

Curriculum Vita
Virginia M. Ayres, Ph.D.

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I. Education:

1985	Ph.D.	Physics	Purdue University, West Lafayette, IN
1977	B.A.	Physics	Johns Hopkins University, Baltimore, MD
1977	B.A.	Biophysics	Johns Hopkins University, Baltimore, MD

Ia. Professional Experience - Academic Positions:

1997-Present	Associate Professor, Departments of Electrical & Computer Engineering, Michigan State University
2005-2006	Visiting Associate Professor, Tokyo Institute of Technology Japan (Chaired position)
1997-2001	Adjunct Associate Professor, Department of Materials Science and Mechanics, Michigan State University
1989-1990	Visiting Scholar, Department of Physics & Astronomy, Dartmouth College

Iib. Professional Experience – Government Laboratory:

1985-1997	Research Physicist, U.S. Navy White Oak Laboratory, Silver Spring, MD
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Iic. Professional Experience – Leadership:

2020-	NASA Michigan Space Grant Consortium: Michigan State University Affiliate Member, Executive Board
2005 -2012	Member, College of Science Alumni Board, Purdue University
1995-1997	Program Director, National Science Foundation: Quantum Electronics, Plasmas & Electromagnetics Program
1993-1994	Science and Technology Agent, Office of Innovative Science and Technology, Strategic Defense Initiative: Interactive Space Technologies: Behavior of Systems in the Space Environment

III. Research Interests: <http://www.egr.msu.edu/ebnl>

Nanobiology

Directive impact of nanophysical cues in Central Nervous System (CNS) injury and repair:

- Regenerative scaffolds for traumatic injury repair
- Tunneling nanotube induction and role(s) in CNS cellular network communication
- Micro-environments of degenerative diseases

Quantum/ Nano electronics

- Quantum communications
- Materials and devices in space environments

Instrumentation Development

- Scanning probe recognition microscopy

IV. Honors and Awards:

2019	Marquis Who's Who Albert Nelson Marquis Lifetime Achievement Award; 2010-present Marquis Who's Who in: America, Science and Engineering, In the East
2019	Keynote Speaker, SPIE Optics and Photonics, 11-15 August 2019, San Diego, CA, "Spin-Orbit Interactions in Flying Qubit Architectures"
2019	Keynote Speaker, 6th International Conference on Materials Science and

- Nanotechnology, 22 July 19, Rome, Italy, "Nanowires and Nano-Enhanced Properties: What Proofs are Definitive?"
- 2017-18 Guest Editor, IEEE Transactions on Nanotechnology: Special Section/Issue on the 17th IEEE International Conference on Nanotechnology
- 2017 Keynote Speaker, Plenary Session, IEEE NANO 2017, Pittsburgh, PA 25-28 July 2017, "Directive Nanophysical Cues As A Strategy For Central Nervous System Repair"
- 2017-present Ambassador, American Society of Cell Biology
- 2015 Faculty Sponsor for 2015 NIH DEBUT Challenge Honorable Mention Award "Smart Walker Device"
- 2015 Plenary Speaker, Advances in Nanotechnology, Birmingham, UK, 09-10 June 2015, "Nanoscale Cues for Regenerative Neural Cell Systems"
- 2014 Interview in R&D Magazine, rdmag.com, in *Nano Testing for Future Electronics* by Lindsay Hock, on Ayres' research "Testing Nanoelectronics for Space" [http:// www.rdmag.com/articles/2014/08/nano-testing-future-electronics](http://www.rdmag.com/articles/2014/08/nano-testing-future-electronics)
- 2014-2013 Purdue University Distinguished Women Scholars Award
- 2013 Feature article on Ayres' research "Extracellular scaffolds for nervous system rehabilitation" in *International Innovations: The Brains Behind Healthcare Research*, July 2013 Issue 22.
- 2006 Department of Physics Outstanding Alumna Award, Purdue University
- 2006-2005 Chair of International Cooperation, Tokyo Institute of Technology, Japan
- 2004 NASA Faculty Fellowship Award
- 2003 Invitational Visit to Japan, Takano Company
- 2003 NASA Faculty Fellowship Award
- 1998 NSF Director's Award for Collaborative Integration: Plasma Working Group
- 1997 & 1996 NSF Outstanding Performance Award
- 1996 Japan Society for Promotion of Science Invitation Fellowship for Research in Japan
- 1995 Navy Certificate of Achievement for Exemplary Performance
- 1988 & 1986 Navy Quality Step Increase for Outstanding Performance
- 1987 Navy Sustained Superior Performance Award

V. Professional Activities and Organizations:

Va. Advisory

Royal Society, UK:

University Research Fellowship

National Institutes of Health (NIH):

Reviewer for (2007 – present):

ARRA Academic Research Enhancement Award (AREA) ZRG1 BST-Q (52)
 Nanotechnology in Medicine and Biology-Synthesis, Theory and Analysis ZRG1
 BCMB-S
 Nanotechnology ZRG1 BST-M (51)
 Nanotechnology ZRG1 NANO-M (01)
 Nanotechnology ZRG1 NANO-M (01)
 Small Business ZRG1 IMST-D (13) Biomaterials, Delivery Systems, and
 Nanotechnology
 Small Business ZRG1 IMST-M (13) Basic and Integrative Bioengineering
 Small Business ZRG1 IMST-M (13) B Basic and Integrative Bioengineering

National Science Foundation (NSF):

Reviewer for (1990 – present):

Engineering Research Centers (ERC)
 Experimental Program to Stimulate Competitive Research (EPSCoR)

Graduate Research Fellowship Program (GRFP)
Integrative Graduate Education and Research Training (IGERT)
Integrative Hybrid and Complex Systems Program
Major Research Instrumentation (MRI)
Nanomanufacturing Program
Nanoscale Science and Engineering Centers (NSEC)
Nanotechnology Education for Undergraduates (NEU)
Partnerships for International Research and Education (PIRE)
Physics of Living Systems Program
Quantum Electronics, Waves and Beams Program

Site Visit Team, Center for Plasma-Aided Manufacturing, University of Wisconsin, 1996

National Aeronautics and Space Administration (NASA):

Reviewer for (2011 – present):
Earth Science and Technology Office

National Research Council (NRC):

Reviewer for:
National Materials Advisory Board Review of Air Force Office of Scientific Research
Materials Research Proposals

U.S. Civilian Research and Development Foundation (CRDF):

Cooperative Grants Program

U.S.-Israel Binational Science Foundation (BSF):

Cooperative Research Program

State of Texas Advanced Research Program and Advanced Technology Program:

Advanced Research Program

Editorships and Journal Referee:

Referee: Computerized Medical Imaging and Graphics
Referee: Polymer International
Referee: Scanning
Referee: European Physics Letters
Referee: Chemistry of Materials
Referee: Superlattices and Microstructures
Editor: IEEE Transactions in Nanotechnology: Special Issue NANO17
Referee: IEEE Transactions in Nanotechnology
Referee: Diamond and Related Materials
Referee: Journal of Applied Physics

Vb. Organizing

- 2017- Chair, Nano-Metrology and Characterization Track, IEEE NANO 2017, Pittsburgh, PA 25-28 July 2017
- 2017- Session Co-Chair: Nano-Metrology and Characterization I, IEEE NANO 2017, Pittsburgh, PA 25-28 July 2017
- 2017- Session Co-Chair: Plenary Session III, IEEE NANO 2017, Pittsburgh, PA 25-28 July 2017
- 2016- Nanomaterials Coordinator, Facility for Rare Isotope Beams (FRIB) Working Group, East Lansing, MI
- 2012 Finalist, Conference Chair, Biophysical Society Thematic Meeting “Biophysics in Regenerative Medicine”, Asilomar Conference Grounds, Pacific Grove, CA, USA, June 02-04, 2014
- 2008 Session Chair: “Coatings, Films and Fibres”, 6th International Symposium on Nanomanufacturing (<http://www.isnm2008.org/>), 12-14 November 2008, Athens, Greece

- 2008 International Program Committee, 6th International Symposium on Nanomanufacturing (<http://www.isnm2008.org/>), 12-14 November 2008, Athens, Greece
- 2006 Technical Committee, 4th International Symposium on Nanomanufacturing (<http://www.isnm2006.org/>), 01-03 November 2006, Massachusetts Institute of Technology, Cambridge, MA
- 2003 International Organizing Committee, 2003 International Conference on Plasma Science, June 2-5, 2003, Jeju, Korea
- 2002 Discussion Leader (Session Chair): Gordon Research Conference on Plasma Processing Science, July 21-26, 2002, Tilton, NH: "Getting Smaller: Applications of Plasmas in Nanotechnology"
- 2000 Session Chair: "Partially Ionized and Low Temperature Plasmas", APS/Division of Plasma Physics, October 23-27, 2000, Quebec City, Canada
- 2001 Technical Program Committee, 2001 IEEE International Conference on Plasma Science, June 17-22, 2001, Las Vegas, NV
- 1998 National Program Committee, 1998 IEEE International Conference on Plasma Science, June 1-3, 1998, Raleigh, NC
- 1996 National Program Committee, 1996 IEEE International Conference on Plasma Science, June 3-5, 1996, Boston, MA
- 1996 Session Chair: "Light Source Performance", 1996 IEEE International Conference on Plasma Science, June 3-5, 1996, Boston, MA
- 1996 Session Chair: "Scanning Probe Microscopy and Advanced Imaging Techniques", International Conference on Imaging and Image Processing, December 9-11, 1996, Santa Barbara, CA

Vc. Executive

- 2003- IEEE Nanotechnology Council TC-1
- 1999-2000 Chair, IEEE Nuclear and Plasma Sciences Society Executive Committee for Plasma Science and Applications (PSAC)
- 1999-2000 IEEE Nuclear and Plasma Sciences Society Advisory Committee (PSAC)
- 1997-1999 IEEE Nuclear and Plasma Sciences Society Executive Committee for Plasma Science and Applications (PSAC)

Vd. Professional Societies:

- American Physical Society (CMP-Condensed Matter Physics, BMP-Biomedical Physics)
- Biophysical Society
- American Society for Cell Biology
- Materials Research Society
- IEEE Nuclear & Plasma Sciences Society
- FRIB Users Organization, Facility for Rare isotope Beams, National Superconducting Cyclotron Laboratory
- American Association of Physics Teachers
- American Society for Engineering Education

VI. Major Service to Michigan State University:

Facility for Rare Isotope Beams (FRIB):

- 2017 - present: Isotope Harvesting Working Group
- 2016 - present: Nanomaterials Coordinator

University:

- Judge, University Undergraduate Research and Arts Forum (S2004, S2013, S2015, S2016, S2017)
- Judge, University Graduate Research and Arts Forum (S1998, S2011)
- Co-Coordinator, Science At The Edge Seminar Series (S2001, F2001)
- Instructor, Frontiers in Science: "Nanoscience and Nano Engineering" (S2001)
Accredited program for Michigan high school teachers
- Instructor, Michigan State University High School Engineering Institute (Summer 1999)

College of Engineering:

Undergraduate Awards and Financial Aid Committee (2016-present)
Judge, Engineering Graduate Research Symposium (F2011)
Dean's Search Committee (1998-99)

Department of Electrical and Computer Engineering:

Undergraduate Studies Committee (F2016, S2017, F2017, S2018, F2018)
Research and Graduate Studies Committee (F1999, S2001, F2010, S2011, F2011, S2012, F2012, S2013, F2013, S2014, F2014, S2015)
Graduate Admissions, Recruiting and Financial Aid Committee: (F2006, S2007, F2007, S2008, F2008, S2009, F2009, S2010)
Laboratory Committee (F2004, S2005)
Coordinator, ECE Department Distinguished Speaker Seminar Series (F2002, S2003)
Faculty Meeting Secretary (F2002, S2003)
Curriculum Committee (F2001, S2002)
By-Laws Committee (F2000, S2001)
Department Advisory Council (F1999, S2000)
Promotion and Tenure Committee (F1998, S1999)
Faculty Recruiting Committee (F1998, S2000)
Qualifying Exam Committee: Electronic Devices and Circuits (S1998, S1999, S2000, S2013, S2014, S2107)
Qualifying Exam Committee: Area Coordinator: Electronic Devices (S2014, S2015)

VII. Curricular Activities:

Courses Developed:

At Tokyo Institute of Technology, Japan:

Special Lecture on Mechanical Sciences and Engineering G & H: Mechanical Effects in Nanostructures and Devices (G: Fall Quarter 2005, H: Winter Quarter 2005-06)
Developed new graduate level curriculum on mechanical effects in reduced dimensionality systems including both physical and organic nanostructures. A requirement of the Chair of International Cooperation is that the Special Lecture series be given in English. These lectures were video-taped as well as CD-archived and are now available as reference materials in both nanotechnology and scientific English for students at Tokyo Institute of Technology.

At Michigan State University:

ECE802: Nanoelectronics (F2013, F2015)
This new course offering rigorously updates ECE931B: Molecular Electronics, with increased emphasis on transport in carbon nanostructures
ECE 931B Microstructures and Devices: Molecular Electronics (F2002, S2005, S2008)
New course offering in the 931 series. V. Ayres developed a new graduate level curriculum, including rigorous development of concepts and analytical techniques for evaluation of electronic transport in reduced dimensionality systems in inorganic and organic nanostructures.
ECE 931C Microstructures and Devices: Properties of Semiconductors (2003)
First team-taught offering of ECE 931C, with Prof. T. Grotjohn. V. Ayres developed section in scattering, high field transport, and quantum effects in semiconductors.
ECE 931A Microstructures and Devices: (2000)
Team development of new quantum devices curriculum with Prof. T. Hogan. V. Ayres developed Nanocircuits: Carbon Nanotube versus QCA (Quantum Cellular Automata) Devices half of course.
ECE 476: Electro-Optics (F2000, S2001, F2001, S2002, F2002, F2003, F2004, F2006, F2007, F2008, F2009, F2010, F2011)
All instructional materials web-based, beginning 2006
Complete revision of laboratory manual F2008; partial revision F2010
ECE 474: (F2000, S2001, S2003, S2005, S2007, S2009, S2011)
Addition of quantum devices section (beginning S2005), and carbon nanotube structure, (n,m), C_h, T, θ , etc. section (beginning S2009) to standard curriculum

All instructional materials web-based, beginning S2007
ECE 280 Analytical Methods for Electrical Engineering (2004)
Team development of new course offering in mathematical methods for engineering sciences with Prof. J. Deller. V. Ayres developed the “Applications of Complex Analysis” and the “Vector Calculus” sections.

Courses Taught:

ECE 931A: Microstructures and Devices: Quantum Devices (S2000)
ECE 931B: Microstructures and Devices: Molecular Electronics (S2002, S2005, S2008)
ECE 931C: Microstructures and Devices: Properties of Semiconductors (S2003)
MSM 990: Graduate Independent Study
Directed Studies in Polycrystalline diamond film growth and characterization (1999)
ECE 875: Electronic Devices (S2012, S2013, S2014)
ECE 874: Physical Electronics (F2003, F2012, F2017)
ECE/PHY 850: Electrodynamics of Plasmas (S1998)
ECE802-604/605: Nanoelectronics (F2013, F2015)
ECE 801: Graduate Independent Study: (1999, 2000, 2017) 4 students
• Directed Studies in Generalization of Bio-Compatible Implants for Cranial Gun Shot Wounds (2017)
• Directed Studies in GaN Environmental LEDs (Environmental Science and Policy Program Master Specialization Requirement) (2017)
• Directed Studies in Principal Component Analysis in scanning probe microscopy (2000)
• Directed Studies in FTIR emission feedback control for carbon nanomaterials growth (1999)
ECE 489: Alternative Research-focus Senior Design Capstone Faculty Mentor (F2018-2 teams, S2020-1 team)
ECE 480: Senior Design Capstone Project Facilitator (F2002-2 teams, S2003-1 team, S2004-2 teams, F2004-1 team, S2007-1 team, F2007-1 team, S2008-1 team, F2008-1 team, S2009-1 team, F2009-1 team, S2011-1 team, S2013-1 team, S2014-1 team, F2014-1 team, S2015-2 teams, F2015-1 team, S2016-1 team), F2016-1 team, F2017-1 team, S2018-1 team
2nd Place, Prism VentureWorks Prize, S2004
1st Place, Prism VentureWorks Prize, S2009
1st Place, Prism VentureWorks Prize, and Best Poster Award, F2009
1st Place, Prism VentureWorks Prize, S2011
1st Place, Prism VentureWorks Prize, F2014
2015 NIH DEBUT Challenge Honorable Mention “Smart Walker Device”, S2015
2nd Place, Prism VentureWorks Prize, F2015
Best Poster Award, F2017
ECE 476: Electro-Optics (F2000, S2001, F2001, S2002, F2002, F2003, F2004, F2006, F2007, F2008, F2009, F2010, F2011)
ECE 474: Principles of Electronic Devices (F1997, S1998, F1998, F1999, F2000, S2001, S2003, S2005, S2006, S2007, S2009, S2011, S2015, S2018)
ECE 390: Ethics, Professionalism and Contemporary Issues (S2012, F2012, F2013 (team with T. Hogan), F2014, S2016, F2016, S2017, F2017, S2018, F2018)
ECE 345: Electronics for non-ECE majors (F2001)
ECE 305: Electromagnetics for ECE majors (S2010, F2018, **S2020: Real-time Online Zoom**)
ECE 302: Electronics for ECE majors (F1999, S2000)
ECE 280: Analytical Methods for Electrical Engineering (S2004)

VII. Research Supervision:

Present Graduate Students

Gaurab Panda Ph.D. Candidate
Ph.D. Thesis: Nano and Quantum Electronics
M.S. Environmental Science and Policy Program Master Specialization

Graduate Student Honors and Awards:

Gaurab Panda

2018- 3rd Place: Best Poster, Michigan State University Graduate Research Symposium, 29 March 2018, East Lansing, MI
2017- IEEE Nanotechnology Council Student Travel Award for IEEE NANO 2017, 25-28 July 2017, Pittsburgh, PA
2017- Michigan State University Graduate Office Student Travel Award
2017- Michigan State University Graduate Office Fellowship Award

Cristian Herrera Rodriguez

2017- Peraton, Inc. for NASA Goddard Space Flight Center Summer Internship

Kan Xie

2016- Michigan State University College of Engineering Dissertation Completion Fellowship Award

Volkan M. Tiryaki

2013- Michigan State University College of Engineering Dissertation Completion Fellowship Award
2012- Michigan State University Graduate Office Fellowship Award
2009- Michigan State University Graduate Office Student Travel Award

Raeid Alduhileb

2010 - First author on Materials Research Society Nominee for Best Poster Award, Fall 2010

Benjamin W. Jacobs

2007- NASA Graduate Student Researchers Program Fellowship (2nd Competitive Renewal)
2006- Visiting Student Research Associate, Tokyo Institute of Technology, Japan, 05 March-02 June 2007, National Science Foundation International Research and Education in Engineering Award (IREE)
2006- Best Poster Co-Awardee, 6th IEEE Conference on Nanotechnology, Cincinnati, OH, 16-20 July 2006, <http://www.ececs.uc.edu/~mcahay/Nano2006/index2006.html>
2006- NASA Graduate Student Researchers Program Fellowship (1st Competitive Renewal)
2005- NASA Graduate Student Researchers Program Fellowship
2004- IBM Ph.D. Fellowship Finalist
2003- NASA Faculty Fellowship Student Award
2 week internship at NASA Goddard Space Flight Center

Qian Chen

2006- Best Poster Co-Awardee, 6th IEEE Conference on Nanotechnology, Cincinnati, OH, 16-20 July 2006 <http://www.ececs.uc.edu/~mcahay/Nano2006/index2006.html>

Kaylee McElroy

2005-06- Academic Achievement Graduate Assistant Award

Susan P. Song

2004-UNCF NASA Harriet G. Jenkins Summer Mini Grant Program Awardee 2004
2003-UNCF NASA Harriet G. Jenkins Summer Mini Grant Program Awardee 2003
2001 to 2004-UNCF NASA Harriet G. Jenkins Predoctoral Fellowship
2000 to 2001- Academic Achievement Graduate Assistant Award

Brandy G. Goolsby

2001- GEM Master of Science Fellowship
2000- Sloan Scholar

Amy L. Hoffman

1998-Academic Achievement Graduate Assistant Award

Munif Farhan

1998- College of Engineering Summer Research Internship Award

Present Undergraduate Students:

Haozhi Dong, Usienemfon Adia-Nimuwa, Ryan Aridi

Summary: Undergraduate Independent Research Advisor: 37 students

United States Citizen/Permanent Resident: 27/37 students

Under-represented Groups: 14/37 students

37	Spring 2019 Fall 2018	ECE 490	Ryan Aridi	CubeSat Quantum Relay Devices Regenerative/ Degenerative Behavior of Neural Cell Systems
36	Spring 2019 Fall 2018 Summer 2018 Spring 2018 Fall 2013 Summer 2013 Spring 2013 Fall 2012	ECE 489 MSU PA	Usienemfon Adia- nimuwa	Investigations in Regenerative and Degenerative Neuroscience Nanoscale Cues of Tissue Scaffold Used In Regenerative Medicine
35	Spring 2019 Fall 2018 Summer 2018 Spring 2018 Fall 2017 Summer 2017 Spring 2017 Fall 2016	ECE 489 MSU PA	Haozhi Dong	Computational Nanoelectronics and Nanobiology
34	Fall 2017	ECE 499	Devin Weerasinghe	Investigations in Regenerative and Rehabilitation Neuroscience
33	Fall 2017 Spring 2017	ECE 489 ECE 499 ECE 490	Jesus Garcia	Nanoscale Cues In Regenerative Medicine and Degenerative Disease
32	Fall 2017 Summer 2017	ECE 489 ECE 499 ECE 490	Jun Hyeon Ro	High-speed Electrochemical Deposition of Ni-Co Nanocrystals and Nanowires
31	Spring 2016 Fall 2015 Summer 2015	TEC	Isaac D. Caterino	Analyses For Nanoscale Cues of Tissue Scaffolds In Regenerative Medicine

30	Spring 2015	MSU URA	Jacob A. Brettrager	Closing the Feedback Loop: How to know what works in Undergraduate Ethics Education
29	Summer 2015 Spring 2015 Summer 2014 Summer 2013	TEC	Samed Kursathan Bay	Electronics and Nanoelectronics
28	Spring 2015	NSF URA	Steven A. Hartz	Analyses For Nanoscale Cues of Tissue Scaffolds In Regenerative Medicine
	Fall 2014 Summer 2014 Summer 2013	MSU URA MSU PA		Nanomaterials and Nanoelectronics in Extreme Environments
27	Spring 2011 Fall 2010	ECE499 ECE 490	Kan Xie	Nanomaterials and Nanoelectronics in Extreme Environments
26	Summer 2010	ECE 499	Joshua C. Myers	Nanomaterials and Nanoelectronics in Extreme Environments
25	Summer 2009	MI-LSAMP/SURA09	Adeel A. Khan	Nanoscale Biomaterials Properties of Tissue Scaffold Used In Regenerative Medicine
24	Fall 2008 Spring 2009	MI-LSAMP	Jonathan C. Callahan	Nanomaterials in Extreme Environments
23	Summer 2008	MI- LSAMP/ SURA08	Dexter A. Flowers	Regenerative Neural Cell System
22	Spring 2007 Fall 2006 Summer 2006	NSF-REU COE SRI	Andrew D. Baczewski	Nano-electronic and Nano-biological Investigations
21	Spring 2005	ECE-491	Elissa Carey	Photonic Investigation of Nanomaterials
20	Spring 2005 Fall 2004	MSU URF	Mark Englund	Fundamental Radiation Interactions in Nanoelectronics
19	Summer 2002	ECE 490	Daniel Capps	Micro Raman Spectroscopy Instrumentation Development

18	Spring 2002	ECE 499	Ricky Samona	Controlled Adaptive Learning Augmentation for Scanning Probe Microscope-based Nanomanipulation
17	Spring 2002 Fall 2001	GE FFF	Brandy Goolsby	Sensing and Control for SPM Micro/Nano Manipulation
16	Spring 2001 Fall 2000	ECE 490	Harun Saglik	SPM based Nanomanipulation of Biological Objects
15	Fall 2000	ECE 490	Karen Gilgenbach	SPM Investigation of the Molecular Basis of Hypertension
14	Fall 1999	ECE 490	Richard Venia	Impedance Spectroscopy of Nitrogen Methane hydrogen Grown Polycrystalline Diamond Films
13	Fall 1999	ECE 490	Susan Song	SPM Investigations of Nitrogen Methane hydrogen Grown Polycrystalline Diamond Films
12	Fall 1999	ECE 490	David Bordoley	Electronic and Thermal Properties of Diamond Films and Carbon Nanotubes
11	Summer 1999	ECE 490	Jason Spano	Electronic Properties of Diamond and Carbon Nanomaterials
10	Spring 1999	ECE 499	Ali Khan	FTIR Emission Feedback Control for Carbon Nanomaterials Growth
9	Spring 1999	ECE 490	Jill Bobbitt	Image Processing in SPM for Grain Boundaries and Terraces
8	Fall 1999	ECE 490	Carlos Adianata	FTIR Emission from Carbon Nanomaterials
7	Fall 1998	EE 499	Tariq Al-Hindi	FTIR Emission from Diamond and Amorphous Tetrahedral Carbon Films
6	Fall 1998	EE 499	Sarah Hagopian	SPM Investigation of Growth and Materials Structure of Doped Diamond Films

5	Fall 1998	EE 490	Hamad Balhareth	SPM Investigation of Growth and Materials Structure of Doped Diamond Films
4	Summer 1998	EE 491	Brian F. Wright	SPM Analysis of Polycrystalline Diamond Films
3	Summer 1998 Spring 1998	EE 490 MSU URI	Jazimah Abdul Majeed	SPM Investigation of Growth and Materials Structure of Diamond Films
2	Spring 1998	EE 490	Daniel Spach	SPM Investigation of Growth and Materials Structure of Diamond Films
1	Fall 1998 Summer 1998 Spring 1998	EE 490 COE SRI MSU URF	Munif. Farhan	SPM Investigation of Growth and Materials Structure of Diamond Films

Participation Mechanisms:

COE SRI/URI - College of Engineering Summer/Undergraduate Research Internship
 ECE 489 - Alternative Capstone, 4 credits
 ECE 490/491/499 – Undergraduate Independent Study/Research, 1-3 credits
 GE FFF - GE Faculty for the Future
 MI-LSAMP – Louis Stokes Alliance for Minority Participation
 MSU PA – Professorial Assistant Honors College Fellowship, Michigan State University
 MSU URF/URA – Michigan State University Undergraduate Research Fellowship/Research Assistant
 NSF REU – National Science Foundation Research Experience For Undergraduates
 SURA – Summer Undergraduate Research Academy
 TEC – The Early College, Lansing Community College

Summary: Honors Option Advisor (<http://honorscollege.msu.edu/>): 13 students

13	Fall 2018	ECE 390	Jason Glynn	Web Accessibility for ECE 390
12	Fall 2018	ECE 390	Greg Stark	Web Accessibility for ECE 390

11	Fall 2017	ECE 390	Jack Christie	Electronic Options for Interactive Participation
10	Spring 2016	ECE 390	Nathan Blanke	Accessibility Conversion for ECE 390: Ethics, Professionalism and Contemporary Issues
9	Spring 2016	ECE 390	Steffany Ellenstein	Closing the feedback loop: How to know what works in Undergraduate ethics education
8	Fall 2014	ECE 390	Jacob Brettrager	Closing the feedback loop: How to know what works in Undergraduate ethics education
7	Fall 2014	ECE 390	Bailey Winter	Closing the feedback loop: How to know what works in Undergraduate ethics education
6	Fall 2011	ECE 476	Christopher Sielger	Integrated Photonic Circuits
5	Spring 2005	ECE 474	Luke Niewiadomski	Quantized Electronic Devices
4	Spring 2005	ECE 474	Hong-Vinh Nguyen	Quantized Electronic Devices
3	Spring 2003	ECE 474	Ankar Patel	Honors Option Challenge
2	Spring 2000	ECE 302	David Bordoley	PSPICE Goal Functions and Schade Curves
1	Spring 1998	ECE 474	Matthew Feusse	Transient and Environmental Effects in CMOS Electronics

Participation Mechanism:

ECE 390: Ethics, Professionalism and Contemporary Issues: 2 students (F2018), 1 student (F2017), 2 students (S2016), 2 students (F2014)

ECE 476: Electro-Optics: 1 student (F2011)

ECE 474: Principles of Electronic Devices: 4 students total: 2 students (S2005), 1 student S(2003), 1 student (S1998)

ECE 302: Electronics for ECE majors: 1 student (S2000)

Undergraduate Student Honors and Awards:

Ryan Aridi

2019 NASA Goddard Space Flight Center Summer Internship

Usienemfon Adia-Nimuwa

2018- American Society of Cell Biology Student Travel Award for ASCB/EMBO 2018 Meeting, 08-12 December 2018, San Diego, CA

2013- Research by Usienemfon Adia-Nimuwa featured in the Honors College recruiting brochure:

Undergraduate Research at Michigan State University: Expanding the Path to Knowledge

2013- Professorial Assistant Honors College Fellowship, Michigan State University

Haozhi Dong

2017- National Science Foundation Student Travel Award for IEEE NANO 2017, 25-28 July 2017, Pittsburgh, PA

2016-present Professorial Assistant Honors College Fellowship, Michigan State University

Jacob A. Brettrager

2015- Michigan State University Undergraduate Service Award (USA)

2014- 3rd Place, Prism VentureWorks Prize, F2014

Steven A. Hartz

2014- 2nd Place, Prism VentureWorks Prize, F2014

2012- Professorial Assistant Honors College Fellowship, Michigan State University

Adeel A. Kahn (Western Michigan University)

2011- Engineer's Week Scholarship (V. M. Ayres recommendation)

2011- 1st place in poster presentation at Mid-East Honors Association Annual Conference, March 26th, 2011 in Dayton, OH. "Neural Cell Investigations in Relation to Spinal Cord Injury." by Adeel Khan, Virginia Ayres, Volkan M Tiryaki, Sally Meiners, Roberto Delgado-Rivera

2009- MI-LSAMP Summer Undergraduate Research Academy at Michigan State University, V. M. Ayres, Research Supervisor

Kan Xie

2010 - Co-author and presenter of Materials Research Society Nominee for Best Poster Award, Fall 2010

Jonathan C. Callahan

2009 MI-Louis Stokes Alliance for Minority Participation Travel Award to APS March Meeting

2008-2009 MI-Louis Stokes Alliance for Minority Participation Research Fellowship

Dexter A. Flowers (Wayne State University)

2008- MI-LSAMP Summer Undergraduate Research Academy at Michigan State University, V. M. Ayres, Research Supervisor

Andrew D. Baczewski

2007- National Science Foundation Graduate Fellowship Program Honorable Mention

2007- Participant in National Science Foundation International Research and Education in Engineering Award (IREE). Visiting Research Associate Tokyo Institute of Technology, Japan, 05 March-02 June 2007

2006- Best Poster Co-Awardee, 6th IEEE Conference on Nanotechnology, Cincinnati, OH, 16-20 July 2006 <http://www.ececs.uc.edu/~mcahay/Nano2006/index2006.html>

2006- National Science Foundation Research Experience for Undergraduate Award (REU)

2006- College of Engineering Summer Research Internship Award

2006- Distinguished Academic Achievement Award (MSU College of Engineering)

2006- Service Recognition Award (MSU College of Engineering)

2005- Distinguished Academic Achievement Award (MSU College of Engineering)

2005- MSU Study Abroad Merit Scholarship
2005- General Motors Scholarship
2005- Arthur R. and Pearl Butler Scholarship Fund
Six semesters on the Dean's List (2003-2006)

Karen Gilgenbach

2000- 11th Annual Argonne Symposium for Undergraduates in Science, Engineering and Mathematics
Participant (refereed)

Harun Saglik

2002-Michigan State University Outstanding Senior Award
2000- Annual Argonne Symposium for Undergraduates in Science, Engineering and Mathematics
Participant (refereed)

Brandy D. Goolsby

1999- GE Faculty for the Future Scholarship

Susan P. Song

1999- GE Faculty for the Future Scholarship
1999- 10th Annual Argonne Symposium for Undergraduates in Science, Engineering and Mathematics
Participant (refereed)

Richard L. Venia

1999- 10th Annual Argonne Symposium for Undergraduates in Science, Engineering and Mathematics
Participant (refereed)

VIII. Publications:

Refereed Articles and Chapters

Refereed Proceedings Papers

Refereed Extended Abstracts

Invited Colloquia and Seminars

Invited Symposia, Workshops and Special Sessions

Student Presentations

Contributed Conference Proceedings and Presentations

Technical Reports

Dissertation

Articles Written about Ayres' Research

Patents and Registrations

[SCI Impact Factor: 2018]

Refereed Journal Articles and Chapters

1. Tiryaki, VM, **Ayres, VM**. Automated Acquisition of Nanofiber Diameter and Orientation Distribution from Atomic Force Microscopy Images of Nanofibrillar Scaffolds. Submitted.
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3. **VM Ayres**, Q Chen, Y Fan and L Udpa, "Properties Investigation by Scanning Probe Recognition Microscopy", ***Program Booklet SCANNING 2008***, 14-17 April 2008 NIST Gaithersburg, MD
4. BW Jacobs, S.P. Song, R.M. Ronningen, A.F. Zeller, M.A. Crimp, **V.M. Ayres**, H.C. Shaw, J.B. Benavides, J. Plante and A. Kogut, "Potential of Resilient Nanomaterials for Space Applications", ***Proceedings of the 5th Trends In Nanotechnology*** (TNT04) CMP Cientifica (2004)
5. Q. Chen, Y. Fan, L. Udpa, M.S. Schindler and **V.M. Ayres**, "Scanning Probe Recognition Microscopy for Nano Biomedical Applications", ***Proceedings of the 5th Trends In Nanotechnology*** (TNT04) CMP Cientifica (2004)
6. **V.M. Ayres**, F. Salam, N. Xi and D. Wang, "Scanning Probe Microscopy with Landmark Referenced Control", ***Conference Record of the 3rd Trends In Nanotechnology*** (TNT02) published by CMP Cientifica, pp. 157-158 (2002)

Invited Seminars/Colloquia:

1. "Directive Cues In Brain & Spinal Cord: Regeneration, Degeneration and Rehab"
VM Ayres
Department of Biomedical Engineering / Institute for Quantitative Health Sciences and Engineering Seminar
Michigan State University
19 March 2019
2. "Brain Repair: Regenerative, Degenerative and Rehab"
VM Ayres
Trifecta Initiative Fall Welcome Event
Michigan State University
21 September 2018
3. "The Physics and Biophysics of Astrocyte Modulation by Nanophysical Cues"
VM Ayres
Department of Physics Special Seminar
Purdue University
West Lafayette, IN
05 Mar 2014
3. "Nanoscale Cues for Regenerative Neural Cell Systems"
VM Ayres
Van Andel Institute
Grand Rapids, MI
20 August 2013
4. "Nanoscale Cues for Regenerative Neural Cell Systems Investigated by Scanning Probe Recognition Microscopy"
VM Ayres
Electrical Engineering & Computer Sciences Department Seminar
University of Michigan, Ann Arbor, MI
July 13, 2009
5. "Undergraduate Research in the EBNL Group"

VM Ayres

EGR 160: Diversity and Engineering Seminar and Panel
Michigan State University
East Lansing, MI 48824
09 April 2009

6. "Scanning Probe Recognition Microscopy Investigations of Tissue Scaffolds for Spinal Cord Repair"
VM Ayres
Department of Physics Colloquium
North Carolina State University
Raleigh NC
18 February 2008
7. "Multiphase Gallium Nitride Nanowires and Nanocircuits"
VM Ayres
nanoHub 501 Graduate Tutorial Seminar Series
Purdue University
West Lafayette, IN
16 January 2008
8. "Multiphase Gallium Nitride Nanowires and Nanocircuits"
VM Ayres
Howard University Nanotechnology Symposium, 05-06 November 2007
Howard University, Washington DC
05 November 2007
9. "Electronic Transport Characteristics of Gallium Nitride Nanowire-based Nanocircuits"
VM Ayres
Electrical & Computer Engineering and Computer Science Department Colloquium
University of Cincinnati
Cincinnati, Ohio
05 January 2007
10. "Scanning Probe Recognition Microscopy"
VM Ayres
National Institute of Standards and Technology
Gaithersburg, MD
March 22, 2006
11. "Scanning Probe Recognition Microscopy Investigation of Tissue Scaffold Properties"
VM Ayres
Ethicon/Johnson & Johnson
Somerville, NJ
March 21, 2006
12. "Two-Phase Coaxial Homostructure Gallium Nitride Nanowires"
VM Ayres
Center for Condensed Matter Sciences
National Taiwan University
Taipei, Taiwan
February 15, 2006
13. "Radiation Resilience of Nanostructures"
VM Ayres
Department of Chemistry Colloquium
Howard University
Washington, DC

July 14, 2004

14. "The Potential of Nanoelectronics for Space Applications"
VM Ayres
NASA Goddard Space Flight Center
Greenbelt, MD
June 18, 2004
15. "CNT-Based Nanoelectronics for Polarimeter-on-a-Chip"
VM Ayres
NASA Goddard Space Flight Center
Greenbelt, MD
June 16, 2004
16. "Fundamental Space Radiation Interactions in New Nanoscale Components"
VM Ayres
NASA Goddard Space Flight Center
Greenbelt, MD
July 18, 2003
17. "Site-specific Scanning Probe Microscopy of Biological Specimens"
VM Ayres
Department of Physics Colloquium
Purdue University, West Lafayette, IN
April 25, 2002
18. "Optimal Microstructure Design Engineering of Diamond Films"
VM Ayres, TR Bieler, B Adams
Electronics Science and Technology Division (Code 6800)
Naval Research Laboratory, Washington, DC
July 30, 2001
19. "The Effect of Nitrogen on Competitive Growth in Polycrystalline Diamond Films"
VM Ayres
Condensed Matter Physics Colloquium Series
Department of Physics & Astronomy
Michigan State University, East Lansing, MI
April 24, 2000
20. "The Best of Both Worlds: Diamond and Carbon Nanotube Hybrid Films"
VM Ayres
Nuclear Engineering & Radiological Sciences Department Colloquium
University of Michigan, Ann Arbor, MI
February 4, 2000
21. "Diamond and Carbon Nanotube Hybrid Films"
V. M. Ayres and D. Tomanek
Micro and Nano Engineering Center
Michigan State University, East Lansing, MI
December 15, 1999
22. "The Effect of Nitrogen on Competitive Growth Mechanisms of Diamond Films"
V. M. Ayres
Chemistry Division Colloquium
Argonne National Laboratory, Argonne IL
December 14, 1999
23. "Carbon Nanotubes: From Modeling to Synthesis and Applications"

D Tomanek, VM Ayres and D Luzzi
NASA Goddard Space Flight Center
Radiation Effects Branch
Greenbelt, MD
December 7, 1999

24. "Carbon Nanotubes: From Modeling to Synthesis and Applications"
D Tomanek and VM Ayres (joint presentation)
Dupont Experimental Research Station
Chaad's Ford, DE
December 6, 1999
25. "A Discussion With SWE About the Possibility of Becoming An Engineering Professor and How To Get There"
VM Ayres
Society for Women Engineers
Michigan State University, East Lansing, MI
October 20, 1999
26. "Plasma Processing and Nanoscale Characterization of Novel Electronic Materials"
VM Ayres
Electrical & Computer Engineering Department Graduate Student Seminar Series
Michigan State University, East Lansing, MI
April 8, 1999
27. "Macro- and Micro-Electronic Investigations of Polycrystalline Diamond Thin Films for Electronic Applications"
VM Ayres, M Bataineh, M Farhan, and BF Wright
IEEE Fall Regional Meeting - Electronic Devices Section
Detroit, MI
October 28, 1998
28. "Scanning Probe Microscope Investigations of Polycrystalline Diamond Thin Films"
VM Ayres, M Farhan, D Spach, J Abdul Majeed, BF Wright, H Balhareth, S Hagopian, BL Wright, and J Asmussen
Michigan Microscopy and Microanalysis Society
Kalamazoo, MI
October 16, 1998
29. "FTIR-Emission Characterization of Diamond Films"
VM Ayres
Department of Electrical and Computer Engineering
Michigan State University, East Lansing, MI
May 1, 1997
30. "Recent Characterization Studies of Hetero and Homo-Epitaxially Grown Diamond Films"
VM Ayres
Department of Mechanical & Aerospace Engineering and Applied Physics
Princeton University, Princeton, NJ
April 15, 1997
31. "FTIR-Emission Characterization of Diamond Films"
VM Ayres
Department of Physics Colloquium
Purdue University, West Lafayette, IN
February 14, 1997
32. "FTIR-Emission Spectroscopy of Polycrystalline Diamond Films"

VM Ayres
Technion, Inc./Norton Diamond Films
Technion, Inc, Irvine CA
December 12, 1996

Invited Plenary, Keynote and Panel Speeches

1. (Invited Keynote Speaker) R Aridi, **VM Ayres**, HC Shaw and D Preston, "Spin-Orbit Interactions in Flying Qubit Architectures", ***SPIE Nanoscience and Engineering***, 11-15 August 2019, San Diego, CA
2. (Invited Keynote Speaker) **VM Ayres**, "Nanowires and Nano-Enhanced Properties: What Proofs are Definitive?" 6th International Conference on Materials Science and Nanotechnology, 22 July 19, Rome, Italy
3. (Invited Keynote Speaker, Plenary Session) **VM Ayres**, "Nanoscale Cues for Regenerative Neural Cell Systems" ***17th IEEE International Conference on Nanotechnology (IEEE NANO 2017)***, 25-28 July 2017, Pittsburgh, PA.
4. (Invited Plenary Speaker) **VM Ayres**, "Nanoscale Cues for Regenerative Neural Cell Systems" ***Advances in Nanotechnology (ADNT15)***, 09-10 June 2015, Birmingham, UK
3. (Invited Workshop and Presentation) **V.M. Ayres**, "The New Physics of Heavy Ion Interactions with Nanostructures", ***National Superconducting Cyclotron Laboratory User Workshop***, 16-17 August 2007, East Lansing, MI
4. (Invited Webcast) **Keithley Nano Days** 23-26 April 2007
Two 30 minutes presentations plus 30 minute live Q&A session in USA and in Europe
V.M. Ayres and B.W. Jacobs, Session #3-Realise: Seminar #5 "Electronic Properties of Zinc-Blende Wurtzite Biphase Gallium Nitride Nanowires and NanoFETs", 26 April 2007
5. (Invited Presentation) **V.M. Ayres**, A.F. Rice and L. Udpa, "The Strategic Role of the NSF GOALI Program in Scanning Probe Recognition Microscopy Development", National Science Foundation DMI Grantees Conference, 24-28 July, 2006, St. Louis, MO
6. (Invited Workshop) **V.M. Ayres**, "Resilient Nanoelectronics for Space Applications" ***International Workshop on Nanoscience and Nanotechnology***, Center for Micro-Nano Sciences and Technology, National Cheng Kung University, Tainan, Taiwan, 14 February 2006
7. (Invited Presentation) H.C. Shaw, D. Liu, B.W. Jacobs, **V.M. Ayres**, R.M. Ronningen, A.F. Zeller, M.A. Crimp, J. Halpern, M-Q He, G.L. Harris and M.P. Petkov, "Performance of Nanomaterials and Actively Running Nanocircuits During Heavy Ion Irradiation", ***12th NASA VLSI Design Symposium***, 4-5 October 2005, Coeur d'Alene, ID
8. (Invited Presentation) **V.M. Ayres**, M.A. Crimp, B.W. Jacobs, M. Englund, E. Carey, R. M. Ronningen, A. F. Zeller, H. C. Shaw, M. P. Petkov and J. B. Halpern, "Nanotube, Nanowire and Nanocircuit Behavior in Simulated Space Environments", SPIE, 1-5 August, 2005, San Diego, CA
9. (Invited Workshop) T.R. Bieler, **V.M. Ayres** and B.L. Adams, "Designing Processing Strategies for Elastic Property Optimization for Polycrystalline Diamond Films", ***Microstructure Sensitive Design: A Workshop***, Drexel University, 2-7 December, 2002, Philadelphia, PA
10. (Invited Workshop) T.R. Bieler, **V.M. Ayres** and B.L. Adams, "Nanoscope Stress Evaluation and Mesoscopic Grain Boundary Conditions in Polycrystalline Ceramics", ***Air Force Office of Scientific Research Contractors Meeting in Metallic Materials and Ceramic Materials***, August 12-14, 2002, Bar Harbor, ME

11. (Invited Workshop) Fathi M. Salam and **Virginia Ayres**, "Landmark-based control for precision handling of biological specimens", **2002 IEEE International Conference on Robotics and Automation, Workshop W2: "Manipulation in the Micro and Nano Domains: New Materials and Technologies"**, May 12-14, 2002, Crystal City, VA
12. (Invited Workshop) **V.M. Ayres**, "Bioelectronics", **UMAC: Emerging Directions in Materials Workshop**, April 13, 2002, Michigan State University, East Lansing, MI
13. (Invited Special Session) **V.M. Ayres**, N. Xi, F. Salam, D. Wang, D. Arnosti, K. Gilgenbach, B. Goolsby, W. K. Fung and M. M. Yu, "SPM-Based Nano-Robotic operation for Site specific Biological Investigations" **IEEE Int'l Conf. on Nanotechnology and Nanomanipulation Special Session**, Maui, HI, October 28-30, 2001
14. (Invited Special Session) **V.M. Ayres** (Michigan St Univ.), E. Choueri (Princeton Univ.), C. Keane (U.S. DOE), C. Surko (U. C.-San Diego), and J. Willis (U.S. DOE), **American Physical Society: The Field of Plasma Physics - the Next Generation**, Bull. Am. Phys. Soc., Vol. 45, No. 7, p. 88 (2000).
15. (Invited Workshop) **V.M. Ayres**, N. Xi, F. Salam, B. Goolsby, and A. Hoffman, "Sensing, Planning and Control for Nano-Manipulation" **Nanoscience and Nanotechnology Workshop**, April 15, 2000, Michigan State University, East Lansing, MI
16. (Refereed Workshop) J.K. Park, **V.M. Ayres**, J. Asmussen and K. Mukherjee, "High Resolution Micro-Machining/Patterning of CVD Diamond Films for MEMS", **Solid State Studies in Ceramics, Gordon Conference 1999**, August 1-6, 1999, Kimball Union Academy, NH.
17. (Invited Workshop) ONR Workshop, "Future Directions in Electromagnetics Research", **Progress in Electromagnetics Research Symposium**, July 7-11, 1997 Boston, MA

Selected Student Presentations (Student presenters underlined):

1. **Best Poster: 3rd Place** "Flying Qubit Investigations for Heterostructure based Qubit implementations"
Haozhi Dong, Gaurab Panda, Kan Xie, Virginia Ayres, Harry Shaw, Deborah Preston, Manohar Deshpande
Michigan State University Graduate Research Symposium
Michigan State University, East Lansing, MI
29 March 2018
2. "Investigation of Nanofibrillar Influence on Cell-Cell Interactions of Astrocytes by Atomic Force Microscopies"
VM Tiryaki, VM Ayres, K. Xie, AA Khan, DA Flowers, I Ahmed, R Delgado-Rivera, S Meiners,
Engineering Graduate Research Symposium
Michigan State University, East Lansing, MI
03 November 2011
3. "Neural Cell Investigations in Relation to Spinal Cord Injuries"
Adeel Khan, Virginia Ayres, Volkan M Tiryaki, Sally Meiners, Roberto Delgado-Rivera
Mideast Honors Association Annual Conference (<http://www.mideasthonors.org/>)
Dayton, OH
26 March 2011
4. "Neural Cell Investigations in Relation to Spinal Cord Injuries"
Adeel Khan, Virginia Ayres, Volkan M Tiryaki, Sally Meiners, Roberto Delgado-Rivera
Michigan-LSAMP Kick-Off Conference
Lansing Community College, Lansing, MI
03 February 2011

5. "Neural Cell Investigations in Relation to Spinal Cord Injuries"
Adeel Khan, Virginia Ayres, Volkan M Tiryaki, Sally Meiners, Roberto Delgado-Rivera
 2009 Summer Undergraduate Research Academy Colloquium
 Michigan State University, East Lansing, MI
 15 August 2009
6. "Nano Mechanical and Electronic Investigations with Tokyo Institute of Technology"
Benjamin W. Jacobs, Andrew D. Baczewski, Virginia M. Ayres and Atsushi Hirata
 2007 NSF Grantees Conference on International Research and Education in Engineering
 Purdue University, West Lafayette, IN
 30 October-01 November 2007
7. "Current and Future Work With Carbon Nanotubes and Carbon Nanostructures"
S. P. Song
 1st Annual NASA/Harriet G. Jenkins Technical Symposium
 NASA Johnson Space Center, Houston, TX
 10-13 June 2002
8. "Scanning Probe Microscope Based Micro/Nanomanipulation Investigation of
 Molecular Events Sparked by Angiotensin II"
K. Gilgenbach, H. Saglik, B. Goolsby, H. Hummert, V. Ayres, N Xi, F. Salam and D.
 Wang
 11th Annual Argonne National Laboratory Symposium for Undergraduate Research in
 Science, Engineering & Mathematics
 Argonne National Laboratory, Argonne, IL
 3-4 November 2000
9. "Analysis of Laser Ablation Processes on CVD Diamond Films"
J.K Park, V. M. Ayres, J. Asmussen, and K. Mukherjee
 Michigan Microscopy and Microanalysis Society Soaring Eagle, MI
 22 October 1999
10. "Impedance Spectroscopy Investigation of Nitrogen-Methane-Hydrogen Grown
 Polycrystalline Diamond Films"
Susan P. Song, Richard A. Venia, Mohannad Bataineh and Virginia M. Ayres
 10th Annual Argonne National Laboratory Symposium for Undergraduate Research in Science,
 Engineering & Mathematics
 Argonne National Laboratory, Argonne, IL
 05 November 1999

Contributed Conference Proceedings and Presentations

1. (Invited Oral Session) Ayres, VM, Tiryaki, VM, Ahmed, I, Shreiber, DI. Potential Role Of TNTs In Astrocytic Gliosis. Subgroup S: Tunneling Nanotubes and Other Cell Protrusions: Structure, Composition, and Role in Inter-Cellular Communication and Disease, at the 2019 American Society for Cell Biology/European Molecular Biology Organization ASCB/EMBO Annual Meeting, 07-11 December 2019, Washington, DC.
2. Shaw, HC, Krainak, MA, Yang, G, Safavi, H, Ayres, VM, El-Araby, E, Thayer, DR, Heiner, J, Naimipour, N, Cooper, L, Israel, D, De Paula, RP, Srinivasan, D, AlMaeeni, S. Concepts for Utilization of Quantum Communication and Quantum Key Distribution. 70th International Astronautical Congress, 21-25 October 2019, Washington D.C.
3. Xie, K, Ayres, VM, Shaw, HC, Hirata, A. Impact of Stored Mechanical Energy in Carbon Onion Resilience Under Space Radiation. SPIE. Nanoscience and Engineering, 11-15 August 2019, San Diego, CA.

4. Aridi, R, Dong, H, Adia-Nimuwa, U, Panda, G, Ayres, VM, Tiryaki, VM, Chen, H, Ahmed, I, Shreiber, DI. Investigation of Glia Mechanosensation Using Energy Minimization of Curvature and Elastic Energies. Submitted for presentation at the 63rd Annual Meeting of the Biophysical Society, 02-06 March 2019, Baltimore, MD (Regular conference and Undergraduate Poster Award competition (UPAC)).
5. Adia-Nimuwa, U, Panda, G, Dong, H, Ayres, VM, Tiryaki, VM, Chen, H, Ahmed, I, Shreiber, DI,. Quantitative Investigation of Biomaterials-Based Impact on Glia and Neuron Reactivity. 2018 American Society for Cell Biology/European Molecular Biology Organization ASCB/EMBO Annual Meeting, 08-12 December 2018, San Diego, CA.
6. Panda, G, Dong, H, Xie, K, Ayres, VM, Shaw, HC, Preston, DM. Influence of Effective Mass on Flying Qubit Coupling for Heterostructure-based Qubit Implementations. Symposium EP06: Coherent Electronic Spin Dynamics in Materials and Devices, 2018 MRS Fall Meeting, 25-30 November 2018, Boston, MA.
7. Panda, G, Hussain, MS, Ayres, VM, Dong, H, Xie, K, Ro, JH, Adia-Nimuwa, U, Shaw, HC. Ni/Co Nanocrystalline Film and Nanowires Grown Via High Speed Electrodeposition on Untreated Titanium. Symposium NM02: Nanometal Synthesis, Properties and Applications, 2018 MRS Fall Meeting, 25-30 November 2018, Boston, MA.
8. Hussain, MS, Ayres, VM. Ni/Co Nanocrystalline Film and Nanowires Grown Via High Speed Electrodeposition on Untreated Titanium. 5th Nano Today Conference, 06-10 December 2017, Waikoloa, HI.
9. Xie, K, Panda, G, Dong, H, Ayres, VM, Shaw, HC, Preston, DM, Deshpande, MD. Flying Qubit Investigations for Semiconductor Heterostructure Qubit Implementations. Symposium EM08: Emerging Materials for Quantum Information, Materials Research Society 2017 Fall Meeting, 26 November-01 December, 2017, Boston, MA.
10. Ayres, VM, Garcia, JA, Tiryaki, VM, Ahmed, I, Shreiber, DI. Biomaterial Instructive Cues for CNS Interventions. Symposium BM04: Biomaterials for Regenerative Engineering, Materials Research Society 2017 Fall Meeting, 26 November-01 December, 2017, Boston, MA.
11. Dirheimer, T, Hancock, J, Hill, D, Kochubievsky, Y, Moore, S, Blosser, S, Langendonk, S, Ayres, V, Garcia, J. The "Smart Walker" Electronic Travel Device. AER (Association for Education and Rehabilitation) International Orientation & Mobility Conference 2017, 19-22 July 2017, Pittsburgh, PA.
12. Hussain, MS, Xie, K, Dong, H, Ayres, VM. Structural Properties of High Speed Electrodeposited NiCo Alloy Film on Titanium. American Physical Society March Meeting 2017, 13-17 March 2017, New Orleans, LA.
13. Tiryaki, VM, Xie, K, Garcia, J, Karana, M, Ayres, VM, Ahmed, I, Shreiber, DI. Directive Nanophysical Cues for Regenerative Neural Cell Systems. American Physical Society March Meeting 2017, 13-17 March 2017, New Orleans, LA.
14. Caterino, ID, Xie, K, Hartz, SA, Ayres, VM, Shreiber, DI, Ahmed, I, Tiryaki, VM. Nanofibrillar Scaffolds in Translational Medicine. Oral presentation Symposium SM4: Engineering Biointerfaces with Nanomaterials, 2016 MRS Spring Meeting & Exhibit, March 28-April 1, 2016, Phoenix, AZ
15. Xie, K, Ayres, VM. Thermionic Field Emission Transport At Nanowire Schottky Barrier Contacts. Oral presentation Symposium EE12: Radiation Damage in Materials-A Grand Multiscale Challenge, 2016 MRS Spring Meeting & Exhibit, March 28-April 1, 2016, Phoenix, AZ
16. Ayres, VM, Xie, K. Interface Charge Versus Irradiation Time at Nanoscale Contacts. Poster presentation Symposium EE12: Radiation Damage in Materials-A Grand Multiscale Challenge, 2016 MRS Spring Meeting & Exhibit, March 28-April 1, 2016, Phoenix, AZ

17. Ayres VM, Tiryaki, VM, Shreiber, DI, Ahmed, I. Directive Nanoscale Cues for Regenerative Neural Cell Systems, Invited Lightning Talk with Poster presentation opportunity, 2015 American Society for Cell Biology ASCB Annual Meeting, 12-16 December 2015, San Diego, CA.
18. Ayres, VM, Tiryaki, VM, Shreiber, DI and Ahmed, I. Nanofibrillar Scaffolds in Translational Medicine. Symposium KK: Nanomaterials in Translational Medicine, 2015 MRS Spring Meeting & Exhibit, April 6-10, 2015, San Francisco, CA
19. Xie, K, Hartz, SA, Ayres, VM. Thermionic Field Emission Transport At Nanowire Schottky Barrier Contacts. Symposium S: Semiconductor Nanowires and Devices for Advanced Applications, 2015 MRS Spring Meeting & Exhibit, April 6-10, 2015, San Francisco, CA
20. Tiryaki, VM, Ayres, VM, Ahmed, I, Shreiber, DI. Quantitative Investigation of Differences in Differentiation of Reactive and Nonreactive Astrocytes in Response to Nanophysical Cues. 2014 American Society for Cell Biology/International Federation for Cell Biology ASCB/IFCB Meeting, 6-10 December 2014, Philadelphia PA
21. Tiryaki VM, Adia-Nimuwa U, Hartz SA, Xie K, Ayres VM, Ahmed I, and Shreiber DI. A New Atomic Force Microscopy Based Cell Shape Index Definition Retains Cell Spreading and Stellation Behavior. Abstracts, No:1383 p. 563. 2013 Annual Meeting of the American Society for Cell Biology, 14-18 December 2013, New Orleans, LA.
22. Adia-Nimuwa, U, Tiryaki, VM, Hartz, SA, Xie, K, Ayres, VM, Ahmed, I, Shreiber, DI. Atomic Force Microscopy Based Cell Shape Index. Bulletin of the American Physical Society March Meeting 2013 Volume 58, Number 1, 18-22 March 2013, Baltimore MD.
23. Ayres, VM, Tiryaki, VM, Xie, K, Ahmed, I, Shreiber, DI. Response of Quiescent Cerebral Cortical Astrocytes to Nanofibrillar Scaffold Properties. Bulletin of the American Physical Society March Meeting 2013 Volume 58, Number 1, 18-22 March 2013, Baltimore MD.
24. Hartz S, Xie K, Liu Z, Ayres VM. Schottky Barrier Transport for Multiphase Gallium Nitride Nanowires. Bulletin of the American Physical Society March Meeting 2013, Volume 58, Number 1, 18-22 March 2013, Baltimore MD.
25. Tiryaki, VM, Ayres, VM, Xie, K, Ahmed, I, Shreiber, DI. Quiescent Response of Cerebral Cortical Astrocytes to Nanoscale Scaffold Properties. Biophysical Journal 104(2) pp. 162a, 57th Annual Meeting of the Biophysical Society, 02-06 February 2013, Philadelphia, PA
26. Ayres, VM, Tiryaki, VM, Xie, K, Ahmed, I, Shreiber, DI. Nanophysical Properties of Scaffolds Induce Cerebral Cortical Astrocyte Response. 2012 American Society for Cell Biology ASCB Annual Meeting, 15-19 December 2012, San Francisco, CA.
27. Tiryaki, VM, Xie, K, Ayres, VM, Ahmed, I and Shreiber, DI. New Atomic Force Microscopy Based Astrocyte Stellation Index. Symposium UU: Scanning Probe Microscopy - Frontiers in Nanotechnology, Materials Research Society Fall Meeting, 25-30 November 2012, Boston, MA (Oral presentation).
28. Xie, K, Ayres, VM, Liu, Z, Jacobs, BW, Baumann, T, Ronningen, RM, Zeller, AF, Tupta, MA. Real-Time Investigation of NanoFET Current Surge Capability during Heavy Ion Irradiation. Symposium FF: Semiconductor Nanowires - Optical and Electronic Characterization and Applications, Materials Research Society Fall Meeting, 25 - 30 November, 2012, Boston, MA (Oral Presentation).
29. Tiryaki, VM, Xie, K, Ayres, VM, Ahmed, I and Shreiber, DI. A Method to Resolve Atomic Force Microscopy Feature Definition Issues for Neural Cells Cultured on Nanofibrillar Scaffolds. NIST Proceedings of the Functional Imaging for Regenerative Medicine Workshop, p. 33. 31 May-01 June 2012, Gaithersburg, MD.

30. Xie, K, Tiryaki, VM and Ayres, VM. A Method to Resolve Atomic Force Microscopy Feature Definition Issues for Cells Cultured on Nanofibrillar Scaffolds. *Biophysical Journal* 102(3) p. 587a. 56th Annual Meeting of the Biophysical Society, 25-29 February 2012, San Diego, CA.
31. Ayres, VM, Xie, K, Tiryaki, VM, Ahmed, I, and Shreiber, DI. Investigation of Nanophysical Properties of Aging Nanofibrillar Tissue Scaffolds by SPRM, TEM, and FTIR and Raman Spectroscopies. Symposium KK: Biomaterials for Tissue Regeneration, Materials Research Society Fall Meeting, 28 November-02 December 2011, Boston, MA
32. Tiryaki, VM, Ayres, VM, Ahmed, I and Shreiber, DI. Investigation of the Effect of Nanoscale Elasticity on Astrocyte Responses in Analysis of Neural Cell Regeneration”, Symposium KK: Biomaterials for Tissue Regeneration, Materials Research Society Fall Meeting, 28 November-02 December 2011, Boston, MA.
33. Al-Duhaileb, RA, Xie, K, Ayres, VM, Ronningen, RM, Zeller, AF, Baumann, T, and Hirata, A. Investigations of Zipping Mechanism in Relativistic Heavy Ion Interactions With Carbon Onions”, Symposium AA: Carbon Nanotubes, Graphene, and Related Nanostructures, Materials Research Society Fall Meeting, 28 November-02 December 2011, Boston, MA.
34. Tiryaki, VM, Ayres, VM, Khan, AA, Flowers, DA, Meiners, S, Ahmed, I and Delgado-Rivera, R. Astrocyte Cell-Cell Interactions Via Long-range Connective Bridges on Directive Surfaces. *Biophysical Journal* 100(3) p. 162a. 55th Annual Meeting of the Biophysical Society, 05-09 March 2011, Baltimore, MD.
35. Tiryaki, VM Ayres, VM, Khan, AA, Flowers, DA, Ahmed, I, Delgado-Rivera, R and Meiners, S. Investigation of Nanofibrillar Influence on Cell-Cell Interactions of Astrocytes by Epi-Fluorescence and Atomic Force Microscopies. Symposium QQ: Nanofunctional Materials, Nanostructures, and Nanodevices for Biomedical Applications II Materials Research Society Fall Meeting, 30 November-04 December 2010, Boston, MA.
36. Alduhaileb, RA, Xie, K, Ayres, VM, Jacobs, BW, Fan, X, McElroy, K, Myers, JC and Hirata, A, Responses of Carbon Onions to High Energy Heavy Ion Irradiation. Symposium T: Nanostructured Materials in Harsh Environments, Materials Research Society Fall Meeting, 30 November-04 December 2010, Boston, MA.
37. Tiryaki, VM, Ayres, VM, Khan, AA, Delgado-Rivera, R, Ahmed, I and Meiners, S. Nanoscale Tissue Scaffold Investigations to Optimize Central Nervous System Prosthetic. *Biophysical Journal* 98(3) p. 189a. 54th Annual Meeting of the Biophysical Society, 20-24 February 2010, San Diego, CA.
38. Ayres, VM and Caldwell, TD. Strategies for Successful Diversity Participation in Biophysics Research. *Biophysical Journal* 98(3) p. 409a. 54th Annual Meeting of the Biophysical Society, 20-24 February 2010, San Diego, CA
39. VM Tiryaki, VM Ayres, AA Khan, R Delgado-Rivera, I Ahmed, SA Meiners, “Quantitative Investigations of Nanoscale Elasticity of Nanofibrillar Matrices”, Materials Research Society Fall Meeting, 30 November-04 December 2009, Boston, MA.
40. K McElroy, JM Callahan, BW Jacobs, MA Crimp, TR Bieler, VM Ayres, “Catalyst-Free GaN Nanowire Nucleation”, Materials Research Society Fall Meeting, 30 November-04 December 2009, Boston, MA.
41. RA Alduhaileb, VM Ayres, BW Jacobs, X Fan, K. McElroy, A Hirata, M Horikoshi, N Lehnert, M.G. Galinato “Carbon Onion Films-Molecular Interactions of Multi-layer Fullerenes”, Materials Research Society Fall Meeting, 30 November-04 December 2009, Boston, MA.
42. DA Flowers, VM Ayres, R Delgado-Rivera, I Ahmed, SA Meiners, “Nanoscale Properties of Neural Cell Prosthetic and Astrocyte Response”, *Bull. Am. Phys. Soc.*, Vol. 54, No. 1, e-ref: V 27.10 (2009).

43. RA Al-Duhaileb, BW Jacobs, MA Crimp, VM Ayres, A Hirata, M Horikoshi, MGI Galinato, N Lehnert, "Friction and Stability of Carbon Onions Films in Vacuum", *Bull. Am. Phys. Soc.*, Vol. 54, No. 1, e-ref: V 24.5 (2009).
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Technical Reports

1. Space Power Institute, Auburn University Report, "Investigation of Applications of Diamond and DLC Films in Microwave Tubes", R. Ramesham, M. Rose, R. Askew, T. Bekker, J. Dayton, I. Krainsky, G. Mearini, D. File, A. Gilmour, and V. Ayres, August, 1993. V. M. Ayres, Chapter V: "Surface and Sub-Surface Physics of Diamond and DLC Films".
2. NSWC Technical Report 87-340 , "Nonlinear Analysis of Non-Neutral Plasmas", V. M. Ayres.
3. NSWC Technical Report TR 87-268 , "Fundamental Cyclotron Frequency Generation from a Cusptron Oscillator", W. Namkung, J. Y. Choe, H. S. Uhm, and V. Ayres.
4. NSWC Technical Report TR 87-266 , "Microwave Generation from a Cusptron Oscillator with a Six-Vane Circuit", W. Namkung, J. Choe, H. S. Uhm, and V. Ayres.
5. Purdue University Report PURD-TH-84-13 , "S, X Baryons as Relativistic Bound States of Three Baryons", M. Sugawara, and V. M. Ayres.,
6. Purdue University Report PURD-TH-84-3 , "The Evaluation of B and T Meson Masses", M. Sugawara and V. M. Ayres.
7. Purdue University Report PURD-TH-83-16 , "The Meson Mass Spectrum", M. Sugawara and V. M. Ayres.
8. Purdue University Report PURD-TH-83-1, "Radiative Decays of 2- and 3- Body Bound States", M. Sugawara and V. M. Ayres.
9. Purdue University Report PURD-TH-82-2 , "Radiative and Weak Decays of Relativistic Bound States", M. Sugawara and V. M. Ayres.

Dissertation:

"Relativistic Bound States of Fermions and Antifermions"
Advisor: M. Sugawara, Dept. of Physics, Purdue University

Articles/Videos about Ayres' Research:

On Michigan State University College of Engineering Facebook (www.facebook.com/SpartanEngineering) and Twitter (www.twitter.com/msu_egr_news), and on Department of Electrical and Computer Engineering Facebook (www.facebook.com/ece_spartans), "**MSU Senior Receives American Society of Cell Biology Travel Award**". January 2019.

In **Networks**, Michigan State University Department of Electrical and Computer Engineering Newsletter, Fall/Winter 2015, p. 04. Feature article on Ayres' research, "**Potential Treatment for Shrapnel Injuries**", presented during 2015 as invited plenary presentation in Birmingham, UK.

In **Networks**, Michigan State University Department of Electrical and Computer Engineering Newsletter, Fall/Winter 2015, p. 06. Feature article on **Smart Walker Earns National Honors at NIH**

Challenge. V Ayres was the NIH Faculty Sponsor for the 2015 NIH DEBUT (Design By Undergraduate Team) Honorable Mention Award project.

<https://youtu.be/ww2d9Vdguas>

In *R&D Magazine*, *rdmag.com*, August 05, 2014. Article **Nano Testing for Future Electronics** by Lindsay Hock, with Ayres research interview in **Testing nanoelectronics for space**. <http://www.rdmag.com/articles/2014/08/nano-testing-future-electronics>

In *International Innovations: The Brains Behind Healthcare Research*, July 2013 Issue 22, pp. 28-30. Feature article on Ayres' research, **"Nanoscale Cues for Regenerative Neural Cell Systems"**.

In *NSCL THE GREENSHEET* (Michigan State University) July 2, 2010. Volume 28, Number 26, Cyclotron Update: Experiment No. 05044: **"Fundamental Radiation Interactions in Reduced Dimensionalities"**.

In *Physics Interactions Newsletter* (Purdue University), Vol. 2005-2006, **"Physics Outstanding Alumni Award 2006"**

In *Up to Date at the Cyclotron* (Michigan State University) NSCL Cyclotron and A100 News: Experiment No. 02501 **"Fundamental Radiation Interactions in Reduced Dimensionalities"**, No. 1036, June 10, 2005

In *Currents Magazine* (Michigan State University), **"Engineers Are Good for Your Health"**, Volume 2, No. 1 pp. 12-17, Summer 2002

In *Currents Magazine* (Michigan State University), **"The Science of Small"**, Volume 85, pp. 1-4, Spring 2000

Patents and Registrations:

Provisional Patent Application 62/410,515, Quantum Relay Device for Quantum Communications. HC Shaw, VM Ayres, K Xie.

IX. Current and Pending Support:

CURRENT AWARDS:

National Science Foundation
NSF-MIP Platform for the Accelerated Realization, Analysis, and Discovery of Interface Materials (PARADIM)
Materials Proposal 205: Materials-By-Design Approach To Quantum Entanglement
PI: Ayres
Institution: Michigan State University
State: Michigan
Co-PI: Shaw, Canavan
Institution: NASA Goddard Space Flight Center
State: Maryland
Total Award Amount: samples by molecular beam epitaxy (MBE)/Cornell University
Approval Date: 07 November 2019 Projected Duration: 12 months

NASA
Michigan Space Grant Consortium, MSU Affiliate
PI: Ayres
Institution: Michigan State University
State: Michigan
Total Award Amount: \$37659.00 (+\$12,997.00 cost share = \$50,656.00)
Start date: 01 May 2020 Projected Duration: 12 Months

SUBMITTED:

National Aeronautics and Space Administration
Quantum Opto-Electronics for Quantum Communications
Proposal Number: 20-NUP2020-0023
MSU Proposal #: 43041
PI: Ayres
Institution: Michigan State University
State: Michigan
Total Award Amount: \$50,642.52

American Society of Cell Biology Public Engagement Grant
Public Engagement with the Visually Challenged
PI: Ayres
Institution: Michigan State University
State/Country: Michigan, USA
Total Award Amount: \$26,981.00
Proposed Start Date: 15 June 2020 Projected Duration: 9 months

National Institutes of Health
Quantitative Determination of Tunneling Nanotube Development in Astroglial Systems
Grants.gov Tracking # GRANT13129162
MSU Proposal #: 45039
PI: Ayres
Institutions: Michigan State University; Rutgers, The State University of New Jersey
State/Country: Michigan, USA
Total Award Amount: \$1,548,573.14.00
Proposed Start Date: 21 April 2021 Projected Duration: 60 months

SUBMISSION IN PROCESS:

National Science Foundation
Quantitative Determination of Tunneling Nanotube Development in an Astroglial Model System
MSU PI: Ayres
Institutions: Michigan State University; Rutgers, The State University of NJ
State(s)/Country: Michigan, USA; New Jersey, USA
Total Award Amount: \$450,000.00
Proposed Start Date: 01 October 2020, Projected Duration: 36 Months

National Science Foundation
Quantum Opto-Electronics
MSU PI: Ayres
Institutions: Michigan State University
State(s)/Country: Michigan, USA
Total Award Amount: \$400,000.00
Proposed Start Date: 01 October 2020, Projected Duration: 36 Months

PAST AWARDS: by Agency:

National Science Foundation:

National Science Foundation
Nanoscale Cues for Regenerative Neural Cell Systems
Award #: PHY 0957776
PI: Ayres
State(s): Michigan
Total Award Amount: \$349,895.00
Start Date: 01 October 2010 Projected Duration: 36 Months

National Science Foundation
Award #: CBET 0922999
Acquisition of an environmental scanning electron microscope with a 3D dual beam focused ion beam (FIB)
PI: Drzal
Co-PIs: Pratt, Crimp, Chan, Ruan
Senior Investigators: Ayres, and others
Institution: Michigan State University
State: Michigan
Total Award Amount: \$1,453,598.00 + 30% MSU match
Start Date: 01 October 2009 Projected Duration: 24 Months

International Research in Engineering and Education (IREE)
IREE: Nano Mechanical and Electronic Investigations with Tokyo Institute of Technology
Award#: DMI-0637134
PI: Ayres
Institution: Michigan State University
State: Michigan
Total Award Amount: \$35,000.00
Start Date: 15 August, 2006 Projected Duration: 18 Months

Research Experience for Undergraduates (REU)
Award#: DMI-0631978
PI: Ayres
Institution: Michigan State University
State: Michigan
Total Award Amount: \$6,000.00
Start Date: 23 May, 2006 Projected Duration: 18 Months

National Science Foundation
Scanning Probe Recognition Microscopy
Award#: DMI-0400298
PI: Ayres
Institution: Michigan State University
State: Michigan
Total Award Amount: \$350,000.00
Start Date: August 15, 2004 Projected Duration: 48 Months

National Science Foundation
The Acquisition of Laboratory Equipment to Facilitate Micro and Nano Engineering at Michigan State University
Award#: ECS-0116252
PI: J. Asmussen
Co-PI: F. Salem, D. Aslam, T. Grotjohn, and V. Ayres
Institution: Michigan State University
State: Michigan
Total Award Amount: \$272,000.00
Start Date: 01 September 2001 Projected Duration: 60 Months

National Science Foundation
Bioengineering a SPM Based Nanomanipulator With Landmark Referenced Control
Award#: BES-0225805
PI: Ayres
Institution: Michigan State University
State: Michigan
Total Award Amount: \$46,628 Start Date: Sep 01, 2002 Projected Duration: 24 Months

NASA:

NASA 2019 Summer Student Internship Program at Goddard Space Flight Center. Topic - Quantum Communications.

PI: Ayres
Student: Ryan Aridi.
Total Award Amount: \$7,300.00
Start Date: 03 June 2019 Projected Duration: 10 weeks

National Aeronautics and Space Administration
CubeSat Quantum Relay Device
Award #: NNX16AT85G
MSU App. #: 147376
PI: Ayres
Institution: Michigan State University
State: Michigan
Total Award Amount: \$54,176.00
Start Date: 23 September 2016 Projected Duration: 18 months

Peraton, Inc for NASA Goddard Space Flight Center
Summer Internship/Short Term Hire
Development of Quantum Transport Layers
Award #: Task Order (TO) 195
PI: V. Ayres, H. Shaw (NASA GSFC)
Institution: NASA Goddard Space Flight Center
State: Maryland
Total Award Amount: \$9,099.00
Start Date: 05 June, 2017 Projected Duration: 10 weeks

National Aeronautics and Space Administration

Graduate Student Researchers Program (GSRP)
Radiation Resiliency in Reduced Dimensionality Systems
Award #: NNG05GO15H
PI: V. Ayres
Institution: Michigan State University
State: Michigan
Total Award Amount: \$78,000.00 Start Date: August 15, 2005 Projected Duration: 36 Months

National Aeronautics and Space Administration
Resilient Nanoscale Electronics for Space Applications
Award #: NASA Award Task No.14: Subcontract Award, Muniz Engineering, Inc
PI: Ayres
Institution: Michigan State University
State: Michigan
Total Award Amount: \$118,185.00 Start Date: Jan 01, 2003 Projected Duration 32 months:

ASEE 2004 NASA Faculty Fellowship Program
PI: V. Ayres
Institution: NASA Goddard Space Flight Center
State: Maryland
Total Award Amount: \$15,900.00 Start Date: June 01, 2004 Projected Duration: 03 months
All NASA Centers: 764 applied/235 accepted
NASA Goddard Space Flight Center: 149 applied/26 accepted

ASEE 2003 NASA Faculty Fellowship Program
PI: V. Ayres
Institution: NASA Goddard Space Flight Center
State: Maryland
Total Award Amount: \$12,000.00 Start Date: May 28, 2003 Projected Duration: 10 Weeks
All NASA Centers: 740 applied/244 accepted
NASA Goddard Space Flight Center: 201 applied/30 accepted

UNCF Harriet G. Jenkins Predoctoral Fellowship
National Aeronautics and Space Administration
PI: Susan Song (graduate student V. Ayres)
Institution: Michigan State University
State: Michigan
Total Award Amount: \$73,500 Start Date: August 15, 2001 Projected Duration: 36 Months

UNCF Harriet G. Jenkins Predoctoral Fellowship
National Aeronautics and Space Administration
PI: Susan Song (graduate student V. Ayres)
Mini Grant Program Summer 2003
"Radiation Effects on the Electronic and Mechanical Properties of Carbon Nanotubes and Carbon Nanotube Interfaces"
Total Award Amount: \$6,700.00

UNCF Harriet G. Jenkins Predoctoral Fellowship
National Aeronautics and Space Administration
PI: Susan Song (graduate student V. Ayres)
Mini Grant Program Summer 2002
"Radiation Effects on the Electronic and Mechanical Properties of Carbon Nanotubes and Carbon Nanotube Interfaces"
Total Award Amount: \$6,700.00

National Aeronautics and Space Administration
Synthesis of Hybrid Carbon Nanotube/Diamond Films

Award #: NAG-61-2743
PI: D. Tomanek
Co-PI: V. Ayres and D. Aslam
Institution: Michigan State University
State: Michigan
Total Award Amount: \$20,000.00 Start Date: Mar 20, 2000 Projected Duration: 12 Months

National Aeronautics and Space Administration
Atomic Force Microscope Lithography and BEEM Investigation of Carbon Nanotube Interfaces
Award #: NAG5-8893
PI: V. Ayres
Institution: Michigan State University
Internal MSU#: 61-2742
State: Michigan
Total Award Amount: \$5,000.00 Start Date: Jan 15, 2000 Projected Duration: 12 Months

FRIB/National Superconducting Cyclotron Laboratory:

National Superconducting Cyclotron Laboratory No. 05044
Fundamental Radiation Interactions in Reduced Dimensionalities
PI: Ayres
Institution: Michigan State University
State: Michigan
Total Award: 92 Hours Beam Time
Total Award Equivalent Amount (NASA rate): \$223,000.00 Start Date: July 1, 2005 Projected Duration:
until fully used

National Superconducting Cyclotron Laboratory No. 020501
Fundamental Radiation Interactions in Reduced Dimensionalities
PI: Ayres
Institution: Michigan State University
State: Michigan
Total Award: 16 Hours Beam Time
Total Award Equivalent Amount (NASA rate): \$38,832.00 Start Date: April 1, 2003 Projected Duration: 36
Months

Japan:

Chair of International Cooperation
Tokyo Institute of Technology
PI: Ayres
Institution: Tokyo Institute of Technology
Country: Japan
Total Award Amount: ¥3073144 Start Date: Sep 20, 2005 Projected Duration: 5 Months