

Graduated Bowman Probes

Date: April 3 to April 10, 2026

Client: Dr. James Law

Advisor: Professor Monica Ohnsorg

Team:

Neel Srinivasan nsrinivasan8@wisc.edu (Team Leader/BPAG)

Caden Robinson carobinson5@wisc.edu (BSAC)

Caleb White cwhite@wisc.edu (BWIG)

Cole Miller ctmiller8@wisc.edu (Communicator)

Problem Statement

Bowman probes are the standard instrument used in interrogation of the nasolacrimal (tear duct) system in Ophthalmology. They are available in various sizes and provide tactile feedback to the surgeon when probing the canalicular/nasolacrimal system, allowing them to assess for strictures, discontinuities, obstruction, or other abnormality within its lumen. Probing is typically performed prior to the passage of implants such as nasolacrimal stents (eg. Crawford, Lacriflow, Nunchucku, Monoka), to confirm patency of the nasolacrimal system. Available probes on the market do not have any markings on them which may allow the surgeon to make measurements to points within the canalicular/nasolacrimal lumen (eg. a stricture at 30 mm distal to the punctum), which can be helpful in correlating with imaging findings, or for accurate clinical documentation and therefore inform management of nasolacrimal pathologies. We propose the development of such a stent with inscribed bands corresponding to millimeter markings which may be referenced during canalicular or nasolacrimal probing.

Brief Status Update

This week the team worked with Hassan, Professor Pfefferkorn's graduate student, to come up with an improved version of our laser fixture. The team found out that the initial version was too tall and reflective, which would cause disruption to the laser's focal plane and overall marking procedure. The team has acquired thinner and non-reflective steel from the design lab at engineering centers building, and has a planned meeting with Hassan on Friday, April 10th to determine the parts viability. Once the team is given clearance, we plan to fabricate the fixture and conclude prototype fabrication on Monday, April 13th.

Summary of Weekly Team Member Design Accomplishments

- Team:
 - Met with Hassan to discuss laser fixture requirements
 - Worked on executive summary draft
 - Worked on engineering judgement assignment & reflected on its applicability to our project

- Neel Srinivasan:
 - Picked up parts with Caleb for second version of laser fixture
 - Researched manufacturing techniques for aluminum & stainless steel processing
 - Worked with team on creating a testing timeline

- Caden Robinson:
 - Drafted up protocols for autoclave testing
 - Found an alternative way to create the sample folder for probe fabrication
 - Worked to create the executive summary with the team

- Caleb White:
 - Helped the team complete both the ethics in engineering and executive summary draft.
 - Set up several meetings with Hassan, first to establish that the new holding fixture material was adequate and second for probe fabrication.
 - Went with Neel to the ECB shop to find a non reflective stainless steel piece for the probe holder.

- Cole Miller:
 - Helped to complete the ethics in engineering assignment
 - Worked to create executive summary with team
 - Worked with team to plan testing timeline

Weekly/Ongoing Difficulties

N/A

Upcoming Team and Individual Goals

- Team:
 - Complete all probe fabrication
 - Begin autoclave and incubator testing and reach out to Dr. Law about thawing cadaver if specimens
 - Finish executive summary

- Neel Srinivasan:
 - Complete probe fabrication with Hassan and team
 - Complete individual testing sections with minimum sample size $n = 3$
 - Finalize testing data/analysis and begin working on poster presentation

- Caden Robinson:
 - Complete fabrication of all probes and finish testing
 - Finish executive summary
 - Begin working on final deliverables and preparing for the poster presentation

- Caleb White:
 - Complete all probe fabrication next week Monday with Hassan.
 - Perform autoclave and incubator testing.
 - Complete the final draft of the executive summary

- Cole Miller:
 - Complete all probe fabrication with Hassan and Team
 - Finish Executive Summary
 - Perform autoclave testing and plan for the end of the semester

Project Timeline

| Project Goal | Deadline | Team Assigned | Progress | Completed |
|------------------------------|----------|---------------|----------|-----------|
| Meet with client | 2/2 | All | ✓ | ✓ |
| Product Design Specification | 2/5 | All | ✓ | ✓ |
| Preliminary Presentations | 2/20 | All | ✓ | ✓ |
| Preliminary Deliverables | 2/25 | All | ✓ | ✓ |
| Show and Tell | 3/20 | All | ✓ | ✓ |
| Poster Presentations | 4/24 | All | X | X |
| Final Deliverables | 4/29 | All | X | X |

Expenses

| Item | Description | Manufacturer | Part Number | Date | QT Y | Cost Each | Total | Link |
|-------------|-------------|--------------|-------------|------|---------|--------------|-------|------|
| Component 1 | | | | | | | | |

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|--------------------------------------|--|--------------------|---------------|-----------|---|---------|---------|----------------------|
| Set of Bowman's probes | A set of unmarked Bowman's probes used in duct procedures for the team to practice fabrication and testing | Premium Instrument | B0777N38SV | 2/25/26 | 3 | \$16.99 | \$50.97 | Link |
| Component 2 | | | | | | | | |
| CerMark 2 oz Aerosol Ultra | A 2 oz aerosol can of CerMark ULTRA Aerosol spray used for laser marking of various materials including metals and ceramics. | CerMark USA | CULTRA.A2 | 3/11/2026 | 1 | \$17.00 | \$17.00 | Link |
| LMM6018 CerMark USA white sheet tape | A small 2"x6" sheet of white tape used for laser marking definition on typically metal surfaces. | CerMark USA | CLMM6018.S H2 | 3/11/2026 | 1 | \$8.00 | \$8.00 | Link |
| Component 3 | | | | | | | | |
| | | | | | | | | |
| TOTAL: | | | | | | | | \$75.97 |