**NATIONAL INTERDISCIPLINARY CANNABIS SYMPOSIUM**

**December 1-3, 2023**

**Portland, Oregon**

**Saturday, December 2, 3:45 – 5:00 pm PST**

**Breakout Session 2**

**Panel: Developing Cannabis Testing & Technology**

**Moderator**

[Tara Lovestead](https://www.nist.gov/people/tara-m-lovestead), PhD, **is a Supervisory Chemical Engineer at the National Institute of Standards and Technology. She co-leads the Chemical Foundations for a Reliable Cannabis Breathalyzer program with her colleague, Kavita Jeerage, PhD. Their program, supported by funding from the National Institute of Justice (NIJ), in collaboration with Prof. Bidwell at the University of Colorado, Boulder, will begin in 2024 to measure THC and 9 other cannabinoids in breath sampled 12 times over several hours following cannabis inhalation to investigate the hypothesis: Can THC quantified in breath at two timepoints following cannabis use reliably determine recent use with a statistically significant participant population.**

**Panelists**

[Amy Miles](https://www.linkedin.com/in/amym3) is a Project Program Manager and the former Director of the Forensic Toxicology Program at the Wisconsin State Laboratory of Hygiene (WSLH). Amy provides expert court testimony and interpretation of laboratory reports for coroners, medical examiners, attorneys, and law enforcement officers. Amy also provides expert consultation for drug impaired driving cases both locally and nationally. Currently, Amy is working with the Wisconsin State Highway Safety Office on various projects related to forensic toxicology and highway safety.

[Dr. Michael Kosnett](https://www.linkedin.com/in/kosnettm/) is a Medical Toxicologist and Occupational and Environmental Medicine Physician. He is also an Associate Adjunct Professor at the Colorado School of Public Health. Currently, he serves as the Co-Principal Investigator, Comparative Assessment of Driving Impairment in Occasional Versus Heavy Marijuana Users, funded by the Colorado Department of Public Health and Environment in a grant to the University of Colorado, 2017 to 2020.

[Dr. Denise Valenti](https://www.linkedin.com/in/denise-a-valenti-53b72516/) is a residency-trained, low-vision/blind-rehabilitation optometrist. Dr. Valenti researched sensory impairment and driving using real car closed-track protocols. She has provided direct clinical care for more than 25 years, served as a driving consultant to General Motors specific to sensory systems and aging, and is active in research and consultation related to vision, aging, neuroprocessing, and cognitive functions. Dr. Valenti has had NIH support to study retinal processing and cannabis use and currently has NIJ funding to further validate the forensics technology IMMAD-VR.

**Introduction of the panel topic**

Decriminalization and legalization of cannabis in many countries (e.g. Canada in 2018) and across most of the United States has coincided with a surge in medical and recreational use and concern regarding impaired driving skills. Unlike ethanol, a quantitative biological measurement of Δ9-tetrahydrocannabinol (THC), the primary psychoactive molecule in cannabis, does not have a straightforward or consistent correlation with impairment. Even if such a correlation existed, the amount of THC consumed is much smaller than the amount of ethanol consumed when drinking alcoholic beverages. These very small amounts being quantified require expert technicians and sensitive, specific, and expensive laboratory equipment. In the absence of a meaningful biological measurement, observational and functional measurements have been developed. This panel of experts will present the current state of developing cannabis testing and technology for roadside detection, and what is needed from a judicial standpoint.

**Goals and discussion**

The session will begin with a background discussion of how detecting alcohol intoxication evolved from an observational to a biological measurement of blood ethanol to a roadside breath ethanol measurement, with over a hundred devices approved for evidential use by the National Highway Traffic Safety Administration (NHTSA) in the US. Cannabis impairment determination, in general, is proving more challenging to underpin. Amy Miles, the Project Program Manager at the Wisconsin State Laboratory of Hygiene, will begin with an overview of the current state of roadside cannabis intoxication detection and the gaps that must be overcome for practical use in the courtroom. Dr. Denise Valenti, CEO and Founder of IMMAD, Impairment Measurement Marijuana, and Driving, will follow with a presentation on the difference between observational, functional, and biological measurements of cannabis impairment. Dr. Michael Kosnett, Associate Adjunct Professor, Department of Environmental and Occupational Health, Colorado School of Public Health, will discuss one challenge of biological measurements, which is discerning patterns of acute or regular cannabis usage, and the forensic utility of blood measurements of cannabinoids other than THC alone.

**Outcome**

Participants will learn the gaps in roadside cannabis detection and the areas of need for practical use in the courtroom.

Participants will learn about the challenges of determining cannabis impairment and the difference between observational, functional, and biological measurements.

Participants will learn the forensic utility of a biological measurement of THC and other cannabinoids found in cannabis plant material.

**Reference materials**\*

*Articles, reports, funding & awards:*

* K.M. Jeerage, C.N. Beuning, A.J. Friss, L.C. Bidwell, T.M. Lovestead. THC in breath aerosols collected with an impaction filter device before and after legal-market product inhalation – a pilot study. Journal of Breath Research 17 (2023) 037103 <https://doi.org/10.1088/1752-7163/acd410>
* Evaluation of On-Site Oral Fluid Drug Screening Technology: https://rosap.ntl.bts.gov/view/dot/54911
* Society of Forensic Toxicologists (SOFT) Oral Fluid Committee: <https://www.soft-tox.org/oral-fluid-literature>
* Mullins M. Defining recent cannabis use analytically. Clin Toxicol (Phila). 2023 May;61(5):324-325. PMID: 37293899. https://doi.org/10.1080/15563650.2023.2210404
* Rague JM, Ma M, Dooley G, et al. The minor cannabinoid cannabigerol (CBG) is a highly specific blood biomarker of recent cannabis smoking. Clinical Toxicology (Philadelphia, Pa.). 2023 May;61(5):363-369. PMID: 36939145. https://doi.org/10.1080/15563650.2023.2173076.
* Kosnett MJ, Ma M, Dooley G, Wang GS, Friedman K, Brown T, Henthorn TK, Brooks-Russell A. Blood cannabinoid molar metabolite ratios are superior to blood THC as an indicator of recent cannabis smoking. Clin Toxicol (Phila). 2023 May;61(5):355-362. PMID: 37293900; PMCID: PMC10481452. https://doi.org/10.1080/15563650.2023.2214697
* Ramaekers, J., Kauert, G., van Ruitenbeek, P. et al. High-Potency Marijuana Impairs Executive Function and Inhibitory Motor Control. Neuropsychopharmacol 31, 2296–2303 (2006). <https://doi.org/10.1038/sj.npp.1301068>
* Hartman R L, Brown T L, Milavetz G, Spurgin A, Pierce R S, Gorelick D A, Gaffney G and Huestis M A 2015 Cannabis effects on driving lateral control with and without alcohol Drug Alcohol Depend. 154 25–37. <https://doi.org/10.1016/j.drugalcdep.2015.06.015>
* Brooks-Russell A et al 2021 Simulated driving performance among daily and occasional cannabis users Accid. Anal. Prev. 160 106326. <https://doi.org/10.1016/j.aap.2021.106326>
* Marcotte T D et al 2022 Driving performance and cannabis users' perception of safety: a randomized clinical trial JAMA Psychiatry 79 201–9. <https://doi.org/10.1016/j.aap.2021.106326>
* Breath Measurements of Acute Cannabis Use (BACE): Towards Reliable Determination of Recent Use. Department of Justice (DOJ)/National Institute of Justice (NIJ), Multiple Principal Investigators: Jeerage, Lovestead. Award # DJO-NIJ-22-RO-0003, Jan. 2022 – Dec. 2024, $1.5M total. <https://nij.ojp.gov/funding/awards/djo-nij-22-ro-0003>
* Chemical Foundations for a Cannabis Breathalyzer. DOJ/ NIJ, Multiple Principal Investigators: Jeerage, Widegren, Lovestead. Award # DJO-NIJ-19-RO-0008, Jan. 2019 – Dec. 2022, $481k total. <https://nij.ojp.gov/funding/awards/djo-nij-19-ro-0008>