

EXPERIENCE

RESEARCH ASSISTANT • LAB FOR NANOSCALE OPTICS (HARVARD) • AUG 2020 – PRESENT

- Studying combination of integrated photonic nanostructures with atomic color centers in diamond for quantum information processing applications:
 - Investigating SiVs as a quantum memory for near-term quantum communication networks
 - Designing and measuring lithium niobate electro-optic devices for scaling up visible quantum emitter platforms
 - Experimentally investigating use of Silicon Vacancy (SiVs) centers in diamond for single photon and multi-photon entangled state generation
 - Developing low insertion-loss, cryogenically compatible permanent packaging for integrated photonics in diamond
- Involved cryogenic quantum optics experiments, microfabrication, and photonic and microwave device design

TEACHING FELLOW • ENGSCI 177/277 (HARVARD) • JAN 2022 – JUNE 2022

- Oversaw laboratory-based course on nanofabrication for undergraduates / graduates.

GRADUATE RESEARCH ASSISTANT • NANOPHOTONICS CENTRE (UNIVERSITY OF CAMBRIDGE) • OCT 2019 – JUN 2020

- Studied molecule-mediated photocurrent in plasmonic nanogaps
- Designed and assembled electrical and optical setups to perform high sensitivity optoelectric measurements

INTERN • SAMSUNG ADVANCED INSTITUTE OF TECHNOLOGY (SAIT) / SAMSUNG SEMICONDUCTOR • JAN 2019 – SEP 2019

- Designed, optimized and experimentally validated nanophotonic powered metadevices for integration into Samsung's commercial electronic devices.
- 2 patents filed on work

UNDERGRADUATE RESEARCH INTERN • LABORATORY FOR NANOSCALE OPTICS (HARVARD) • JUN 2018- SEPT 2019

- Investigated use of high stress thin films to improve properties of color centers in diamond for quantum photonic devices
- Performed diamond nanofabrication and assisted cryogenic quantum optics experiments

UNDERGRADUATE RESEARCHER • CHOO LAB (CALTECH) • JAN 2016- PRESENT

- Quantum effects in Plasmonic Metal Insulator Metal cavities
 - Numerically analyzed quantum effects in plasmonic MIM
- Bioinspired Random Nanostructuring for Angle Independent Optics
 - Numerically analyzed the use of biologically inspired random nanostructuring to improve the angle independence of Fabry Perot cavities via FDTD
- Thermography sensor :
 - Designed novel method to fabricate microscale, high sensitivity metal-silicon micro-thermocouple temperature sensors.

EDUCATION

PHD / MSCI APPLIED PHYSICS • PRESENT • HARVARD UNIVERSITY • CAMBRIDGE, MA

Under Prof. Marko Loncar

Funded through NSF Graduate Fellowship (GRFP)

MPHIL PHYSICS • 2020 • UNIVERSITY OF CAMBRIDGE • CAMBRIDGE, UK

Thesis: "Photocurrent in Plasmonic Molecular Junctions"

Under Prof. Jeremy Baumberg at the Nanophotonics Centre

Fully funded through Churchill Scholarship

BS ELECTRICAL ENGINEERING • 2019 • CALTECH • PASADENA, CA

Thesis: "Quantum Effects in Plasmonic Metal-Insulator-Metal Waveguides"

Related Awards: Senior Thesis Award, Tau Beta Pi Honor Society

GPA: 4.0/4.0

PRESENTATIONS

"Coherent Single Photon Source in an Integrated Diamond Nanophotonic System" – CLEO 2022

"Angle Independent Fano Resonances in Bioinspired Nanostructured Fabry-Pérot Sensors" – CLEO Pacific Rim 2020

"Quantum Mechanical Effects on Nanofocusing Limits of Metal-Insulator-Metal Plasmonic Waveguides" – META 2019

PUBLICATIONS

"Robust multi-qubit quantum network node with integrated error detection". P.J. Stas, et al. arXiv: 2207.13128

"Efficient Source of Shaped Single Photons Based on an Integrated Diamond Nanophotonic System". E. Knall*, C. Knaut*, R. Bekenstein*, **D. Assumpcao***, et al. PRL 129, 053603

"Mechanical Control of a Single Nuclear Spin". S. Maity, B. Pingault, G. Joe, M. Chalupnik, **D. Assumpcao**, E. Cornell, L. Shao, M. Loncar, Phys. Rev. X, 12, 011056

"Quantum Tunneling Induced Optical Rectification and Plasmon-Enhanced Photocurrent in Nanocavity Molecular Junctions". D. Kos, **D. Assumpcao**, C. Guo, J. Baumberg, ACS Nano, 2021

"Landau-damping-induced limits to light-matter interactions in sub-10-nm planar plasmonic nanocavities". **D. Assumpcao**, R. Siddique, H. Choo. Optics Express. 2021

"High-performance flexible metal-on-silicon thermocouple". **D. Assumpcao**, S. Kumar, V. Narasimhan, J. Lee, H. Choo, Scientific Reports. 2018.

AWARDS

Caltech Senior Thesis Award (2019)

NSF Graduate Fellowship (2019)

Hertz Finalist (2019)

Churchill Scholarship (2019)

Tau Beta Pi (2018)