BIOGRAPHICAL SKETCH

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NAME: Pennell, Kelly G.

eRA COMMONS USER NAME (credential, e.g., agency login): Kelly_Pennell

POSITION TITLE: Professor of Engineering

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
Lawrence Technological University, Southfield, MI	BS	05/1997	Civil Engineering
Rose Hulman Institute of Technology, Terre Haute, IN	MS	05/2001	Environmental Engineering
Purdue University, West Lafayette, IN	PhD	12/2005	Civil Engineering
Brown University, Providence, RI	Postdoctoral	07/2008	Chemical Engineering

A. Personal Statement

Since 2020, I have served as the Director of the NIEHS University of Kentucky Superfund Research Center (UKSRC). As an established fate-and-transport expert, I lead research that combines fate and transport science with geospatial information science and data science approaches to drive data to action by identifying risks co-occurring halogenated contaminants co-exist. In addition, I facilitate multidisciplinary integration among projects and cores by co-leading the *Data Management and Analysis Core*. Since 2005, I have been part of the NIEHS Superfund Research Program academic community, providing nearly two decades of experience working within multi-disciplinary environmental health science teams. I am adept at drawing connections between various disciplines related to environmental problems and have served in other leadership roles at the University of Kentucky (UK). From 2016-2019, I also led the Kentucky Water Resources Research Institute (e.g. associate director and acting director), which addresses water resources concerns across the state of Kentucky in rural and urban communities. From 2018-2019, I served as the Interim Director of the Tracy Farmer Institute of Sustainability and the Environment, which includes over 100 faculty and staff across more than ten academic units across UK. In 2015, I received a National Science Foundation CAREER award, NSF's most prestigious award in support of early-career faculty who have the potential to serve as academic role models in research and education. My research program emphasizes stakeholder-relevant, solution-oriented research related to environmental fate and transport, with emphasis on diagnosing where environmental risks are located so they can be more accurately reduced and prevented.

Ongoing projects that I would like to highlight include:

P42 ES007380
Pennell (PI)
02/01/20-03/31/25
University of Kentucky Superfund Research Program: Nutrition and Superfund Chemical Toxicity – Administrative Core

P42 ES007380
Pennell (PI)
02/01/20-03/31/25
University of Kentucky Superfund Research Program: Nutrition and Superfund Chemical Toxicity – Project 4

P42 ES007380
Pennell (PI)
02/01/20-03/31/25
University of Kentucky Superfund Research Program: Nutrition and Superfund Chemical Toxicity –
Data Management and Analysis Core (DMAC)

R01 ES032396
Unrine and Hoover (MPI), Role: Co-I
02/01/21-10/31/26
Research to Action: A University-Community Partnership to Reduce Exposure to Disinfection Byproducts in
Appalachia

Citations:

1. Ojha, S., Li, Y., Rezaei, N., Hoover, A., Robinson, A., and **Pennell, K.G.** (2022). A Geospatial and
   Binomial Logistic Regression Model to Prioritize Sampling for Per- and Polyfluorinated Alkyl
   Substances in Public Water Systems. *Integrated Assessment and Environmental Management*. 19(1):
   163-174. PMID: 35373458 PMCID: PMC9888445.
2. Brewer, D., Travis, E., Koempel, A., Ormsbee, L.E. & **Pennell, K.G.** (2020). Community forum identifies
   opportunities to engage with Eastern Kentucky community leaders about chronic disease and
   environmental pollution, *Applied Environmental Education & Communication*. 19 (2), 187-204.
   PMID: 32973411. PMCID: PMC7510481.
3. Reichman, R., Shirazi, E., Colliver, D. & **Pennell, K.G.** (2017). US Residential Building Air Exchange
   Rates: New Perspectives to Improve Decision Making at Vapor Intrusion Sites. *Environmental Science:
   Processes and Impacts,* 19(2), pp. 87-100. PMID: 2816210. PMCID: PMC5369024.
4. **Pennell, K. G.,** Thompson, M., Rice, J.W., Senier, L., Brown, P., Suuberg., E. (2013) "Bridging
   Research and Environmental Regulatory Processes: The Role of Knowledge Brokers." *Environmental
   Science & Technology* 47 (21), 11985-11992. PMID: 24083557. PMCID: PMC3875357.

B. Positions, Scientific Appointments, and Honors

Positions and Scientific Appointments

2021-present	Professor, Department of Civil Engineering, University of Kentucky, Lexington, KY
2020-present	Director, University of Kentucky Superfund Research Center, Lexington, KY
2018-2019	Acting Director, Kentucky Water Resources Research Institute, University of Kentucky, Lexington, KY
2018-2019	Interim Director, Tracy Farmer Institute of Sustainability and the Environment, University of Kentucky, Lexington, KY
2016-2021	Associate Professor, Department of Civil Engineering, University of Kentucky, Lexington, KY
2016-2020	Assistant Director, University of Kentucky Superfund Research Center, Lexington, KY
2016-2018	Associate Director, Kentucky Water Resources Research Institute, University of Kentucky, Lexington, KY
2013-2016	Assistant Professor, Department of Civil Engineering, University of Kentucky, Lexington, KY
2010-2013	Assistant Professor, Department of Civil and Environmental Engineering, University of Massachusetts-Dartmouth, Dartmouth, MA
2009-2011	Secretary, Metcalf Institute Executive Advisory Board
2008-2010	Assistant Professor (Research), School of Engineering, Brown University, Providence, RI
2007-present	Member, American Chemical Society
2007-present	Member, Metcalf Institute Advisory Board (Secretary, 2009-2011)
2005-2011	Policy Liaison, Superfund Research Program, Brown University, Providence, RI
2005-2008	Post-Doctoral Research Associate, School of Engineering, Brown University, Providence, RI
2002-2005	Research Associate, Department of Chemical Engineering, Purdue University, West Lafayette, IN
1997-2002	Remediation Engineer, ARCADIS Geraghty & Miller, Indianapolis, Indiana

Honors

2023- 2028	Earl Parker Robinson Chair Professor in Engineering, University of Kentucky
2016-2021	Gill Associate Professorship, University of Kentucky
2017	Outstanding Faculty in Civil Engineering, University of Kentucky
2015	NSF CAREER Award
2005	Pierle Charitable Family Scholarship, Purdue University
2004	Andrews Environmental Grant, Purdue University
2004-2005	Matthew Kern Environmental Fellowship, Purdue University
2002-2003	Lynn Fellowship, Purdue University
1998, 2000	ARCADIS Employee Recognition Award

Licenses

2015-present	Licensed Professional Engineer (PE), State of Kentucky
2001-2019	Licensed Professional Engineer (PE), State of Indiana

C. Contributions to Science

1. **Field studies to understand chemical occurrence for reduction and prevention measures**
   Identifying where chemical contaminants are likely to occur is a key area of concern for hazardous substance management, especially for chemicals that are transported by complicated paths. Preventing and reducing risks requires locating contaminant sources, defining contaminant pathways, and identifying receptors (e.g., source-pathway-receptor model). My research in this area aims to better understand the occurrence and forms of chemicals that exist in various environmental systems. With researchers from Brown University (Liu *et al.*, 2011), we established sulfidation kinetics and evaluated various environmental systems that might be important for fate and transport considerations of nAg. With another team, I investigated passive sampling techniques in the Narragansett Bay (Perron *et al.*, 2013) and continued to evaluate these methods within the regulatory context for characterizing human and ecological health risks. My research group has also conducted field studies with the US EPA and a NIEHS SBIR Grantee (Roghani *et al.*, 2018) to better understand how volatile organic compounds present in liquids disposed of in aging sewer networks are transported in multi-phases, and consequently pose exposure risks to communities. Most recently, we have been evaluating field samples to better understand the transport pathways of per-and polyfluoroalkyl substances (PFAS) in water systems (Ojha *et al.*, 2022).

   a. Lui, J., **Pennell, K.G.**, Hurt, R.H. (2011) Kinetics and Mechanisms of Nanosilver Oxysulfidation. *Environmental Science and Technology*, 45: 7345-7353. PMID: 21770469. PMCID: PMC3164758
   b. Perron, M.M. Burgess, R. M., Cantwell, M. G., Suuberg, E.M., **Pennell, K.G.** (2013) Performance of passive samplers for monitoring estuarine water column concentrations: 1. Contaminants of concern. *Environmental Toxicology and Chemistry*. 32(10): 2182-2189. PMID: 23832638. PMCID: PMC3979968
   c. Roghani, M., Jacobs, O.P., Miller, A., Willett, E.J., Jacobs, J.A., Viteri, C.R., Shirazi, E., **Pennell, K.G.** (2018). Occurrence of chlorinated volatile organic compounds (VOCs) in a sanitary sewer system: Implications for assessing vapor intrusion alternative pathways. *Science of the Total Environment,* 616-617: 1149-1162. PMID:29146079. PMCID: PMC5752621
   d. Ojha, S., Li, Y., Rezaei, N., Hoover, A., Robinson, A., and **Pennell, K.G.** (2022). A Geospatial and Binomial Logistic Regression Model to Prioritize Sampling for Per- and Polyfluorinated Alkyl Substances in Public Water Systems. *Integrated Assessment and Environmental Management*. 19(1): 163-174. PMID: 35373458 PMCID: PMC9888445

2. **Numerical modeling to inform science decision making**
   Collectively, with a team of collaborators, we have published more than 25 articles related to numerical modeling, expanded from my original vapor transport model (Pennell *et al.*, 2009). My NSF CAREER award (Vapor Intrusion, Knowledge Brokers, and Environmental Health: A Three-Dimensional Perspective, 2015-2020) focused on new scientific discoveries related to this original work. We modeled contaminant transport into and around buildings (*e.g.,* Shirazi and Pennell, 2017), which is critical for understanding inhalation risks

for building occupants. We have validated our computational fluid dynamics (CFD) model at a field site, accounting for weather effects (Shirazi *et al.*, 2020), and we further expanded our understanding of this exposure pathway to include the effects of preferential pathways (Roghani *et al.*, 2021). I train pre- and postdoctoral trainees to hone numerical modeling skills as knowledge brokers and to interweave knowledge from various stakeholders and scientific disciplines so that evidence-based information influences policy decisions. Trainees who work with me go on to eventually work in academia and/or industry roles advising decision makers on best-practices and identifying new scientific discoveries to protect public health.

a. **Pennell, K. G.**, Bozkurt, O., Suuberg, E. M. (2009). Development and Application of a 3-D Model for Evaluating Site-Specific Features on Vapor Intrusion Rates in Homogenous Geologies. *Journal of Air and Waste Management Association*. 59: 447-460. PMID: 19418819
b. Shirazi, E. and **Pennell, K.G.** (2017). Three-Dimensional Vapor Intrusion Modeling Approach that Combines Wind and Stack Effects on Indoor, Atmospheric, and Subsurface Domains. *Environmental Science: Processes and Impacts,* 19(12), pp. 1594-1607. PMC5755378
c. Shirazi, E., Hawk, G.S., Holton, C. W., Stromberg, A.J., and **Pennell, K.G.** (2020). Comparison of Modeled and Measured Indoor Air Trichloroethene (TCE) Concentrations at a Vapor Intrusion Site: Influence of Wind, Temperature, and Building Characteristics. *Environmental Science Processes and Impacts*, 22: 802-811. PMCID: PMC7153494
d. Roghani, M., Li, Y, N. Rezaei, Robinson, A., Shirazi, E., and **Pennell, K.G.** (2021). Modeling Fate and Transport of Volatile Organic Compounds (VOCs) Inside Sewer Systems. *Groundwater Monitoring and Remediation.* 41(2): 112-121. PMCID: PMC8744132

3. **Data management and multidisciplinary research**
My experience working within multidisciplinary research teams, translating research for policy decision makers, and conducting research within large multidisciplinary research centers has nurtured a sense of epistemic empathy, which Little and Pennell (2017) discuss is critical for addressing complex environmental health challenges. Our research group has quantitatively honed skills to analyze large, complex data sets and create frameworks that allow openness across stakeholders. For example, policy makers in California approached me about their plans to revise the California Geotracker Database (Geotracker), which provides a flexible data infrastructure to integrate and report complex datasets from hazardous waste sites. We shared information from several articles we published, including Reichman et al., 2017, and translated implications into database architecture relevant for vapor intrusion site assessments. More recently, we collaborated with data scientists to consolidate a PFAS geospatial dataset by incorporating the FAIR (Findable, Accessible, Interoperable, and Reusable) principles for ArcGIS maps (Ohja *et al.*, 2023). We also collaborated with four NIEHS-funded Superfund Research Programs to introduce new tools and resources based on *in vivo* experiments and proposed a framework using FAIR guiding principles to further promote interaction between data producers and data scientists. Because of our ability to bridge academic and environmental policy realms, we are regularly approached by policy decision makers who are interested in how environmental health science can inform regulatory decisions.

a. Little, P.C. & **Pennell, K.G.** (2017). Measuring Vapor Intrusion: From Source Science Politics to a Transdisciplinary Approach. *Journal of Environmental Sociology, 3(2)*, pp. 145-154. PMID: 28367475. PMCID: PMC5370174
b. Reichman, R., Shirazi, E., Colliver, D. & **Pennell, K.G.** (2017). US Residential Building Air Exchange Rates: New Perspectives to Improve Decision Making at Vapor Intrusion Sites. *Environmental Science: Processes and Impacts,* 19(2), pp. 87-100. PMID: 2816210. PMCID: PMC5369024
c. Ojha, S., Powell, C., A., Thompson, P. T., Moseley, H., & **Pennell, K.G**., (2023) Identifying and sharing per-and polyfluoroalkyl substances (PFAS) hot-spot areas and exposures in drinking water. *Scientific Data,* 388(10). PMCID: PMC10275912
d. Nault, R., Cave., M. C., Ludewig, M.C., Moseley, H.N.B, **Pennell, K.G.,** & Zacharewski, T. (2023). A Case for Accelerating Standards to Achieve the FAIR Principles of Environmental Health Research Experimental Data. *Environmental Health Perspectives,* 131 (6). PMCID: PMC10289218

Complete List of Published Work in MyBibliography:

https://www.ncbi.nlm.nih.gov/sites/myncbi/kelly.pennell.1/collections/61695231/public/