NIMA LECLERC

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EDUCATION

University of Pennsylvania, Philadelphia, PA
Doctor of Philosophy, Electrical Engineering, August 2020-May 2025
Masters of Science, Electrical Engineering, August 2021-May 2022

Cornell University, Ithaca, NY
Bachelors of Science, Materials Science and Engineering, August 2017-May 2020
Thesis: "Microscopic origins of low-frequency noise in III-V nitride 2DHG and 2DEG quantum wells: theory and experiment"

San Francisco State University, San Francisco, CA
Bachelors of Science, Mechanical Engineering, August 2015-May 2017

AWARDS AND DISTINCTIONS

Penn Engineering Doctoral Academic Service Recognition (2022) · Perry World House Graduate Fellowship (2021) · The Dean's Fellowship of the University of Pennsylvania (2021) · Cornell Engineering Learning Initiative Research Grant (2017) · Cornell Tradition Fellowship (2017) · Caltech Summer Undergraduate Research Fellowship (2017) · SFSU Scholar-Athlete (2016) · Robert L. Pender Memorial Scholarship (2015)

SCIENTIFIC PUBLICATIONS AND PREPRINTS

3. K. Inzani*, N. Pokhrel*, **N. Leclerc**, Z. Clemens, S. Ramkumar, S. Griffin, E. Nowadnick, *Manipulation of spin orientation via ferroelectric switching in Fe-doped* Bi_2WO_6 *from first principles.* Phys. Rev. B (2022).

2. **N. Leclerc**, *Predicting Dynamics of Transmon Qubit-Cavity Systems with Recurrent Neural Networks*, arXiv:2109.14471 (2021).

1. **N. Leclerc**, *Low-Frequency Noise in III-V Nitride 2D Electron and Hole Gases*, Cornell University (2020).

POLICY PUBLICATIONS

2. **N. Leclerc**, *A Quantum Sputnik Moment*, Just Security (2022).

1. **N. Leclerc**, J. Rosen, T. Shattuck, *The Dawn of a New Space Age*, Perry World House (2022).

CONFERENCE PRESENTATIONS AND INVITED TALKS

13. **Electrical Engineering PhD Colloquium**, University of Pennsylvania, Philadelphia, PA (October 2021); presented an invited talk, *High fidelity single and two-qubit gates in silicon quantum processors.*

12. **Kepler Computing Company Presentation**, Kepler Computing, Berkeley, CA (August 2021); presented a talk, *Taming the beasts in ferroelectric memories.*

11. **APS March Meeting 2021**, virtual conference (March 2021); presented a talk, *Electric field of single spins in complex oxides.*

10. **Molecular Foundry User Meeting 2020**, virtual conference (August 2020); presented a poster, *Electric field control of single spins in complex oxides for energy-efficient logic.*

9. **Cornell MSE Honors Thesis Colloquium**, virtual conference (May 2020); presented a talk, *Low-frequency noise in III-V nitride 2D electron and hole gases.*

8. **Quantum Simulations Group Colloquium**, Lawrence Livermore National Laboratory, Livermore, CA (January 2020); presented an invited talk, *Stretching Moore's law: quantum design of materials and devices for classical computation.*

7. **PsiQuantum Company Presentation**, PsiQuantum, Palo Alto, CA (August 2019); presented a talk, *Optimal single-photon detector design.*

6. **MIT IEEE Undergraduate Research Conference**, MIT, Cambridge, MA (October 2018); presented a lightning talk, *Strain Engineering Valleytronic Materials to Preserve State Coherence.*

5. **Molecular Foundry User Meeting 2020**, Lawrence Berkeley National Laboratory, Berkeley, CA (August 2018); presented a poster, *Stretching Moore's Law: Strain Engineering of 2D Valleytronic Materials from First Principles.*

4. **CURBx TED-style Conference**, Cornell University, Ithaca, NY (August 2018); presented an invited talk, *From Quantum Mechanics to Battery Design: Uncovering the Material World with Computation.*

3. **Student-Faculty Programs, Summer Seminar Day**, Caltech, Pasadena, CA (August 2017); presented a talk, *Developing Next-Generation 3D Microbatteries, via Two-Photon Lithography.*

2. **ACS National Meeting 2017**, San Francisco, CA (April 2017); presented a talk, *Understanding Li diffusion behavior in amorphous and crystalline Li3PS4 solid electrolytes, via ab-initio simulations.*

1. **Electrochemical Society Meeting 2016**, Honolulu, HI (October 2016); presented a poster, *DFT Molecular Dynamics Simulations of Li^+.*

RESEARCH EXPERIENCE

Graduate student researcher University of Pennsylvania
Philadelphia, PA August 2021-present
Advisor: Dr. Anthony Sigilito
Using optical and electron-beam lithography to fabricate double quantum dot devices in silicon. Spearheading the development of quantum control codebase and quantum compiler.

Graduate student researcher University of Pennsylvania
Philadelphia, PA August 2020-May 2021
Advisor: Dr. Lee Bassett
Developed an infrastructure for efficient search of new spin-qubit candidates. Used quantum mechanical models combined with Bayesian optimization to identify optimal defect-host combinations.

Researcher Lawrence Berkeley National Laboratory
Berkeley, CA June 2020-September 2020
Advisor: Dr. Sinéad Griffin
Primary contributor of the codebase Magmango to automate calculation of single-spin magnetic properties. Discovered one of the first electric-field controlled spin qubits in a ferroelectric host.

Undergraduate Researcher Cornell University
Ithaca, NY December 2017-May 2020
Advisor: Dr. Debdeep Jena
Built a temperature-dependent low-frequency characterization setup to identify signatures of quantum noise in GaN-AlGaN devies and developed a theoretical noise model for honors thesis. Predicted the phase stability and electronic structure of semiconductor-superconductor interfaces.

SULI Intern Lawrence Berkeley National Laboratory
Berkeley, CA May 2018-August 2018
Advisor: Dr. Jeffrey Neaton
Developed theoretical models of the strain dependence on the valley lifetime in the 2D transition metal dichalcogenide (TMD) materials using BerkeleyGW and EPW.

ELI Fellow Cornell University
Ithaca, NY September 2017-December 2017
Advisor: Dr. Richard Robinson

Optimized the RF-sputtered thin film of Lithium thiophosphate solid state electrolyte and verified desired phases via X-ray photoelectron spectroscopy and X-ray diffraction.

SURF Fellow — Caltech
Pasadena, CA — May 2017-August 2017
Advisor: Dr. Julia Greer
Awarded the Summer Undergraduate Research Fellowship to develop 3D Lithium iodide microbatteries scaffolds with two-photon lithography.

Undergraduate Researcher — San Francisco State University
San Francisco, CA — August 2015-May 2017
Advisor: Dr. Nicole Adelstein
Investigated the correlated Li^+ diffusivity in solid state electrolytes (SSEs). Used molecular dynamics to unveil the role of octahedral tilts on Li^+ pathways in SSEs driving diffusion.

INDUSTRY EXPERIENCE

Scientific Consultant — Kepler Computing
Remote — January 2022-May 2022
Developed an accurate stochastic model for the switching of ferroelectric memory devices.

Research and Development Intern — Kepler Computing
Berkeley, CA — June 2021-August 2021
Spearheaded modeling and device characterization efforts to minimize to reduce switching voltages of ferroelectric memories. Developed current leakage model that identified synthesis-induced leakage sources and guided new process within the company.

Research and Development Intern — PsiQuantum
Palo Alto, CA — May 2019-August 2019
Developed infrastructure for single-photon-detector design, currently used as a primary design tool for detector design. Identified that line-edge-roughness (LER) is the efficiency-limiting parameter of detectors, allowing for team to refocus efforts.

TEACHING EXPERIENCE

Research Mentor — Inspirit AI + X
Remote — May 2022-present
Advising high school students on independent research machine learning projects with focuses ranging from materials physics to reinforcement learning.

Machine Learning Instructor — Inspirit AI
Remote — March 2021-present
Taught courses in Machine Learning and Deep Learning to over 200 high school and college students in lecture-style and interactive coding coding sessions. Provided recommendations to students who have gone on to receive prestigious scholarships and acceptances to top-tier colleges. Frequently received outstanding feedback on teaching performance.

Head Teaching Assistant — University of Pennsylvania
Philadelphia, PA — September 2020-May 2021, January 2022-May 2022
Head teaching assistant for CIS 515 (Mathematics for Machine Learning). Developed and delivered recitation curriculum covering research applications of machine learning to group of 50 students, wrote autograder for course's coding projects, led weekly meetings with the TA team, and served as point-of-contact for conflict resolution among team of 5 TAs.

Teaching Assistant — Cornell University
Ithaca, NY — January 2020-May 2020
Teaching assistant for CS 4787 (Machine Learning for Large-Scale Systems). Spearheaded development of the course's autograder, led review sessions for class of 50 students, hosted weekly office hours, and developed solutions to weekly problem sets.

Tutor   San Francisco State University
San Francisco, CA   September 2015-May 2017
Math and science tutor for college students at the Campus Academic Resource Program. Tutored over 200 students in subjects ranging general chemistry to differential equations, prepared and delivered workshops on various, and consistently ranked as the program's best tutor.

LEADERSHIP AND POLICY EXPERIENCE

Co-Founder   Quantum Engineering Graduate Association
Philadelphia, PA   May 2022-present
Founded Penn's first quantum engineering graduate organization. Organized a seminar series from leading experts across academia, industry, and government in quantum engineering. Working closely with high schools in West Philadelphia and community colleges to deliver quantum engineering workshops to prepare the next-generation quantum workforce.

Policy Gradaute Associate   Perry World House
Philadelphia, PA   August 2021-present
Selected for a competitive fellowship to be a 2021 Graduate Associate at the Perry World House- a policy think tank at Penn. Attended regular workshops, catered to develop policymaking skills aligned with my doctoral research. Working closely with journalists and legislators to develop policy in building a US quantum workforce, starting with the publication of an opinion piece.

Co-Founder   #savethefrontline
remote   March 2020-August 2020
Co-founded a non-profit organization for PPE distribution across New York City during the COVID-19 pandemic. Raised nearly $ 350 K in donations and delivered nearly 95 K PPE items to hospitals and underserved communities in the greater New York City area.

ACADEMIC SERVICE

Rapporteur   Perry World House
Philadelphia, PA   March 2022
Coordinated a policy workshop on space policy and technologies. Invited top academics, policy makers, and business leaders in space technology. Wrote a pre-workshop report distributed to each panelist and edited publications submitted by participants. Became lead author on paper published based on workshop discussions.

Reviewer   American Chemical Society
Remote   January 2022
Reviewer for ACS in Focus book: "Machine Learning in Materials Science".

Grader   Physics Unlimited
Remote   January 2020
Graded 30 exams for the Physics Unlimited quantum physics high school competition.

Mentor   Cornell Undergraduate Research Board
Ithaca, NY   March 2019 - May 2020
Advised 20 underclassman undergraduates on seeking research experiences at Cornell. Achieved 100 % success rate in matching students to their top three preferred research groups.

Mentor   Cornell Engineering Learning Initiatives
Ithaca, NY   March 2019
Served as a mentor for students coming from underserved backgrounds within the College of Engineering. Met weekly with 4 mentees individually to work maximize use opportunities at Cornell and to provide academic support.

SKILLS

Programming: Python (proficient), C++ (proficient), Mathematica (proficient), MATLAB (proficient).

Scientific Software: Quantum ESPRESSO, VASP, COMSOL, BerkeleyGW, Wannier90, SPICE.

Nanofabrication: Atomic layer deposition, electron-beam lithography, two-photon lithography , sputtering.

Materials characterization: X-ray diffraction, X-ray photoelectron spectroscopy, scanning electron microscopy.

Languages: French (proficient), Farsi (conversational).

Music: Classical piano (19 years), violin (5 years).

Sports: Competitive long-distance running (14 years). Competed in track and field and cross country for a NCAA Division II team. Earned second place overall in the San Francisco Half Marathon.

Languages: English (fluent), French (proficient), Farsi (conversational).