OPTICS 104

Education

Master of Science, Applied Physics **Expected June 2018**
University of Oregon Eugene, OR
Focus in Optical Materials and Devices

Bachelor of Science, Physics **May 2017**
University of Portland Portland, OR
Minor in Mathematics

Technical Experience

Research Assistant **January 2014 – 2016**
Dr. Maximilian Schlosshauer, University of Portland Portland, OR

Delayed-choice quantum eraser *with collaboration from Dr. Mark Beck*

- Constructed a single photon delayed quantum eraser resulting in a 75% erased visibility by recreating and adapting a single photon quantum eraser from another research group.
- Troubleshot problems that arose during the construction and data collection of the delayed eraser by developing a systematic method of testing to locate the problematic component.

Quantum paradox of separation of a single photon from one of its properties

- Utilized weak quantum measurements to simultaneously observe presence and polarization of ensemble single photons allowing for a true observation of the quantum paradox of separation of information.
- Modified and troubleshot a Sagnac interferometer to achieve a beam separation of 1 cm while maintaining equal optical path lengths.
- Documented procedure and findings allowing for future recreation and expansion of experiments.

Technical Intern (Multiple Departments) **Summers 2012 – 2015**
Bend Research, a Division of Capsugel Bend, OR

Implementation

- Engineered a process for mechanical analysis of a melt spray congeal process to pinpoint the source of high frequency vibrations through the use of acoustic vibrometers and accelerometers.
- Characterized fluid-bed coated microbeads (50-300 μm) by creating precision cross sectional samples and imaging the samples using a SEM to measure the coating thickness.
- Trained incoming intern in the use of fabrication equipment and the process used in the mechanical analysis of vibrations.

Fabrication

- Assembled, tested, and performed full installation of a dry-box to be used in the testing and packaging of O_2 sensitive product.
- Designed and modified pharmaceutical spray dryers to achieve target throughputs and particle uniformity.
- Assisted in the construction of engineering controls for pharmaceutical containment laboratory suites to allow for integration into existing control systems.
- Installed and troubleshot the implementation of newly constructed lab equipment in an efficient manner that allowed for the shortest turnover possible.

Skills

Programing: Intermediate in MatLab, Mathematica, LaTeX, and OpticStudio. Novice in VBA, Python, Java, SOLIDWORKS, and LabVIEW.
Optics: Intermediate in IR laser alignment, free space to fiber coupling, fiber to fiber coupling, and single photon detector alignment.
Manufacturing: Proficient with an angle grinder, die grinder, and forklift. Prior experience with Tig welding, soldering, and circuits.

Work Experience

Academic Peer Leader **Academic Year 2015 – 2017**
University of Portland Portland, OR

- Taught introductory physics labs to 30 students by developing weekly lesson plans to teach the lab material and answer questions.
- Relayed student feedback to the lab coordinator on recent course changes and recommended new changes by arranging weekly meetings.
- Worked with first time adjunct instructors to teach and assist them with running the lab effectively.

Tutor **Academic Year 2015 – 2017**
University of Portland Athletics Portland, OR

- Constructed individualized lesson plans for Introductory Physics.
- Simultaneously managed and scheduled weekly sessions for 7 students.
- Taught effective study methods to maintain a 100% passing rate for my students.

Produce Clerk **July 2016 – October 2016**
Fred Meyers Portland, OR

- Helped revise inventory organization system for optimal restocking efficiency.
- Ensured inviting entrance through product rotations and continuous maintenance of displays.
- Reduced the time required to close the department by rotating product, restocking, and cleaning throughout the shift.

Dispatch Coordinator **June 2016 – August 2016**
CHEP Pallet Solutions. A Brambles Company Portland, OR

- Developed the dispatch position by organizing the deliveries to occur in a timely and consistent manner resulting in fewer missed deliveries.
- Developed an efficient system for tracking and rotating 60 collection sites in Oregon and Washington.
- Improved loading efficiency by creating and enforcing an order by which the inventory was used.

Publications

- Ashby, J.; **Schwarz, P.**; Schlosshauer, M. (2016). Observation of the quantum paradox of separation of a single photon from one of its properties. American Physical Society, Physical Review A 94.
- Ashby, J.; **Schwarz, P.**; Schlosshauer, M. (2016). Delayed-choice quantum eraser for the undergraduate laboratory. American Journal of Physics 84.

Presentations

- **Schwarz, P.**; Ashby, J.Ashby, J.; Schwarz, P.; Schlosshauer, M. (Feb. 2017). Experimental realization of a single-photon quantum Cheshire Cat. Oregon Academy of Science. Corvallis, OR.
- Ashby, J.; **Schwarz, P.**; Schlosshauer, M. (Feb. 2015). Testing Local Realism. Oregon Academy of Sciences. Portland, OR.
- Ashby, J.; **Schwarz, P.**; Schlosshauer, M. (Nov. 2014). Delayed-choice quantum eraser for the undergraduate laboratory. Murdock Undergraduate Research Conference. Vancouver, WA. (Poster)

Honors and Awards

Eagle Scout **2012**