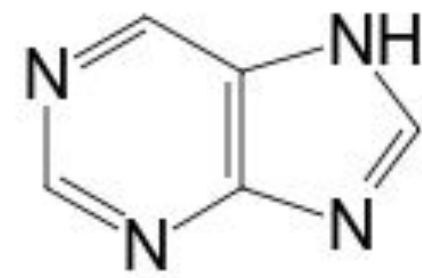


Introduction

Gout Disease

Pain and inflammation occur when too much uric acid crystallizes and deposits in the joints.

- Form of arthritis
- Kidneys don't filter out all of uric acid
- Excess crystallizes in joints.

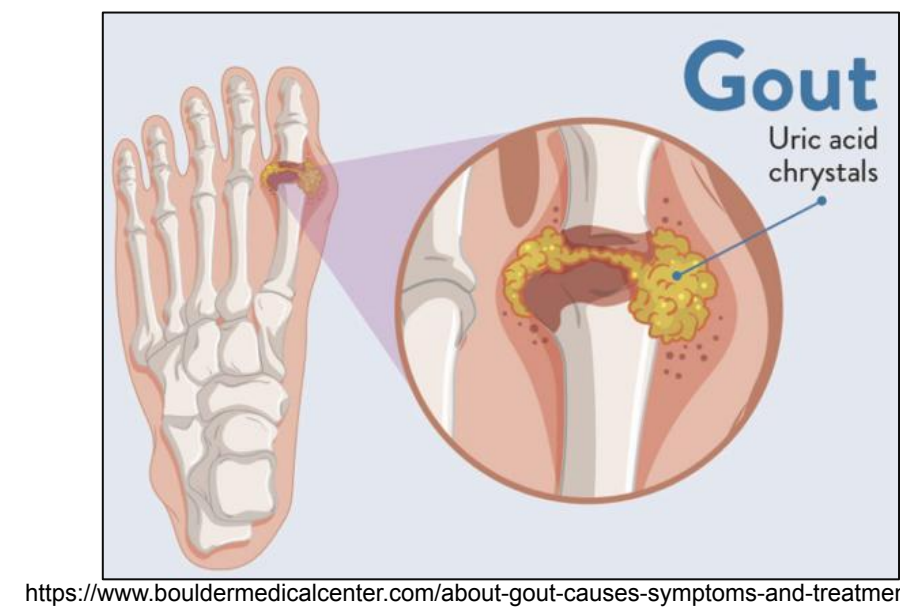


Causes

Excessive consumption of red meats.

Diagnosis

Blood tests, help patients monitor their levels of Uric Acid.



Objective & Impact of Professor's Research

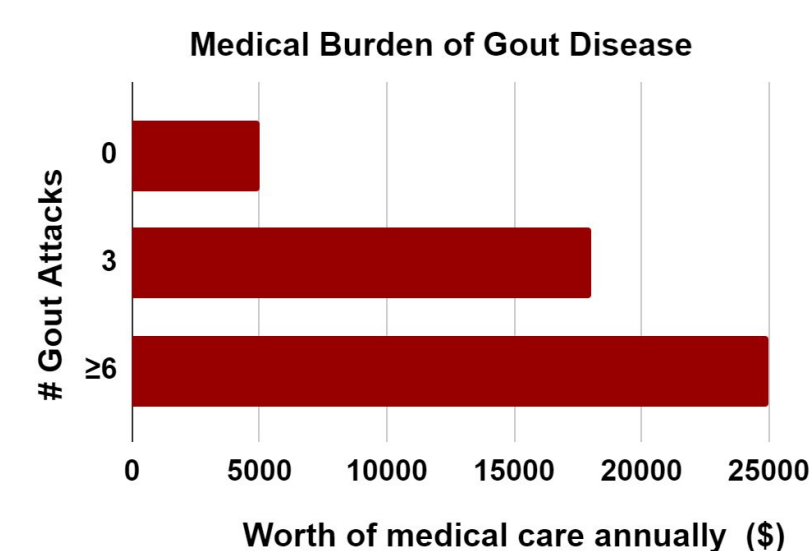
Objective: Utilizing accessible biofluids (e.g., Urine) to detect Uric Acid as the final oxidation (breakdown) product of purine metabolism

What is limiting us?

- ✗ Expensive lab test
- ✗ long waiting time
- ✗ Accessibility

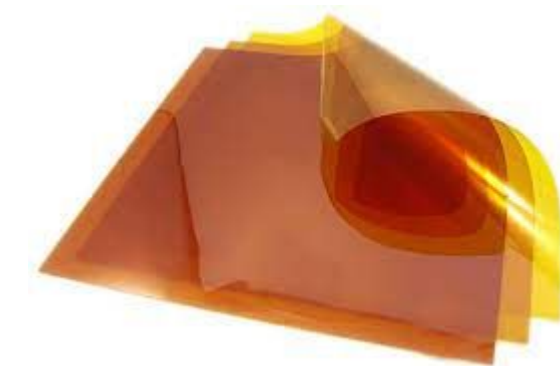
Our Approach!

- ✓ Affordable
- ✓ Fast response
- ✓ Easy fabrication



Methods & Results

Device Fabrication



Polyimide Film

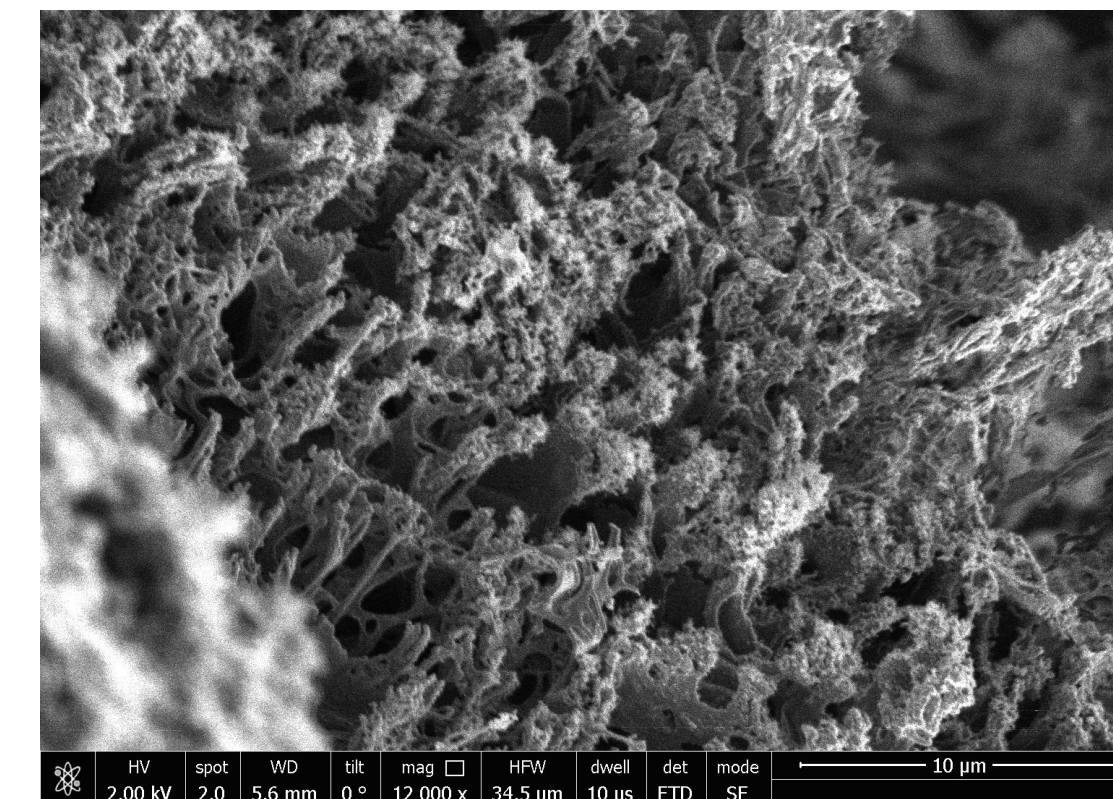
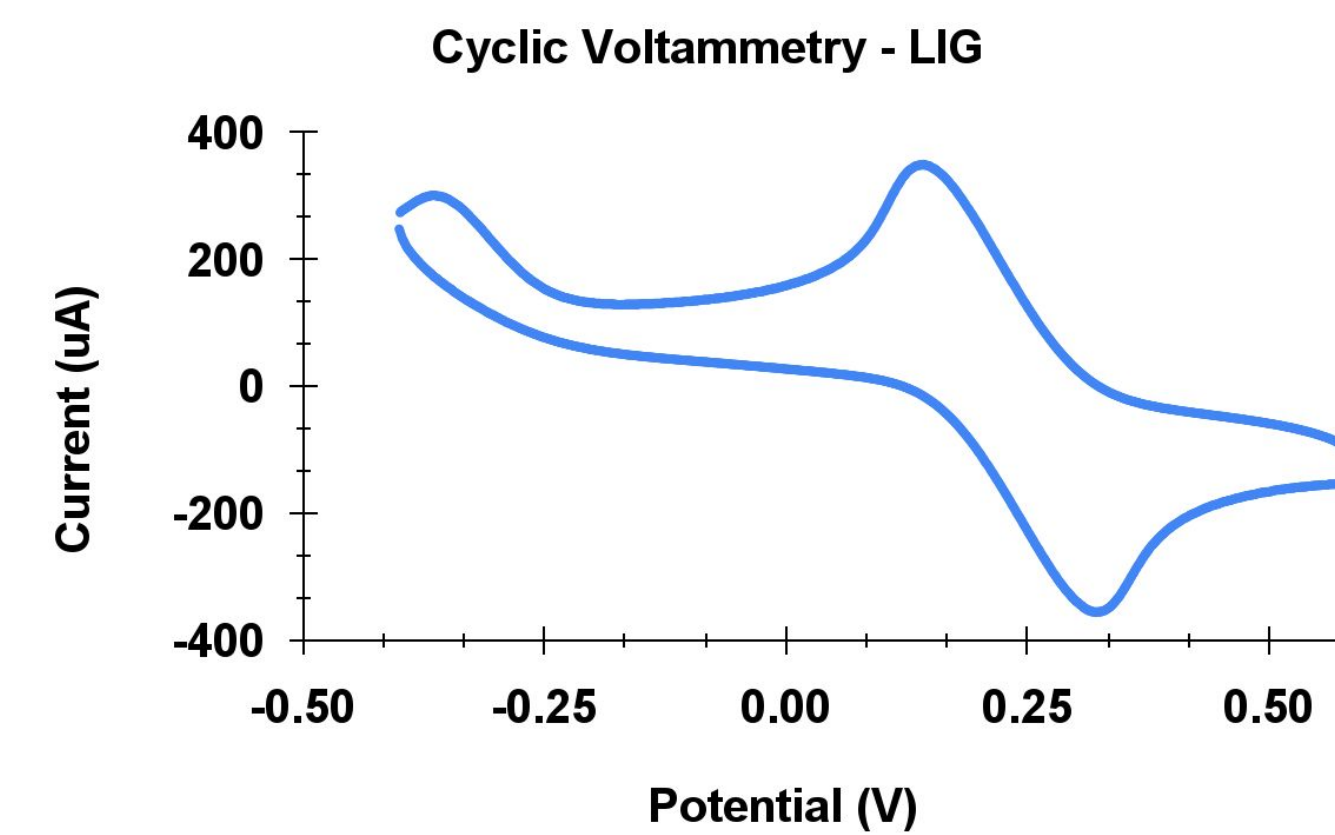


Laser Engraving

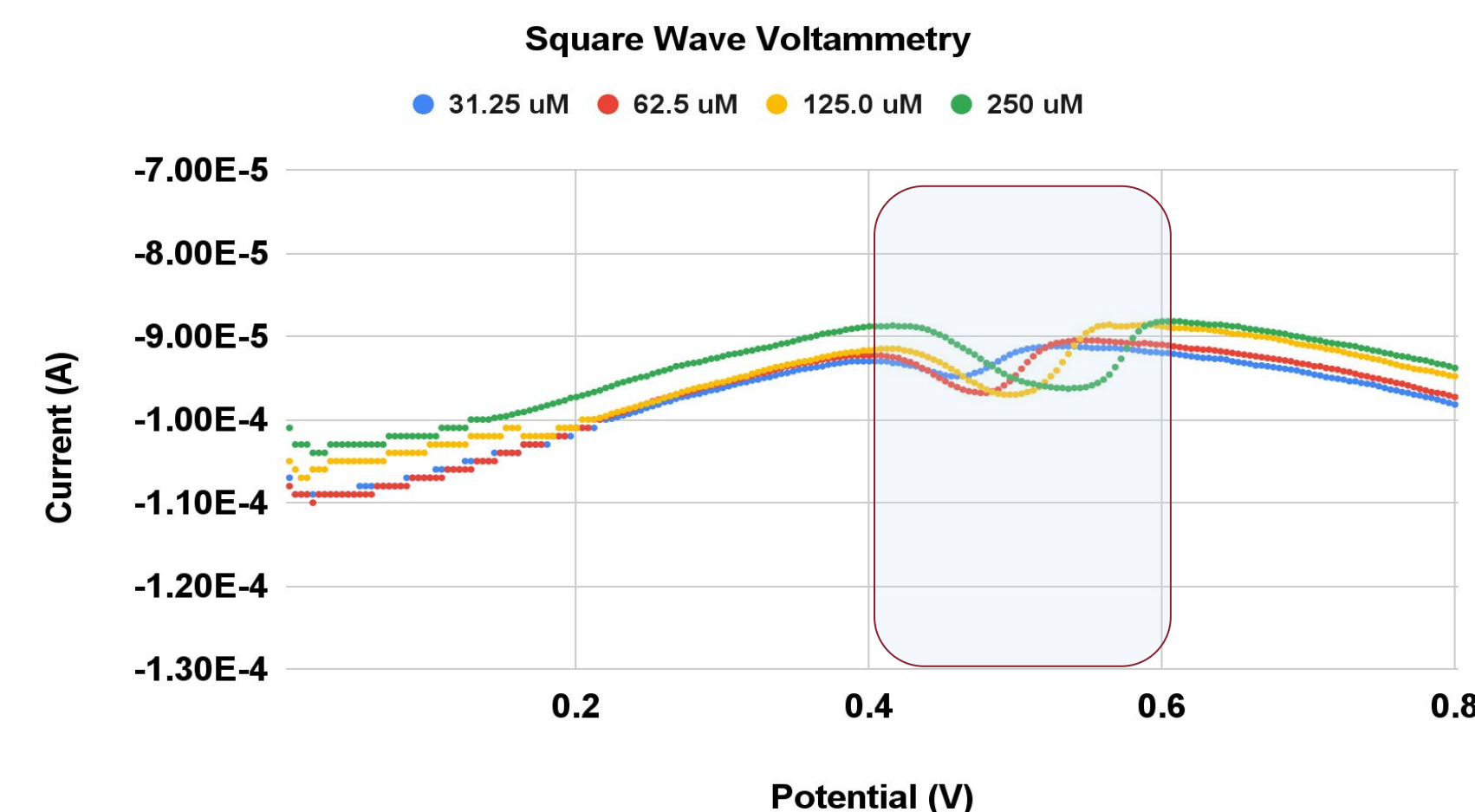


Flexible Sensor

Cyclic Voltammetry Comparison



Uric Acid Detection via Square Wave Voltammetry



Decrease in the chart identifies the concentration of Uric Acid that is present

Next Steps for You & Advice for Future SHINE Students

Next steps:

- Improve detection limit to develop point-of-care prevention device for uric acid build up.
- Develop compact, portable readout system for daily-use



Hints for SHINE:

- Complete tasks
- ask questions
- Interact with lab mates and others

Acknowledgements

I would like to thank those who gave me the opportunity to even step foot into this opportunity, Steven Dorfman. Along with Dr. Maral Mousavi, Victor Ong, Ali Soleimani, and Farbod Amirghasemi.

References

- professional, C. C. medical. (n.d.). Hyperuricemia (high uric acid level): Symptoms, causes & treatment. Cleveland Clinic. <https://my.clevelandclinic.org/health/diseases/17808-hyperuricemia-high-uric-acid-level>
- Gout. NHS inform. (n.d.). <https://www.nhsinform.scot/illnesses-and-conditions/muscle-bone-and-joints/conditions/gout#:~:text=Gout%20is%20caused%20by%20a,red%20and%20swollen>
- Mayo Foundation for Medical Education and Research. (2022, November 16). Gout. Mayo Clinic. <https://www.mayoclinic.org/diseases-conditions/gout/diagnosis-treatment/drc-20372903>
- Gouty arthritis: Guidelines for Management published by ACR. Hospital for Special Surgery. (n.d.). https://www.hss.edu/conditions_guidelines-for-management-of-gouty-arthritis.asp#:~:text=In%20gout%20patient%20the%20goal,surface
- Bishnu Prasad Devkota, M. (2022, March 18). Uric acid. Reference Range, Interpretation, Collection and Panels. <https://emedicine.medscape.com/article/2088516-overview#?form=fpf>
- Gouty arthritis: Guidelines for Management published by ACR. Hospital for Special Surgery. (n.d.). https://www.hss.edu/conditions_guidelines-for-management-of-gouty-arthritis.asp#:~:text=In%20gout%20patient%20the%20goal,surface
- Bishnu Prasad Devkota, M. (2022, March 18). Uric acid. Reference Range, Interpretation, Collection and Panels. <https://emedicine.medscape.com/article/2088516-overview#?form=fpf>