WILLIAM C. J. HUNTER

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PROFICIENCIES

Teaching:	UW Catalyst, Tegrity, Panopto, LaTeX
Programming:	C, C++, Matlab, Labview, Unix scripting, HTML
Analytic tools:	Signal/image processing, spectral analysis, optimization methods, Probability/information/decision theory, estimation and image reconstruction, Radiation physics/simulation, Wave mechanics, Complex vector analysis
Experimental:	PET & SPECT detector and system fabrication & characterization Atomic-force microscopy, Vacuum deposition, Wire bonding
Electronic:	Fabrication and testing of analog & digital acquisition and control systems, PC board design (Eagle CAD), soldering, component testing, Analog & Digital Oscilloscopes, NIM electronics
Mechanical:	AutoCAD/Solid Works, machining (mill, lathe, band saw, etc.), welding, casting

TEACHING EXPERIENCE

- Co-Instructor with Dr. Paul Kinahan, Phys. 428 (Imaging Detectors), Dept. of Phys., U.WA, 2013
- Officer, UW Toastmasters, 2013-Present: President (2013-14), VP of Education (2015-Present)
- Nuclear Medicine Residence Lecturer, Dept. of Rad., U.WA, 2008-Present
- Teaching Assistant, Dept. of Phys., U.AZ, 1994-1997: (Stat. Mech., E&M., Optics, Adv. Lab)
- Master Tutor, Math & Science Learning Center, U.AZ, 1991-1993

RESEARCH EXPERIENCE

Chief Science Officer, PET/X LLC, Seatle WA, 2013-Present:

- Design, build and test a prototype compact high-resolution PET scanner for evaluation of breast-cancer therapies (see petxllc.com).
- Grant writing for early-stage commercialization of the PET/X concept
- Strategic planning, partnering, and business model development
- Financial Management planning
- Grant-award administration
- Coordination of administrative-services and accounting contractors

Research Scientist, Dept. of Radiology (Nuclear Medicine), Univ. of WA, 2008-Present:

- Designed, setup, ran detector/electronics experiments based on both PMT and SiPM photodetectors. This includes having worked with NIM, CAMAC, VME and custom designed data acquisition systems. Many of these systems required programming and operating computer control. In this process, I wrote scripting protocols to optimize efficiency of data collection and acquired data to characterize detector and imaging systems.
- Analyzed experimental and simulation data to determine performance characteristics of the detector system and to optimize detector design, acquisition methods, and analysis tools for developing accurate, high-resolution imaging tools.
- Co-inventor and developer of high-resolution PET detectors including Trapezoidal Monolithic-Slat detectors and Sub-Surface Laser Engraved scintillators.
- Maintained and used a sub-surface laser engraving system for patterning scintillation crystals for optimization of light response function and detector spatial resolution.
- Authored and published a Monte-Carlo photon-tracking simulation tool called SCOUT.
- Developed 3D calibration and position methods for PET detectors.
- Presented grant-supported research at more than two dozen conferences (e.g., IEEE NSS-MIC, SPIE MI, AMI, WMIC, UA SPECT-SAIW)
- Collaborated (Philips MS, GE Global, Zekotek,) with industrial partners on academic research projects
- Authoring and reviewing scientific journal papers (e.g. in PMB, Med. Phys, and TNS).

- Co-author of many successful grant proposals
- Trained faculty, other staff, post docs, graduate students and undergraduate interns to acquire data with laboratory hardware and software, analyze data, and become proficient in analysis tools (e.g. Matlab, Labview, Unix scripting, ANSI C).
- Taught basic nuclear medicine physics concepts to radiology and nuclear medicine residents, mentored imaging-science trainees, and co-taught graduate level course in department of physics.
- Acquisition, registration, and NeuroSTAT-analysis of zebra-finch brain imagery.

Research Associate, Dept. of Radiology, University of Arizona, Tucson, 2007–2008:

- Inventor of BazookaPET, a high-res, photon-counting PET detector
- Developed statistical method for multi-hit parameter estimation.

Graduate Student, Dept. of Radiology, University of Arizona, Tucson, 2000–2007:

- Developed SemiSPECT, a small-animal SPECT using eight Si-CZT hybrid detectors
- Developed MA-PMT-based SPECT detectors and DAQ for statistical estimation methods
- Signal probability modeling
- Author of SCOUT, a fast Monte Carlo tool of Scintillation Camera Output

Research Scientist, Institute for Defense Analyses, Alexandria, VA, 1997–2001:

- Principle investigator of DOD networked-surveillance performance for drug interdiction task;
- Developed pixel-level change detection algorithms for synthetic-aperture radar

Lab Coordinator & Research Associate, Zetetic Institute, Inc., Tucson, AZ, 1993-1995:

- Engineer facility for lightweight ultra-low-expansion mirrors by honeycomb-sandwich method;
- Thin-film vapor deposition; develop new interferometry methods.

EDUCATION

University of Arizona, Tucson, AZ

Ph.D., Nuclear Physics, University of Arizona, 2007,
"Modeling stochastic processes in γ-ray imaging detectors and evaluation of a MA-PMT scintillation camera for use with ML estimation methods,"

Master of Science, Semiconductor Physics, University of Arizona, 1997

Bachelors of Science, Physics & Astronomy, University of Arizona, 1993

PUBLICATIONS

Hunter W.C.J., Miyaoka R.S., MacDonald L, McDougald W., and Lewellen T.K., "Light-Sharing Interface for dMiCE Detectors using Sub-Surface Laser Engraving." *IEEE Trans Nucl Sci*, Accepted Nov,Vol. 62, pp. 27–35, (Feb. 2015); PMID: 25506194.

Pierce L.A., Hunter W.C., Haynor, D.R., MacDonald L.R., Kinahan P.E., and Miyaoka R.S., "Multiplexing strategies for monolithic crystal PET detector modules," *Phys Med Bio*, Vol. 59(18), pp. 5347-60, (2014); PMID: 25146849.

Hunter W.C.J., Barrett H.H., Muzi J.P., McDougald W., MacDonald L.R., Miyaoka R.S., and Lewellen T.K., "SCOUT: a fast Monte-Carlo modeling tool of scintillation camera," *Phys. Med. Biol.*, Vol 58, pp. 3581–3598, (2013); PMID: 23640136.

Hunter W.C.J., Barrett H.H., Lewellen T.K., Miyaoka R.S., "Multiple-Hit Parameter Estimation in Monolithic Detectors," *IEEE Trans. Med. Imag.*, Vol 32, Issue 2, pp. 32–337, (2012); PMID: 23193231.

MacDonald L.R., Hunter W.C.J., Kinahan P.E., Miyaoka R.S., Effects of Detector Thickness on Geometric Sensitivity and Event Positioning Errors in the Rectangular PET/X Scanner. *IEEE Trans Nucl Sci*, Vol. 60(5), pp. 3242–3252, 2013.

Li X., Hunter W.C.J., Lewellen T.K., and Miyaoka R.S., " Use of Cramer–Rao Lower Bound for Performance Evaluation of Different Monolithic Crystal PET Detector Designs." *IEEE Trans Nucl Sci.*, Vol. 59(1): pp. 3–12, (2012); PMID: 22685349.

Miyaoka R.S., Li X., Hunter W.C.J., Pierce L, McDougald W., Kinahan PE, Lewellen T.K.. Resolution Properties of a Prototype Continuous Miniature Crystal Element (cMiCE) Scanner." *IEEE Trans Nucl Sci*. Vol. 58(5), pp. 2244–2249, (2011); PMID: 24347676.

MacDonald L.R., Harrison R.L., Alessio A.M., Hunter W.C.J., Lewellen T.K., and Kinahan PE, "Effective count rates for PET scanners with reduced and extended axial field of view," *Phys Med Biol*, Vol. 56(1), pp. 3629–3643, (2011); PMID: 21610291.

Hunter W.C.J., Barrett H.H., and Furenlid L.R., "Calibration Method for ML Estimation of 3D Interaction Position in a Thick Gamma-Ray Detector," IEEE Trans Nucl Sci, Vol. 56, pp. 189-196, (2009); PMID: 20191099.

Barrett H.H., Hunter W.C.J., Miller B.W., Moore S.K., Chen Y., and Furenlid L.R., "Maximum-likelihood methods for processing signals from gamma-ray detectors," *IEEE Trans Nucl Sci,* Vol. 56, pp. 725-735, (2009); PMID: 20107527.

Kim H., Furenlid L.R., Crawford M.J., Wilson D.W., Barber H.B., Peterson T.E., Hunter W.C.J., Liu Z., Woolfenden J.M., and Barrett H.H., "SemiSPECT: A small-animal SPECT imager based on eight CZT detector arrays," *Med Phys*, Vol. 33, pp. 465-474, (2006); PMID: 16532954. Awarded AAPM Sylvia Sorkin Green.

J. Silk, W. Hunter and L. Zheng, "Change Detection with Oblique Scenes." Proc of Counter Camouflage, Concealment, and Deception FOPEN Workshop, MIT Lincoln Lab, Oct. 3–4, 2000.

Dion-Schwarz, C., Hunter W., Nicoll, J.F., Cartier, J.F., "Improving Interoperability to Achieve Dominant Battlespace Awareness (U)." K-2, Military Sensing Symp Proc, Kelley AFB, San Antonio, Texas, 2000.

Silk, J., Hunter W., "Pixel-Level Change Detection for Foliage Penetrating Synthetic Aperture Radar: Registration Studies and Sensitivity Analyses." Proc IEEE Radar Conf, Apr. 1999.

BOOK CHAPTER

Barrett H.H. and Hunter W.C.J., "Detectors for small-animal SPECT: I. Overview of detector technologies." Chapter 2 in Small-Animal SPECT Imaging, M. Kupinski and H. Barrett (Eds.), Springer Science + Business Media, New York, NY, pp. 9-48, 2005.

DISSERTATION: http://search.proquest.com/docview/304895308

U.S. PATENTS

Miyaoka R.S., Li, X. Lewellen T.K., and Hunter W.C.J., "Trapezoidal monolithic slat (TMS) detectors with depth of interaction positioning capability." Provisional patent pending.

Hunter W.C.J., Lewellen T.K., and Miyaoka R.S., "High-refractive-index layer and/or focusing interface used to improve the effective solid angle for a multifaceted retroreflector." Provisional patent UW8526D pending.

Hunter W.C.J., Lewellen T.K., Miyaoka R.S., and MacDonald L.R., " Optical-Interference Patterning For Radiation Detector Crystals." Provisional patent UW8117D filed; full patent pending (Application No. PCT/US2010/054307).

Barrett H.H., Furenlid L.R., Hunter W.C.J., and Miller B.W., "BazookaPET", Disclosure submitted, #UA08-069, Provisional patent application submitted, March 6, 2008.

Barrett H.H., Hunter W.C.J., S. Taylor, and K. Zinn, "LumiSPECT: a small-animal bioluminescence/SPECT imaging system using a high-resolution imaging element and high quantum efficiency CCD camera", Provisional Patent Application #UA05-044, 2005.