

Mathew Wayne Swinney

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- Education**
- Texas A&M University** (December 2015 – EXPECTED)
- Ph.D., Nuclear Engineering – Nonproliferation and Nuclear Security, Reactor Theory, Computational Methods, and Measurement Techniques
 - 95 hrs. - 3.8 GPA
 - Dissertation title: “*Experimental and Computational Assessment of Trace Nuclide Ratios in Weapons Grade Plutonium for Nuclear Forensics Analysis*”
- Air Force Institute of Technology** (December 2010)
- Nuclear Physics (Master’s level work) – Nuclear Weapons Effects, Instrumentation, and Physics
 - 54 hrs. – 3.8 GPA
 - Primary research topic: *Defect Characterization, Scintillation Properties, and Neutron Detection Feasibility of Lithium Tetraborate*
- Angelo State University** (May 2005)
- B.S., Applied Physics
 - 3.6 GPA
- Experience**
- Oak Ridge National Laboratory (ORNL)** (Sept. 2015 ~ present)
Post Doctorate for Nuclear Security Modeling Group, Reactor and Nuclear Systems Division
- Pacific Northwest National Laboratory (PNNL)** (June 2015 ~ August 2015)
Summer intern as part of the Next Generation Safeguards Initiative (NGSI) program in the Nuclear Security Directorate
- Oak Ridge National Laboratory (ORNL)** (May 2014 ~ July 2014)
Summer intern as part of the Nuclear Engineering Science Laboratory Synthesis (NESLS) program in the Reactor and Nuclear Systems Division
- Nuclear Security Science and Policy Institute (NSSPI)** (August 2011 ~ May 2015)
Graduate Research Assistant for International Safeguards and Nonproliferation under both Texas A&M University and the Texas A&M Engineering Experiment Station
- Air Force Institute of Technology (AFIT)** (September 2008 ~ December 2010)
Graduate Student and Researcher in the Department of Engineering Physics
- Air Force Research Laboratory (AFRL)** (June 2005 ~ September 2008)
Research Physicist in the Warfighter Interface Division, Human Effectiveness Directorate, 711th Human Performance Wing, Wright-Patterson Air Force Base (WPAFB)
- Projects/Roles**
- NSSPI Graduate Research Assistant (August 2011 ~ Present)
- Worked with ORNL to evaluate the irradiation of depleted uranium oxide fuel surrogates in the High Flux Isotope Reactor (HFIR) using the Monte Carlo neutron transport code, MCNP (2014)
 - Conducted gamma spectroscopy measurements using a High Purity Germanium (HPGe) detector to quantify fission product activities in irradiated fuel surrogates from ORNL (2014)
 - Presented research comparing Monte Carlo results of HFIR and Fast Breeder Reactor simulations at DND-NSF ARI program review in Leesburg, VA (2014)
 - Presented research at ORNL poster session as part of the NESLS program - “Heat Generation and Neutronics Calculations in Support of HFIR Irradiation Experiments”
 - Participated in the Nuclear Fuel Cycle Experience (NFE) conducted by NSSPI, visiting numerous nuclear fuel cycle facilities throughout Japan, including Fugen, Mihama, Rokkasho, and the Integrated Support Center for Nuclear Nonproliferation and Nuclear Security (2013)
 - Conducted gamma spectroscopy measurements of used Three-Mile Island fuel at ORNL; these measurements were part of a project to help determine the source of possible shipper-receiver differences (SRD) in spent fuel (2011)
- AFIT Graduate Research Assistant (September 2008 ~ December 2010)
- Conducted optical absorption (UV, visible, near IR) and luminescence (photo, thermal, and x-ray induced) measurements on lithium tetraborate crystals investigating possible neutron detection mechanisms (2010)
 - Conducted Electron Paramagnetic Resonance (EPR) measurements in collaboration with West Virginia University to characterize the defects inherent in lithium tetraborate crystals (2009)
 - Conducted irradiation experiments using the Ohio State University Nuclear Reactor Lab (2009)

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AFRL Research Physicist (June 2005 ~ September 2008)

- Program manager for the Small Business Innovative Research (SBIR) program, planning research, evaluating progress and recommended funding
- Managed over \$2 Million in contracted research and development, yielded two revolutionary night vision architectures
- Officer In Charge of optical measurement lab, maintained and operated equipment worth over \$250K
- Served as lead officer on over 50 military funeral details, providing leadership and mentorship for 30 assigned enlisted members
- Served as division safety officer, HAZMAT monitor, and logistics manager (tool and lab control, equipment calibration, developed safety procedures, etc.)
- Led helmet compatibility evaluation study of the Joint Service Aircrew Mask (JSAM), saved \$1.5M for chem/bio mask program, identified fitting flaws and ensured crew safety
- Led operational evaluation of 172 panoramic night-vision goggles architectures – transitioned to A-10s
- Developed experimental procedures and executed over 500 trials documenting the effects of helmet-mounted displays on combatants situational awareness

Publications – Journal Articles

Swinney, M.W., Chirayath, S.S., and Ellis, R.J. "Experimental and computational forensics characterization of weapons-grade plutonium produced in a fast reactor neutron environment" *Nuclear Science and Engineering - in communication*

Xiao, Jie, N. Lozova, Ya B. Losovyy, D. Wooten, I. Ketsman, **M. W. Swinney**, J. Petrosky et al. "Surface charging at the (100) surface of Cu doped and undoped $\text{Li}_2\text{B}_4\text{O}_7$." *Applied Surface Science* 257, no. 8: 3399-3403, 2011.

Swinney, M. W., J. W. McClory, J. C. Petrosky, Shan Yang, A. T. Brant, V. T. Adamiv, Ya V. Burak, P. A. Dowben, and L. E. Halliburton. "Identification of electron and hole traps in lithium tetraborate ($\text{Li}_2\text{B}_4\text{O}_7$) crystals: Oxygen vacancies and lithium vacancies." *Journal of Applied Physics* 107, no. 11: 113715, 2010.

Publications – Conference Proceedings

Swinney, M.W., Chirayath, S.S. "Comparison of FBR and HFIR Monte-Carlo simulations with validation from gamma spectroscopy in support of the NFASP Project". In *Proceedings of American Nuclear Society Winter Meeting 2014: Nuclear Nonproliferation Technical Group: General I*, 2014.

Parfenov, Alexander, X. Winston Xia, Indra Tenggara, Tin Win, Jason Holmstedt, Neven Rakuljic, Tin M. Aye, **Mathew W. Swinney**, and Peter L. Marasco. "Liquid crystal modulated optical amplifier for night vision imaging." In *Photonic Devices and Applications*, pp. 70500U-70500U. International Society for Optics and Photonics, 2008.

Swinney, Mathew W., Peter L. Marasco, and Eric L. Heft. "Comparison of experimental vision performance testing techniques, including the implementation of an active matrix electrophoretic ink display." In *Defense and Security Symposium*, pp. 65570Q-65570Q. International Society for Optics and Photonics, 2007.

Havig, Paul, John McIntire, and **Mathew Swinney**. "Effects on task performance due to placement of a monocular HMD." In *Defense and Security Symposium*, pp. 622407-622407. International Society for Optics and Photonics, 2006.

Invited Lectures

Partnership for Nuclear Security's (PNS) Nuclear Security and Safeguards Education Series, Pandit Deendayal Petroleum University (PDPU), Gandhinagar, Gujarat, India, January 15 – February 16, 2014

Awards/Honors

Various Air Force medals/ribbons: Air Force Organizational Excellence Award, National Defense Service Medal, Global War on Terrorism Service Medal, Air Force Longevity Service Ribbon, Air Force Training Ribbon
Air Force Commendation Medal for meritorious service while assigned to the Battlespace Visualization Branch, Warfighter Interface Division, Human Effectiveness Directorate, 711th Human Performance Wing, Detachment 1, Air Force Research Laboratory, Air Force Materiel Command, Wright Patterson Air Force Base, Ohio (Oct 2008)
Air Force Achievement Medal for outstanding achievement as an officer of the Base Honor Guard, 88th Services Division, Wright-Patterson Air Force Base, Ohio (May 2007)
Company Grade Officer of the 4th quarter (1 of 55) for the Human Effectiveness Directorate - AFRL (2006)
Graduated with Cum Laude and Dean's List (all 8 semesters) from Angelo State University (May 2005)
Carr Academic Scholarship and USAF ROTC Scholarship to attend Angelo State University (2001)