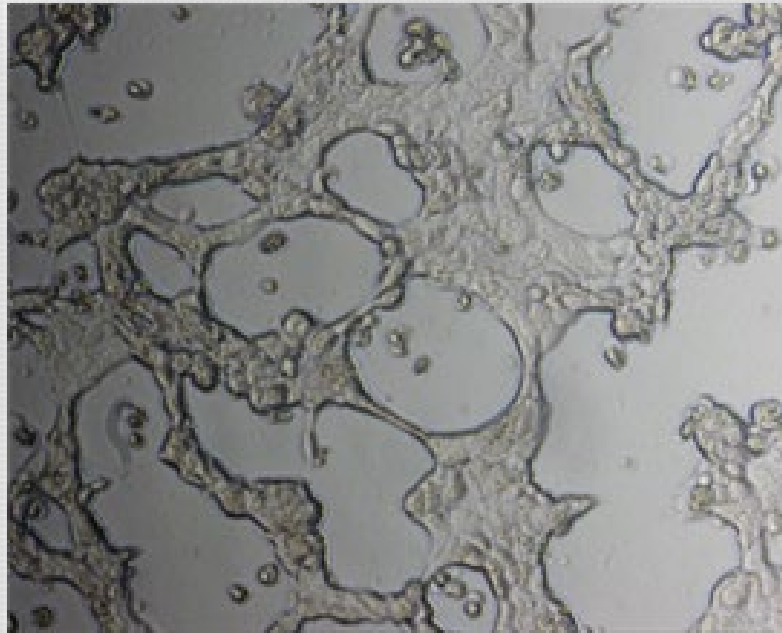


Environmental Engineering and Water Resources Research



Environmental Engineering and Water Resources Research



Dr. Rama Venkat
Dean, College of Engineering
Phone: (702) 895-1094
Email: Rama.Venkat@unlv.edu



Dr. Mohamed Trabia
Associate Dean, College of Engineering
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Currently at UNLV, researchers are actively pursuing research in environmental engineering, water quality, and water resources. This research, which is funded by multiple agencies and industries, specifically address very important questions to the state, the southwest, and the world.

We would like to introduce you to some of our researchers. Please feel to contact us if we can help with future collaboration.

Environmental Engineering and Water Resources

Research Areas of Expertise

- Microwave remote sensing
- Data visualization
- Urban thermodynamic and hydrodynamic modeling
- Sustainable water resources management
- Vulnerability assessment to floods and droughts
- Estimation of water depth, soil moisture, and flooding using satellites
- Wastewater treatment
- Biological nutrient removal
- Efficacy of decarbonization plans
- Environmental analytical chemistry
- Bio-regeneration of ion exchange
- Removal of specific bulk contaminants from water and wastewater
- Disinfection byproducts and toxicity bioassays
- Stormwater pollution control
- Advanced oxidation with ozone
- Water quality data analysis
- Machine learning and energy data analysis
- Sampling strategies

Environmental Engineering and Water Resources Research

Why UNLV?

- UNLV is situated in the center of a metropolitan area faced with serious challenges related to the availability and quality of air and water.
- UNLV's researchers have contributed steadily to meet these challenges.
- UNLV's researchers have established strong collaborations with federal and local agencies in addition to developing strong partnerships with industries.



Faculty Involved in Environmental Engineering and Water Resources Research

Dr. Sajjad Ahmad, P.E., F.ASCE, F.EWRI

Professor, Department of Civil and Environmental Engineering and Construction

Dr. Jacimaria Batista, P.E.

Professor, Department of Civil and Environmental Engineering and Construction

Dr. Marie-Odile Fortier

Assistant Professor, Department of Civil and Environmental Engineering and Construction, Sustainability in Arid Lands

Dr. Dave James, P.E., F. NSPE

Professor, Department of Civil and Environmental Engineering and Construction
Director, Solar and Renewable Energy Programs

Dr. Eakalak Khan, P.E.

Professor, Department of Civil and Environmental Engineering and Construction

Dr. Erica Marti

Associate Professor, Department of Civil and Environmental Engineering and Construction

Dr. Haroon Sahotra

Professor, Department of Civil & Environmental Engineering Director,
GIS and Remote Sensing Core Lab and Visualization Facility

Environmental Engineering and Water Resources Research Highlights



Dr. Sajjad Ahmad, P.E., F.ASCE, F.EWRI

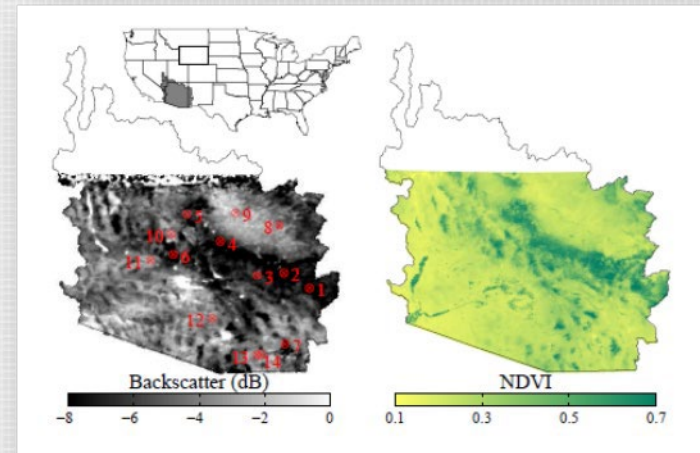
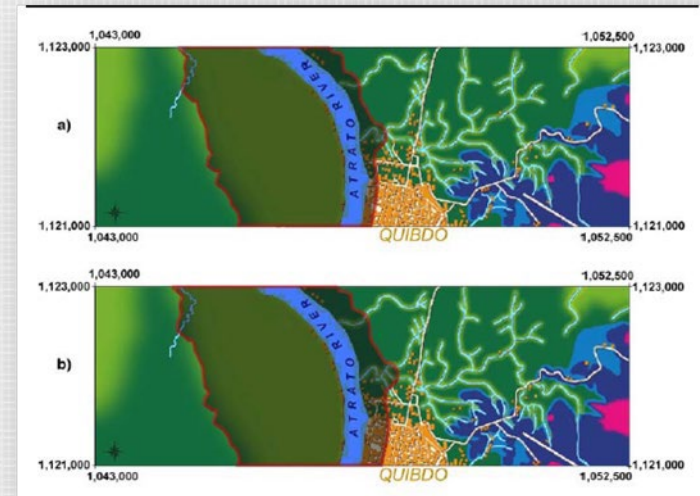
Professor, Department of Civil and Environmental
Engineering and Construction

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- Expertise
 - Water management in response to climate variability and change
 - Seasonal-to-interannual estimation of streamflow and precipitation
 - Hydrologic and hydraulic modeling
 - Estimation of water depth, soil moisture, and flooding using Satellite Remote Sensing
 - Sustainable water resources management
 - Water-energy nexus
 - Vulnerability assessment to floods and droughts
 - Public health



Dr. Sajjad Ahmad, P.E., F.ASCE, F.EWRI

Professor,

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Relevant Publications

- Adjovu GE, Stephen H, James D, Ahmad S (2023). "Measurement of Total Dissolved Solids and Total Suspended Solids in Water Systems: A Review of the Issues, Conventional, and Remote Sensing Techniques." *Remote Sensing* 15(14), 3534.
- Adjovu GE, Stephen H, Ahmad S (2023) "Spatiotemporal Variability in Total Dissolved Solids and Total Suspended Solids Along the Colorado River." *Hydrology* 10(6), 125.
- Adjovu GE, Stephen H, James D, Ahmad S (2023) "Overview of the Application of Remote Sensing in Effective Monitoring of Water Quality Parameters." *Remote Sensing*. 15(7), 1938.
- Riazi M., Khosravi K., Shahedi K., Ahmad S., Jun C., Bateni S.M., Kazakis N. (2023) "Enhancing flood susceptibility modeling using multi-temporal SAR images, CHIRPS data, and hybrid machine learning algorithms". *Science of the Total Environment*. 871, 162066.
- Saher R., Middel A., Stephen H., & Ahmad S. (2022). "Microclimate Effects and Irrigation Water Requirement of Mesic, Oasis, and Xeric Landscapes." *Hydrology*, 9(6), 104.
- Shrestha B., Stephen H., & Ahmad S. (2021) "Impervious Surfaces Mapping at City Scale by Fusion of Radar and Optical Data through a Random Forest Classifier". *Remote Sensing*. 13(15), 3040.
- Saher R., Stephen H., & Ahmad S. (2021). "Effect of Land Use Change on Summer time Surface Temperature, Albedo, and Evapotranspiration in Las Vegas Valley". *Urban Climate*. 39, 100966.
- Poudel U., Stephen H., Ahmad S. (2021). "Evaluating Irrigation Performance and Water Productivity Using EEFlux ET and NDVI". *Sustainability*, 13, 7967.
- Saher R., Stephen H., and Ahmad S. (2021). "Understanding the summertime warming in canyon and non-canyon surfaces", *Urban Climate* 38, 100916.
- S Bukhary, A Kalra, S Ahmad. "Incorporating Pacific Ocean climate information to enhance the tree-ring-based streamflow reconstruction skill," *Journal of Water and Climate Change* 12 (5), 1891-1909 (2021).

Dr. Jacimaria Batista, P.E.

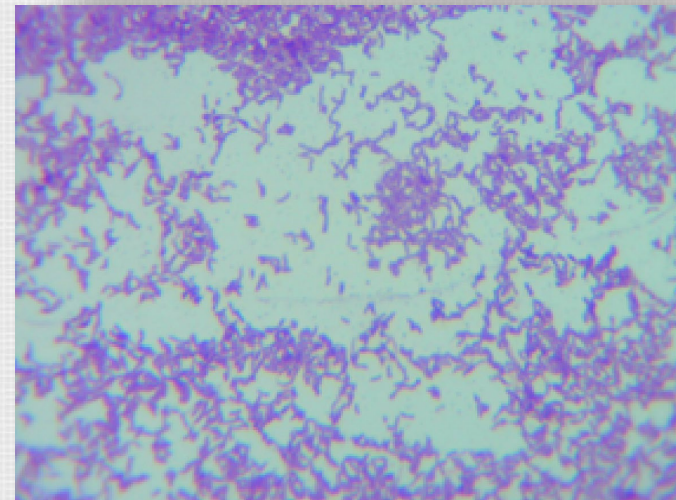
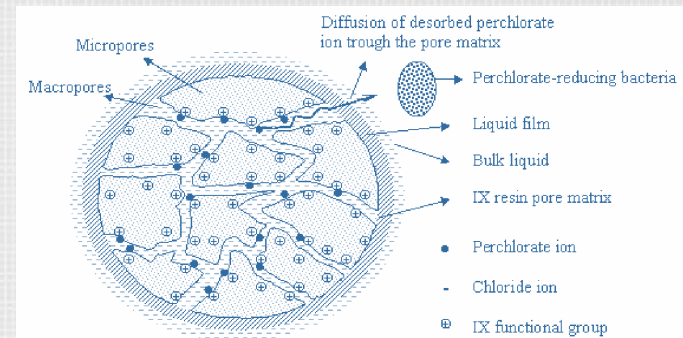
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- Expertise

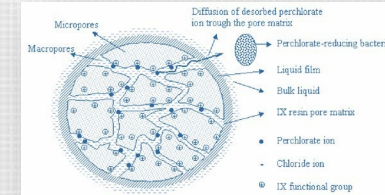
- Wastewater treatment
- Water reuse – brine treatment
- Energy water nexus
- Bioremediation of inorganics
- Adsorption processes and ion-exchange technology
- Biological nutrient removal
- Bio-regeneration of ion exchange
- Algal toxin treatment
- Perchlorate treatment and remediation
- Removal of arsenic, chromium, perchlorate, selenium, uranium, and fluoride from water



Dr. Jacimaria Batista, P.E.

Professor,

Department of Civil and Environmental Engineering and Construction



Relevant Publications

- Y Saedi, JR Batista, R Britto, D Grady, "Impacts of co-contaminants and dilution on perchlorate biodegradation using various carbon sources", *Biodegradation* 34 (4), 301-323 (2023).
- PP Shrestha, JR Batista. "Transition from traditional to alternative project delivery methods in water and wastewater project: executive decision-makers' perspective," *Engineering, Construction and Architectural Management* (2021).
- JR Rabello, JM Gonz ales, JR Batista, A Silva, EJX Costa. "A Simple, Effective, and Low-Cost System for Water Monitoring in Remote Areas Using Optical and Conductivity Data Signature" *Water, Air, & Soil Pollution* 232 (3), 1-13 (2021).
- JR Bailey, S Bukhary, JR Batista, S Ahmad. "Renewable Energy Generation and GHG Emission Reduction Potential of a Satellite Water Reuse Plant by Using Solar Photovoltaics and Anaerobic Digestion." *Water* 2021, 13, 635 (2021).
- SR Gaaney, MT Lavar, CT Adcock, JR Batista, K Czerwinski, DW Hatchett. "The influence of thermal processing on the sorption of Cs and Sr by sitinakite". *Microporous and Mesoporous Materials* 296, 109995 (2020).
- JR Bailey, S Ahmad, JR Batista. "The Impact of Advanced Treatment Technologies on the Energy Use in Satellite Water Reuse Plants." *Water* 12 (2), 366 (2020).
- S Bukhary, J Batista, S Ahmad. "An Analysis of Energy Consumption and the Use of Renewables for a Small Drinking Water Treatment Plant." *Water* 12 (1), 28 (2019).
- S Bukhary, J Batista, S Ahmad. "Using Solar and Wind Energy for Water Treatment in the Southwest." *World Environmental and Water Resources Congress; American Society of Civil Engineers*, pages 410-416 (2019).
- S Mortazavian, A Saber, J Hong, JH Bae, D Chun, N Wong, D Gerrity, J Batista, K Kim, and J Moon. "Synthesis, characterization, and kinetic study of activated carbon modified by polysulfide rubber coating for aqueous hexavalent chromium removal." *Journal of Industrial and Engineering Chemistry* 69, 196-210 (2019).
- PP Shrestha, R Maharjan, JR Batista. "Performance of Design-Build and Construction Manager-at-Risk Methods in Water and Wastewater Projects". *Practice Periodical on Structural Design and Construction* 24 (1), 04018029 (2018).

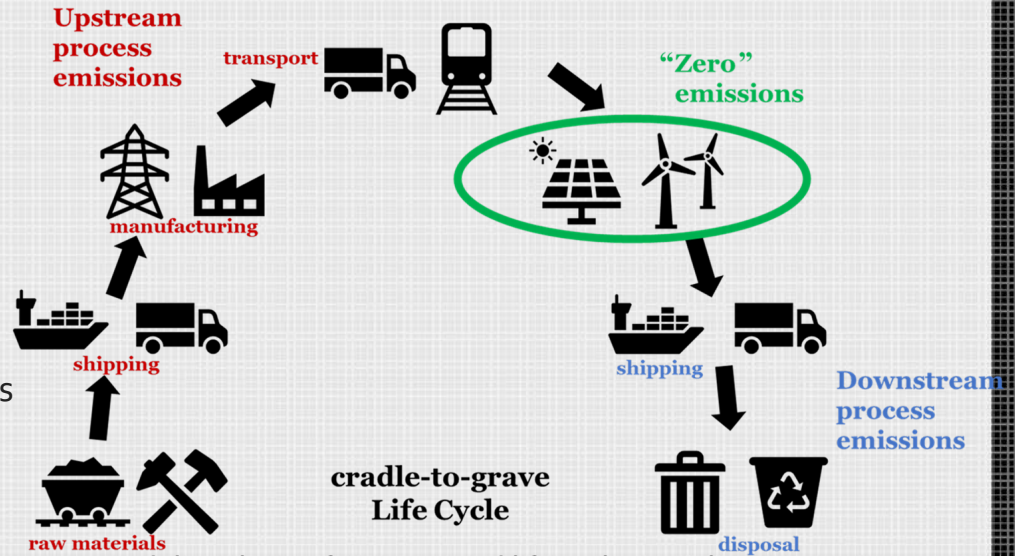
Dr. Marie-Odile Fortier

Assistant Professor, Department of Civil and Environmental Engineering and Construction, Sustainability in Arid Lands

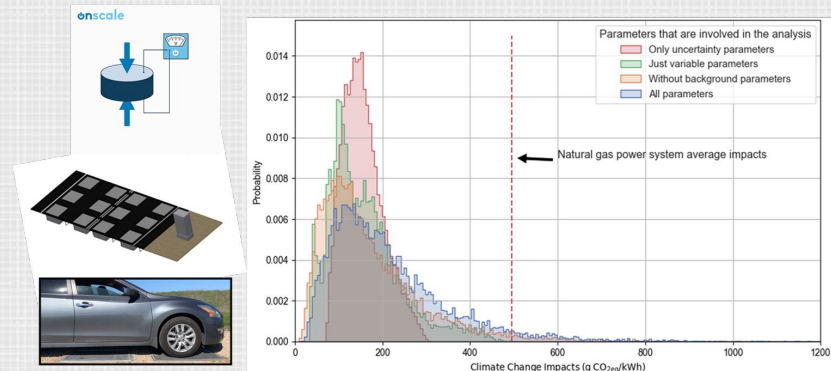
Phone: (702) 894-1459

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- Expertise
 - Geographically specific life cycle assessment, carbon footprints of energy systems
 - Quantifying land use change impacts of fossil fuel and renewable energy expansion
 - Parametric life cycle modelling of novel renewable energy and bioenergy technologies
 - Assessing the efficacy of decarbonization plans
 - Machine learning and energy data analytics

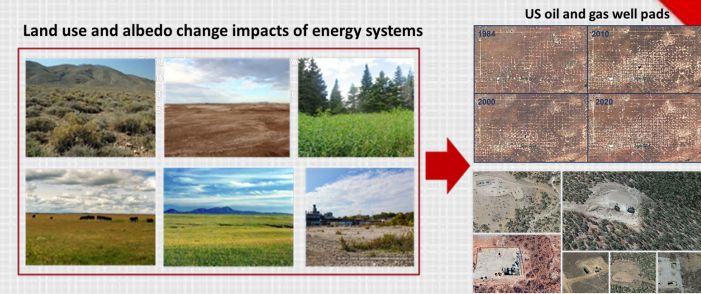


Modeling the performance and life cycle greenhouse gas emissions of emerging renewable energy technologies



Dr. Marie-Odile Fortier

Assistant Professor, Department of Civil and Environmental Engineering and Construction, Sustainability in Arid Lands



Relevant Publications

- Pfadt-Trilling AR, Widyolar BK, Jiang L, Brinkley JT, Bhusal Y, Winston R, and Fortier M-OP. (2023) "Life cycle greenhouse gas emissions of low-temperature process heat generation by external compound parabolic concentrator (XCPC) solar thermal array." *Renewable Energy* 205, 992-998
- Therasme O, Volk TA, Fortier M-OP, Kim Y, Wood CD, Ha H, Ali A, Brown TR, and Malmshemer RW. (2022) "Carbon footprint of biofuels production from forest biomass using hot water extraction and biochemical conversion in the Northeast United States." *Energy* 241, 122853
- Pfadt-Trilling AR, Volk TA, and Fortier M-OP. (2021) "Climate change impacts of electricity generated at a waste-to-energy facility." *Environmental Science and Technology* 55(3), 1436-1445
- Pfadt-Trilling AR and Fortier M-OP. (2021) "Greenwashed energy transitions: Are US cities accounting for the life cycle greenhouse gas emissions of energy resources in climate action plans?" *Energy and Climate Change* 2, 100020.
- Yang S, Volk TA, and Fortier M-OP. (2020) "Willow biomass crops are a carbon sequestration system or low-carbon biomass feedstock depending on prior land use and transportation distances to end users." *Energies* 13(16), 4251.
- Fortier M-OP, Teron L, Reames TG, Munardy DT, and Sullivan B. (2019) "Introduction to evaluating energy justice across the life cycle: A social life cycle assessment approach." *Applied Energy* 236, 211-219.
- Fortier M-OP, Roberts GW, S-Williams SM, Sturm BSM. (2017) "Determination of the life cycle climate change impacts of land use and albedo change in algal biofuel production." *Algal Research* 28, 270-281.

Dr. David James, P.E., F.NSPE

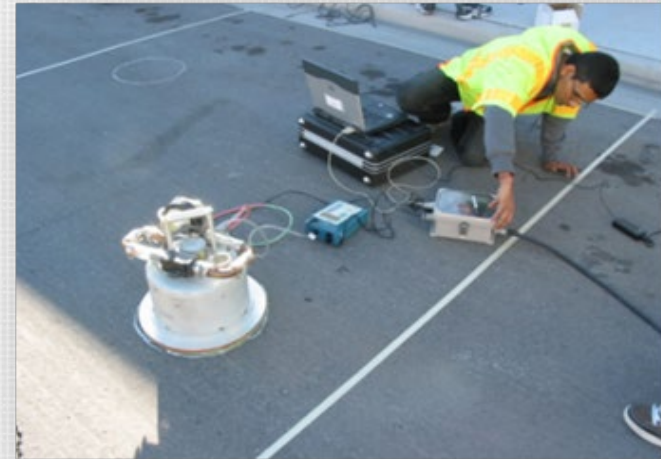
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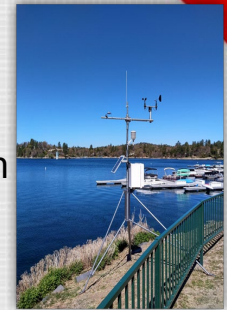
Email: dave.james@unlv.edu

- Expertise
 - Water quality data analysis
 - Paved road and vacant land dust emissions
 - Sampling strategies, finite populations



Dr. David James, P.E., F.NSPE

Professor, Department of Civil and Environmental Engineering and Construction
Director, Solar and Renewable Energy Programs



Relevant Publications

- Wainscott, Susan B., Mohamed Trabia, David E. James; "Engaging Everyone in Research Ethics: Assessment of a Workshop for Engineering and Computer Science Graduate Students." *Advances in Engineering Education* 11(4), 58-79 (2023)
- S. Ehsani, David James, Z. M. Oskaoie, "Determining Selenium speciation by graphite furnace atomic absorption spectrometry" *Environ Monit Assess* 193:581 (2021).
- D. R. Fitz, K. Bumiller, V. Etyemezian, H. D. Kuhns, J. A. Gillies, G. Nikolich, David E. James, R. Langston, R. S. Merle, "Real-time PM₁₀ emission rates from paved roads by measurement of concentrations in the vehicle's wake using on-board sensors Part 2. Comparison of SCAMPER, TRAKER™, flux measurements, and AP-42 silt sampling under controlled conditions", *Atmospheric Environment*, Volume 256, July 2021, 118453, ISSN 1352-2310 (2021) .
- D. R. Fitz, K. Bumiller, C. Bufalino, David E. James. "Real-time PM₁₀ emission rates from paved roads by measurement of concentrations in the vehicle's wake using on-board sensors part 1. SCAMPER method characterization." *Atmospheric Environment* 230 117483 (2020) .
- Saber, A., David E. James, and I.A. Hannoun. "Effects of lake water level fluctuation due to drought and extreme winter precipitation on mixing and water quality of an alpine lake, Case Study: Lake Arrowhead, California." *Science of the Total Environment* (2020).
- Saber, A., David E. James, & Hayes, D. F. "Long-term forecast of water temperature and dissolved oxygen profiles in deep lakes using artificial neural networks conjugated with wavelet transform". *Limnology and Oceanography* (2019) .
- Saber, A., David E. James, & Hayes, D. F. "Estimation of water quality profiles in deep lakes based on easily measurable constituents at the water surface using artificial neural networks coupled with stationary wavelet transform". *Science of the Total Environment*, 694, 133690 (2019).
- Saber, A., James, D. E., & Hayes, D. F. "Effects of seasonal fluctuations of surface heat flux and wind stress on mixing and vertical diffusivity of water column in deep lakes." *Advances in Water Resources*, 119, 150-163 (2018).

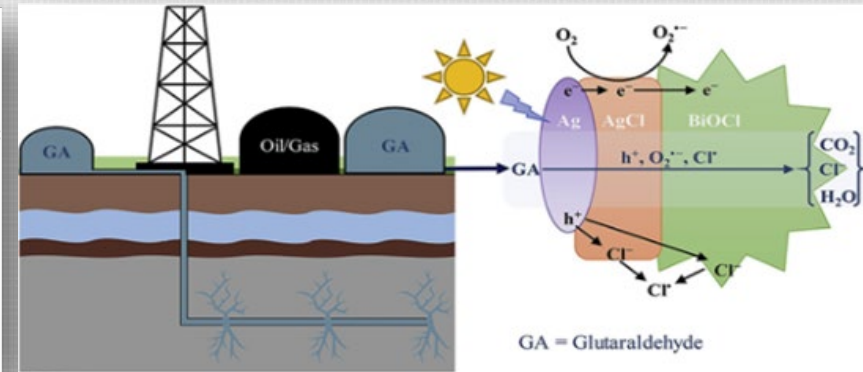
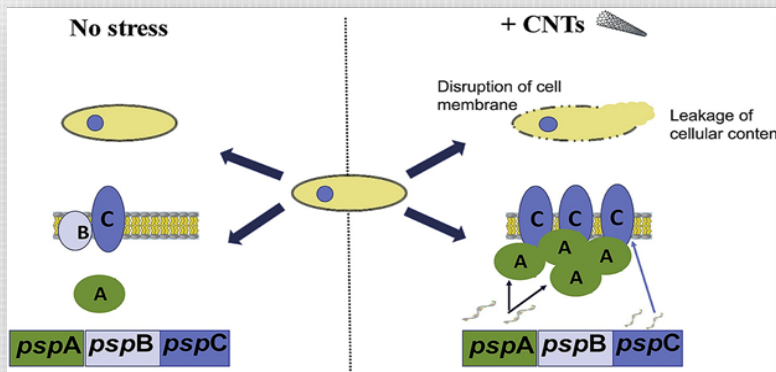
Dr. Eakalak Khan, P.E.

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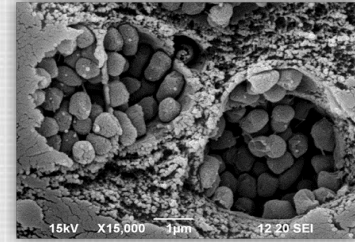
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- Expertise
 - Removal of specific and bulk chemical contaminants from water and wastewater focusing on process development
 - Biodegradation of organic contaminants and method development for measuring biodegradability and bioavailability of bulk contaminants in water and wastewater
 - Impact of nanotechnology on microbes and bioprocesses
 - Fate and transport of contaminants in environment
 - Stormwater pollution control



Dr. Eakalak Khan, P.E.

Professor, Department of Civil and Environmental Engineering and Construction



Relevant Publications

- Masrura, S.U., Dissanayake, P., Sun, Y., Ok, Y.S., Tsang, D.C.W., and Khan, E. (2021) "Sustainable Use of Biochar for Resource Recovery and Pharmaceutical Removal from Human Urine: A Critical Review." *Critical Reviews in Environmental Science and Technology*, 51, 30216-3048.
- Abbas, T., Wadhawan, T., Khan, A., McEvoy, J., and Khan, E. (2021) "Iron Turning Waste: Low Cost and Sustainable Permeable Reactive Barrier Media for Remediating Dieldrin, Endrin, DDT and Lindane in Groundwater." *Environmental Pollution*, 289, Article # 117825.
- Thuptimdang, P., Siripattanakul-Ratpukdi, S., Ratpukdi, T., Youngwilai, A., and Khan, E. (2021) "Biofiltration for Treatment of Recent Emerging Contaminants in Water: Current and Future Perspectives." *Water Environment Research*, 93, 972-992.
- Christensen, V.G., Stelzer, E.A., Eikenberry, B.C., Olds, H.T., LeDuc, J.F., Maki, R.P., Saley, A.M., Norland, J., Khan, E. (2021) "Cyanotoxin Mixture Models: Relating Environmental Variables and Toxin Co-Occurrence to Human Exposure Risk". *Journal of Hazardous Materials*, 415, Article # 125560.
- Joshi, R., Kasi, M., Wadhawan, T., Khan, E. (2021) "Production and Removal of Soluble Organic Nitrogen by Nitrifying Biofilm". *Journal of Environmental Chemical Engineering*, 9, Article # 105440.
- Jindakaraked, M., Khan, E., Kajitvichyanukul, P. (2021) "Biodegradation of Paraquat by Pseudomonas putida and Bacillus subtilis Immobilized on Ceramic with Supplemented Wastewater Sludge". *Environmental Pollution*, 286, Article # 117307.
- Ratpukdi, T., Intarasuwan, K., Jutaporn, P., Khan, E. (2021) "Interactions between Natural Organic Matter Fractions and Nanoscale Zero-valent Iron". *Science of The Total Environment*, 796, Article # 148954.
- Hong, S., Ratpukdi, T., Delorme, A., Khan, E. (2021) "Biobased Materials as Potential Precursors for Disinfection By-products in Water." *Journal of Environmental Chemical Engineering*, 9, Article # 106032.
- Joshi, R., Kasi, M., Wadhawan, T., Khan, E. (2021) "Investigating Organic Nitrogen Production in Activated Sludge Process: Size Fraction and Biodegradability." *Science of the Total Environment*, 773, Article # 145695.
- Martin, M.A., Sivaguru, J., McEvoy, J., Sonthiphand, P., Khan, E. (2021) "Photolytic Fate of (E)- and (Z)-Endoxifen in Water and Treated Wastewater Exposed to Sunlight". *Environmental Research*, 197, Article # 111121.

Dr. Erica Marti

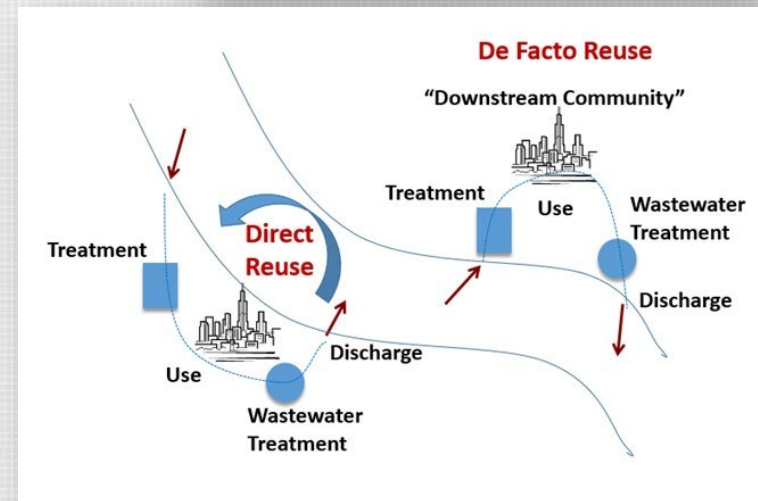
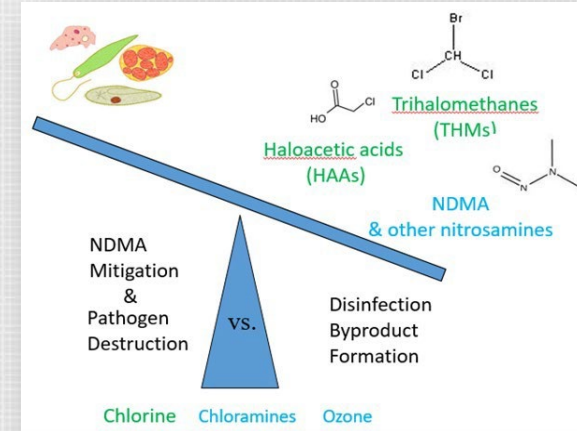
Associate Professor,

Department of Civil and Environmental Engineering and Construction

Phone: (702) 895-2693

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- Expertise
 - Water and wastewater treatment
 - Disinfection byproducts and toxicity bioassays
 - Potable water reuse
 - Fate and transport of trace contaminants (e.g., estrogen, pharmaceuticals)
 - Environmental analytical chemistry
 - Advanced oxidation with ozone
 - Activated carbon and biochar adsorption



Dr. Erica Marti

Associate Professor, Department of Civil and Environmental Engineering
& Construction

Ozonation in water and
wastewater treatment.



- Pochampally, S. V., Krishnaswamy, P., Ogra, C., Mortazavian, S., Marti, E., & Moon, J. (2023). "Adsorption of chlorinated hydrocarbons onto non-activated biochars: Biochar physicochemical characteristics and governing factors." *Bioresource Technology Reports*, 22, 101465.
- Kajjumba, G. W., & Marti, E. J. (2022). "A review of the application of cerium and lanthanum in phosphorus removal during wastewater treatment: Characteristics, mechanism, and recovery." *Chemosphere*, 309, 136462.
- Gerrity, D., Papp, K., Dickenson, E., Ejjada, M., Marti, E., Quinones, O., ... & Trenholm, R. A. (2022). "Characterizing the chemical and microbial fingerprint of unsheltered homelessness in an urban watershed". *Science of The Total Environment*, 840, 156714.
- Kajjumba, G. W., Bokota, R. E., Attene-Ramos, M., & Marti, E. J. (2022). "Evaluation of disinfection byproducts for their ability to affect mitochondrial function." *Journal of Environmental Sciences*, 117, 295-304.
- Kajjumba, G. W., Attene-Ramos, M., Marti, E. J. "Toxicity of lanthanide coagulants assessed using four in vitro bioassays." *Science of the Total Environment*, 800 (2021), 149556. DOI:10.1016/j.scitotenv.2021.149556
- Kajjumba, G. W. Fischer, D., Risso, L., Koury, D., Marti, E. J. "Application of cerium and lanthanum coagulants in wastewater treatment—A comparative assessment to magnesium, aluminum, and iron coagulants". *Chemical Engineering Journal*, 426 (2021), 13268. DOI: 10.1016/j.cej.2021.131268
- Abbas, T., Kajjumba, G. W., Ejjada, M., Masrura, S. U., Marti, E. J., Khan, E., & Jones-Lepp, T. L. "Recent Advancements in the Removal of Cyanotoxins from Water Using Conventional and Modified Adsorbents—A Contemporary Review." *Water*, 12:10, 2756. DOI:10.3390/w12102756 (2020).
- Qui Cheng, A., Rouhani, D., & Marti, E. J. "Optimizing Tank Design to Improve THM Removal with Spray Aeration." 20th World Environmental & Water Resources Congress in Henderson, NV (2020).
- Marti, E.J., Glover, C., & Dickenson, E.R.V. "Ranitidine – A Potential Significant NDMA Precursor for Potable Reuse." 2018 Water Environment Federation (WEF) Disinfection & Reuse Symposium in Portland, OR (2018).
- Marti, E.J., Batista, J.R., Dickenson, E.R.V. "Treatment of Specific NDMA Precursors by Biofiltration." *Journal - American Water Works Association* 109:6 E273-E286. DOI: 10.5942/jawwa.2017.109.0070 (2017).

Dr. Haroon Sahotra

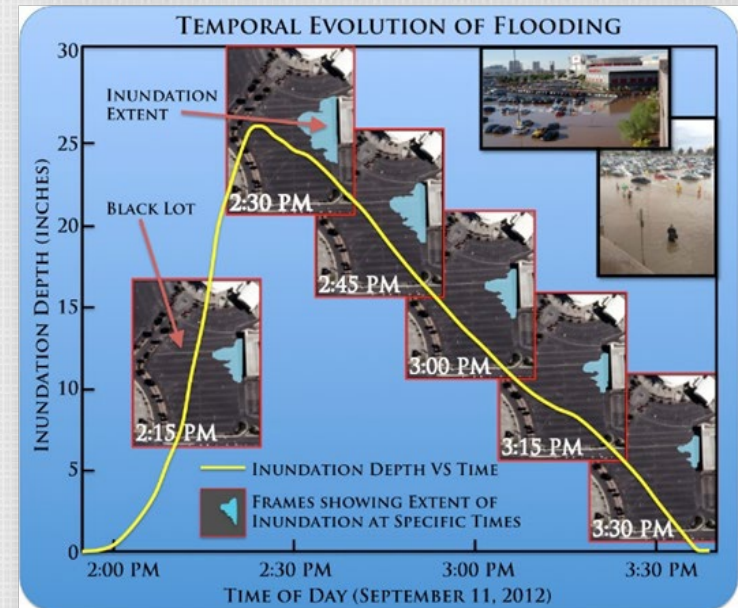
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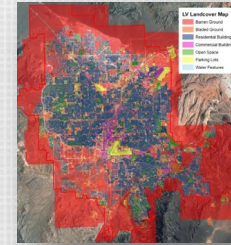
Email: haroon.stephen@unlv.edu

- Expertise
 - Microwave remote sensing
 - Geographic information systems (GIS)
 - Land scatterometry and radiometry
 - Remote sensing applications to water resources and hydrologic studies
 - Data visualization
 - Integration of remote sensing, GIS, and global position systems for Earth system science research
 - Surface water hydrology
 - Urban thermodynamic and hydrodynamic modeling



Dr. Haroon Sahotra

Professor, Department of Civil and Environmental Engineering and Construction
Director, GIS and Remote Sensing Core Lab and Visualization Facility



Relevant Publications

- M Bartshe, C Coughenour, H Stephen. "The relationship between tree canopy and social capital on physical activity in college students." *Journal of American College Health* 71 (6), 1705-1714 (2023).
- GE Adjovu, H Stephen, D James, S Ahmad, "Measurement of Total Dissolved Solids and Total Suspended Solids in Water Systems: A Review of the Issues, Conventional, and Remote Sensing Techniques." *Remote Sensing* 15 (14), 3534 (2023).
- GE Adjovu, H Stephen, S Ahmad. "A Machine Learning Approach for the Estimation of Total Dissolved Solids Concentration in Lake Mead Using Electrical Conductivity and Temperature." *Water* 15 (13), 2439 (2023).
- GE Adjovu, H Stephen, S Ahmad. "Spatial and Temporal Dynamics of Key Water Quality Parameters in a Thermal Stratified Lake Ecosystem: The Case Study of Lake Mead." *Earth* 4 (3), 461-502 (2023).
- GE Adjovu, H Stephen, S Ahmad. "Spatiotemporal Variability in Total Dissolved Solids and Total Suspended Solids along the Colorado River." *Hydrology* 10 (6), 125 (2023)
- GE Adjovu, H Stephen, D James, S Ahmad. "Overview of the Application of Remote Sensing in Effective Monitoring of Water Quality Parameters." *Remote Sensing* 15 (7), 1938 (2023)
- TA Shaikh, GE Adjovu, H Stephen, S Ahmad. "Impacts of Urbanization on Watershed Hydrology and Runoff Water Quality of a Watershed: A Review." World Environmental and Water Resources Congress 2023, 1271-1283.
- GE Adjovu, T Ali Shaikh, H Stephen, S Ahmad. "Utilization of Machine Learning Models and Satellite Data for the Estimation of Total Dissolved Solids in the Colorado River System." World Environmental and Water Resources Congress 2023, 1147-1160
- R Saher, A Middel, S Ahmad, H Stephen. "Numerical Approach to Understanding the Microclimate Effects and Irrigation Water Requirements in Urban Landscapes." AGU Fall Meeting 2021.
- R Saher, H Stephen, S Ahmad. "Effect of land use change on summertime surface temperature, albedo, and evapotranspiration in Las Vegas Valley." *Urban Climate* 39, 100966 (2021).