A. BIOGRAPHICAL INFORMATION

Jerome C. Licini

work: Physics Department
Lehigh University
16 Memorial Drive East
Bethlehem, PA 18015
610 758-5137 (phone)
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Education

1976 – 1980 Princeton University, Princeton NJ.
Bachelor of Arts of Physics, magna cum laude, June 1980.

1980 - 1986 Massachusetts Institute of Technology, Cambridge, MA.
Ph.D. degree in Condensed Matter Physics, February 1987.

1987 – Continuing education via seminars on research areas, proposal preparation, course development, and teaching skills.

Employment

1977 – 1979 Research Associate, Princeton Plasma Physics Laboratory, NJ.

1981 Research Assistant, IBM, Tucson, AZ.

1984 – 1985 Visiting Researcher, AT&T Bell Laboratories, Murray Hill, NJ.

1987 Postdoctoral Associate, M.I.T., Cambridge, MA.

1987 – 1993 Assistant Professor, Lehigh University, Bethlehem, PA.

1993 – Associate Professor, Lehigh University, Bethlehem, PA.

1987 – Independent Consultant. Registered with Ben Franklin Technology / Pennsylvania Manufacturers Resource Center. Clients have included:
Lehighton Electronics (patented electromagnetic design for non-contact semiconductor analysis)
Valley Enterprises (digital signal processing)
HoverTech International (materials and circuits)
Enviroplan Consulting (air flow calc. for pollution sampling)
W. H. Freeman and Company (textbook editing)
Roeger, Walker, Cassel, & Holko (collision modeling, friction calculations, expert witness)
Hamburg, Rubin, Mullin, Maxwell & Lupin (collision modeling, expert witness).

2018 – Physics Department Associate Chair, Lehigh University, Bethlehem, PA.

B. PUBLICATIONS AND CREATIVE ACTIVITIES

Books Edited

Contributing Editor for Instructor's Solution Manual to "Physics for Scientists and Engineers," Fifth Edition, by Paul A. Tipler, W. H. Freeman and Company, New York, 2004 (ISBN 0-7167-9839-5).

Refereed Journal Publications (h-index = 7)

1. "Characterization of Magnetic Transistors," J. L. Lopez and J. C. Licini, J. Appl. Phys. 53, 8389 (1982).

2. "Aperiodic Magnetoresistance Oscillations in Narrow Inversion Layers in Silicon," J. C. Licini, D. J. Bishop, M. A. Kastner, and J. Melngailis, Phys. Rev. Lett. 55, 2987 (1985). (Cited more than 79 times.)

3. "Weakly Localized Behavior in Quasi-One-Dimensional Lithium Films," J. C. Licini, G. J. Dolan, and D. J. Bishop, Phys. Rev. Lett. 54, 1585 (1985).

4. "Lithium Quench-Condensed Microstructures and the Aharonov-Bohm Effect," D. J. Bishop, J. C. Licini, and G. J. Dolan, Appl. Phys. Lett. 46, 1000 (1985). (Cited more than 25 times.)

5. "Quantum Interference Effects in Lithium Ring Arrays," G. J. Dolan, J. C. Licini, and D. J. Bishop, Phys. Rev. Lett. 56, 1493 (1986). (Cited more than 26 times.)

6. "Search for Exclusive J/Ψ Production," with I. H. Chiang, et al., Phys. Rev. D 34, 1619 (1986).

7. “Conductance Fluctuations Near the Localized-to-Extended Transition in Narrow Si MOSFETs,” M. A. Kastner, R. F. Kwasnick, J. C. Licini, and D. J. Bishop, Phys. Rev. B 36, 8015 (1987). (Cited more than 19 times.)

8. “Anomalous Magnetoresistance of the Electron Gas in a Restricted Geometry,” M. A. Kastner, S. B. Field, J. C. Licini, and S. L. Park, Phys. Rev. Lett. 60, 2535 (1988).

9. “Quantum Conductance Fluctuations in Self-Aligned Pinch-Narrowed Silicon Metal-Oxide-Semiconductor Field-Effect Transistors,” D. A. Slimmer, J. C. Licini, S. D. Van Campen, and R. F. Kwasnick, J. Appl. Phys. 72, 1183-1185 (1992).

10. “Discovery of Narrow-Band Photoionization Resonance Transition at 0.65 eV in AlGaAs/GaAs Heterostructures,” M. Spector, L. N. Pfeiffer, J. C. Licini, K. W. West, and G. A. Baraff, Phys. Rev. Lett. 71, 903 (1993).

11. “Quantum Conductance Fluctuation Correlation Range and Amplitude as a Parameter-Independent Probe of the Localized-to-Extended State Transition in Narrow Si Metal-Oxide-Semiconductor Field-Effect Transistors,” J. C. Licini and S. B. Field, Phys. Rev. B 51, 14741 (1995).

12. “A Tilted-Axes Tool for Introductory Mechanics and Mathematics Courses,” Jerome C. Licini, The Physics Teacher 56(8), 528-9 (2018).

13. “Why Is an Empty Shampoo Bottle So Easy to Knock Over?” Jerome C. Licini and Zijun Yuan, The Physics Teacher 58, 220-1 (2020).

14. “Enhanced Rolling Moment of Inertia Demonstration,” Jerome C. Licini, Richard O. White, George Awad, and Yoon Jung Choi, accepted for publication in The Physics Teacher as of April 13, 2023, scheduled for February 2024.

15. “Hollow, solid, and *faster* rolling cylinders,” Jerome C. Licini, submitted to The Physics Teacher, December 2023.

Published Reports

“Quantum Conductance Fluctuations in Extremely Narrow Inversion Layers in Silicon,” J. C. Licini, Ph.D. thesis, published as MIT VLSI Memo No. 87-393 (July 1987).

Refereed Published Conference Proceedings

1. “Effects of the Substrate-Epitaxial Interface on the DLTS Spectra in MESFET and HFET devices, M. Spector, M. L. Gray, J. D. Yoder, A. M. Sergent, and J. C. Licini, Mat. Sci. Forum 83-87, 1563 (1992).

2. “Study of PPC in AlGaAs/GaAs Heterostructures. Discovery of an Excited State of the DX Center at 0.65 eV.” M. Spector, L. N. Pfeiffer, and J. C. Licini, Mat. Sci. Forum 143-147, 1141 (1994).

Patents

The purpose of my inventions was to solve the commercially important problem of determining the electronic properties of heterostructure semiconductor wafers before expensive processing steps and avoiding damage or contamination. Other methods were ineffective at measuring the high-mobility active layer buried underneath the high-conductivity cap layer. The invention performs Hall effect measurements that would ordinarily only be possible on finished devices or by destroying the wafer via the novel technique of microwave reflection, leaving the wafer in a pristine state for continued processing.

US Patent Number 6,791,339 (September 14, 2004) “Method and apparatus for nondestructive measurement and mapping of sheet materials.”

US Patent Number 7,109,724 (September 19, 2006) “Method and apparatus for nondestructive measurement and mapping of sheet materials.”

US Patent Number 8,207,748 (June 26, 2012) “Device and handling system for measurement of mobility and sheet charge density.”

15 Additional international patents granted.

C. HONORS AND AWARDS

CAS Dean's Teaching Award – Prestigious award for excellence in teaching (one award every three years). March 10, 2023

Recognized as an Accessibility Champion by Lehigh University Disability Support Services. (March 17, 2020)

Invited participant and presenter of 31st International Scottish Summer School in Physics (a NATO Advanced Study Institute), “Localisation and Interaction in Disordered Metals and Doped Semiconductors,” St. Andrew’s, Scotland, July 22 – August 7, 1986. Presented seminar “Quasi-One-Dimensional MOSFETs” to audience containing several Nobel Prize winners.

D. RESEARCH FUNDING

Competitively Awarded National Research Grants

National Science Foundation Grant Number 9209058, “Electron - Electron Interaction,” Start date 09/01/1992, Jerome C. Licini (Principal Investigator and sole awardee), $195,200.00.

Competitively Awarded University Research Grants

Lehigh University Faculty Research Grant for collaboration with University of Pennsylvania, awarded November 18, 2005, $1,600.

Department Innovation Grant

Lehigh University Physics Department Innovation Grant for research, awarded August 25, 2023, $5,000.

G. SCHOLARLY PRESENTATIONS

Invited Presentations

Presented seminar “Quasi-One-Dimensional MOSFETs” at 31st International Scottish Summer School in Physics (a NATO Advanced Study Institute), “Localisation and Interaction in Disordered Metals and Doped Semiconductors,” St. Andrew’s, Scotland, July 22 – August 7, 1986.

Presented colloquium talks at academic institutions as well as Bell Laboratories and NEC Research Institute.

Invited talk at 219th Electrochemical Society meeting in Montreal, “Conductance Peak in Carbon Nanotube Field Effect Transistors at Low Temperatures and High Magnetic Fields,” May 3, 2011.

Chaired Session Presentations

More than 17 presentations starting in 1982 at the Third Joint Intermag-MMM Conference (IEEE International Magnetics – Magnetism and Magnetic Materials), Montreal, Canada. 2 presentations in past three years:

“Analysis of unusual splitting of Kondo peak n the differential conductance of a carbon nanotube quantum dot,” Jeffrey Stephens*, Jerome Licini, A.

T. Charlie Johnson, Douglas Strachan, Danvers Johnston, and Sam Khamis, March 14, 2008, APS - 2008 APS March Meeting.

"Exploration of conductance peak splitting in carbon nanotube field effect transistors at critical field strengths," Jeffrey D. Stephens*, Jerome C. Licini, A.T. Charlie Johnson, Douglas Strachan, Danvers Johnston, and Sam Khamis, March 16, 2009, APS - 2009 APS March Meeting.

"Conductance Peak in Carbon Nanotube Field Effect Transistors at Low Temperatures and High Magnetic Fields" J. C. Licini (Lehigh University) and J. Stephens (Misericordia University), May 4, 2011, Electrochemical Society Meeting, Montreal. Invited talk.

H. TEACHING

Physics 11 – Introductory Physics I (Mechanics and Thermodynamics) typically every Fall (over 350 students) and Summer

Physics 21 – Introductory Physics II (Electromagnetism and Optics) typically every Spring (over 290 students) and Summer

Physics 22 – Introductory Physics II Laboratory (E&M and Optics) Fall and Spring semesters 2009-2019

Physics 72-10 (originally Physics 95 and 96) – One credit online add-on courses for potential majors since 2016

Arts 001 – Choices and Decisions, Fall 2003 and Fall 2006

Physics 213 – Undergraduate Electricity and Magnetism, Fall 2004

Physics 215 – Classical Mechanics I, Fall 2003

Physics 362 – Atomic and Molecular Structure, Fall 2004 and Fall 2006

Physics 397 – Topics in Condensed Matter (co-supervised), Spring 2011

Physics 422 – Graduate Electricity and Magnetism

I. RESEARCH ADVISING AND MENTORING

Undergraduates (partial listing):
Jessica Leonard (2002)
Dani Rhen (2003, Fullbright Scholar)
Paul Belony (2003, Ph.D. Student at Lehigh University)
Steve Eckel (2004, Goldwater Scholar)
Katie Weber (2006)
Giles Howlett (2007)
Bryan Stirling (2015-2016)
Omar Ahmed (2016)
Yoonjung Choi (2017-2018)
George Awad (2017-2019)
Zijun (Allen) Yuan (2019-2020)

Masters:
Abhishesh Regmi (2006)
Vabaza Xuza (2003-6)

Doctoral:
David Slimmer (Ph.D. 1992, Department Chair at Lander University)
Magaly Spector (Ph.D. 1993, V.P. at University of Texas, Dallas)
Stephen Van Campen (Ph.D. 1994, Kimball Physics)
Viorel Ontalus (Ph.D. 2000, IBM)
Jeffrey Stephens (Ph.D. 2010, Misericordia University)
Jacob Bardzell (Ph.D. side project on physics education research, 2022)
Danielle Smith (Ph.D. side project on physics education research, 2022)

J. SERVICE

University Service

Assisted development office by accepting consulting requests from “major donor.”

Presented technical background to the University community at the Pre-Inauguration Seminar “Good Science and the Art of Discovery.” This was in preparation for Horst Stormer’s talk “Conveying Science” at “A Celebration of Research and Its Global Impact” in honor of the inauguration of Lehigh University’s 13th President, Alice P. Gast, April 4, 2007.

ITaLLIC Seminar –Submitted proposal and was awarded assistance to add audience response clickers to Physics 11 in Spring 2007 semester. One of two invited panelists for Lehigh Lab Forum on clicker use (November 6, 2009).

Panel Reviewer for Faculty Innovation Grants (Spring 2010, 2011).

Internal Panel Reviewer of pre-proposals for NSF Major Research Instrumentation Program (Fall 2010, 2011)

College Service

Non-major advising: Ran section of Arts 001 “Choices and Decisions” in Fall 2003 (18 students) and Fall 2006 (19 students). Advised those students with academic decisions and registration issues until they selected majors (typically 3 to 4 semesters). College of Arts and Sciences “Advising Mentor” 2011-2019.

Interdisciplinary Program Service

Outside project advisor for team of students in Lehigh University’s Integrated Product Development (IPD) Program, 2005 and one prior year.

Department Service

Physics Department Associate Chair (2018-)

Administer Anticipatory Exam for Physics 11 and 21 every year

Physics rater for TOPSS tests for graduate student English proficiency.

Serve on search committee (Fall 2010 – Spring 2011)

Serve on Ph. D. committees for various students (most recently Federico Halpern, Paul Belony, Catherine Tomkiel).

Serve on Qualifier Examination preparation committee every year.

Past chairman of departmental Space Committee.

Brought in colloquium speaker David Maiullo in coordination with Zoellner Arts Center (2017)

Professional Service

Reviewer for journal “The Physics Teacher” (2020-)

Reviewer of a major section of "Effective Practices for Physics Programs (EP3)," American Physical Society and American Association of Physics Teachers, 2021-2022.

Community Service

TV appearance to discuss stability in the “broomstick challenge” on WFMZ-TV, 10 o’clock news broadcast, Tuesday February 11, 2020.

Professional Memberships

Member American Physical Society and American Association of Physics Teachers.

Founding Board Member of local chapter of Cryogenic Society of America.