Dhruv Srivastava, Work Term Assignment for ASE 125N

1. Introduction

Founded in 1851, Corning Incorporated is a global leader in materials science, most notably recognized for pioneering breakthroughs in glass, ceramics, and optical physics. Corning is widely known for innovations such as Gorilla® Glass, used in smartphones and consumer electronics, and for creating the first commercially viable optical fiber, now considered the foundation of the modern digital world. Over the last five decades, Corning has revolutionized communication infrastructures by enabling the high-speed internet, cloud computing, and data-dependent ecosystems that drive global industries.

Corning Optical Communications (COC) focuses on developing fiber-based products, connectors, and systems that support enterprise networks, data centers, and telecommunications providers. With the exponential growth of artificial intelligence, cloud infrastructure, and high-volume data processing, the global demand for denser, faster, and more reliable optical connectivity solutions continues to increase.

I worked as a Development Engineering Intern at the Austin site, supporting new connector development through the Corning Optical Connectivity division (COC). The goal of the team is to architect next-generation connectivity devices that allow enterprise and hyperscale data centers to transfer dramatically more data while minimizing space, cost, and loss. My main work involved integrating and validating a new multi-fiber connector architecture, designed to increase data throughput while maintaining the same footprint as existing components. This report outlines my role, work environment, technical contributions, and the skills developed throughout my term.

2. Work Environment

During this work term, I operated within a cross-functional engineering environment that involved collaboration with designers, test engineers, managers, and international manufacturing specialists. I reported directly to a development engineer who served as my mentor and project lead, while the broader department was managed by leadership responsible for coordinating program objectives and resource alignment.

I closely worked with:

- *Zach Thompson, Development Engineer — served as my mentor and daily supervisor, guiding project direction and participating in design reviews.*
- *Laszlo Markos, Department Manager — oversaw the engineering organization and evaluated project alignment within the program roadmap.*
- *Jeff Grenger, Test Engineering Manager — provided technical direction in configuring the Viavi Optical Test Bench and validating optical loss measurements.*
- *Julian Juarez, Development Engineer — supported my work in additive manufacturing, helping configure FDM and SLA systems for rapid prototyping.*
- *Jameson Wright, Development Engineer — assisted with PTC Creo and WindChill, helping establish revision control, CAD libraries, and drafting practices.*

The collaborative structure exposed me to real-world engineering decision-making. I attended and contributed to weekly engineering updates, design reviews, and Final Concept Review sessions that included manufacturing engineers in China, program management, and stakeholders responsible for financial feasibility. These sessions helped validate whether the proposed connector architecture justified development cost, tooling, and transition into higher readiness level phases.

The department maintained a culture of knowledge sharing, early review cycles, and documentation rigor. I learned to prepare professional engineering documentation, including tolerance stack-ups, design review presentations, CAD drawing packages, and prototype fabrication plans. This environment provided a realistic understanding of the expectations placed on full-time development engineers working on optical connectivity products.

3. *Technical Summary*

Project Overview — Multi-Fiber Connector Development

The primary objective of my project was to assist in the design and feasibility validation for a new multi-fiber connector, intended to enable higher data density within the same standardized footprint. Increasing fiber count per connector directly contributes to improved bandwidth capacity and data center efficiency, especially in hyperscale environments where physical space and installation time are mission-critical.

Engineering Problem Definition

Traditional fiber connectors are limited by physical footprint and alignment constraints. Increasing the number of fibers without expanding the form factor requires redesigning internal geometry, alignment features, and fiber routing paths — all while maintaining optical performance and meeting industry standards such as Telecordia insertion loss requirements ($\leq$0.3 dB).

The challenge was ensuring:

- *Precise fiber alignment during mating*

- *Repeatable manufacturability with minimal tolerancing risk*
- *Backward compatibility with existing hardware*
- *Low optical loss under test conditions*

Tools, Methods, and Engineering Responsibilities

Throughout the project I used:

Engineering Tool	*Purpose*
PTC Creo	*3D modeling, feature design, assemblies*
Creo Simulate	*Structural simulation and fit validation*
WindChill	*PLM, revision tracking, drawing release*
FDM and SLA Printing	*Rapid prototyping and ergonomic testing*
Machine Tools	*Minor machining and post-processing*
Viavi Test Bench	*Optical loss measurements*
GD&T + Tolerance Vectoring	*Controlling critical alignment features*

My responsibilities included modeling components, generating engineering drawings, preparing prototypes, and performing iterative design adjustments based on test results and feedback received during design reviews.

Design Decisions and Trade-offs

One of the most impactful decisions we made was to retain the same external footprint as a similar connector already in production. This reduced:

- *New mold/tooling requirements*

- *Manufacturing ramp-up complexity*
- *Cost barriers for customer adoption*

However, this introduced internal geometric constraints, forcing innovative changes to fiber routing and alignment features and leaving less tolerance freedom than a custom footprint would allow.

Results and Impact

Using additive manufacturing, I produced multiple prototype iterations to validate fit, ergonomics, and preliminary optical alignment. The final test configuration achieved optical insertion loss under 0.3 dB, successfully meeting Telecordia requirements. This proved the design concept was viable for the next review stage and provided the engineering team with physical models to test, critique, and refine.

This exposure strengthened my understanding of how simulation, prototype testing, and manufacturing realities converge to guide real engineering decisions — a perspective far more comprehensive than typical academic design cycles.

4. Term in Review

Academic knowledge in CAD, assemblies, and GD&T played a major role in enabling me to contribute quickly. Understanding how tolerance stack-ups propagate through an assembly helped me communicate design intent and comprehend feedback during reviews.

My strongest areas were:

- *CAD modeling and visualization*

- *Breaking down assemblies into constraints and datums*
- *Rapid prototyping and iteration*

The skills I plan to improve include:

- *Advanced simulation techniques for structural and thermal behavior*
- *Optical testing procedures and interpretation*
- *Writing technical documentation for design review and decision tracking*

This experience solidified my interest in the field of mechanical engineering and product development. Observing how components evolve through review cycles, stakeholder engagement, and prototype testing clarified what professional engineering looks like beyond the classroom. It reinforced my motivation to pursue roles where I can work hands-on with assemblies, testing, and validation to bring designs from concept to reality.

5. *Works Cited*

a. Corning Incorporated. (n.d.). *45 Years of Optical Fiber Innovation*. https://www.corning.com/worldwide/en/innovation/culture-of-innovation/corning-celebrates-45-years-on-cutting-edge-with-optical-fiber.html Corning
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