

# FRANK C. PEIRIS

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## Employment

### PROFESSOR OF PHYSICS

Department of Physics, Kenyon College (2015-present)

### ASSOCIATE PROFESSOR OF PHYSICS

Department of Physics, Kenyon College (2007-2015)

### ASSISTANT PROFESSOR OF PHYSICS

Department of Physics, Kenyon College (2001-2007)

### VISITING PROFESSOR OF PHYSICS

Department of Physics, University of Peradeniya, Sri Lanka (2008-2009)

### RESEARCH SCIENTIST

Department of Chemistry, University of Toronto (2004-2006)

### POSTDOCTORAL RESEARCH ASSISTANT

Department of Electrical Engineering, University of Notre Dame (1999-2001)

### RESEARCH AND TEACHING ASSISTANT

Department of Physics, University of Notre Dame (1993-1999)

## Education

### UNIVERSITY OF NOTRE DAME, NOTRE DAME, IN

**Ph.D.** in Solid State Physics, (August 1999)

**Thesis:** Measurement and applications of dispersion in epitaxial II-VI semiconductor thin films and multilayers.

**Advisor:** Professor J. K. Furdyna

### UNIVERSITY OF NOTRE DAME, NOTRE DAME, IN

**M.S.** in Solid State Physics, JUNE 1996.

### GOSHEN COLLEGE, GOSHEN, IN

**B.S.** in Physics, MAY 1993.

## Publications (Kenyon students in bold)

*“Building Materials from Colloidal Nanocrystal Arrays: Evolution of Structure, Composition, and Mechanical Properties upon the Removal of Ligands by O<sub>2</sub> Plasma”*, Santosh Shaw, Julien L. Colaux, Jennifer L. Hay, Frank C. Peiris, and Ludovico Cademartiri, *Advanced Materials*. **28** (40), 8900-8905 (2016)

*“Fabrication of semiconducting pyrite thin films from hydrothermally synthesized pyrite (FeS<sub>2</sub>) powder”*, Z. Shi, A. H. Jayatissa, and F. C. Peiris, *Journal of Materials Science: Materials in Electronics*, **27**, 535 (2016)

“Dielectric Functions and Carrier Concentrations of  $Hg_{1-x}Cd_xSe$  films determined by Spectroscopic Ellipsometry”, **A. J. Lee**, F. C. Peiris, G. Brill, K. J. Doyle and T. H. Myers. Applied Physics Letters, **107**, 072102 (2015)

“Temperature Dependent Dielectric Functions of Molecular Beam Epitaxy-grown GaMnAs thin films”, F. C. Peiris, **T. R. Scully**, X. Liu and J. K. Furdyna. Solid State Communications, **199**, 22-25 (2014)

“Exploring the Optical Properties of  $Hg_{1-x}Cd_xSe$  Films using IR-Spectroscopic Ellipsometry”, F. C. Peiris, G. Brill, Brenda VanMil, Kevin J. Doyle and Thomas H. Myers. Journal of Electronic Materials, **43**, 3056-3059 (2014)

“Nanometer-Scale Precision Tuning of 3D Photonic Crystals Made Possible Using Polyelectrolytes with Controlled Short Chain Length and Narrow Polydispersity”, Z. Wang, M. Calvo, G. Masson, A. Arsenault, F. C. Peiris, M. Mamak, H. Míguez, I. Manners, and G.A. Ozin, Adv. Mater. Interf. **1**, 1300051-5 (2014)

“Porosity tuning of the optical properties of mesoporous silica planar defect in macroporous silica opal”, F. C. Peiris, **J. D. Murphree**, **J. R. Rodriguez**, B. Hatton, V. Kitaev, and G. A. Ozin. Journal of Applied Physics. **112**, 093107 (2012)

“Electrochromic Bragg Mirror: ECBM”, Engelbert Redel, Jacek Mlynarski, Jonathon Moir, Abdinoor Jelle, Chen Huai, Srebrni Petrov, Michael G. Helander, Frank C. Peiris, Georg von Freymann, and Geoffrey A. Ozin. Advanced Materials **24**, 265 (2012)

“Far-infrared dielectric functions and phonon spectra of BeZnTe alloys determined by spectroscopic ellipsometry”, **N. Mandal**, F. C. Peiris, O. Maksimov, and M. C. Tamargo. Solid State Communications. **149**, 1698 (2009)

“Spatially Localized Photoluminescence at 1.5 Micrometers Wavelength in Direct Laser Written Optical Nanostructures”, S. Wong, O. Kiowski, M. Kappes, J. K. N. Lindner, **N. Mandal**, F. C. Peiris, G. A. Ozin, M. Thiel, M. Braun, M. Wegener, and G. von Freymann. Advanced Materials **20**, 4097 (2008)

“Exploring the Thermal Transformation of Mesoporous Titania using Spectroscopic Ellipsometry”, S. Y. Choi, M. Mamak, B. Lee, S. Speakman, G. A. Ozin, and F. C. Peiris, Phys. Stat. Sol. **205**, 825 (2008)

“Innovations in Nanoscience Education at Kenyon College”, Timothy S. Sullivan, Mark S. Geiger, James S. Keller, J. Terrence Klopccic, Frank C. Peiris, Benjamin W. Schumacher, **Jeremy S. Spater**, and Paula C. Turner, IEEE Transactions on Education **51**, 234 (2008)

“Living Photolytic Ring-Opening Polymerization of Amino-Functionalized Ferrocenophanes: Synthesis and Layer-by-Layer Self-Assembly of Well-Defined Water Soluble Polyferrocenylsilane Polyelectrolytes”, Z. Wang, G. Masson, F. C. Peiris, G. A. Ozin and I. Manners, Chemistry A. Eur. J. **13**, 9372 (2007)

“Optical properties of molecular beam epitaxy-grown InGaMnAs thin films”, F. C. Peiris, **J. I. Hungerford**, O. Maksimov, and N. Samarth, Journal of Vacuum & Science Technology B. **25**, 1087-1089 (2007)

“3D hexagonal (R-3m) mesostructured nanocrystalline titania thin films: synthesis and characterization”, S. Y. Choi, B. Lee, D. B. Crew, M. Mamak, F. C. Peiris, S. Speakman, N. Chopra, and G. A. Ozin, Advanced Functional Materials **16**, 1731-1738 (2006)

“DNA designer defects in photonic crystals: optically monitored biochemistry”, F. Fleischhaker, A. C. Arsenault, F. C. Peiris, V. Kitaev, I. Manners, R. Zentel, and G. A. Ozin, Advanced Materials **18**, 2387-2391 (2006)

- “Micro-Brillouin scattering from a single isolated nanosphere”*, Y. Li, H. S. Lim, S. C. Ng, Z. K. Wang, M. H. Kuok, E. Vekris, V. Kitaev, F. C. Peiris, and G. A. Ozin, *Appl. Phys. Lett.* **88**, 23112-1 to 23112-3 (2006)
- “Anisotropy in periodic mesoporous silica and organosilica films studied by generalized ellipsometry”*, F. C. Peiris, B. D. Hatton, G. A. Ozin, and D. D. Perovic, *Appl. Phys. Lett.* **87**, 241902-1 to 241902-3 (2005)
- “Dielectric functions of molecular beam epitaxy-grown GaMnAs thin films”*, **Z. J. Weber**, F. C. Peiris, X. Liu and J. K. Furdyna, *Journal of Vacuum & Science Technology B.* **23**, 1313-1316 (2005)
- “Redox-tunable defects in colloidal photonic crystals”*, F. Fleischhaker, A. C. Arsenault, Z. Wang, V. Kitaev, F. C. Peiris, G. von Freymann, I. Manners, R. Zentel, and G. A. Ozin, *Advanced Materials* **17**, 2455-2458 (2005)
- “Photochemically and thermally tunable planar defects in colloidal photonic crystals”*, F. Fleischhaker, A. C. Arsenault, V. Kitaev, F. C. Peiris, G. von Freymann, I. Manners, R. Zentel, and G. A. Ozin, *Journal of American Chemical Society* **127**, 9318-9319 (2005)
- “Optical Properties of Cl-doped ZnSe epilayers grown on GaAs substrates”*, **B. C. Karrer**, F. C. Peiris, Brenda VanMil, Ming Luo, N. C. Giles, and Thomas H. Myers, *Journal of Electronic Materials.* **34**, 944-948 (2005)
- “Dependence of indices of refraction on Mn composition of Zn<sub>1-x</sub>Mg<sub>x</sub>Se thin films using prism coupler technique”*, Y. H. Um, Y. H. Hwang, F. C. Peiris, and J. K. Furdyna, *Phys. Stat. Sol.* **241**, 1677-1680 (2004)
- “Optical properties of CdSe<sub>x</sub>Te<sub>1-x</sub> epitaxial films studied by spectroscopic ellipsometry”*, F. C. Peiris, **Z. J. Weber**, Y. Chen, G. Brill, and N. K. Dhar, *Journal of Electronic Materials.* **33**, 724-727 (2004)
- “Determination of the dielectric functions of MBE-grown Zn<sub>1-x</sub>Mg<sub>x</sub>Te semiconductor alloys”*, **A. J. Franz**, F. C. Peiris, X. Liu, U. Bindley, and J. K. Furdyna, *Phys. Stat. Sol.* **241**, 507-510 (2004)
- “Determination and modeling of the optical constants of direct band gap Be<sub>x</sub>Zn<sub>1-x</sub>Te grown by molecular beam epitaxy”*, M. Munoz, O. Maksimov, M. C. Tamargo, **M. R. Buckley**, and F. C. Peiris, *Phys. Stat. Sol.* **241**, 706 (2004)
- “Optical Properties of molecular beam epitaxy-grown ZnMnTe thin films measured by complementary techniques”*, F. C. Peiris, **B. A. Kowalski**, X. Liu, U. Bindley, and J. K. Furdyna, *Journal of Applied Physics.* **94**, 4717-4719 (2003).
- “The indices of refraction of molecular beam epitaxy-grown Be<sub>x</sub>Zn<sub>1-x</sub>Te ternary alloys”*, F. C. Peiris, **M. R. Buckley**, O. Maksimov, and M. C. Tamargo, *Journal of Electronic Materials.* **32**, 742-746 (2003).
- “Electronic and structural properties of II-VI ternary alloys and superlattices”* M.-H. Tsai, F. C. Peiris, S. Lee, and J. K. Furdyna, *Physical Review B.* **65**. 235202-1 to 235202-9 (2002).
- “Dielectric functions and critical points of BeZnTe alloys measured by spectroscopic ellipsometry”*, **M. R. Buckley**, F. C. Peiris, O. Maksimov, M. Munoz, and M. C. Tamargo, *Applied Physics Letters.* **81**, 5156-5158 (2002).
- “Quantum dot cellular automata at a molecular scale”* M. Lieberman, S. Chellamma, B. Varughese, Y. Wang, C. Lent, G. H. Bernstein, G. L. Snider, and F. C. Peiris, *Annals of the New York Academy of Sciences.* **960**, 225-239 (2002).
- “Determination of the dispersion of the index of refraction and the elastic moduli for MBE-grown ZnBeSe alloys”*, F. C. Peiris, U. Bindley, J. K. Furdyna, Hyunjung Kim, A. K. Ramdas, and M. Grimsditch, *Applied Physics Letters.* **79**, 473-475 (2001).

- “Optical properties of molecular beam epitaxy-grown  $ZnSe_xTe_{1-x}$  semiconductor alloys” F. C. Peiris, U. Bindley, and J. K. Furdyna, *Journal of Electronic Materials*. **30**, 677-681 (2001).
- “Determination of the indices of refraction of MBE-grown  $ZnSe/ZnCdSe$  multiple quantum well structures” F. C. Peiris, U. Bindley, and J. K. Furdyna, *Journal of Vacuum & Science Technology B*. **19**, 1497-1500 (2001).
- “Distributed Bragg reflectors based on  $(Zn,Cd,Mg)Se$  for use in the visible spectral range” O. Maksimov, S. P. Guo, L. Zeng, M. C. Tamargo, F. C. Peiris, and J. K. Furdyna, *Journal of Applied Physics*. **89**, 2202-2207 (2001).
- “Indices of refraction and their dispersion properties of  $ZnCdMgSe$  thin films grown by molecular beam epitaxy”, F. C. Peiris, J. K. Furdyna, S. P. Guo, and M. C. Tamargo, *Journal of Applied Physics*. **89**, 3748-3752 (2001).
- “High Reflectivity symmetrically strained  $Zn_xCd_yMg_{1-x-y}Se$  based distributed Bragg reflectors for current injection devices” O. Maksimov, S. P. Guo, F. Fernandez, M. C. Tamargo, F. C. Peiris, and J. K. Furdyna, *Journal of Vacuum & Science Technology B*. **19**, 1479-1482 (2001).
- “Red-green-blue light emitting and distributed Bragg reflectors based on  $ZnCdMgSe$  lattice-matched to  $InP$ ” M. C. Tamargo, S. P. Guo, O. Maksimov, Y. C. Chen, F. C. Peiris, and J. K. Furdyna, *Journal of Crystal Growth*. **227**, 710 - 716 (2001).
- “Dielectric function and bowing parameter of  $ZnMgSe$  and  $ZnBeSe$  alloys”, H. Lee, I. Y Kim, J. Powell, D. E. Aspnes, F. C. Peiris, S. Lee, and J. K. Furdyna, *Journal of Korean Physical Society*. **37**, 1012 (2000).
- “Precise measurements of the dispersion of the index of refraction for  $ZnCdTe$  alloys”, F. C. Peiris, S. Lee, U. Bindley, and J. K. Furdyna, *Journal of Electronic Materials*. **29**, 798 (2000).
- “Distributed Bragg reflectors for visible range applications based on  $(Zn,Cd,Mg)Se$  lattice-matched to  $InP$ ” S. P. Guo, O. Maksimov, M. C. Tamargo, F. C. Peiris, and J. K. Furdyna, *Applied Physics Letters*. **77**, 4107-4109 (2000).
- “Precise and efficient *ex situ* technique for determining composition and growth rates in MBE-grown semiconductor alloys”, F. C. Peiris, S. Lee, U. Bindley, and J. K. Furdyna, *Journal of Vacuum & Science Technology B*. **18**, 1443-1447 (2000).
- “Visible-near ultraviolet ellipsometric study of  $ZnMgSe$  and  $ZnBeSe$  alloys”, H. Lee, I. Y Kim, J. Powell, D. E. Aspnes, F. C. Peiris, S. Lee, and J. K. Furdyna, *Journal of Applied Physics*. **88**, 878 (2000).
- “Wavelength dependence of the indices of refraction of MBE-grown  $ZnMgSe$  and  $ZnCdSe$  thin films measured by two complementary techniques”, F. C. Peiris, S. Lee, U. Bindley, and J.K. Furdyna, *Journal of Applied Physics*. **86**, 918-922 (1999).
- “MBE-grown  $ZnSe/ZnTe$  high-reflectivity distributed Bragg reflectors”, F. C. Peiris, S. Lee, U. Bindley, and J. K. Furdyna, *Semiconductor Science & Technology*. **14**, 878-882 (1999).
- “ $ZnMgSe/ZnCdSe$  and  $ZnMgSe/ZnSeTe$  distributed Bragg reflectors grown by molecular beam epitaxy”, F. C. Peiris, S. Lee, U. Bindley, and J. K. Furdyna, *Journal of Applied Physics*. **86**, 719-724 (1999).
- “Optical properties of wide bandgap  $ZnBeSe$  alloys”, A.M. Mintairov, F. C. Peiris, S. Lee, U. Bindley, J. K. Furdyna, S. Raymond, and J. L. Merz, *Semiconductors*. **33**, 1021-1023 (1999).
- “Characterization of MBE grown II-VI semiconductor distributed Bragg reflectors”, F. C. Peiris, S. Lee, U. Bindley, and J. K. Furdyna, *Journal of Crystal Growth*. **210/202**, 1040 (1999).

“Refractive index measurements of ZnSe-based ternary epitaxial layers grown by MBE on GaAs (100)”, F. C. Peiris, S. Lee, U. Bindley, and J.K. Furdyna, Journal of Vacuum & Science Technology B. **17**, 1214-1217 (1999).

“A prism coupler technique for characterizing thin film II-VI semiconductor systems”, F. C. Peiris, S. Lee, U. Bindley, and J. K. Furdyna, Journal of Applied Physics. **84**,5194-5197(1998).

“ZnMgSe/ZnCdSe distributed Bragg reflectors grown by MBE on GaAs (100)”, F. C. Peiris, S. Lee, U. Bindley, and J. K. Furdyna, Proceedings of Semiconductor Lasers & Quantum Dot Technologies. **10**, 51 (1998).

“MnSe: rocksalt vs. zinc-blende structure”, Hyunjung Kim, R. Vogelgesang, A. K. Ramdas, F. C. Peiris, U. Bindley, and J. K. Furdyna, Physical Review B. **58**. 6700-6703 (1998).

“Unusual elastic constants of cubic-MnTe in strained layer superlattices measured by x-ray diffraction”, J. R. Buschert, F. C. Peiris, N. Samarth, H. Luo, and J. K. Furdyna, Physical Review B. **49**, 4619-4622 (1994).

“Growth and characterization of digital alloy quantum wells of CdSe/ZnSe”, H. Luo, N. Samarth, A. Yin, A. Pareek, M. Debrowolska, J. K. Furdyna, K. Mahalingam, N. Otsuka, F. C. Peiris, and J. R. Buschert, Journal of Electronic Materials. **22**, 467-471 (1993).

## Oral Presentations (Kenyon students in bold)

“Exploring the Physics of Self-assembled Nano-porous Structures”, F. C. Peiris, Physics Colloquium, Kenyon College. (2016)

“Temperature Dependent Dielectric Functions of MBE-grown Hg<sub>1-x</sub>Cd<sub>x</sub>Se Semiconductor Alloys”, F. C. Peiris, G. Brill, Kevin J. Doyle and Thomas H. Myers, The 32nd North American Conference on Molecular Beam Epitaxy, Saratoga Springs, New York, USA (2016).

“Electron-phonon coupling parameters of Ga<sub>1-x</sub>Mn<sub>x</sub>Sb measured using temperature-dependent spectroscopic ellipsometry”, F. C. Peiris, X. Liu and J. K. Furdyna, 7th International Conference on Spectroscopic Ellipsometry, Berlin, Germany (2016).

“Probing the Temperature-dependent Dielectric Functions of MBE-grown GaMnSb using Spectroscopic Ellipsometry”, F. C. Peiris, **N. Mandel**, X. Liu and J. K. Furdyna, Electroceramics XIV, Bucharest, Romania (2014)

“Exploring the Optical properties of HgCdSe films using IR-spectroscopic ellipsometry”, F. C. Peiris, G. Brill, Brenda VanMil, Kevin J. Doyle and Thomas H. Myers, The 2013 U.S. workshop on the physics and chemistry of II-VI materials, Chicago, Illinois, USA (2013)

“Magnetic Thin Films: Exploring Physics, Exploiting Applications”, F. C. Peiris, Physics Colloquium, Kenyon College. (2013)

Temperature Dependent Dielectric Functions of Molecular Beam Epitaxy-grown GaMnAs thin films”, F. C. Peiris, **Z. J. Weber**, **N. Mandel**, **T. R. Scully**, X. Liu and J. K. Furdyna, March Meeting of the American Physical Society, Baltimore, Maryland (2013).

“Photonic Crystals: Fabricating Nano Sensors and Bowling Doosras with Photons”, First International Conference on Advanced Materials, Science and Engineering, Colombo, Sri Lanka. (2012)

“*Fabricating Sensors using Photonic Crystals*”, F. C. Peiris, Physics, International Conference on Materials, Energy and Environment, University of Toledo, Toledo, Ohio. (2012)

“*Exploring Dielectric Functions of MBE-grown GaMnAs using Temperature-dependent Spectroscopic Ellipsometry*”, F. C. Peiris, **Z. J. Weber**, **N. Mandal**, X. Liu, and J. K. Furdyna, 15<sup>th</sup> International Conference on II-VI Compounds, Mayan Riviera, Mexico. (2011)

“*Structural Color: From Damsellies to Artificial Sensors*”, F. C. Peiris, Physics Colloquium, Kenyon College. (2010)

“*Nanoporous Materials: The Beauty of Self-assembly & the Amazing Functionality*”, F. C. Peiris, Nanoscience Workshop, Post Graduate Institute of Technology, University of Peradeniya. (2010)

“*Bowling Doosras with Photons: All Optical Computers*”, F. C. Peiris, Physics Colloquium, Department of Physics, University of Peradeniya. (2009)

“*Optical Signatures of the Thermal Transformation of Periodic Mesoporous Titania*”, F. C. Peiris, Chemistry Colloquium, Lehigh University. (2007)

“*Exploring the Thermal Transformation of Mesoporous Titania using Spectroscopic Ellipsometry*”, F. C. Peiris, S. Y. Choi, M. Mamak, B. Lee, S. Speakman, and G. A. Ozin. 4<sup>th</sup> International Conference on Spectroscopic Ellipsometry, Stockholm, Sweden (2007)

“*Defect-based Photonic Crystals*”, F. C. Peiris, Physics Colloquium, John Carroll University. (2007)

“*Spectroscopic Ellipsometry studies on optical properties of molecular beam epitaxy-grown InGaMnAs thin films*”, F. C. Peiris, **J. I. Hungerford**, O. Maksimov, and N. Samarth, 24<sup>th</sup> North American Conference on Molecular Beam Epitaxy, Durham, North Carolina (2006).

“*Interrogating and Exploiting Self Assembly*”, F. C. Peiris, Physics Colloquium, Oberlin College. (2006)

“*My Second Innings as a Graduate Student: Batting on a Reactive Wicket*”, F. C. Peiris, Physics Colloquium, Kenyon College. (2006)

“*Dielectric functions of as-grown and annealed GaMnAs thin films*”, **Z. J. Weber**, F. C. Peiris, X. Liu and J. K. Furdyna, March Meeting of the American Physical Society, Los Angeles, California (2005).

“*Ellipsometry for Thin Film Photonic Structures*”, F. C. Peiris, Chemistry Colloquium, University of Toronto. (2005)

“*Burstein-Moss Effect in n-type MBE-grown ZnSe thin films*”, **B. C. Karrer**, F. C. Peiris, Brenda VanMil, Ming Luo, N. C. Giles, and Thomas H. Myers, March Meeting of the American Physical Society, Los Angeles, California. (2005).

“*Optical properties of GaMnAs thin films measured using ellipsometry*”, **Z. J. Weber**, F. C. Peiris, X. Liu and J. K. Furdyna, 22<sup>nd</sup> North American Conference on Molecular Beam Epitaxy, Banff, Canada (2004).

“*Optical properties of GaMnAs thin films measured by spectroscopic ellipsometry*”, **Z. J. Weber**, F. C. Peiris, X. Liu, U. Bindley, and J. K. Furdyna, March Meeting of the American Physical Society, Montreal, Canada. (2004).

“*Determination and Modeling of the Optical Constants of direct band gap  $Be_xZn_{(1-x)}Te$  grown by Molecular Beam Epitaxy*”, M. Munoz, O. Maksimov, and M.C. Tamargo, **M. R. Buckley**, and F. C. Peiris 11<sup>th</sup> International Conference on II-VI Compounds, Niagara Falls, New York, USA (2003)

“*Determination of the dielectric functions of MBE-grown ZnMgTe semiconductor alloys*”, **A. J. Franz**, F. C. Peiris, X. Liu, U. Bindley, and J. K. Furdyna, 11<sup>th</sup> International Conference on II-VI Compounds, Niagara Falls, New York, USA (2003)

“*Optical properties of CdSe<sub>x</sub>Te<sub>1-x</sub> epitaxial films studied by spectroscopic ellipsometry*”, F. C. Peiris, **Z. J. Weber**, Y. Chen, G. Brill, and N. K. Dhar, ” The 2003 U.S. workshop on the physics and chemistry of II-VI materials, New Orleans, Louisiana, USA (2003)

“*Investigation of Faraday Rotation and Other Optical Properties of Doped InP*”, M. Syed, A. Siahmakoun, and F. C. Peiris, March Meeting of the American Physical Society, Austin, TX, USA (2003).

“*Characterization of the optical properties of BeZnTe thin films using spectroscopic ellipsometry*”, F. C. Peiris, **M. R. Buckley**, O. Maksimov, and M.C. Tamargo, Electronic Materials Conference, Santa Barbara, California, USA (2002).

“*Dispersion of the refractive indices of BeZnTe alloys grown on InP*”, **M. R. Buckley**, F. C. Peiris, O. Maksimov, and M.C. Tamargo, March Meeting of the American Physical Society, Indianapolis, Indiana, USA (2002).

“*Scanning tunneling microscopy characterization of potential molecules for implementing molecular-quantum-dot-cellular-automata*”, F. C. Peiris, G. L. Snider, Z. Li, B. Varughese, S. Chellamma, and M. Lieberman, March meeting of the American Physical Society, Seattle, Washington, USA (2001).

“*Electronic and structural properties of ZnSeTe alloys and the sinusoidally modulated ZnSeTe superlattices*”, M. H. Tsai, F. C. Peiris, S. Lee, and J. K. Furdyna, March meeting of the American Physical Society, Seattle, Washington, USA (2001).

“*Molecular quantum-dot-cellular-automata: surface attachment and STM spectroscopy*”, M. Lieberman, Z. Li, F. C. Peiris, and G. L. Snider, 221<sup>st</sup> American Chemical Society National Meeting, San Diego, California, USA (2001).

“*Visible-Near UV Ellipsometric study of ZnMgSe and ZnBeSe alloys*”, H. Lee, I.Y Kim, J. Powell, D.E. Aspnes, F. C. Peiris, S. Lee, and J. K. Furdyna, March meeting of the American Physical Society, Minneapolis, Minnesota, USA (2000).

“*Zn<sub>x</sub>Cd<sub>y</sub>Mg<sub>1-x-y</sub>Se distributed Bragg reflectors grown by molecular beam epitaxy*”, O. Maksimov, S. P. Guo, Y. Y. Luo, W. Lin, M. C. Tamargo, F. C. Peiris, and J. K. Furdyna, MBE-XI, Beijing, China (2000).

“*Determination of the indices of refraction of MBE-grown ZnSe/ZnCdSe multiple quantum well structures*”, F. C. Peiris, U. Bindley, and J. K. Furdyna, 19<sup>th</sup> North American conference on molecular beam epitaxy, Arizona, USA (2000).

“*Optical properties of molecular beam epitaxy-grown ZnSe<sub>x</sub>Te<sub>1-x</sub> semiconductor alloys*”, F. C. Peiris, U. Bindley, and J. K. Furdyna, The 2000 U.S. workshop on the physics and chemistry of II-VI materials, Albuquerque, New Mexico, (2000).

“*Wavelength dependence of the indices of refraction of MBE-grown ZnMgSe and ZnCdSe thin films measured by two complementary techniques*”, F. C. Peiris, S. Lee, U. Bindley, and J. K. Furdyna, March meeting of the American Physical Society, Atlanta, Georgia, USA (1999).

“*Elastic moduli for MBE-grown ZnMgSe and ZnBeSe*”, A. K. Ramdas, Hyunjung Kim, F. C. Peiris, U. Bindley, J. K. Furdyna, and M. Grimsditch, March meeting of the American Physical Society, Atlanta, Georgia, USA (1999).

*“High reflectivity distributed Bragg reflectors based on II-VI semiconductor ternaries”*, F. C. Peiris, S. Lee, U. Bindley, and J. K. Furdyna, March meeting of the American Physical Society, Atlanta, Georgia, USA (1999).

*“Precise measurements of the dispersion of index of refraction for ZnCdTe alloys”*, F. C. Peiris, S. Lee, U. Bindley, and J. K. Furdyna, The 1999 U.S. workshop on the physics and chemistry of II-VI materials, Las Vegas, Nevada, (1999).

*“Precise and efficient ex situ technique for determining composition and growth rates in MBE-grown semiconductor alloys”*, F. C. Peiris, S. Lee, U. Bindley, and J. K. Furdyna, 18<sup>th</sup> North American conference on molecular beam epitaxy, Banff, Canada, 1999.

*“A prism coupler technique for characterizing thin film II-VI semiconductor systems”*, F. C. Peiris, S. Lee, U. Bindley, and J. K. Furdyna, March meeting of the American Physical Society, Los Angeles, California, USA (1998).

*“MnSe: rocksalt vs. zinc-blende structure”*, Hyunjung Kim, R. Vogelgesang, A. K. Ramdas, F. C. Peiris, U. Bindley, and J. K. Furdyna, March meeting of the American Physical Society, Los Angeles, California, USA (1998).

*“Characterization of MBE grown II-VI semiconductor distributed Bragg reflectors”*, F. C. Peiris, S. Lee, U. Bindley, and J. K. Furdyna, Tenth international conference in MBE, Cannes, France (1998)

*“Optical properties of wide bandgap ZnBeSe alloys”*, A. M. Mintairov, F. C. Peiris, S. Lee, U. Bindley, J. K. Furdyna, S. Raymond, and J. L. Merz, Conference on semiconductors and heterostructures, St. Petersburg, Russia (1998).

*“ZnMgSe/ZnCdSe distributed Bragg reflectors grown by MBE on GaAs (100)”*, F. C. Peiris, S. Lee, U. Bindley, and J. K. Furdyna, Conference in Semiconductor Lasers & Quantum Dot Technologies, La Jolla, California, (1998).

*“Refractive index measurements of ZnSe-based ternary epitaxial layers grown by MBE on GaAs (100)”*, S. Lee, F. C. Peiris, S. Lee, U. Bindley, and J. K. Furdyna, Seventeenth North American MBE conference, University Park, PA, USA (1998).

*“Surprising elastic constants of cubic-MnTe in strained layer superlattices measured by x-ray diffraction”*, J. R. Buschert, F. C. Peiris, N. Samarth, H. Luo, and J. K. Furdyna, March meeting of the American Physical Society, Indianapolis, Indiana, USA (1992).

## **Grants Funded (External)**

*“Above band edge optical behavior of wide band gap semiconductor alloys and heterostructures”*, American Chemical Society-Petroleum Research Fund, \$35,000, (2002, 2 years)

*“Nanotechnology in Physics and Chemistry at Kenyon College”*, National Science Foundation, \$100,000, (2004, 2 years)

*“Investigation of the electronic excitation structure of spintronics based diluted magnetic semiconductors using spectroscopic ellipsometry”*, Research Corporation-Cottrell, \$36,920 (2004, 2 years)

*“Temperature Dependent Magneto-Optical Ellipsometry Studies of Magnetic Semiconductors”* American Chemical Society-Petroleum Research Fund, \$50,000 (2005, 2 years)



*“Acquisition of an IR Ellipsometer for Undergraduate Research and Education”*,  
National Science Foundation, \$217,500 (2005, 3 years)

*“Ellipsometric Study of the Evolution of the Band-structure of Diluted Magnetic Semiconductors”*,  
Research Corporation-Cottrell, \$40,150 (2007, 2 years)

*“Photonic Crystals-based Hybrid Structures for Laser and Photovoltaic Applications”*,  
American Chemical Society-Petroleum Research Fund, \$65,000, (2008, 3 years)

*“Probing the Interplay between Magnetic Properties, Band Structure and Carrier Dynamics of III-V-based Magnetic Semiconductors”*, National Science Foundation, \$150,000 (2012, 3 years)

*“Fundamental Properties of Porous Structures and the Dynamics of Absorbent-pore Interactions”*,  
American Chemical Society-Petroleum Research Fund, \$75,000, (2016, 3 years)

*“Exploring the Transport Properties of Topological Insulators using Spectroscopic Ellipsometry”*,  
National Science Foundation, \$175,000 (2016, 3 years)

## **Grants Funded (Internal)**

*“Spectroscopic ellipsometric studies of nanostructures”*, Faculty Development Grant, \$2500, (2004)

*“Structural and Optical Properties of Novel Photonic Structures”*, Labalme Grant, \$5000, (2005)

*“Incorporation of Magnetic Capabilities into Ellipsometry”*, Faculty Development Grant, \$2500, (2007)

*“Hybrid Structures: Dots, Pores & Spheres”*, Labalme Grant, \$5000, (2009)

*“Feather Coloration: Clues for Innovations in Material Science using Nature’s Nano Architectures”*,  
GLCA-New Directions Grant, \$8300, (2011)

*“Implementing an Experimental Technique to Study Adsorption in Porous Structures”*, FRG, \$2000, (2014)

*“Exploring Novel Structures for Next-generation Solar Cells”*, FRG, \$3000, (2015)

*“Developing an Optical Technique to Explore Biochemical Interactions”*, FRG, \$3000, (2016)

## **Courses Taught**

PHYS 110-First Year Seminar in Physics-Nanoscience

PHYS 140-Classical Physics

PHYS 141-Introduction to Experimental Physics

PHYS 135-General Physics II

PHYS 145-Modern Physics

PHYS 146-Introductory to Experimental Physics

PHYS 210-Intermediate Seminar in Physics

PHYS 245-Waves and Oscillations

PHYS 246-Waves and Oscillations Laboratory  
PHYS 340-Classical Mechanics  
PHYS 355-Optics  
PHYS 375-Condensed Matter Physics  
PHYS 380-Introduction to Electronics  
PHYS 385-Advanced Experimental Physics

## Independent Studies

*Introduction to Semiconductors* – Benjamine Kowalski, 2001  
*Ellipsometry Applications in Semiconductors* – Benjamine Kowalski, 2002  
*Introduction to Aerodynamics* – Eric Christianson, 2002  
*Semiconductor Optics* – Matt Buckley, 2002  
*Introduction to Ellipsometry* – Alexander Franz, 2002  
*Thin Film Optics* – Emily Berkeley, 2002  
*Advanced Topics on Ellipsometry* – Alexander Franz, 2003  
*Optical Properties of Semiconductors* – Brain Karrer, 2003  
*Magneto-optics of GaMnAs* – Zack Weber, 2004  
*Optics of Thin Films* – Nirajan Mandal, 2007  
*Dielectric Mirrors* – Patrick Meyers, 2010  
*Magneto-optical thin films* – Andrew Chevalier, 2012  
*III-V-based Magnetic Semiconductors* – Timothy Scully, 2012  
*Evaporation Systems* – Lucas Herweyer, 2013  
*Synthesizing Magnetic Films* – Aiden Lee, 2013  
*Building a Magneto-optical System* – Ryan Darragh, 2013/2014

## Summer Science Projects

*Dispersion properties of Mn-based semiconductor alloys* – Benjamine Kowalski, 2002  
*Dielectric constants of ZnBeTe ternary alloys* – Matt Buckley, 2002  
*Optical properties of ZnMgTe* – Alexander Franz, 2003  
*Determination of the Optical Properties of CdSeTe Alloys* – Zachary Weber, 2003  
*Optical properties of quantum wells and superlattices* – Jeremy Spater, 2004  
*Magnetic Semiconductors* – John Hungerford, 2004  
*Photonic Crystals* – Joseph Rodriguez, 2006  
*Doped-glassy thin films* – Nirajan Mandal, 2007  
*Dielectric Mirrors* – Patrick Meyers, 2008  
*Hybrid Photonic Structures* – Joe Murphree, 2008  
*Faraday Rotators* – Andrew Chevalier, 2011  
*Low-temperature Ellipsometry* – Timothy Scully, 2012  
*Magneto-optical Thin Films* – Aiden Lee, 2013  
*Low-temperature Ellipsometry* – Manjul Sharma, 2013  
*Magnetic Force Microscopy* – Hanning Wong, 2013  
*Doping Characteristics of IR-active Materials* – Aiden Lee, 2014  
*Synthesizing Conducting Porous Thin Films* – Mathew Christopher, 2014  
*Exploring the Effective Mass of Semiconductors Using Infrared Faraday Rotation* – Haifeng Qiao, 2015  
*Surface Plasmon Resonance Ellipsometry for Label-Free Biosensing* – Eliana B. Crawford, 2015

## Services

Member of the CPC (2006 and 2007)  
Chaired the LBIS-subcommittee of CPC (2006)  
Member of the search committee for LBIS – Vice President  
Physics Library Liaison, Fall 2002-present  
Member of the search committee for the visiting position in physics in 2002  
Coordinated with Admission staff to promote Kenyon to International students, 2002  
Member of the Ad Hoc Faculty Committee on Admissions, 2002-03.  
Member of the committee which reviews grant application for Kenyon Campus Community Development Fund (KCCDF), 2002-03  
Faculty Advisor for International Students at Kenyon (ISAK), 2002-03  
Manuscript Reviewer - Journal of Applied Physics, Applied Physics Letters, Journal of Electronic Materials, and Nanotechnology.  
Grant Reviewer - American Chemical Society, National Science Foundation.

## Development Activities

NSF Teaching Initiative Workshop for New Physics Faculty, College Park, MD. November 2001.  
Ellipsometry Training Course, Lincoln, Nebraska. January 2002.  
Nanotechnology Workshop, SUNY at Buffalo, May 2003.  
Nanoscience-Implementation & Evaluation, Gathersburg, Maryland. August 2004.  
Future of Nanomaterials, Toronto. May 2006.  
Taught a two-semester course in Intro/Advanced Nanoscience at the University of Peradeniya, Sri Lanka (2009)  
Served in the Organization Committee for the International Conference on Materials, Energy and Environment, University of Toledo, Toledo, Ohio. (2012)  
Served in the Program Committee for the First International Conference on Advanced Materials, Science and Engineering, Colombo, Sri Lanka. (2012)

## Awards and Honors

Invited to serve in the International Program Committee for the Conference on II-VI semiconductors, 2003.  
Lodish Faculty Development Professor of Natural Science, (2001-2004)  
Best student presentation award at the 1999 U.S. Workshop on Physics and Chemistry of II-VI materials, Las Vegas, Nevada, 1999.  
Robert J. Tomsich Award for outstanding achievement in research and science (2004)

## Professional Membership

The American Physical Society  
Materials Research Society  
Council on Undergraduate Research.