Graduated Bowman Probes

Date: March 20 to March 26, 2026

Client: Dr. James Law
Advisor: Professor Monica Ohnsorg
Team:
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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 on fabrication of our fixture for the laser marking process. The team used the mill and lathe in the Engineering Centers Building Design Lab to create an aluminum fixture that can hold all of the Bowman's probe sizes. The team also received valuable feedback and guidance from seniors during show and tell. We decided to follow through on one particular piece of advice, specifically having screw holes to secure the probe to the fixture to ensure uniformity. The team also has planned to meet Hassan again to create another prototype with the usage of our new fixture. Finally, the team has created a tentative fabrication and testing timeline that would offer the best results before final poster presentations.

Summary of Weekly Team Member Design Accomplishments

- Team:
    - Continued research to decide on viability of Ceramark for the graduation of Bowman's probes
    - Discussed methods to include smaller(~1mm) markings as requested by Dr. Law
    - Worked on implementation of received feedback from show and tell

- Neel Srinivasan:
    - Worked with Caleb to design and fabricate laser fixture at ECB
    - Created CAD files to model laser fixture
    - Researched methods beyond Ceramark to add 1mm markers in a different color

- Caden Robinson:
    - Investigated show and tell suggestions
    - Worked with team to fabricate prototype
    - Continued research into methods of creating smaller markers

- Caleb White:
    - Spoke to Hassan to get laser bed specifications in regard to laser range and size of fixture.
    - Worked with Neel to fabricate the probe holder using the ECB machine shop.
    - Communicated with Dr. Law about the CerMark products getting an estimate on arrival time and verified cadaver testing procedure.

- Cole Miller:
    - Created alternative designs for laser fixture
    - Researched viability of show and tell suggestions
    - Investigated alternative methods of creating markers

Weekly/Ongoing Difficulties

N/A

Upcoming Team and Individual Goals

- Team:
    - Work on executive summary draft
    - Continue researching best methods for adding distinguishable 1mm markers
    - Enjoy spring break

- Neel Srinivasan:
    - Start working on executive summary draft

- Caden Robinson:
    - Start work on executive summary draft

- Caleb White:
    - Work on executive summary draft
    - Update the team website
    - Spring Break!

- Cole Miller:
    - Work on executive summary draft

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	QTY	Cost Each	Total	Link
Component 1								
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 tape	A small 2”x6” sheet of white tape used for laser marking definition on typically metal surfaces.	CerMark USA	CLMM6018.SH2	3/11/2026	1	$8.00	$8.00	Link
Component 3								
TOTAL:								**$75.97**