Ruben Aguiló Schuurs

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EDUCATION

University of Wisconsin-Madison   May '26 (expected)
BS Physics (Honors) & Computer Sciences   GPA: **3.955**/4.0
Thesis: *Analyzing and Correcting Optical Phase Noise through Feedforward cancellation for Neutral-atom Quantum Computing*

RESEARCH EXPERIENCES

AQuA-1: One-Photon Atom Qubit Array   June '24 - Present
Supervisor: Dr. Mark Saffman   Dept. of Physics

- Implementing Feedforward phase noise cancellation in 1-photon neutral atom quantum computing system to suppress noise impact on experimental results by up to 10^{-5} errors at $\Omega/2\pi$ = 800 kHz on π-rotation gates

- Designed and assembled PCB to regulate gain amplification of Pound-Drever-Hall error signal

- Designed and simulated performance of Herriott Cell for 638nm, 1W laser to delay by 40m

- Assembled 4km 638nm self-heterodyne linewidth measurement module

- Assembled testbed for Rb MOTs and NDSSR functionality in dual-species Rb & Cs QC lab efforts

- Developed algorithm to auto-relock 918nm laser frequency and mode through VISA protocols with Raspberry Pi employing laser frequency tuning, piezoelectric voltage ramping, and cavity temperature modulation

- Engineered custom alumalite plate with HEPA filtration, VGA, and XLR panels to generate positive pressure environment in our experimental enclosure

Interpretability of CNN to Diagnose Alzheimer's D. from PET scans   June '23 - Aug. '24
Supervisors: Dr. Robert Jeraj and Dr. Alison Deatsch   Dept. of Medical Physics

- Redeveloped Convolutional Neural Network to diagnose Alzheimer's Disease from PET scans by reworking TensorFlow model to PyTorch, obtaining up to 88% accuracy and 98.3% AUC from ROC

- Implemented GuidedGradCam to investigate model's predictive power and identify brain regions responsible for Alzheimer's Disease, and explored other methodologies to further enhance certainty

Dual-axis coupled heliostat reflector for concentrated solar power Nov. '22 - Sept. '23
Supervisors: Dr. Gregory Nellis and Simon Brooks   Dept. of Mechanical Eng.

- Engineered Arduino firmware for dual-axis heliostat reflector operated by two closed-loop stepper motors, achieving 180° azimuthal & 90° altitudinal rotational control, and implemented algorithm to automatize reflector's positional control through solar tracking

PRESENTATIONS

R. Aguilo-Schuurs, L. Phuttitarn, S. Norrell, J. Thompson, T. Graham, M. Otten, and M. Saffman. "Towards CZ gates with alkali atom one-photon Rydberg excitation". Presented at: MCAW 2025; 2025 Nov 9; Urbana, IL.

R. Aguilo-Schuurs, A. Deatsch. "Interpretability of Hybrid CNN + RNN to Diagnose Alzheimer's Disease from Brain Images". Presented at: Undergraduate Research Symposium; 2024 April 25; Madison, WI.

HONORS & AWARDS

UW-Madison Student Employee of the Year - Community Service   Jan. 2025
Awarded for outstanding contributions to campus safety, service, and community engagement

Exceptional Citizenship Award   Fall 2024
Awarded for performing life-saving measures in my duties as a Building Manager

MLH Best Sustainability Hack sponsored by Avanade   May 2023
Awarded at MadHacks 2023 with project "EmptyFridge"

SCHOLARSHIPS

Five scholarships, one research fellowship, and one grant. Total: $23,000

Bernice Durand Undergraduate Research Scholarship *($10,000 - Dept. of Physics)*	Spring 2025
Hilldale Undergraduate Research Fellowship *($4,000 - Undergraduate Awards)*	Spring 2025
L&S Honors Summer Senior Thesis Grant *($3,000 - L&S Honors)*	Spring 2025
Leo and Jean Besozzi Scholarship *($1,000 - College of L&S)*	Spring 2025
Florence Waste Pulver Scholarship *($1,000 - College of L&S)*	Spring 2024
Henry & Eleanor Firminhac Scholarship *($3,000 - Dept. of Physics)*	Spring 2024
Letters & Science General Knapp Scholarship *($1,000 - College of L&S)*	Spring 2023

PROFESSIONAL EXPERIENCE

Lead Building Manager   May. '24 - Aug '25
Supervisor: Dr. Craig Kaufmann, Student Affairs Manager   Wisconsin Union

· Led team of **20 building managers** responsible for overseeing daily operations across five buildings within the Wisconsin Union, which serves nearly 4 million visitors annually, by conducting weekly meetings to reinforce policies and discuss team challenges

· Trained and mentored incoming building managers, providing constructive feedback and reinforcing security vs customer service expectations

Building Manager   Sept. '23 - May. '24
Supervisor: Dr. Craig Kaufmann, Student Affairs Manager   Wisconsin Union

· Acted as central decision-maker in handling complex patron interactions, including de-escalating conflicts and managing emergency situations, including medical responses and fire alarms

· Enforced policies and ensured the safety of the Wisconsin Union, while overseeing opening/closing procedures, financial transactions, and crowd management

· Oversaw building operations, troubleshooting maintenance issues, coordinating facility needs, and liaising with custodial and event support teams

HACKATHON PROJECTS

Winning Project: Password "Unhasher"   Oct. '23
Wisconsin Qiskit Fall Fest 2023   UW-Madison

- Implemented Grover's Algorithm to breach test scenario hashing algorithm showcasing field's potential to compromise cryptography systems by technically cutting breach time from $\approx$30 years to 30 seconds

SERVICE & MENTORING

Hackathon Planning Lead   Sept. '25 - Present
Wisconsin Quantum Computing Club

- Coordinated IBM-sponsored Qiskit Fall Fest '25 at UW-Madison, including an Intro to Qiskit Workshop and a 1-week-long hackathon with speakers, lab tours, and "Quantum Office Hours" to teach quantum computing to students from diverse technical backgrounds

International Peer Mentor   Nov. '22 - Present
Supervisors: Jay Stokes   UW-Madison Dept. of International Student Services

- Mentored a total of 20 undergraduates and 6 graduate international students through 1-1 meetings, group activities and weekly check-ins to help adjust to university environment

Physics Outreach Volunteer   Spring '23 - Present

- Usher: Wonders of Physics 40th (2023), 41st (2024), and 42nd (2025) shows.
- Presenter: 2023 & 2024 Physics Fair, Vortex Cannon demonstration

SKILLS

Engineering	RF circuits & signals, PCB design, soldering
Optics	Laser systems, PDH Locking, Fiber coupling, Testbed design
Programming Languages	C, Java, Arduino, Python, SQL
Software & OS	Solidwords, Linux, Bash/Shell, Raspberry Pi OS, Latex
Hobbies	Tennis and cross-country skiing