

BNEIR NEWSLETTER

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<https://sites.dartmouth.edu/bneir/>

Biomedical National Elemental Imaging Resource



WHAT'S NEW AT BNEIR?

Keeping users up to date on everything going on at BNEIR's unique shared resource

LA-ICP-TOF-MS UP AND RUNNING

We have conducted 206.5 hours of elemental imaging on the instrument since March, working on a range of biomedical specimens including lung, liver and intestinal samples.



WHY IS LA-ICP-TOF-MS BETTER?

If you're wondering why BNEIR's new instrumentation is so much better for elemental imaging - here's a quick guide.

Consisting of two (new) instruments working together, the new bundle makes the process faster, provides more detailed images, can cover much larger samples and can provide information on every element in the periodic table. It makes benchtop elemental imaging an untargeted analytical technique.

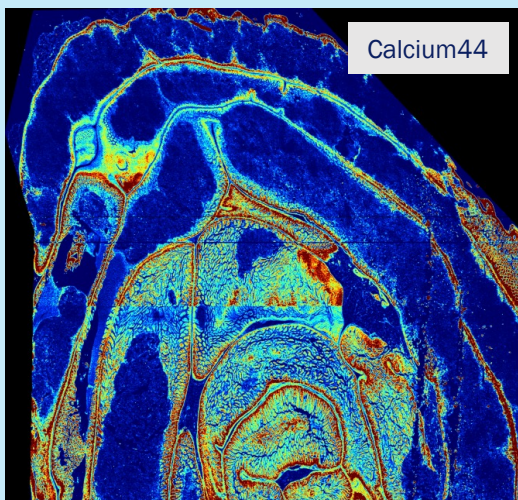
	Ablation	Detection
OLD SYSTEM	<ul style="list-style-type: none"> • MAX 20 shots/second • 213 nm: ablates glass • 4 µm minimum beam 	<ul style="list-style-type: none"> • Quadrupole: scans through masses sequentially • Targeted: choose analytes before experiment
NEW SYSTEM	<ul style="list-style-type: none"> • MAX 1000 shots/second • 266 nm does not ablate glass • 1 µm minimum beam • Imaging cup captures particulate plumes 	<ul style="list-style-type: none"> • Flight tube: accelerates ions toward detector all at once • Untargeted: "all of the elements all of the time" • See the map during analysis
	FASTER, HIGHER RESOLUTION	MORE DATA



SHOWCASING ICP-TOF DATA



Mouse intestine (right) analyzed for Kendal Hirschi at Baylor College of Medicine. FOCUS: Nutrient availability from biofortified foods.



SAMPLE SUBMISSION CHECKLIST

Send us your samples for imaging!

- **Digital manifest:** Email us an Excel spreadsheet listing your samples.
- **Simple IDs:** Use simple, non-informative IDs: e.g., 1, 2, 3: it makes the analysis unbiased (“blinded”) and prevents typos (we will re-number the digital manifest otherwise).
- **Spares:** Send us any extra/non-perfect sections so we can optimize acquisition parameters (e.g., attenuate any high abundance elements that might saturate the detector).



TOOTH DATA WORKSHOP

BNEIR and the Trace Element Analysis Core Facility at Dartmouth held a workshop on April 13, 2023, to bring together three user groups all measuring deciduous dentine to understand early life elemental exposure. The purpose of the meeting was to help users understand and work with laser ablation data and to share our method development findings, particularly mapping whole tooth sections with icpTOF. As a result, two multi-cohort collaborative publications are in progress.

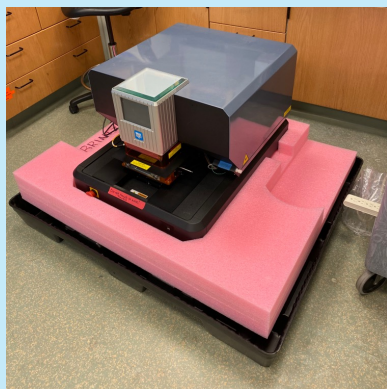


Left to Right: Modupe Coker (PI of Nigeria DOHMaIN cohort, Rutgers), Margaret Karagas (PI NHBCS cohort, Dartmouth), Brian P Jackson (BNEIR), Felicitas Bidlack (Forsyth Institute), Tracy Punshon (BNEIR), Matt Barr (BNEIR) and Marc Weisskopf (PI: MEMCARE cohort, Harvard)



NWR213 LASER DOWN

Our elemental imaging workhorse stopped functioning last month. This has been diagnosed as having a computer issue, so it may not be prudent to make such expensive repairs to a laser so close the end of its life. We are awaiting a decision on an administrative supplement that would fund a new [Iridia 193 nm](#) system, which is more suited to hard materials such as teeth and bones.



We will repair the instrument if funding isn't available for a replacement.



UPCOMING EVENTS



[Gordon Research Conference \(GRC\) – Cell Biology of Metals](#)
Mount Snow, VT
30 JUL-4 AUG 2023



[2024 Winter Conference on Plasma Chemistry](#)
Tucson, AZ
15-20 JAN, 2024