

The burglary microbiome project

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Researchers have demonstrated that microbial signatures, the unique microbial make-up of each individual, from the built environment can identify persons involved in crimes occurring in the home, such as burglaries. The research is presented at ASM Microbe, the annual meeting of the American Society for Microbiology, held from June 7th to June 11th in Atlanta, Georgia.

"If an individual's microbial signatures are recovered from a built-environment, the human made surroundings that we people live in, they can discriminately identify a person among other individuals," said Jarrad Hampton-Marcell, Ph.D. Candidate, Department of Biological Sciences, University of Illinois at Chicago, who will present the study at ASM Microbe. "The microbiome can possibly serve as trace evidence in forensic investigations," he said.

The researchers collected samples from residents (nostril and hand) and various surfaces from their respective homes in Chicago, IL and Fort Lauderdale, FL prior to and following mock burglaries by non-residents. They identified unique bacterial assemblages for each individual, and generated models to discern the accuracy of predicting a non-resident interacting with a given home.

Humans emit approximately 36 million [microbial cells](#) per hour into their immediate environment, providing the opportunity to trace microbial signatures back to their originating source. The potential of tracking microbial exchange between an individual and a built environment surface has been well demonstrated by matching the

microbial signature on individual participants' finger tips to keys on a computer keyboard, as well as personal devices.

A total of 9,965 unique operational taxonomic units (OTUs) were identified among 30 individuals. Non-residents' unique OTUs were mapped to residents' home demonstrating an interaction accuracy greater than 60%. When observing the change in uOTUs over time, appearance/disappearance rates showed no significant difference (ANOVA, $p > 0.05$) in the absence or presence of other individuals.

"This study is one of the first to use the microbiome as a forensic tool using unique markers rather than variances in microbial community structure," said Hampton-Marcell, "With further improvement in detection of stable markers, the human microbiome may serve as an additional tool for human profiling and [crime scene investigations](#)."

Provided by American Society for Microbiology

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