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Engineering & Scientific Consulting

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Professional Profile

Dr. Mahdi Chitsaz is an environmental scientist specializing in environmental data analysis, data integration, and visualization. He applies his knowledge of environmental forensics, particularly chemical fingerprinting methods and environmental fate and transport analyses, in support of legal claims and liability allocation associated with chemical contaminants in the environment.

Dr. Chitsaz's core expertise includes environmental data modeling for chemical source identification and source apportionment analysis of complex mixtures of organic pollutants such as polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), and per-and polyfluoroalkyl substances (PFAS) in sediments and water. His experience includes exploratory data analysis methods such as Positive Matrix Factorization (PMF) and geospatial analysis (Python & ArcGIS) applied to a range of topics from source apportionment to watershed runoff and infiltration calculations.

He also has hands-on experience in a microbiology laboratory identifying heavy metal-resistant bacteria to be utilized in phytoremediation.

Academic Credentials & Professional Honors

Ph.D., Environmental Sciences, Rutgers University, New Brunswick, 2023

B.S., Environmental Science, Warsaw University of Life Sciences (WULS), 2013

Mark B. Bain fellowship - Hudson River Foundation, 2018

Professional Affiliations

Society of Environmental Toxicology and Chemistry (SETAC)

Publications

Al Hello, M., Burris, D.R., Chitsaz, M. & Rodenburg, L.A. (2023) Source apportionment of polycyclic aromatic hydrocarbons in New York/New Jersey Harbor sediment. Water and Environment Journal, 1– 1.

Chitsaz, M., Fennell, D. E., & Rodenburg, L.A. (2020). Sources of polychlorinated biphenyls to Upper Hudson River sediment post-dredging. Chemosphere, 259, 127438.

Lin, Y., Jiang, J. J., Rodenburg, L. A., Cai, M., Wu, Z., Ke, H., & Chitsaz, M. (2020). Perfluoroalkyl substances in sediments from the Bering Sea to the western Arctic: Source and pathway analysis. Environment international, 139, 105699.

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Lin, Y., Liu, L., Cai, M., Rodenburg, L. A., Chitsaz, M., Liu, Y., Chen, M., Deng, H., & Ke, H. (2020). Isolating different natural and anthropogenic PAHs in the sediments from the northern Bering-Chukchi margin: Implications for transport processes in a warming Arctic. Science of The Total Environment, 736, 139608s.

Presentations

Sources of Polychlorinated Biphenyls to Upper Hudson River sediment post-dredging, SETAC North America 40th Annual Meeting, 2019

PCB cycling in stormwater in an urban high desert: Santa Fe, NM, SETAC North America 38th Annual Meeting, 2017

Project Experience

Employed PMF in the source apportionment analysis of PCBs for the sediment of the Upper Hudson River following dredging operations.

Used the EPA PMF analysis tool to apportion sources of PCBs and PAHs in New York/New Jersey Harbor sediments.

Developed an interactive tool to visualize PCB congener dechlorination products and their hierarchical relations to aid in understanding environmental patterns of PCB occurrence.

Designed data management pipeline focusing on efficient data collection and retrieval for a large dataset containing more than a million images.

Extracted diverse tabular data from PDF files using Python, employing a combination of image processing and OCR techniques, facilitating subsequent data analysis.

Utilized web data retrieval techniques to acquire time-series weather station data, which were then analyzed and visualized to gain deeper insights.

Leveraged Python to interface with low-level M.S. Windows controls, enabling batch automation of hydrological analysis software, optimizing the process for efficient execution.