



Look Beyond your Discipline

Kerry Kinney, Ph.D., holds the L.P. Gilvin Centennial Professorship in the Department of Civil, Architectural and Environmental Engineering at The University of Texas at Austin. She also is a courtesy professor in the Department of Population Health at the Dell Medical School. Kinney's cross-disciplinary research in environmental engineering and molecular biology centers on the investigation of microorganisms and contaminants in engineered systems including buildings, residential water systems and municipal wastewater systems. She has extensive experience working with multidisciplinary teams to investigate human exposure to microorganisms and contaminants in the indoor environment.

Nuggets mined from today's episode:

Dr Kinney attributes her prior work in industry (hazmat consulting) with piquing her curiosity and interest in science. She learned as much in industry as she did as an undergrad.

Research and practitioners live in 2 different worlds. Practitioners need to push their problems toward researchers. And researchers need to push their research to practitioners. Better communication between researchers and practitioners contributes to: identifying problems, knowledge gain, resulting in new solutions. Cross pollination between practitioners and researchers will provide solutions faster. Look beyond your discipline.

IAQ has always been important, and is even more so now due to COVID with more people forced to spend more time at home indoors. There are greater concerns about cleaning and building systems operation due to COVID.

The International Society of Indoor Air Quality and Climate (isiaq.org) is a non-profit scientific organization seeking to advance and support the creation of healthy and comfortable indoor building environments. Due to COVID, ISIAQ has pivoted from in person events to doing webinars and other livestream events (including Indoor Air 2020). The webinar series has been successful with up to 500-600 participants at any given webinar.

Resistance to change is both natural and national. More information is being created faster and distributed more widely than ever before. Can and will we keep the momentum going after COVID? ISIAQ is looking at other avenues for information delivery.

ISIAQ has always had practitioners on their board of directors. Researchers commonly create abstracts (a summary of the contents of a book, article, or formal speech) when

submitting articles for publication or presentation. This requirement is foreign to practitioners.

Healthy Buildings 2021 – America, hosted by the Cleaning Industry Research Institute (CIRI) is being held in Honolulu, Hawaii, August 10–12, 2021 Learn more at: <https://hb2021-america.org/> A great opportunity to meet and interact with researchers and practitioners from around the world. “Indoor Air School” hands-on workshop.

We live in a microbial world. Microbes are on and in our bodies, on surfaces and in the air. Microbiome “the microorganisms in a particular environment (including the body or a part of the body). We depend on a vast army of microbes to stay alive: a microbiome that protects us against germs, breaks down food to release energy, and produces vitamins”. “The combined genetic material of the microorganisms in a particular environment. Understanding the microbiome—human, animal, and environmental—is as important as the human genome” Oxford Languages. Exposures aren’t generally a problem until the natural balance is disrupted. Humans shed bacteria from our skin and fungi often come from outdoors. The type and quantity of microbes can be location and seasonally dependent. Fungi have adapted to colonize on a wide variety of substrates and amplify when moisture is abundant. Early life exposure to the beneficial microbes has a protective effect. Clean your shower heads!

Furnace ‘filter forensics’, studying dust trapped in furnace filters is a great way to study what is going on inside of a building. Dirty furnace filters are readily available. Homeowners will gladly exchange their dirty furnace filter for a clean replacement filter.

Filter dust provides an integrated sample of the indoor environment. Kerry studied the filter dust in 60 homes for: bacteria, fungi, phthalates and allergens. The sample size has been reduced from an entire dirty filter to a thimble sized sample taken by the occupant using a small handheld vacuum cleaner. Kerry uses surveys pushed out to occupants via phone APPs to obtain information. Developing an APP dashboard to provide near real-time data to households. Filter forensics and indoor monitoring 7/24 provides big data. Challenges of interpretation of gigs of data.

How to measure sleep outside the lab? Looking at low cost sensors and wearables (e.g. <https://www.fitbit.com/>) Wearables can provide valuable data during sleep studies. Sleep can be impacted by both IEQ, physical and psychological stressors.

APPs can help obtain information and determine shared concerns from among vulnerable communities. Her dream is to provide communities that have higher pollutant exposures and essential workers with specific information while answering high level questions that affect everyone. She learned the importance of listening during a focus group of filter forensic study participants. She asked what was important to them and they asked what cleaning products were recommended, which was something that Kerry hadn’t previously considered. She learned the importance of asking the right questions. She now knows much more about cleaning products.

Overcoming logistical hurdles. What happens to samples during shipping? Temperature differentials during sample shipment have been studied. High temperature can cook the sample during shipment. Learned how to keep samples cool during shipment.

Dust indoors impacts respiratory health. Kerry is asthmatic and is studying inflammatory chemical reactions with Dr. Felix Rivera-Mariani at Larkin University.

<https://www.ularkin.org/>

Cedar fever symptoms may include itchy, watery, red eyes; nasal congestion, runny nose and sinus pressure; sneezing; sore throat and fatigue. Despite its name, cedar fever doesn't cause a fever, but inflammation triggered by the allergic reaction may raise the body temperature slightly. <https://www.myurgentcareclinic-boerne.com/>

Alternaria alternata, a cosmopolitan saprophyte commonly found in soil and plants, is usually considered an outdoor allergen. Although most intense exposure is likely to occur outdoors, *Alternaria* and other allergenic fungi are also found in indoor environments. <https://www.ncbi.nlm.nih.gov/pmc/articles>

Flame retardants and phthalates are among the chemicals studied during filter forensics.

University Texas Austin uses highly sophisticated and sensitive instruments in its test house and test HVAC system to study what happens on both sides of a furnace filter, reactions between dust with household cleaning products, air cleaning devices (ozone, plasma and UVC). Ozone, UVC and hydroxyl radicals generate nonspecific oxidants, that will create byproducts during reactions.

Regarding concerns over antimicrobial product use indoors and human exposures, Kerry suggests that studying the most widely used antimicrobial active ingredients will provide more meaningful information than studying individual formulations.

University Texas Austin is a 70,000 city, a microcosm of what lies beyond. COVID response was amazing and humbling. It was all hands on deck with departments lending their unique knowledge and expertise (e.g. how to set up classrooms for social distancing, HVAC systems, cleaning, preparation and delivery of food, wastewater monitoring, etc.) Research capabilities were shifted to contact tracing, sequencing facility running free COVID tests with fast turnaround, etc. All the safety recommendations are important: social distancing, masks, cleaning, and HVAC.

During studies, students will tell you critical truths (e.g. asking students about social distancing). Like other colleges and universities, many of the courses are also web based. Hybrid courses for students with labs or for additional in person instruction.

Can we predict if and when COVID will come back?

Kerry is tired of home cooked meals. Austin has lost some well known restaurants. It's a civic duty to support local businesses, to order and buy local.

Restoration Global Watchdog, Pete Consigli

- COVID has made event planning more difficult, hopes we can go to Healthy Buildings 2021 in Hawaii in August
- Oklahoma-Texas football game known as the Red River Rivalry isn't the same with COVID restrictions
- Austin is known for food (e.g. world class barbeque), music and culture.
- As a Sicilian he was taught how to cook grass and make it taste like a vegetable.
- Bacon is not a vegetable!

Z-Man

UVC air treatment reacting with dust to create odors.

https://www.uvccleaningsystems.com/cm/dpl/downloads/articles/16/Root_Cause_of_UV_C_Odor.pdf Brais, N., & Despatis, B. (n.d.). Root Cause to Odor Generated by UV Disinfection by Mobile Units (Rep.). Montreal, QC: Sanuvox Technologies.

<https://hvac-talk.com/vbb/showthread.php?64483-Smokey-smell-from-UV>

Trivia Question:

Name the legendary animal which when seen on the University Texas Campus on the way to take an exam improves your grade?

Answer:

Albino squirrel

Prize Winner: Doug Kohnen Eratech Environmental who was first to correctly identify the 1620s as the time period when the noun resilience was first used.

Z-Man signing off