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Research Fellow

Center for Philosophy and
the Natural Sciences

California State University,
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Education

- 2004, Ph.D** **Georgia Institute of Technology**, Atlanta, GA
School of Physics
Advisor: Prof. David Finkelstein
- 1997, M.S.** **University of Akron**, Akron, OH
Department of Physics
- 1993, B.S.** **Tehran Polytechnic**, Tehran, Iran
Department of Physics

Teaching and Professional Positions

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|---------------------|-------------------------------------|---|
| 2005-2011 | Assist. Professor of Physics | Department of Chemistry & Physical Sciences |
| 2011-Present | Assoc. Professor of Physics | Pace University, Pleasantville, NY |
| 2015-Present | Director | Pforzheimer Honors College, Pace University, NY |
| 2013-2015 | Faculty Fellow | The Provost Office, Pace University, NY |
| 2008-Present | Research Fellow | Center for Philosophy and the Natural Sciences
California State University, Sacramento, CA |
| 2006-2007 | Visiting Fellow | Department of Physics
Harvard University, Cambridge, MA |
| 2002-Present | Assistant Editor | International Journal of Theoretical Physics |
| 2004-2005 | Instructor of Physics | Department of Chemistry and Physics
Augusta State University, Augusta, GA |

Research Experience

2005-
Present

**Department of Chemistry and Physical Sciences
Pace University**

Studying the applications of physics and especially quantum theory in complex networks and agent-based modeling. Studying the general quantization process based on principle of algebraic simplicity and developing a finite quantum theory of the gauge fields (and specifically of gravity). Also studying the philosophical foundations of a quantum theory of space-time focusing on the “quantum physical investigation into the causal and logical order and the physical basis of possibility” as a concurrent Research Fellow at the Center for Philosophy and Natural Sciences, Sacramento State University, California.

2006-2007

**Department of Physics
Harvard University**

Studied the philosophical and physical foundations of a quantum theory of space-time based on Segal’s principle of algebraic simplicity. Studied the foundations of string theory and explore its successes and challenges as a theory promising to unify gravity and quantum theory. Studied philosophical foundations of quantum theory, quantum logic, and the concept of time (logical and causal order) in physics.

2005-2006

**Department of Chemistry and Physics
Augusta State University**

Worked on developing the time-dependent finite quantum theory of the harmonic oscillator as a major step toward developing a finite quantum theory of gauge fields.

1998-2004

**School of Physics
Georgia Institute of Technology**

Worked on a unified post-quantum theory, applying a regularization process to the non-semi-simple Heisenberg algebra of the usual quantum theory. Work involved Segal’s idea of stabilizing physical theories by introducing regularization constants so that the group of the theory becomes (semi)simple. As an example, studied the stabilized theory of the time-independent quantum harmonic oscillator.

1995-1997

**Department of Physics
University of Akron**

Studied the ray picture of light in general theory of relativity. Developed a “formal quantum” theory for light rays in curved space-time manifolds and explored the “classical” limit of this theory. Applied this theory to the case of a uniform gravitational field.

1989-1993

**Department of Physics
Tehran Polytechnic**

Studied possible cosmological models based on the mass density of the universe. Studied the rotational curves of the spiral galaxies and investigated the possible candidates for the unobservable cosmological mass (the Dark Matter) that causes unexpected behaviors in these curves.

Courses

Quantum Mechanics, Relativity, Electromagnetism, Classical Mechanics, Mathematical Physics, History and Philosophy of Science, Thermodynamics and Statistical Physics, Modern Physics. General Physics, Astronomy, Research Methodology for Honors Student.

Awards, Grants, Fellowships

- (2013-2015) **Faculty Fellow**, The Provost Office, Pace University, New York
- (2010-2013) **Consultant, Research Grant**, *Foundations of Relational Realism, Logical Causality, Intrinsic Decoherence, and Category Theoretic Mereotopological Model of Quantum Spacetime*, Funded by a grant from The Fetzer-Franklin Fund, Center for Philosophy and Natural Sciences, California State University, Sacramento, <http://www.csus.edu/cpns/research.html>
- (2008-2010) **Consultant, \$209,000 Research Grant**, *Logical Causality in Quantum Mechanics*, Funded by a grant from The Fetzer-Franklin Fund
- (2008) **Co-investigator, \$20,000 Planning Grant**, Science and Transcendence Advanced Research Series (STARS), *Quantum Physical Investigation into the Causal and Logical Order and the Physical Basis of Possibility*.
- (2010) **Pforzheimer Honors College Research Grant, \$1,000**. (with Erik Nykwest, Pace Physics Major, to develop a physics course for the Honors College)
- (2009-2013) **Faculty Consultant, TLQP Grant** (Teacher Leader Quality Partnership, Inquiry Learning Collaborative, School of Education, Pace University).
- Scholarly Research Award, Pace University (2005,2006,2007,2008,2009,2010,2011,2012)
- Kenan Grant, Pace University (2006,2007,2008)
- Visiting Fellowship, Harvard University (2006-2007)
- Kira Institute Fellowship, (Kira summer workshop, Amherst College, Amherst, MA 1998, 1999, 2002)
- Graduate Teaching Assistantship (Georgia Institute of Technology, 1997-2004)
- Graduate Teaching Assistantship (University of Akron, Ohio, 1995-1997)

Publications (Advanced Research)

- **Mohsen Shiri-Garakani**, Physics and Self-organization in Complex Networks, in progress.
- **Mohsen Shiri-Garakani**, Emergence, Physics, and Complex Networks, in progress.
- **Mohsen Shiri-Garakani**, Structure of Physical Revolutions, in progress.
- **Mohsen Shiri-Garakani** and David R. Finkelstein, *Finite Quantum Dynamics*, International Journal of Theoretical Physics, **50**, 1731 (2011)
- **Mohsen Shiri-Garakani** and David R. Finkelstein and, *Finite Quantum Kinematics of the Harmonic Oscillator*, J. Math. Phys, **47**, 032105 (2006)
- J. Baugh, D. R. Finkelstein, A. Galiutdinov, and **M. Shiri-Garakani**, *Transquantum Dynamics*, Foundations of Physics, **33**, 1267, (2003). Also published online arXiv: [hep-th/0304031](http://arxiv.org/abs/hep-th/0304031) under the title *Ultraquantum Dynamics*
- James Baugh, David Ritz Finkelstein, Andrei Galiutdinov, Heinrich Saller and **Mohsen Shiri**, *Transquantum Space-Time*, Proceedings of the 5th International Symposium of Fundamental Physics, Birla Science Center, Hyderabad, January 2003
- James Baugh, Andrei Galiutdinov, David Ritz Finkelstein, **Mohsen Shiri-Garakani** and Heinrich Saller, *Elementary operation*, Based on a talk given at the 5th International Quantum Structure Association Conference, Cesena, Italy, 2001. Refereed and selected for the conference. Published online: arXiv: [quant-ph/0411213](http://arxiv.org/abs/quant-ph/0411213)
- David R. Finkelstein, **M. Shiri-Garakani**, *Expanded Quantum Linear Harmonic Oscillator*. Proceedings of the 3rd International Symposium on Quantum Theory and Symmetries (QTS3), Cincinnati, Ohio, September 2003

Talks and Presentations

(Note: The abstracts for the 7 talks in the APS Centennial Meeting are refereed and published in the proceedings of the American Physical Society Centennial Meeting, Atlanta, Georgia, March 20-26, 1999.)

- *General Structure of Physical (R)Evolution: A Different Approach to a Unified Finite Theory*, Invited talk given at Tehran Polytechnic, Jan 2015
- *Online Vs. Traditional: Future of Higher Education, An agent Based Modeling Approach*, Presented at Pace Science Day, April 2013.
- *Modeling the Future of Higher Education*, Presentation given at the network day for the TLQP Grant (Teacher Leader Quality Partnership, Inquiry Learning Collaborative, School of Education, Pace University, February 2013)
- *Thinking Science: A Universal Model*, Presentation given at the network day for the TLQP Grant (Teacher Leader Quality Partnership, Inquiry Learning Collaborative, School of Education, Pace University, June 2011)
- *Structure of Physical (R)Evolution*, Talk given at Pace University, SIGMA XI, co-sponsoring with TriBeta Biology Honor Society and Chemistry Society, 2010
- *Geothermal Energy*, Presented at Pace Earth Day event, 2008
- *Finite Quantum Theory*, Talk given at California Polytechnic Institute, 2007
- Dennis W. Marks, Andrei Galiautdinov, **Mohsen Shiri**, James Baugh, , David R. Finkelstein, William Kallfelz, and Zhong Tang, *Field Theory as Degenerate Limit of Quantum Network Dynamics*, Presented at the American Physical Society Centennial Meeting, Atlanta, Georgia, March 20-26, 1999
- Andrei Galiautdinov, **Mohsen Shiri**, James Baugh, , David R. Finkelstein, William Kallfelz, Zhong Tang and Dennis W. Marks, *Chronon Size*, Presented at the American Physical Society Centennial Meeting, Atlanta, Georgia, March 20-26, 1999
- **Mohsen Shiri**, James Baugh, , David R. Finkelstein, William Kallfelz, Zhong Tang, Dennis W. Marks and Andrei Galiautdinov, *Compton Limit to Localization*, Presented at the American Physical Society Centennial Meeting, Atlanta, Georgia, March 20-26, 1999
- James Baugh, , David R. Finkelstein, William Kallfelz, Zhong Tang, Dennis W. Marks, Andrei Galiautdinov and **Mohsen Shiri**, *Chronon Statistics*, Presented at the American Physical Society Centennial Meeting, Atlanta, Georgia, March 20-26, 1999
- David R. Finkelstein, William Kallfelz, Zhong Tang, Dennis W. Marks, Andrei Galiautdinov, **Mohsen Shiri**, and James Baugh, *Chronon Statistics*, Presented at the American Physical Society Centennial Meeting, Atlanta, Georgia, March 20-26, 1999
- William Kallfelz, Zhong Tang, Dennis W. Marks, Andrei Galiautdinov, **Mohsen Shiri**, James Baugh and David R. Finkelstein, *Correspondence Principles*, Presented at the American Physical Society Centennial Meeting, Atlanta, Georgia, March 20-26, 1999
- Zhong Tang, Dennis W. Marks, Andrei Galiautdinov, **Mohsen Shiri**, James Baugh and David R. Finkelstein and William Kallfelz, *Quasi-Fermions and Quasi-Bosons in Schur-Wilczek Statistics*, Presented at the American Physical Society Centennial Meeting, Atlanta, Georgia, March 20-26, 1999
- KIRA Institute interdisciplinary summer school on philosophy, science and religion: *Ways of Knowing*, Amherst College, Amherst, Massachusetts, Aug. 2-4, 2002. Talk presented: *Quantum Knowledge*
- KIRA Institute interdisciplinary summer school on philosophy, science and religion: *Values in a World Facts*, Amherst College, Amherst, Massachusetts, Jul. 25-Aug. 7, 1999. Talk presented: *Values and Facts in Philosophy of Rumi*

- KIRA Institute interdisciplinary summer school on philosophy, science and religion: *Values in a World of Facts*, Amherst College, Amherst, Massachusetts, Aug. 2-15, 1998. Talk presented: *Values, Facts, and Philosophy of Ludwig Wittgenstein*

Student Research at Pace University

- Doctorate Co-Advisor, **Christina Butler**, DPS candidate, Sidenberg, Thesis: *The Use Of Computer-Based Simulations And Their Impact On Students' attitudes Toward Physics And Conceptual Understanding in an Introductory Physics Course (in progress)*
- Doctorate Co-Advisor, **Jean De Niro**, DPS candidate, Lubin, Thesis: *Application of physics on complex network in business (in progress)*
- **Rocco Aliberti** and **Mohsen Shiri-Garakani**, *Acceleration of a Pendulum in Vacuum*, Presented at the Eastern Colleges Science Conference, Pace University, (2010)
- **Erik Nykwest** and **Mohsen Shiri-Garakani**, *Non-Newtonian Fluids*, Presented at the Dyson Society of Fellows Conference, Pace University, March (2010)
- **Evans Ihenachor** and Mohsen Shiri-Garakani, *Acceleration of a Damped Pendulum*. (Senior research project.

Books

- **Mohsen Shiri-Garakani**, Editor, *The Chronon Chronicle, (in progress)*. Collected Annotated Works of David Ritz Finkelstein. (He was my Ph.D. mentor and a pioneer in theoretical physicist:: <http://www.physics.gatech.edu/people/faculty/dfinkelstein.html>)
- **M. Shiri**, F. Alavi, *A Companion to the English for the Students of Science*, Tehran: Tarahan-e Nashr, 1990
- **M. Shiri**, F. Alavi, *A Companion to the English for the Students of Medicine*, Tehran: Tarahan-e Nashr, 1990

Professional Memberships and Recognitions

- American Physical Society (APS)
- The American Association for the Advancement of Science (AAAS)
- The New York Academy of Science
- Dyson Society of Fellows, Pace University
- Marquis Who is Who in America (2007,2008,2009)

Languages

Persian (native), English (fluent), French and Italian (conversational)

Extracurricular Activities, Interests

Play classical guitar. Active participation in an exclusive monthly discussion group, with focus on philosophy of science. Write contemporary Persian poems. Perform Persian traditional music for Setar, Nay and vocals. Write Persian Calligraphy. Interests include reading (history and philosophy of science, poetry, linguistics, and arts.), French, Iranian and Italian cinemas, Photography, soccer, cooking and hiking.