

Expansion of CEPS-ChBE Shared Facilities Through Equipment Upgrades and Repairs

Proposal team leader: Saman A. Aryana, Professor and Head of Department

Department: Chemical and Biomedical Engineering, CEPS

Total Amount Requested: \$59,826

Project Description: This proposal seeks funding on behalf of the Department of Chemical and Biomedical Engineering (ChBE) to upgrade and repair two critical pieces of equipment: a Gas Chromatograph (GC), currently non-operational, and a Dynamic Light Scattering (DLS) instrument that is approximately two decades old and in need of replacement. This request aligns with a departmental initiative launched in Fall 2023 to establish and maintain a shared analytical and experimental facility. This facility will support students and researchers in ChBE and across CEPS for both instructional purposes and research projects. The shared labs currently house BET units, Furnaces, and Induction Heaters, and will soon include a PVT Cell.

The upgraded instruments will significantly enhance students' experiences in chemical engineering courses such as Transport Phenomena, Reaction Engineering, Separations, and Materials Science, as well as laboratory courses like Unit Operations Lab and Process Design and Control. Consequently, this proposal directly supports two goals of the Tier 1 Engineering Initiative: Excellence in Undergraduate Education and World-Class Research and Graduate Education.

Additionally, the department's active engagement with industry partners, leveraging expansions of its Process Controls and Simulations Lab, has initiated ongoing negotiations with the UW Foundation to secure a \$100,000 donation from HF Sinclair in support of its Process Controls and Instrumentation minor. This proposal will further bolster Productive Economic Development through Partnerships by contributing to ChBE's teaching and research capabilities, thereby attracting additional industry collaborations, improving student recruitment and retention, and fostering sustainable career pathways for students.

Student program fees will support equipment use for instructional purposes, and the department will develop a sustainable plan in Fall 2025 to fund the labs' maintenance needs in support of research projects.

Equipment Details:

1. Gas Chromatograph (GC): Clarus 500

This instrument is currently non-functional. Once repaired, it will enable the separation of individual components of a mixture based on volatility and their interaction with the stationary phase in the column. A GC detector measures the concentration of compounds, producing chromatograms with peaks proportional to their quantities.

Applications include use in research on complex fluids and integration into core Chemical Engineering courses, enabling hands-on learning in experimental methods, data analysis, reaction product quantification, separation principles, and reaction kinetics.

Repair Estimate: \$16,022, covering a service kit for the digital display, miscellaneous parts, freight, and fuel surcharges (as quoted by PerkinElmer U.S. LLC). The College Facilities

Manager, Joe Rovani, confirmed via email that space, power, and other requirements are met to support the equipment. Once repaired, this GC will serve as a shared resource for faculty, researchers, and students, addressing a critical gap in college-wide access, as existing units are housed in restricted labs.

2. Dynamic Light Scattering (DLS) Instrument: NanoBrook Series

The existing instrument, approximately two decades old, produces unreliable measurements, and replacement parts are no longer available. Brookhaven Instruments offers a 20% discount on a new NanoBrook 90Plus PALS Bundle through a replacement program.

Capabilities of the New Instrument: The instrument measures particle size and zeta potential with high accuracy, even in challenging environments (e.g., high salt concentrations, organic solvents). The instrument's enhanced sensitivity enables measurements with standard deviations of less than $\pm 1.5\%$ over very short time scales (<10 seconds). A 40mW solid-state red diode laser with a wavelength of 640 nm is included in the basic configuration and can be changed at any time in the future if a different wavelength is needed.

Quote for Replacement: \$43,804. This budget includes \$43,504 for a nominal 40mW @ 640nm temperature-controlled semiconductor laser, Particle Solutions software, plus \$300 for delivery via FedEx 2nd Day, as confirmed in correspondence with the Brookhaven Instruments Regional Sales Engineer. The College Facilities Manager, Joe Rovani, confirmed via email that space, power, and other requirements are met to support the equipment.

This new DLS will provide cutting-edge capabilities to faculty, researchers, and students, advancing both research and instruction. Existing DLS units on campus are housed in restricted labs with lengthy access request processes, significantly limiting their usability.

Project Impact:

The upgraded instruments will enable the following benefits:

1. **World-Class Research and Graduate Education:**
 - Enhance faculty and student capabilities to collect preliminary data for grant proposals.
 - Support advanced experimental techniques, such as rheological measurements and trace detection.
 - Facilitate interdisciplinary research with other departments, including Chemistry and the School of Energy Resources.
2. **Excellence in Undergraduate Education:**
 - Integrate state-of-the-art equipment into laboratory courses, enriching hands-on learning experiences for undergraduate students.
3. **Productive Economic Development through Partnerships:**
 - Strengthen industry collaborations by enhancing the department's research and teaching infrastructure, attracting external funding, and fostering industry-aligned career pathways for students.

The proposed repairs and upgrades align with the Tier 1 Engineering Initiative's goals by expanding ChBE's shared facilities, fostering interdisciplinary research, and supporting CEPS and UW's broader mission to provide world-class education and research opportunities.



300 Innovative Way, Suite 222, Nashua, NH 03062, USA
 www.brookhaveninstruments.com
 +1 (631) 758-3200

QUOTE

Quote No.: **Q000623**
 Quote Date: 12/2/2024
 Expiration Date: 3/3/2025

PREPARED FOR:
University of Wyoming WY United States of America Attn: Saman Aryana Email: saryana@uwoyo.edu

PREPARED BY:	EMAN MIQDADI, EMIQDADI@BROOKHAVENINSTRUMENTS.COM		
ESTIMATED LEAD TIME:	4 - 6 Weeks	PAYMENT TERMS:	N30
SHIP METHOD:	FEDEX 2ND DAY	FOB:	EXWORKS NASHUA, NH

QTY	PART ID	ITEM DESCRIPTION	UM	DISCOUNT	UNIT PRICE	EXTENDED PRICE
1	C1003384	NanoBrook 90Plus PALS Bundle NanoBrook 90Plus PALS Bundle includes the 90Plus PALS Submicron Particle Sizer (DLS) and Zeta Potential (PALS & ELS) Analyzer, a nominal 40mW @ 640nm temperature controlled semiconductor laser, and Particle Solutions software. This bundle also includes: <ul style="list-style-type: none"> •BI-SREL electrode assembly for all organic solvents and aqueous solutions •BI-ZR5 (44 ± 8 MV) zeta potential verification material •(3) BI-SCP 100 plastic cells/caps •BI-ELECCK electrode cleaning kit •BI-SCGO Box of 10 open glass square cells for use with BI-SREL electrode. •BI-SVK92 (92 ± 3 nm) particle size reference standard Windows compatible computer (required) and on-site installation are not included	EA	\$10,876.00	\$54,380.00	\$43,504.00

Quote Total: \$54,380.00
Total (USD): \$43,504.00

We are pleased to submit the above quotation for your consideration. This quote is subject to and expressly conditioned upon customer's acceptance of Brookhaven Instruments Corporation ("Brookhaven") standard Terms and Conditions located at <http://www.brookhaveninstruments.com/purchasing-terms-conditions/> as evidenced by customer's issuance of a purchase order for product(s), customer's acceptance of any product under the purchase order, or customer's payment for any product under the purchase order. Additional or different Terms & Conditions (including those that may be contained in customer's purchase order) shall be void and of no effect unless a written agreement to the contrary is provided by Brookhaven. Any commodities, technology or software covered by this quote will be transferred or exported in accordance with the U.S. Export Administration Regulations and the Foreign Assets Control Regulations. Diversion contrary to U.S. law is prohibited.

This quote is valid for 60 days. All prices are quoted in USD. This quote is confidential between the addressee and Brookhaven Instruments Corporation.



PerkinElmer U.S. LLC
 710 Bridgeport Avenue
 Shelton, CT
 06484-4794
 United States
 PHONE: (855) 726-9377 FAX: (203) 266-1072
 www.perkinelmer.com

Reference Number
 WO-03019441

Date
 12/12/2024

Activity Code
 Repair

Expiry Date
 01/11/2025

Customer Contact
 Alex Kapeller
Phone Number
 3077010021
Email
 akapelle@uwyo.edu

Fax Number
 N/A

Service Estimate

Ship To:
 UNIVERSITY OF WYOMING
 16TH & GIBBON ST
 LARAMIE WY 82071 US

Bill To:
 UNIVERSITY OF WYOMING
 1000 E UNIVERSITY AVE
 LARAMIE WY 82071 US

Model	Serial Number	Requested Start Date	
CLARUS500GASCHROM	650N6021401	N/A	1 of 1

Estimate Description

Quoted By: Billable Service team

This is an ESTIMATE for the repair of 650N6021401-CLARUS 500 GAS CHROMATOGRAPH 120V,50/60H. This proposal attempts to estimate charges as accurately as possible based on what is known about the issue. If included, a base service charge covers up to 6.0 full hours of labor & travel. If needed, additional estimated labor and travel hours are charged at an hourly rate. Estimate pricing reflects Bill To party as reported in the Work Order. Additional charges may apply for those customers using third party billing services. If additional charges are found to be needed the purchase order amount will need to be increased accordingly before further work is performed. The Service Engineer will arrive prepared with all materials suspected to be needed for a first-time resolution of a worst-case scenario. If additional time or materials are needed based on findings while on site the purchase order amount will need to be increased accordingly before further work is performed. Conversely, if time exceeding the base service charge or any materials quoted are not needed, these charges will not be included in the final invoice. If you would like to proceed with service, please call 1 855 726 9377 or reply to LAS.Service.AES@perkinelmer.com Please provide this estimate Work Order Number and purchase order information. Please ensure the vendor information on the purchase order matches the PerkinElmer address information below. The dispatch team will then schedule and order parts ASAP. PerkinElmer appreciates your business, and we look forward to working with you to reach your goals.

Quantity	Part Number	Part Description	Unit Price	Unit Discount	Total Net Price	
1	N6550125	SERVICE KIT- GC 580 DIGITAL DISPLAY	2,761.30	N/A	2,761.30	
1	SVFRT001	Freight Charge - Standard Ground	31.00	N/A	31.00	
1	SV000160	Base Service Charge	3,173.00	N/A	3,173.00	
4	SV000120	Fuel surcharge	14.00	N/A	56.00	
1	SV000080	SV - MISC PART CHARGE	10,000.00	N/A	10,000.00	
					\$ 16,021.30	
Technician Signature					Total Amount before Tax	N/A
12/12/2024 Billable Service team					\$ 16,021.30	

Customer Signature

12/12/2024

Customer Signature

Terms & Conditions
 THIS QUOTATION IS SUBJECT TO PERKINELMER'S TERMS AND CONDITIONS OF SERVICE LOCATED AT <https://content.perkinelmer.com/corporate/policies/terms-conditions-of-service.html>, WHICH IS HEREBY INCORPORATED BY THIS REFERENCE. TERMS SUBJECT TO CREDIT APPROVAL.

From: Joe Rovani Rovani@uwyo.edu 
Subject: RE: Request for Facilities Confirmation for CEPS Proposal
Date: January 2, 2025 at 8:21 AM
To: Saman Aryana saryana@uwyo.edu

JR

Hi Saman,

Thanks for sending this explanation to me for review. These are standard benchtop instruments and if you believe you have the bench footprint and laboratory power, then please proceed with your upcoming RFP. The only recommendation I have at this time is that many GC's require a dedicated power outlet for the oven, which should be on a separate circuit than the GC electronics. This requirement could vary depending on the wattage of the GC oven element, and I would suggest consulting the installation manual before powering up the GC. Good luck with your upcoming RFP and let me know if I can help should you acquire your new GC. I have decades of experience with GC, GC/MS, etc as an analytical chemist.

Happy New Year.

Joe

Joe Rovani

Facility Manager

Engineering & Physical Sciences Deans Office

EERB 401 | (307) 766-6170 | rovani@uwyo.edu



From: Saman Aryana <saryana@uwyo.edu>
Sent: Tuesday, December 24, 2024 8:03 PM
To: Joe Rovani <Rovani@uwyo.edu>
Subject: Request for Facilities Confirmation for CEPS Proposal

Hi Joe,

I hope this email finds you well.

I realize this comes during the holiday season, and I truly appreciate your understanding as I reach out at a less-than-ideal time. Unfortunately, this is my only available time to work on proposals. In this vein, I am preparing a proposal for CEPS (due January 8, 2025) to repair and upgrade two existing instruments in ChBE.

I recently noticed that the college requires "*confirmation from the College Facilities Manager, Joe Rovani (rovani@uwyo.edu), that space, power, and other requirements are met to support the equipment.*" The instruments include a currently non-functioning Gas Chromatograph and an out-of-date Dynamic Light Scattering instrument, which, if funded, would be included in the shared ChBE labs.

Between the two ChBE labs (one currently housing the BET units and the other with furnaces and induction heaters), I believe the requisite space and power needs for these instruments will be met, and I don't anticipate any renovation resulting from this project. Would you be willing to provide confirmation that the space, power, and other requirements are adequate to support these instruments?

Please let me know if I can provide any additional information to assist with your confirmation. If it would be helpful to discuss this matter in more detail, I'd be happy to meet over the phone or in person at your convenience.

I understand it's the holiday season and there is no urgency to this request.

Wishing you and your family a joyful holiday season!

Best regards,
Saman

Saman Aryana, PhD
Occidental Chair in Energy and Environmental Technologies
Professor and Head, Department of Chemical & Biomedical Engineering
Adjunct Professor, School of Energy Resources
University of Wyoming