CURRICULUM VITAE
# Matthew Yeh

415 425 4954
myeh@g.harvard.edu
https://mudyeh.github.io

## Education

- **Harvard University** *Aug 2020-present*
  - **GPA**: N/A
  - **Major**: PhD, Applied Physics

- **University of California, Berkeley** *Aug 2016-May 2020*
  - **GPA**: 3.971
  - **Major**: B.S., Electrical Engineering and Computer Sciences

## Research Interests

Photonics, quantum technologies, quantum optics, optoelectronics, optical materials.

## Journal Papers

1. D.-H. Lien*, S. Z. Uddin*, **M. Yeh**, M. Amani, H. Kim, J. W. Ager III, E. Yablonovitch, and A. Javey, "Electrical suppression of all nonradiative recombination pathways in monolayer semiconductors", *Science*, 364, 468–471, 2019.
   - "Electrostatic doping improves 2D semiconductor performance", Chemistry World, May 2019.
   - "You Don't Have to Be Perfect for TMDCs to Shine Bright", LBNL News, May 2019.

2. J. Cho, M. Amani, D.-H. Lien, H. Kim, **M. Yeh**, V. Wang, C. Tan, and A. Javey, "Centimeter-scale and visible wavelength monolayer light-emitting devices", *Advanced Functional Materials*, 29, 1907941, 2019.

3. M. Hettick*, H. Li*, D.-H. Lien, **M. Yeh**, T.-Y. Yang, M. Amani, N. Gupta, D. C. Chrzan, Y.-L. Chueh, and A. Javey, "Shape-controlled single-crystal growth of InP at low temperatures down to 220 °C", *Proceedings of the National Academy of Sciences U.S.A.*, 117 (2) 902-906, 2020.

4. C. Tan*, M. Amani*, C. Zhao, M. Hettick, X. Song, D.-H. Lien, H. Li, **M. Yeh**, V. R. Shrestha, K. B. Crozier, M. C. Scott, and A. Javey, "Evaporated $Se_xTe_{1-x}$ thin films with tunable bandgaps for short-wave infrared photodetectors", *Submitted.*

* indicates equal contribution.

## Research Experience

- **Ali Javey Lab, Undergraduate Researcher** *May 2018-present*

**Optical characterization of exciton physics**

  - Helped lead a project investigating whether electrostatic doping can be used to enhance the photoluminescence quantum yield of quantum dots.
  - Developed and fabricated monolayer semiconductor device structures for applying gate voltage while measuring PL. Discovered that encapsulating the monolayer in PMMA reduces hysteresis, enabling strong and repeatable gate control that can suppress all nonradiative recombination.
  - Extended the gated PL device concept to devices for diffusion measurements, in order to visualize the transport of different exciton species in 2D materials.

**Materials for electronics, optoelectronics, and photonics**

  - Performed PL spectroscopy measurements and data analysis for projects on low temperature synthesis of III-V semiconductors and large-area $WS_2$ monolayer light-emitting devices.

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- **Alexander Pines Lab, Undergraduate Researcher** *June 2017-Jan 2018*

  **Enhanced NMR sensitivity *via* NV center polarization transfer**

  – Streamlined the fabrication process (including frequency tuning and impedance matching) for two NMR probe configurations corresponding to different sample types (nanodiamond powder, $^{13}$C enriched diamond). Wrote MATLAB/Python scripts to analyze the probe circuit.

  – Used COMSOL to simulate the resonant frequencies and Q factor of a microwave cavity.

## Teaching Experience

- **UC Berkeley, Undergraduate Student Instructor** *Jan 2017-May 2019*

  – **Teaching Assistant**, EE16B - Designing Information Devices and Systems II (January-May 2019)

  – **Reader**, EE105 - Microelectronic Devices and Circuits (August-December 2018)

  – **Teaching Assistant**, EE16A - Designing Information Devices and Systems I (June 2017-May 2018)

  – **Lab Assistant**, EE16A - Designing Information Devices and Systems I (January-May 2017)

## Honors and Awards

- **Harvard Quantum Initiative Graduate Fellowship** *Fall 2020*

  – Graduate fellowship awarded by HQI, an interdisciplinary community of researchers at Harvard dedicated to the advancement of the science and engineering of quantum systems and their applications.

- **Arthur M. Hopkin Award** *Spring 2020*

  – The Hopkin award honors an outstanding Electrical Engineering undergraduate who demonstrates seriousness of purpose and high academic achievement.

- **Dean's List** *All semesters*

  – The Dean's honors list recognizes outstanding academic achievement each fall and spring semester. Qualifying students must have a semester GPA in the top 10 percent of all College of Engineering undergraduates.

- **EECS Honors Program** *Jan 2019-present*

  – The EECS Honors Program is designed to provide talented undergraduate students with more flexibility at the undergraduate level. Honors students pursue an academic concentration outside of the department and engage in research.

- **Eta Kappa Nu, Member** *Sep 2017-present*

  – Eta Kappa Nu (HKN) is the national Electrical Engineering and Computer Science honor society. Eligibility is extended every semester to students in the top third of the senior class or the top quarter of the junior class of EECS majors at UC Berkeley.

- **Lowell Alumni Association Scholarship** *May 2016*

  – Awarded to an outstanding graduating senior at Lowell High School.

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## Skills

- **Fabrication**: Evaporation, photolithography (cleanroom, development, etching, liftoff), oxygen plasma cleaning, soldering, drill press, bandsaw
- **Characterization**: Laser measurement (micro-photoluminescence spectroscopy, absorption spectroscopy, laser alignment, optical table setup), optical microscope, AFM, probe station, electronic test equipment (oscilloscope, multimeter, LCR meter, function generator, semiconductor parameter analyzer, network analyzer)
- **Software**: Cadence, LTSpice, Git, Origin, ZEMAX OpticStudio, LayoutEditor
- **Programming Languages**: Python, Java, C, MATLAB, Processing, LaTeX