

CURRICULUM VITAE

David Kelly Campbell

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Current Position

Professor
Physics, Electrical and Computer Engineering, and Materials Science and Engineering
Boston University
Department of Physics
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Date and Place of Birth

July 23, 1944
Long Beach, CA USA

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Education

B.A. in Chemistry and Physics, *summa cum laude*, Harvard College, 1966.
Part III, Mathematics Tripos, *distinction*, University of Cambridge, 1967.
Ph.D. in Theoretical Physics and Applied Mathematics, University of Cambridge, 1970.

Professional Employment

1970-72 **Instructor and Research Associate** in Department of Physics and **Fellow** in the Center for Advanced Study, University of Illinois, Urbana-Champaign.
1972-74 **Member**, the Institute for Advanced Study, Princeton, New Jersey.
1974-77 **J. Robert Oppenheimer Fellow**, Los Alamos Scientific Laboratory.
1977-92 **Staff Member**, Los Alamos National Laboratory.
1985-92 **Director**, Center for Nonlinear Studies, Los Alamos National Laboratory.
1990-92 **Adjunct Professor of Physics**, University of New Mexico.
1992-2000 **Professor and Head**, Department of Physics, University of Illinois.
2000- **Professor** of Physics, Electrical and Computer Engineering, and Materials Science and Engineering, Boston University.
2000-05 **Dean**, College of Engineering, Boston University.
2004-05 **Provost *ad interim***, Boston University.
2005-2011 **Provost**, Boston University.

Scholarships, Fellowships, Grants, and Awards

National Merit Scholarship, Harvard College, 1962-66.

Phi Beta Kappa, Senior Sixteen, Harvard College, 1966.

Sophia Freund Prize (highest ranking graduate), Harvard College, 1966.

Marshall Scholarship, University of Cambridge, 1966-68.

NSF Predoctoral Fellowship, University of Cambridge, 1968-70.

Fellow, Center for Advanced Study, University of Illinois, 1970-72.

J. Robert Oppenheimer Fellow, Los Alamos Scientific Laboratory, 1974-77.

National Academy of Sciences Exchange Scientist to Soviet Union, 1977.

Distinguished Performance Award, Los Alamos National Laboratory, 1982.

Visiting Professor, University of Dijon, Dijon, France, 1984 and 1985.

Ministry of Education Exchange Scientist to People's Republic of China, 1986.

New Mexico Eminent Scholar, 1989.

Laboratory Distinguished Lecturer, Associated Western Universities (AWU)/Department of Energy (DOE), 1990.

Emil Warburg Lecturer, University of Bayreuth, Germany, 1990.

Toshiba Lecturer, Keio University, Tokyo, Japan, 1994.

Deutschebank Distinguished Lecturer, Frankfurt, Germany, 1994.

C. N. Yang Visiting Professor, Chinese University of Hong Kong, 1996.

Stanislaw M. Ulam Scholar, Center for Nonlinear Studies, Los Alamos National Laboratory, August 1998-August 1999.

Julius Edgar Lilienfeld Prize, American Physical Society, 2010 (jointly with Shlomo Havlin)

Visiting Scholar, International Institute of Physics, Federal University of Rio Grande do Norte, Natal, Brazil, 2014-2016

Gauss Professor, Akademie der Wissenschaft zur Göttingen, 2014-2015

Phi Beta Kappa Visiting Scholar, 2015-2016

Visiting Scholar, Cohen Center for the Study of Technological Humanism, James Madison University, 2015

Sigma Phi Prize in statistical physics, 2020 (see

http://sigmaphisrv.polito.it/index.php?option=com_content&view=article&id=189&Itemid=306

For details of this award).

Scientific and Academic Societies

American Association for the Advancement of Science, **Fellow** (1988).

American Association of Physics Teachers.

American Physical Society, **Fellow** (1990).

American Society for Engineering Education.

Massachusetts Academy of Sciences (**Fellow**, 2011)

New York Academy of Science.

Phi Beta Kappa, Alpha Chapter of Massachusetts.

J. Robert Oppenheimer Memorial Committee, 1986-92.

Society of Industrial and Applied Mathematics

Professional Experience

Pre-doctoral Research

Numerical analysis of shock wave propagation, Stanford Research Institute, Summer 1964.

Experimental studies of optical spectra of molecules, Harvard University, Summer 1965.

Design of magnetic optics for cesium beam frequency standards, Varian Associates, Summer 1966.

Teaching

Supervision (selection, assignment and discussion of problems to accompany lecture material) in a variety of courses in applied mathematics and theoretical physics, University of Cambridge, 1966-70.

Physics 101 (section), Introduction to Physics for Non-physicists, University of Illinois, Fall 1970.

Physics 385, Introduction to Quantum Mechanics, University of Illinois, Spring-Fall 1971 and Spring 1972.

Lecturer on pion condensation and field theoretical approach to nuclear physics, L'École d'Été, Les Houches, France, 1977.

Guest Lecturer, Society of Physics Students, 1981-present.

Lecturer on Nonlinear Science, Summer Science Teacher Institute, Los Alamos National Laboratory, 1986.

Lecturer on “Introduction to Nonlinear Science,” Complex Systems Summer Institute, Santa Fe, New Mexico, June 1988, June 1993, June 1999, and June 2000.

Instructor, Physics 501/551, “Introduction to Nonlinear Phenomena” University of New Mexico, Spring-Fall 1989 and Fall 1991.

Lecturer on Introduction to Chaotic Dynamics, Troisieme Cycle, Fribourg-Lausanne, Switzerland, June 1991.

Instructor, Physics 573, Advanced Classical Mechanics, University of New Mexico, Fall 1991.

Lecturer on “Introduction to Nonlinear Science”, Winter School on “Complexity,” Tucson, Arizona, January 1992.

Lecturer on “Field Theory Models of Conducting Polymers,” Greek Summer School, Crete, June 1994.

Physics 199B, “What is Physics?” University of Illinois, Fall semester 1994-97.

Lecturer on “Introduction to Nonlinear Science” University of California Coordinating Committee on Nonlinear Science Summer School, UCLA, June 1996.

Lecturer on “Polarons” and “The Fermi-Pasta-Ulam Problem,” Danish Graduate School in Nonlinear Science, Lyngby, Denmark, February 1999.

Coordinator, “The Engineer as Entrepreneur,” special lecture series in EK100 (Freshman Introduction to Engineering), Boston University, Fall 2000, Fall 2001, Fall 2002.

Occasional lectures, “Technology and Society” (CAS SO277/ENG EK280), 2002-2005, “Physics of the 20th Century and Beyond” (CAS PY100), 2009

GRS PY 895, “Dynamics of Nonlinear Systems,” Boston University, Fall semester 2012, Fall semester 2019, Fall 2020

GRS PY 896, “The Physics of Carbon,” Boston University, Spring Semester, 2013 Spring Semester 2014

Lecturer, “Introduction to Nonlinear Science,” 3rd European PhD Summer School on "Mathematical Modeling of Complex Systems," held July 15-26, 2013 at the Technological Educational Institute (TEI) of Crete (Greece)

KHC501, “Innovation, Culture, and Society,” Senior Seminar in Kilachand Honors College, Boston University, Fall 2013, Fall 2014, Fall 2015, Fall 2016, Fall 2017, Fall 2018

KHC502, “Innovation, Culture, and Society,” Senior Seminar in Kilachand Honors College, Boston University, Spring 2014, Spring 2015, Spring 2016, Spring 2017, Spring 2018, Spring 2019

Lecturer, “Nonlinear Dynamics and Complex Systems,” 4th European PhD Summer School on "Mathematical Modeling of Complex Systems," held July 14-25, 2014 at the Cultural Foundation “Kritiki Estia,” Athens (Greece)

GRS PY 896, “Novel Two-Dimensional Electronic Membranes,” Boston University, Spring 2015

GRS PY961 “Scholarly Methods in Physics,” Fall semester 2018, Fall semester 2019

GRS PY 896 “Dynamics of Nonlinear Systems, Boston University, Spring 2020

KHC PY 104, “Energy and Society,” Fall 2021

CAS PY565, “Dynamics of Nonlinear Systems,” Spring 2022

Editorial Positions

Editorial Board, *Journal of Mathematical Physics*, 1984-87.

Editorial Board, *Complex Systems*, 1987-90.

Editor, *Physics Reports*, 1987-present.

Editor, *Nonlinearity*, 1987-90.

Divisional Associate Editor, *Physical Review Letters*, 1988-91.

Editor-in-Chief, *Chaos: An Interdisciplinary Journal of Nonlinear Science*, 1990-2016.

Founding Editor-in-Chief, *Chaos: An Interdisciplinary Journal of Nonlinear Science*, 2016-present

Advisory Board, *Artificial Life*, 1993-2000

Head of Faculty for Nonlinear Dynamics, F1000Prime, 2018-present

Consulting, Reviewing, and Advisory Positions

Consultant and Reviewer for Holt, Rinehart and Winston, 1972-78.

Consultant, AFOSR contract at University of Utah, 1980-81.

Member, National Research Council Briefing Panel on Nonlinear Phenomena, 1987.

US Representative, NATO Special Program Panel on *Chaos, Order, and Patterns: Aspects of Nonlinearity*, 1988-93.

Consultant, Bolt, Beranek, and Newman, 1990-92.

Member, Review and Site Selection Panels for the “Fields Institute for Mathematical Sciences,” National Science and Engineering Research Council of Canada, 1991-93.

Chair, National Science Foundation *ad hoc* Panel for Mathematical and Physical Sciences Directorate Initiative in Nonlinear Science, 1991.

Chair, National Research Council Naval Studies Board, Naval Research Laboratory Workshop on Mathematics, 1992.

Chair, External Review Committee, Department of Physics, Duke University, 1993.

Member, External Advisory Committee, Center for the Theoretical Studies of Physical Systems, Clark Atlanta University, 1993-99.

Member, External Review Committee, Advanced Physics Degree Programs, Board of Regents, State of Louisiana, 1994.

Member, External Review Committee, Department of Physics, City College of New York, 1994.

Member, Scientific Advisory Board, Institute for Scientific Interchange, Turin, Italy, 1994-2012.

Member, External Review Committee, Brandeis University, 1996.

Member, External Review Committee, Department of Physics, University of Utah, 1997.

Member, External Advisory Council, National Computational Science Alliance, 1997-2000.

Consultant, Florida A&M University Department of Physics, proposal to Florida Board of Regents for Ph.D. program in Physics, 1998.

Member, National Visiting Committee for Physics Education Research Group at University of Washington, 1998-2005.

Consultant on “Complexity,” Exxon Research, New Jersey, September 1999.

Member, External Advisory Committee, Center for Nonlinear Studies, Los Alamos National Laboratory, 2000-present.

Member, Advisory Panel to Florida Board of Regents, review of proposal for a Ph.D. Program in Physics, 2000.

Chair, External Review Committee, Department of Physics, Georgia Tech, April 2000.

Member, Selection Committee, Schlumberger Professorship in Complex Systems, University of Cambridge, Cambridge, England, 1999-2000.

External Reviewer, Department of Physics, Politecnico di Torino, December 2001.

Member, User Advisory Committee, National Computational Science Alliance, 2001-2005.

Member, Board of Governors, Institute for Complex Adaptive Matter, 2002-present.

Member, NSF Division of Undergraduate Education special review panel for Course, Curriculum, and Laboratory Improvement, February 2001.

Chair, Academic Consulting Panel, review of the Faculty of Science, Hong Kong Baptist University, March 2004.

Member, National Research Council Committee on the Management of Los Alamos National Laboratory, 2004.

Chair, Joint APS/AAPT *ad hoc* Task Force on Graduate Education in Physics, 2004-2005.

Member, South Carolina Centers of Economic Excellence On-Site Review Panel, May 2005.

Member (2006-2013) **and Chair** (2014-2017), Scientific Advisory Board, Max Planck Institute for Dynamics and Self- Organization, (Göttingen, Germany)

Member, ABA Committee to review George Washington University Law School, 2008

Chair, Visiting Committee for the Department of Physics, Chinese University of Hong Kong, June 2010

Member, ABA Committee to review Cornell Law School, 2011

Chair, Committee to review the Department of Physics and Astronomy, University of Iowa, 2012

Member, Review Panel, Institute for Basic Science, Korea, 2014

Member, NEASC Accreditation Review Panel, University of New Hampshire, 2014.

Chair, Committee to Review the Department of Physics and Astronomy at Purdue University, 2014

Chair, Review Panel, Institute for Basic Science, Korea, 2015

Member, Advisory Board, Center for the Theoretical Physics of Complex Systems, Korea 2016-present

Member, NEASC Accreditation Review Panel, University of Rhode Island, 2017

Member, Feld Professorship selection committee, Boston University 2021

Member, University of Toronto review committee, 2021

Reviewer for *Physical Review Letters*, *Physical Review A*, *B*, *C*, *D*, *E*, *Physics Letters A* and *Physics Letters B*, *Physica D*, and (irregularly) other technical journals.

Reviewer for NSF, DOE, SERC (Great Britain), and NATO granting agencies.

Professional Service and Leadership Positions

Founding Co-Chair. for Nonlinear Studies, Los Alamos National Laboratory, 1980.

Deputy Chair, Center for Nonlinear Studies, Los Alamos National Laboratory, 1981.

Chair, Postdoctoral Fellowship Committee, Los Alamos National Laboratory, 1983-85.

Coordinator (with M. Kruskal, A. Newell, J. R. Schrieffer, and H. Segur) of Program on “The Role of Integrable Models in Physics,” Institute of Theoretical Physics, Santa Barbara, August 1984-July 1985.

Member, University of California Coordinating Committee for Nonlinear Science, 1984-92.

Director, Center for Nonlinear Studies, Los Alamos National Laboratory, 1985-92.

Member, Science Board, Santa Fe Institute, 1984-2018

Vice-Chair, Science Board, Santa Fe Institute, 1987-92.

Participant, University of California Management Institute, Irvine, California, 1987.

Organizer, Minisymposium on “Solitons and Coherent Structures,” Society of Industrial and Applied Mathematics (SIAM) 35th Anniversary Meeting, October 1987.

Member of Executive Committee, International Conference on Synthetic Metals, Santa Fe, June 1988.

Coordinator of research program on “Theoretical Models for High Temperature Superconductivity,” Institute for Scientific Interchange, Turin, Italy, 1988-91.

Director, NATO Advanced Research Workshop, “Interacting Electrons in Reduced Dimensions,” Turin, Italy, October 1988.

Organizer, Minisymposium on “Low-dimensional Behavior in Nonlinear Partial Differential Equations,” AMS/SIAM Joint Meeting, April 1990.

Director, NATO Advanced Research Workshop, “Transport and Excitations in Novel Superconductors,” Turin, Italy, October 1991.

Head, Department of Physics, University of Illinois at Urbana-Champaign, 1992-2000.

Director, NATO Advanced Research Workshop, “The Gran Finale,” Como, Italy, September 1993.

Director, NATO Advanced Research Workshop, “The Hubbard Model: Its Physics and Mathematical Physics,” San Sebastian, Spain, October 1993.

Co-Chair, APS/AAPT Physics Department Chairs National Conference on “Physics Graduate Education for Diverse Career Options,” May 1995.

Co-Chair, Science Steering Committee, Santa Fe Institute, 1997-99.

Member, Science Steering Committee, Santa Fe Institute, 2000-2003.

Member, National Science Foundation review panel on Mathematical Physics, January 2002.

Vice-Chair, Chair-Elect, Chair, Past Chair, Group on Statistical and Nonlinear Physics, American Physical Society, 2000-2003.

Chair, Task Force on Graduate Education in Physics, American Physical Society/American Association of Physics Teachers, 2004-2005.

Co-Organizer, Workshop on Physics Outreach, Aspen Center for Physics, 2004.

Chair, American Physical Society selection committee for the Edward A. Bouchet Award, 2005

Co-Organizer, “50 Years of the Fermi-Pasta-Ulam Problem: Legacy, Impact, and Beyond,” Center for Nonlinear Studies (Los Alamos) Annual Conference, May 2005.

Co-Chair, Science Board, Santa Fe Institute 2005-2010

Co-Organizer, International Conference, “Dynamics Days 2007,” Boston, January 2007.

Member, Organizing Committee for the National Academy of Sciences Keck Foundation Initiative conference on “Complex Systems,” November 2008.

Member, Scholarly Publishing Roundtable, 2009-2010

Member, National Academies Keck Foundation Initiative Communications Awards Committee, 2010-present

Member, Nominating Committee, Physics Section of the American Association for the Advancement of Science, 2011-2014

Member-at-Large, Physics Section of the American Association for the Advancement of Science, 2012-2016

Member, Board of Managers of the American Institute of Physics Publishing (AIPP), 2013-2018

Co-Chair, XXVI IUPAP International Conference on Computational Physics (CCP2014), August 2014

Co-Chair, Conference on Strongly Correlated Electron Systems at 60 (SCES@60), October 2014

Member, American Physical Society selection committee for Dannie Heineman Prize, 2016-2018

Member, Organizing Committee for the National Academy of Sciences Keck Foundation Initiative conference on “Art and Science, Engineering, and Medicine Frontier Collaborations: Ideation, Translation, and Realization” November 2015.

Chair, American Institute of Physics selection committee for Tate Medal, 2015-2016

External Evaluator, Professorship in Theoretical Physics, Gothenburg, Sweden 2017

Vice-Chair, Chair-Elect, Chair, Past Chair Division of Condensed Matter Physics, American Physical Society, 2019-2022

Member, Graduate Academic Affairs Committee, Boston University 2021-2022

Selected Invited Presentations at National and International Meetings

“The Role of Chiral Symmetry in the Cooling of Pion Condensed Neutron Stars,” invited talk at April 1977, Washington, D.C. Meeting of the American Physical Society; *Bull. A.P.S.* **22**, 540 (1977).

“Solitons,” invited talk at the VII International Colloquium on Group Theoretical Methods in Physics, September 11-16, 1978, Austin, Texas.

“Pion Condensation and Its Possible Precursors in Finite Nuclei,” invited talk at the October 1980, Minneapolis, Minnesota Meeting of the Division of Nuclear Physics of the American Physical Society; *Bull. A.P.S.* **25**, 731-732 (1980).

“Solitons and Polarons in Polyacetylene,” invited talk at the International Colloquium on the Physics and Chemistry of Organic and Synthetic Metals, December 11-18, 1982, Les Arcs, France.

“Solitons and Polarons in Quasi-One-Dimensional Conducting Polymers and Related Compounds,” invited talk at the II International Workshop on Molecular Electronic Devices, April 13-15, 1983, Washington, D.C.

“Nonlinear Excitations in Quasi-One-Dimensional Conducting Polymers,” invited talk at the March 1984 Detroit, Michigan Meeting of the American Physical Society; *Bull A.P.S.* **29**, 271-72 (1984).

“A Field Theorist’s View of Conducting Polymers: Solitons in Polyacetylene and Related Systems,” invited talk at the Seventh Kyoto Summer Institute, August 1984.

“Nonlinear Science: From Paradigms to Practicalities,” invited address at the opening ceremonies for MIDIT, the Institute of Nonlinear Science at the Technical University of Denmark, Lyngby, Denmark, December 4, 1985.

“Theoretical Aspects of Optical Absorption Conducting Polymers,” invited talk at the Western Spectroscopy Association 3rd Annual Conference, Asilomar, California, January 1986.

“Electron-Electron Interaction Effects in Quasi-One-Dimensional Conducting Polymers and Related Systems,” invited talk at the International Conference on Synthetic Metals, ICSM’86, Kyoto, Japan, June 1986.

“Nonlinear Phenomena in Materials Science,” invited talk at the Materials Research Society Fall Meeting, Boston, Massachusetts, December 1986.

“Chaos: Chto Delat? (What is to be done?),” invited summary talk at Chaos ’87, International Conference on Chaos and Systems Far From Equilibrium, Monterey, California, January 1987.

“Optical Properties and Nonlinear Excitations of Conjugated Polymers,” invited talk at the Materials Research Society Fall Meeting, Boston, Massachusetts, December 1987.

“Self-Trapping in Nonlinear Systems,” invited talk at the Workshop on Nonlinear Dynamics, Villa Colobella, Perugia, Italy, April 1988.

“Nonlinear Science: What’s Next?” invited summary talk, International Conference on “Singular Behavior and Nonlinear Dynamics,” Samos, Greece, August 1988.

“Earthquakes as Nonlinear Phenomena,” invited talk at the US/USSR National Academy of Sciences Joint Workshop, Leningrad, USSR, October 1988.

“Nonlinear Science,” invited review talk, XIX Annual Anomalous Absorption Conference, Durango, Colorado, June 1989.

“Strongly Correlated Quasi-One-Dimensional Bands: Ground States, Optical Absorption, and Phonons,” invited talk at the Adriatica Research Conference on Strongly Correlated Electron Systems, Trieste, Italy, July 1989.

“Breathers in Classical $\lambda\phi^4$ Field Theory?” invited talk at the US-USSR Joint Workshop on Chaos, Woods Hole, Massachusetts, July 1989.

“Electron-Electron Interactions in Conducting Polymers,” invited talk at the Symposium on Electroresponsive Molecular and Polymeric Systems, Brookhaven National Laboratory, October 1989.

“Nonlinear Science: The Next Decade,” invited talk at the session on “Frontiers in the Physical Sciences” at the Annual Meeting of the American Association for the Advancement of Science, New Orleans, Louisiana, February 1990.

“Solitary Waves and Their Interactions in Non-Integrable, Nonlinear Partial Differential Equations,” invited talk at the AMS/SIAM Regional Meeting, April 1990.

“Normal States of Organic Superconductors: Symmetry Breaking in the One-Quarter Filled, Strongly Correlated Band,” invited talk at the NATO Advanced Research Workshop on Microscopic Aspects of Nonlinearity in Condensed Matter, Florence, Italy, June 1990.

“Novel Electronic Materials in Reduced Dimensions,” Emil Warburg Lectures, Universität Bayreuth, Bayreuth, Germany, July 1990.

“Chaos, Order, and Patterns: The Physics of Nonlinear Phenomena,” invited address at the Florida Science Teachers Summer Honors Science Symposium, Orlando, Florida, July 1990.

“Nonlinear Science: Where do we go from here?” invited plenary talk at the International Conference on Mechanics, Physics, and Structure of Materials,” Thessaloniki, Greece, August 1990.

“Breathers in $\lambda\phi^4$ Theory: Instability Beyond all Orders,” invited talk at the NATO Advanced Research Workshop on Asymptotics Beyond all Orders, San Diego, January 1991.

“Triplet States in Correlated Bands: Applications to Optical Properties of Conducting Polymers,” invited talk at the International Topical Conference on Optical Probes of Conjugated Polymers, Snowbird, Utah, August 1991.

“The Sawtooth Circle Map,” invited talk at CHAOS IV, Joint US/Former Soviet Union Workshop Kiev, Ukraine, July 1992.

“Quantum Restoration of Classically Broken Symmetry,” invited talk at NATO Advanced Study Institute on “Future Directions of Nonlinear Dynamics in Physical and Biological Systems,” Lyngby, Denmark, August 1992.

“Excited States and Optical Absorption in Polyacetylene and the Finite Polyenes,” invited talk at International Conference on Synthetic Metals, Goteborg, Sweden, August 1992.

“The Status of Solitons,” invited *rapporteur* review at the NATO Advanced Research Workshop “The Gran Finale,” Como, Italy, September 1993.

“The Phase Diagram of the One-Dimensional Extended Hubbard Model,” invited talk at the NATO Advanced Research Workshop on “The Hubbard Model: Its Physics and Mathematical Physics,” San Sebastian, Spain, October 1993.

“The Future of Nonlinear Science,” Toshiba Lecture at Keio University, Tokyo, Japan, July 1994.

“Electron-Electron Interactions in Superconducting Fullerides,” invited talk at International Conference on Synthetic Metals, Seoul, South Korea, August 1994.

“Nonlinear Science: From Paradigms to Practicalities,” Deutschebank Lecture at the University of Frankfurt, Frankfurt, Germany, October 1994.

“Piecewise Linear Approximations for Nonlinear Maps: Good Enough for Government Service?” invited talk at Army Research Office Workshop on “Nonlinear Dynamics in Science and Engineering,” Georgia Institute of Technology, Atlanta, Georgia, November 1994.

“Coherent Structures Amidst Chaos: Solitons, Fronts, and Vortices,” invited talk at Interdisciplinary Symposium on “Nonlinear Science, Medicine, and Technology,” Mobile, Alabama, April 1995.

“Solvable Models for the Quasi-Periodic Transition to Chaos,” invited talk at the Danish Physical Society, Odense, Denmark, June 1995.

“Order and Chaos in Semiconductor Superlattices,” invited talk at International Conference on “Nonlinear Physics: Theory and Experiment,” Gallipoli, Italy, July 1995.

“Chaotic Transport in Semiconductor Superlattices,” invited talk at IV Wigner Symposium, Guadalajara, Mexico, August 1995.

“Conducting Polymers: From Relativistic Field Theory to Applications,” invited talk at Rencontre de Moriond “Electron Correlations and Transport in Mesoscopic Systems,” Les Arcs, France, January 1996.

“Nonlinear Excitations and Optical Absorption in Conducting Polymers,” invited talk at American Chemical Society Symposium on “Modeling of Charge Carriers and Transport in Organic Materials,” Dayton, Ohio, June 1996.

“Parallel-Parking an Aircraft Carrier: Re-engineering the Elementary Physics Sequence at the University of Illinois,” invited talk at the AAPT National Meeting on Reforming Physics Undergraduate Education, American Center for Physics, College Park, Maryland, September 1996.

“Chaos and Symmetry Breaking in Semiconductor Superlattices,” invited talk at International Conference on “Correlations in Unconventional Quantum Liquids,” Evora, Portugal, October 1996.

“Breathers in Discrete $\lambda\phi^4$ Field Theory,” invited talk at the International Symposium on “Localized States in Nonlinear Lattices,” Dresden, Germany, April 1997.

“Parallel-Parking an Aircraft Carrier: Re-engineering the Elementary Physics Sequence at the University of Illinois,” invited talk at the APS-AAPT National Meeting of Physics Department Chairs, American Center for Physics, College Park, Maryland, May 1997.

“Nonlinear Science: From Paradigms to Practicalities,” invited talk to Business Network of the Santa Fe Institute, Santa Fe, New Mexico, May 1997.

“ $\lambda\phi^4$ Field Theory: Still a Few Kinks in the System,” invited talk at 17th Annual Conference of the Center for Nonlinear Studies, Los Alamos National Laboratory, Los Alamos, New Mexico, May 1997.

“Finite Frequency Phonon Effects in Spin-Peierls Systems,” invited talk at ICMS '98, the International Conference on Synthetic Metals, Montpellier, France, July 1998.

“Solitons/Coherent Structures: Self-Organization from Tsunamis to Optical Fibers,” invited talk at the Second International Conference on Complex Systems, Nashua, New Hampshire, October 1998.

“Dissipative Chaos and Symmetry Breaking in AC-Driven Nanostructures,” invited talk at the Fourth International Symposium on New Phenomena in Mesoscopic Structures (NPMS '98), Kauai, Hawaii, December 1998.

“Solitons: From Paradigms to Practicalities,” plenary talk at the Annual Meeting of the Finnish Physical Society, Turku, Finland, March 1999.

“Paradigms Regained: The Future of Nonlinear Science,” plenary talk at the Symposium on Nonlinear Science, sponsored by the California Coordinating Committee on Nonlinear Science, Napa, California, April 1999.

“Momentum Conservation Implies Anomalous Conductivity in One-Dimensional Lattices,” invited talk at the International Conference on “Nonlinearity, Integrability, and all that: Twenty years after NEEDS '79,” Gallipoli, Italy, July 1999.

“Chaos, Complexity, and all that: One Physicist’s Perspective,” invited talk at conference on Complex Systems and Policy Analysis: New Tools for a New Millennium, RAND Science and Technology Policy Institute, Washington, D.C., September 2000.

“Solitons, Fronts, and Vortices: Emergent Coherent Structures in Nonlinear Systems,” invited talk at the National Academy of Sciences Arthur M. Sackler Colloquium on “Self-Organized Complexity in the Physical, Biological, and Social Sciences,” Irvine, California, March 2001.

“Conducting Polymers and Relativistic Field Theories,” invited talk at the Symposium honoring the 2000 Nobel Prize in Chemistry, University of Pennsylvania, May 2001.

“Bipolarons in Anisotropic Systems,” invited talk at the International Conference on Localized Modes, Heraklion, Crete, July 2001.

“From Fermi-Pasta-Ulam to Solitons and Chaos,” invited talk at the Fermi Centennial Symposium, Fermi National Accelerator Laboratory, September 2001.

“Educating in Bulk: The Introductory Physics Course Revisions at Illinois,” invited talk at the Meeting of Chairs and Heads of Physics Departments, sponsored by the National Task Force on Undergraduate Physics, American Center for Physics, College Park, Maryland, November 2001.

“Broken Symmetry States and Charge Order in Organic Superconductors,” invited lecture at the Croucher Foundation Advanced Study Institute on “New Developments in High Temperature Superconductivity Theory,” Chinese University of Hong Kong, Hong Kong, June 2002.

“Charge Order in Quasi-1D Organic Charge Transfer Solids,” lecture at the International Conference on Synthetic Metals (ICSM02), Shanghai, China, June 2002.

“Nonlinear Science: The Next Decade,” lectures at University of Massachusetts September 2002, Tufts University, November 2002.

“Organic Electronic Conductors,” invited lecture at the National Conference on “Understanding Complex Systems,” University of Illinois, Urbana-Champaign, May 2003.

“The Links Between Engineering and Physics,” invited lecture at the American Institute of Physics Industrial Forum, IBM, Yorktown, October 2004.

“Functional Renormalization Group Approach to Molecular Conductors,” International Symposium on Molecular Conductors, Hayama, Japan, July 2005.

“Localizing Energy Through Nonlinearity and Discreteness,” colloquium, Argonne National Laboratory, September 2005.

“From FPU to Intrinsic Localized Modes: An Odysey in Nonlinear Science,” Department of Physics Colloquia, Universities of Houston (October 2005), Arizona (November 2005), and Toronto (March 2006), National University of Singapore (August 2006).

“Intrinsic Localized Modes,” invited talk, International Conference on “Dynamics Days 2006,” Maryland, January 2006; invited talk, International Conference “European Dynamics Days 2006,” Crete, Greece, September 2006.

“From DHN to (CH)_x: Applications of Quantum Field Theory in Condensed Matter Physics,” invited talk at Memorial Symposium for Brosl Hasslacher, Los Alamos National Laboratory, November 2006.

“From Memory to Future,” invited conference summary talk for eponymous conference held at the Institute for Scientific Interchange, Turin, Italy, November 2006.

“Intrinsic Localized Modes: Localizing Energy Through Nonlinearity and Discreteness,” invited talk at International Conference on Statistical Field Theory of Quantum Devices, Perugia, Italy, July 2007

“The Fermi-Pasta-Ulam (FPU) Problem: Solitons, Chaos, ILMs, q-breathers, and Mixing,” invited talk at the International Workshop on Turbulent Mixing and Beyond, International Center for Theoretical Physics, Trieste, Italy, August 2007

“The Legacy of FPU,” keynote address at the International Conference on Understanding Complex Systems, University of Illinois, Urbana-Champaign, May 2008.

“Multi-scale Functional Renormalization Group Approach to Models for Strongly Correlated Electrons,” invited talk at the Workshop of Exactly Solvable Models and Their Applications in Cold Atomic Systems, Chinese University of Hong Kong, June 2008.

“Nonlinear Science 101,” invited tutorial lecture for the National Academy of Sciences Keck Foundation Initiative in “Complex Systems,” August 2008.

“The Fermi-Pasta-Ulam (FPU) Problem: The Birth of Nonlinear Science,” invited plenary talk at the Ulam Centennial Symposium, University of Florida, March 2009.

“The Fermi-Pasta-Ulam (FPU) Problem: The Birth of Nonlinear Science,” invited talk at the International Symposium on Nonlinear Dynamics and its Applications in Science, Göttingen, Germany, July 2009.

“Filtering Coherent Atomic Beams: The Peierls-Nabarro Energy Landscape of the Nonlinear Trimer,” invited plenary talk at the Dynamics Days 2010, Northwestern University, January 2010.

“The Fermi-Pasta-Ulam (FPU) Problem: The Birth of Nonlinear Science,” Julius Edgar Lilienfeld Prize talk at the American Physical Society meeting, March 2010.

“The Fermi-Pasta-Ulam Problem: A Path to Complexity,” invited lecture at the International School of Physics “Enrico Fermi” Course CLXXVI, *Complex Materials in Physics and Biology*, Varenna, Italy, June 2010.

“Transfer of Bose-Einstein Condensates through Discrete Breathers in an Optical Lattice,” invited lecture at the international conference “From Quantum Field Theory to Quantum Information and Quantum Devices,” (QID 2011), Perugia, Italy January 2011

“Transfer of Bose-Einstein Condensates through Intrinsic Localized Modes in an Optical Lattice,” invited lecture at the workshop on “Large Fluctuations and Collective Phenomena in Disordered Materials, University of Illinois, Urbana-Champaign, May 2011.

“Transfer of Bose-Einstein Condensates through Intrinsic Localized Modes in an Optical Lattice,” invited lecture at the XVI National Conference of Statistical Physics and Complex Systems,” Parma, Italy June 2011.

“Transfer of Bose-Einstein Condensates through Intrinsic Localized Modes in an Optical Lattice,” invited lecture at Graphene Research Centre, National University of Singapore, Singapore, November 2011.

“The Fermi-Pasta-Ulam (FPU) Problem and the Birth of Nonlinear Science,” Physics Colloquium at the University of Maryland, March 2012

“PhD Programs in Iceland: Observations of a Lapsed Administrator,” Plenary address at the Conference on Advanced Graduate Education in Iceland, June 2012

“Global Phase Space of Coherence and Entanglement in a double-well Bose-Einstein Condensate,” invited lecture at the 109th Rutgers Statistical Physics Conference, May 2013

“Dynamics of Entanglement in a Dissipative Bose-Hubbard Dimer,” invited seminar at the University of California, Riverside June 2013

“The Fermi-Pasta-Ulam Problem and the Birth of Nonlinear Science,” Physics Department colloquium, Georgia Tech, October 2013;

“The Dynamics of Entanglement in a Dissipative Bose-Hubbard Dimer,” Condensed Matter Theory Seminar, Georgia Tech October 2013.

“The Fermi-Pasta-Ulam Problem and the Birth of Nonlinear Science,” Colloquium at the Nonlinear Physics Centre at the Australian National University, Canberra, Australia December 2013

“The Dynamics of Entanglement in a Dissipative Bose-Hubbard Dimer,” Condensed Matter

Theory Seminar at the Nonlinear Physics Centre at the Australian National University, Canberra, Australia December 2013

"The Fermi-Pasta-Ulam Problem and the Birth of Nonlinear Science," invited lecture, Institute for Basic Science, Seoul, Korea, February 2014

"The Fermi-Pasta-Ulam Problem and the Birth of Nonlinear Science," invited lecture, International Institute of Physics, University of Rio Grande do Norte, Natal, Brazil, June 2014

"Global Phase Space Study of Coherence and Entanglement in a Double-Well Bose-Einstein Condensate," invited lecture, International Conference on Quantum Engineering of States and Devices, NORDITA, Stockholm, Sweden, August 2014

"The Fermi-Pasta-Ulam Problem and the Birth of Nonlinear Science," invited lecture, Max Planck Institute for Dynamics and Self-Organization, Göttingen, Germany, October 2014

"The Nonlinear Odyssey of the Soliton," invited lecture, Akademie der Wissenschaften zur Göttingen. June 2015

"The Remarkable Bose-Hubbard Dimer," International Winter School on "Strongly Coupled Field Theories for Condensed Matter and Quantum Information Theory, International Institute of Physics, Natal, Brazil August 2015

"Back to the Future: Recovering the Age of Wonder," Visiting Scholar Lecture, Cohen Center for the Study of Technological Humanism, October 2015

Phi Beta Kappa Visiting Scholar Lectures on

**"Coherent Structures and Solitons in Nonlinear Systems",
"Our Chaotic and Fractal World",
"Dynamics of Interacting Populations",
"Nonlinear Science: From Paradigms To Practicalities",
"Flatland Redux: Graphene and other Two-Dimensional Electronic Materials",
"The Fermi-Pasta-Ulam Problem and the Birth on Experimental Mathematics", and
"The Remarkable World of Ultracold Atoms",**

given at Universities of Arizona, North Dakota, Miami, Florida, SUNY Albany, and Baylor, Butler, and Lawrence Universities, October 2015-April 2016

"Back to the Future: Recovering the Age of Wonder," Invited lecture, Braginsky Center for the Interface between Science and the Humanities, May 2016

"'Soliton' Interactions in *Non-Integrable* Systems," Invited lecture, at the Italy-Israel symposium "Simplifying Biological Systems," in memory of Prof. Eshel Ben-Jacob, May 2016

"FPU and the Birth of Nonlinear Science," Invited lecture at the 10th International Conference on Computational Physics, Macao, SAR, China January 2017.

"Intermittent Fermi-Pasta-Ulam Dynamics at Equilibrium," talk at the March 2017 Meeting of the American Physical Society, New Orleans, Louisiana, March 2017.

"Our Colorful Oscillating World," presentation at the Aspen Center for Physics, Aspen, Colorado, July 2017.

"Intermittent Many-Body Dynamics at Equilibrium," Invited lecture at the Sixth International Conference on Turbulent Mixing and Beyond, Abdus Salam International Centre for Theoretical Physics, Trieste, Italy, August 2017.

"Intermittent Many-Body Dynamics at Equilibrium," Colloquium at SUNY Buffalo, September 2017

"The Remarkable World of Ultra-Cold Atoms," Seminar at SUNY Buffalo, September 2017

“Intermittent Many-Body Dynamics at Equilibrium,” Invited lecture at the XV Latin American Workshop on Nonlinear Phenomena, La Serena, Chile, November 2017.

“Intrinsic Localized Modes: Localizing Energy through Nonlinearity and Discreteness,” Theoretical Condensed Matter Physics seminar, Harvard University, November 2017

“Fold, Staple, and Multilate: Kirigami for 2D Electronic Materials,” Invited lecture at the Second Colloquium on the Physics of Complex Systems, Center for the Theoretical Physics of Complex Systems, Institute for Basic Sciences, Daejeon, Korea, December 2017

“Intermittent Many-Body Dynamics at Equilibrium,” Invited lecture at Dynamics Days US 2018, Denver, Colorado, January 2018

“Kirigami Actuators,” contributed talk at the March American Physical Society meeting, March 2018, Los Angeles, California

“A Brief History of (h)Our Time,” Invited lecture at the symposium honoring Anthony J. Leggett’s 80th Birthday, University of Illinois, Urbana, Illinois March 2018

“Building Research Capabilities in Peru: Perspectives of a former BU Provost,” invited lecture at the Laspau Symposium, Harvard University, May 2018

“The Subtle Road to Equilibrium: Intermittent Many-Body Dynamics at Equilibrium,” Invited lecture at “Ljubljana Corr’18” Conference, Ljubljana, Slovenia, June 2018

“The Subtle Road to Equilibrium: Intermittent Many-Body Dynamics at Equilibrium,” Invited lecture at Conference on Nonlinear Localization in Lattices 2018, Spetses, Greece, June 2018

“...And here’s how it all began: Reflections on the first SFI Summer School,” Invited lecture at the Santa Fe Institute Summer School Alumni conference, July 2018

“The 1D Extended Hubbard Model: A Cautionary Tale,” invited lecture at the “Gubernatisfest” At the Los Alamos National Laboratory, October 2018

“Existence and Breakdown of Higher-Order FPUT “Super-recurrences”, Invited lecture at the conference on Systems Far from Equilibrium, International Institute of Physics, Natal, Brazil, November 2018

“A Moveable Feast of the Mind: Five Decades with David Pines,” Invited lecture at the Annual Meeting of the Institute for Complex Adaptive Matter, National Tsing Hua University, Taiwan, January 2019

“The Subtle Road to Equilibrium in the FPUT Model,” Invited lecture at the 124th Statistical Physics Meeting, Rutgers, May 2019.

“The Subtle Road to Equilibrium in the FPUT Model,” Colloquium at the Department of Applied Mathematics and Theoretical Physics, University of Cambridge, May 2019.

“Fold, Stable, and Mutilate: Kirigami for 2D Materials,” Invited lecture at the Symposium on Machine Learning in the Materials Genome, Spetses, Greece, June 2019

“The Subtle Road to Equilibrium in the FPUT Model,” Invited lecture at the Symposium in honor of the 60th Birthday of Giorgos P. Tsironis, Chania, Greece, June 2019

“The Subtle Road to Equilibrium in the FPUT Model,” Invited lecture at the “50 years of Stochastic Processes at UCSD: A Symposium in Honor of Katja Lindenberg, August 2019.

“The Subtle Road to Equilibrium in the FPUT Model,” Physics Colloquium, Boston College September 2019.

“Approaching Equilibrium in Classical and Quantum Systems: The Dynamical Glass Phase” Workshop on Ordering and Dynamics of Correlated Quantum Systems, Evora, Portugal, October . 2019

“Remembering Mitchell Feigenbaum,” invited lecturer at Feigenbaum Memorial Symposium, Rockefeller University, October 2019

“The Subtle Road to Equilibrium in the FPUT Model,” Seminar on PDEs and Dynamics, Brown University, November 2019

“History of the CNLS,” CNLS 40th Anniversary Celebration, Los Alamos, NM (virtual), October 2020

“Reflections on Mitchell,” invited talk at Simons Foundation Symposium “Renormalization Perspective: Feigenbaum Memorial Conference, “ Stony Brook, NY (virtual) March 2021

“Fold, Staple, and Mutilate: Kirigami for 2D Electronic Membranes and Beyond,” invited presentation at IEMTRONICS Conference, Vancouver, CA, (virtual) April 2021

“Historical Overview of Kink-Antikink Interactions in *Nonlinear Klein-Gordon Field Theories*,” invited talk at SIAM Conference on Dynamical Systems, Seattle, WA (virtual) May 2021

“Folie à deux: Pursuit of the elusive dimer,” invited talk at the Kenkrefest, University of New Mexico (virtual) May 2021

“Historical Overview of Kink-Antikink Interactions in *Nonlinear Klein-Gordon Field Theories*,” invited talk at the XVIII Instabilities and Nonequilibrium Structures, Santiago, Chile (virtual) December 2021

“Decomposed Functional Renormalization Group Flows for Multiband Hamiltonians,” contributed talk at the APS March 2022 meeting, Chicago, Illinois March 16, 2022

“Intermittent Many-Body Dynamics at Equilibrium,” invited talk at the 12th IMACS International Conference Nonlinear Evolution Equations and Wave Phenomena: Computation and Theory, University of Georgia (virtual) April 1, 2022

“Four Decades of Collaboration with Jose Carmelo,” invited talk at International Symposium honoring Jose Carmelo’s 70th Birthday, Braga, Portugal July, 2022 (virtual)

“Generalized fRG Solver for Strongly Correlated Systems” invited talk at International

Symposium on Exact Renormalization Group (ERB 2022), Berlin, Germany July 28, 2022 (virtual)

“The approach to equilibrium in the Fermi-Pasta-Ulam-Tsingou (FPUT) problem,” invited talk at US Dynamics Days, Cambridge, England January 9, 2023 (virtual)

“Correlated Metallic Phases in Hubbard-Holstein Hamiltonians,” contributed talk at APS March meeting, Las Vegas, NV. March 10, 2023

“The approach to equilibrium in the Fermi-Pasta-Ulam-Tsingou (FPUT) problem,” invited talk at the International Meeting SigmaPhi 2023, Chania, Greece, July 10, 2023

“FPUT and the Birth of Nonlinear Science,” invited plenary talk at the International Meeting SigmaPhi 2023, Chania, Greece, July 14, 2023

Publications

Articles in Refereed Scientific Journals, Proceedings, and Books

- [1] **D. K. Campbell**, W. A. Klemperer, and J. R. Lombardi, “Electric Dipole Moment of the π - π^* Singlet State of HCOF,” *J. Chem. Phys.* **46**, 3481-3486 (1967).
- [2] **D. K. Campbell**, “Basic Commutation Relations for Current Divergences,” *II Nuovo Cimento* **58A**, 547-550 (1968).
- [3] **D. K. Campbell**, “ $2 \rightarrow n$ Production Processes and the Multi-Regge Model,” *Phys. Rev.* **188**, 2471-2485 (1969).
- [4] D. I. Olive, W. J. Zakrzewski and **D. K. Campbell**, “Veneziano Amplitudes for Reggeons and Spinning Particles,” *Nuclear Physics B* **14**, 319-329 (1969).

- [5] **D. K. Campbell** and G. F. Chew, “Multiperipheral Dynamics,” notes taken by D. K. Campbell from lectures by G. F. Chew at the Summer School in Elementary Particle Physics held at Brookhaven National Laboratory in 1969: pages 292-389 in BNL report 50212 (C-58), February, 1970.
- [6] **D. K. Campbell** and S.-J. Chang, “Cluster Decomposition Properties of ϕ^3 Perturbation Theory Amplitudes at High Energy,” *Phys. Rev. D* **4**, 1151-1177 (1971).
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- [8] **D. K. Campbell**, “Multiparticle Spectra in Simple Theoretical Models: A Cluster-Decomposition Analysis,” *Phys. Rev. D* **6**, 2658-2689 (1972).
- [9] **D. K. Campbell**, “Comment on Kinematic Models of Inclusive Spectra,” *Phys. Rev. D* **7**, 2793-2799 (1973).
- [10] **D. K. Campbell** and S.-J. Chang, “Multiplicity Distribution in Multiperipheral Models with Isospin,” *Phys. Rev. D* **8**, 2996-3008 (1973).
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- [15] **D. K. Campbell** and Yao-Tang Liao, “Semiclassical analysis of bound states in the two-dimensional sigma model,” *Phys. Rev. D* **14**, 2093-2116 (1976).
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Patents Filed/Issued

- 1) CASIMIR-ENABLED QUANTUM MAGNETOMETER U.S. Patent Application No.: 63/159,829 Filed: March 11, 2021 Inventors: Bishop et al (David K. Campbell included). BU Ref. No.: BU-2020-094 B&L Ref. No.: BOS-0011PR (56136.03018)
- 2) SINGLE POINT GRADIOMETER U.S. Application No.: 17/692,692 Filed: March 11, 2022 Inventors: Javor et al. (David K. Campbell included) BU Ref. No.: BU-2021-068 B&L Ref. No.: BOS-0041US (56136.03091)
- 3) SYSTEM AND METHOD FOR MEASURING SECOND ORDER AND HIGHER GRADIENTS U.S. Application No.: 17/692,651 Filed: March 11, 2022 Inventors: Javor et al. (David K. Campbell included) BU Ref. No.: BU-2021-049 B&L Ref. No.: BOS-0030US (56136.03089)
- 4) CASIMIR-ENABLED SENSING SYSTEM AND METHOD U.S. Application No.: 17/692,633 Filed: March 11, 2022 Inventors: Bishop et al. (David K. Campbell included) BU Ref. No.: BU-2020-094 B&L Ref. No.: BOS-0011US (56136.03087)