Md Nafiz Amin

(831)-332-9039 mdamin@ucsc.edu linkedin.com/in/mdnafizamin Md Nafiz Amin

Objective

Optics and photonics researcher with 6+ years of hands-on experience in experimental photonics, photonic design, optics, and imaging systems. Seeking challenging projects in photonics design and testing, product development, and AI in photonics. Expected Graduation- August 2024.

Skills

Lab Skills:	Passive component testing, Imaging systems, Optical fibers, waveguides, lab equipment- class 3B and class 4 laser, tunable supercontinuum and Ti:Sapphire cavity lasers, interferometer, spectrum analyzers, wave meter, photo detectors, tunable filters, attenuator, combiners/splitters, power meter.
Optics Skills:	Mode propagation, beam optics, ray optics, adaptive optics.
Material characterization:	AFM, SEM, FIB milling, e-beam evaporation, ion etching, UV lithography
Simulation:	Fimmwave, OmniSim, COMSOL Multiphysics, Lumerical, OSLO (free alternative to Zemax, beginner level)
Design Tools:	Autodesk Fusion360, SolidWorks.
Programming:	Python, MATLAB, C/C++, NI LabVIEW, C#, JMP, HTML.
Technical Knowledge:	semiconductor physics (2 classes), semiconductor processes (3 grad classes), photonics and optical fiber (2 grad classes), optics and imaging (1 grad class)

Work Experience

University of California, Santa Cruz *Santa Cruz, California*

Graduate Student Researcher, ECE Department *September 2017 - present*

- **Lab automation for Integrated Spectrometer**- Developed a novel deep-learning-based integrated imaging spectrometer using multimode interference (MMI) waveguides in the Vis-NIR spectrum.
  - Designed, implemented, and maintained multiple test setups involving laser (LabVIEW) - camera (C++) - spectrum analyzer (python) communication (TCP) architecture for equipment automation and remote control of high-speed optical acquisition setup.
  - Co-developed a deep learning (TensorFlow) framework for image-to-spectrum prediction.
  - Developed low-light imaging techniques for astronomy applications.
- **Optical wafer characterization-** Performed hands-on optical characterization, testing and validation experiments of optofluidic biosensors.
  - Performed the optomechanical alignment and troubleshooting of the related optical equipment.
  - Performed sample preparation and optical measurements, data analysis, and result statistics.
- **Optical component design-** Performed numerical simulations for optimization of waveguide spectrometers, planar multi-splitter waveguides and surface grating couplers for biosensing.
  - Performed waveguide design analysis using eigenmode solvers, FDTD, FDM etc. algorithms.
  - Performed passive optical component design, optimization, and performance analysis.
  - Worked on Photonic Crystal Fiber Design using FEM in COMSOL Multiphysics for undergraduate thesis.
- **Waveguide gluing-** Initiated and collaborated on a project for glued bonding between single-mode optical fiber and the edge-coupled photonic waveguides on a 3D printed stage.
  - Developed a UV in-fiber delivery and monitoring process for slow curing of the optical bonding glue. This idea shares similar concepts to photonic wire bonding.
  - Successfully transported and tested a fiber-coupled waveguide from the UCSC lab to the Lick observatory. The long-term goal is photonics packaging in the lab and on-site implementation.

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- **Optofluidic biosensor**- Designed an integrated, free-space optofluidic biosensor by thin metal film evaporation on an antiresonant (ARROW) semiconductor waveguide.
  - Designed a top-down fluorescence laser excitation scheme for flowing biomolecule detection.
  - Built multiple epi-illumination microscope systems.
- **Astrophotonics**- Collaborated in experiments at Lick Observatory (San Jose, CA) to integrate a photonic spectrometer module with the 120-inch Shane telescope.
  - Collaborated with astronomers and UC observatory engineers in integrating photonic testbeds on the telescope's adaptive optics system.

City University, Bangladesh *Dhaka, Bangladesh*
Lecturer, Dept. of EEE *December 2016 - July 2017*

- Instructed courses in- a) Optical Fiber Communications, and b) Signals and systems.

Grameenphone Ltd. *Dhaka, Bangladesh*
Senior System Engineer, Circuit Switching System (CSS) *September 2016 - December 2016*

- Operation and maintenance support of Grameenphone's 2G/3G Voice Core Network nodes.
  - Collaborated with multiple teams involving electrical engineers, process engineers, test engineers, operations engineers, and external technology vendors.

Management Trainee, Next Business Leader (NBL) program *September 2015 - August 2016*

- To understand project management and the overall workflow of a telecommunications company.

Education

University of California, Santa Cruz - Ph.D., Electrical Engineering *Santa Cruz, California*
Research area: Photonic spectrometer & optofluidic biosensor *September 2017- present*
Advisor: Prof. Holger Schmidt *Expected Graduation:* ***August 2024***

University of California, Santa Cruz - M.S., Electrical Engineering *September 2017 - June 2022*

Bangladesh University of Engineering and Technology - B.Sc. *May 2010 – September 2015*
Electrical and Electronic Engineering *Dhaka, Bangladesh*

Publications highlights

(Full list- Please visit the Google Scholar profile link above)

- M. N. Amin *et al.*, "*Multi-mode interference waveguide chip-scale spectrometer*", manuscript submitted, another article in progress.
- M. N. Amin *et al.*, "*Free-Space Excitation of Optofluidic Devices for Pattern-Based Single Particle Detection*," IEEE Photonics Technology Letters, vol. 33, no. 16, pp. 884-88, 2021.
- M. N. Amin *et al*., "*Highly nonlinear polarization-maintaining photonic crystal fiber with nanoscale GaP strips*," Applied Optics, vol. 55 no. 35, pp. 10030-10037, 2016.

Awards and Activities

- Recipient of the IEEE Photonics Conference 2019 travel grant, CLEO 2023 travel grant.
- Recipient of the Regents Fellowship for incoming doctoral students at UC Santa Cruz.
- Member of SPIE, OSA, and *IEEE* Photonics Society.