

# Title: Repair of a MALDI-Time-of-Flight Mass Spectrometer Used in Chemical and Biochemical Research at the University of Wyoming

PI John Hoberg Chemistry, CEPS

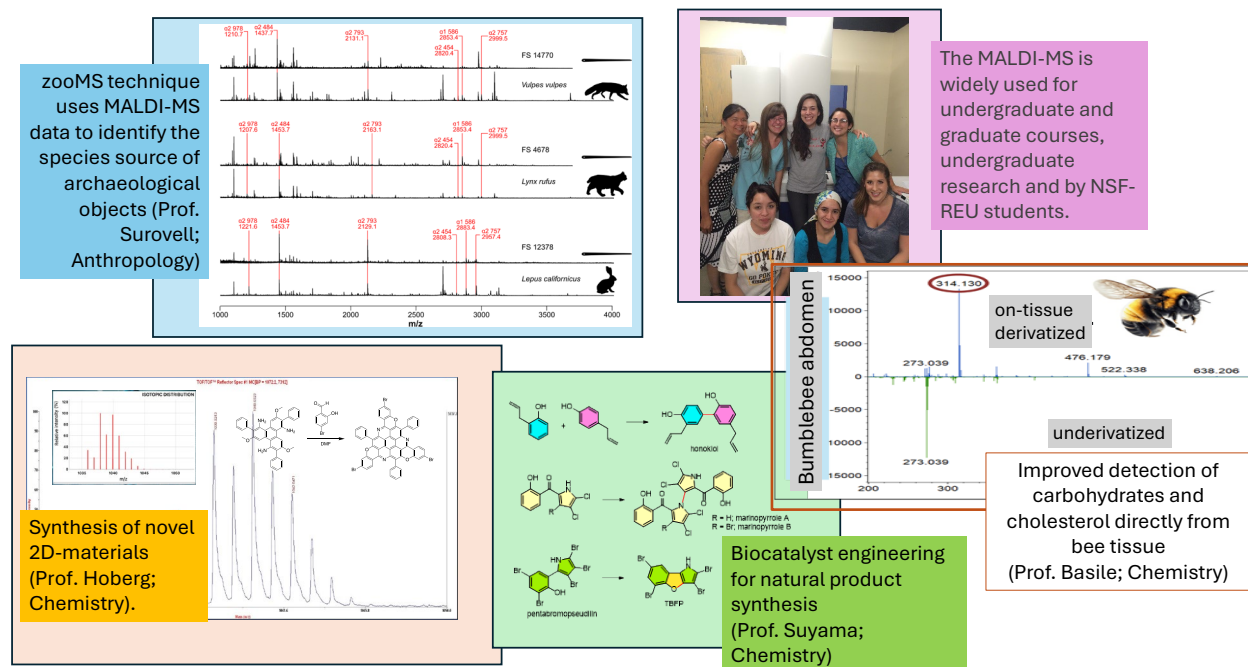
Co-PIs: See complete list in table

Total amount requested: \$ 73,311.45

## Project Description

**What is being requested:** This proposal requests funds to repair a MALDI-Time-of-Flight Mass Spectrometer instrument (a.k.a., 'MALDI-MS') currently housed in the Physical Science bldg. This instrument was purchased with funds from an NSF-MRI grant in 2015 and operated under an Open-Access model, that is, the instrument is accessible to all investigators at UW (see partial list in Table). Unfortunately, a recent power failure caused damage to the computer/instrument boards crucial for the operation of the MALDI-MS. The repair consists of replacing acquisition boards in the computer and performing software and hardware adjustments for proper operation by a manufacturer technician (see attached quote from Sciex).

**Why is being requested:** The MALDI-MS instrument has been in operation since 2015 and has required very little maintenance, mainly due to the robustness of this type of MS instrument. The MALDI-MS instrument is an indispensable research tool to any laboratory across campus and the CEPS. Specifically, it is used to determine the molecular weight of compounds (in synthetic Organic Chemistry) and/or the molecular weight distribution of a wide range of samples (coal derived products, molasses, asphalt, etc.). Currently, there are at least 8 research laboratories across campus that use the MALDI-MS instrument for their research (complete list below; Some examples of projects shown in the figure below).



As part of the Open-Access management of this instrument, the Basile Lab provides training to all students requiring access to use this instrument for their research.

Support for the prompt repair of the MALDI-MS instrument is vital for the continued progress of World-Class research at UW -impacting at least 8 investigators (all with limited budgets) and their graduate students- and facilitating undertaking new projects and seeking new funding opportunities.

***How the proposal will benefit the College:*** The MALDI-MS instrument provides low and high molecular weight (MW) measurement capabilities that makes it an indispensable research tool for any investigator at UW. Currently, *the accessibility and use to the MALDI-MS is directly contributing to two of the goals of the Tier 1 Engineering Initiative:*

**World-Class Research and Graduate Education:** The availability of the MALDI-MS at UW enables research in any laboratory over a wide range of applications and field of work, and it is an indispensable tool in chemical synthesis. For example, the Hoberg group uses MALDI-MS to guide the synthesis of 2D membranes for separations and graphitic materials, while the Suyama group employs it in natural product synthesis. The Basile lab utilizes the MALDI-MS in the development of novel techniques for the analysis of metabolites in soil and insect tissue (bees). Prof. Maohong Fan and Dr. Roberta Sabino utilize the MALDI-MS system to obtain MW distributions of their samples (coal and molasses by-product, respectively). Prof. Surovell's research utilizes the MALDI-MS instrument to identify the animal source of archaeological bone fragments (work recently featured in CNN; see link below). A full list of collaborators is shown in the table below.

**Current Research Projects Using the MALDI-MS system at the University of Wyoming:**

PI	Dept/College	Project using the MALDI-MS	Funding agency
Hoberg/Brant/Oliveira	Chemistry/CEPS	Molecular filter synthesis	NSF-DMREF
Hoberg/Zhou/Leonard		Enhanced rare earth production	UW Energy Materials Center
Basile	Chemistry/CEPS	Imaging-MS, undergraduate res	NSF (pending)
Li	Chemistry/CEPS	Polymer synthesis	
Suyama	Chemistry/CEPS	Natural products, Organic synthesis	NSF, NIH-INBRE, NIH (submit Jan 2025)
Surovell	Anthropology/A&S	zooMS: bone identification*	NSF (pending)
Sabino	Chem. Eng./CEPS	Up-cycling/molasses	USDA (pending)
Fan	Chem. Eng./CEPS	Up-cycling/coal	DoE
Adams	WRI	Up-cycling/coal-asphalt	WRI

\*Article in CNN: <https://www.cnn.com/2024/12/04/science/ancient-needles-discovery-wyoming/index.html>

**Excellence in Undergraduate Education:** Because of the ease of use and robustness of this instrument, the MALDI-MS is widely utilized for demonstrations and hands-on measurements in undergraduate and graduate courses, including CHEM4230 Instrumental Chemical Analysis, CHEM5200 Mass Spectrometry, Chemistry Undergraduate Research (Hoberg, Basile, Suyama, Li), NSF-REU program (Chemistry) and undergraduate research support to Norwest College (Powell, WY) Chemistry Capstone projects (Prof. Uko Udodong, Advisor).

**Budget:**

(see attached quote from Sciex)

1.1 SV000009 Billable Labor 40 535.40 535.40	21,416.00
5800 - BA21701410 Issue: Not Communicating	
2.1 SV000064 ZONE 3 STANDARD TRAVEL CHARGE 1 2,375.20 2,375.20 2,375.20	
3.1 SV000029 SV Daily Travel 4 1,069.71 1,069.71	4,278.84
4.1 1023755 MODULE* PCI CANBUS CARD CAN-PCI 226 1	2,097.43
5.1 1033604 DIGITIZER* DUAL-CHANNEL 1GHZ 2GS PER SECOND	40,427.10
6.1 1027941 Opti-TOF Cal Mix 5 Calibration Insert 1	1,282.37
Opti-TOF Cal Mix 5 Calibration Insert compatible with 5800, 4800 instruments	
7.1 1027943 Opti-TOF TIS Calibration Insert 1	1,434.51
	Quotation Total 73,311.45 USD



# Service Estimate

**AB SCIEX LLC**  
**1201 Radio Rd**  
**REDWOOD CITY, CA 94065-1217**  
**United States**

Tele : +1 (877) 740-2129 opt 1  
 Fax : +1 (650) 631-4803  
 Email : sales.americas@sciex.com

Quote Number	12217490
Account Number	51365
Quote Date	20-DEC-2024
Valid To	19-MAR-25
Freight Terms	SX - Prepaid and Add
Free On Board	Factory
Payment Terms	Net 30 days
Taxable	No
Sales Representative	No Sales Credit
Administrator	Audrey Meneses

**To:**

Franco Basile  
 University of Wyoming  
 1000 E University Ave  
 School of Pharmacy  
 LARAMIE, WY 82071  
 United States

Tele :  
 Fax :  
 Email : Basile@uwyo.edu

Item No	Part Number	Description	Duration	Quantity	Unit List Price	Unit Net Price	Total Extended Price
1.1	SV000009	Billable Labor 5800 - BA21701410 Issue: Not Communicating		40	535.40	535.40	21,416.00
2.1	SV000064	ZONE 3 STANDARD TRAVEL CHARGE		1	2,375.20	2,375.20	2,375.20
3.1	SV000029	SV Daily Travel		4	1,069.71	1,069.71	4,278.84
4.1	1023755	MODULE* PCI CANBUS CARD CAN-PCI 226		1	2,097.43	2,097.43	2,097.43
5.1	1033604	DIGITIZER* DUAL-CHANNEL 1GHZ 2GS PER SECOND		1	40,427.10	40,427.10	40,427.10
6.1	1027941	Opti-TOF Cal Mix 5 Calibration Insert Opti-TOF Cal Mix 5 Calibration Insert compatible with 5800, 4800 instruments		1	1,282.37	1,282.37	1,282.37
7.1	1027943	Opti-TOF TIS Calibration Insert		1	1,434.51	1,434.51	1,434.51

Sub Total	73,311.45	USD
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Quotation Total	73,311.45	USD



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Fax : +1 (650) 631-4803  
Email : sales.americas@sciex.com

Quote Number	12217490
Account Number	51365
Quote Date	20-DEC-2024
Valid To	19-MAR-25
Freight Terms	SX - Prepaid and Add
Free On Board	Factory
Payment Terms	Net 30 days
Taxable	No
Sales Representative	No Sales Credit
Administrator	Audrey Meneses

Sales tax will be included, if applicable, at time of invoice.

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