Introduction to Research Workshop

Shreya Pawar

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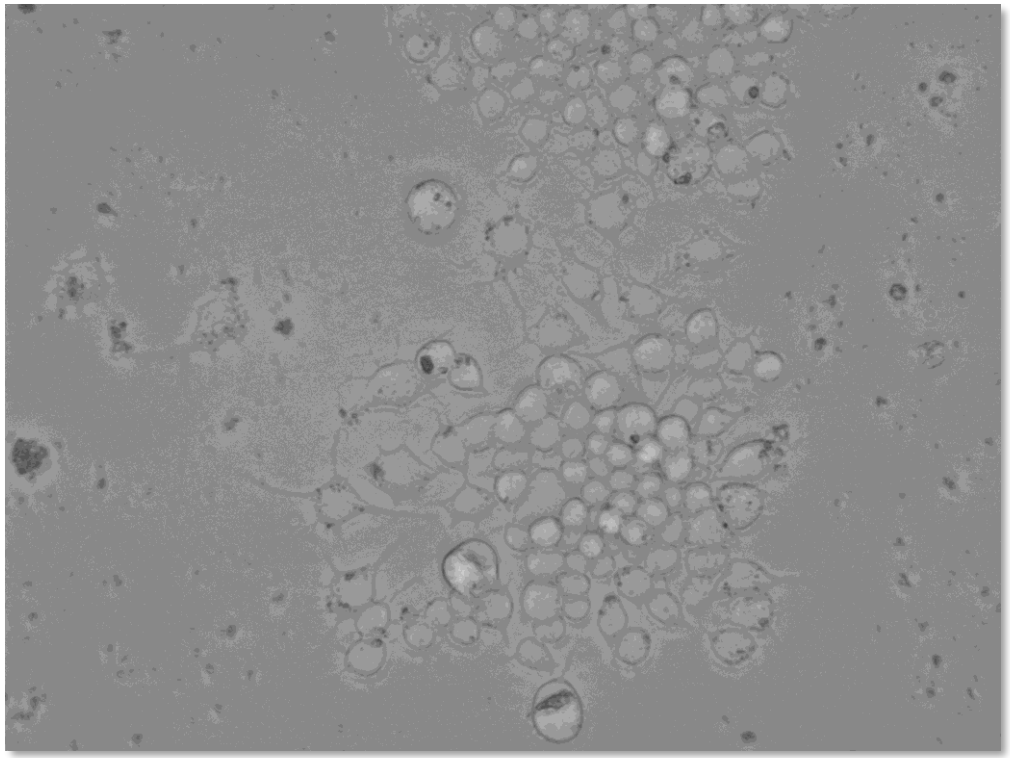
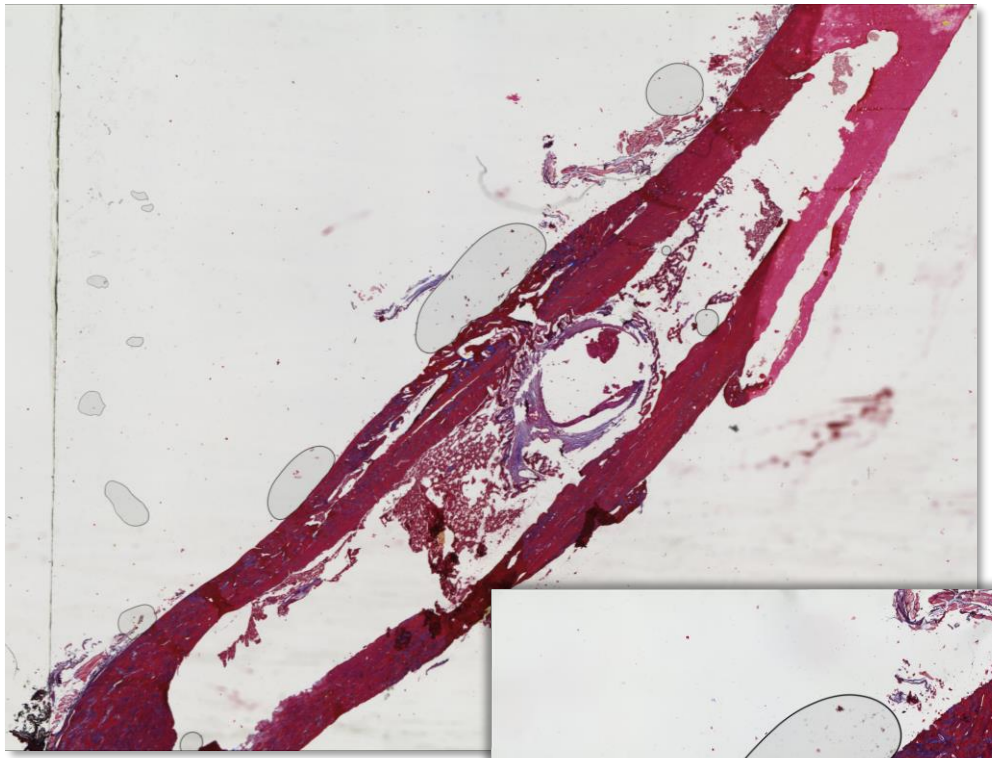
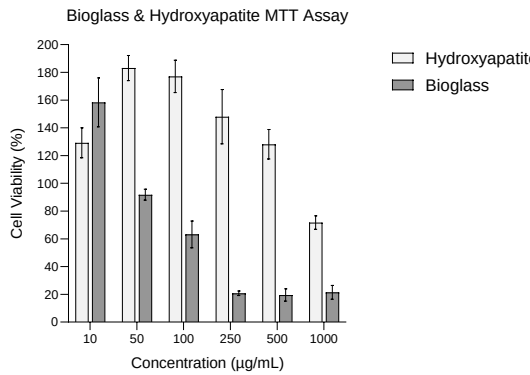
September 27, 2023






Bioglass & Hydroxyapatite MTT Assay
Hydroxyapatite
Bioglass
Cell Viability (%)
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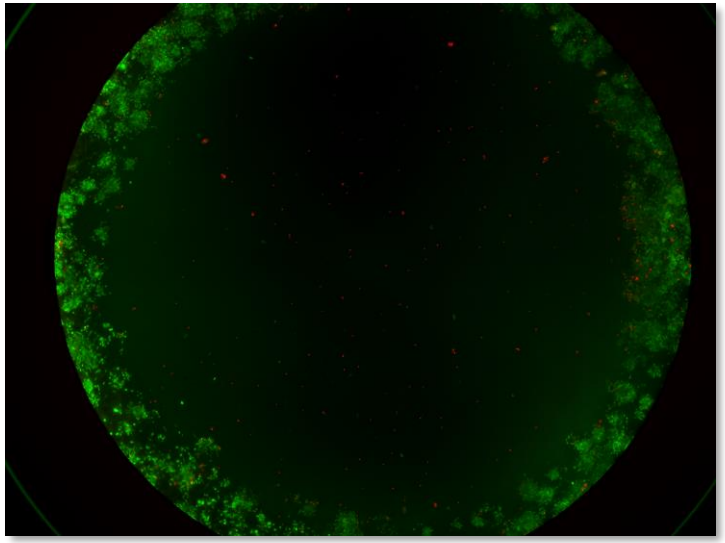
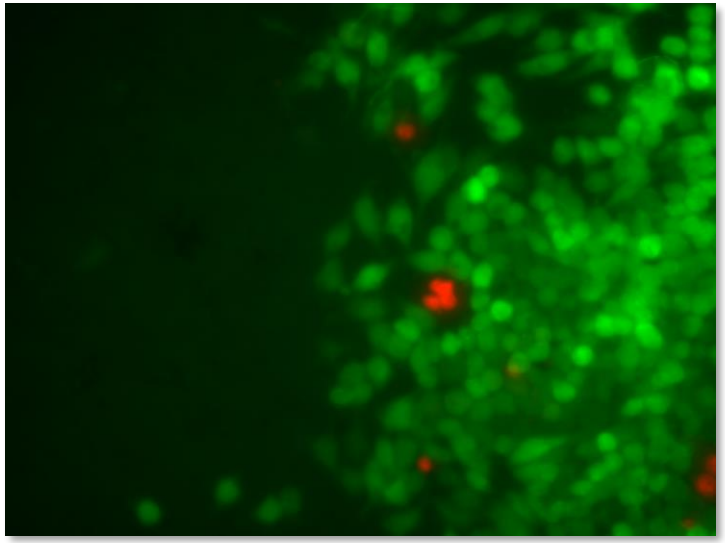
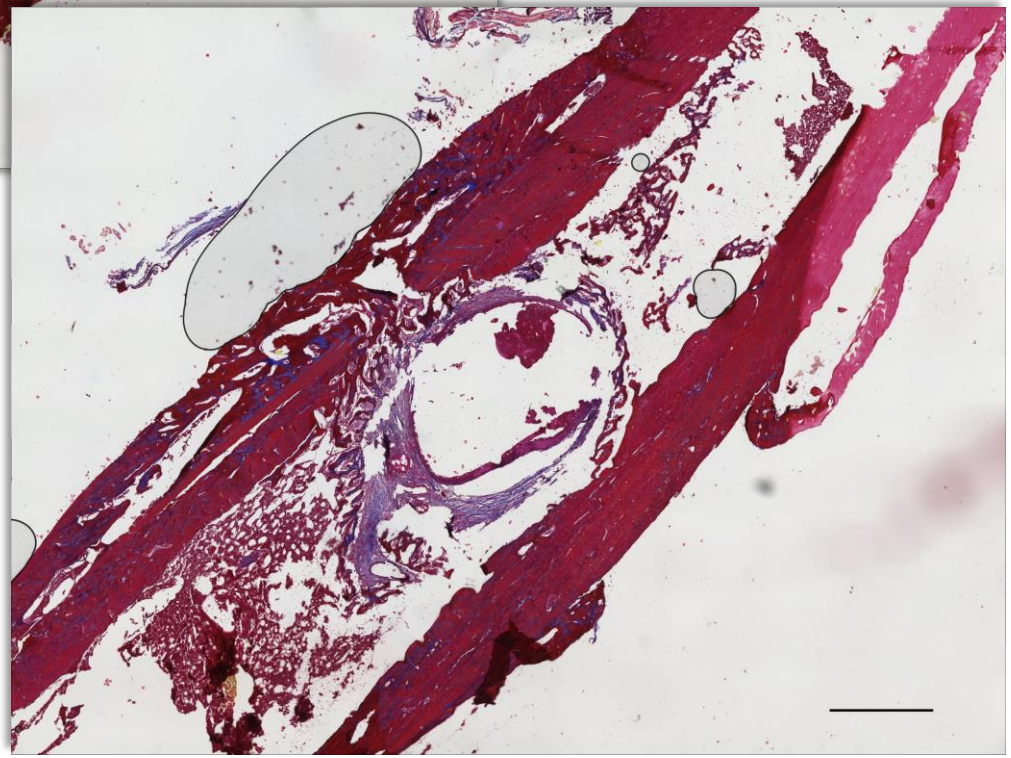
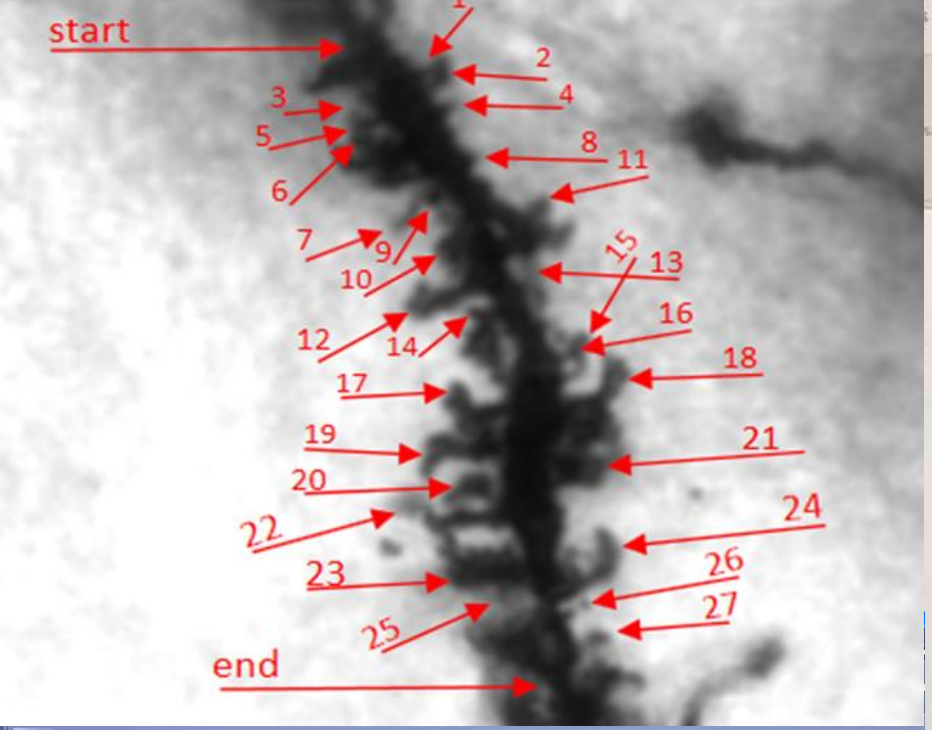
Concentration (µg/mL)








start
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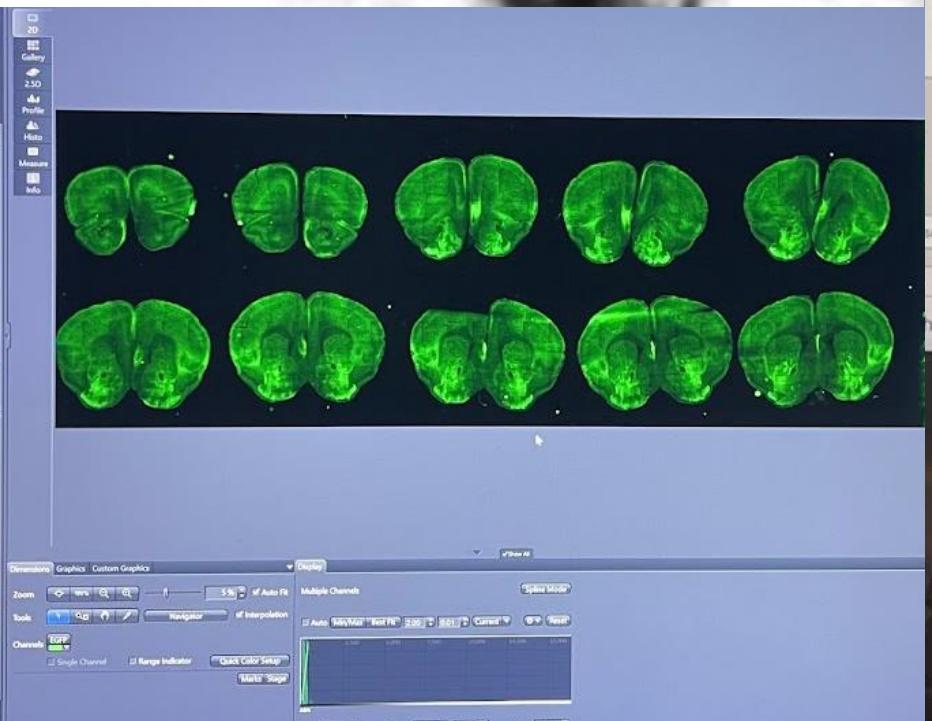

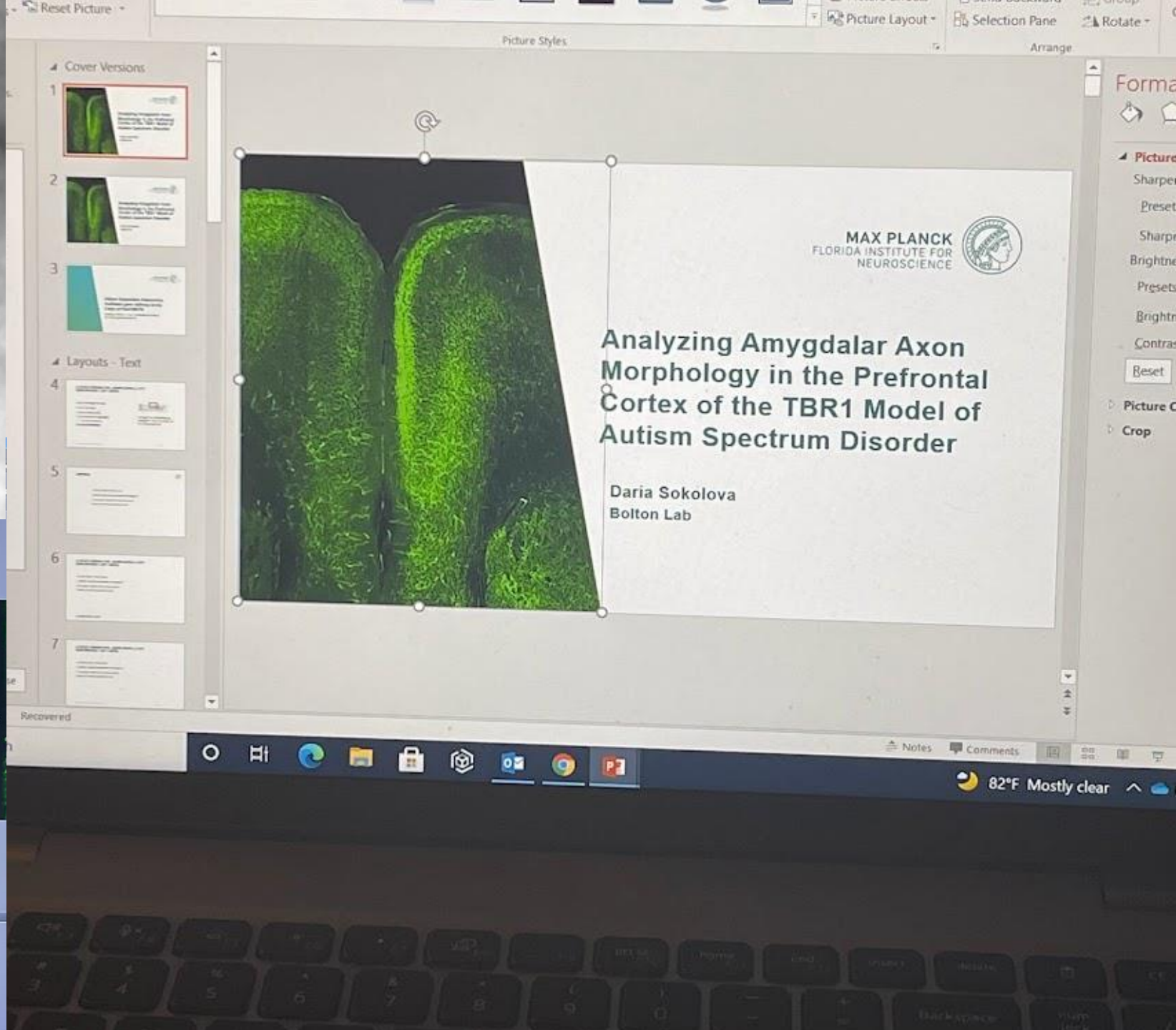
Reset Picture
Picture Layout
Selection Pane
Rotate
Picture Styles
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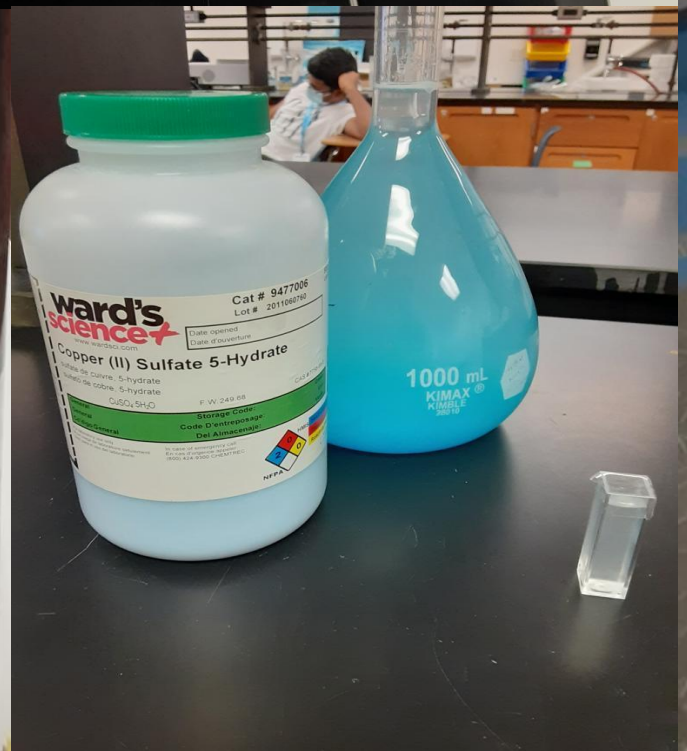
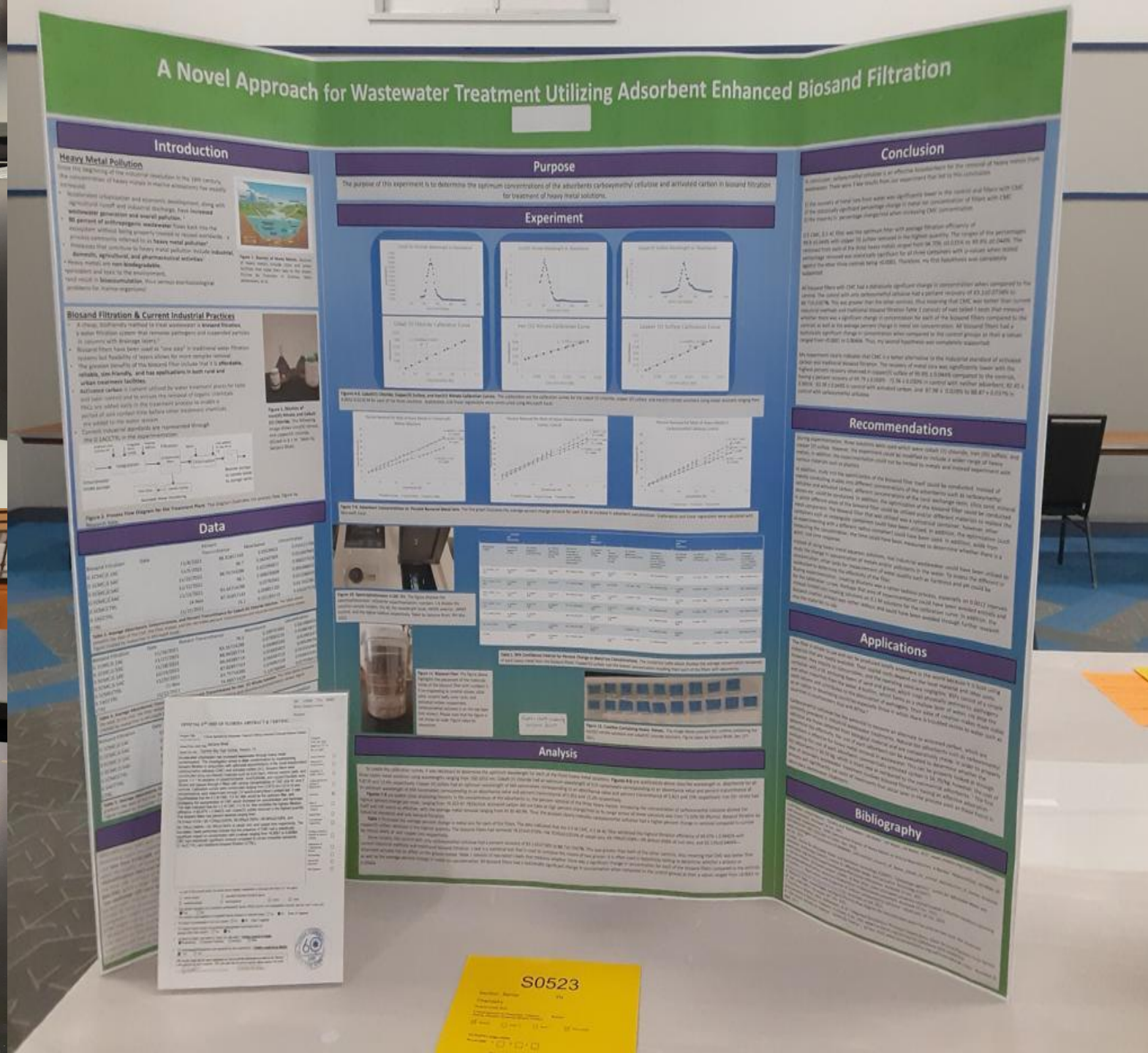
Cover Versions
Layouts - Text
MAX PLANCK
FLORIDA INSTITUTE FOR
NEUROSCIENCE
Analyzing Amygdalar Axon Morphology in the Prefrontal Cortex of the TBR1 Model of Autism Spectrum Disorder
Daria Sokolova
Bolton Lab
Recovered
Notes
Comments
82°F Mostly clear


ward's science
Cat # 9477006
Lot # 201106760
Copper (II) Sulfate 5-Hydrate
1000 mL
KIMAX
KIMBLE


A Novel Approach for Wastewater Treatment Utilizing Adsorbent Enhanced Biosand Filtration
Introduction
Heavy Metal Pollution
Biosand Filtration & Current Industrial Practices
Purpose
Experiment
Data
Analysis
Conclusion
Recommendations
Applications
Bibliography
S0523

I. What is research?

Research is...inquiry to discover information.

Employing biomimicry through bird claw morphology in next generation prosthetics

Developing a nanobubble-based gene delivery system for treatment of osteoporosis

Investigating the relationship of race and ethnicity concordance in physician-patient communication

Demonstrating the impairment of lymphocyte function due to metabolic dysregulation in severe COVID-19 infections

What types of research can I do?

- Broad types of research:
  - Wet Lab: In-person procedures involving physical samples and hands-on experimentation
    - Translational Research
  - Dry Lab: Processing any data collected from experimentation and drawing conclusions: statistics, data analysis, and even engineering based
    - Clinical Research

Undergraduate Research Experiences

- Helping with research
- One semester
- Gain an experience
- Learn some skills

- Deep Independent Research
- Numerous years
- Capstone project
- Publications
- Presentations

II. Why get involved in research?

Why get involved in research?

- Research is very important for the application: The MSAR[1] database reports that in most medical schools, over **70%** of accepted applicants have some research experience.
- **44%** of medical schools in 2016-2017 had a curriculum that contains a research component.[2]
- Research has importance beyond the medical school application.
  - Open the door to new opportunities.
  - Pursue your interests and gain new insights.
  - Apply the information learned in classes.

1. Medical School Admission Requirements
2. 2016-2017 LCME
Annual Medical School Questionnaire Part II[2]

Reasons to conduct research!

1

Knowledge & Skills

Academic and future success

2

Mentorship and Guidance

Faculty support through disciplinary and career exploration

3

Funding and Opportunities

Scholarships, stipends, course credit, and competitive edge

4

Post-Graduation Preparation

Focus career goals, helps develop key experiences and networks

III. How do you find the right research?

Research is research

- Consider another discipline
  - If you are going into medical school, this may be a good time to consider another interest of yours and pursue that
  - Could be complementary to medical education
- Consider clusters
- You need to show commitment and sincere interest to the process of learning/conducting research
  - Doing one month or two of research doesn't necessarily show that you are engaged
  - Quality of your research matters, not necessarily the rote work, discipline, etc.

How do you find the right research?

- Finding research that you are passionate about allows you to:
  - Enjoy your research
  - Bring your research to greater heights
  - Discuss thoroughly about it in an interview
  - Prevent burn out
- A two-part problem:
  - Choosing the right research
  - Finding the right PI

How do you find the right research?

- Have your interests/specific department as a starting point
- Use UCF resources: **Directories, Office of Undergraduate Research, and Research Match Week**
- Prepare your resume: 1-2 pages, relevant experiences from college
- Create an email displaying your interest and past experiences

Crafting the Email

- Informative subject line
- Formal, concise introduction including your year and major
- Inform the PI of any relevant skillsets and past experiences
- Explain why you have an interest in the lab and how that research assists you in accomplishing your academic goals
- Schedule a meeting and/or arrange a time with the PI's office hours
- Attach your resume and unofficial transcript
- Sample emails on next slide!

The email

Dear Dr. **[Appropriate Title],**

Hello, my name is **[Insert Full Name]** and I am a **[College Year]** student majoring in **[Insert Major].** I heard about the research you are doing in **[specific research topic]** from the department website. I have taken a few classes related to the field **[Inset classes that may apply]** and have already completed my CITI Training **[or other relevant safety training that may be needed]**.

I became interested in this topic after doing a study abroad opportunity that allowed me to be exposed to the different political systems in Europe and how they affect health care systems. I became curious to see how integration of politics and health care can affect community health. After reading the paper you published in 2014 **[cite title],** I am extremely interested to learn more about your area of study.

I would like to further discuss possible research opportunities you may have if you have any appointment times available. I have attached my resume to this email. Thank you for taking the time to read this email and I hope to hear back from you soon.

Sincerely,
[Sign Full Name]

[Email signature:]
Name
Major
Program (if a scholarly program, or hold some higher position)
Preferred form of contact

The email

Subject: Nanobubble-based Gene Delivery Undergraduate Research Opportunity August 23, 2023

Good afternoon, Dr. Razavi,

I am Sanjana Bhatt, an incoming freshman majoring in Biomedical Sciences and a part of the 8-year Burnett Medical Scholars program at UCF. I am very interested in bubble-based drug/gene delivery systems, and I am seeking an undergraduate research position in your lab.

As an aspiring doctor, I have been searching for research opportunities concerning the intersection of nanotechnology and targeted drug/gene/oxygen delivery to treat various neurodegenerative and bone diseases. Upon reviewing your research in the development of nanobubble-based gene delivery for osteoporosis treatment, I found it fascinating because of 1) the synthesis of nanobubbles themselves and 2) the series of biocompatibility tests using human bone-marrow cells which ultimately suppressed the degenerative osteoclasts. I find your research to be the perfect intersection of nanotechnology and immunology, my two most significant interests.

I have significant experience in chemistry research and consider myself proficient with skills such as Excel and UV spectrometry. I have performed t-tests, created confidence intervals, determined margins of error, and conducted other forms of statistical analyses through Excel to determine whether there are statistically significant differences between control groups and test groups.

I have also presented chemistry research on regional, state, and international levels. I presented “A Novel Approach to Wastewater Filtration” at the International Science and Engineering Fair in Atlanta, Georgia in 2022. One may review the abstract to my project here: [link to abstract]

I would appreciate the chance to talk to you about your research with nanobubble-based gene delivery and possibly refer me to papers that give me a greater background specific to your research?

I would love to meet you whenever you are available or in your office hours. My phone number is (954)-383-1647. I have attached my resume and LinkedIn profile. Please let me know if there is any other information I can provide. I look forward to talking to you soon.
Sincerely,
Sanjana Bhatt
sa914437@ucf.edu
[LinkedIn profile]
[Resume attachment]

Interview with the PI

- Coordinate availability
- Clearly display your research interests
- Focus on your past experiences in research
- Prepare questions:
    - What types of experiments are used to investigate the topic?
    - Where can I read more about the project?
    - What will be my responsibilities in the lab?

IV. What opportunities are at UCF?

Starting Research Programs at UCF

- UCF Research and Mentoring Program (RAMP)
- L.E.A.R.N.
- McNair Scholars
- Summer Undergraduate Research Fellowship (SURF)
- Summer Research Academy (SRA)
- For more information about research programs, feel free to browse the Office of Undergraduate Research's official website: https://academicsuccess.ucf.edu/our/

Starting at the Lab

- Before starting, review articles surrounding your lab's projects
- Make sure to complete the lab safety modules (required before starting lab work)
- Go over basic biology and chemistry topics you believe will be useful
- Working at a lab is comparable to a part-time job; typically requires 8-12 hours a week and a flexible schedule*

V. Closing remarks

Our Research Experiences: What We've Learned

Questions?

Feel free to contact us at research@premedamsa.com

Don't forget to sign in!!