

# Exploring the Relationship Between Multiple Indoor Air Pollutants and Sleep Quality

Hagen Fritz, Sepehr Bastami, Kerry Kinney, and Zoltan Nagy  
Civil, Architectural, and Environmental Engineering, UT Austin

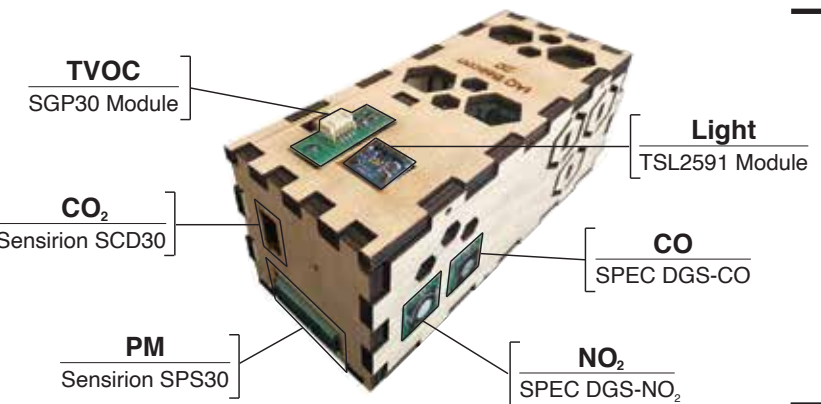


## Motivation

Discover relationship between  
IAQ and sleep quality

Determine if relationship varies  
depending on how sleep is measured

## Methods



BEVO Beacon: IAQ Monitor

### Activity Tracking

Passively monitors  
activity

### Sleep Tracking

Sleep periods/stages  
estimated by heart  
rate/movement



Fitbit Inspire HR: Sleep Monitor

Deployed: 26  
Period: 06/15 -  
09/01

Deployed: 48  
Period: 06/10 -  
09/01

## Results

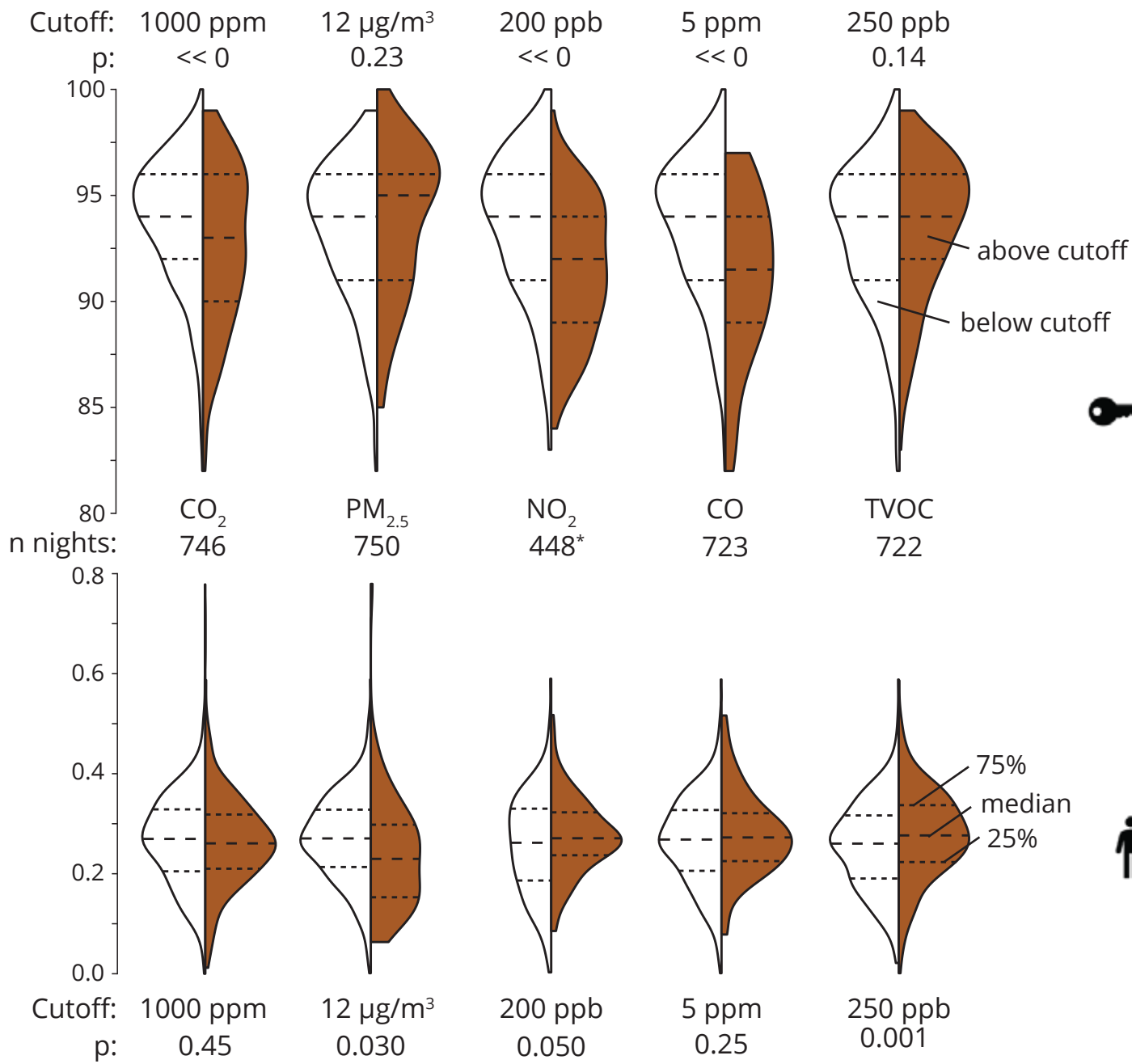


Figure 1. Differences in Fitbit sleep metrics on evenings when median pollutant concentrations were above/below specified cutoff.

\*Only 15 of the 26 beacons had NO<sub>2</sub> sensors

## Sleep Efficiency

- 85% considered normal
- NO<sub>2</sub> has greatest effect (-)
- PM<sub>2.5</sub> has negligible effect

## REM:nREM

- Fitbit-measured REM : Light+Deep
- 0.2 - 0.25 normal for adults
- CO<sub>2</sub> has negligible effect

## Key Points

Holistic view makes finding  
confounding variables easy

Outcome might vary with  
self-report sleep quality

NO<sub>2</sub>/TVOCs as important as  
CO<sub>2</sub>/PM<sub>2.5</sub>

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Hagen Fritz  
HagenFritz@utexas.edu  
nagy.caee.utexas.edu

