Newton, J. Hooker, M. Gearheart, K. Murphy, De-Hua Wen, F.J. Fattoyev and Bao-An Li,
[European Journal of Physics A50, 41](#)
- 2014 “Probing the high-density behavior of symmetry energy with gravitational waves”,
F.J. Fattoyev, **W.G. Newton** and Bao-An Li,
[European Journal of Physics A50, 45](#)
[arXiv:1309.5153](#)
- 2013 “The cooling of the Cassiopeia A neutron star as a probe of the nuclear symmetry energy and nuclear pasta”,
W.G. Newton, K. Murphy, J. Hooker and Bao-An Li,
[ApJ 779, L4](#)
[arXiv:1308.2137](#)
- 2013 “Constraining the High-Density Behavior of Nuclear Symmetry Energy with the Tidal Polarizability of Neutron Stars”,
F. Fattoyev, J. Carvajal, **W.G. Newton** and Bao-An Li,
[Phys. Rev. C87, 015806](#)
[arXiv:1210.3402](#)
- 2013 “A survey of the parameter space of the compressible liquid drop model as applied to the neutron star inner crust”,
W.G. Newton, M. Gearheart, and Bao-An Li,
[ApJS 204, 1, 9](#)
[arXiv:1110.4043](#)
- 2012 “Generic constraints on the relativistic mean-field and Skyrme-Hartree-Fock models from the pure neutron matter equation of state”,
F. Fattoyev, **W.G. Newton**, Jun Xu and Bao-An Li,
[Phys. Rev. C86, 025804](#)
[arXiv:1205.0857](#)
- 2012 “Sensitivity of the neutron star r-mode instability window to the density dependence of the nuclear symmetry energy”,
De-Hua Wen, **W.G. Newton**, and Bao-An Li,
[Phys. Rev. C85, 025801](#)
[arXiv:1110.5985](#)

- 2011 “Upper limits on the observational effects of nuclear pasta in neutron stars”,
M. Gearheart, **W.G. Newton**, J. Hooker and Bao-An Li,
[MNRAS 418, 2343](#)
[arXiv:1106.4875](#)
- 2009 “Constraining the gravitational binding energy of PSR J0737-3039B using terrestrial nuclear data”,
W.G. Newton and Bao-An Li,
[Phys. Rev. C80, 065809](#)
[arXiv:0908.1731](#)
- 2009 “Modeling nuclear “pasta” and the transition to uniform nuclear matter with the 3D Skyrme-Hartree-Fock method at finite temperature: Core-collapse supernovae”,
W.G. Newton and J.R. Stone,
[Phys. Rev. C79, 055801](#)
[arXiv:0904.4714](#)
- 2005 “The double pulsar J0737-3039: Testing the neutron star equation of state”,
Ph. Podsiadlowski,ÊJ.D.M. Dewi,ÊP. Lesaffre,ÊJ.C. Miller,Ê**W.G. Newton**,ÊJ.R. Stone,
[MNRAS 361, 1243](#)
[astro-ph/0506566](#)
- 2004 “Giant resonances from TDHF”,
P.D. Stevenson,ÊM.R. Strayer,ÊJ. Rikovska-Stone,Ê**W.G. Newton**,
[Int. Journ. Mod. Phys. E13, 181](#),
[nucl-th/0310020](#)

Book Chapter

- 2011 “The nuclear symmetry energy, the inner crust, and global neutron star modeling”,
W.G. Newton, M. Gearheart, J. Hooker, Bao-An Li,
In “Neutron Star Crust”, edited by C. A. Bertulani and J. Piekarewicz,
Nova Publishing, ISBN: 978-1-62081-960-9,
[arXiv:1112.2018](#)

Other scientific articles

- 2013 “Neutron stars: A taste of pasta?”,
W.G. Newton,
[News and Views, Nature Physics 9, 396](#)

Selected conference proceedings

- 2015 “Core-collapse supernova matter: light clusters, pasta phase and phase transitions”,
Helena Pais, Silvia Chiacchiera, Fabrizio Grill, Constanca Providencia, Isaac Vidana, Sidney S. Avancini, De-
ora P. Menezes, **William G. Newton** and Jirina R. Stone
[Compact Stars in the QCD Phase Diagram IV](#)
[arXiv:1503.08753](#)

- 2013 “Constraints on the symmetry energy from neutron star observations”,
W.G. Newton, M. Gearheart, De-Hua Wen and Bao-An Li
[Journal of Physics: Conference Series 420, 012145](#),
[arxiv:1212.4539](#)
- 2013 “Pure Neutron Matter Constraints and Nuclear Symmetry Energy”,
 F. Fattoyev, **W.G. Newton**, Jun Xu and Bao-An Li,
[Journal of Physics: Conference Series 420, 012108](#),
[arxiv:1209.2718](#)
- 2013 “Applying the ÒsnowplowÓ model for pulsar glitches to constrain nuclear symmetry energy”,
 J. Hooker, **W.G. Newton**, Bao-An Li
[Journal of Physics: Conference Series 420, 012153](#)
- 2013 “Probing Nuclear Symmetry Energy and its Imprints on Properties of Nuclei, Nuclear Reactions, Neutron Stars and Gravitational Waves”,
 Bao-An Li, Lie-Wen Chen, F. Fattoyev, **W.G. Newton**, Chang Xu,
[Journal of Physics: Conference Series 413, 012021](#),
[arxiv:1212.1178](#)
- 2011 “Imprints of nuclear symmetry energy on properties of neutron stars”,
 Bao-An Li, Lie-Wen Chen, M. Gearheart, J. Hooker, Che Ming Ko, P.G. Krastev, Wei-Kang Lin, **W.G. Newton**, De-Hua Wen, Chang Xu and Jun Xu,
 INPC2010, July 4-9, 2010, Vancouver, Canada
[Journal of Physics: Conference Series 312, 042006](#),
[arxiv:1103.4652](#)
- 2009 “Modeling nuclear pasta and the phase transition to uniform nuclear matter with the 3D-Skyrme-Hartree-Fock method”,
W.G. Newton,
 Proceedings of the 5th Facility of Rare Isotope Beams (FRIB) Workshop on Bulk Nuclear Properties, Michigan State University,
[AIP Conf. Proc. 1128, 154](#),
[arxiv:0903.1464](#)
- 2007 “A new study of the transition to uniform nuclear matter in neutron stars and supernovae”,
W.G. Newton,
[Physics of Particles and Nuclei, 39, 7, 1173](#),
[arXiv:0708.3212](#)
- 2007 “From microscales to macroscales in 3D: Self-consistent equation of state for supernova and neutron star models”,
W.G. Newton, J.R. Stone, and A. Mezzacappa,
[Journal of Physics: Conference Series 46, 408](#),
[arXiv:0708.3197](#)
- 2006 “Sub-nuclear matter in neutron stars and supernovae: nuclear pasta and beyond”,
W.G. Newton,
[Proceedings of RAGtime 6/7: Workshop on Black Holes and Neutron Stars](#),
 Editors S. Heldk and Z. Stuchlik, Silesian University in Opava, Czech Republic, ISBN 80-7248-334-X, pp.119

Presentations

Invited Talks, Seminars and Colloquia

- Mar 2019 “An Online Master of Science in Physics for Physics Teachers”, **Invited panel presentation**, PhysTEC meeting, Boston, MA
- Nov 2018 “Nuclear Pasta in Neutron Stars”, CalTech, Pasadena, CA, USA
- Oct 2016 “Testing low mass neutron star formation scenarios using universal(-ish) relations between neutron star properties”, Texas A&M University, College Station, TX, USA
- Apr 2016 “Neutron stars and their mantles”, Texas Tech University, Lubbock, TX, USA
- Apr 2016 “Neutron stars and their mantles”, Texas Christian University, Fort Worth, TX, USA
- Dec 2015 “The nuclear symmetry energy and neutron stars” SINAP-CUSTIPEN Workshop on Clusters and Correlations in Nuclei, Nuclear Reactions and Neutron Stars, Shanghai, China
- Jul 2015 “The crust of neutron stars”, Graduate Seminar, University of Melbourne, Melbourne, Australia
- Feb 2015 “Into the neutron star mantle: in search of super-condensed matter”, University of Texas at Arlington, TX, USA
- Sept 2014 “Into the neutron star mantle: in search of super-condensed matter”, University of Texas at Dallas, TX, USA
- Jul 2014 [“Symmetry energy constraints from observational signatures of the neutron star crust-core transition”](#), NuSym14: The 4th International Symposium on the Nuclear Symmetry Energy, Liverpool, UK, July 2014
- March 2014 “The physics and observational consequences of the neutron star crust-core boundary layer”, Seminar, Los Alamos National Laboratory, Los Alamos, NM, USA
- March 2014 “The material science of the neutron star crust: searching for observational signatures of condensed nuclear matter”, Colloquium, University of Texas San Antonio, San Antonio, TX, USA
- Feb 2014 “The physics and observational consequences of the neutron star crust-core boundary layer”, Seminar, National Superconducting Cyclotron Laboratory, Michigan State University, East Lansing, MI, USA
- Jun 2013 “The nuclear equation of state: what we can infer from experiments and observation”, The Gordon Research Conference on Nuclear Chemistry, New London, NH, USA

- Oct 2012 “Measuring nuclear interactions at 10^{20} paces”,
Seminar, Department of Physics, University of Surrey, UK
- Mar 2012 “Measuring nuclear interactions at 10^{20} paces”,
Colloquium, Department of Physics and Astronomy, Texas A&M University-Commerce, USA
- Oct 2011 “Why do pulsars glitch?”,
Colloquium, Department of Physics and Astronomy, Texas A&M University-Commerce, USA
- Oct 2011 “How deep does a pulsar crust go? Using terrestrial experiments to explore the outer layers of a neutron star”,
Fall Joint Meeting of APS and AAPT and Zone 13 SPS,
Texas A&M University-Commerce, USA.
- Jul 2011 “[Inner crust composition and transition densities](#)”,
INT Program INT-11-2b: Astrophysical transients: multi-messenger probes of nuclear physics,
Seattle, USA.
- Jul 2011 “Nuclear symmetry energy and neutron stars”,
Seminar, Quarks and Hadrons Group, University of Maryland, USA.
- Jun 2011 “[The neutron star inner crust: symmetry energy dependence of observable properties](#)”,
NuSYM11: International symposium on nuclear symmetry energy,
Smith College, USA.
- Oct 2010 “The physics and observable consequences of neutron star crust-core boundary”,
Seminar, Argonne National Laboratory, USA.
- Oct 2010 “The physics and observable consequences of neutron star crust-core boundary”,
Seminar, Michigan State University, USA.
- Apr 2009 “Nuclear pasta and the transition to uniform nuclear matter”,
Seminar, Los Alamos National Laboratory, USA.
- Apr 2007 “Complex microscopic structure in neutron stars and supernovae”,
Department of Astronomy, University of Central Lancashire, UK
- Jan 2007 “Exploring complex microscopic structure in neutron stars and supernovae with 3D Hartree-Fock”,
Seminar, Institut de Physique Nucléaire d’Orsay, Paris, France.
- Feb 2006 “Complex fluids in a neutron star inner crust”,
Seminar, Department of Applied Mathematics, University of Southampton, UK.

Selected Conference Presentations

- Mar 2020 “Scaffolding scientific explanations: An example from introductory physics”, Next Gen PET Virtual Conference
- Feb 2020 “An online alternative certification program for physics teachers that is actually good” (POSTER), PhysTEC meeting, Denver, CO

- Dec 2019 “Material Properties of Nuclear Pasta from Quantum Simulations”, 2019 Texas Relativity Conference, Portsmouth, UK
- Nov 2019 **Workshop organized** for the Conference for the Advancement of Science Teaching, B. Modir, **W. G. Newton**, R.Lock “Entropy: Conceptions and Misconceptions”, Dallas, TX
- Jul2019 “The Big Picture: Scaffolding Student Understanding of the Structure of Physics in Introductory Classes” (POSTER), AAPT Summer Meeting, Provo, UT
- Jul 2019 “An Online Master of Science in Physics for Physics Teachers”, AAPT Summer Meeting, Provo, UT
- Jun 2019 “Linking neutron star observations and nuclear experiment consistently”, European Week of Astronomy and Space Science, Lyon, France
- Jun 2019 “Linking neutron star observations and nuclear experiment consistently”, AAS Summer Meeting, St. Louis, MO
- May 2019 “The nature of pasta disorder from quantum simulations”, JINA-CEE Frontiers in Nuclear Astrophysics, Michigan State University, MI
- Apr 2019 “The nature of pasta disorder from quantum simulations”, PHAROS conference on the Multi-Messenger Physics and Astrophysics of Neutron Stars, Platja d’ Aro, Spain
- Apr 2019 “Pasta: glassy, disordered and abundant”, Investigating the Cooling of Neutron Stars Conference, Amsterdam, Netherlands
- Apr 2019 “Glassy pasta and other stories”, INT Workshop 19-1a: Quantum Turbulence: Cold Atoms, Heavy Ions, and Neutron Stars, University of Washington, Seattle, WA
- Mar 2019 “Training and supporting in-service high school physics teachers: an online MS Physics Program” (POSTER), PhysTEC meeting, Boston, MA
- Jan 2019 “An Online Master of Science in Physics for Physics Teachers”, AAPT Winter Meeting, Houston, TX
- Nov 2018 **Workshop organized** for the Conference for the Advancement of Science Teaching, **W. G. Newton**, R. M. Lock “Bringing high school physics into the modern world”, Fort Worth, TX
- Oct 2018 “Nuclear Pasta in neutron stars”, TSAPS, University of Houston, Houston, TX
- Apr 2018 “Quantum simulations of nuclear pasta”, INT Workshop on Astro-Solids, Dense Matter, and Gravitational Waves University of Washington, Seattle, WA
- Mar 2018 “Using universal relations to test low mass neutron star formation scenarios”,INT-JINA Symposium on First multi-messenger observations of a neutron star merger and its implications for nuclear physics, University of Washington, Seattle, WA
- Mar 2018 “Nuclear Pasta in neutron stars”, TSAPS, Tarleton University, Stephenville, TX
- Nov 2017 “Nuclear pasta in neutron stars”, 50 years of beam symposium, College Station, TX
- Jul 2017 “Pasta in Old and New Neutron Stars”, MICRA 2017, MSU, East Lansing, MI

- Feb 2017 “Quantum Simulations of Nuclear Pasta”, JINA-CEE Frontiers in Nuclear Astrophysics Workshop, Lansing, MI
- Jan 2017 “Testing low mass neutron star formation scenarios using universal relations between neutron star properties”, AAS Winter Meeting, Grapevine, TX
- Nov 2016 “The Nuclear Symmetry Energy and Neutron Stars”, CUSTIPEN workshop, Texas A&M University-Commerce, TX
- Nov 2016 “Quantum simulations of nuclear pasta”, JINA-CEE workshop on the neutron star crust, Seattle, WA
- Aug 2016 “Quantum simulations of nuclear pasta”, INT Program INT-16-2b: The Phases of Dense Matter, Seattle, WA
- Jul 2016 “Innovative Online Master’s Courses for Physics Teachers”, American Association of Physics Teachers Summer Meeting, Sacramento, CA
- May 2016 “Using universal relations to test low mass neutron star formation scenarios”, JINA-CEE International Symposium on Neutron Stars in the Multi-Messenger Era: Prospects & Challenges, Ohio State University, Athens, OH
- Oct 2015 “Developing Online Master’s Courses for Physics Teachers”, Texas Section of the American Physical Society and the American Association of Physics Teachers, Baylor, TX
- Jul 2015 “The neutron star radius and the crust-core boundary”, The neutron star radius and all that jazz, McGill University, Montreal, Canada
- Aug 2014 [Community submission to Neutron Star and Dense Matter Working Group](#), Joint DNP Town Meetings on Nuclear Structure and Nuclear Astrophysics, Texas A&M University, College Station, TX
- Dec 2013 “The cooling of the Cas A neutron star as a probe of the symmetry energy and nuclear pasta”, XXVII Texas Symposium on Relativistic Astrophysics, Dallas, TX
- Oct 2013 “Tidal interactions during neutron star mergers: equation of state considerations”, Joint Fall 2013 Meeting of the Texas Sections of the APS, AAPT, and Zone 13 of the SPS, Brownsville, TX
- Aug 2013 [“Pulsar glitches from a nuclear physics perspective”](#), International Workshop on Nuclear Dynamics and Thermodynamics, Texas A&M University, College Station, TX, USA
- Jul 2013 [“Constraining the High-Density Behavior of Nuclear Symmetry Energy with the Tidal Polarizability of Neutron Stars”](#), NuSym 2013, Michigan State University, East Lansing, MI, USA
- May 2013 “Inferring nuclear matter properties from observations of dynamical neutron star phenomena”, NS2013, Amsterdam, Netherlands

- June 2012 [“Symmetry energy aspects of neutron star modeling”](#),
Compstar 2012: The physics and astrophysics of compact stars
Tahiti, French Polynesia
- May 2012 [“Combining terrestrial experiments and neutron star observations to constrain the equation of state of asymmetric nuclear matter”](#),
NN2012, San Antonio, Texas, USA
- May 2011 [“The neutron star inner crust: upper limits on the observational consequences of nuclear pasta”](#),
Compstar 2011: Gravitational waves and electromagnetic radiation from compact stars,
INFN Catania, Italy.
- Aug 2010 [“Constraining the gravitational binding energy of PSR J0737-3039B”](#),
Pan American Study Institute on the physics and astrophysics of rare isotopes,
Joao Pessoa, Brazil.
- Feb 2009 [“Modeling nuclear pasta and the phase transition to uniform matter with Skyrme-Hartree-Fock”](#),
Compstar 2009: The crust of compact stars and beyond,
Universidade de Coimbra, Portugal.
- Nov 2008 [“Modeling nuclear pasta with Skyrme-Hartree-Fock”](#),
5th FRIB workshop on bulk nuclear properties,
Michigan State University, USA.
- Feb 2008 [“The transition from homogeneous to inhomogeneous matter in the neutron star crust”](#),
Compstar 2008: The complex physics of neutron stars,
Ladek Zdroj, Portugal.
- Sept 2006 [“Matter at sub-nuclear densities and the inner crust of neutron stars”](#),
Understanding neutron stars workshop,
University of Alicante, Spain.
- Aug 2006 [“Sub-nuclear matter in neutron stars and supernovae”](#),
Helmholtz International Summer School: Dense matter in heavy ion collisions and astrophysics,
Dubna, Russia.
- Jan 2006 [“Sub-nuclear matter in core collapse supernovae”](#),
Workshop on supernovae,
International School for Advanced Studies (SISSA), Trieste, Italy.
- Sept 2005 [“The structure of the neutron star inner crust”](#),
RAGtime 7: Workshop on black holes and neutron stars,
Opava, Czech Republic.
- Aug 2004 [“Self-consistent equation of state for hot, dense matter”](#),
Symposium on nuclear equation of state used in astrophysics models,
Philadelphia, Pennsylvania, USA.

Professional Affiliations

American Physical Society
American Astronomical Society
American Association for the Advancement of Science
National Science Teachers Association
American Association of Physics Teachers

Other Positions Held

- 2004-2007 Visiting Student Junior Advisor, St. Edmund Hall, University of Oxford:
Organised welcome and social events for students visiting from abroad; responsible for students' welfare during the first few weeks of their visit.
- 2003-2004 Cover Dean, St. Edmund Hall, University of Oxford:
Responsible for student discipline and welfare on college site.