

# Israel J. Vaughn

Canberra, ACT, 2602, Australia

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## EDUCATION

<b>PhD</b>	Optical Sciences	<i>University of Arizona</i>
<b>MS</b>	Mathematics	<i>University of New Mexico</i>
<b>BS</b>	Mathematics	<i>New Mexico Institute of Mining and Technology</i>

## EMPLOYMENT

<b>Research Associate</b>   <i>UNSW Canberra</i>	2016-Present
Imaging systems, Polarimetric Imaging, Scatterometer, Optical Engineering, Control Engineering, Systems Engineering, Space Systems Engineering	
<b>Systems Engineer</b>   <i>maxwell's muse, llc</i>	2014-2016
Systems Engineering, Optical Design, C++ Design	
<b>Graduate Researcher</b>   <i>University of Arizona</i>	2009-2016
Machine Learning, Polarimetric System Design, Imaging Operators	
<b>Software Engineer</b>   <i>Advanced Optical Technologies</i>	2011-2012
Material Classification of Polarimetric Data	
<b>Systems/Software/Optical Engineer</b>   <i>Advanced Optical Technologies</i>	2006-2009
Polarization, Remote Sensing, Machine Learning	

## QUALIFICATIONS | EXPERIENCE

### *5-10 Years Experience*

C/C++, Matlab, Classification/Machine Learning, Optical Design (mostly opto-mechanical), Systems Engineering/Instrumentation, Polarisation/Polarisation Imaging, Software Engineering, Scientific Computing, Instrumentation control

### *1-4 Years Experience*

Mathematical Imaging Science, CUDA, Labview, Solidworks and ASME Y14.5-2009 tolerancing, Management (1-2 people), Low level hardware troubleshooting (TCP, I2C bus), ZEMAX, Space Systems Engineering

## HONORS, FELLOWSHIPS, AND AWARDS

GTEAMS NSF GK-12 Fellowship	<i>National Science Foundation</i>
Tech and Research Initiative Funding: Imaging Fellowship	<i>State of Arizona, USA</i>
2nd place poster Artificial and Computational Intelligence Conf.	<i>American Meteorological Soc.</i>
Optical Sciences Departmental Fellowship	<i>University of Arizona, USA</i>
Mathematics Departmental Award	<i>New Mexico Tech, USA</i>
Silver Scholarship	<i>New Mexico Tech, USA</i>
New Mexico Scholars Scholarship	<i>State of New Mexico, USA</i>
Tech Scholar	<i>New Mexico Tech, USA</i>
Student Appreciation Award for Student Body Service	<i>New Mexico Tech, USA</i>

## PUBLICATIONS

IJ Vaughn, AS Alenin, JS Tyo (2017) A fast Stokes polarimeter: preliminary design. *SPIE Vol. 10407*.

AS Alenin, IJ Vaughn, JS Tyo (2017) A nine-channeled partial Mueller matrix polarimeter. *SPIE Vol. 10407*.

IJ Vaughn, AS Alenin, JS Tyo (2017) Statistical scene generation for polarimetric imaging systems. *preprint arXiv:1707.02723*.

AW Kruse, AS Alenin, IJ Vaughn, JS Tyo (2017) Polarization-color mapping strategies: catching up with color theory. *SPIE Vol. 10407*.

AS Alenin, IJ Vaughn, JS Tyo (2017) Optimal bandwidth micropolarizer arrays. *Opt. Letters*.

IJ Vaughn, AS Alenin, JS Tyo (2017) Focal plane filter array engineering I: rectangular lattices. *Opt. Express*.

M Cegarra-Polo, AS Alenin, IJ Vaughn, AJ Lambert (2016) GEO Satellite Characterization Through Polarimetry Using Simultaneous Observations from Nearby Optical Sensors. *AMOS*.

IJ Vaughn, AS Alenin, JS Tyo (2016) Bounds on the microanalyzer array assumption. *Proc. SPIE 9853, 98530W*.

AS Alenin, IJ Vaughn, JS Tyo (2016) Estimation of errors in partial Mueller matrix polarimeter calibration. *Proc. SPIE 9853, 98530T*.

F Snik, G van Harten, AS Alenin, IJ Vaughn, JS Tyo (2015) A multi-domain full-Stokes polarization modulator that is efficient for 300-2500nm spectropolarimetry. *Proc. SPIE 9613, 96130G*.

IJ Vaughn, OG Rodríguez-Herrera, M Xu, JS Tyo (2015) A portable imaging Mueller matrix polarimeter based on a spatio-temporal modulation approach: theory and implementation. *Proc. SPIE 9613, 961312*.

IJ Vaughn, OG Rodríguez-Herrera, M Xu, JS Tyo (2015) Bandwidth and crosstalk considerations in a spatio-temporally modulated polarimeter. *Proc. SPIE 9613, 961305*.

T Wakayama, K Komaki, IJ Vaughn, JS Tyo, Y Otani, T Yoshizawa (2013) Evaluation of Mueller matrix of achromatic axially symmetric wave plate. *Proc. SPIE 8873, 88730P*.

IJ Vaughn, BG Hoover, JS Tyo (2012) Classification using active polarimetry. *Proc. SPIE 8364, 83640S*.

IJ Vaughn (2011) The imaging equation for a microgrid linear Stokes polarimeter. *Proc. SPIE 8160, 816008*.

SR Felker, JS Tyo, EA Ritchie, IJ Vaughn (2010) Support vector machine techniques to predict tropical cyclone re-intensification following extratropical transition. *AMS Conference on Hurricanes and Tropical Meteorology*.

IJ Vaughn, BG Hoover (2008) Noise reduction in a laser polarimeter based on discrete waveplate rotations. *Opt. Express 16, 2091-2108*.

## PRESENTATIONS AND POSTERS

A fast Stokes polarimeter: preliminary design SPIE 2017

Temporal focal plane filter arrays SPIE 2017

Bounds on the microanalyzer array assumption SPIE 2016

Spatio-temporal imaging Mueller matrix polarimeter theory SPIE 2015

A portable imaging Mueller matrix polarimeter	SPIE 2015
Classification using active polarimetry	SPIE 2012
The imaging equation for a microgrid linear Stokes polarimeter	SPIE 2011
Machine learning techniques to analyze extra-tropical transition	AMS 2011
Demonstrations of noise- and error-reduction in a laser polarimeter	SPIE 2007

### **TECHNICAL, WHITE, AND WORKING PAPERS**

- A short introduction to one parameter semigroups
- Retardance correction of IR zero-order waveplates (with B. G. Hoover)
- Issues in imaging false alarm rates when using per pixel classification
- Empirical Risk in Terms of ROC variables
- Support vector machine parameter description