Graduated Bowman Probes

Date: April 10 to April 17, 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

To start our week, the team obtained finished prototypes from Hassan, Professor Pfefferkorn's graduate student. The team is now focusing on testing protocols, in order to quantitatively and qualitatively assess our graduated Bowman's Probe prototype. The team is individually covering different testing protocols, and plan to be ready with data and proof of concept by Friday, April 24th for poster presentations. The team also has plans to meet with Dr. Law for wet sample & cadaveric testing to survey the accuracy of the prototypes.

Summary of Weekly Team Member Design Accomplishments

- Team:

    - Created and assigned testing protocols to team members
    - Worked on executive summary as a team
    - Worked on elevator pitch for executive awards

- Neel Srinivasan:
    - Ran incubation testing to observe degradation of bowman probes in artificial tear solution
    - Collaborated with team to obtain probes from Hassan
    - Worked with Caleb on microscope framing and probe measurements

- Caden Robinson:
    - Worked with team & Hassan to manufacture laser marked prototype probes
    - Began planning autoclave cycle testing
    - Worked with team on executive summary for design awards

- Caleb White:
    - Worked with Hassan to finish full probe fabrication.
    - Developed an agar and gelatin based phantom nasolacrimal conduit for tissue pull testing.
    - Conducted tissue pull testing using microscope observation and weight alteration.

- Cole Miller:
    - Assisted team with planning testing
    - Analyzed microscope images to determine accuracy of markings
    - Completed executive summary with team

Weekly/Ongoing Difficulties

N/A

Upcoming Team and Individual Goals

- Team:
    - Work on executive awards elevator pitch
    - Finish, practice, and deliver poster presentation

    - Complete testing and data analysis

- Neel Srinivasan:
    - Complete incubator tests
    - Work with team on creating poster
    - Run analysis on test results using imageJ

- Caden Robinson:
    - Work with team on testing analysis
    - Work with team on poster
    - Run autoclave cycle testing

- Caleb White:
    - Work with the team on creating poster.
    - Run statistical analysis on weight change alteration.
    - Meet Dr. Law for Cadaveric proof of concept.

- Cole Miller:
    - Analyze results of testing and what they mean for our project
    - Meet with Dr. Law for Cadaveric tests
    - Work on creating poster with team

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**