Jamison Sloan Email : jamison@mit.edu

Education

- **Massachusetts Institute of Technology** Cambridge, MA
  Ph.D. in Electrical Engineering and Computer Science *Sept. 2018 – Jun. 2023 (Expected)*
- **Massachusetts Institute of Technology** Cambridge, MA
  Bachelor of Science in Physics. GPA: 4.7/5.0 *Sept. 2014 – Jun. 2017*

Research Experience

- **MIT Photonics and Modern Electromagnetics Group** Prof. Marin Soljačić
  Research Assitant *Spring 2016 - Present*
  - **Tunable UV Emitters via Graphene Plasmonics**: Showed that raidative cascade may be used to indirectly extend the effect of Purcell enhancement via graphene plasmons to frequency regimes previously considered impossible. Gave a talk at CLEO 2017. Published in *Nano Letters*.
  - **Surface Magnon Polaritons**: New theory project in macroscopic quantum electrodynamics which explores the interactions of quantum-scale systems with novel polariton modes in magnetic materials. Presented at CLEO 2018. Manuscript in preprint.
  - **Polaritonic Dynamical Casimir Effect**: New theory project in macroscopic quantum electrodynamics which explores the possibility that highly confined surface polaritons may enhance photon production from the vacuum by orders of magnitude.
- **MIT Lincoln Laboratory** Dr. Cheryl Sorace-Agaskar, Dr. Paul Juodawlkis
  Research Assistant *Fall 2017 – Present*
  - **Solid State LIDAR**: Work in collaboration with MIT Lincoln Laboratory to develop and test novel LIDAR beam-steering devices for potential applications in autonomous vehicles and other remote sensing. Helped test devices and design a photonic crystal lens for new devices. Contributed heavily to photonic layout mask for fabrication of a new silicon chip.
- **Lawrence Livermore National Laboratory** Dr. Yunwei Sun, Dr. Charles Carrigan
  Summer Research Scholar *Summer 2015*
  - **Uncertainty Quntification for Detection of Underground Nuclear Explosions**: Performed analytical and simulation work in nuclear geophysics to model uncertainty propagation in models of xenon radioisotopes for potential use in monitoring for unauthorized nuclear testing. Analytical models agreed with simulations, resulting in first author publication in the *Journal of Environmental Radioactivity*.
  - **Summer Research Scholar Presentation**: Gave a poster presentation on the aforementioned work to other students and scientists at the lab.

Education and Outreach Experience

- **MIT Educational Counselor** MIT Admissions Dept.
  Educational Counselor *Fall 2018*
  - **Applicant Interviews**: This admissions season I am serving as an educational counselor who interviews prospective undergraduate students in the area. I believe strongly in what MIT can do for aspiring young people, and enjoy the opportunity to help shape the next generation of students.
- **MIT Splash** MIT ESG
  Weekend program teacher *Fall 2018*
  - **Splash courses**: Splash is a weekend program in which highschool students sign up for courses taught by members of the MIT community. This year I am designing and teaching a class on quantum vacuum phenomena which aims to excite highschoolers about physics.
- **MIT Sophomore Lab** Dr. Christoph Paus, Dr. Sean Robinson
  Lab Course Designer *Summer 2017*
  - **Course Development**: A team of physics faculty at MIT developed a sophomore level laboratory course for students of physics. I worked with faculty and several undergraduates to design, develop, test, and document experiments to be used in the course.

- **Design School X** — Dr. David Clifford
  Education Designer — *2015 - Present*
  - **Program Development**: Design School X (DSX) is a project supported through Stanford's D-Lab which aims to build a novel highschool in Oakland, CA designed to help students from a wide range of socioeconomic and family backgrounds work together to prepare themselves for the world. I've worked with Dr. David Clifford to design a flexible math curriculum for these students that combines rigor with real world applications.
- **Chegg** — Chegg
  Online Tutor — *2015 - 2016*
  - **Online Tutoring**: Worked for online tutoring agency that helps students find tutors. Helped primarily college-aged students with a wide range of topics in math, physics, and computer science.
- **ATI Delve** — MIT
  AP Calculus Teacher — *2014 - 2015*
  - **Teaching Calculus to Highschool Students**: Instructed a year long AP Calculus course for local high school students via an outreach program at MIT. Prepared lectures and supplemental materials, gave lectures, wrote and gave feedback on assignments.

Skills and Interests

- **Programming**: I have programmed for 8+ years, comfortable in: Python, Julia, Java, C/C^{++}, MATLAB, Mathematica, LaTeX
- **Simulation**: Lumerical FDTD, and MEEP/MPB with Scheme interface.
- **CAD**: Familiar with 3D modeling, generation of STL mesh files, and specifically photonic GDS layout using gdspy library, KLayout, and Cadence.
- **Notable Coursework**: Advanced undergraduate courses in quantum mechanics and electromagnetism, graduate courses in quantum field theory, statistical physics, mathematical methods, electromagnetism, and numerical simulation.
- **Teaching**: I care deeply about education and plan to continue teaching and involvement in curriculum and program development. All students, whether at elite institutions or underprivileged primary schools, deserve quality resources.

Manuscripts

- **Manuscript**: **Jamison Sloan**, Nick Rivera, John D. Joannopolous, Ido Kaminer, Marin Soljačić. Extreme enhancement of spin transitions through antiferromagnetic polaritons. 2018. https://arxiv.org/abs/1810.06761
- **Publication**: **Jamison Sloan**, Nick Rivera, Marin Soljačić, Ido Kaminer. Tunable UV Emitters via Graphene Plasmonics. 2017. *Nano Letters.* 18 (1), 308-313
- **Publication**: **Jamison Sloan**, Yunwei Sun, Charles Carrigan (2016). Uncertainty quantification for discrimination of nuclear events as violations of the comprehensive nuclear-test-ban treaty. *Journal of Environmental Radioactivity.* 155-156. 130-139. 10.1016/j.jenvrad.2016.02.022.

Conference Presentations

- **MRS Talk**: **Jamison Sloan**, Nick Rivera, John D. Joannopoulos, Ido Kaminer, Marin Soljačić. Exploiting Polaritons on Antiferromagnetic Materials to Enable Fast Spin Dynamics. MRS Fall 2018.
- **CLEO Talk**: Josue Lopez, Scott Skirlo, Dave Kharas, **Jamison Sloan**, Jeffery Herd, Paul Juodawlkis, Marin Soljačić, Cheryl Sorace-Agaskar. Planar-lens Enabled Beam Steering for Chip-scale LIDAR, CLEO 2018. Optical Society of America.
- **CLEO Talk**: **Jamison Sloan**, Nick Rivera, John D. Joannopoulos, Marin Soljačić, Ido Kaminer. Surface Magnon Polaritonics for Strong Magnetic Interactions with Light, CLEO 2018. Optical Society of America.
- **CLEO Talk**: **Jamison Sloan**, Nick Rivera, Ido Kaminer, Marin Soljačić. Shaping Emission Through Graphene Plasmons, CLEO 2017. Optical Society of America.
- **Symposium Talk**: **Jamison Sloan**, Nick Rivera, Ido Kaminer, Marin Soljačić. Spectral Reshaping using Polaritons: Influencing UV Dynamics with IR Polaritons. MIT Undergraduate Physics Symposium. 2016.

Awards and Honors

- **NSF Honorable Mention**: 2018