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Education

Ph.D.	Ohio University	Condensed Matter Physics	1985
M.S.	Ohio University	Condensed Matter Physics	1982
M.S.	Dhaka University (Bangladesh)	Condensed Matter Physics	1978
B.S.	Dhaka University	Physics (Honors)	1976

Professional Experience

Professor (1999- present) ----------Department of Physics and Astronomy, Ball State University
Associate Professor (1995-1999)- -Department of Physics and Astronomy, Ball State University
Assistant Professor (1990- -1995)- Department of Physics and Astronomy, Ball State University
Assistant Professor (1986-1987)--- Department of Physics, University of New York at Potsdam
Instructor (1986)----------Department of Physics and Astronomy, Ohio University
Graduate Assistant (1979-1985)----Department of Physics and Astronomy, Ohio University
Scientific Officer (1977-1978)----- Atomic Energy Commission, Dhaka, Bangladesh

Research Interests

- Statistical Physics: Phase Transition and Critical Phenomenon in two-dimensional Ising Models.
- Quantum-dot Cellular Automata (QCA) Devices, Nanoelectronics; Electronic properties and Quantum Transport in Nanoscale structures: Carbon nanotubes, Graphene, Graphene Nanoribbons (GNRs), and Boron-Nitrides.
- Thermal properties of Carbon Nanotubes (CNTs) and Graphene Nanoribbons

Publications

- K.A. Muttalib, **M. Khatun**, and J.H Barry, *"Perpendicular susceptibility and geometrical frustration in two-dimensional Ising antiferromagnets: Exact soultions,"* Phys. Rev **B** Vol. **96**, No 18, 184411 (2017)

- **Mahfuza Khatun**, Zhe Kan, Antonio Cancio, and Chris Nelson, "*Effects of Band Hybridization on Electronic properties in Tuning Armchair Graphene Nanoribbons,*" Canadian Journal of Physics Vol. 94, No. 2, pp. 218-225 (2016)

- Zhe. Kan, Chris Nelson, and **Mahfuza. Khatun,** "*Quantum conductance of zigzag graphene oxide nanoribbons,"* Journal of Applied Physics **115**, 153704 (2014).

- **M. Khatun**, B. D. Padgett, G. A. Anduwan, I. Sturzu, and P. D. Tougaw, "*Defect and Temperature Effects on Complex Quantum-dot Cellular Automata Devices,"* Journal of Applied Mathematics and Physics, Published online (htttp://www.scrip.org/journal/jamp), August 15 (2013).

- P. D. Tougaw **and M. Khatun**, "*A Scalable Signal Distribution network for Quantum-dot Cellular Automata,*" IEEE Transaction on Nanotechnology, Volume: **12**, 2, 215-224 March(2013).

- G. A. Anduwan, B. D. Padgett, M. Kuntzman, M. K. Hendrichsen, I. Sturzu, **M. Khatun** and P. D. Tougaw, "*Fault-tolerance and thermal characteristics of quantum-dot cellular automata devices"* J. Appl. Phys. **107**, 114306 (2010).

- **M. Khatun**, I. Sturzu, P. D. Tougaw and T. Barclay "*Fault Tolerance Properties in Quantum-dot Cellular Automata Devices,"* J. Phys. D: Appl. Phys. **39**, 1489-1494 (2006).

- **M. Khatun,** T. Barclay, P. D. Tougaw and I. Sturzu "*Fault Tolerance Calculations for Clocked Quantum-dot Cellular Automata Devices"*, Journal of Applied Physics, **98**, 094904 (2005).

- Sturzu and **M. Khatun**, "*Quantum Calculation of Thermal Effect in Quantum-dot Cellular Automata,*" Complexity, **10**, 4, pp. 73-78 (2005).

- Sturzu, L. Kanuchok, M. Khatun, and D. Tougaw, "*Thermal Effect in Quantum-dot Cellular Automata,"* Physica E: Low Dimensional Systems and Nanostructures, 27/1-2 pp 188-197(2005).

- Sturzu and **M. Khatun**, "*Quantum Statistics for Quantum-dot Cellular Automata,"* Bulletin of Transilvania University, Brasov, Romania, **10**(45) B1, 87 (2003).

- E. Mandell and **M. Khatun**, "*Quasi-Adiabatic Clocking of Quantum-Dot Cellular Automata*," J. Appl. Phys. 94, 4116 (2003).

- **M. Khatun** and J.W. Emert,"*Vacancy Migration in the 3-12 Ising Ferromagnet*," Physica Status Solidi **B**, 231, 341 (2002).

- **M. Khatun** and J.W. Emert, "*Vacancy Migration in the Kagomé Ising Ferromagnet*," Physica Status Solidi **A**, 214, 11 (1999).

- **M. Khatun**, P.K. Joyner, R.M. Cosby, and Y.S. Joe, "*Quantum Interference in a Stub-Constriction Structure Containing an Infinite Potential Barier,"* J. Appl. Phys. **84**, 3409 (1998).

- **M. Khatun** and J. H. Barry, "*Exact Solutions for Inelastic Neutron Scattering from Planar Ising Ferromagnets*," Physica **A 247,** 511 (1997).

- J.H. Barry and **M. Khatun**, "*Exact Solutions for Correlations in the Kagome' Ising Antiferromagnet*," Int. J. Mod. Phys. **B11,** 93 (1997).

- Y.S. Joe, **M. Khatun**, and R.M. Cosby, "*Quantum Transport Anomalies in Semiconductor Nanosystems*," J. Appl. Phys, **78**, 7120 (1995).

- J.H. Barry and **M. Khatun**, "*Exact Solutions for Ising-Model Correlations on the 3-12 Lattice*," Phys. Rev. **B51**, 5840 (1995).

- Y.S. Joe, **M. Khatun**, and R.M. Cosby, "*Quantum Interference in Multichannel Systems*," J. Appl. Phys. **78**, 5840 (1995).

- Y.S. Joe, **M. Khatun**, and R.M. Cosby, "*Conductance Oscillations Through Double Slits in a Quantum Wire*," Solid State Comm. **93**, 943 (1995).

- R. Delannay, N. Ito, **M. Khatun**, and G. Le Caer, *"Exact Two-Cell Correlations in Random Cellular Structures Generated from a 2D Ising Ferromagnet,"* Physica A, **212**, 1 (1994).

- R. Delannay, G. Le Caer, and **M. Khatun**, "*Random Cellular Structures Generated from a 2D Ising Ferromagnet,"* J. Phys. A: Math. Gen. **25**, 6193 (1992).

- J.H.Barry, T. Tanaka, **M. Khatun**, and C.H. Munera,*"Exact Solutions for Odd-Number Correlations on Planar Lattices*," Phys. Rev. **B44**, 2595 (1991).

- M. Fahnle and **M. Khatun**,"On the Magnetic Contribution to the Free Enthalpy of Vacancy Migration in Ferromagnetic Crystals," Phys. Stat. Sol. **A126**, 109 (1991).

- **M. Khatun**, J.H. Barry, and T. Tanaka, "*Exact Solutions for Even-Number Correlations of the Square Ising Model*," Phys. Rev. **B42**, 4398 (1990).

- J.H. Barry, **M. Khatun**, and T. Tanaka, "*Exact Solutions for Ising-model Even-number Correlations on Planar Lattices*," Phys. Rev. **B37**, 5193 (1988).

- J.H. Barry and **M. Khatun**, "*Exact Solutions for Perpendicular Susceptibilities of Kagome' and Decorated Kagome Ising Models*," Phys. Rev. **B35**, 8601 (1987).

Papers Presented at Professional Meetings

A. 2-D Ising Model

- **M. Khatun ,** K. A. Muttalib, and J. H. Barry,"*Perpendicular susceptibility and geometrical frustration of two-dimensional kagomé Ising antiferromagnet*", 2018 APS March Meeting, Los Angeles, CA, March 5-9, 2018

- **M. Khatun** and John Emert, *"Vacancy Migration in a Semiregular Ising Lattice Having Two Types of Edges (3-12)",* APS March Meeting, Indianapolis, IN, March 18-22, Bull. Amer. Phys. Soc. **47, (**2002).

- **M. Khatun** and John Emert, *"Vacancy Migration in the Two-dimensional Ising Systems," APS March Meeting*, Seattle, WA, March 12-16, Bull. Amer. Phys. Soc. **46**, (2001).

- **M. Khatun** and John Emert,*"Vacancy Migration in the Two-dimensional Ising Model,"* Indiana Academy of Science Fall Meeting, Richmond, IN, November 2-3, (2000).

- **M. Khatun** and J.W. Emert, *"Vacancy Migration in the Kagome Ising Ferromagnet,*" Ohio Section spring Meeting of American Physical Society, Ball State University, Muncie, Indiana, May 1-2, (1998).

- J.W. Emert and **M. Khatun**, *"Graph Theory and the Ising Model,*" Ohio Section spring Meeting of American Physical Society, Ball State University, Muncie, Indiana, May 1-2, (1998).

- W. D. Stayte and **M. Khatun**, *"Spin Correlations on a Planar Decorated Kagome Ising Ferromagnet,*" Proc. Indiana Academy of Science, 112th Annual Meeting, DePauw University, IN, November 8, (1996).

- J.H. Barry and **M. Khatun**, "*Exact Solutions in the Kagome Ising Antiferromagnet,"* Statphys. Syposium, Boston, March 30-31, (1996).

- C.S. Cochran and **M. Khatun**, *"Ferromagnetic Spin Correlations on the Two-dimensional Decorated-honeycomb Crystal Structure,"* AAPT Indiana Section Spring Meeting, Indianapolis, IN, April 7-8, (1995).

- **M. Khatun** and J.H. Barry, *"Exact Solutions for Even-Number Correlations of the Kagome Ising Antiferromagnet,"* Ohio Section Spring Meeting of American Physical Society, Cleveland, OH, May 13-14, (1994).

- L.M. Pawlowski and **M. Khatun** *"Exact Solutions for Ising Model Correlations on Square and Decorated Square Lattices,*" Undergraduate Research Conference, Butler University, Indianapolis, IN, April 15, (1994).

- **M. Khatun** and J.H. Barry, *"Ising Model Correlations and their Applications,"* AAPT Indiana Section meeting, Terra Haute, IN, April 15-16, (1994).

- **M. Khatun**, "*Ising Model and Neutron Scattering from Ising Ferromagnets,*" Department of Physics and Astronomy, Ball State University, Muncie, IN, February, 1994.

- **M. Khatun** and John Emert, *"Vacancy Migration in a Semiregular Ising Lattice Having Two Types of Edges (3-12)",* APS March Meeting, Indianapolis, IN, March 18-22, Bull. Amer. Phys. Soc. **47, (**2002).

- J.H. Barry and **M. Khatun**, "*Exact Solutions for Ising Correlations on 3-12 Lattice,"* Statphys 18, Berlin, Germany, (1992).

- **M. Khatun** and J.H. Barry, "*Exact Solution for Inelastic Neutron Scattering from 3-12 Ising Ferromagnet,"* Bull. Amer. Phys. Soc. **37**, 379 (1992).

- **M. Khatun** and J.H Barry *"Exact Solutions for Spin ½ Ising-Model Correlations on 3-12 Lattice,"* Proc. Indiana Academy of Science, 108th Annual Meeting, Ball State University, Muncie, IN, Nov. 6, (1992).

- **M. Khatun**, J.H. Barry, and M. Fahnle, "*Exact Solutions for 2-d Ising Model Even- and Odd- Number Correlations and their Applications,*" Indiana Sec. Amer. Assoc. Phys. Teachers, Ball State University, Muncie, IN, April 13, (1991).

- **M. Khatun** and J.H. Barry, *"Exact Solutions for Inelastic Neutron Scattering from the Kagome, Triangular and Square Ising Ferromagnets,"* Proc. 39th Annual Midwest Solid State Conference, p 16, Ames, Iowa, September 27-28, (1991).

- **M. Khatun** and J.H. Barry, *"Exact Solutions for Perpendicular Susceptibilities of 3-12 Ising Models,"* Bull. Amer. Phys. Soc. **36**, 2168 (1991).

- **M. Khatun** and J.H. Barry, *"Exact Solutions for Inelastic Neutron Scattering from the Planar Ising Ferromagnets,"* Sigma Xi Research Poster Session, Ball State University, Muncie, IN, October 11, (1991).

- **M. Khatun**, "*Exact Solutions for Localized Correlations of S=1/2 Ising Models on Planar Ising Ferromagnets,"* Department of Physics and Astronomy, Ball State University, Muncie, IN, July, (1990).

- **M. Khatun**, *"Exact Solutions for Localized Correlations of Spin 1/2 Ising Models on Various Planar Lattices,"* Millersville University, Millersville, Pennsylvania, June, 1990.

- **M. Khatun**, *"Even- and Odd- Number Localized Spin Correlations on Planar Ising Ferromagnets,"* State University of New York at Potsdam, Potsdam, New York, June, (1986).

- J.H. Barry and **M. Khatun**, "*Exact Solutions for Perpendicular Susceptibilities of the Kagome and Decorated-Kagome Ising Models,",* Statphys 16, Boston, MA, (1986).

- **M. Khatun**, J.H. Barry, and T. Tanaka, *"Exact Solutions for Spin ½ Ising Model Correlations on Planar Lattices,"* Bull. Amer. Phys. Soc. **30**, 596 (1985).

- **M. Khatun**, J.H. Barry, and T. Tanaka, *"Exact Solutions for Spin ½ Ising Model Even-number Correlations on the Square Lattice,*" Bul. Amer. Phys. Soc. **30**, 108 (1985).

B. Electronic Structure and Quantum Transport in Carbon Nanostructures

- Tuan Le and **Mahfuza Khatun**, "*Phonon Dispersion and Thermal Conductivity of Carbon Nanotubes (CNTs*)", APS Ohio-Region Sectional Fall Meeting, Miami University, Oxford, OH, (October13-14, 2017).

- Spencer Jones and **Mahfuza Khatun,** "*Electronic Properties of Graphene Nanoribbons Using Extended Hückel Theory",* Ohio APS Fall Meeting, Bowling Green State University – Bowling Green, OH (October 7-8, 2016).
- Anthony Gilmore and **Mahfuza Khatun**, *"Electrical and Thermal Transport Properties in Carbon Structures,"* Student Symposium, Ball State University, March 24, (2010)

- Albert DiBenedetto, **Mahfuza Khatun**, and Antonio Cancio, "*Electronic Properties of Hexagonal Boron Nitride and Graphene Nanoribbons",* Ohio APS Fall Meeting, Bowling Green State University – Bowling Green, OH (October 7-8, 2016).
- **Mahfuza Khatun**, "Electronic Properties of Carbon: Graphene Nanoribbons (GNRs), "PHYC-115, Physics and Astronomy, BSU, (October, 2016).

- Albert Dibenedetto, **Mahfuza Khatun**, and Antonio Cancio, "Electronic Properties of Hexagonal Boron Nitride and Graphene Nanoribbons," Indiana Academy of Science, Indianapolis, Indiana (March26, 2016)

- Travis Everhart and **Mahfuza Khatun**, "Electronic Properties of Graphene and Beyond," Indiana Academy of Science, Indianapolis, (March26, 2016)

- Albert Dibenedetto and **Mahfuza Khatun** (Mentor), "Electronic Properties of Hexagonal Boron Nitride Nanoribbons," Student Symposium, Ball State University (April8 2016) -

- Travis Everhart and **Mahfuza Khatun** (Mentor), "Graphene Nanoribbons and Beyond," Student Symposium, Ball State University (April 8, 2016).

- Nick Strange and **Mahfuza Khatun** (Mentor), Student Symposium, " Electronic Properties of Graphene Nanostructures: Zigzag and Armchair," Ball State University (March 31 2015).

- Albert DiBenedetto and **Mahfuza Khatun** (Mentor), Student Symposium, *"Electron Transport of Carbon Nanostructures,"* Ball State University (March 31, 2015).

- Spencer Jones and **Mahfuza Khatun** (Mentor), Student Symposium, " Electronic Properties of Graphene Nanostructures: Zigzag and Armchair," Ball State University (March 31, 2015).

- Albert DiBenedetto and **Mahfuza Khatun**, "*Electronic Properties of Carbon Nanostructures,*" Indiana Academy of Science 130th Annual Meeting," Indiana Academy of Science, Indianapolis, Indiana (March 21, 2015).

- Nick Strange and **Mahfuza Khatun**, *"Electronic Structure of Zigzag Graphene Nanoribbon,"* Indiana Academy of Science 130th Annual Meeting," Indiana Academy of Science, Indianapolis, Indiana. (March 21, 2015).

- Spencer Jones and **Mahfuza Khatun**, "*Carbon Nanoribbons and Their Properties*," Indiana Academy of Science 130th Annual Meeting, " Indiana Academy of Science, Indianapolis, Indiana (March 21, 2015).

- **Mahfuza Khatun**, "Carbon Nanotubes (CNTs) & Graphene Nanoribbons (GNRs)", PHYC-115, Physics and Astronomy, BSU, (September 2015).

- Albert DiBenedetteo and **Mahfuza Khatun**, M (Mentor), Electronic properties of Carbon Nanostructures: Armchair nanoribbons" Physics and Astronomy, BSU Student Seminar (November, 2014).

- Spencer Jones and **Mahfuza Khatun** (Mentor), "Electronic properties of Carbon Nnaotubes and Nnaoribbons" Physics and Astronomy, BSU Student Seminar (December, 2014).

- **Mahfuza Khatun**, Zhe Kan, and Chris Nelson, Indiana Academy of *Science 129th Annual Meeting, "Electronic* Properties of Graphene Nanoribbons (GNRs)," Indiana Academy of Science, Indianapolis, Indiana (March 15, 2014).

- Albert DiBenedetto, **Mahfuza Khatun**, Zhe Kan, and Chris Nelson, Indiana Academy of Science 129th Annual Meeting, *"Quantum Transport of Carbon Nanotubes (CNTs) and Graphene Nanoribbons (GNRs),"* Indiana Academy of Science, Indianapolis, Indiana (March 15, 2014).

- Albert DiBenedetto and **Mahfuza Khatun** (Mentor), Student Symposium, *"Electronic Properties of Carbon Structures,"* Ball State University (April 1, 2014).

- **Mahfuza Khatun**, " Carbon Nanotubes (CNTs) & Graphene Nanoribbons (GNRs)", PHYC-115, Physics and Astronomy, BSU, (September 2014).

- Zhe Kan, Chris Nelson, and Mahfuza Khatun, "Quantum Conductance of Graphene Nanoribbons (GNRs),")," APS Bulletin of the American Physical Society 2013 Annual fall meeting of Ohio Region-Section (OSAPS), Vol 58, **9** University of Cincinnati, Cincinnati, OH, October 4-5, (2013)

- Shaun Wood, Chris Nelson, and **M. Khatun, "**Heat Flux and Thermal Conductivity of Carbon Nanotubes (CNTs)," APS Bulletin of the American Physical Society 2013 Annual fall meeting of Ohio Region-Section (OSAPS), Vol 58, **9**, University of Cincinnati, Cincinnati, OH, October 4-5, (2013).

- Shaun Wood and **M. Khatun,** "*Thermal Properties of Carbon Nanotubes,"* Student Symposium, Ball State University, March 26 (2013).

- Zhe Kan and **M. Khatun**, "*Electrical Properties of Carbon Structures,"* Student Symposium, Ball State University, March 26 (2013).

- Jeremy Christman, Andrew Moore, and **M. Khatun**, "*Thermal Transport Properties of Carbon Nanotubes,"* 24th Undergraduate Research Conference at Butler University, April 20 (2012).

- Andrew Moore, Jeremy Christman, and **M. Khatun**, "*Thermal transport properties of carbon nanotubes using molecular dynamics,"* Student Symposium, Ball State University, March 27 (2012).

- **M. Khatun** and Benjamin Padgett, "*Fault Tolerant Characteristics in Quantum-dot Cellular Automata Devices,"* Bull. of Ohio Region-Section of the American Physical Society (OSAPS) Meeting, Vol 56, **8,** Ball State University, October 14-15 (2011).

- Anthony Gilmore and **M. Khatun**, "*Electronic and Thermal Properties of Graphene and Carbon Structures,*" Ohio Region-Section of the American Physical Society (OSAPS) Meeting, Vol 56, **8,** Ball State University, October 14-15 (2011).

- Jeremy Christman, Andrew Moore, and **M. Khatun**, "*Thermal Transport in Carbon Nanotubes,"* Ohio Region-Section of the American Physical Society (OSAPS) Meeting, Vol 56, **8,** Ball State University, October 14-15 (2011).

- Andrew Moore and **M. Khatun**, "*Thermal Transport in Carbon Nanotubes using Molecular Dynamics,"* Ohio Region-Section of the American Physical Society Meeting, Vol 56, **8,** Ball State University, October 14-15 (2011).

- Anthony Gilmore and **M. Khatun**, *"Electrical and Thermal Transport Properties in Carbon Structures,"*Student Symposium, Ball State University, March 24, (2010).

- Anthony Gilmore and **Mahfuza Khatun**, "Heat Conduction in Carbon Nanotubes," Indiana Academy of Science 125th Fall Meeting, Indiana University Kokomo, Kokomo, Indiana, October 22-23 (2009).

- **M. Khatun** and Benjamin Padgett, "Fault-Tolerant and Thermal Characteristics of Quantum-dot Cellular Automata Devices," Indiana Academy of Science 125th Fall Meeting, Indiana University Kokomo, Kokomo, Indiana, October 22-23 (2009).

- Adam Hinkle, Antonio Cancio and **Mahfuza Khatun**, "*Tight Binding Energy Bands and Electronic Properties of Carbon Nanotubes,"* Indiana Academy of Science Fall Meeting, Indianapolis University, October 25-26, (2007).

- Adam Hinkle, Antonio Cancio and **Mahfuza Khatun**, *"Tight Binding Calculation of Electronic Properties of Oligophenyl and Oligoecene Chains,"* Student Symposium, Ball State University, March 24-25, (2008).

- Adam Hinkle, Antonio Cancio and **Mahfuza Khatun**, *"Tight Binding Calculation of Electronic Properties of Oligophenyl and Oligoecene Chains,"* Argonne National Lab (2007).

- Daniel Baker and **M. Khatun**, "Electrical Properties of DNA-A Molecular Transistor*,"* Indiana Academy of Science 123rd Fall Meeting, Indianapolis University, Indianapolis, IN, October 25-26, (2007).

C. Quantum Dot Cellular Automata

- **Mahfuza Khatun**, Benjamin Padgett, Gabriel A. Anduwan and Ioan Sturzu, " Fault tolerant Characteristics of Quantum Dot Cellular Automata Devices," APS March Meeting, Pittsburgh, March 16-21 (2009).

- Benjamin D. Padgett, Gabriel Anduwan, Michael Kuntzman, Ioan Sturzu, and **Mahfuza Khatun,** "Modeling and Simulation of Fault Tolerant Quantum-dot Cellular Automata Devices," APS March Meeting, Pittsburgh, March 16-21 (2009).

- Gabriel Anduwan, Michael Kuntzman, Ioan Sturzu and **Mahfuza Khatun**, "*Defect and temperature Effects in Quantum-dot Cellular Automata Devices,"* Indiana Academy of Science Fall Meeting, Indianapolis University, October 25-26, (2007).

- **Mahfuza Khatun** and Benjamin Padgett, "Fault-Tolerant and Thermal Characteristics of Quantum-dot Cellular Automata Devices," Indiana Academy of Science 125th Fall Meeting, Indiana University Kokomo, Kokomo, Indiana, October 22-23 (2009).

- Benjamin Padgett and **Mahfuza Khatun**, "Modeling *and Simulation of fault tolerant Quantum-dot Cellular Automata Devices,"* Student Symposium, Ball State University, March 24, (2009).

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- Anthony Gilmore, Michael Kuntzman, Ioan Sturzu, and **Mahfuza Khatun,** "Computation with Quantum dot and Molecules," Student Symposium, Ball State University, March 26-27, 2007.

- Gabriel Anduwan , Ioan Sturzu and **Mahfuza Khatun, "***Fault Tolerant Characteristics of Quantum-dot Cellular Automata (QCA) Devices,"* Student Symposium, Ball State University, March 26-27, (2007).

- Gabriel Anduwan, Michael Kuntzman, Anthony Gilmore, Ioan Sturzu and **Mahfuza Khatun**, "*Fault Tolerant Characteristics of Quantum-dot Cellular Automata Devices,"* Indiana Academy of Science Fall Meeting, Ball State University, November 2-3, 2006.

- Anthony Gilmore, Michael Kuntzman, Gabriel Anduwan, Ioan Sturzu and **Mahfuza Khatun**, *"Designing and Simulation of Quantum-dot Cellular Automata Devices,"* Indiana Academy of Science Fall Meeting, Ball State University, November 2-3, (2006).

- Michael Kuntzman, Gabriel Anduwan, Anthony Gilmore, Ioan Sturzu and **Mahfuza Khatun**, "*A Basic Understanding the Operation of Quantum-dot Cellular Automata Devices"* Indiana Academy of Science Fall Meeting, Ball State University, November 2-3, 2006.

- Gabriel Anduwan, Anthony Gilmore, Michael Kuntzman, Daniel Baker and **Mahfuza Khatun** (Faculty Mentor), "*Quantum-Dot Cellular Automata* **"***A New Computing Paradigm for the Nanoscale,,*" Student Symposium, Ball State University, March 21, (2006).

- **Mahfuza Khatun**, "*A Computational Paradigm at the Nanoscale: Computing with Quantum dots QCA,"* Indiana Academy of Science Fall Meeting, Ball State University, November 2-3, 2006.

- Travis Barclay, Elizabeth Cougill and **Mahfuza Khatun**, "Quantum-dot Cellular Automata," Student Symposium, Ball State University, March 16, (2005).

- Ioan Sturzu, Travis Barclay and **Mahfuza Khatun** "Numerical Simulations in Quantum-dot Cellular Automata Devices," Ohio APS Meeting, Dayton Ohio, April 8-9, 2005

- Ioan Sturzu and **Mahfuza Khatun**, "Quantum method for fault tolerance calculations in Quantum-dot Cellular Automata clocked devices," APS March Meeting, LA, March 21-25, 2005.

- Travis Barclay, Ioan Sturzu and **Mahfuza Khatun,** "Defect Tolerance Properties Calculations for Quantum-dot Cellular Automata using Inter-cellular Hartree Approximation," APS March Meeting, LA, March 21-25, 2005.

- **Mahfuza Khatun**, "Nanoscience," invited speaker at the Discovery Luncheon, Carmel Indiana, September 26, 2005.

- Ioan Sturzu and **Mahfuza Khatun**, *Approximation methods in the study of temperature effect in Quantum-dot Cellular Automata and comparaison with full-basis quantum calculation*, Indiana Academy of Science Fall Meeting, Hanover College, October 28-29, 2004.

- Travis Barclay, Melissa Hendrichsen, Ioan Sturzu and **Mahfuza Khatun**, Defect *Tolerance Calculations for Quantum-dot Cellular Automata*, Indiana Academy of Science Fall Meeting, Hanover College, October 28-29, 2004.

- Ioan Sturzu and **M. Khatun**, " Quantum calculation of the QCA response function for non-zero temperatures," *Bulletin of the American Society of Ohio Section Spring Meeting*, Ohio University, Athens, Ohio, April 16-17, 2004.

- Ioan Sturzu, **Mahfuza Khatun** and Melissa Hendrichsen, "Quantum Calculation of the Thermal Effect in Quantum-dot Cellular Automata," *Understanding Complex Systems Symposium: Networks*, University of Illinois at Urbana-Champaign, May 17-20, 2004.

- **M. Khatun**, I. Sturzu, L. Kanuchok and D. Tougaw, "*Statistical Study of Thermal Effect in Quantum-dot Cellular Automata*," APS March Meeting, Montreal, Canada, March 23-26, Bull. Amer. Phys. Soc. **49**, (2004), page 978.

- Ioan Sturzu, L. Kanuchok,, **M. Khatun**, and D. Tougaw, "*Quantum Statistical Calculations for Thermal Effect in Quantum-Dot Cellular Automata,*" Ohio American Physical Society Meeting, Cleveland, OH, October 17-18, (2003).

- **M. Khatun**, "*Quasi–adiabatic Clocking and Thermal Effect in QCA,*" Kickoff Meeting for the Center for Computational Nanoscience, Ball State University, September 24, (2003).

- L. Kanuchok, I. Sturzu and **M. Khatun**, *"Thermal Effect in Quantum-Dot Cellular Automata,"* Indiana Academy of Science, 119th Annual Meeting, Anderson University, October 17-18, (2003).

- **M. Khatun**, E. Mandell and L. Kanuchok, *"Clocking of Quantum-dot Cellular Automata Devices,"* 2nd International Workshop on Quantum Dots for Quantum Computing and Classical Size Effect Circuits (IWQDQC-2) Bulletin, Page 84, University of Notre Dame, Indiana, August 7-9, (2003).

- **M. Khatun**, "*A Nanoscle Paradigm for Computation: Quantum-dot Cellular Automata,"* Department of Physics and Astronomy, Ball State University, November 6, 2003.

- **M. Khatun**, "*Quantum-dot Cellular Automata,"* Department of Computer Science, Ball State University, October 22, 2003.

- Luke Kanuchok and **M. Khatun**, "*Quantum-dot Cellular Automata Clocking,"* APS March Meeting, Austin, TX, March 3-7, Bull. Amer. Phys. Soc. **48**, (2003), page 496.

- L. Kanuchok and **M. Khatun**, "*Clocking of Quantum-Dot Cellular Automata*," Proc. 50th Midwest Solid State Conference and Workshop on Solid State Quantum Computation, Urbana-Champaign, IL, October 18-20, (2002).

- L. Kanuchok, M. Hendrichsen, T. Barclay and **M. Khatun**, "*Quantum-dot Cellular Automata*," Student Symposium, Ball State University, March 20, (2002).

- E. Mandell and **M. Khatun**, *"Clocking an Array of Quantum Dots,"* Ohio Section/American Physical Society (APS) and The American Association of Physics Teachers (AAPT) Fall Meeting, Toledo, OH, October 13-14, (2000).

- Luke Kanuchok, Travis Barclay and **M. Khatun**, "*Potential Barrier Modulation in QCA*," Indiana Academy of Science Fall Meeting, Indianapolis, IN, October 10-11, (2002).

- Eric Mandell, Craig Lent, and **M. Khatun**, *"Quasi-adiabatic Clocking of Quantum-dot Cellular Automata,"* APS March Meeting, Seattle, WA, March 12-16, Bull. Amer. Phys. Soc. **46**(1) (2001), page 534.

- Eric Mandell and **M. Khatun**, *"Time-dependent Electric Field due to a line of Charged Rods,"* Indiana Academy of Science Fall Meeting, Richmond, IN, November 2-3, (2000).

- **M. Khatun** and Eric Mandell, *"Clocking an Array of Quantum Dots,"* Focus on Excellence, Ball State University, Nov. 15, (2000).

- T. Kuhlman, **M. Khatun** and Paul Bock, *"Molecular Wire,"* Student Symposium, BSU, March 28, (2000).
- **M. Khatun**, "*A Review of Architects of Nanoelectronics: Digital Logic Circuits,"* CERES, Ball State University, November 18, 2000.

- T. Kuhlman, B. Case, **M. Khatun**(faculty mentor*), "Architects of Nanoelectronics: Digital Logic Circuits,"* Sigma Xi 4th Annual Student Symposium, BSU, March 23, (1999).

- **M. Khatun**, T. E. Kuhlman, and B. Case, "*A Review of Architects of Nanoelectronics: Digital Logic Circuits,*" AAPT Indiana Section Spring Meeting, DePaue University, Aprill 17, (1999).

- T. Kuhlman, B. Case, **M. Khatun**, R.M. Cosby, and Y. S. Joe, *"Architecture for Nanodevices: Quantum Dots and Molecular Wires,"* Undergraduate Research Conference, Butler University, April 9, (1999).

D. Electronic Structure and Quantum Transport in Semiconductor Devices

- G.A. Anduwan, **M. Khatun**, R.M. Cosby, and Y.S. Joe, *"Quantum Interference in a Ring Structure Containing an Impurity Scatterer,"* Ohio Section spring Meeting of American Physical Society, Ball State University, Muncie, Indiana, May 1-2, (1998).

- R.M. Cosby, Y.S. Joe, and **M. Khatun**, *"Conductance Spectroscopy of Quantum Pseudo-dot Nanostructures,"* Proc. 23rd Midwest Solid State Theory Symposium, Manhattan, Kansas, October 14-15, (1995).

- Y.S.Joe, **M. Khatun**, and R.M. Cosby, *"Interference in a Quantum Wire Modulated With Double-bend Structures,"* Proc. 23rd Midwest Solid State Theory Symposium, Manhattan, Kansas, October 14-15, (1995).

- **M. Khatun**, P.K. Joyner, R.M. Cosby, and Y.S. Joe, "*Impurity Effects in Mesoscopic Systems,*" Ohio Section Fall Meeting of American Physical Society, Dayton, OH, Oct. 6-7, (1995).

- Y.S. Joe, **M. Khatun**, and R.M. Cosby, *"Quantum Electron Interference in a Four-Parallel System,"* Ohio Section Fall Meeting of American Physical Society, Dayton, OH, Oct. 6-7, (1995).

- D.R. Hump, R.M. Cosby, Y.S. Joe, and **M. Khatun**, "*Speculations on Semiconductor Nanostructures Devices,*" Ohio Section Fall Meeting of American Physical Society, Dayton, OH, Oct. 6-7, (1995).

- R.M. Cosby, J. Bowman, Y.S. Joe,and **M. Khatun**, *"Coupling and Confinement effects on the conductance of a Double Quantum dot,"* Bull. Amer. Phys. Soc., **41**, 342 (1996).

- **M. Khatun**, R.M. Cosby and Y.S. Joe, *"Conductance Modulations With Variation of Impurity Position in a Nanosystem,"* Bull. Amer. Phys. Soc., **40**, 361 (1995).

- R.M. Cosby, Y.S. Joe, and **M. Khatun**, *"Conductance Spectroscopy of Quantum Pseudo-dot Nanostructures,"* Proc. 23rd Midwest Solid State Theory Symposium, Manhattan, Kansas, October 14-15, (1995).

- Y.S.Joe, **M. Khatun**, and R.M. Cosby, *"Interference in a Quantum Wire Modulated With Double-bend Structures,"* Proc. 23rd Midwest Solid State Theory Symposium, Manhattan, Kansas, October 14-15, (1995).

- **M. Khatun**, P.K. Joyner, R.M. Cosby, and Y.S. Joe, "*Impurity Effects in Mesoscopic Systems*," Ohio Section Fall Meeting of American Physical Society, Dayton, OH, Oct. 6-7, (1995).

- Y.S. Joe, **M. Khatun**, and R.M. Cosby, *"Quantum Electron Interference in a Four-Parallel System,"* Ohio Section Fall Meeting of American Physical Society, Dayton, OH, Oct. 6-7, (1995).

- D.R. Hump, R.M. Cosby, Y.S. Joe, and **M. Khatun**, "*Speculations on Semiconductor Nanostructures Devices,*" Ohio Section Fall Meeting of American Physical Society, Dayton, OH, Oct. 6-7, (1995).

- **M. Khatun**, Erwin, Y.S. Joe, and R.M. Cosby, Ball State University,"*Electronic Conductance in a Quantum Wire With a Finite/Infinite Scatterer,"* Ohio Section Fall Meeting of American Physical Society, Toledo, OH, Oct. 14-15, (1994).

- **M. Khatun**, Erwin, Y.S. Joe, and R.M. Cosby, Ball State University,"*Electronic Conductance in a Quantum Wire With a Finite/Infinite Scatterer,"* Ohio Section Fall Meeting of American Physical Society, Toledo, OH, Oct. 14-15, (1994).

- Y.S. Joe, **M. Khatun**, R.M. Cosby, M.W.C Dharma-Wardana, and S.E. Ulloa *"Quantum Transport in Nanochannel Systems Containing a Controllable Impurity or Slits,"* Bull. Amer. Phys. Soc., **39**, 354 (1994).

- Y.S. Joe, **M. Khatun**, and R.M. Cosby, Ball State University, *"Superlattice Effects and Additivity on Conductance in a Quantum Wire with Multi-Slits,"* Ohio Section Fall Meeting of American Physical Society, Toledo, OH, Oct. 14-15, (1994).

- R.M. Cosby, Y.S. Joe, and **M. Khatun**, Ball State University, *"Conductance of a Quantum Wire With Series and Parallel Slits,"* Ohio Section Fall Meeting of American Physical Society, Toledo, OH, Oct. 14-15, (1994).

- R.M. Cosby, Y.S. Joe, and **M. Khatun**, "*Quantum Interference in a Nanochannel Containing a Quantum Box*," Ohio Section Spring Meeting of American Physical Society, Cleveland, OH, May 13-14, (1994).

- Y.S. Joe, **M. Khatun**, and R.M. Cosby, *"Conductance Oscillations through Double Slits in a Quantum wire,"* Ohio Section Spring Meeting of American Physical Society, Cleveland, OH, May 13-14, (1994).

- Y.S. Joe, **M. Khatun**, and R.M. Cosby, Ball State University, *"Superlattice Effects and Additivity on Conductance in a Quantum Wire with Multi-Slits,"* Ohio Section Fall Meeting of American Physical Society, Toledo, OH, Oct. 14-15, (1994).

- R.M. Cosby, Y.S. Joe, and **M. Khatun**, Ball State University, *"Conductance of a Quantum Wire With Series and Parallel Slits,"* Ohio Section Fall Meeting of American Physical Society, Toledo, OH, Oct. 14-15, (1994).

- R.M. Cosby, Y.S. Joe, and **M. Khatun**, "*Quantum Interference in a Nanochannel Containing a Quantum Box*," Ohio Section Spring Meeting of American Physical Society, Cleveland, OH, May 13-14, (1994).

- Y.S. Joe, **M. Khatun**, and R.M. Cosby, *"Conductance Oscillations through Double Slits in a Quantum wire,"* Ohio Section Spring Meeting of American Physical Society, Cleveland, OH, May 13-14, (1994).

- Y.S. Joe, **M. Khatun**, R.M. Cosby, and S.E. Ulloa, *"Conductance Oscillations in Low Dimensional Systems,"* Proc. 21-st Midwest Solid State Theory Symposium, P 15, Detroit, MI, October 3-4, (1993).

- T. Villoch, R.M. Cosby, M. Khatun, and Y.S.Joe, *"High Energy Electron Transport in Semiconductor nanostructures,"* Undergraduate Research Conference, Butler University, April 9, (1999)

- T. Kuhlman, B. Case, **M. Khatun**(faculty mentor*), "Architects of Nanoelectronics: Digital Logic Circuits,"* Sigma Xi 4th Annual Student Symposium, BSU, March 23, (1999).

- Taran Villoch, R.M.. Cosby (faculty mentor), Y.S. Joe, and M. Khatun, *"Electronic Conduction in a Mesoscopic Device,"* Sigma Xi 4th Annual Student Symposium, BSU, March 23, (1999).

- Y.S. Joe, D.S. Ikeler, R.M. Cosby, and **M. Khatun**, *"Quantum Transport in Nanoscale Electronic Devices,"* Focus in Excellence Meeting, BSU, November, (1998).

- G.A. Anduwan, **M. Khatun**, R.M. Cosby, and Y.S. Joe, *"Quantum Interference in a Ring Structure Containing an Impurity Scatterer,"* Ohio Section spring Meeting of American Physical Society, Ball State University, Muncie, Indiana, May 1-2, (1998).

- G. A. Anduwan, **M. Khatun** (faculty mentor), *"Electron Transport in Mesoscopic Device,"* Sigma Xi 3rd Annual Student Symposium, BSU, March 23, (1998).

- G. A. Anduwan, **M. Khatun**, R. M. Cosby, and Y.S. Joe, *"Electron Transport" in a Mesoscopic Ring,"* Indiana Academy of Science Meeting, St. Joseph College, IN, October 31, (1997).

- **M. Khatun**, R.M. Cosby,and Y.S. Joe, *"Electronic Transport in a Nanochannel Containing Delta Impurities,"* Proc. Indiana Academy of Science, 112th Annual Meeting, DePauw University, IN, November 8, (1996).

- **M. Khatun**, P.K. Joyner, R.M. Cosby, and Y.s. Joe, *"Electronic Transport in Mesoscopic S* R.M. Cosby, J. Bowman, Y.S. Joe,and **M. Khatun**, *"Coupling and Confinement effects on the conductance of a Double Quantum dot,"* Bull. Amer. Phys. Soc., **41**, 342 (1996).

- **M. Khatun**, R.M. Cosby and Y.S. Joe, *"Conductance Modulations With Variation of Impurity Position in a Nanosystem,"* Bull. Amer. Phys. Soc., **40**, 361 (1995).

- *ystems,"* Proc. Indiana Academy of Science, 111th Annual Meeting, Indianapolis, IN, November 3, (1995).

- Jong-Lae Kim, **M. Khatun**, R.M. Cosby, and Y.s. Joe, *"Electron Conductance in a Nanochannel Containing Delta Potentials,"* Proc. Indiana Academy of Science, 111th Annual Meeting, Indianapolis, IN, November 3, (1995).

- Tian Xie, R.M. Cosby, Y.s. Joe, and **M. Khatun,** *"Electron Conductance in a Nanochannel Containing Delta Potentials,"* Proc. Indiana Academy of Science, 111th Annual Meeting, Indianapolis, IN, November 3, (1995).

- J.L. Kim, **M. Khatun**, R.M. Cosby, and Y.S. Joe,*"Electronic Energy Levels and Wavefunctions in a Nanochannel Containing Delta Impurities,"* AAPT Indiana Section Spring Meeting, Indianapolis, IN, April 7-8, (1995).
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- P.K. Joyner, **M. Khatun**, R.M. Cosby, and Y.S. Joe,"*Conductance of a Nanochannel with a tab and a constriction,"* AAPT Indiana Section Spring Meeting, Indianapolis, IN, April 7-8, (1995).

- John V. Bowman, R.M. Cosby, Y.S. Joe, and **M. Khatun**, *"Electron Transport and Series Quantum Dots in a Semiconductor Nanochannel,"* AAPT Indiana Section Spring Meeting, Indianapolis, IN, April 7-8, (1995).

- P.K. Joyner, **M. Khatun**, R.M. Cosby, and Y.S. Joe, *"Electronic Conductance in a Nanostructure With and Infinite Potential,"* Sigma Xi Research Poster Session, Ball State University, Muncie, IN, November 18, (1994).

- Y.S. Joe, **M. Khatun**, R.M. Cosby, M.W.C Dharma-Wardana, and S.E. Ulloa *"Quantum Transport in Nanochannel Systems Containing a Controllable Impurity or Slits,*" Bull. Amer. Phys. Soc., **39**, 354 (1994).

- Erwin, Y.S. Joe, **M. Khatun**, and R.M. Cosby, *"Quantum Mechanics of an Electron in a Nanochannel With a Potential Barrier,"* Sigma Xi Research Poster Session, Ball State University, Muncie, IN, November 18, (1994).

- J.V. Bowman, Y.S. Joe, **M. Khatun**, and R.M. Cosby, *"Electron Transport in a Nanchannel With Ramped Potentials,"* Sigma Xi Research Poster Session, Ball State University, Muncie, IN, November 18, (1994).

- Y.S. Joe, **M. Khatun**, and R.M. Cosby, Ball State University, *"Quantum Transport Anomalies in Ballistic Nanostructures,"* Proc. Indiana Academy of Science, 110th Annual Meeting, Notre Dame, IN, November 4, (1994).

- P.K. Joyner, **M. Khatun**, Y.S. Joe, and R.M. Cosby, Ball State University, *"Transverse Energy Levels in a Quantum Wire With an Infinite Scatterer,"* Proc. Indiana Academy of Science, 110th Annual Meeting, Notre Dame, IN, November 4, (1994).

- Erwin, R.M. Cosby, Y.S. Joe, and **M. Khatun**, Ball State University, *"Electron Eigenvalues and Eigenfunctions for a Nanochannel With a Finite rectangular Barrier,"* Proc. Indiana Academy of Science, 110th Annual Meeting, Notre Dame, IN, November 4, (1994).

- J.V. Bowman, R.M. Cosby, Y.S. Joe, and **M. Khatun**, Ball State University, *"Quantum Transport in a Confined Two-Dimensional Electron Gas,"* Proc. Indiana Academy of Science, 110th Annual Meeting, Notre Dame, IN, November 4, (1994).

- R.M. Cosby, Y.S. Joe, and **M. Khatun**, *"Conductance Quantization in Semiconductor Nanostructures- A Review,"* AAPT Indiana Section Spring Meeting, Terre Haute, IN, April 15-16, (1994).

- Y.S. Joe, **M. Khatun**, R.M. Cosby, M.W.C. Dharma-Wardana, and S.E. Ulloa, *"Quantum Interference in Nanostructures,"* AAPT Indiana Section Spring Meeting, April 15-16, 1994, Terre Haute, IN, April 15-16, (1994).

- S. Martin, R.M. Cosby, Y.S. Joe, and **M. Khatun**, *"Computing the Conductance of a Nanostructure,"* AAPT Indiana Section Spring Meeting, Terre Haute, IN, April 15-16, (1994).

- R.M. Cosby and **M. Khatun** "*Electron Transport in Nanostructures,*" Sigma Xi Research Poster Session, Ball State University, Muncie, IN, (1992).

Grants Received:

- **Mahfuza Khatun** and Albert DiBenedetto, Indiana Space Grant, $ 6000 (received in 2016)

- Honors Undergraduate Fellowship, BSU, **M. Khatun** (Faculty Mentor),*"Quantum Transport in Carbon Nanotube Devices,"* $2180, (2011).

- Agency: Indiana Academy of Science, **M. Khatun** (PI) "*Thermal Transport in Carbon Nanotube Devices,"* M. Khatun, Amount $2000, (2010).

- Agency:Indiana Academy of Science, **M. Khatun (PI)**, *Quantum-dot Cellular Automata (QCA): A Computational Paradigm Without Current at the Nanoscale*; Amount: $2,810, (2006).

- Honors Undergraduate Fellows Program, Ball State University, Quantum-dot Cellular Automata (QCA): *A Nanoscale Paradigm for Computation*; Faculty Mentor for Daniel Baker, (2006-2007)

- Agency: Indiana 21st Century Research and Technology Fund, Y.S. Joe (PI), **M. Khatun** (CO-PI), R. Cosby, S. Datta, M. Lundstrom, C. Lent, D. Tougaw, S. Ulloa, G Snider, P. Van patten, and A. Orlov, *Center of Excellence in Computational Nanoscience,* Amount: $1,510,321, Spring, 2003.

- Agency: Indiana Academy of Science, Title: "*Electron Transport in Semiconductor Nanodevices and Novel Architecture of Nanoelectronics,*" **M. Khatun** (PI**)**, Amount: $2,993, March 15, 1999.

- Agency: National Center for Supercomputing Applications, University of Illinois at Urbana-Champaign, IL; Title: "*Electron Transport in Nanoconstrictions*," Co-PI: R.M. Cosby, **M. Khatun** and Y.S. Joe; Amount: 300 Service Units(valued $61,200)--Supercomputer time; Duration: September, 1997 - October, 1998; Date of Application: 9/29/97.

- Agency: American Physical Society; Title: "*Travel Grants for Women Speakers,*" PI: **M. Khatun,** Amount: $500, Duration: 1997-1998, Date of Application: 10/7/1997.

- Agency: National Center for Supercomputing Applications, University of Illinois at Urbana-Champaign, IL; Title: *"Electron Transport in Nanoconstrictions,"* Co-PI: R.M. Cosby, **M. Khatun** and Y.S. Joe; Amount: 900 Service Units(valued $183,611)--Supercomputer time; Duration: 1996-1997; Date of Application: 11/30/1995.

- Agency: National Science Foundation; Title: "*Awareness, Skills, and Mentoring Add Up to Success for Girls in Science, Engineering, and Mathematics (SEM) Careers,"* Co-PI:

Bernadette Perham and Rebecca Pierce, Mentors: **M. Khatun**, Nancy Behforouz, Jayanthi Kandiah, Mary E. Kite, and Patricia L. Lang (Each mentor wrote a section of the proposal in her own field); Amount: $100,000; Duration: July 1995-July 1996 ; Date of Application: 1/15/1995.

- Agency: National Center for Supercomputing Applications, University of Illinois at Urbana-Champaign, IL; Title: "*Electron Transport in Nanoconstrictions*," Co-PI: R.M. Cosby, **M. Khatun** and Y.S. Joe; Amount: 90 Service Units(valued $90,000)--Supercomputer time; Duration: September, 1994-October,1995; Date of Application: 6/27/1994.

- Agency: American Physical Society; Title: *"Travel Grants for Women Speakers,"* PI: **M. Khatun,** Amount: $500, Duration: 1994-1995, Date of Application: 10/26/1994.

- Agency: American Physical Society Title: *Travel Grants for Minority Speakers,* PI: **M. Khatun,** Amount: $500, Duration: 1993-1994; Date of Application: 9/2/1993.

- Agency: National Center for Supercomputing Applications, IL; Title: "*Electron Transport in Nanoconstrictions,*" Co-PI: R.M. Cosby and **M. Khatun;** Amount: 10 Service Units (valued $10,000)--Supercomputer time; Duration: May, 1993 - May, 1994; Date of Application: 9/24/92.

- **M. Khatun** (PI), R. Cosby, F. Jin and C. Cancio, "*Carbon Nanostructures and Devices Research,"* $ 9,000, **Enhanced Provost Initiative (EPI), BSU,** (2008).

- CERES Research Fellowship, **M. Khatun**, IP, BSU--"Nanoelectronics: Semiconductor Nanoelectronics and Molecular Wires," Amount: $10,000, BSU, (2000).

- **M. Khatun,** PI, "Electron Transport in Semiconductor Nanodevices and Novel Architecture for nanoelectronics," Summer Grant,$11,483, OARSP, BSU, (2000).

- **M. Khatun,** PI, "Electron Transport in Semiconductor Nanodevices and Novel Architecture for nanoelectronics,"Travel Grant, $524, OARSP, BSU, (2000).

- Source: Distinction Fellows Program,BSU, Title:"Semiconductor nanodevices and Novel Architecture for Nanoelectronics," Faculty Mentor: **M. Khatun**, Student: Thomas E. Kuhlman, Amount: $1,400, BSU (1999).

- Source: Center for Energy Research/Education/Services (CERES), BSU, **1997-98 CERES Research Fellow;** Award: ½ academic year load; Title: *"Transport Phenomena in Semiconductor Quantum Structures,"* PI: **M. Khatun,** (1997).

- Source: 1996 Summer Research Gran, BSU t; Title: "*Nanoscale Electron Devices - A Theoretical Study,"* PI: R.M. Cosby, Co-PI: **M. Khatun** and Y.S. Joe; Award: 1/3 Summer, (1995).

- Source: Honors College, BSU, Undergraduate Fellows Proposal, Title:"*Phase Transition and Critical Phenomena in Low Dimensional Ferromagnetic Ising System Models,*" PI: **M. Khatun,** Amount: $1,500; Duration: 1995-1996. Date of Application: 3/1/1995.

- Source: Center for Energy Research/Education/Services (CERES) BSU, **1994-95 CERES Research Fellow**; Award: ½ academic year load and a Graduate Research Assistant; Title: "*Transport Phenomena in Semiconductor Quantum Devices,*" PI: **M. Khatun,** Date of Application: 3/18/1994.

- Source: 1994 Summer Research Grant, BSU; Title:"*Effects of Impurities on the Conductance of a Semiconductor Nanochannel,*" PI: R.M. Cosby, Co-PI: **M. Khatun** and Y.S. Joe; Award: 1/3 Summer time, Date of Application: 11/15/1993.

- Source: Provost Initiative; Title: "*Electron in Ultra-small Semiconductor Devices,*" Co-PI: R.M. Cosby and **M. Khatun**; Amount: $2,000; Duration: Summer, 1992, Date of Application: 11/30/1992.

Grant Proposals Submitted:

1. **Mahfuza Khatun** and Antonio Cancio, *"Quantum Transport and electronic properties of two-dimensional nanostructures*,$294,000, Academic Excellence Grant proposal- Ball State University, May 29, 2015 (Letter of Intent).

2. **Mahfuza Khatun** (PI), Co-PIs: Bob Berrington, Joel Bryan, Antonio Cancio, Eric Hedin, and Muhammad Maqbool, "Improving Student Recruitment, Retention, and Success in STEM" $86,000, Academic Excellence Grant proposal, Ball State University, May 28, 2015 (Letter of Intent).

3. **Mahfuza Khatun** and Antonio Cancio *Quantum Transport and electronic properties of two-dimensional nanostructures*,$293,000, Academic Excellence Grant proposal- Ball State University, July 2015 (Full Proposal)

4. Agency: National Science Foundation (NSF) --CSUMS: *Immersive Experiences in Computational Mathematics at Ball State University*, M. Karls (PI), M. Begum, K. Jones, I. Livshits, and R. Stankewitz, and **M. Khatun** (Faculty Advisor) Amount: $1, 234,947, October, (2008).

5. **M. Khatun**, PI, "*Designing and Simulation of Electronic Devices with Quantum Dots and Molecules,*" $18,325, OARSP, BSU, (2007).

6. Agency*:* Discovery*, A Computational Paradigm at the Nanoscale: Computing with Quantum Dots and Molecules,* **M. Khatun** (PI), Amount: $49,915, BSU, (2007).

7. Agency: National Science Foundation (NSF), Modeling and Simulation of Fault Tolerant Quantum-dot Cellular Automata Devices, **M. Khatun** (PI), Amount: $331,212.00, (2005).

8. Agency: National Science Foundation (NSF), Fault Tolerance Modeling for Quantum-dot Cellular Automata Devices, **M. Khatun** (PI), Amount: $373,168, (2005).

9. Agency: National Science Foundation (NSF), "Design and Simulation of Quantum-dot Cellular Automata Circuits, Douglas Tougaw (PI), Jeffrey Will, **M. Khatun**, Craig Lent, Fabrizio Lombardi, Amount: $1,998,541, (2004).

10. Agency: National Science Foundation; Title:*"Undergraduate Research Experiences in Physics and Astronomy*," PI: R.M. Cosby, CO-PI: R. H. Kaitchuck , G. Thomas, and M.S. Islam; Mentor: **M. Khatun** (wrote part of the proposal in condensed matter theory); Amount: $243,259; Duration: 1997-2000, Date of Application: 9/12/1996.

11. Agency: Indiana Academy of Science; Title: "*Phase Transition and Critical Phenomena in 2-Dimensional Ferromagnetic Ising Lattice Structures*," PI**: M. Khatun**, Amount: $2,500; Duration: 1996-97, Date of Application: 9/13/1996.

12. Agency: National Science Foundation; Title: *"Quantum Electronic Transport in Semiconductor Nanosystems,"* Co-PI: R.M. Cosby, **M. Khatun**, and Y.S. Joe; Amount: $133,488; Duration: 1996-1998, Date of Application: 11/20/1995.

13. Agency: National Science Foundation; Title: "*Quantum Transport in Reduced Dimensionality,*" PI: Y.S. Joe, Mentors: R.M. Cosby and **M. Khatun;** Amount: $105,813; Duration: March 1996- August 1997, Date of Application: 9/14/1995.

14. Agency: National Science Foundation; Title: *"Quantum Electronic Transport in Semiconductor Nanosystems,*" Co-PI: R.M. Cosby, **M. Khatun**, and Y.S. Joe; Amount: $461,075; Duration: 1995-1998, Date of Application: 11/10/1994.

15. Agency: National Science Foundation; Title: *"Impurity Effects on Conductance in Semiconductor Nanostructures,*" PI: **M. Khatun,** Amount: $49,987; Duration: May 1, 1995 - Aug. 31, 1996; Date of Application: 7/22/1994.

16. Agency: The Petroleum Research Fund; Title: *"Impurity Effects on Conductance in Semiconductor Nanostructures,*" PI: **M. Khatun,** Amount: $20,000; Duration: May, 1995 - Aug., 1996, Date of Application: 7/5/1994.

17. Agency: National Science Foundation; Title: *"Electronic Transport and Quantum Interference in Ballistic Nanostructures,*" Co-PI: R.M. Cosby, Y.S. Joe, and **M. Khatun**; Amount: $293,625, Duration: 1994-1997, Date of Application: 10/15/1993.

18. Agency: Army Research Office; Title: "*Electronic Transport and Quantum Interference in Ballistic Nanostructures,*" Co-PI: **M. Khatun**, Y.S. Joe, and R.M. Cosby; Amount: $293,625, Duration: 1994-1997, Date of Application: 10/29/93

19. Agency: Air Force Office of Scientific Research Title: "*Electronic Transport and Quantum Interference in Ballistic Nanostructures"*, Co-PI: Y.S. Joe, **M. Khatun**, and R.M. Cosby; Amount: $293,625; Duration: January, 1995 - December, 1997, Date of Application: 10/29/1993.

20. Agency: Office of Naval Research; Title: "*Electronic Transport and Quantum Interference in Ballistic Nanostructures,*" Co-PI: Y.S. Joe, **M. Khatun**, and R.M. Cosby; Amount:$293,625; Duration: 1994-1997, Date of Application: 11/5/1993.

21. Agency: Semiconductor Research Corporation; Title: "*Condensed Matter Theory of Resonant Tunneling and Ballistic Transport,"* Co-PI: R.M. Cosby, Y.S. Joe, and **M. Khatun**; Amount: Preliminary proposal without budget, Date of Application: 6/11/1993.

22. Agency: Semiconductor Research Corporation; Title: "*Electron Transport in Quantum Devices,*" Co-PI: R.M. Cosby and **M. Khatun;** Amount: $186,000; Duration: 1992-1994, Date of Application: 1/18/1993.

Invited talks/ Seminars/Colloquia

- **Mahfuza Khatun**, "Electronic Properties of Carbon: Graphene Nanoribbons (GNRs), "PHYC-115, Physics and Astronomy, BSU, (October, 2016).

- Mahfuza Khatun, "Electronic Properties of Carbon: Graphene Nanoribbons (GNRs),"PHYC-115, Physics and Astronomy, BSU, (September, 2015).

- Mahfuza Khatun, "Diversity in Religion," RELS- 280 class, BSU, (September, 2015)

- **Mahfuza Khatun,** PHYC-115, "Carbon Nanotubes (CNTs) & Graphene Nanoribbons (GNRs) " Physics and Astronomy, BSU, (Fall 2014).

- **Mahfuza Khatun** PHYC-115, "Quantum Conductance of Graphene Nanoribbons (GNRs) " Physics and Astronomy, BSU, (Fall 2013).

- **Mahfuza Khatun,** PHYC-115, "A Computational Paradigm at the Nanoscale: Computing with Quantum dots QCA, " Physics and Astronomy, BSU, (Fall 2012).

- **Mahfuza Khatun** PHYC-115, "A Computational Paradigm at the Nanoscale: Computing with Quantum dots QCA," Physics and Astronomy, BSU, (Fall 2011).

- Khatun, "Nanoscience," invited speaker at the Discovery Luncheon, Carmel Indiana, September 26, 2005.

- **M. Khatun**, *"A Nanoscle Paradigm for Computation: Quantum-dot Cellular Automata,"* Department of Physics and Astronomy, Ball State University, November 6, 2003.

- **M. Khatun**, *"Quantum-dot Cellular Automata,"* Department of Computer Science, Ball State University, October 22, 2003.

- **M. Khatun**, *"A Review of Architects of Nanoelectronics: Digital Logic Circuits,"* CERES, Ball State University, November 18, 2000.

- **M. Khatun**, "*Electronic Transport in mesoscopic Structures*," Center for Energy Research, Education and Services (CERES), Ball State University, Muncie, IN, October, 1997.
- **M. Khatun**, "*Electronic Transport in Nanoconstrictions*," Center for Energy Research, Education and Services (CERES), Ball State University, Muncie, IN, October, 1994.

- **M. Khatun**, "*Ising Model and Neutron Scattering from Ising Ferromagnets*," Department of Physics and Astronomy, Ball State University, Muncie, IN, February, 1994.

- **M. Khatun**, "*Exact Solutions for Localized Correlations of S=1/2 Ising Models on Planar Ising Ferromagnets,"* Department of Physics and Astronomy, Ball State University, Muncie, IN, July, 1990.
- **M. Khatun**, *"Exact Solutions for Localized Correlations of Spin 1/2 Ising Models on Various Planar Lattices,"* Millersville University, Millersville, Pennsylvania, June, 1990.

- **M. Khatun**, *"Even- and Odd- Number Localized Spin Correlations on Planar Ising Ferromagnets,"* State University of New York at Potsdam, Potsdam, New York, June, 1986.

Courses Taught

Ohio University (Spring, 1986)
General Physics I (Calculus- based)

SUNY, Potsdam (1986-1987):
- PHYS- 475 --Mechanics 47
- PHYS 484 --Thermodynamics and Statistical mechanics
- PHYS- 202---College physics (algebra-based)
- PHYS-330 Meteorology

Ball State University (1990-2018):
- ASTR-100 –Introductory astronomy
- PHYC-101 --- Conceptual physics for the elementary education majors
- PHYC- 110 --- Algebra-based general physics

- PHYC-112—Algebra-based general physics
- PHYC 120—Calculus-based general physics for the physics majors (core course)
- PHY-260---Modern physic for the physics majors (core course)
- PHY-330/530---Analytical Mechanics(core course)
- PHYC-434/534 –Thermal Physics (core course)
- PHYC- 671—Classical Mechanics (core course)
- PHYC-675 –Statistical Mechanics (core course)

Dissertation/ Master's Thesis andResearch paper/ Independent research

During the past three decades, I have been working with many undergraduate and graduate students. Their involvements include working on doctoral thesis, master's thesis, master's degree research papers, honors fellowships, honors thesis, and independent research studies. Students worked mainly on four different topics: Phase transition and critical phenomena on 2-D Ising models, Electron transport in semiconductor nanodevices, Quantum Dot Cellular Automata (QCA) Devices, Electronic properties and quantum transport of carbon structures (graphene, carbon nanotubes (CNTs), graphene nanoribbons, and boron-nitride nanoribbons.

In addition, I have served as member of master's thesis committees and member at-large on doctoral committee at Ball State University. A list of the students and their research topics is shown here.

Master's Students

- Tuan Le, "Thermal Properties of Single Walled Carbon Nanotubes: Molecular Dynamics", Master's thesis (2017-) ---in progress.

- Albert DiBenedetto, "Electronic properties of carbon and boron-nitride hexagonal nanoribbons", Master's thesis (2017)

- Spencer Jones – "*Quantum Transport in Carbon Nanostructures*" Master's thesis (2016).

- Shaun Wood "Thermal Properties of Carbon Nanotubes," Research paper 12 (2013).

- Zhe Kan "Electrical Properties of Carbon Structures," Master's thesis (2013).

- Benjamin Padgett**,** "Modeling and Simulation of Fault Tolerant properties of Quantum-dot Cellular Automata Devices" Master's thesis (2010).

- Adam Hinkle, M.S thesis, "Tight Binding Calculations of Electronic properties of Oligophenyl and Oligoacene Nanoribbons" Master's thesis (2008).

- Travis Barclay, M.S. thesis, "The Temperature Effect and Defect Study in Quantum-dot Cellular Automata," Master's thesis (2005).

- Melissa Hendrichsen, M.S. Thesis, "Thermal Effect and Fault Tolerance in Quantum-dot Cellular Automata," Master's thesis (2005)

- Luke Kanuchok, M.S. thesis, "*The Thermal Effect and Clocking in Quantum-dot Cellular Automata*," Master's thesis (2003).

- Christopher Cochran- M.S. thesis, *"Even-number Correlations on Two-Dimensional Ising Lattice Structures,"* Master's thesis (2002).

- Eric Mandell, M.S. thesis, "*Theoretical Studies of Inter-dot Potential Barrier Modulation in Quantum-dot Cellular Automata,"* Master's thesis (2001).

- Gabriel A. Anduwan- M.S. thesis, *"Electron Transport in Semiconductor Nanoconstrictions with and without an Impurity in the channel,"* Master's thesis (1998).

- Jong-Lae Kim- M.S. thesis, *"Electron Transport in a Nanostructure Containing Delta Impurities,"* Master's thesis (1996).

- Philip K. Joyner- M.S. thesis, *"Electron Transport in Semiconductor Nanoconstrictions with and without a Scatterer,"* Master's thesis (1995).

Doctoral Thesis Advisor

Gabriel Anduwan ,"*Thermal Effect and Fault Tolerance on Nanoscale Devices: The Quantum Dot Cellular Automata"* Ed. D (2007).

Member-at-large, Doctoral Committee

- Devinder Kaour , Ph. D. Dissertation (Chemistry, Ball State University, 2016)

Undergraduate Students

- Travis Everhart – "*Effects of Disorder on the Quantum Transport of Carbon Nanoribbons and Nanotubes"* (Spring 2014). PHYC 482 -- (2016)

- Albert DiBenedetto ---"*Electron Transport in Carbon Nanostructures,"* (2013- May 2015). PHYC 482 --Independent Research (Fall 2014).

- Nick Strange – "*Physical Properties of Carbon Nanostructures*" (Spring 2014-May 2015). PHYC-482-- Independent Research (Fall 2014).

- Andrew Moore ---Graduate Student, “Thermal and Electrical properties of Carbon Nanotubes (CNTs)”, Spring 2012.

- Jeremy Christman, “*Quantum Transport in Carbon Nanotube Devices,”* (2011-2012).

- David Hines, “Nanoelectronics”- (Fall 2012).
- Travis Everhart – *“Effects of Disorder on the Quantum Transport of Carbon Nanoribbons and Nanotubes”* (Spring 2014).
  PHYC 482 --Independent Research (Spring 2016)

- Albert DiBenedetto ---“*Electron Transport in Carbon Nanostructures,”* (2013- May 2015). PHYC 482 --Independent Research (Fall 2014).

- Nick Strange – “*Physical Properties of Carbon Nanostructures*” (Spring 2014-May 2015). PHYC-482 Independent Research (Fall 2014).

- Andrew Moore ---Graduate Student, “Thermal and Electrical properties of Carbon Nanotubes (CNTs)”, Spring 2012.

- Jeremy Christman, “*Quantum Transport in Carbon Nanotube Devices,”* (2011-2012).

- David Hines, “Nanoelectronics”---independent study (Fall 2012).

- Joseph Laslie, *“Carbon Nanotubes (CNTs)”* (Fall 2010).

- Josh Gevirtz: *“Undergraduate Research in Nanoscience*” (Spring 2009)

- Molly Reber, Undergraduate Research in Nanoscience— (2007)

- Daniel Baker, Undergraduate Research in Nanoscience----(2005- 2007)

- Anthony Gilmore, Undergraduate Research in Nanoscience----(2005- 2007)

- Michael Kuntzman, Undergraduate Research in Nanoscience---- (2005- 2008)

- Elizabeth Cougill, Independent Research, “Quantum-dot Cellular Automata,” Spring 2005

- Kyle Crater, PHYC 482--Independent research, “Nanoscience-electronics and Quantum-dot Cellular Automata,” Spring, 2004.

- Travis Barclay, “Nanoelectronics and Quantum-dot Cellular Automata,” (2002-2003).

- Michael St. Clair (Senior, Indiana Academy of Sciences) --"Quantum Dot Cellular and Electron Transport in Semiconductor Devices," Fall, 2000.

- Thomas Kuhlman-- "QCA and Molecular Electronics," (1998- 2000).

- Brian Case-- "Nanoelectronics and QCA", (1998-2000).

- Stayte Wesley- Undergraduate Research Fellow,"Phase Transition and Critical Phenomena in Low Dimensional Ferromagnetic Ising Systems,"1996.

- Lisa Pawlowski- Honors thesis, " Exact Solutions for Ising Model Correlations of the Decorated –Square Lattice" (1994).

Master's Thesis Committee Member:

- Brendan Ferris "Electronic Properties of two-dimensional Phosphorene materials using Density Functional Theory (2017).
- Jesse Watson, "Testing the Tran-Blaha Approach for Band Gap Calculations in a Pseudopotential Environment," (Summer 2015)

- Jack Nault, "*Measuring the Quality of Generalized Gradient Approximations in a Density Functional Theory Pseudopotential Environment for Solids*" June, 2012.

- Zsolt Balint, "*Recreation of the IE 0657-56 (Bullet Cluster) Merging Event via N-body Computer Simulations*" (July, 2012).

- Dayna Thompson, "*Photo metric parallaxes and Subdwarf Identification for M-Type Stars*" (July, 2012).

- Christopher Wagner, "*Exchange Energy and Potential Using the Laplacian of the Density,"*(July 2011).

- Alexia M. Benson-Avillan, *"Spectroscopic Analysis of Dwarf Nova SS Cygni"* (May, 2010).

- Abigail Perkins, *Electron-spin polarization via Zeeman and A-B effect in double quantum dot ring* (December, 2009).

- Feras G. Alzubi, *"Atomistic Modeling of Elastic and Transport properties of Carbon Nanotubes"* (July 2008)

- Sudhendra Vasthari, --"*Electronic and Transport Properties of Carbon Structures* (research paper, December 2008)

- Mohan Ram Varanasi---M.S thesis, "Behavior of Electrons in Quantum Dot Nanostructures," (July, 2006)

- Michael Lisowski----M.S thesis, “Elecctronic Structure Calculations of Small CdSe,” March 2006.

- Kevin Tajkowski-- M.S. thesis, “One-Dimensional Models of the Transport of Electrons in a Quantum Wire,” (July, 2001).

- Hsiu-Lien Hu-- M.S. thesis “Quantum Transport of Energetic Electrons in Ballistic Nanostructures,” (July, 2000).

- David Ikeler-- M.S. thesis, “Transport in a Nanostructure with Quasiperiodically Varying Potential Characteristics,” (July, 1997).

- John Bowman-- M.S. thesis, "Transport in a Confined Two-Dimensional Electron Gas With Longitudinal Potential Variations," (October, 1995).

- Shashi Martin-- M.S. thesis, "Computation of Conductance of a Nanostructure," (July, 1994).

- Erwin- M.S. thesis, “Electron Eigenvalues and Eigenfunctions for a Nanochannel with Finite Rectangular Barrier,” (December, 1994).

Professional Service

University

- Graduate Education Committee (Fall 2015- 2018)
- Deans Advisory Council (2012-May 2015)
- Associate Provost for Research and Dean of Graduate School Search Committee (2007-2009)
- McGaughey Leadership Award Committee—College representative (2000- 2006)
- Green Committee: Member of the fund raising committee(2000-2001)
- University Research Committee (1997-1999)
- Professional Affairs Committee (1996-1999)
- Graduate Faculty Advisory Committee (1995- 1998)
- Center for International Programs: (1994)

Department

- Curriculum and Assessment Committee (Chair: 2011-2016, Member: 2006-2011; Chair: 2000-2006; Member: 1992-1999)
- Undergraduate Committee: (Member: 2012-2016, 2003- 2005)
- Committee on Committee (Member : 2015-2016, 2009-2014 2002-2003, 2004-2005)
- Promotion and Tenure Committee (Member: 2014-2015 , Chair: 2009-2011, 2007 –2008; Member: 2008-2009, 1995-1997).
- Faculty Search Committee (20011-20012 Chair ; 2002-2003 Chair; 2006- 2008 Member)
- Graduate Committee ()

- Graduate Committee: Graduate student selection, library and colloquium (2011-2012---Member ; 1999- 2002 (Chair); 1998-1999, 2004-2006, 2008-2009 --Member)
- Colloquium Committee: (1992-1999-----Chair)
- Staffing Committee: (2007-2008, 2011-2013, Member)

Others:

Mentor: "Awareness, Skills, and Mentoring Add up to Success for Girls in Science, Engineering, and Mathematics Careers", supported by NSF (July 1995-June 1996).

Mentor: Summer Scholars Residential Program for Minority Students, supported by Indiana State Legislators (1995, 1997).

Mentor: "An Introduction to Analog and Digital Electronics for Young Men and Women", Supported by NSF (summers 1991-93).

Judge: East Central Indiana Regional Science Fair; 1992, 1994

Chair: Physics and Astronomy Section, Indiana Academy of Sciences, 1995, 2003-2004.
Vice-Chair: Physics and Astronomy Section, Indiana Academy of Sciences, 2002-2003.

Professional Development

"Professional Skills Development for Women Physicists Workshop," sponsored by the American Physical Society, Los Angeles, CA, March 20, (2005).

"**Center for Computational Nanoscience (CCN) Linux Training Sessions,"** arranged by the University Computing Services (UCS), February-March, (2004).

"Large Interactive Classroom Workshop (Student Electronic Response System)," organized by Dr. Robertson from Physics and Astronomy, Ball State University, Summer, (1998).

"Mathematica Workshop for Faculty", organized and conducted by Drs. Errington and Koltenbah from Physics and Astronomy, and Drs. Emert and Nelson from Mathematical Sciences, Ball State University, (1995-96).

"**Making Larger Classes Work,"** Ball State University, Summer, (1995).

Awards:
Outstanding Research Award, Ball State University, (2005)

Membership in Professional Organization
The American Physical Society
The Indiana Academy of Science