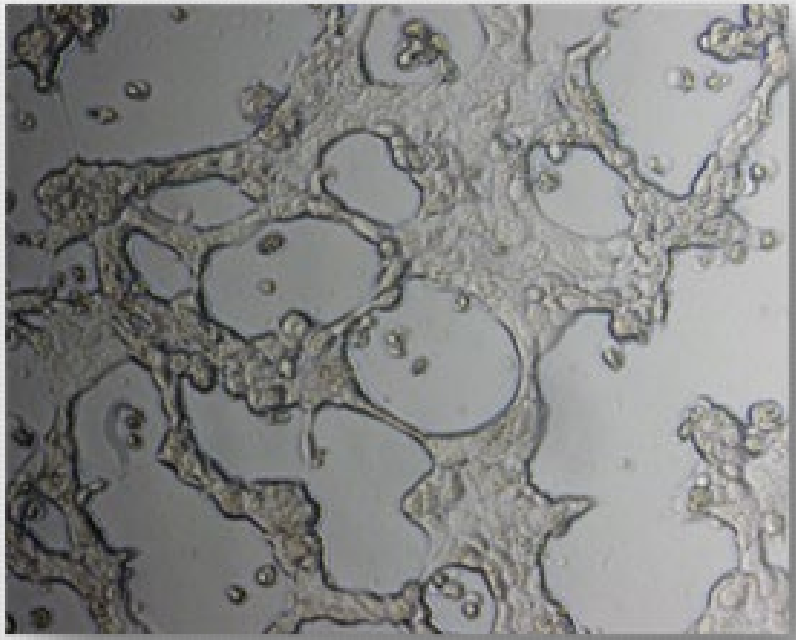
Environmental Engineering and Water Resources Research



Environmental Engineering and Water Resources Research

Dr. Rama Venkat
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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

- Geographic information systems (GIS)
- Microwave remote sensing
- Data visualization
- Hydrologic and hydraulic modeling
- Urban thermodynamic and hydrodynamic modeling
- Sustainable water resources management
- Water-energy nexus
- Vulnerability assessment to floods and droughts
- Estimation of water depth, soil moisture, and flooding using satellites
- Activated carbon and biochar adsorption
- Trace organic contaminants
- Environmental microbiology
- Adsorption processes and ion-exchange technology
- Bio-regeneration of ion exchange
- Water quality control
- Removal of organic and inorganic contaminants from water
- Disinfection byproducts and toxicity bioassays
- Stormwater pollution control
- Advanced oxidation with ozone
- Water quality data analysis
- Water uptake by plant roots at the rhizosphere scale

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.
Chair & 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
Associate 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
Assistant Professor, Department of Civil and Environmental Engineering and Construction

Dr. Haroon Stephen
Associate 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.

Chair and Professor,

Department of Civil and Environmental Engineering and Construction

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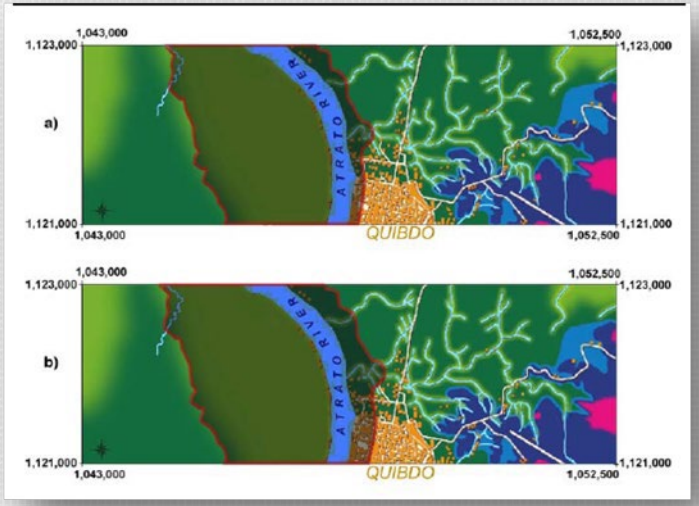
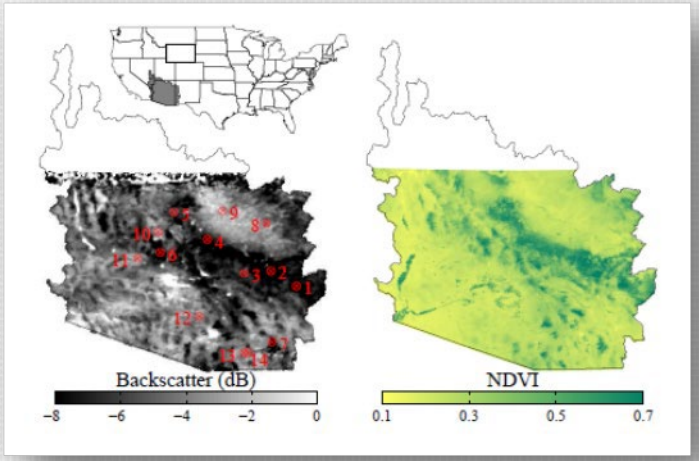
Website: http://faculty.unlv.edu/sajjad/

- 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

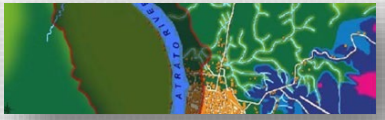




Dr. Sajjad Ahmad, P.E.

Chair & Professor,

Department of Civil and Environmental Engineering and Construction



Relevant Publications

- 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).
- M Panahi, K Khosravi, S Ahmad, S Panahi, S Heddam, AM Melesse, ... "Cumulative infiltration and infiltration rate prediction using optimized deep learning algorithms: A study in Western Iran," *Journal of Hydrology: Regional Studies 35*, 100825 (2021).
- D Fan, S Wang, Y Guo, Y Zhu, E Agathokleous, S Ahmad, J Han. "Cd induced biphasic response in soil alkaline phosphatase and changed soil bacterial community composition: The role of background Cd contamination and time as additional factors." *Science of The Total Environment* 757, 143771 (2021).
- AY Bavandpour, H Nozari, S Ahmad. "System Dynamics Approach for Water Resources Systems Analysis." *Essential Tools for Water Resources Analysis, Planning, and Management*, 153-176 (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 13* (5), 635 (2021).
- B Naeem, M Azmat, H Tao, S Ahmad, MU Khattak, S Haider, S Ahmad, ... "Flood Hazard Assessment for the Tori Levee Breach of the Indus River Basin, Pakistan." *Water* 13 (5), 604 (2021).
- JR Bailey, S Ahmad, JR Batista. "The Impact of Advanced Treatment Technologies on the Energy Use in Satellite Water Reuse Plants". *Water* 12 (2), 36 (2020).
- B Thakur, A Kalra, S Ahmad, KW Lamb, V Lakshmi. "Bringing statistical learning machines together for hydro-climatological predictions-Case study for Sacramento San Joaquin River Basin, California." *Journal of Hydrology: Regional Studies 27*, 100651 (2020).
- A Gregory, C Chen, R Wu, S Miller, S Ahmad, JW Anderson, H Barret, ... "Efficient Model-data Integration for Flexible Modeling, Parameter Analysis & Visualization, and Data Management". *Frontiers in Water* 2, 2 (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 (2020).

Dr. Jacimaria Batista, P.E.

Professor, Department of Civil and Environmental Engineering and Construction

Phone: (702) 895-1585

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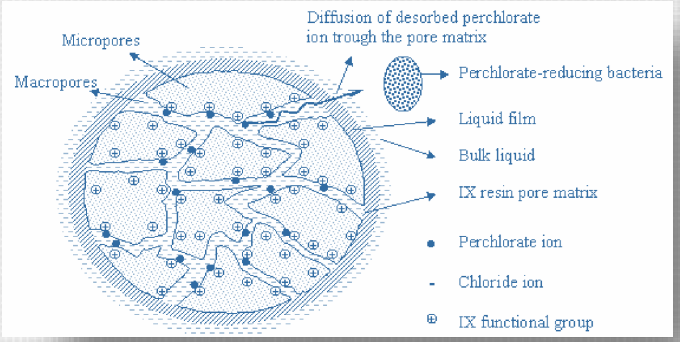
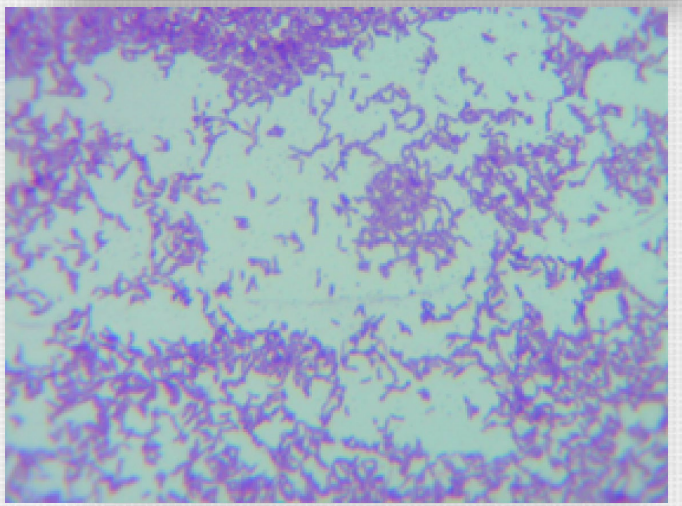
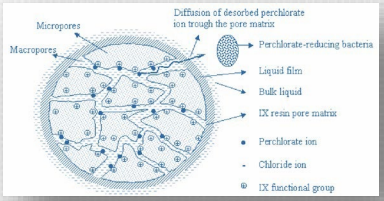
- Expertise
  - Wastewater treatment
  - Water reuse – brine treatment
  - Energy water nexus
  - Bioremediation of inorganics
  - Adsorption processes and ion-exchange technology
  - Biological nutrient removal
  - Bio-regeneration of ion exchange
  - Algal toxin treatment
  - Perchlorate treatment 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

- 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 Gonzáles, 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 Gainey, MT Lauar, 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).
- M Arnold, J Batista, E Dickenson, D Gerrity. "Use of ozone-biofiltration for bulk organic removal and disinfection byproduct mitigation in potable reuse applications". *Chemosphere* 202, 228-237 (2018).

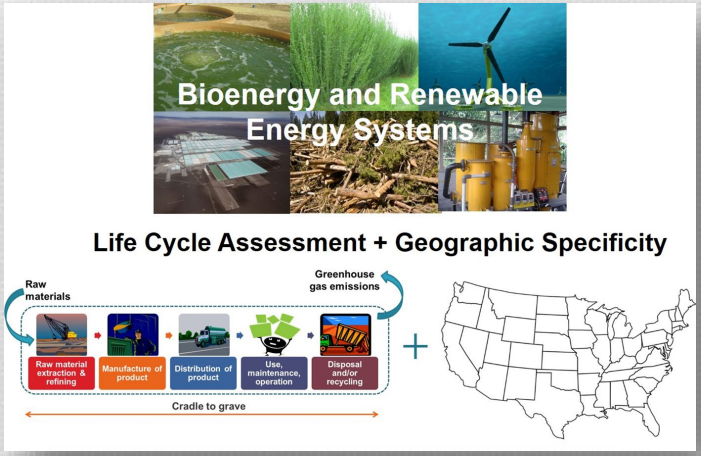
Dr. Marie-Odile Fortier

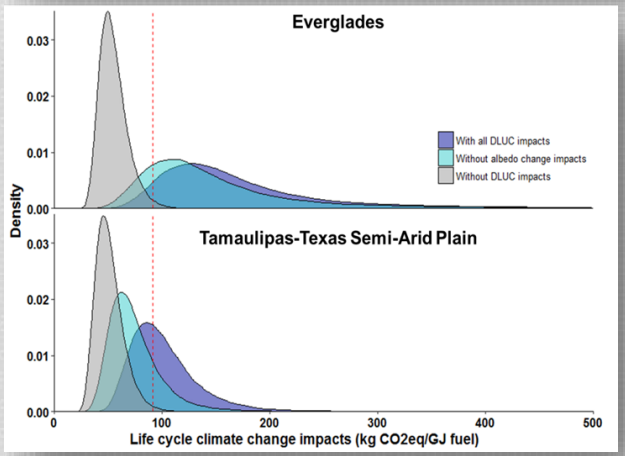
Assistant Professor, Department of Civil and Environmental Engineering and Construction, Sustainability in Arid Lands

Phone: (702) 894-1459

Email: marie-odile.fortier@unlv.edu

- Expertise
  - Geographically specific life cycle assessment (LCA)
  - Quantifying land use change and albedo change impacts of energy systems
  - Parametric life cycle modelling of novel renewable energy and bioenergy technologies
  - Assessing the efficacy of climate change mitigation strategies
  - Determining the carbon footprint of bioproducts and of approaches to harness energy from wastes





Dr. Marie-Odile Fortier

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

- Frank JR, Therasme O, Volk TA, Brown TR, Malmsheimer RW, Fortier M-OP, Eisenbies MH, Ha H, and Heavey J. (2022) "Integrated stochastic life cycle assessment and techno-economic analysis for shrub willow production in the northeastern United States." *Sustainability* 14(
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- Therasme O, Volk TA, Eisenbies MH, Amidon TE, and Fortier M-OP. (2021) "Life cycle greenhouse gas emissions of ethanol produced via fermentation of sugars derived from shrub willow (Salix ssp.) hot water extraction in the Northeast United States." *Biotechnology for Biofuels* 14(1), 52.
- 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.
- Quinn RJ, Ha H, Volk TA, Brown TR, Bick S, Malmsheimer RW, and Fortier M-OP. (2020) "Life cycle assessment of forest biomass energy feedstock in the Northeast United States." *GCB Bioenergy* 12, 728-741.
- 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

Associate Professor,

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

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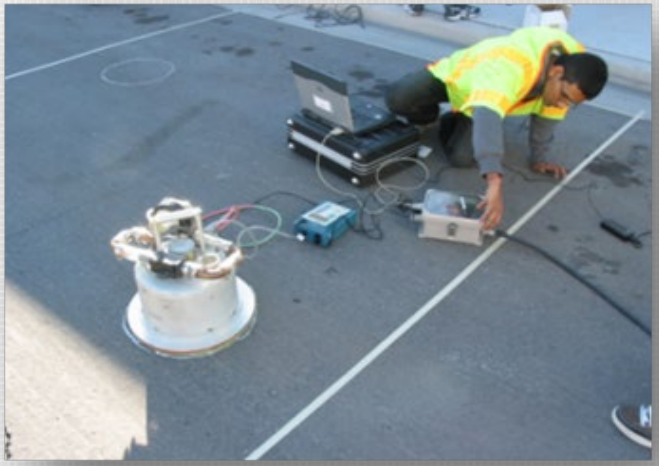
Email: dave.james@unlv.edu

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



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

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

Relevant Publications

- S. Ehsani, David James, Z. M. Oskaouie, "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) .
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- 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).
- James, D. ,Schraw, G., & Kuch, F. "Assessment & Evaluation in Higher Education Using the margin of error statistic to examine the effects of aggregating student evaluations of teaching". *Assessment & Evaluation in Higher Education*, 1-11 (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.

Professor, Department of Civil and

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Phone: (702) 774-1449

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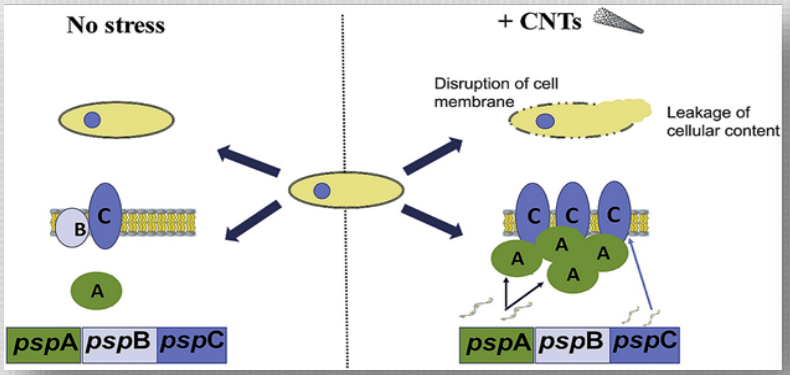
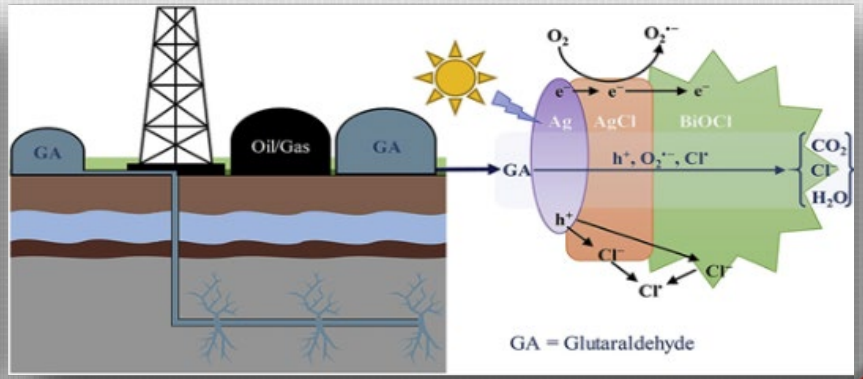
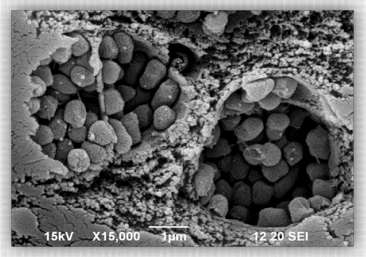
- Expertise
  - Removal of specific and bulk chemical contaminants from water and wastewater focusing on process development
  - Biodegradation of organic contaminants and method development for measuring biodegradability and bioavailability of bulk contaminants in water and wastewater
  - Impact of 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

Assistant Professor,

Department of Civil and Environmental Engineering and Construction

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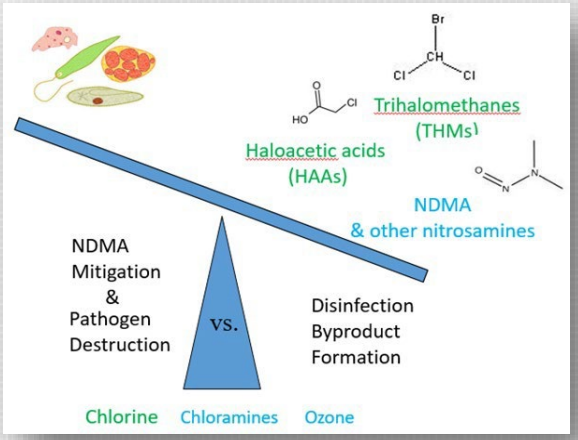
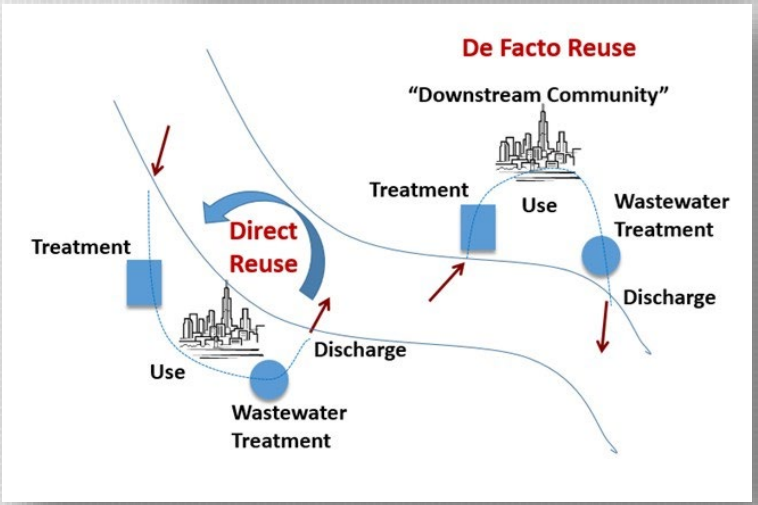
- Expertise
  - Water and wastewater treatment
  - Disinfection byproducts and toxicity bioassays
  - Potable water reuse
  - Fate and transport of trace contaminants (e.g., estrogen, pharmaceuticals)
  - Environmental analytical chemistry
  - Advanced oxidation with ozone
  - Activated carbon and biochar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





Dr. Erica Marti

Assistant Professor, Department of Civil and Environmental Engineering & Construction

Ozonation in water and wastewater treatment.

Relevant Publications

- 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).
- Woods-Chabane, G., Glover, C., Marti, E.J., Dickenson, E.R.V. "A novel assay to measure tertiary and quaternary amines in wastewater: An indicator for NDMA wastewater precursors". *Chemosphere* 179 298-305. DOI: 10.1016/j.chemosphere.2017.03.045 (2017) .
- Zeng, T., Glover, C.M., Marti, E.J., Woods-Chabane, G.C., Karanfil, T., Mitch, W.A., Dickenson, E.R.V. "Relative Important of Different Water Categories as Sources of N-Nitrosamine Precursors". *Environmental Science and Technology* 50 13239-13248. DOI: 10.1021/acs.est.6b04650 (2016) .
- Marti, E.J., Pisarenko, A.N., Peller, J., Dickenson, E.R.V. "N-Nitrosodimethylamine (NDMA) Formation from the Ozonation of Model Compounds". *Water Research* 72 262-270. DOI: 10.1016/j.watres.2014.08.047 (2015) .
- Gerrity, D., Pisarenko, A.N., Marti, E.J., Trenholm, R.A., Gerringer, F., Reungoat, J., Dickenson, E.R.V. "Nitrosamines in pilot-scale and full-scale wastewater treatment plants with ozonation". *Water Research* 72 251-261. DOI: 10.1016/j.watres.2014.06.025 (2015) .

Dr. Haroon Stephen

Associate Professor,
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Director, GIS and Remote Sensing Core Lab and Visualization Facility

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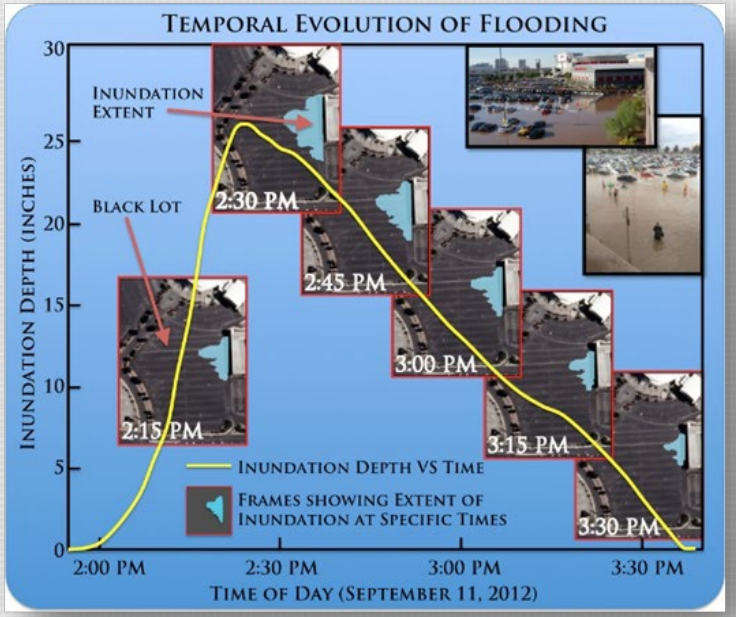
- Expertise
  - Microwave remote sensing
  - Geographic information systems (GIS)
  - Land scatterometry and radiometry
  - Remote sensing applications to water resources and hydrologic studies
  - Data visualization
  - Integration of remote sensing, GIS, and global position systems for Earth system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



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Department of Civil and Environmental Engineering and Construction
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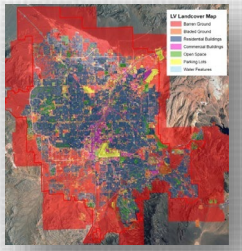

Relevant Publications

- 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).
- B Shrestha, S Ahmad, H Stephen. "Fusion of Sentinel-1 and Sentinel-2 data in mapping the impervious surfaces at city scale." *Environmental Monitoring and Assessment* 193 (9), 1-21 (2021).
- R Saher, H Stephen, S Ahmad. "Understanding the summertime warming in canyon and non-canyon surfaces." *Urban Climate* 38, 100916 (2021).
- R Saher, H Stephen, S Ahmad. "Urban evapotranspiration of green spaces in arid regions through two established approaches: a review of key drivers, advancements, limitations, and potential opportunities." *Urban Water Journal* 18 (2), 115-127 (2021).
- B Shrestha, H Stephen, S Ahmad. "Impervious Surfaces Mapping at City Scale by Fusion of Radar and Optical Data through a Random Forest Classifier." *Remote Sensing* 13 (15), 3040
- H Stephen, S Ahmad. "Evaluating Irrigation Performance and Water Productivity Using EEFlux ET and NDVIU Poudel," *Sustainability* 13 (14), 7967 (2021).
- T Ali Shaikh, S Ahmad, H Stephen. "Assessing Spatiotemporal Change in Land Cover and Total Dissolved Solids Concentration Using Remote Sensing Data." World Environmental and Water Resources Congress 2021, 384-396 (2021).
- G Ebenezer Adjovu, S Ahmad, H Stephen. "Analysis of Suspended Material in Lake Mead Using Remote Sensing Indices." World Environmental and Water Resources Congress 2021, 754-768 (2021).
- U Poudel, S Ahmad, H Stephen. "Studying the Intra-Annual Variability in Surface Area and Volume of Salton Sea, California, Using Remote Sensing-Based Water Indices and GIS." World Environmental and Water Resources Congress 2021, 769-783 (2021).