

Ambient Ionization & Sampling Interest Group Workshop Report 2024

“20 Years of Ambient Ionization: Where are we now?”

72nd ASMS Conference at Anaheim, California
June 5th, 5:45-7:00 PM
Wednesday Workshop 10

Coordinators and Presiders:

Anyin Li (University of New Hampshire)
Chris Gill (Vancouver Island University)
Jacob Jordan (University of California, Berkeley)

This year’s workshop was composed of 1) a survey; 2) lightning talks from students, postdoctoral researchers, and professors in the field of ambient ionization; and 3) a panel discussion with experts in the field of desorption electrospray ionization. As it is the 20th anniversary of DESI techniques, the lightning talks and panelists were selected to highlight the diversity of DESI methods and applications that have been developed since the inception of the technique in the early 2000s. This year’s workshop was well attended by 95-102 scientists throughout the event, consistent with the high attendance from previous years. Attendees actively participated in the Q&A discussion and the poster survey. When asked whether they believed that the interest group would be bigger in 10 years, most attendees answered yes.

The survey poster collected information about the fields, current capacities, and desires of those in the ambient ionization community. The attendees of the workshop spanned a diverse array of fields (Figure 1). Many attendees (combined 48%) worked in clinical/diagnostics (24%) or fundamental research (24%), whereas a smaller percentage of attendees worked in forensics/security (17%), environmental research (12%), manufacturing/quality control (7%) and imaging (2%). 14% of attendees worked in “other” fields. There were a total of 42 responses to the survey out of the total ~100 attendees.

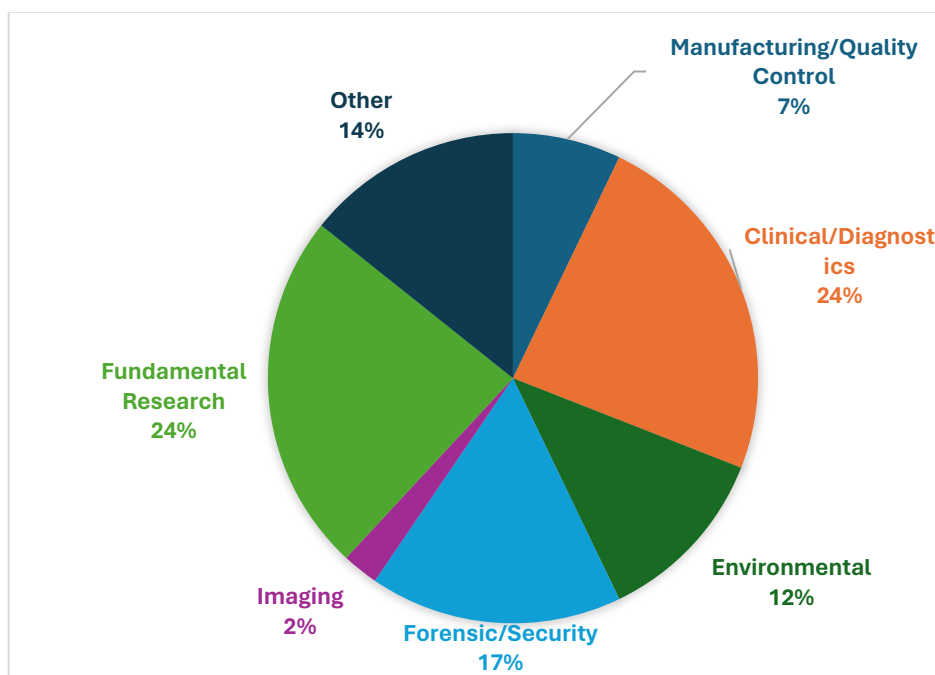


Figure 1. The Different Fields of Participants in the Ambient Ionization Workshop

3-Minute Lightning Talks:

Allix Coon (SUNY Albany)	(H)Ear Me Out: Utilization of Earwax for the Identification of Chemical Markers of Ménière's Disease
Andre Kalenak (Cornell)	Rapid Analysis of Free and Total Volatile Phenols by Sorbent Sheet Extraction–Direct Analysis in Real Time Mass Spectrometry (SPMESH-DART-MS)
Paul-Abu Rabie (GSK)	Automated Laser Assisted-Rapid Evaporative Ionisation Mass Spectrometry (LA-REIMS) for cell line phenotype predication in real-time
Hannah Federle (IUPUI)	Breaking Down Barriers to Point-of-Care Therapeutic Drug Monitoring: Quantitation and Validation of beta-Lactams from Plasma Utilizing Paper Spray Mass Spectrometry
Dmitry Leontyev (Georgia Tech)	Isomer and Isobar Spatial Traumatic Brain Injury Lipidomics with Desorption Electrospray Ionization Cyclic Ion Mobility Mass Spectrometry Imaging
Kenneth Virgin (Purdue University)	High Throughput DESI tissue Analysis of Angiotensin II metabolism in Mice

Panelists:

Livia Eberlin (Baylor College of Medicine)

Chip Cody (JEOL)

Mark Towers (Waters)

Neloni Wijeratne (ThermoFisher Scientific)

Major Discussion Points:

Following the lightning talks, a panel discussion commenced that focused on some frustration within the community toward comments that ambient ionization approaches (published or otherwise) must be validated with LC/MS, and how these two fields of techniques compete with each other. The consensus of the group was that ambient ionization should *not* try to compete with LC/MS in terms of accuracy or separation efficiency, but new developments in the field should focus instead on the niche that ambient ionization methods could occupy in the current analytical landscape. For example, ambient ionization is often faster and can be performed without “clean” solvents, making it a promising tool for performing rapid toxicology or forensics screening from “dirty samples”, even in remote areas without access to “clean” reagents. This has the potential to save significant amounts of money (and time) by only performing the detailed, comparatively expensive, time-consuming LC/MS methods on samples that are first determined to be positive by ambient ionization.

Another focus of the discussion was the potential for performing higher throughput ambient ionization analysis through the use of automated sampling, artificial intelligence data analysis methods, and disposable sample cartridges/sampling apparatus with minimal carryover. There was general optimism that with advances in the fields of robotics and artificial intelligence, ambient ionization could become closer to the automated capacity of current LC/MS methods, where one might put samples in the instrument in the afternoon and have data by the next morning with minimal input from the user.

The workshop concluded with the takeaway message “Let’s find our niche together.”