

# MATTHEW GARRITY

Medford, MA • m.garrity0@gmail.com • 201-850-9754 • [garritymade.com](http://garritymade.com) • [linkedin.com/in/matthewggarrity](https://linkedin.com/in/matthewggarrity)

## SUMMARY

---

Opto-mechanical engineer with 6+ years of experience designing and aligning precision optical systems, including single-mode fiber array units, quantum cascade laser assemblies, and nonlinear optics packages for NASA and Naval Research Laboratory programs. MS from the University of Arizona Wyant College of Optical Sciences. Specializes in tolerance analysis, alignment fixturing, and packaging design that bridges optical requirements to manufacturable hardware.

## SKILLS

---

**Optical:** Zemax, Fiber optics, fiber array units (FAUs), precision alignment, beam characterization, Lasers, nonlinear, optical metrology

**Mechanical:** SolidWorks, OnShape, GD&T (ASME Y14.5), tolerance analysis, FEM / FEA, kinematic design, Design for Manufacturing and Assembly (DFMA), packaging design

**Fabrication:** HSMWorks CAM, CNC milling (g-code), manual mill + lathe, 3D printing (FDM), laser cutting, cleanroom handling of optics and fiber

**Software + Other:** Python, MATLAB, Arduino, soldering + wiring, technical writing, vendor coordination

## EDUCATION

---

**MS, Opto-Mechanical Engineering**, University of Arizona Wyant College of Optical Sciences • **BS, Physics**, UMass Lowell

## PROFESSIONAL EXPERIENCE

---

**Opto-Mechanical Engineer** | Irradiant Technologies, Waltham, MA *Feb 2025 – Present*

- Designed optical system and packaging for collimating and coupling light between single-mode fibers arrays, handling alignment tolerances characteristic of SMF-to-SMF coupling.
- Performed tolerance analysis on an 80-channel Fiber Array Unit to establish manufacturing requirements; designed the packaging and alignment fixturing used to build the assemblies.
- Developed bench-top test protocols for qualifying two-photon lithographically printed microlens arrays and verifying parameter repeatability across builds.
- Created standards for printing and characterizing optical samples, enabling consistent performance evaluation across manufacturing runs.

**Mechanical Engineer** | RedShift Bio, Boxborough, MA *Feb 2021 – Jan 2025*

- Designed kinematic assembly fixturing for flagship products quantum cascade laser, achieving 40 microradian alignment repeatability across production builds and enabling consistent build quality without expert-level assembly skill.
- Redesigned main optical train mounting scheme on flagship instrument, increasing functionality and streamlining the alignment procedure for assembly technicians.
- Prototyped and assembled improved microfluidic chips for next-generation instrumentation, bridging opto-mechanical and fluidic domains and reducing sample consumption by 10x.
- Led the design, fabrication, and testing of the External Buffer Station addon, allowing for better sample to buffer ratios.
- Drafted mechanical drawings to ASME Y14.5 GD&T standards and performed mechanical analysis to specify requirements and drive design choices.
- Supervised and maintained the in-house machine shop, serving as the team's primary resource for fast-turn prototyping and part modification.

**Opto-Mechanical Engineer** | QPeak, Bedford, MA *Nov 2019 – Dec 2020*

- Created opto-mechanical packaging on SBIR programs for NASA and the Naval Research Laboratory, delivering customer-ready hardware from concept through assembly.
- Designed and assembled matchbox-sized, epoxyless, hermetically sealed pulsed UV laser packages integrating nonlinear optical cavities within strict volume and environmental constraints.
- Assembled high-power Mid-IR and visible fiber optic delivery cables, solving material and structural challenges unique to high-power fiber applications.
- Characterized beam quality of multiple laser systems through near-field, far-field, and  $M^2$  measurements; handled, cleaned, and inspected optics and fibers in a cleanroom environment.

**Junior Opto-Mechanical Engineer** | Hindsight Imaging, Brookline, MA *Oct 2018 – Nov 2019*

- Modified a flagship spectrometer from Zemax files through finished opto-mechanical parts designed in SolidWorks and machined in-house.
- Primary CNC machinist: designed parts, generated g-code, and produced prototype and production components.
- Rewrote test protocols and assembly documentation; designed manufacturing fixturing and jiggling.

**Engineering Technician** | L3-SSG, Wilmington, MA *Apr 2017 – Mar 2018*

Operated LUPI-style interferometers and Fizeau plate systems in an ISO-certified cleanroom, performing optical metrology on space telescope components.