

## **Nucleic Acids Mass Spectrometry: Emerging Applications, Effective Analytical Strategies, and Characterization for Progressively Larger Nucleic Acids**

**American Society for Mass Spectrometry, Annual Conference 2023. Houston, TX U.S.A.**

**Organizers:** Dr. Jennifer Lippens (Janssen Pharmaceutica), Prof. Varun Gadkari (University of Minnesota)

The recent resurgence of nucleic acids into the forefront of biomedical research as well as the continued development of nucleic acid-based therapies and the rapidly emerging need for nucleic acid targets has necessitated a resurgence in method development specifically in nucleic acid mass spectrometry. This year's workshop was organized by Dr. Jennifer Lippens (Janssen Pharmaceutica) and Prof. Varun Gadkari (Univ. of Minnesota). The stated objective of the workshop was: *"advancing applications and development of mass spectrometry for nucleic acids analysis, while bringing together scientists from all areas of research to meet the demand of a rapidly growing interest in nucleic acids mass spectrometry."*

This year's workshop consisted of a panel of scientists spanning various career stages, and in the future, we hope to engage additional speakers from other areas (industry, government, etc) as well. This year's panel included:

Prof. Benjamin Garcia (WUSTL), Ann Anders (Michigan), Prof. Pat Limbach (Cincinnati), Dr. Limin Deng (UConn), and Prof. Mark Dickman (Sheffield)

Each panelist presented a short overview of their research with a focus on highlighting current challenges pertaining to nucleic acid MS, as well as any potential solutions. Prof. Limbach also presented valuable information about his work with the National Academies and NIH "Toward Mapping and Sequencing of RNA Modifications," detailing an ongoing study panel which is evaluating what the "needs" are in the nucleic acids research space and is trying to devise a baseline for evaluating future funding requests in this space. He invited attendees to participate and help impact how funding agencies are making decisions in this space, which the organizers felt was a strong addition to the panel.

Following the panel presentation, an engaging discussion filled the latter half of the workshop. Broad participation from attendees across all areas of science (e.g. academia, industry, govt., others) and from all training levels, including students, made for a fruitful discussion. This discussion began mostly around methodologies, tips/tricks in analysis, and experimental challenges while the second half of the discussion was more broadly focused on what the nucleic acids MS community could benefit from as a whole – which tied back to Prof. Limbach's presentation of the NIH/NAS study panel. Some consensus that the MS community would benefit from standardized samples, and methods which could be used to assess future/developing techniques was brought forward. Comparisons were drawn to the early days of proteomics, where standardization of QA/QC samples played a critical role in the development of libraries and data repositories.

There were an estimated 120-175 participants, with several attendees standing and almost every seat occupied in one of the larger meeting rooms. Some independent surveying of the attendees (roughly half participated) showed that almost 100% of responding attendees found the workshop to be "useful" and that they would attend a future Asilomar or Sanibel meeting dedicated to nucleic acid MS. It also demonstrated broad attendance across various sectors including:

- Academia (34%)
- Industry (52%)
- Government
- Instrumentation/vendors
- Contract research organizations
- Pharmaceuticals
- Non-profits

In total, the Oligonucleotide & Nucleic Acid ASMS evening workshop was an overwhelming success. Attendees were very engaged and supportive, suggesting a strong desire for a more formal "community" in the nucleic acids MS space. We also received interest from some participants for joining as future leadership of the Nucleic Acids MS Interest Group.