

Graduated Bowman Probes

Date: October 2 to October 8, 2026

Client: Dr. James Law

Advisor: Professor Wally Block

Team:

Neel Srinivasan nsrinivasan8@wisc.edu (Team Leader)

Caden Robinson carobinson5@wisc.edu (BPAG)

Caleb White cfwhite@wisc.edu (BWIG)

Kenneth Sun kksun2@wisc.edu (BSAC)

Sudhi Chavadam chavadam@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 presented their preliminary presentation and completed the preliminary report. During this, the team was able to gather valuable feedback from peers and design advisors, along with recommendations on how to proceed. The team is also finalizing updates to improve the previous semesters testing protocols such that they match our new goals.

Summary of Weekly Team Member Design Accomplishments

- Team:

- Delivered preliminary presentation
 - Completed preliminary report
- Neel Srinivasan:
 - Worked with team to deliver preliminary presentation and write preliminary report
 - Researched laser power combinations' effect on probes surface for tissue snag
 - Researched improved artificial tear/lacrimal duct solution for accelerated life test
- Caden Robinson:
 - Met with Dr Ohnsorg and discussed fabrication options for the soft tissue mimic
 - Researched materials that have similar properties to the epithelial tissue in the lacrimal duct
- Caleb White:
 - Researched epithelial soft tissue characteristics to establish quantitative specs for MTS lacrimal phantom testing.
 - Reached out to Joshua Alexander to get a status report on the test bioprint.
 - Helped complete the preliminary report.
- Kenneth Sun:
 - Researched load cell options small enough for probe force testing
 - Begun sop improvements for probe graduation uniformity
- Sudhi Chavadam:
 - Researched resins for external shell 3d printing and other fabrication techniques
 - Gathered literature on available internal coating polymers with high hydrophilicity and similarity to endothelial tissue

Weekly/Ongoing Difficulties

N/A

Upcoming Team and Individual Goals

- Team:
 - Begin testing procedures for probe prototypes
 - Reach out to/meet Mr. Schumacher to assess probe configurations and discuss future steps
 - Meet with medical school advisor, Jayden, to update on current progress along with future goals
 - Order necessary materials for phantom fabrication

- Neel Srinivasan:
 - Begin probe testing
 - Meet with team to discuss how we're splitting up fabrication and testing work
 - Create timeline for phantom and probe tests

- Caden Robinson:
 - Buy capillary tubing and create initial 3D printed prototype
 - Continue to look into material choice and bioprinting options

- Caleb White:
 - Work towards establishing a fabrication process for the lacrimal phantom.
 - Meet with Mr. Schumacher to discuss correct laser specs in accordance with our graduation desires.
 - Test hydrogel/injectable collagen idea for mucosal mimic.

- Kenneth Sun:
 - Continue working on both force test and graduation uniformity test

- Sudhi Chavadam:

- Continue working towards ordering polymer supplies and external / internal mimic work

Project Timeline

Project Goal	Deadline	Team Assigned	Progress	Completed
Meet with client	Sep 11, 2026	All	✓	✓
Product Design Specification	Sep 18, 2026	All	✓	✓
Preliminary Presentations	Oct 2, 2026	All	✓	✓
Preliminary Deliverables	Oct 7, 2026	All	✓	✓
Show and Tell	Oct 30, 2026	All		
Poster Presentations	Dec 4, 2026	All		
Final Deliverables	Dec 9, 2026	All		

Expenses

Item	Description	Manufacturer	Part Number	Date	QTY	Cost Each	Total	Link	
Component 1									
Component 2									
Component 3									
TOTAL:								\$0.00	