



**FALL 2023**

**Biochemistry and Molecular Biology  
Brown Bag Series**

**iGEM**

*“iGEM-WrightState Deconta-Mn-ate:  
Advancing Manganese Detection”*

**Tuesday, October 24, 2023**

**11:00 AM**

**135 Oelman Hall**

**Lab: Madhavi Kadakia, Ph.D.**



Boonshoft  
**School of Medicine**  
WRIGHT STATE UNIVERSITY



**WRIGHT STATE**  
UNIVERSITY

<https://science-math.wright.edu/biochemistry-and-molecular-biology>

## **Abstract:**

The iGEM-WrightState Deconta-Mn-ate research project is to address the urgent issue of manganese contamination in drinking water. The project is a multidimensional endeavour that combines cutting-edge research, social outreach and collaboration to address the important global water quality issue. Our goal is to provide innovative solutions for water testing and to inspire scientists and citizens to join us in this vital cause.

Our project builds upon our 2022 development of an *E. coli*-based biosensor capable of detecting down to 0.01mM (0.5ppm) manganese. Our 2023 team adapted the biosensor to a cell-free approach, reducing assay time from 24 hours to 2 hours. We also incorporated a NanoLuciferase reporter which significantly increased the magnitude of the response to manganese and enabled imaging with a mobile phone. Finally, we designed a 3D-printed luminescence imaging device to improve the fieldability of our manganese test.

Our project extends beyond the laboratory, as we actively engage with the global iGEM community and the public through social media. Further, our commitment to public engagement and outreach is exemplified by our collaborative efforts with the Boonshoft Museum of Discovery, The Ohio State University and the Center of Science and Industry. Through these initiatives, we aim to raise awareness about manganese contamination and promote scientific literacy.