

ALEXANDER MILES
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Objective

To pursue research and development opportunities in the fields of optical materials and thin-film systems for photonics, optical materials, bio-sensing, energy collection, and other performance-critical applications.

Education

University of Arizona: *Bachelor of Science, Materials Science Engineering* May 2011 - GPA 3.9/4.0
University of Arizona: *Bachelor of Science, Optical Sciences and Engineering* May 2011 - GPA 3.9/4.0
University of Arizona: Doctoral Candidate in Optical Sciences Dec 2015 - GPA 4.0/4.0

Skills

- Geometric Optics - Design & Alignment
- Physical Optics - Holography
- Thin-Film Filters
- Magneto-optics
- Nonlinear Optics
- Photonic Systems
- Zemax (Seq., Non-Seq.)
- CODE V
- Solidworks
- MATLAB
- L^AT_EX
- Python
- German (Intermediate, technical)
- French (Intermediate)
- Russian (Beginner)
- American Sign Language (Beginner)
- Communication and Outreach

Research Experience

University of Arizona, College of Optical Sciences Summer 2011 - Present
Research Associate, Advisor Dr. Robert Norwood

- Developed separation and isolation of nanodiamond quantum dots.
- Studied magneto-optic properties of nanocomposite materials for bio-sensing.
- Designed and optimized a novel hybrid solar collector and integrated thin-film mirror.
- Build and test of a telecom-wavelength free-space MEMs fiber optic switch.
- Study of pulsed response of photorefractive polymers for holographic display applications.

Naval Undersea Warfare Center - Newport, Rhode Island Summer 2013
Student Technical Assistant, supervisor Dr. Tariq Manzur

- Test and on-site deployment of atmospheric and meteorological monitoring equipment.
- Produced protocols for data gathering, analysis, and comparison to models.

SCHOTT AG, Advanced Optics Division - Mainz, Germany Summer 2010
Praktikant (Intern) to Dr. Ralf Reiter and Dr. Bianca Schreder

- Perform and review German-English translation for technical literature.
- Diagnosis of adverse surface reactions in phosphate-based glass.

Lunar and Planetary Sciences, NASA Space Grant Academic Year 2009-2010
Research Assistant and Programmer for Dr. Robert Erdmann

- Retrofitting a FORTRAN-based simulation for directional solidification in microgravity.

University of Arizona, Materials Science Department Summer 2009
Student Research Assistant to Dr. Barrett G. Potter, Jr.

- Investigate the effect of surface treatment on thermal opacification in KDP crystals.

University of Arizona, Materials Science Department Summer 2008
Student Research Assistant to Dr. Pierre Lucas

- Study of photo-relaxation and photo-expansion in calcogenide glasses using surface roughness and differential scanning calorimetry.

Steward Observatory Imaging Technology Lab

September 2007 - December 2009

Student Research Assistant

- Train on numerous measurement and experimental techniques.
- Study of protective coatings compatibility for CCDs.

Teaching Experience

- Supervised a semester-long Senior level laboratory course on photonics.
- Taught week-long course on utilizing Python for scientific applications.
- Guest lectured on scientific communication, linear algebra for optics, and introduction to polarization.

Leadership and Service

Center for Integrated Access Networks (CIAN)

2011 - Present

Officer - Student Industry Liaison Officer

- Serve as an intermediary for pairing students with relevant industry members.
- More than 100 hours of outreach for primary, middle school, and high school students.

Mentoring

- Derek Keyes, Optical Sciences Undergraduate 2011 - 2012
- Brandon O'Shea, Josh Miller, Stéphane Razafindramanana, REU Students Summer 2014

Patents and Publications

Real-time imaging of chromophore alignment in photorefractive polymer devices through multiphoton microscopy
B. Lynn, **A. Miles**, S. Mehravar, P.A. Blanche, K. Kieu, R.A. Norwood, N. Peyghambarian. *submitted*

7x7 DMD-based diffractive fiber switch at 1550nm, **A. Miles**, B. Lynn, P.A. Blanche, J. Wissinger, D. Carothers, L. LaComb, R.A. Norwood, N. Peyghambarian. *Optics Communications* **334**, 41-45 (2015)

Method of purifying nanodiamond powder and purified nanodiamond powder, R.A. Norwood, P. Gangopadhyay, **A. Miles**, J. Kato, S. Virji-Khalfan, M. Miyawaki. US Patent 2014/0004031 A1. Filed June 28, 2012 and issued January 2, 2014 in collaboration with Canon nc.

Design and Preliminary Implementation of an N x N Diffractive All-Optical Fiber Optic Switch, B. Lynn, P.A. Blanche, **A. Miles**, J. Wissinger, D. Carothers, L. LaComb, R.A. Norwood, N. Peyghambarian. *Journal of Lightwave Technology* **31**, 24 (2013)

Rapid Prototyped Terahertz-Domain Gradient Index Optics: Computational Design, simulation, and manufacture, **A. Miles**, W. Duncan, B. Klug, C. Holmes, *International Telemetering Conference 2011 (ITC/USA)*. Las Vegas, NV. Oct 23-26, 2011

Posters and Presentations

Scalable Diffractive All-Optical Fiber Switch at 1550nm; **A. Miles**, B. Lynn, P.A. Blanche, J. Wissinger, R.A. Norwood, N. Peyghambarian. Presented February 3rd, 2014 at the CIAN 2014 Industry Advisory Board Meeting, San Francisco, California.

Fast Optical Switch for Data Communication Applications; **A. Miles**, B. Lynn, P.A. Blanche, D. Carothers, J. Wissinger, R.A. Norwood, N. Peyghambarian. Presented July 8 2013 at the IEEE 2013 Summer Topical Meeting, Waikoloa, Hawaii.

Honors

(2014) Moore Scholarship Recipient
(2013) TRIF Photonics Fellow
(2010) SCHOTT Advanced Optics Scholarship
(2010) University of Arizona da Vinci Scholar
(2009) NASA Space Grant Recipient
(2007-2010) Dean's List with Distinction, UA
(2007-2010) Presidents Award for Excellence, UA

Memberships

(2013-Present) CIAN Student Industry Liaison Officer
(2008-2011) Material Advantage, UA
(2009-2011) President of Keramos, UA
(2008-Present) SPIE Member, UA Chapter
(2008-Present) Student Optics Chapter (OSA/SPIE), Officer