ALEX HAGEN

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EDUCATION

Jan. 2009 - Present Purdue University

- ⇒ Doctorate of Philosophy in Nuclear Engineering, GPA 3.60, *Final Defense in early 2018*
- ⇒ Master of Science in Nuclear Engineering, GPA 3.73, Minor in Computational Science and Engineering, *August 2014*
- ⇒ Bachelor of Science in Nuclear Engineering, GPA 3.48, *May 2012*

RESEARCH POSITIONS

May 2012 - Present Graduate Researcher - Metastable Fluid Research Laboratory

- ⇒ Performed successful proof of concepts for 4 new special nuclear material interdiction methods
- ⇒ Developed Tensioned Metastable Fluid Detectors for use in active interrogation for the DHS/DNDO
- ⇒ Developed validation method and multiphysics simulation of Acoustically Tensioned detector systems

Oct. 2010 - May 2012 Undergraduate Researcher - Metastable Fluid Research Laboratory

- ⇒ Extended previous work on acoustics simulation of Acoustically Tensioned detector systems
- ⇒ Evaluated photon detection capabilities of Centrifugally Tensioned detector system

May 2011 - Aug. 2011 Undergraduate Laboratory Intern - Argonne National Laboratory Nuclear Engineering Division

- ⇒ Validated multiphysics fission reactor simulation against legacy codes and experiment

INDUSTRIAL EXPERIENCE

Dec. 2012 - Present Engineering Consultant - Sagamore Adams Laboratories, LLC.

- ⇒ Conceptualized, designed, and characterized 2 novel neutron detector systems that were released to market
- ⇒ Upgraded neutron detection systems per customer requirements for homeland security applications

Jan. 2009 - Jan. 2011 Industrial Design Assistant - Steiner Enterprises

- ⇒ Designed, drafted, and prototyped products as part of a small team for the education industry
- ⇒ Developed 6 products from concept to production for the marketplace
- ⇒ Sourced, revised, or formalized the machine drawings and designs of over 30 other products

REFERENCES

- ⇒ *Rusi Taleyarkhan, PhD - rusi@purdue.edu - (765)-313-1876.* Full Professor at Purdue University Nuclear Engineering. Principle Investigator of DNDO Grant Supporting my work, Chair of Thesis Committee, and Academic Advisor for past 8 years.
- ⇒ *James Schweitzer, PhD - jfschweitzer@purdue.edu - (765)-494-2350.* Director of Radiological and Environmental Management and Assistant Professor of Health Physics at Purdue University. Member of Thesis Committee for both PhDNE and MSNE.
- ⇒ *Thomas Atkinson, PhD - tatkinson@purdue.edu - (765)-494-2600.* Associate Dean of the Graduate School at Purdue University. Served as the advisor to Purdue Graduate Student government and worked closely with me in outreach work while I chaired the Purdue Graduate Student Government's Advancement Committee.
- ⇒ *Brian Archambault, PhD - barchambault@salabsllc.com - (765)-313-1876.* Manager of Technology at Sagamore Adams Laboratory, LLC. Direct Research Advisor, Co-investigator on active interrogation for past 6 years.
- ⇒ *Kevin Fischer - kffische@gmail.com - (630)-589-4927.* Data Analysis and Test Reporting Engineer at Bechtel Corporation. Co-investigator on acoustically tensioned detector systems during Masters study from 2012 - 2014.

ACADEMIC POSITIONS

June 2017 - Present Mentor for Jefferson High School Student

Mentored and taught Jefferson High School student to complete project involving acoustic tensioned metastable fluid detectors to compete at the Purdue Regional Science Fair (a fair that leads into the Intel International Science and Engineering Fair).

June 2015 - Mar. 2016 Mentor for Jefferson High School Student

Mentored and taught Jefferson High School student to complete projects involving simulation of energy threshold for cavitation in a tensioned metastable fluid detector to compete at the Purdue Regional Science Fair. **Student won Best in Show award at Purdue Regional Science Fair and was chosen to compete at Hoosier State Science Fair.**

June 2014 - Mar. 2015 Mentor for Two Jefferson High School Students

Mentored and taught Jefferson High School students to complete projects involving acoustic cavitation detection and alternative centrifugal metastable fluid detector manufacturing to compete at the Purdue Regional Science Fair.

Aug. 2014 - Dec. 2014 Grader - NUCL 402 - Nuclear Power Systems

Graded homeworks and tests, held weekly office hours, taught class several times, held exam review sessions. **Nominated and received most votes for Magoon Teaching Assistant Award.**

Aug. 2014 - Dec. 2014 Tutor - NUCL 510 - Reactor Physics

Helped prepare student who was struggling for first and second exam in Reactor Physics Course.

May 2014 - Aug. 2014 Graduate Assistant - Summer Undergraduate Research Fellowship

Administrated and supervised 43 students completing research projects in computer science, chemical engineering, nuclear engineering, and aerospace engineering. Developed and delivered 5 seminars on research skills. Administrated research symposium for student projects.

Jan. 2014 - May 2014 Teaching Assistant - NUCL 310 - Introduction to Nuclear Reactor Theory

Graded homeworks and tests, held twice weekly office hours to help students, taught class.

Aug 2013 - Mar. 2014 Mentor for Jefferson High School Student

Coordinated with and mentored a Jefferson High School student to complete a project involving laser induced cavitation and pressure profilimetry to compete at the Purdue Regional Science Fair. **Student won a gold medal for the engineering division at the fair.**

Aug. 2013 - Dec. 2013 Teaching Assistant - NUCL 300 - Nuclear Structure and Radiation Interactions

Graded homeworks and tests, held weekly office hours to help students, taught class.
Nominated for Magoon Teaching Assistant Award.

Aug. 2012 - Dec. 2012 Grader - NUCL 300 - Nuclear Structure and Radiation Interactions

Graded homeworks and tests, held weekly office hours to help students, taught class.

Aug. 2012 - Dec. 2012 Grader - NUCL 200 - Introduction to Nuclear Engineering

Graded homeworks and tests, held weekly office hours to help students, taught class.

Aug. 2011 - Mar. 2012 Mentor for Jefferson High School Student

Coordinated with and mentored a Jefferson High School student to complete a project involving (γ, n) production and detection to compete at the Purdue Regional Science Fair. **Student won a gold medal for the engineering division at the fair.**

SELECTED PUBLICATIONS AND CONFERENCE PRESENTATIONS

⇒ T. Grimes, **A. Hagen**, B. Archambault, and R. Taleyarkhan. "Enhancing the performance of a tensioned metastable fluid detector based active interrogation system for the detection of SNM in <1 m 3 containers using a D-D neutron interrogation source in moderated/reflected geometries." In: *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment* (Dec. 2017)

⇒ B. Archambault, **A. Hagen**, K. Masuda, N. Yamakawa, and R. P. Taleyarkhan. "Threshold Rejection Mode Active Interrogation of SNMs Using Continuous Beam DD Neutrons with Centrifugal and Acoustic Tensioned Metastable Fluid Detectors." In: *IEEE Transactions on Nuclear Science* (2016), pp. 1–1

⇒ **A. Hagen**, T. F. Grimes, B. C. Archambault, T. N. Harris, and R. P. Taleyarkhan. "Characterization and Optimization of a Tensioned Metastable Fluid Nuclear Particle Sensor Using Laser Based Profilometry." In: *Journal of Nuclear Engineering and Radiation Science* 1.4 (Sept. 2015), p. 041004

⇒ **A. Hagen**. "Multiphysics Modeling in Optimization of Acoustically Tensioned Metastable Fluid Neutron Detectors." Master of Science. Purdue University, 2014

⇒ R. Taleyarkhan, J. Lapinskas, B. Archambault, J. Webster, T. Grimes, **A. Hagen**, K. Fisher, S. McDeavitt, and W. Charlton. "Real time monitoring of actinides in chemical nuclear fuel reprocessing plants." In: *Chemical Engineering Research and Design* 91.4 (Apr. 2013), pp. 688–702

⇒ R. Taleyarkhan, B. C. Archambault, A. Sansone, and **A. Hagen**. "Femto- to Macro- Scale Interdisciplinary Sensing with Tensioned Metastable Fluid Detectors." In: *IEEE Sensors Demonstrations*. Orlando, FL: IEEE, 2016

⇒ B. C. Archambault, J. A. Webster, T. F. Grimes, K. F. Fischer, **A. Hagen**, and R. P. Taleyakhan. "Advancements in the development of a directional position sensing fast neutron detector using acoustically tensioned metastable fluids." In: *Nuclear Instruments and Methods in Physics Research Section A: Accelerators, Spectrometers, Detectors and Associated Equipment* 784 (June 2015), pp. 176–183

⇒ B. Archambault, T. Grimes, J. Webster, N. Wilson, **A. Hagen**, K. Fischer, and R. Taleyarkhan. "Development of a 4π directional fast neutron detector using tensioned metastable fluids." In: *2012 IEEE Conference on Technologies for Homeland Security (HST)*. IEEE, Nov. 2012, pp. 423–428

⇒ N. Hume, J. A. Webster, T. F. Grimes, **A. Hagen**, R. P. Taleyarkhan, and B. C. Archambault. "The MAC-TMFD: Novel multi-armed Centrifugally Tensioned Metastable Fluid Detector (Gamma-Blind) & Neutron-alpha recoil spectrometer." In: *2013 IEEE International Conference on Technologies for Homeland Security (HST)*. IEEE, Nov. 2013, pp. 435–440

⇒ J. A. Webster, **A. Hagen**, B. C. Archambault, N. Hume, and R. P. Taleyarkhan. "High Efficiency Gamma Beta Blind Alpha Spectrometry for Nuclear Energy Applications." In: *Proceedings of the International Conference on Nuclear Engineering*. ASME, July 2014, V005T17A054

⇒ A. Bakken, N. Boyle, B. Archambault, **A. Hagen**, N. Kostry, K. Fischer, and R. Taleyarkhan. "Thermal and ionizing radiation induced degradation and resulting formulation and performance of tailored poly(lactic acid) based hot melt adhesives." In: *International Journal of Adhesion and Adhesives* 71 (Dec. 2016), pp. 66–73

PATENTS

⇒ Taleyarkhan, Bakken, Fisher, **Hagen**, Kostry. Polylactic acid adhesive compositions and methods for their preparation and use. *World Patent # WO2014078720A1*, 2014

LEADERSHIP AND COMMUNITY ROLES

⇒ *Aug. 2012 - May 2017* President of NEGO (Nuclear Engineering Graduate Organization)

⇒ *Aug. 2014 - May 2016* Chair of Purdue Graduate Student Government (PGSG) Advancment Committee

⇒ *Aug. 2015 - May 2016* Clerk of Purdue Graduate Student Government

⇒ *Aug. 2013 - May 2016* Senator representing Nuclear Engineering to Purdue Graduate Senate

⇒ *Feb. 2014 - June 2015* Assistant Coach - Tippco U14 Girls Soccer Team

⇒ *Aug. 2013 - Oct. 2013* Commentator for High School Soccer Games for Walton Webcasting

⇒ *May. 2011 - May 2012* President and Captain of Purdue Men's Club Soccer

HONORS AND AWARDS

⇒ *July 2017* Received Best Paper Award at Intl. Conference on Nuclear Engineering 25
⇒ *May 2017* Department of Energy Innovation in Nuclear Technology R&D Award
⇒ *Nov. 2016* ANS Young Member's Group Best Paper Award
⇒ *Oct. 2016* IEEE Sensors Conference Demonstration 1st Prize
⇒ *Apr. 2016* Purdue Engineering Outstanding Service Award
⇒ *July 2014* Received Best Poster Award and Best Paper Award at Intl. Conference on Nuclear Engineering 22
⇒ *Dec. 2014* Nominated and received most votes for Magoon Teaching Excellence Teaching Assistant Award
⇒ *Dec. 2013* Nominated for Magoon Teaching Excellence Teaching Assistant Award
⇒ *May 2007* National Merit Scholar
⇒ *May 2006, May 2007* Indiana Delegate for International Science and Engineering Fair

AFFILIATIONS

⇒ American Nuclear Society
⇒ Health Physics Society
⇒ American Society of Mechanical Engineers

SKILLS