

**STEVEN M. DURBIN**  
*Curriculum Vitae*

1903 W. Michigan Ave.  
Western Michigan University  
Kalamazoo, MI 49008

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**EDUCATION**

Ph.D. in Electrical Engineering  
Thesis: Numerical Modelling of Photon Recycling in III-V Optoelectronic Devices  
Purdue University, West Lafayette, Indiana, USA December

M.S.E. in Electrical Engineering  
Thesis: Growth and Characterization of Zincblende MnTe Epilayers and Single  
Quantum Well Structures  
Purdue University, West Lafayette, Indiana, USA December

B.S. in Electrical Engineering  
Purdue University, West Lafayette, Indiana, USA May

**POSITIONS  
HELD**

*Interim Chair* (7/1/2021 to present) Department of Engineering Design,  
Manufacturing & Management Systems  
Western Michigan University, Kalamazoo

Significant Accomplishments

- Hired three new faculty members (1 with tenure, 2 term faculty)
- Shepherded major curriculum proposal through to approval
- Major undergraduate laboratory renovation under way
- Assisted in development and conducting of high school and community college outreach activities to create pipeline into undergraduate programs
- Secured funding (\$150k) for major lab equipment upgrades
- Updated undergraduate accreditation processes post-COVID
- Restructured undergraduate advising
- Increased graduate enrolment through revised application processing

*Interim Associate Director of  
Academic Labor Relations*  
(4/1/2021 to 6/30/2022)

Academic Affairs/Office of the Provost  
Western Michigan University, Kalamazoo

Significant Duties

- Acting Director (2/22 – 6/22)
- Chief negotiator, WMU-TAU Agreement (2/22 – 6/22)
- Lead negotiator, WMU-PIO Agreement, summer 2021
- Primary point of contact between the administration and three academic labor unions (AAUP, PIO, TAU)
- Provided advice to administrators including department chairs/directors, deans, senior administrators regarding contract issues
- Responsible for grievance processing and resolution, COVID policy compliance, formal and informal professional concerns processes
- Assisted with employee benefits questions and issues/concerns

*Professor* (2013 to present) Department of Electrical and  
*Chair* (2013-2016) Computer Engineering  
 Western Michigan University  
 Kalamazoo, MI 49008

#### Significant Administrative Accomplishments

- Hired three new faculty; all received tenure
- Major curriculum changes processed to both BS programs
- Major update to doctoral examination process
- Garnered over \$100,000 in laboratory improvement funds
- Creation of outreach activities for middle and high school students
- Development of strong visual identity for department

*Associate Professor* (2010 to 2013) Department of Electrical Engineering and  
 Joint Tenured Position Department of Physics  
 University at Buffalo (SUNY)  
 Buffalo, NY 14260 USA

*Associate Professor* (2007 to 2010) Electrical and Computer Engineering  
 University of Canterbury  
 Christchurch, NEW ZEALAND

*Senior Lecturer above Bar*<sup>1</sup>  
 (2005 to 2006)

*Senior Lecturer* (2002 to 2004)

*Lecturer* (2000 to 2001)

*Assistant Professor* (1995 to 2000) Department of Electrical Engineering  
*Visiting Assistant Professor* (1994) Florida A&M University and  
 The Florida State University  
 Tallahassee, Florida 32310 USA

#### HONORS & AWARDS

Recipient of a NASA Graduate Research Fellowship for Ph.D. research.  
 Member, Eta Kappa Nu electrical engineering honor society.  
 Member, Tau Beta Pi engineering honor society.

#### PROFESSIONAL MEMBERSHIPS

Senior Member, Institute of Electrical and Electronics Engineers (since 1994)  
 Member, Materials Research Society (since 2000)  
 Professional Member, Royal Society of New Zealand (since 2000)  
 Member, AVS (since 2005)  
 Member, Society of Amateur Radio Astronomers (since 2020)  
 Professional Member, Royal Society of New Zealand (since 2000)  
 Member, American Physical Society (since 1994)

#### TECHNOLOGY TRANSFER ACTIVITY

I-CORPS Teams Technical lead. July 2019, Washington, D.C. Team.  
 Grant #193582. 113 In-person interviews (121 total).  
 Ongoing customer discovery: Over 200 interviews and counting  
 2 US patents and 1 Japan patent awarded  
 4 patent applications in review; 4 provisional patent applications filed

<sup>1</sup> British System Academic Rank (Lecturer, Senior Lecturer, Senior Lecturer above Bar, Associate Professor/Reader, and Professor).

## RESEARCH ACTIVITY

### Research Interests

My traditional interests lie primarily in the development of novel semiconductor/electronic materials and devices, with a long-standing activity in optoelectronics. More recently, I have become interested in new approaches to quantifying disorder in physical systems, and applying that to engineering material properties, model validation, and event detection. Specific areas of current interest include:

- Disorder in physical systems
- Engineering material properties using disorder analysis
- Semiconductor and superconducting materials
- Photovoltaic and thermoelectric energy conversion
- Nanostructures and two-dimensional materials
- Schottky junction formation
- Doping and defect characterisation of semiconductors
- Materials and device characterization
- Machine learning
- AAC device design

### Sponsored Research Contracts and Grants

#### A. Current and Pending Grants

1. Engineering Band Gap Energy Through Structural Motifs in Nitride Semiconductors (1 July 2020 to 6/30/2023): DMR-2003581  
PI: S.M. Durbin (R.A. Makin, co-PI)  
Sponsor: National Science Foundation  
Budget: \$443,064
2. Research Services Agreement (11/29/2021-05/28/2022)  
(co-PI with R.A. Makin)  
Sponsor: Company Confidential, Kalamazoo, MI.  
Budget: \$11,750
3. Disorder Engineering of Polymer Fibers for Enhanced Properties (8/1/2023 – 12/31/2025) \*pending  
PI: S. Rao (Michigan Tech); (co-PI along with R.A. Makin)  
Sponsor: National Science Foundation  
Amount requested: \$400,568
4. Solar Data Analysis (7/1/2023 – 12/31/2028) \*pending, preliminary proposal  
PI: R.A. Makin (co-PI with others.)  
Sponsor: National Science Foundation  
Amount requested: \$25,000

5. Helios: Solar Weather Analysis Beyond Machine Learning (2/16/2023-12/31/2023) \*pending  
 PI: S.M. Durbin (R.A. Makin, co-PI)  
 Sponsor: Michigan Economic Development Corporation  
 Amount requested: \$32,000

## **B. Completed New Zealand Projects (most recent first)**

### **1. MacDiarmid Institute for Advanced Materials and Nanotechnology**

*P.I. (through June 2010).*

**Funding Source:** Tertiary Education Commission National Centres of Excellence Fund

**Funding Period:** Renewed for 6 years from July 2008

**Project Budget:** NZ\$100,000 p.a.

**Summary:** From July 2008, funding is on a per-PI basis whereas previously it was project based. PI allocation includes 0.15 fte, PhD scholarship line, travel and project costs, and associated overheads.

### **2. Probing Metal Oxide Surfaces: Investigating the Origins of Electron Accumulation**

*Lead P.I. (co-PIs M.W. Allen, R.J. Reeves; AIs C.F. McConville, T.D. Veal, R.C. Clarke)*

*\*From June 2010 I served as an associate investigator.*

**Funding Source:** Marsden Fund of New Zealand

**Funding Period:** 1 February 2010 – 31 January 2014

**Project Budget:** NZ\$780,000

**Summary:** This proposal, awarded through New Zealand's most prestigious research fund, is focussed on determining the physical origins of observed surface accumulation on two oxide semiconductors in particular, ZnO and In<sub>2</sub>O<sub>3</sub>, both of interest for a wide variety of applications including flat panel displays, power electronics, and UV detection.

### **3. Development of Commercially Viable ZnO Optoelectronic Devices**

*Lead P.I. (co-investigators M.W. Allen, R.J. Blaikie, R.J. Reeves)*

**Funding Source:** MacDiarmid Institute for Advanced Materials and Nanotechnology

**Funding Period:** 1 July 2009 – 30 June 2011

**Project Budget:** NZ\$397,530

**Summary:** Two year seed funding to commercialise ZnO Schottky devices, in part through technology protected under provisional patent.

### **4. MacDiarmid Institute Postdoctoral Fellowship (Competitive Fund)**

*P.I.*

**Funding Source:** MacDiarmid Institute for Advanced Materials and Nanotechnology

**Funding Period:** 1 July 2008 – 30 June 2010

**Project Budget:** NZ\$250,000

**Summary:** One of 5 postdoctoral positions competitively awarded.

### **5. Unravelling the Nature of Conductivity in Philosopher's Wool**

*Lead P.I. (R. Reeves, J. Metson, co-PIs; T. Myers and A. Cartwright, AIs)*

**Funding Source:** Marsden Fund

**Funding Period:** 1 November 2006 – 31 December 2009

**Project Budget:** NZ\$780,000

**Summary:** This proposal, awarded through New Zealand's most prestigious research fund, seeks to provide definitive answers to what defects presently limit the ability to control conductivity in ZnO, a material of interest for both light emitting and photovoltaic device applications.

## 6. Comparison of Ozone-Assisted and RF Plasma-Assisted MBE Growth of ZnO

*P.I. (R. Reeves, Co-P.I.; M. Kral and J. Kennedy, Associate Investigators)*

**Funding Source:** MacDiarmid Institute Contestable Fund

**Funding Period:** 01/05 – 12/07

**Project Budget:** NZ\$114,928

**Summary:** This seed funding enabled initial work on the growth of ZnO by molecular beam epitaxy using a combination of ozone and rf oxygen plasma. Of particular interest is the effect of process parameters on film microstructure as determined by electron diffraction and electron microscopy.

## 7. Acquisition of an Ozone Generation System

*P.I.*

**Funding Source:** University of Canterbury Research Committee Equipment Fund

**Funding Period:** 01/05

**Project Budget:** NZ\$176,000

**Summary:** Reproducible high quality ZnO layers have, despite considerable world-wide effort, remained elusive. Based on reports of molecular beam epitaxy growth of oxide superconductor crystals which indicate ozone is the optimal source of reactive oxygen, we propose to investigate the potential of ozone in growth of ZnO single crystals. To date, the most common approach has been RF plasma, which, although successful for GaN and related materials, does not seem to be adequate for this II-VI material.

## 8. Novel Thin Film Magnetic Structures For Spintronic Applications

*P.I. along with Roger Reeves, Dept. of Physics*

**Funding Source:** MacDiarmid Institute CoRE Grant

**Funding Period:** FY2002 - FY2007 (renewed through 2014; budget pending)

**Project Budget:** NZ\$816,109

**Summary:** My research group's objectives in this grant include the investigation of above room temperature ferromagnetism in nitride and oxide semiconductors, particularly InN. The remainder of the project is led by Dr. Roger Reeves in collaboration with the Ioffe Institute, focussing on optical properties of CaF/MnF magnetic superlattices.

## 9. Widebandgap Nitride Semiconductors

*P.I. along with Roger Reeves, Dept. of Physics*

**Funding Source:** MacDiarmid Institute CoRE Grant

**Funding Period:** FY2002 - FY2007 (renewed through 2014; budget pending)

**Project Budget:** NZ\$686,586

**Summary:** This project was initially geared towards investigation of optoelectronic properties of nanocrystalline and amorphous GaN, but has recently been redirected towards InN and high indium content nitride alloy semiconductors. Considerable controversy

continues regarding the exact nature of the bandgap of InN, in part due to a lack of adequate material quality. We are exploring both epitaxial lateral overgrowth and novel substrates as a means of improving the microstructure of the thin films.

### **10. Design and Acquisition of a UHV Pulsed Laser Deposition System**

*P.I. responsible for system design. Co-P.I. Roger Reeves, Dept. of Physics*

**Funding Source:** MacDiarmid Institute Equipment Fund

**Funding Period:** 2002-2004

**Project Budget:** NZ\$537,000

**Summary:** This equipment grant was part of the initial Centre of Excellence proposal. The equipment arrived in late 2004 and installation has been pending completion of laboratory renovations. Two separate vacuum systems were designed and custom-built, including a UHV chamber equipped with in-situ reflection high-energy electron diffraction.

### **11. Nano-Engineered Materials for Optics and Electronics**

*Programme Leader of Multi-Institution Consortium and Project P.I.*

**Funding Source:** New Economy Research Fund/ The Foundation for Research, Science and Technology New Zealand

**Funding Period:** 01/01/2001 - 30/09/2007

**Project Budget:** NZ\$1,181,049 (P.I. budget NZ\$105,000 per annum)

**Summary:** This grant was renewed three times, and was a consortium between Canterbury University, Otago University, Institute of Geological & Nuclear Sciences and Industrial Research Ltd. My research group's objectives include investigation of InGaN for potential in photovoltaic devices.

## **C. Completed US Grants (most recent first)**

### **1. I-CORPS: End-User Trained Augmentative/Alternative Communication Tablet for Speech-Impaired Patients.** (15 June 2019 to 31 December 2020)

PI: S.M. Durbin

Agency: NSF

Budget: \$50,000

### **2. EAGER: Earth Abundant Element Nitride Semiconductors Based on ZnSnN<sub>2</sub>**

*P.I.*

**Funding Source:** National Science Foundation

**Funding Period:** 1 September 2012 – 31 July 2016 (transferred to WMU effective Jan 2014)

**Project Budget:** US\$239,973

**Summary:** This project seeks to synthesize and characterize a new narrow bandgap semiconductor, ZnSnN<sub>2</sub>, which has significant potential for solar cells and related optoelectronic device applications. Advantages over traditional compound semiconductors include that its constituent elements are earth-abundant and hence lower cost, and that they can be obtained from recycled sources, and are therefore more environmentally friendly.

### 3. Indium-Based Bismide Compounds for Infrared Device Applications

*Lead P.I.* (co-PIs B. McCombe, W. Lanford, L. Piper)

**Funding Source:** SUNY RF Collaboration Fund

**Funding Period:** 1 January 2013 to 31 December 2014

**Project Budget:** US\$99,855

**Summary:** This seed funding project seeks to establish the structural, electronic and optical properties of InBi and InBiAs, compounds with significant potential for far-infrared detection. Despite several theoretical studies, definitive experimental studies of these materials are lacking. Samples will be grown using a state-of-the-art III-V molecular beam epitaxy system, and characterized in collaboration with co-workers at SUNY Binghamton and SUNY Albany.

### 4. Acquisition of a Variable Temperature Scanning Probe Microscope System

*Lead P.I. with R. Alamo, H. Garmestani, P. Kalu, J. Schwartz and J. Zheng*

**Agency:** National Science Foundation (USA). Award number 0076485.

**Project Dates:** May 2000

**Budget:** US\$250,000. (includes \$120,000 University Matching)

**Summary:** This instrument was designed to measure a sample over the temperature range of 10 K to over 400 K, with the intention increasing the upper temperature limit.

### 5. Sub-Microsecond Time Resolved RHEED Investigation of Pulsed Laser Deposition Film Growth Dynamics

*Co-P.I. with J. Zheng*

**Agency:** The National Science Foundation (USA) Award number 9903460.

**Project Dates:** 6/1/99 to 5/31/02

**Budget:** US\$225,212.

**Summary:** PLD is known to have a comparable growth rate and crystal quality to low temperature molecular beam epitaxy, despite the large number of energetic adatoms arriving in a short pulse. This successful unsolicited NSF proposal was designed to lay the groundwork for investigating film growth dynamics in PLD through submicrosecond resolution electron diffraction performed in-situ.

### 6. Laser-Based Decontamination of Microcavities

*co-P.I. with A. Deshmukh*

**Sponsor:** Cummins Engine Corporation (USA)

**Project Dates:** 5/15/97 to 10/15/97

**Budget:** US\$ 30,000.

**Summary:** This one-summer project supported one graduate student and several undergraduate students as a pilot program for excimer laser based cleaning of high aspect ratio machined cavities.

### 7. SiGeC by Pulsed Laser Deposition

*P.I.*

**Sponsor:** The Ballistic Missile Defense Organization (USA)

**Project Dates:** 8/1/97 to 7/30/99

**Budget:** US\$252,000.

**Summary:** Recognizing the infrared bandgap of Ge and the ultraviolet bandgap of diamond, it had been proposed that SiGeC alloys could span the near IR to near UV spectrum while remaining compatible with silicon based technology. The goal of this project was to determine if the high kinetic energy inherent to PLD could overcome some of the solubility obstacles.

#### **8. Cubic Boron Nitride Alphavoltaic Devices (P.I.)**

**Agency:** NASA

**Project Dates:** 10/1/96 to 9/30/99

**Budget:** US\$259,505.

**Summary:** In collaboration with researchers at Lewis (now Glen) Research Center, growth of cubic phase boron nitride was proposed using a novel combination of rf nitrogen plasma and PLD of elemental boron. The end application was for radioisotope battery devices based on americium.



## REFEREED JOURNAL PUBLICATIONS

1. D. L. Mathine, S. M. Durbin, R. L. Gunshor, M. Kobayashi, Z. Pei, J. Gonsalves, N. Otsuka, Q. Fu, M. Hagerott, and A. V. Nurmikko, "Pseudomorphic ZnTe/AlSb/GaSb heterostructures by molecular beam epitaxy," *Applied Physics Letters* 55(3), 1989, pp. 268-270. <https://doi.org/10.1063/1.101925>
2. S. M. Durbin, J. Han, Sungki O, M. Kobayashi, D. Menke, R. L. Gunshor, Q. Fu, N. Pelekanos, A. V. Nurmikko, D. Li, J. Gonsalves, and N. Otsuka, "Zincblende MnTe: epilayers and quantum well structures," *Applied Physics Letters* 55(20), 1989, pp. 2087-2089. <https://doi.org/10.1063/1.102091>
3. N. Pelekanos, Q. Fu, A.V. Nurmikko, S. Durbin, J. Han, Sungki O, D. Menke, M. Kobayashi, and R. L. Gunshor, "Spectroscopy in CdTe/MnTe and ZnTe/MnTe single quantum wells: new binary wide-gap II-VI heterostructures," *Journal of Crystal Growth* 101(1-4), 1990, pp. 628-631. [https://doi.org/10.1016/0022-0248\(90\)91050-Z](https://doi.org/10.1016/0022-0248(90)91050-Z)
4. G. Kudlek, N. Presser, J. Gutowski, S. Durbin, D. Menke, M. Kobayashi, and R.L. Gunshor, "High-density luminescence and excitation spectroscopy of mbe-grown ZnSe/GaAs epilayers," *Journal of Crystal Growth* 101(1-4), 1990, pp. 667-672. [https://doi.org/10.1016/0022-0248\(90\)91055-U](https://doi.org/10.1016/0022-0248(90)91055-U)
5. D. L. Mathine, S. M. Durbin, R. L. Gunshor, M. Kobayashi, D.R. Menke, J. Gonsalves, N. Otsuka, Q. Fu, M. Hagerott, and A.V. Nurmikko, "Molecular beam epitaxy of pseudomorphic ZnTe/AlSb/GaSb," *Surface Science* 228, 1990, pp. 344-346. [https://doi.org/10.1016/0039-6028\(90\)90324-2](https://doi.org/10.1016/0039-6028(90)90324-2)
6. S. Durbin, M. Kobayashi, Q. Fu, N. Pelekanos, R. L. Gunshor, and A. V. Nurmikko, "ZnTe/ MnTe: a new metastable wide gap II-VI heterostructure," *Surface Science* 228, 1990, pp. 33-36. [https://doi.org/10.1016/0039-6028\(90\)90252-4](https://doi.org/10.1016/0039-6028(90)90252-4)
7. N. Pelekanos, Q. Fu, J. Ding, W. Walecki, A. V. Nurmikko, S. M. Durbin, J. Han, M. Kobayashi, and R. L. Gunshor, "Spectroscopy of CdTe/MnTe single quantum wells: a strained layer II-VI heterostructure with strong confinement," *Physical Review B* 41(14), 1990, pp. 9966-9970. <https://doi.org/10.1103/PhysRevB.41.9966>
8. W. Walecki, W. R. Patterson, A.V. Nurmikko, H. Luo, N. Samarth, J. K. Furdyna, M. Kobayashi, S. Durbin, and R. L. Gunshor, "Ultraviolet and blue holographic lithography of ZnSe epilayers and heterostructures with resolution to 100 nm and below," *Applied Physics Letters* 57(25), 1990, pp. 2641-2643. <https://doi.org/10.1063/1.103810>
9. N. Presser, G. Kudlek, J. Gutowski, S. Durbin, D. Menke, M. Kobayashi, and R. L. Gunshor, "High-density spectroscopy of ZnSe/GaAs epilayers in the near-bandedge region," *Physica Status Solidi (b)* 159, 1990, pp. 443-448. <https://doi.org/10.1002/pssb.2221590152>
10. Q. Fu, N. Pelekanos, A.V. Nurmikko, S. Durbin, J. Han, Sungki O, D. Menke, M. Kobayashi and R.L. Gunshor, "Strong confinement effects in CdTe/MnTe quantum wells: a new strained layer binary II-VI heterostructure," *Surface Science* 229, 1990, pp.148-150. [https://doi.org/10.1016/0039-6028\(90\)90856-4](https://doi.org/10.1016/0039-6028(90)90856-4)

11. G. Kudlek, J. Hollandt, N. Presser, J. Gutowski, S. M. Durbin, D. R. Menke, M. Kobayashi, and R. L. Gunshor, "Thermally induced optical bistability in ZnSe epilayers grown by molecular beam epitaxy," *Journal of Applied Physics* 68(6), 1990, pp. 2532-2534. <https://doi.org/10.1063/1.346475>
12. G. Kudlek, N. Presser, J. Gutowski, K. Hingerl, H. Sitter, S.M. Durbin, D.R. Menke, M. Kobayashi, and R.L. Gunshor, "Comparative optical investigations of ZnSe/GaAs epilayers grown by molecular beam and hot-wall epitaxy," *Journal of Applied Physics* 68(11), 1990, pp. 5630-5635. <https://doi.org/10.1063/1.346975>
13. J. Han, S. M. Durbin, R. L. Gunshor, M. Kobayashi, D. R. Menke, Q. Fu, N. Pelekanos, A. V. Nurmikko, Y. Nakamura, and N. Otsuka, "Quantum wells with zincblende MnTe barriers," *Journal of Crystal Growth* 111, 1991, pp. 767-771. [https://doi.org/10.1016/0022-0248\(91\)91078-O](https://doi.org/10.1016/0022-0248(91)91078-O)
14. N. Pelekanos, J. Ding, Q. Fu, A.V. Nurmikko, S.M. Durbin, M. Kobayashi, and R.L. Gunshor, "Hot-exciton luminescence in ZnTe/MnTe quantum wells," *Physical Review B* 43, 1991, pp. 9354-9357. <https://doi.org/10.1103/PhysRevB.43.9354>
15. S.M. Durbin and J.L. Gray, "Numerical modeling of photon recycling in solar cells," *IEEE Transactions on Electron Devices* 41, 1994, pp.239-245. [10.1109/16.277372](https://doi.org/10.1109/16.277372)
16. S.M. Durbin, A.V. Deshmukh, T.D. Brooks and L.J. van de Burgt, "Precision laser-based decontamination of microcavities," *Applied Surface Science* 127-129, 1998, pp. 810-814. [https://doi.org/10.1016/S0169-4332\(97\)00747-2](https://doi.org/10.1016/S0169-4332(97)00747-2)
17. M.E. Ramsey, E. Poindexter, J.S. Pelt, J. Marin and S.M. Durbin, "Hydrophobic CN<sub>x</sub> thin film growth by inductively-coupled rf plasma enhanced pulsed laser deposition," *Thin Solid Films* 360(1-2), 2000, pp. 82-88. [https://doi.org/10.1016/S0040-6090\(99\)00881-0](https://doi.org/10.1016/S0040-6090(99)00881-0)
18. J.S. Pelt, M.E. Ramsey and S.M. Durbin, "Characterization of crystalline SiC films grown by pulsed laser deposition," *Thin Solid Films* 371, 2000, pp. 72-79. [https://doi.org/10.1016/S0040-6090\(00\)00991-3](https://doi.org/10.1016/S0040-6090(00)00991-3)
19. P.V.P.S.S. Sastry, J. Su, S. Atwell, S.M. Durbin and J. Schwartz, "Fabrication and characterization of (HgRe)Ba<sub>2</sub>Ca<sub>1</sub>Cu<sub>2</sub>O<sub>y</sub> thin films fabricated by pulsed laser deposition," *IEEE Transactions on Applied Superconductivity* 11, 2001, pp. 3098-3101. [10.1109/77.919718](https://doi.org/10.1109/77.919718)
20. S. Wang, T. Yuan, E.D. Walsby, R.J. Blaikie, S.M. Durbin, D.R.S. Cummings, J. Xu, and X.-C. Zhang, "Characterisation of T-ray binary lenses", *Optics Letters* 27 (2002). 1183-1185. <https://doi.org/10.1364/OL.27.001183>
21. E.D. Walsby, S. Wang, B. Ferguson, J. Xu, T. Yuan, R.J. Blaikie, S.M. Durbin, D.R.S. Cumming, and X.-C. Zhang, "Multilevel silicon diffractive optics for THz waves," *Journal of Vacuum Science and Technology B* 20 (2002) 2780-2783. <https://doi.org/10.1116/1.1518021>
22. J.H. Su, S.L. Atwell, O. Castillo, S.M. Durbin, P.A. Salvador, P.V.P.S.S. Sastry and J. Schwartz, "Growth of superconducting (Hg,Re)Ba<sub>2</sub>CaCu<sub>2</sub>O<sub>y</sub> thin films on Ag by pulsed laser deposition," *Physica C* 372 (2002) 782-785. [https://doi.org/10.1016/S0921-4534\(02\)00906-1](https://doi.org/10.1016/S0921-4534(02)00906-1)

23. A. Pun, J.P. Zheng, J. Kennedy, A. Markwitz and S.M. Durbin, "Analysis of heteroepitaxial germanium on gallium arsenide grown by pulsed laser deposition," *Current Applied Physics* 4 (2004) 229-232. <https://doi.org/10.1016/j.cap.2003.11.016>
24. E.D. Walsby, S.M. Durbin, D.R.S. Cumming and R.J. Blaikie, "Analysis of silicon terahertz diffractive optics," *Current Applied Physics* 4 (2004) 102-105. <https://doi.org/10.1016/j.cap.2003.10.006>
25. V.A. Christie, S.I. Liem, R. Reeves, V.J. Kennedy, A. Markwitz and S.M. Durbin, "Characterisation of polycrystalline gallium nitride grown by plasma-assisted evaporation," *Current Applied Physics* 4 (2004) 225-228. <https://doi.org/10.1016/j.cap.2003.11.015>
26. A. Markwitz, V.J. Kennedy, S.M. Durbin, P. B. Johnson, A. Mücklich, N. Dytlewski, "Depth profiling of light elements in MBE-grown GaN and helium-implanted titanium with heavy ion time-of-flight elastic recoil detection," *Surface and Interface Analysis* 36 (2004) 317-322. <https://doi.org/10.1002/sia.1691>
27. Robert J. Kinsey, Steven M. Durbin, Phillip A. Anderson, Chito E. Kendrick and Roger Reeves, "Characteristics of InN Thin Films Grown Using a PAMBE Technique," *Journal of Crystal Growth* 269 (2004) 167-172. <https://doi.org/10.1016/j.jcrysgr.2004.05.046>
28. A.F. Pun, X. Wang, J.B. Meeks, S.M. Durbin, and J.P. Zheng, "Initial growth dynamics of homoepitaxial (100) GaAs grown by pulsed laser deposition," *Journal of Applied Physics* 96, 2004 6357-6361. <https://doi.org/10.1063/1.1806258>
29. C.E. Kendrick, P.A. Anderson, R.J. Kinsey, V.J. Kennedy, A. Markwitz, A. Asadov, W. Gao, R.J. Reeves and S.M. Durbin, "Polycrystalline InGaN grown by MBE on fused silica glass," *Physica Status Solidi (c)*, 2 (2005) 2236-2239. <https://doi.org/10.1002/pssc.200461379>
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47. W.C.T. Lee, C.H. Swartz, M. Cheung, A.N. Cartwright, S. Chandri, T.H. Myers, and S.M. Durbin, “Carrier dynamics of ZnO thin films – degeneracy, inhomogeneity, and multiple carriers,” 53<sup>rd</sup> Symposium of the American Vacuum Society (12-17 November 2006, San Francisco). Oral presentation.
48. C.F. McConville, T.D. Veal, L.F.J. Piper, P.H. Jefferson, P.A. Anderson, S.M. Durbin, D. Muto, H. Naoi, Y. Nanishi, H. Lu and W.J. Scaff, “Valence band photoemission and surface Fermi level of In-polar and N-polar InN,” Fall 2006 Meeting of the Materials Research Society (26 November – 1 December 2006, Boston, USA). Oral presentation.
49. A.N. Cartwright, M. C. Cheung, O. W. Akinbode, T. Murphy, K. Moazzam, J. D. Phillips, W. C. T. Lee, P. Miller, C. Swartz, S. M. Durbin, R. J. Reeves, T. H. Myers, West Virginia Univ.; J. W. Dong, A. V. Osinsky, “Ultrafast spectroscopy in ZnO,” Optoelectronics 2007 (SPIE Photonics West), Conference 6474 (21-24 January 2007, San Jose, California). **Invited Presentation.**

50. M.W. Allen, C.H. Swartz, P. Miller, R.J. Reeves, J.B. Metson, M.M. Alkaisi, and S.M. Durbin, "High quality silver oxide Schottky devices on polar and non-polar zinc oxide," AMN-3, 3rd International Conference on Advanced Materials and Nanotechnology (11-17 February 2007, Wellington, New Zealand). Oral presentation.
51. J. Chai, C.E. Kendrick, W.C.T. Lee, F. Freitas, R. Hartmann, and S.M. Durbin, "Zinc oxide nanowires grown by ozone-assisted molecular beam epitaxy," AMN-3, 3rd International Conference on Advanced Materials and Nanotechnology (11-17 February 2007, Wellington, New Zealand).
52. C.H. Swartz, P.A. Anderson, R.J. Reeves, S. Chandril, T.H. Myers, J. Kennedy, K. Prince and S.M. Durbin, "P-type InN through Mg and transition metal doping," AMN-3, 3rd International Conference on Advanced Materials and Nanotechnology (11-17 February 2007, Wellington, New Zealand). Oral presentation.
53. C.E. Kendrick, R. Tilley, M. Kobayashi and S.M. Durbin, "GaN Nanotrees," AMN-3, 3<sup>rd</sup> International Conference on Advanced Materials and Nanotechnology (11-17 February 2007, Wellington, New Zealand). Oral presentation.
54. W.C.T. Lee, J. Chai, C.H. Swartz, R.J. Reeves, J. Kennedy, and S.M. Durbin, "Growth of low conductivity ZnO epilayers and incorporation of nitrogen by plasma-assisted molecular beam epitaxy," AMN-3, 3<sup>rd</sup> International Conference on Advanced Materials and Nanotechnology (11-17 February 2007, Wellington, New Zealand). Oral presentation.
55. R.J. Mendelsberg, M. Kerler, S.M. Durbin, R.J. Reeves, "Photoluminescence behaviour of ZnO nanorods produced by eclipse PLD from a Zn metal target," 7<sup>th</sup> International Conference on Physics of Light-Matter Coupling in Nanostructures, PLMCN7 (12-17 April 2007, Havana, Cuba). (Oral presentation).
56. C.E. Kendrick, R. Tilley, M. Kobayashi, and S.M. Durbin, "3D Branching GaN Nanowires," Spring Meeting of the European Materials Research Society (28 May to 1 June, 2007, Strasbourg, France). (Oral presentation).
57. C.H. Swartz, P.A. Anderson, S.M. Durbin, R.J. Reeves, S. Chandril, T.H. Myers, S.P. Ahrenkiel and K. Prince, "Mg doping on InN and the use of yttrium-stabilised zirconia substrates," Spring Meeting of the European Materials Research Society (28 May to 1 June, 2007, Strasbourg, France). (Oral presentation).
58. C.H. Swartz, P.A. Anderson, R.J. Reeves, S. Chandril, T.H. Myers, S.P. Ahrenkiel and S.M. Durbin, "Controlling carrier type and concentration in InN through doping and substrate choice," Electronic Materials Conference (20-22 June 2007, Notre Dame, Indiana, USA). (Oral presentation).
59. M.W. Allen, C.H. Swartz, P. Miller, R.J. Reeves, and S.M. Durbin, "Influence of surface polarity on the electrical and optical properties of bulk ZnO," Electronic Materials Conference (20-22 June 2007, Notre Dame, Indiana, USA). (Oral presentation).

60. S.M. Durbin, C.E. Kendrick, C.H. Swartz, Y.W. Song, R.J. Reeves and J. Kennedy, "Zn: A p-type dopant for InN?" 7<sup>th</sup> International Conference on Nitride Semiconductors (16-21 September 2007, Las Vegas, Nevada, USA). (LATE NEWS - Oral presentation).
61. C.H. Swartz, M.W. Allen, S.M. Durbin and T.H. Myers, "Separation of surface and bulk conduction in ZnO using variable magnetic field Hall effect measurements," 54th American Vacuum Society Symposium (14-19 October 2007, Seattle, Washington, USA). (Oral presentation).
62. C.H. Swartz, S.M. Durbin, M.W. Allen, and T.H. Myers, "Separation of surface and bulk conduction in hydrothermally grown ZnO using variable magnetic field Hall effect measurements," 2007 Fall Meeting of the Materials Research Society (25 -30 November 2007, Boston, USA). (Oral presentation.)
63. M. Allen, C. Swartz, M. Henseler, R. Reeves, J. Metson, H. Von Wenckstern, M. Grundmann, S.A. Hafield, P.H. Jefferson, P.D.C. King, T. Veal, C. McConville, M. Kobayashi and S. Durbin, "Mechanisms in the formation of high quality Schottky contacts to n-type ZnO," 2007 Fall Meeting of the Materials Research Society (25 -30 November 2007, Boston, USA). (Oral presentation.)
64. C.E. Kendrick, M. Kobayashi and S.M. Durbin, "Electrical properties of self-catalytic GaN nanowires grown by MBE," ICONN2008, 2008 International Conference on Nanoscience and Nanotechnology (25-29 February 2008, Melbourne, Australia). **\*Awarded one of 6 "Best Poster" prizes.**
65. M.A. Allen, P. Miller, R.J. Reeves, O. Avayu, Y. Rosenwaks, and S.M. Durbin, "Spontaneous polarisation effects in ZnO," ICONN2008, 2008 International Conference on Nanoscience and Nanotechnology (25-29 February 2008, Melbourne, Australia). Oral presentation.
66. S.M. Durbin, "On the Selection of Suitable p-Type Dopants for InN," Workshop on Frontier Optoelectronic Materials and Devices, Hakone, Kanagawa, Japan (March 2008). **Invited presentation.**
67. T.H. Myers, C.H. Swartz, P.A. Anderson, S.M. Durbin, R.J. Reeves, S. Chandril, K.J. Doyle, W.J. Schaff, "P-type doping of InN," 50<sup>th</sup> Electronic Materials Conference (25-27 June 2008, Santa Barbara, California, USA). Oral presentation.
68. J. Chai, R.J. Mendelsberg, R.J. Reeves, J. Kennedy, S.M. Durbin, "In-situ Ag doping of plasma-assisted molecular beam epitaxy," IUMRS-ICEM 2008, International Conference on Electronic Materials (28/7/2008 – 1/08/2008, Hilton Sydney, Sydney, Australia). Oral presentation.
69. A. Preston, B. Ruck, J. Zhong, M. Kuebel, C. Meyer, J. Trodahl, K. Smith, W. Lambrecht, N. Strickland, G. Williams, S. Durbin, I. Farrell, and J. Downes, "Growth and electron bands in the intrinsic ferromagnetic semiconductor GdN," IUMRS-ICEM 2008, International Conference on Electronic Materials (28/7/2008 – 1/08/2008, Hilton Sydney, Sydney, Australia). Oral presentation.

70. M.W. Allen and S.M. Durbin, "The influence of interfacial oxygen vacancies on Schottky contacts to ZnO," IUMRS-ICEM 2008, International Conference on Electronic Materials (28/7/2008 – 1/08/2008, Hilton Sydney, Sydney, Australia). Oral presentation.
71. M.W. Allen and S.M. Durbin, "Schottky contacts for high performance zinc oxide semiconductor devices," 2<sup>nd</sup> International Conference on Functional Materials and Devices, ICFMD-2008, (16/06/08-19/06/08, Kuala Lumpur, Malaysia). **Invited presentation.**
72. M.W. Allen and S.M. Durbin, "Factors influencing the formation of Schottky contacts to zinc oxide," 55<sup>th</sup> American Vacuum Society Symposium (19-24 October 2008, Boston, USA). Oral presentation.
73. C.F. McConville, T.D. Veal, P.D.C. King, S.A. Hatfield, B. Martel, J. Chai, M.W. Allen, S.M. Durbin, J. Zuniga-Perez, and V. Munoz-Sanjose, "Surface and interface electronic properties of bulk and epitaxial ZnO," 55<sup>th</sup> American Vacuum Society Symposium (19-24 October 2008, Boston, USA). **Invited presentation.**
74. R.J. Mendelsberg, J. Kennedy, S.M. Durbin and R.J. Reeves, "Unique photoluminescence from ZnO grown by eclipse pulsed laser deposition," 5<sup>th</sup> International Workshop on ZnO and Related Materials (22-24 September 2008, Ann Arbor, Michigan, USA). Oral presentation.
75. M.W. Allen and S.M. Durbin, "The role of metal induced gap states and chemical bonding in the formation of laterally homogenous Schottky contacts to ZnO," 5<sup>th</sup> International Workshop on ZnO and Related Materials (22-24 September 2008, Ann Arbor, Michigan, USA).
76. J. Chai, R.J. Mendelsberg, R.J. Reeves, J. Kennedy, H. von Wenckstern, M. Grundmann, S. M. Durbin, "In-situ Ag doping of ZnO," 5<sup>th</sup> International Workshop on ZnO and Related Materials (22-24 September 2008, Ann Arbor, Michigan, USA). Oral presentation.
77. R.A. Burke, X. Weng, J.M. Redwing, R. Reeves, S. Durbin, "Effect of MOCVD growth conditions on the catalyst composition and properties of GaSb nanowires," SPIE Photonics West (24-29 January 2009, San Jose, California, USA). **Invited presentation.**
78. J. Chai, R.J. Mendelsberg, R.J. Reeves, J. Kennedy, H. Von Wenckstern, M. Grundmann and S.M. Durbin, "Ag doping of zinc oxide," 4<sup>th</sup> International Conference on Advanced Materials and Nanotechnology, AMN-4 (8-12 February 2009, Dunedin, New Zealand).
79. G.C. Turner, M.W. Allen and S.M. Durbin, "Zinc oxide MESFET transistors," 4<sup>th</sup> International Conference on Advanced Materials and Nanotechnology, AMN-4 (8-12 February 2009, Dunedin, New Zealand).
80. L.F.J. Piper, A. DeMasi, L. Colakerol, S.W. Cho, A. Preston, B.J. Ruck, J.H. Chai, S.M. Durbin, A. Schleife, F. Fuchs, F. Bechstedt, A. Klein, P.D.C. King, T.D. Veal, C.F. McConville, D. Payne, A. Boulange, R.G. Edgell, V. Munoz-Sanjose and K.E. Smith, "Bulk and near-surface electronic structure of the transparent conducting oxides: In<sub>2</sub>O<sub>3</sub>, CdO and ZnO," 4<sup>th</sup> International Conference on Advanced Materials and Nanotechnology, AMN-4 (8-12 February 2009, Dunedin, New Zealand). Oral presentation.

81. M.W. Allen, K. Sarpatwari, S.E. Mohny, X. Weng, J.M. Redwing, and S.M. Durbin, "Impact of surface properties on ZnO Schottky devices," 4<sup>th</sup> International Conference on Advanced Materials and Nanotechnology, AMN-4 (8-12 February 2009, Dunedin, New Zealand). Oral presentation.
82. Y.W. Song, P. Senenayake, C.E. Kendrick, M. Cheng, B. Qu, A.N. Cartwright, S.M. Durbin, and R.J. Reeves, "Optical properties of Mg and Zn-doped InN," 4<sup>th</sup> International Conference on Advanced Materials and Nanotechnology, AMN-4 (8-12 February 2009, Dunedin, New Zealand).
83. I.L. Farrell, B. Ludbrook, A.R.H. Preston, H.J. Trodahl, B.J. Ruck, S.M. Durbin and R.J. Reeves, "Growth of rare-earth nitrides by plasma-assisted pulsed laser deposition," 4<sup>th</sup> International Conference on Advanced Materials and Nanotechnology, AMN-4 (8-12 February 2009, Dunedin, New Zealand).
84. B.M. Ludbrook, B.J. Ruck, H.J. Trodahl, A.R.H. Preston, C. Meyer, I.L. Farrell, S.M. Durbin, R.J. Reeves, M. Kubel, L. Ranno, "Growth and physical properties of epitaxial GdN and SmN," March Meeting of the American Physical Society (16-20 March 2009, Pittsburgh, PA, USA). Oral presentation.
85. J. Chai, R.A. Burke, R.J. Mendelsberg, R.J. Reeves, J. Kennedy, H. Von Wenckstern, M. Grundmann, T. Myers, K. Doyle and S.M. Durbin, "MBE Growth and Characterization of Ag-doped Zinc Oxide Thin Films," 2009 Electronic Materials Conference (24-26 June, 2009, University Park, Pennsylvania, PA, USA). Oral presentation.
86. M.W. Allen, S.M. Durbin, K. Sarpatwari and S.E. Mohny, "The Richardson constant for Schottky contacts to n-ZnO," 2009 Electronic Materials Conference (24-26 June, 2009, University Park, Pennsylvania, PA, USA). Oral presentation.
87. C.E. Kendrick, M. Cheung, A.N. Cartwright, Y.-S. Song, R.J. Reeves, T.D. Veal, P.D.C. King, C.F. McConville and S.M. Durbin, "Auger recombination and photoluminescence in Mg-doped InN," 2009 Electronic Materials Conference (24-26 June, 2009, University Park, Pennsylvania, PA, USA). Oral presentation.
88. W.M. Linhart, T.D. Veal, P.D.C. King, C.F. McConville, C. Kendrick, and S.M. Durbin, "Electrical and optical properties of Mg-doped InN," European Materials Research Society (E-MRS) 2009 Spring Meeting (8-12 June 2009, Strasbourg, France).
89. Tim Veal, C. Kendrick, M. Cheung, Y-W. Song, P. D. C. King, C. F. McConville, A. Cartwright, R. J. Reeves, and S. M. Durbin, "Time-resolved differential transmission and photoluminescence studies of recombination mechanisms in Mg-doped InN," European Materials Research Society (E-MRS) 2009 Spring Meeting (8-12 June 2009, Strasbourg, France).
90. S.M. Durbin and M.W. Allen, "Schottky Contacts to ZnO: What We Know, and Don't Know," 2009 Fall Meeting of the Materials Research Society (30 November – 4 December 2009, Boston, USA). **Invited Presentation.**
91. L.F.J. Piper, A.R.H. Preston, S.-W. Cho, A. DeMasi, S.M. Durbin, and K.E. Smith, "The near-surface electronic properties of clean, well-ordered ZnO O- and Zn-polar surfaces," 2009 Fall

- Meeting of the Materials Research Society (30 November – 4 December 2009, Boston, USA). Oral presentation.
92. S.M. Durbin and M.W. Allen, “ZnO Schottky contacts: A test case for interface induced gap state models,” 37<sup>th</sup> Conference on the Physics and Chemistry of Surfaces and Interfaces (10-14 January 2010, Santa Fe, New Mexico, USA). Oral presentation + poster.
  93. S.M. Durbin and M.W. Allen, “Interface State Models and Real ZnO Schottky Contacts,” Deutsche Physikalische Gesellschaft Spring Meeting 2010 (21-26 March 2010, Regensburg, Germany). **Invited Presentation.**
  94. M.W. Allen and S.M. Durbin, “Surface polarity effects in the optical and electronic properties of ZnO,” CIMTEC 2010 - 12<sup>th</sup> International Ceramics Congress & 5<sup>th</sup> Forum on New Materials (6-18 June, 2010, Montecatini Terme, Italy). **Invited Presentation.**
  95. L.R. Bailey, T.D. Veal, C.F. McConville, C.E. Kendrick and S.M. Durbin, “Can indium nitride surfaces be passivated?” 2010 Spring Meeting of the European Materials Research Society (7-11 June 2010, Strasbourg, France).
  96. M.W. Allen, J.G. Partridge, D.H.-S. Kim, and S.M. Durbin, “Induced gap states at zinc oxide surfaces and interfaces,” Electronic Materials Conference (23-25 June 2010, Notre Dame, Indiana USA). Oral presentation.
  97. S.M. Durbin and M.W. Allen, “ZnO Schottky Contacts: A Test for Induced Gap State Models,” Workshop on Oxide Semiconductors (13-14 September 2010, Santa Barbara, USA). **Invited Presentation.**
  98. J.G. Partridge, M.W. Allen, S.M. Durbin, and R. Reeves, “Pulsed laser deposited ZnMgO films for UV detection,” 2010 Fall Meeting of the European Materials Research Society (13-17 September 2010, Warsaw, Poland).
  99. M.W. Allen and S.M. Durbin, “Influence of Spontaneous Polarization and Intrinsic Gap States in Schottky Contacts to ZnO,” 57<sup>th</sup> International Symposium of the AVS (October 17-22, 2010, Albuquerque, NM, USA). **Invited Presentation.**
  100. S.M. Durbin, “Epitaxial growth and its influence on optical, electrical and magnetic properties of metal nitrides,” 2010 Fall Meeting of the Materials Research Society (29 November – 3 December 2010, Boston). **Invited Presentation.**
  101. M.W. Allen, S.M. Durbin, and R.J. Reeves, “The influence of crystallographic polarity on the optical properties of ZnO,” Oxide-based Materials and Devices II, SPIE Photonics West (22-27 January 2011, San Francisco). **Invited Presentation.**
  102. M.W. Allen, R. Heinhold, D. Kim, J.G. Partridge, R.J. Reeves, and S.M. Durbin, “Zinc oxide surfaces, interfaces, devices and applications,” AMN-5: 5<sup>th</sup> International Conference on Advanced Materials and Nanotechnology (7-11 Feb 2011, Wellington, New Zealand). Oral presentation.

103. Y.W. Song, J. Chai, S.M. Durbin, and R.J. Reeves, "Photoluminescence and variable magnetic field Hall effect in Mg-doped InN," AMN-5: 5<sup>th</sup> International Conference on Advanced Materials and Nanotechnology (7-11 Feb 2011, Wellington, New Zealand).
104. S.M. Durbin, "Characteristics of acceptor-doped InN," 2011 Spring Meeting of the European Materials Research Society (9-13 May 2011, Nice, France). **Invited Presentation.**
105. W.M. Linhart, T.D. Veal, R.J.H. Morris, J. Chai, and S.M. Durbin, "Dramatic reduction of InN electron accumulation by high Mg-doping," 2011 Spring Meeting of the European Materials Research Society (9-13 May 2011, Nice, France). Oral presentation.
106. W. Linhart, A. Shukla, J. Chai, C. McConville, S. Durbin and T. Veal, "Dramatic reduction of InN electron accumulation by high Mg-doping," 9<sup>th</sup> International Conference on Nitride Semiconductors (10-15 July 2011, Glasgow, Scotland). Oral presentation.
107. M.W. Allen and S.M. Durbin, "The role of intrinsic gap states and native defects at ZnO surfaces and interfaces," 26<sup>th</sup> International Conference on Defects in Semiconductors (17-22 July 2011, Nelson, New Zealand). Oral presentation.
108. W.M. Linhart, T.D. Veal, L.R. Bailey, L. Fishwick, M. Walker, S.M. Durbin and C.F. McConville, "Sulfur passivation of InN surface electron accumulation," 9<sup>th</sup> International Conference on Nitride Semiconductors (10-15 July 2011, Glasgow, Scotland).
109. T. Moein, A. Pandey, Y. Yao, S.M. Durbin, Q. Gan, N.M. Litchinitser, A.N. Cartwright, "Vertically emitting photonic bandgap cavity arrays for sensing applications," Conference 8099, Biosensing and Nanomedicine, SPIE NanoScience +Engineering Conference (21-25 August 2011, San Diego, CA, USA).
110. J.C. Chai, T.H. Myers, Y.W. Song, R.J. Reeves, W.M. Linhart, T.D. Veal, C.F. McConville, A.V. Stier, B.D. McCombe, M. C-K Cheung, B. Qu, A.N. Cartwright, and S.M. Durbin, "Molecular beam epitaxy growth conditions and acceptor doping of indium nitride," 28<sup>th</sup> North American Molecular Beam Epitaxy Conference (14-17 August 2011, San Diego, CA, USA).
111. H.S. Kim, J.G. Partridge, S.M. Durbin, and M.W. Allen, "Persistent photoconductivity and surface passivation of ZnO Schottky photodiodes," Fall 2011 Meeting of the Materials Research Society (28 November – 2 December 2011, Boston, MA, USA).
112. M.W. Allen, T.D. Veal, C.F. McConville, D.Y. Zemlyanov, G.I.N. Waterhouse, J. Metson, and S.M. Durbin, "Polarity effects in x-ray photoemission of wurtzite semiconductors: ZnO as a case study," Fall 2011 Meeting of the Materials Research Society (28 November – 2 December 2011, Boston, MA, USA).
113. R. Heinhold, F. Schmidt, H. von Wenckstern, M. Grundmann, J. Chai, T.H. Myers, R.J. Mendelsberg, H-S. Kim, S.M. Durbin, R.J. Reeves, and M.W. Allen, "Electrical and optical characterization of ZnO hydrothermal single crystals with low lithium concentration," Fall 2011 Meeting of the Materials Research Society (28 November – 2 December 2011, Boston, MA, USA).



114. M.W. Allen, J.G. Partridge, E. Mayes, M.R. Field, D.G. McCulloch, and S.M. Durbin, “The charge neutrality level of ZnO surfaces and interfaces: Implications for Schottky contact formation,” Fall 2011 Meeting of the Materials Research Society (28 November – 2 December 2011, Boston, MA, USA).
115. C.M. Schlepuetz, Y. Yang, N.S. Husseini, M.W. Allen, S.M. Durbin, and R. Clarke, “Structural investigations on Zn- and O-polar surfaces and Schottky contacts of ZnO,” Fall 2011 Meeting of the Materials Research Society (28 November – 2 December 2011, Boston, MA, USA).
116. Y. Yang, C.M. Schlepuetz, N. S. Husseini, M.W. Allen, S.M. Durbin and R. Clarke, “Atomic structure determination of ZnO polar surfaces by model fitting of x-ray crystal truncation rod data with genetic algorithms,” Fall 2011 Meeting of the Materials Research Society (28 November – 2 December 2011, Boston, MA, USA).
117. S.M. Durbin, “Electronic Properties of ZnO: Reconciling Multiple Techniques,” 2012 March Meeting of the American Physical Society (February 27-March 2, 2012, Boston, MA). **Invited Presentation.**
118. N. Feldberg, J. D. Aldous, Y. Yao, I. Tanveer, B. Keen, W. Linhart, T. D. Veal, Y.-W. Song, R.J. Reeves, and S.M. Durbin, “Plasma-assisted molecular beam epitaxy growth of ZnSnN<sub>2</sub>,” 2012 Meeting of the American Physical Society (February 27-March 2, 2012, Boston, MA).
119. Y. Yao, J.D. Aldous, D. Wong, J.M. Redwing, W. Linhart, C.F. McConville, R.J. Reeves, T.D. Veal, and S.M. Durbin, “Prospects for In-Rich InGaN Based Photovoltaics,” 38<sup>th</sup> IEEE Photovoltaic Specialists Conference (3-8 June 2012, Austin, TX, USA). Poster presentation.
120. N. Feldberg, B. Keen, J.D. Aldous, D.O. Scanlon, P.A. Stampe, R.J. Kennedy, R.J. Reeves, T.D. Veal, and S.M. Durbin, “ZnSnN<sub>2</sub>: A new earth-abundant element semiconductor for solar cells,” 38<sup>th</sup> IEEE Photovoltaic Specialists Conference (3-8 June 2012, Austin, TX, USA). Poster presentation. \*Nominated for Best Poster Award
121. J.D. Aldous, N. Feldberg, Y. Yao, B. Keen, P.A. Stampe, R. Kennedy, R.J. Reeves, D.O. Scanlon, T.D. Veal, and S.M. Durbin, “Towards earth-abundant nitrides: Plasma-assisted molecular beam epitaxial growth of ZnSnN<sub>2</sub>,” Electronic Materials Conference (20-22 June 2012, University Park, PA USA).
122. J.S. Dyck, B.S. Washburne, A.L. McElrogy, K. Kash, and S.M. Durbin, “The effect of the pH of humid air in the ambient on the electronic transport properties of indium nitride,” Electronic Materials Conference (20-22 June 2012, University Park, PA USA). Poster Presentation.
123. R. Heinhold, F. Schmidt, H. von Wenckstern, M. Grundmann, J. Chai, T.H. Myers, R.J. Mendelsberg, H-S. Kim, S.M. Durbin, R.J. Reeves, and M.W. Allen, “Electrical and optical characterization of ZnO hydrothermal single crystals with low lithium concentration,” Gordon Research Conference on Defects in Semiconductors (12-17 August 2012, Biddeford, ME). Poster Presentation.

124. J.D. Aldous, N. Feldberg, Y. Yao, B. Keen, R.J. Reeves, P.A. Stampe, R.J. Kennedy, D.O. Scanlon, S.M. Durbin and T.D. Veal, "Towards earth-abundant nitrides: Plasma-assisted molecular beam epitaxial growth of ZnSnN<sub>2</sub>," UK Semiconductors 2012 (4-5 July 2012, University of Sheffield, Sheffield, UK).
125. S.M. Durbin, "Earth Abundant Element Semiconductors," AMN-6, 6<sup>th</sup> International Conference on Advanced Materials and Nanotechnology (11-15 February 2013, Auckland, New Zealand).  
**Invited Presentation.**
126. N. Feldberg, J.D. Aldous, W.M. Linhart, T.D. Veal, P.A. Stampe, R.J. Kennedy, D.O. Scanlon and S.M. Durbin, "ZnSnN<sub>2</sub>: Growth and tuning through cation disorder," Electronic Materials Conference (26-28 June 2013, Notre Dame, IN).
127. N. Feldberg, J.D. Aldous, W.M. Linhart, T.D. Veal, P.A. Stampe, R.J. Kennedy, D.O. Scanlon, L.F.J. Piper, L. Schweidenback, A. Petrou, and S. Durbin, "Single crystal growth of ZnSnN<sub>2</sub> by molecular beam epitaxy," AVS Symposium (27 October – 1 November, 2013, Long Beach, CA).
128. N. Feldberg, W.M. Linhart, T.D. Veal, P.A. Stampe, R.J. Kennedy, D.O. Scanlon, L.F.J. Piper, R. Clarke, and S.M. Durbin, "Characterization of ZnSnN<sub>2</sub> and the presence and effect of disorder in its cation sublattice," 2013 Fall Meeting of the Materials Research Society (1-6 December 2013, Boston, MA). Poster Presentation.
129. G. Medina, P.A. Stampe, R.J. Kennedy, R.J. Reeves, G.T. Dang, A. Hyland, M.W. Allen, M.J. Wahila, L.F.J. Piper, and S. M. Durbin, "Characterization of tin oxide grown by molecular beam epitaxy," 2013 Fall Meeting of the Materials Research Society, MRS Proceedings 1633 (1-6 December 2013, Boston, MA).
130. S.M. Durbin, "Narrow-gap semiconductors: Trying to live without InN," United Kingdom Nitrides Consortium (UKNC) Winter Conference (7-8 January 2014, Bristol, UK). **Invited.**
131. N. Feldberg, W.M. Linhart, T.D. Veal, P.A. Stampe, R.J. Kennedy, D.O. Scanlon, L.F.J. Piper, Y. Yang, R. Clarke, R.J. Reeves, and S.M. Durbin, "Disorder in ZnSnN<sub>2</sub>: Characterization and band structure effects," March Meeting of the American Physical Society (3-7 March 2014, Denver, CO).
132. B. Keen, R. Makin, P.A. Stampe, R.J. Kennedy, L.F.J. Piper, B. McCombe, C.F. McConville, and S.M. Durbin, "Molecular beam epitaxy growth of GaBi, InBi, and InGaBi," March Meeting of the American Physical Society (3-7 March 2014, Denver, CO).
133. B. Keen, R.A. Makin, P.A. Stampe, R.J. Kennedy, L.F.J. Piper, D.O. Scanlon and S.M. Durbin, "Growth and characterization of binary III-Bi thin films," 5<sup>th</sup> International Workshop on Bismuth-Containing Semiconductors (21-23 July, 2014, Cork, Ireland). **Invited.**
134. J.P. Mathis, N. Senabulya, R. Clarke, N. Feldberg, R. Makin and S.M. Durbin, "Recent developments in II-IV nitride structures (Late News)," 57<sup>th</sup> Electronic Materials Conference (June 24-26, 2015, Columbus, OH)..

135. R. Makin, N. Feldberg, K. Simpson, B. Durant, S. Durbin, T. Veal, D.O. Scanlon, J. Heikinheimo, F. Tuomisto, N. Senabulya, J. Mathis, and R. Clarke, "Ordering in ZnSnN<sub>2</sub>: A new route to band gap engineering," 57<sup>th</sup> Electronic Materials Conference (June 24-26, 2015, Columbus, OH).
136. S. Durbin, R. Makin, N. Feldberg, J. Mathis, N. Senabulya, and R. Clarke, "Tuning bandgap through cation ordering in new PV materials," 62<sup>nd</sup> AVS Symposium (18 – 23 October 2015, San Jose, CA).
137. N. Senabulya, N. Feldberg, R.A. Makin, G. Shi, S.M. Durbin, and R. Clarke, "Single crystal x-ray diffraction study of ZnSnN<sub>2</sub> thin films grown on LiGaO<sub>2</sub> substrates," 58<sup>th</sup> Electronic Materials Conference (22-24 June 2016, Newark, DE).
138. R. Makin, B. Durant, S.M. Durbin, N. Senabulya, J. Mathis, R. Clarke, T. Veal, J. Heikinheimo, and F. Tuomisto, "Band gap engineering in ZnSnN<sub>2</sub> through cation disorder," 58<sup>th</sup> Electronic Materials Conference (22-24 June 2016, Newark, DE).
139. R. Makin, S.M. Durbin, N. Senabulya, J. Mathis, R. Clarke, T.D. Veal, N. Feldberg, P. Miska, "Growth of ordered and disordered ZnSnN<sub>2</sub>," NAMBE (18-21 September 2016, Saratoga Springs, NY).
140. R. Makin, N. Senabulya, J.P. Mathis, R. Clarke, T. Veal, and S.M. Durbin, "ZnSnN<sub>2</sub>: Band gap engineering through cation disorder," 63<sup>rd</sup> AVS Annual Symposium (6-1 November 2016, Nashville, TN).
141. J.S. Dyck, J.W. Cenker, R.A. Makin, N. Feldberg, S. Durbin, "Seebeck coefficient measurements on thin films of ZnSnN<sub>2</sub> and the density of states effective mass," 59<sup>th</sup> Electronic Materials Conference (28-30 June 2017, Notre Dame, IN). Poster presentation.
142. R. Makin, K. York, S. Durbin, N. Senabulya, J. Mathis, R. Clarke, N. Feldberg, P. Miska, "Plasma assisted molecular beam epitaxy growth space of ZnSnN<sub>2</sub>," (28-30 June 2017, Notre Dame, IN).
143. R. Clarke, J.P. Mathis, N. Senabulya, R.A. Makin, S. Durbin, N. Feldberg, R. Reeves, "Optical characterization of epitaxial ZnSnN<sub>2</sub> films," (28-30 June 2017, Notre Dame, IN).
144. R. Makin, K. York, S.M. Durbin, N.A. Feldberg, P. Miska, N. Senabulya, J. Mathis, C. Jones, E. Kioupakis and R. Clarke, "Single crystal thin-film earth-abundant element heterovalent nitride semiconductors," 2017 Fall Meeting of the Materials Research Society (28 November 2017, Boston, MA).
145. R. Makin, K. York, N. Senabulya, J. Mathis, R. Clarke, N. Feldberg, P. Miska, C. Jones, L. Williams, E. Kioupakis, R. Reeves, S. Durbin, "Band gap tuning across the visible spectrum without alloying," Compound Semiconductor Week (CSW 2018, 29 May – 1 June, 2018, Cambridge, MA). *Late news oral presentation.*
146. R.A. Makin, K. York, N. Senabulya, J. Mathis, R. Clarke, N. Feldberg, P. Miska, C.M. Jones, L. Williams, E. Kioupakis, R. Reeves, S.M. Durbin, and T. Veal, "Order parameter and band gap of ZnSnN<sub>2</sub>," Proceedings of the 7<sup>th</sup> World Conference on Photovoltaic Energy Conversion (10-15 June 2018, Waikoloa, HI).

147. R. Makin, K. York, S.M. Durbin, N. Senabulya, J. Mathis, R. Clarke, N. Feldberg, P. Miska, L. Williams, C. Jones, E. Kioupakis, T.D. Veal and R. Reeves, “Band gap dependence of ZnSnN<sub>2</sub> on cation ordering parameter,” 2018 Spring Meeting of the European Materials Research Society (18 – 22 June, 2018). Poster presentation.
148. R. Makin, K.R. York, R.J. Reeves, N. Senabulya, J. Mathis, C.M. Jones, Z. Deng, L. Williams, E. Kioupakis, **R. Clarke**, N. Feldberg, P. Miska, and S.M. Durbin, “II-IV Nitrides: Earth-abundant semiconductors with band-gap turning via cation sub-lattice ordering,” AMN-9, (Wellington, New Zealand). Invited presentation.
149. K.R. York, R. Makin, S. Durbin, J.P. Mathis, N. Senabulya, Z. Deng, L.D. Williams, R. Clarke, E. Kioupakis, P. Miska and R. Reeves, “Ternary heterovalent alternative wide band gap semiconductors,” 61<sup>st</sup> Electronic Materials Conference (6/26/2019 – 6/28/2019, Ann Arbor, MI).
150. R. Makin, K.R. York, S. Durbin, N. Senabulya, J.P. Mathis, R. Clarke, P. Miska, S. Diliberto, C. Jones, Z. Deng, L.D. Williams, E. Kioupakis and R. Reeves, “Effects of controlled cation ordering on optical properties of ZnSnN<sub>2</sub>,” 61<sup>st</sup> Electronic Materials Conference (6/26/2019 – 6/28/2019, Ann Arbor, MI).
151. J.R. Millard, J.W. Cenker, J. Dyck, K.R. York, R. Makin and S. Durbin, “Seebeck and Hall coefficient measurements on ZnSnN<sub>2</sub> and MgSnN<sub>2</sub> – Estimating the density of states effective mass,” 61<sup>st</sup> Electronic Materials Conference (6/26/2019 – 6/28/2019, Ann Arbor, MI). Poster presentation.
152. K.R. York, R.A. Makin, S.M. Durbin, J.P. Mathis, N. Senabulya, R. Clarke and R.J. Reeves, “Tuning band gap energy through controlled disorder in ternary heterovalent compounds,” 62<sup>nd</sup> Electronic Materials Conference (virtual oral presentation, June 2020).
153. S.M. Durbin, Proposal S0071 Update, 2DCC-MIP, 11 May 2020 (virtual oral presentation).
154. R.A. Makin and S.M. Durbin, “An Ising/Potts Model Approach to Predicting Pathogen Case Fatality Rate and Vaccine Efficacy Based on Structural Motifs,” 2021 March Meeting of the American Physical Society (15 March 2021, virtual presentation).
155. A.S. Messecar, S.M. Durbin and R.A. Makin, “Machine learning based investigation of optimal synthesis parameters for epitaxially-grown III-nitride semiconductors,” 2022 Fall Meeting of the Materials Research Society (November 2022, Boston).
156. S. Durbin, K.R. York, R. Makin, T. McKnight and J.M. Redwing, “Disorder and its effects on two-dimensional transition metal dichalcogenides,” 2022 Fall Meeting of the Materials Research Society (November 2022, Boston).
157. R. Makin, K.R. York, A.S. Messecar, and S. Durbin, “Quantifying the effects of disorder on mobility of nitride semiconductors,” 2022 Fall Meeting of the Materials Research Society (November 2022, Boston).

158. R.A. Makin and S.M. Durbin, “Numerical Analysis of Dermatoscopic Skin Lesion Images to Quantify Malignancy Without Machine Learning,” 2023 April Meeting of the Americal Physical Society (15-18 April 2023, Minneapolis). \*withdrawn due to travel conflicts
159. R.A. Makin and S.M. Durbin, “A Bragg-Williams Derived Model for Quantifying Disorder Via Solar Atmosphere Optical Image Analysis,” 2023 April Meeting of the Americal Physical Society (15-18 April 2023, Minneapolis). \*withdrawn due to travel conflicts

## BOOKS

- W.H. Hayt, Jr., J.E. Kemmerly, J.E. Phillips, S.M. Durbin, **Engineering Circuit Analysis, 10<sup>th</sup> Edition**. Dubuque, IA: McGraw-Hill Higher Education, Inc., 2023. ISBN10: 1264149913. *In press*.
- W.H. Hayt, Jr., J.E. Kemmerly, J.E. Phillips, S.M. Durbin, **Engineering Circuit Analysis, 9<sup>th</sup> Edition**. Dubuque, IA: McGraw-Hill Higher Education, Inc., 2019. 864 pages. ISBN 978-0-07-354551-6
- W.H. Hayt, Jr., J.E. Kemmerly, S.M. Durbin, **Engineering Circuit Analysis, 8<sup>th</sup> Edition**. Dubuque, IA: McGraw-Hill, 2012. 852 pages. ISBN 978-0-07-352957-8
- Analisis de Circuitos en Ingenieria 8<sup>th</sup> Ed. ISBN 978-6-07-150802-7
- W.H. Hayt, Jr., J.E. Kemmerly, S.M. Durbin, **Engineering Circuit Analysis, 7<sup>th</sup> Edition**. Boston: McGraw-Hill, 2007. 856 pages. ISBN 978-0-07-286611-7
- Analisis De Circuitos En Ingenieria 7<sup>th</sup> Ed. (2007) ISBN 970-10-6107-1  
 Korean language translation (2007) ISBN 89-6055-011-6  
 Chinese Language Translation \* ISBN 978-7-121-04642-1  
 Bi-Lingual Edition \* ISBN 7-121-03096-9  
 Análise de Circuitos de Engenharia – 7<sup>th</sup> Ed. (2008) ISBN 9788577260218  
 Chinese language translation – long (Taiwan) (2012) 978-7-121-17137-6  
 \*(Publishing House of Electronics Industry, www.phei.com.cn)
- W.H. Hayt, Jr., J.E. Kemmerly, S.M. Durbin, **Engineering Circuit Analysis, 6<sup>th</sup> Edition**. Boston: McGraw-Hill, 2002. 781 pages. ISBN 0-07-228364-5
- International Student Edition ISBN 0-07-112227-3  
 Chinese Language Translation ISBN 7-5053-7633-0/TN  
 Chinese Language Translation ISBN 957-493-652-X  
 Korean Language Translation ISBN 89-88825-50-0  
 Analisis De Circuitos En Ingenieria ISBN 970-10-3694-8  
 Thai Language Edition (2006) ISBN 979-781-244-8

## CHAPTERS IN BOOKS

- S.M. Durbin and K.A. Durbin, “Anonymous polling in an engineering tutorial environment: A case study,” in **Audience Response Systems in Higher Education: Applications and Cases**. D. Banks (ed). Hershey, P.A., USA: Idea Group, Inc. 2006. ISBN 159140948-9. Invited Chapter.
- S.M. Durbin, “InN-based dilute magnetic semiconductors,” in **Indium Nitride and Related Alloys**, T.D Veal, C.F. McConville and W.J. Schaff (eds). London: Taylor and Francis Group, LLC. 2010. ISBN 978-1420078091. Invited Chapter.

## TECHNICAL REPORTS

A.F. Pun, X. Wang, S.M. Durbin and J.P. Zheng, “*Inhibiting surface roughening during the thermal desorption of gallium arsenide*,” AHPARC Technical Report #2005-051, Army High Performance Computing Research Center, Minneapolis, MN, 2005 (16 pgs).

A.F. Pun, X. Wang, S.M. Durbin, and J.P. Zheng, “Reduction of thermal oxide desorption etching on silicon,” AHPARC Technical Report #2006-058, Army High Performance Computing Research Center, Minneapolis, MN, 2006 (21 pgs).

## EDITED BOOKS, CHAPTERS, and PROCEEDINGS

1. S.G. Bailey, A.F. Hepp, D.J. Ferguson, R.P. Raffaele and S.M. Durbin, *Photovoltaics for Space*. (2023). Elsevier. Edited book. ISBN 978-0-12-823300-9

2. S.M. Durbin, Preface: Symposium E: Earth-abundant next generation materials for solar energy – III., *Materials Science in Semiconductor Processing* (2020). Special Issue Editor. S1369-8001(20)31342-1.

3. A. Schleife, M. Allen, S.M. Durbin, T. Veal, C.W. Schneider, C.B. Arnold, and N. Pryds, Symposium F – Oxide Semiconductors and Thin Films, 2012 Fall Meeting of the Materials Research Society (November 2012, Oxide Semiconductors). *MRS Proceedings Volume 1492* (2013). Proceedings Editor.

4. S. Durbin, T. Veal, M. Grundmann, and J. Phillips, “Introduction,” Focus Issue: *Journal of Materials Research* 27(17), 2179 (2012). <https://doi.org/10.1557/jmr.2012.263>

5. S.M. Durbin, “Preface,” *Journal of Vacuum Science and Technology B* 27 (3) May/June 2009 (special issue for 5<sup>th</sup> International Conference on ZnO and Related Materials, 2008). Guest Editor. <https://doi.org/10.1116/1.3141736>.

6. S.M. Durbin, H. von Wenckstern, and M. Allen, Symposium H – ZnO and Related Materials, 2009 Fall Meeting of the Materials Research Society. *MRS Proceedings Volume 1201* (2009). Proceedings Editor.

## PATENTS/ PATENTS PENDING

1. Schottky-like contact and method of fabrication, M.W. Allen and S.M. Durbin  
United States Patent US **8,508,015 B2** (issue date 13 August 2013).

2. Contact and method of fabrication. **Japan Patent #5837299** (Issue date 13 November 2015).

3. Band gap engineered materials. R.A. Makin III and S.M. Durbin, Western Michigan University. United States Patent US**11,545,563** (issue date 3 January 2023).

4. R.A. Makin and S.M. Durbin, “Superconducting materials, devices, and processes,” US Divisional Patent Application to No. 17/011,648/Patent #US11,545,563 (12/2022).

5. Method of Developing Vaccines. R.A. Makin III and S.M. Durbin, Western Michigan University. US Patent Application US-20210349093-A1 (11 November 2021).

6. Quantitative Disorder Analysis and Particle Removal Efficiency of Fiber-Based Filter Media. R.A. Makin III and S.M. Durbin, Western Michigan University. US Patent Application US 2022/0347610 A1 (3 November 2022).

7. Advanced Warning for Solar Flares from Photosphere Image Analysis. R.A. Makin III and S.M. Durbin, Western Michigan University. US Patent Application US-20220365243-A1 (17 November 2022).
8. R.A. Makin and S.M. Durbin, “Quantitative disorder enhanced augmentative/alternative communication device and process,” US Provisional Patent Application (17 October 2022).
9. R.A. Makin and S.M. Durbin, “Quantitative image-based disorder analysis for early detection of melanoma type features,” US Provisional Patent Application (13 June 2022).
10. R.A. Makin III and S.M. Durbin, “Detection of face manipulation by quantified disorder measurements,” Western Michigan University. US Provisional Patent Application (2 June 2022).
11. Increasing ion conductivity of solid electrolyte materials through structural disorder. R.A. Makin III and S.M. Durbin, Western Michigan University. US Provisional Patent Application (1 May 2022).

### **INVITED PRESENTATIONS**

- National Renewable Energy Laboratory Photovoltaics Seminar Series, Golden, CO, USA (June 1994).
- Magnet Science & Technology Seminar Series, National High Magnetic Field Laboratory, Tallahassee, FL, USA (March 2000).
- Plenary Address, AMN-1, Wellington, New Zealand (February 2003).
- Department of Electronic Materials Engineering, Australian National University, Canberra, Australia (August 2003).
- First International Workshop on Indium Nitride, Fremantle, Australia (November 2003).
- Department of Physics, West Virginia University, Morgantown, West Virginia USA (January 2005).
- European Materials Research Society Meeting, Warsaw, Poland (September 2005). [Given by doctoral student P.A. Anderson]
- Department of Electrical Engineering, University at Buffalo, The State University of New York, Buffalo, NY, USA (November 2005).
- Department of Electrical and Computer Engineering, Florida A&M University and The Florida State University, Tallahassee, FL, USA (November 2005).
- Kagami Memorial Laboratory, Waseda University, Tokyo, Japan (September 2006).
- Department of Materials Science and Engineering, The Pennsylvania State University, State College, PA, USA (November 2007)
- Workshop on Frontier Optoelectronic Materials and Devices, Hakone, Kanagawa, Japan (March 2008).
- 2<sup>nd</sup> International Conference on Functional Materials and Devices, ICFMD-2008, Kuala Lumpur, Malaysia (June 2008). [Given by doctoral student M.W. Allen]
- Department of Physics, University of Michigan, Ann Arbor, MI, USA (September 2008).

Department of Chemical Engineering and Materials Science, Michigan State University (January 2009).

2009 Fall Meeting of the Materials Research Society, Boston, MA USA (December 2009).

Institut für Experimentelle Physik, Otto vonGuericke Universität, Magdeburg, Germany (March 2010).

Institut für Festkörperphysik, Technische Universität Berlin, Berlin, Germany (March 2010).

Deutsche Physikalische Gesellschaft Spring Meeting 2010, Regensburg, Germany (March 2010).

CIMTEC 2010 – 12<sup>th</sup> International Ceramics Congress & 5<sup>th</sup> Forum on New Materials, Montecatini Terme, Italy (June 2010) [Given by former PhD student M.W. Allen].

Workshop on Oxide Semiconductors, Santa Barbara, CA, USA (September 2010).

57<sup>th</sup> International Symposium of the AVS, Albuquerque, NM, USA (October 2010). [given by former PhD student M.W. Allen].

2010 Fall Meeting of the Materials Research Society, Boston, MA, USA (December 2010).

Oxide-based Materials and Devices II, SPIE Photonics West (22-27 January 2011, San Francisco).

Department of Physics, Case Western Reserve University, Cleveland, OH (February 2011).

Space Photovoltaics Branch, NASA Glenn Research Center, Cleveland, OH (February 2011).

2011 Spring Meeting of the European Materials Research Society (9-13 May 2011, Nice, France).

Department of Physics Colloquium, West Virginia University, Morgantown, WV (December 5, 2011).

2012 March Meeting of the American Physical Society (February 27-March 2, 2012, Boston, MA).

AMN-6, 6<sup>th</sup> International Conference on Advanced Materials and Nanotechnology (11-15 February 2013, Auckland, New Zealand).

Department of Physics, University of Warwick (January 2014, Coventry, UK).

United Kingdom Nitrides Consortium (UKNC) Winter Conference (7-8 January 2014, Bristol, UK).

5<sup>th</sup> International Workshop on Bismuth-Containing Semiconductors (21-23 July, 2014, Cork, Ireland).

Department of Physics, Hope College (17 October 2014, South Haven, MI).

Department of Physics Seminar, John Carroll University (24 September 2015, Cleveland, OH).

Department of Materials Science and Engineering Seminar, University of Illinois at Urbana-Champaign (21 October 2016, Champaign, IL).

Spring Meeting of the European Materials Research Society (22-26 May 2017, Strasbourg, France).

School of Physical and Chemical Sciences, University of Canterbury (21 June 2019, Christchurch, New Zealand).



## TEACHING ACTIVITY

<b>Primary Interests</b>	Graduate and undergraduate microelectronics/nanotechnology area courses, including solid state, discrete and integrated electronics; introductory linear circuit analysis; electromagnetics.	
<b>Courses Taught at Western Michigan U.</b>	ECE 4810/4820	Senior Design Sequence
	ECE 4950/5950	Semiconductor Materials and Devices
	ECE 6950	Advanced Semiconductor Devices
	ECE 6950	Superconducting Devices
	ECE 2210	Introductory Electronics
	ECE/EDMM 2990	Practical Work Experience
<b>Courses Taught at University at Buffalo</b>	PHY 108	Electromagnetics (Sp 2011, enrol 90; F 2012, enrol 221)
	EE 202	Circuit Analysis I (Fall 2011, enrollment 140)
	EE 311	Integrated Circuits (Spring 2012, enrollment 80)
	PHY 413	Electronics (Sp 2013, enrollment 22)
<b>Courses Taught at University of Canterbury</b>	ENEL 202 Circuits & Systems	
	ENEL 334 Integrated Circuits I	
	ENEL 329 Electromagnetics	
	ENEL 435 Integrated Circuits II	
	ENEL 641 Advanced Semiconductor Devices	
	ENEL 672 Nanotechnology	
<b>Courses Taught at Florida State Univ.</b>	EEL 3111 Introductory Linear Circuits	
	EEL 3112 Advanced Linear Circuits	
	EEL 3300 Introductory Electronics	
	EEL 4301 Advanced Electronic Circuits	
	EEL 4351 Solid State Devices	
	EEL 4914 Senior Design Project	
	EEL 4930 Photonic Devices	
	EEL 5930 Optoelectronic Semiconductor Devices	
	EEL 5930 Superconductor Devices	
	EEL 5905 Directed Independent Study	
<b>Honours Projects Supervised, University of Canterbury</b>	Academic Year 2001-2005: average 4 per year	
	Academic Year 2006: 3	
	As coordinator (2005 - 2006), restructured entire course, including the introduction of an off-campus conference-style oral exam.	
	Academic Year 2007: 0 (on partial sabbatical leave)	
	Academic Year 2008: 2	
	Academic Year 2009: 1	
	Academic Year 2010: 3	
<b>Honors Thesis Students Supervised (FSU)</b>	Michael S. Coleman	B.S.E.E. December 1996
	Andrew G. Hubbard	B.S.E.E. December 1996

### Funded Educational Proposals

*Agency:* Department of Energy *Budget:* \$2000.  
*Project:* Interdisciplinary Solar Vehicle Design Project  
*Agency:* Ford Motor Company *Budget:* \$3000.  
*Project:* Interdisciplinary Solar Vehicle Design Project  
*Agency:* Tallahassee Electric Utility *Budget:* \$5000.  
*Project:* Interdisciplinary Solar Vehicle Design Project  
*Source:* The TRW Foundation *Budget:* \$5000.  
*Project:* Scholarship Program and Laboratory Development

### Postdoctoral Fellows Supervised

Dr. Edward Walsby (Ph.D. Cant.) 2004  
 Dr. Robert John Kinsey (Ph.D. Camb.) 2003 - 2006  
 Dr. Craig Swartz (Ph.D. WVU) 2006 - 2007  
 Dr. Robert Burke (Ph.D. Penn State) 2008 - 2009  
 Dr. Jim Partridge (Ph.D. Bath) 2009 - 2011  
 Dr. Jessica Hui Chai (Ph.D. Cant.) 2010  
 Dr. James Aldous (Ph.D. Warwick) 2011-2013

### Graduate Students Supervised

#### Doctoral Students Presently Supervising

Andrew Messecar *anticipated graduation:* 2024 (WMU, CEAS)

#### Doctoral Students Completed

Krystal York 2022 (WMU, EE)  
 Thesis: Characterization of Disorder and Its Effects on Two-Dimensional Transition Metal Dichalcogenides

Robert Makin 2019 (WMU, CEAS)  
 Thesis: Quantification and Influence of Cation Sublattice Disorder in Ternary Materials with Specific Application to ZnSnN<sub>2</sub>

Nathaniel Feldberg 2015 (UB, Physics)  
 Thesis: Disorder Based Property Tuning in ZnSnN<sub>2</sub>

Benjamin Keen 2014 (UB, Physics)  
 Thesis: III-Bi Semiconductors

Yuan Yao 2013 (UB, EE)  
 Thesis: InGaN/Si Broken-Gap Photovoltaic Elements

Ian Farrell\*\* 2010  
 Thesis: Growth of metal-nitride thin films by pulsed laser deposition

Jessica Chai† 2010  
 Thesis: Combining ZnO and Ag for Potential Optoelectronic Applications

Reuben Mendelsberg\*\* 2009  
 Thesis: Photoluminescence of ZnO Grown by Eclipse Pulsed Laser Deposition

Martin Henseler\*\* 2009  
 Thesis: Optoelectrical studies of ZnO

\*\*Dept. of Physics Ph.D. Student, co-supervisor.

- Paul Miller\*\* 2008  
Thesis: Zinc Oxide: A Spectroscopic Investigation of Bulk Crystals and Thin Films
- Martin Allen†† 2008  
Thesis: Schottky Contact Formation to Bulk Zinc Oxide
- Chito E. Kendrick 2008  
Thesis: Revisiting Nitride Semiconductors: Epilayers, p-Type Doping and Nanostructures
- William C.T. Lee† 2008  
Thesis: Harvesting Philosopher's Wool: Growth and Characterisation of Zinc Oxide Thin Films
- Phillip A. Anderson 2006  
Thesis: Indium Nitride: An Investigation of Growth, Electronic Structure and Doping
- Suk-Ing Liem\*\* 2004  
Thesis: Influence of Ion Energy on the Reactive Ion Etching Induced Optical Damage and Annealing of Gallium Nitride
- Edward Walsby\* 2003  
Thesis: Terahertz Diffractive Optics

#### **Doctoral Students Advised as Committee Member**

- |                         |                             |      |
|-------------------------|-----------------------------|------|
| James Mathis            | Ph.D. Physics (U. Michigan) | 2020 |
| Nasser Minwer M Alsaedi | Ph.D. Comp. Sci. (WMU)      | 2019 |
| Nancy Senabulya         | Ph.D. Physics (U. Michigan) | 2017 |
| Dongming White          | Ph.D. Mech. Eng. (FSU)      | 1997 |

#### **Masters Students Completed**

- G.E. Triplett, Jr. M.S.E.E. Dec. 1997  
Thesis: Plasma Enhanced Pulsed Laser Deposition of BN Thin Films
- T.D. Brooks M.S.E.E. Dec. 1998  
Thesis: Design, Development and Testing of a Pulsed Laser Deposition System with RHEED Capability
- J.S. Pelt M.S.E.E. May 1999  
Thesis: SiC Growth by Conventional PLD and the Hybrid PLD/CVD Technique
- E. Poindexter M.S.E.E. May 2000  
Thesis: Growth of Aluminum, Boron and Titanium Nitride Thin Films by Plasma-Assisted Pulsed Laser Deposition

† New Zealand Tertiary Education Commission (National) Doctoral Scholarship Recipient

\*\*Dept. of Physics Ph.D. Student, co-supervisor.

††Thesis Placed on Dean's List by Dean of Postgraduate Studies

- M.E. Ramsey      M.S.E.E.      May 2000  
Thesis: Growth of SiGe by Pulsed Laser Deposition
- S.L. Atwell      M.S.E.E.      Apr. 2001  
Thesis: Growth and Characterization of (HgRe)BaCaCuO Thin Films
- Virginia Christie      M.E.      May 2003  
Thesis: Growth and Characterisation of Polycrystalline Gallium Nitride Films for Photodetector Applications
- Daniel T.S.E. Lee      M.E.      Sep. 2004  
Thesis: Investigation of Chromium Doped InN for Spintronics Applications
- Chito E. Kendrick      M.E. (with distinction) Jan. 2005  
Thesis: Growth and Characterisation of InGaN for Photovoltaic Applications
- Lyndon Williams\*\*      M.S.      May 2005  
Thesis: An Optoelectronic Study of Indium Nitride
- Y.S. Song\*\*      M.S.      May 2008  
Thesis: Photoluminescence Studies of p-Type InN
- Gary C. Turner      Dec 2009  
Thesis: ZnO MESFET Transistors
- Gabriel Medina      December 2013  
Topic: Molecular Beam Epitaxy of Tin Oxide Semiconductors
- Brian Durant      December 2015  
Thesis: Control of Cation Ordering in Zin Tin Nitride and In-Situ Monitoring of Growth
- Krystal York      M.S.E.E.      June 2018  
Thesis: MgSnN<sub>2</sub>: A New Eco-Friendly Wide Band Gap Semiconductor

†New Zealand Tertiary Education Commission (National) Doctoral Scholarship Recipient

\*Co-supervisor

\*\*Dept. of Physics Student, co-supervisor.

### **Masters Students Supervised as Committee Member**

- Y. Xu      M.S.M.E.      May 1996
- X. Kou      M.S.E.E.      Dec. 1997
- L. Oraganthi      M.S.E.E.      May 1998
- T. Middelkoop      M.S.I.E.      Aug. 1998
- R. Athmanathan      M.S.I.E.      Dec. 1998
- R. Magaña      M.S.E.E.      Aug. 1999
- P. Charbel      M.S.E.E.      May 2000

## SERVICE ACTIVITY

### Professional

#### Journal Review

IEEE Transactions on Electron Devices (1995, 1996, 1998, 1999, 2000, 2002, 2003, 2004, 2005, 2006, 2007, 2009, 2012, 2013), Applied Surface Science (1997, 2009), Thin Solid Films (1998, 1999, 2000, 2005, 2006, 2010), Current Applied Physics (2003, 2004, 2005, 2006, 2007), Advanced Materials (2004), Journal of Electronic Materials (2005, 2006, 2007, 2009, 2013, 2014, 2015), Physical Review B (2005, 2007, 2009, 2010, 2011, 2014), Physical Review Letters (2006, 2010, 2012, 2013), Nanotechnology Letters (2006), Journal of Vacuum Science and Technology A,B (2006, 2007, 2008, 2009, 2012, 2013, 2016), Semiconductor Science and Technology (2007, 2013, 2017), Nanotechnology (2008), Applied Physics Letters (2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015), Journal of Applied Physics (2008, 2009, 2011, 2012, 2013, 2014, 2016, 2017, 2018, 2019, 2020, 2021, 2021, 2022), Journal of Crystal Growth (2008, 2016), Science (2009), Journal of Physics D (2009), Materials Science & Engineering R: Reports (2010), Solid State Electronics (2010), Electron Device Letters (2010, 2011, 2014), physica status solidi (c) (2011, 2014), IEEE Transactions on Education (2011), Materials Science in Semiconductor Processing (2012, 2013, 2015), ACS Nano (2012, 2013), New Journal of Physics (2014), Crystal Research and Technology (2015, 2016), Scientific Reports (2016), Applied Physics A (2017), Journal of the American Ceramic Society (2018), physica status solidi rapid research letters (2018), physica status solidi a (2018), AIP Advances (2020).

#### Conference Committees

Co-organizer, New Zealand Nitride Semiconductor Workshop (June 16-17, 2002), AMN-1, International Conference on Advanced Materials and Nanotechnology (9-14 February 2003), SPIE International Symposium on Microelectronics, MEMS and Nanotechnology (10-12 December 2003, Perth, Australia), AMN-3, Executive Committee of AVS-EMPD (2005, 2006, 2007, 2008, 2009, 2011, 2012, 2013, 2014, 2015), 53<sup>rd</sup> AVS Symposium (12-17 November 2006, San Francisco), 54<sup>th</sup> AVS Symposium (14-19 October 2007, Seattle), 55<sup>th</sup> AVS Symposium (October 2008, Boston), Topical Workshop on Achieving p-type InN (4-5 March 2008, Hakone, Japan), 56<sup>th</sup> AVS Symposium (November 2009, San Jose), COMMAD – Conference on Optoelectronic and Microelectronic Materials and Devices (December 2010, Canberra, Australia), 2011 Fall Meeting of the Materials Research Society (symposium organizer, December 2011, Boston), 28<sup>th</sup> North American Molecular Beam Epitaxy Workshop (August 2011, San Diego), 58<sup>th</sup> AVS Symposium (October 2011, Nashville, TN), 29<sup>th</sup> North American Molecular Beam Epitaxy Conference (October 2012, Stone Mountain Park, GA), 59<sup>th</sup> AVS Symposium (October 2012, Tampa, FL), COMMAD (December 2012, Melbourne, Australia), 16<sup>th</sup> International Conference on II-VI Compounds (2013, Japan), 60<sup>th</sup> AVS Symposium (October 2013, Longbeach, CA), EMPD Program Chair, 61<sup>st</sup> AVS Symposium (November 2014, Baltimore), 9<sup>th</sup> International Workshop on ZnO and Related Semiconductors (30 October – 2 November 2016, Taipei, Taiwan)

#### Conference Chair

General Chair, AMN-2 Second International Conference on Advanced Materials and Nanotechnology (5-11 February 2005, Queenstown, New Zealand); Co-Chair, 8<sup>th</sup> International Workshop on ZnO and Related Semiconductors (September 2014, Niagara Falls, Canada).

## Editorships

*Editor*, Materials Science in Semiconductor Processing (February 2015 to December 2015).

*Editor in Chief*, Materials Science in Semiconductor Processing (2016 to 2021).

## Session Chair

COMMAD 2004 (Conference on Optoelectronic and Microelectronic Materials and Devices), University of Queensland, Brisbane, Australia 8-10 December 2004; 2005 Fall Materials Research Society Meeting (Boston, 2005); Electronic Materials Conference (June 2006, State College, PA; June 2007, Notre Dame, IN), AMN-3 (February 2007, Wellington), International Conference on Nitride Semiconductors (September 2007, Las Vegas), Topical Workshop on Achieving p-type InN (4-5 March 2008, Hakone, Japan), 5<sup>th</sup> International Conference on ZnO and Related Materials (September 2008, Ypsilanti, MI), 55<sup>th</sup> AVS Symposium (October 2008, Boston), AMN-4 (February 2009, Dunedin, New Zealand), Electronic Materials Conference (June 2009, State College, PA), Fall Meeting of the Materials Research Society (December 2009, Boston), 2011 Fall Meeting of the Materials Research Society (December, 2011, Boston), Moderator, Gordon Conference on Defects in Semiconductors (August 2012, Biddeford, ME), 60<sup>th</sup> AVS Symposium (October 2013, Longbeach, CA), 2014 Fall Meeting of the MRS (December 2014, Boston), Electronic Materials Conference (June 2015, Columbus, OH), Electronic Materials Conference (June 2016, Newark, DE), Electronic Materials Conference (June 2017, Notre Dame, IN), 2019 Fall Meeting of the Materials Research Society (November 2019, Boston, MA).

## Other

ABET Program Evaluator (2017-); Created national teleconference seminar series to overcome geographical barriers faced in newly created New Zealand National Centre of Research Excellence (2001); *External Examiner*: B. Ingham Ph.D. thesis, School of Chemical and Physical Sciences, Victoria University of Wellington (2005), S. Granville Ph.D. thesis, Victoria University of Wellington (2007), Holger von Wenckstern Ph.D., Universitaet Leipzig (2008), Kathryn Washburn Ph.D., Victoria University of Wellington (2008), T. Fehlberg Ph.D., University of Western Australia (2009), Julian Steele, Department of Physics, University of Wollongong (2015); Council Member, ANSTO (2005, 2006); Vice President and President-Elect, Royal Society of New Zealand, Canterbury Branch (2005); President, Royal Society of New Zealand, Canterbury Branch (2006); Steering Committee Chair, New Zealand Materials Research Society (2006-2010); External Review, National Research Foundation of South Africa (2007, 2009); Theme 1 Leader, MacDiarmid Institute for Advanced Materials and Nanotechnology (2008, 2009, 2010); Science Executive, MacDiarmid Institute for Advanced Materials and Nanotechnology (2008, 2009, 2010), Panel Member, National Science Foundation (2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022); Member Materials Research Society Pacific Rim Subcommittee (2010, 2011), Materials Research Society Editors Subcommittee (2011, 2012, 2013); Reviewer, Deutsche Forschungsgemeinschaft (2012, 2013), Reviewer, Austrian Science Fund (2012, 2013). Reviewer, Llywodraeth Cymru/Welsh Government (2016); Reviewer, Fonds Wetenschappelijk Onderzoek - Vlaanderen, FWO - Belgium Research Foundation (2017). Reviewer, Swiss National Science Foundation (2021).

## University

Library Committee (2002, 2003, 2004), Academic Board/Faculty Senate (2004, 2005, 2006, 2007, 2011, 2012, 2013), Liaison Officer, Australian Institute of Nuclear Science and Engineering Inc. (AINSE) University/ Australian Nuclear Science and Technology Organisation (ANSTO) Consortium (2004, 2005, 2006, 2007), University Senate Executive Committee (2012, 2013), Faculty Advisor, University at

Buffalo Chapter of the Materials Research Society (2012, 2013), Graduate College Associate Dean Search Committee (2014), University Bookstore Committee (2014), Executive Committee of the Organization of Chairs and Directors/OCHAD (2015-2016), WMU-AAUP Grievance Committee (2018). WMU-AAUP Grievance Officer (2019-2021). Faculty Senate International Education Committee (2019-2020).

### **College**

Fall Commencement Marshal (1998), Library Liason (2004), Beca Prize Committee (2004), Academic Promotions Committee (2009, 2010), Staffing Committee (2009, 2010), University Academic Audit Focus Panel Member (2009), Research Committee (2010).

### **Departmental Committees (\* = chair)**

Faculty Search (1995, 1997, 2002, 2011), Awards and Honors (1995), Curriculum (1995, 2001, 2002, 2003), Instructional Lab (1997, 1998, 1999\*, 2000\*), Graduate Student Picnic\* (1997, 1998, 1999, 2000), Alumni Relations Committee (1999, 2000), Publicity (2001), Canterbury Careers Expo (2001\*), Engineering Open Days (2001\*), Facilities (2001), 1<sup>st</sup> Professional Year Coordinator (2001, 2002, 2003), Computer (2002, 2003), 3<sup>rd</sup> Professional Year Projects Coordinator (2005, 2006), Publicity and Marketing (2008\*), Outreach Coordinator (2009), Strategic Planning Coordinator (2009), Research Committee (2010\*), Outreach (2011, 2012, 2013), EE Graduate Admissions (2011, 2012, 2013), Physics Graduate TA Award (2011, 2012, 2013), Physics Colloquium (2011\*), Physics Graduate Recruitment (2011, 2012, 2013), Physics Undergraduate Studies (2012, 2013), ABET Preparation Committee (2012, 2016, 2018, 2019, 2020, 2021), Undergraduate curriculum committee (2017, 2018).

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