# NSF Convergence Accelerator's 2023 Cohort Phase 1 Award

## Project Title
Nose Computer Interfaces for Narcotics and Weapons Detection

## Awardee
Canaery, Inc.

## Award/Contract #
24C0015

## Award Contract Type
R&D

## Award Date
January 15, 2024

## Principal Investigator
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## NSF Funded Program
NSF Convergence Accelerator

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## PROJECT ABSTRACT

Canaery, Inc. aims to improve narcotics, weapons, and explosives detection by harnessing the power of mammalian olfaction. Odors will be decoded in real-time from rodents equipped with a neural interface, resulting in a standardized, scalable platform for scent detection. In Phase 1, the team will adapt the nose-computer-interface (NCI) system developed by Canaery, Inc., for fentanyl and smokeless gunpowder detection. The NCI's ability to distinguish these targets by the neural activity they evoke will be measured in the presence of background odors and tested on both odor substitutes and street-grade materials. The system's performance will be benchmarked against trained scent-detection animals and validated by potential clients. Following Phase 1, the NCI will be ready for pilot deployment in several security sectors.

This proposal spans several research domains: neuroscience, systems engineering, microfabrication, forensic chemistry, animal behavior, and machine learning. This collaboration includes experts from industry, academia, and government. The Principal Investigator, Dr. Peter Ledochowitsch, has both academic and commercial experience in leading neural engineering projects. Co-PIs include Dr. Dmitry Rinberg, an olfactory neuroscientist and the inventor of the NCI; Dr. Lauryn DeGreeff, a forensic chemist, and member of the NIST Dogs and Sensors Subcommittee; and Dr. Travis Massey, a neural interface microfabrication expert at Lawrence Livermore National Laboratory, and Dr. Cedric Williams, a behavioral neuroscientist at the University of Virginia. Crucially, the team includes a prospective customer of the proposed technology, Frank Cilurso, senior executive and founder of 3DK9, to ensure that our deliverables meet real-world demands.

The team's technology stands to benefit communities affected by gun violence and the opioid epidemic. The NCI system's reduced handler bias also ensures accuracy and avoids undue searches.