

Workshop Thurs-09 (6/4/2020) “Ambient Ionization: How can we make it more reproducible?”

*Dozens of ambient ionization sources for mass spectrometry have been created since the introduction of desorption electrospray ionization (DESI) and direct analysis in real time (DART) in the mid-2000s. These ambient ionization tools are capable of direct examination of samples in real-time with minimal-to-no sample preparation. In last year’s workshop, reproducibility was flagged as one of the main concerns that slows the adoption of ambient ionization. This year we will have brief expert presentations on improving the reproducibility of ambient ionization sources springboarding a more extended discussion on strategies for improvement and possible trade-offs. The ambient ionization workshop aims to encourage the participation and presentations of new investigators, postdocs, and graduate students with a balanced perspective from academia, non-academic labs, and industry. One of the goals of the workshop will be to gather scientists interested in ambient ionization technology and discuss the formation of an ambient ionization interest group to address these new scientific challenges.*

Presiding: Asher Newsome, Smithsonian Institution

Introduction: workshop structure, panelist lineup

Brian Musselman, IonSense: “What if we only ionize analyze? Linking desorption to ionization using gas pulses”

- DART reproducibility with internal standard
- Inter-day repeatability through background reduction

Istvan Pap, Waters: “Development of a Multimodal Fully Integrated Imaging Platform using Infrared Laser-Assisted REIMS and DESI for High Throughput Slide analysis”

- Reproducibility through automation
- DESI flow stability needed

Roshan Javanshad, Western Michigan U., graduate student: “Reproducibility in Desorption Electrospray Ionization Mass Spectrometry (DESI-MS)”

- Heterogeneous “coffee ring” sample deposition by pipet averted by spray deposition
- Atmospheric modifier and pressure controls of enclosure around emitter
- Multiple other techniques

Marjan Dolamoradi, George Washington U., graduate student: “Robustness vs/ reproducibility in remote LAESI-MS”

- Optical system and gas transfer optimization

Linxia Song, U. South Florida, graduate student: “Ambient ionization based on ultrasonic nebulization”

- Low ionization efficiency improved with corona discharge
- Droplet delivery to piezo improves RSD over continuous infusion

Courtney Walton, Oak Ridge Natl. Labs, postdoc: “Evaluation of a tethered open-port sampling interface for liquid extraction-mass spectrometry chemical analysis”

- Pressure of probe to surface is variable

Nathaneal Park, UNC-Chapel Hill, graduate student: “Unique reproducibility challenges presented by Condensed Liquid Aerosol Particle Spray (CLAPS)”

Ambient humidity affects particle size and deposition

Delivery rate and sample collection rate matched for inter-day reproducibility

Business: plans to apply for status as an interest group; likely topic for 2021; future leadership

Open floor to general questions for the panel: future of the field; beginner entryways; other techniques that didn't fit into the workshop