

## Mohsen Shiri-Garakani, Ph.D.

### Work:

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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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|--|---|---|
| <b>2005-Present</b>                          | <b>Assistant Professor of Physics</b>             | Department of Chemistry & Physical Sciences<br>Pace University, Pleasantville, NY             |
| <b>2008-Present</b>                          | <b>Research Fellow</b>                            | Center for Natural Philosophy and the Sciences<br>California State University, Sacramento, CA |
| <b>2002-Present</b>                          | <b>Assistant Editor</b>                           | International Journal of Theoretical Physics  |
| <b>2006-2007</b>                             | <b>Visiting Fellow</b>                            | Department of Physics<br>Harvard University, Cambridge, MA                                    |
| <b>2004-2005</b>                             | <b>Instructor of Physics</b>                      | Department of Chemistry and Physics<br>Augusta State University, Augusta, GA                  |
| <b>Spring 04,<br/>Fall 03,<br/>Summer 99</b> | <b>Course Instructor</b><br>(as Graduate Student) | School of Physics,<br>Georgia Institute of Technology, Atlanta, GA                            |
| <b>1997-2004</b>                             | <b>Teaching Assistant</b>                         | School of Physics,<br>Georgia Institute of Technology, Atlanta, GA                            |
| <b>1995-1997</b>                             | <b>Teaching Assistant</b>                         | Department of Physics<br>University of Akron, Akron, OH                                       |

## Research Experience

- 2005-Present**  
**Department of Chemistry and Physical Sciences**  
**Pace University**  
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 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 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 Taught

Quantum Mechanics, Special Relativity, Electromagnetism, Classical Mechanics, Mathematical Physics, History and Philosophy of Science, Thermodynamics and Statistical Physics, General Physics, Astronomy, Planet Earth.

## Publications, Presentations

- Erik Nykwest and Mohsen Shiri-Garakani, *Magnetism: A Relativistic Effect*, In progress, To be presented at the Dyson Society of Fellows Conference, Pace University, 2011.
- Erik Nykwest and Mohsen Shiri-Garakani, *Non-Newtonian Fluids*, Presented at the Dyson Society of Fellows Conference, Pace University, March 2010.
- Rocco Aliberti and Mohsen Shiri-Garakani, *Acceleration of a Pendulum in Vacuum*, Presented at the Eastern Colleges Science Conference, Pace University, 2010 (Submitted to the Journal of Undergraduate Research in Physics JURP)
- Mohsen Shiri-Garakani, *Quantum physical basis of symmetric and asymmetric objective time*, To be presented at the 9<sup>th</sup> International Workshop, *Applied Category Theory* (Graphs-Operads-Logic), University of Texas, San Antonio, March 14-19, 2011 (Invited Speaker)
- Mohsen Shiri-Garakani, *Structure of Physical (R)Evolution*s, In progress.
- Mohsen Shiri-Garakani, Editor, *The Chronon Chronicle*, Collected Annotated Works of David Finkelstein, In progress (book).
- Mohsen Shiri-Garakani and David R. Finkelstein and, *Finite Quantum Kinematics of the Harmonic Oscillator*, J. Math. Phys, 47, 032105 (2006), *arXiv: quant-ph/0411203*
- David R. Finkelstein and Mohsen Shiri-Garakani, *Finite Quantum Dynamics*, To appear in the International Journal of Theoretical Physics.
- James Baugh, David Ritz Finkelstein, Andrei Galiautdinov, Heinrich Saller and Mohsen Shiri, *Transquantum Space-Time*. Proceedings of the 5<sup>th</sup> International Symposium of Fundamental Physics, Birla Science Center, Hyderabad, January 2003.
- James Baugh, Andrei Galiautdinov, David Ritz Finkelstein, Mohsen Shiri-Garakani and Heinrich Saller and, *Elementary operation*, Based on a talk given at the 5<sup>th</sup> International Quantum Structure Association Conference, Cesena, Italy, 2001. To appear in the International Journal of Theoretical Physics. *arXiv: quant-ph/0411213*.
- M. Brown, D. R. Finkelstein, M. Good, H. Saller and M. Shiri-Garakani, *Clifford-Algebraic Electromagnetic Stress-Energy Tensor*, in preparation.
- James Baugh, David Ritz Finkelstein, M. Shiri-Garakani, Heinrich Saller, *Quantum Space-Time-Gravity*, in preparation.
- 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, *Kinematics of Quantum Switching Networks*, 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 Sebur-Wilczek Statistics*, Presented at the American Physical Society Centennial Meeting, Atlanta, Georgia, March 20-26, 1999.
- M. Shiri, F. Alavi, A Companion to the *English for the Students of Science*, Tehran: Tarahan-e Nashr, 1990. (Book)
- M. Shiri, F. Alavi, A Companion to the *English for the Students of Medicine*, Tehran: Tarahan-e Nashr, 1990. (Book)

## Conferences, Workshops

- The 9<sup>th</sup> International Workshop, *Applied Category Theory* (Graphs-Operads-Logic), University of Texas, San Antonio, March 14-19, 2011 (Invited Speaker, Paper to present: Quantum physical basis of symmetric and asymmetric objective time)
- Dyson Society of Fellows Conference, Pace University, March 2010.
- Research Workshop on Quantum Spacetime and Quantum Philosophy, Georgia Institute of Technology, October 2008.
- APS Annual Meeting, Berkeley, California, Oct. 26-27, 2007.
- The 7<sup>th</sup> International Joint Meeting of American Mathematical Society and Sociedad Matemática Mexicana, (Graphs-Operads-Logic), Universidad Autónoma de Zacatecas, México, May 23-26, 2007. (Invited Plenary Speaker)
- Sudarshan Symposium, Seven Science Quests, University of Texas, Austin, Nov. 6-7, 2006.
- T.D. Lee Symposium, Columbia University, New York, Sep. 29, 2006.
- XI International Conference on Quantum Optics (ICQO'2006), Minsk, Belarus, May 26-31, 2006 (Invited Speaker).
- QFT & QCD: Past, present and Future. Conference in honor of Sidney Coleman, Harvard University, Cambridge, MA, March 18-19, 2005.
- The 3<sup>rd</sup> International Workshop on Graphs-Operads-Logic, Universidad Nacional Autónoma de México, Oaxtepec, Cuautitlán and Acatlán, Feb. 2-13, 2004. (Invited plenary speaker).
- 3<sup>rd</sup> International Symposium on Quantum Theory and Symmetries (QTS3), University of Cincinnati, Cincinnati, Ohio, Sep. 11-14, 2003.
- KIRA Institute interdisciplinary summer school on philosophy, science and religion: *Ways of Knowing*, Amherst College, Amherst, Massachusetts, Aug. 2-4, 2002.
- Klaunder Fest, Conference in honor of John Klaunder, University of Florida, Gainesville, Florida, Feb. 9, 2002.
- American Physical Society Centennial Meeting, Atlanta, Georgia, March 20-26, 1999.
- KIRA Institute interdisciplinary summer school on philosophy, science and religion: *Values and Facts*, Amherst College, Amherst, Massachusetts, Jul. 25-Aug. 7, 1999.
- American Physical Society Centennial Meeting, Atlanta, Georgia, March 20-26, 1999.
- KIRA Institute interdisciplinary summer school on philosophy, science and religion: *Values and Facts*, Amherst College, Amherst, Massachusetts, Aug. 2-15, 1998.

## 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
- Who is Who in America (2008 and 2009)

## Awards, Grants, Fellowships

- (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) Co-investigator, \$209,000 Research Grant, *Logical Causality in Quantum Mechanics*, Funded by a grant from The Fetzer-Franklin Fund.
- 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*, (Joined the investigating group after the grant was awarded on May 15, 2007).
- Principal Investigator, *Physical, Mathematical, and Philosophical Structures of the Physical Evolutions*. (In progress)
- Scholarly Research Award, Pace University (2005,2006,2007,2008,2009)
- Kenan Grant, Pace University (2006,2007,2008)
- Visiting Fellowship, Harvard University (Fund awarded by Pace University, 2006)
- Scholarly Research Award, Pace University (2005,2006)
- Kira Institute Fellowship (2002,1999,1998)
- Graduate Teaching Assistantship (Georgia Institute of Technology, 1997-2004)
- Graduate Teaching Assistantship (University of Akron, 1995-1997)

## 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, soccer, cooking and hiking.