Bilal M. Khan, Ph.D.

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Areas of Expertise

Artificial intelligence (Generative AI, machine learning, reinforcement learning, computer vision) and software engineering in interdisciplinary areas, noticeably in reverse osmosis (RO) membrane-based water treatment processes & environmental risk assessment. Intersection of computer and cognitive science.

Appointments

Current	Associate Professor, CSU San Bernardino, Calirofornia, USA
2020 - 2025	Assistant Professor, CSU San Bernardino, California, USA
2018–	Co-founder, Noria Water Technologies, Los Angeles, USA
2017–2020	Assistant Researcher, University of California Center for Environmental Implications of Nanotechnology (UC CEIN)
2014–2017	Postdoctoral Research Scholar, UC CEIN
2013	Visiting Lecturer, British Broadcasting Corporation (BBC UK)
2012–2013	Research Fellow, University of Leeds (UK)
2010–2012	Lecturer/Associate Lecturer, University of Bradford (UK)
2009–2011	Teaching Assistant, University of Bradford (UK)
2011–2012	Mobile Application Developer, Metricell Ltd. (UK)
2010–2011	Full Stack Web Developer, University of Bradford (UK)

Selected Honors and Awards

2024	2023/24 Research and Creative Activities Faculty Mentor Award - CSUSB
2024	Best oral presentation award. 11th IEEE Intl Conf on Data Science and Advanced Analytics (DSAA). San Diego, CA, USA, October 6th-10th, 2024
2019	2019 Young Professional: Water and Wastes Digest Class of 2019 Young Professionals, WWD (AWWA)
2017	Outstanding work of the year, US Naval Research Laboratory (NRL) Review, "meta-analysis of cellular toxicity for cadmium-containing quantum dots".
2010	Postgraduate certificate in higher education practice (PGCHEP) with distinction: University of Bradford

Education

2022	Association of College and University Educators (ACUE)
2022	Culturally Responsive Teaching (CRT)
2015	Certificate in Entrepreneurship for Science, Medicine & Technology University of California Los Angeles (School of Management)
2008–2012	Ph.D., Computer Science, University of Bradford (UK) Thesis Title: Game Theoretic Coalitional Routing in Cooperative Vehicular Ad Hoc Networks
2012	PGCert in Higher Education Practice, University of Bradford (UK)
2008	M.Sc., Computer Science, Birmingham City University (UK)
2003–2006	M.Sc.,Computer Science, COMSATS University of IT (Pakistan)

Grants

Academic Funding

2022	**Role**: Co-PI **Title**: Analytics for Causal Analysis and Decision Support Models for Autonomous and Smart Water Treatment (National Alliance for Water Innovation (NAWI)	$2M
2022	**Role**: Co-PI **Title**: Optimization of Reverse Osmosis Feed Pretreatment Train Enabled by Machine Learning (National Alliance for Water Innovation (NAWI)	$5,537,546
2022	Pending decision **Role**: Co-PI **Title**: Electrically Modulated Plasmonic Nanohole Membranes for Fouling Control via Coupled Field Transport Interactions (US National Science Foundation)	$400,000
2011	**Role**: Staff **Title**: Cross-Layer Investigation and Integration of Computing and Networking Aspects of Mobile Social Networks (CLIMBER)	$650,000
2011	**Role**: PI-solo **Title**: Tracesaver - A Unique Global Mobile Network Service Tracker and User Centric Data Analyzer	$8,000
2010	**Role**: PI-solo **Title**: Student Coursework Repository (SCORE) - A Learner Centered Student Coursework Management System.	$13,000
2009	**Role**: PI **Title**: EDT portal - Student Project and Dissertation Management System Compliant with UK Higher Education Standards.	$13,000

Industrial Funding/investment

2021	**Role**: PI (NSF Small Business Innovation Research Phase I) **Title**: Monitoring Desalination Membrane Fouling via Real-time Integrated Surface Imaging and Advanced Machine Learning (Award Number (FAIN): 2019726)	$250,000
2019	**Role**: Chief Analytics Officer **Title**: Real Time Membrane Monitor and Operator Decision Support System, Santa Monica Water Treatment Plant	$116,000
2019	**Role**: Chief Analytics Officer **Title**: Real Time Deposition Monitor in Heat Exchangers, Sundt Generating Station, Tucson. Electric Power Co & Electric Power Research Institute (EPRI). 10005960	$50,000
2019	**Role**: Chief Analytics Officer **Title**: Field Demonstration of Real Time Membrane Monitor and Antiscalant Dose Optimization, Orange County Water District, OCWD. PO No. 504307	$30,000
2019	**Role**: Chief Analytics Officer **Title**: Real Time Online Membrane Monitor and Operator Decision Support System, Torrevaldaliga Nord Power Plant, Civitavecchia, Italy. EPRI. 10005960	$101,500

Patents

2023 Anditya Rahardianto & Bilal Muhammad Khan. Method and Apparatus for Real Time Direct Surface Fouling and Scale Monitoring of Heat Transfer Surfaces. PCT/US2020/024773

2018 Anditya Rahardianto & Muhammad Bilal. Method and Apparatus for Real-time Direct Membrane Surface Monitoring. PCT/US18/28823.

Teaching

2020-25	CSE 5120 Introduction to Artificial Intelligence	CSUSB CSE
2025	New course : Reinforcement Learning (CSE 5420)	CSUSB CSE
2020-25	CSE 4600 Operating Systems	CSUSB CSE
2020/24	CSE 4550 Software Engineering	CSUSB CSE
2019	CHENGR100 Fundamentals of CBE (Guest lecture)	UCLA CBE
2018	Computational Modeling (Guest Lecture)	UCLA School of Public Health
2018	NanoDatabank & Nanoinformatics (Trainer)	UCLA, UCSB, EPA, UTEP
2012	COS7025-B Mobile Application Development	University of Bradford
2011	COS7023-B Internet Security & Protocols	University of Bradford
2010	COS7024-B Networks & Protocols	University of Bradford
2009	ENB3001-B Computer Communications	University of Bradford

Teaching Assistant

2010	COS7023-B, Internet Security & Protocols	University of Bradford
2010	COS7024-B Networks & Protocols	University of Bradford
2009	COS7024-B Networks & Protocols	University of Bradford
2009	COS7023-B, Internet Security & Protocols	University of Bradford
2008	ENB3001-B, Computer Communications	University of Bradford
2008	ENG1010M, Circuits and Systems	University of Bradford

Supervision

Ph.D. Supervision/collaboration

2019-Current	Nora Marki, Yang Zhou	UCLA
2016–2018	(Collabortions) Michelle Romero Fishback	UCLA
2014–2016	(Collabortions) Kari Varin Moses, Sirikarn Surawanvijit, John Thompson, Chitrada Roy	UCLA
2010–2012	Shumaila Ansari, Muaaz Hussain, Salahed Din	University of Bradford

Masters and Undergraduate Supervision

2020–Present	Michael Clement, Nathan Kelly, Karen Bhor Giron, Anika Oishi, Uma Mahesh Addanki, Harish Kumar, Joong Kim, Yash Tike, Peter Wright, Kelsey Burgos, Vyshnavi Nalluri, Mahmoud Oraiqat, James Flora, Paris Klein, David Castellanos, Kaushik Mahida	CSU San Bernardino
2016–2020	Konark Kumar, Kanishk Kaul, M. Umar Khan, Abdullah Aleidan, Alhad Deshpande	UCLA
2014–2017	Tiffany Nguyen, Sarah Reed-guy	UCLA
2010–2012	Muaaz Hussain, Ralph Vogt (MS), Suraj Verma (MS), Kashif Shah, Adriana Roxana, Asif Iqbal, Richard Nelms, Bamo Nadir, Farheen Mulla, Sakia Ilahi, Bogdan Dogaru, Kashif Mehmood, Sabia Amin, Mohammad Adnan, Zainab Vance	University of Bradford

Research and Development Experience

2025 CSU San Bernardino and UCLA (Co-PI)

Develop machine learning models and pretreatment decision support architecture for optimized water treatment

Key responsibilities:

- Develop workflows and machine learning frameworks (e.g., LSTMs, seq2seq transformers, reinforcement learning) for optimizing pretreatment processes in water treatment systems
- Validate models using laboratory and field data, integrating virtual sensors, adaptive learning, and mechanistic knowledge for robust decision support
- Construct dynamic Bayesian Networks (DBNs) to capture causal relationships among dosing strategies, pretreatment unit performance, and downstream RO operations
- Apply visualization and interpretability tools (e.g., Self-Organizing Maps, Association Rule Mining) to enhance explainability of model outputs
- Disseminate outcomes through publications, workshops, and conference presentations to advance knowledge and practical applications

2025 CSU San Bernardino and CSU Long Beach (Co-PI)

Investigate electrokinetically coupled transport dynamics and fouling behavior of plasmonic nanohole membranes through modeling and AI/ML approaches

Key responsibilities:

- Develop workflows integrating laboratory/CFD data with machine learning (e.g., LSTMs with attention, Graph Convolutional Networks) to model and forecast fouling under electrokinetic transport conditions
- Conduct exploratory data analysis and feature engineering (SOMs, t-SNE, ARM) to identify critical variables governing fouling onset and progression across spatial and temporal scales
- Build interpretable, data-driven frameworks using visualization tools and causal models to capture spatial deposition and temporal dynamics of fouling
- Translate modeling advances into practical decision-support tools by fine-tuning large language models (LLMs) for interactive knowledge dissemination and AI-assisted fouling control
- Validate ML-driven control strategies against experimental and CFD simulation data, and disseminate findings via publications, workshops, and open-source software

2022 CSU San Bernardino (Co-PI), UCLA, LBNL

Develop analytical and advanced machine learning approaches for causal analysis and decision support modeling for autonomous and smart water treatment

Key responsibilities:

- Establish workflows to develop models suitable for the implementation of self-adaptive/autonomous operation for any water treatment system
- Develop a modeling framework consisting of various numerical methods for developing algorithms and models supportive of self-adaptation and co-learning, pertaining to autonomous water treatment/desalination systems
- Provide data science domain knowledge, specifically around selection of the appropriate numerical methods and their incorporation into the modeling workflow
- Apply the developed modeling framework to selected water treatment systems in service and/or based on historical data
- Conduct impact analysis of modeled water treatment/desalination systems. Write for academic journals, organize and participate in international workshops and presentations

2013–2020 UCLA – UC CEIN (Assistant researcher)

Develop research initiatives and workflows for the advancement of the use of nanotechnology in research community, regulatory bodies and educational institutions.

Key responsibilities:

- Lead teams of data specialists and researchers to develop a decision support system utilizing advanced machine learning and computer vision algorithms for assessing the environmental impact of engineered nanomaterials (ENMs).
- Lead a team of data specialists and researchers to develop and maintain web-based database management system for storage and management of Nanomaterials Data.
- Develop and validate computational models such as BNs, Decision Trees, Self-Organizing Maps (SOMs), association rule mining using experimental data on ENMs exposure and toxicity/bioactivity
- Maintain a high-performance computing cluster with 22 nodes, 240 CPUs, and 115TB of storage; perform hardware diagnostics and troubleshooting
- Write for academic journals, conduct and participate in international workshops and presentations. Prepare to market and commercialize developed tools for government and private sector organizations

2012–2013 University of Leeds (Research Fellow)

Developed software for inferring the most probable maps of buried utilities utilizing a custom built mobile sensor laboratory in collaboration with multiple partner universities. Implemented machine learning and computer vision techniques for hypothesis extraction and automated real-time 3D map (re)construction.

Key responsibilities:

- Constructed a multi-sensor mobile laboratory for underground field data collection and management in collaboration with a multidisciplinary team
- Used AI techniques such as Unsupervised Learning, Deep Neural Networks, Bayesian Mapping models and Markov Chain Monte Carlo (MCMC) simulations to (re)construct most probable 3D maps of buried utilities
- Partnered with peer institutions for data collection and joint research initiatives and hosted symposia to present research findings

2008–2012 University of Bradford (Ph.D. Candidate)

Studied the importance of vehicular communication for advancing safer driving and designing proof of concept for autonomous vehicles. Developed conceptual frameworks for multi-hop routing and implemented optimization algorithms for emergency route clearance

Key responsibilities:

- Used cooperative game theoretic techniques and unsupervised clustering algorithms for efficient routing for emergency vehicles and cooperative driving behavior
- Used intrinsic vehicular properties and dynamic network conditions to design routing algorithms via Shapley's proportional allocation mechanisms, statistical inference techniques. Developed large scale simulations of realistic urban scenarios for validating routing algorithms
- Published and presented in reputed scientific conferences/workshops and utilized the concepts in classrooms

2010–2011 University of Bradford (Full Stack Web Developer)

Developed student coursework repository (SCORE) for interactive feedback management compliant with UK higher education standards.

Key responsibilities:

- Wrote academic reports and training material to be utilized at different schools for the use of the system
- Organized and delivered various training sessions for faculty and staff for the repository and database
- Published and presented in reputed scientific conferences/workshops and other departmental events

Corporate Experience

2018– Noria Water Technologies (Co-founder)

Co-developed a patented real-time surface monitoring system in water treatment and power industry. ***Noria was recently selected among the top 13 outstanding water***

companies by Imagine H2O water accelerator 2019.

Key responsibilities:

- Led the development of an end-to-end cloud-based software platform for a patented real-time surface monitoring system in the water treatment and power industry
- Architected, implemented and maintained system control software using computer vision approaches and local application integrated with secure Amazon cloud services
- Designed APIs for cloud-based operator decision support system to optimize plant and system operations. Developed and maintained internal DevOps tools
- Applied industry standards and practices: design from user experience, design and code reviews, usability/automation testing and automated product deployments
- Co-led customer interactions, reports and recommendations based on user experience

2011–2012 Metricell Ltd. UK (Software Engineer)

Developed a cross-platform mobile application for a private analytical company to pinpoint service area problems to drive necessary investment by mobile network providers.

Key responsibilities:

- Worked with a team of skilled software engineers to develop cross platform mobile application for network service and customer experience improvement
- Utilized advanced data structures and algorithms along with data visualization schemes for real-time tracking and data logging
- Developed design strategies and in-house UI's using advanced computer programming techniques. Used data encryption/decryption libraries for data security to develop and maintain multi-threaded application
- Wrote technical documentations which were advanced to publications in well reputed scientific conferences/workshops

Publications

Book chapters

[1] Khan, B.M. and Cohen, Y. (2022). Predictive Nanotoxicology. In Machine Learning in Chemical Safety and Health (eds Q. Wang and C. Cai). https://doi.org/10.1002/9781119817512.ch9

Journals

[1] Cohen Y, Soto M, Marki N, Jarma Y, Glickfeld M, Rogers M, Yip K, Strauss P, Aguilar C, Khan B, Rao P, Hendrickson T. Techno-economic assessment of distributed wellhead RO water treatment for nitrate removal and salinity reduction: A field study in small

disadvantaged communities. Water Research. 2025 July 15; 280:123462. Available from: https://www.sciencedirect.com/science/article/pii/S0043135425003756

[2] Cohen Y, Khan B, Soto M, Marki N, Jarma Y, Zhou Y. Distributed water desalination and purification systems: perspective and future directions. Current Opinion in Chemical Engineering. 2025 March 01; 47:101078. Available from: https://www.sciencedirect.com/science/article/pii/S2211339824000790

[3] Yang Zhou, Nora Marki, Bilal Khan, Christian Aguilar, Yakubu Jarma, Yoram Cohen, Machine learning models of intermittent operation of RO wellhead water treatment for reduction and nitrate removal. Desalination. 2024 November 09; 588:117951. https://doi.org/10.1016/j.desal.2024.117951

[4] Basheera M. Mahmmod, Wameedh N. Flayyih, Sadiq H. Abdulhussain, Firas A. Sabir, Bilal Khan, Muntadher Alsabah, Abir Hussain, Performance enhancement of high degree Charlier polynomials using multithreaded algorithm, Ain Shams Engineering Journal, Volume 15, Issue 5, 2024, 102657, ISSN 2090-4479, https://doi.org/10.1016/j.asej.2024.102657

[5] Nathan A. Kelly, Bilal M. Khan, Muhammad Y. Ayub, Abir J. Hussain, Khalil Dajani, Yunfei Hou, Wasiq Khan, Video dataset of sheep activity for animal behavioral analysis via deep learning, Data in Brief, Volume 52, 2024, 110027, ISSN 2352-3409, https://doi.org/10.1016/j.dib.2024.110027

[6] Jarma, Yakubu A., John Thompson, **B. M. Khan**, and Yoram Cohen. 2023. "Field Evaluation of UF Filtration Pretreatment Impact on RO Membrane Scaling" Water 15, no. 5: 847. https://doi.org/10.3390/w15050847

[7] Khan, Wasiq, Abir Hussain, Bilal Muhammad Khan, and Keeley Crockett. 2023. "Outdoor Mobility Aid for People with Visual Impairment: Obstacle Detection and Responsive Framework for the Scene Perception during the Outdoor Mobility of People with Visual Impairment." Expert Systems with Applications. https://doi.org/10.1016/j.eswa.2023.120464

[8] D. Shehada, A. Turky, W. Khan, B. Khan and A. Hussain, "A Lightweight Facial Emotion Recognition System Using Partial Transfer Learning for Visually Impaired People," in IEEE Access, vol. 11, pp. 36961-36969, 2023, doi: 10.1109/ACCESS.2023.3264268

[9] Abd, D. H., Khan, W., Khan, B., Alharbe, N., Al-Jumeily, D., & Hussain, A. (2023). Categorization of Arabic posts using Artificial Neural Network and hash features. Journal of King Saud University - Science, 35(6). https://doi.org/10.1016/j.jksus.2023.102733

[10] Flora, Wasiq Khan, Jennifer Jin, Daniel Jin, Abir Hussain, Khalil Dajani, & **Bilal Khan**. 2022. "Usefulness of Vaccine Adverse Event Reporting System for Machine-Learning Based Vaccine Research: A Case Study for COVID-19 Vaccines" International Journal of Molecular Sciences 23, no. 15: 8235. https://doi.org/10.3390/ijms23158235

[11] Khan, Wasiq, **Bilal M. Khan**, Salwa Yasen, Ahmed Al-Dahiri, Dhiya Al-Jumeily, Khalil Dajani, and Abir Hussain. 2022. "COVID-19 Vaccination and Mental Stress within Diverse Sociodemographic Groups" International Journal of Environmental Research and Public Health 19, no. 19: 12932. https://doi.org/10.3390/ijerph19191293

[12] Kleanthous, Natasa, Abir Hussain, Jennifer Sneddon, Wasiq Khan, **Bilal Khan**, Zeyar Aung, and Panos Liatsis. 2022. "Towards a Virtual Fencing System: Training Domestic Sheep Using Audio Stimuli" Animals 12, no. 21: 2920. https://doi.org/10.3390/ani12212920

[13] L. R. Al-khazrajia , M. A. Mohammedb, W. Khan, **B. M. Khan**, and D. H. Abd. 2022. "Image dataset of important grape varieties in the commercial and consumer market" Data In Brief. https://doi.org/10.1016/j.dib.2023.108906

[14] Zhou, **Bilal Khan**, Han Gu, Panagiotis D. Christofides, & Yoram Cohen (2021), Modeling UF fouling and backwash in seawater RO feedwater treatment using neural network with evolutionary algorithm and Bayesian binary classification, Desalination. https://doi.org/10.1016/j.desal.2021.115129

[15] Yang Zhou, **Bilal Muhammad Khan**, Jin Choi & Yoram Cohen (2021), Machine Learning Modeling of Water Use Patterns in Small Disadvantaged Communities.Water. 2021; 13(16):2312. https://doi.org/10.3390/w13162312

[16] Yang Zhou, **Bilal Khan**, Nora Marki, & Yoram Cohen (Ready for submission). 2022. Process Modeling of Intermittent Wellhead RO Water Treatment Operation Via Integration of Self-Organizing Maps and Long Short-Term Memory Recurrent Neural Network (RNN). Journal of Membrane Science.

[17] **Bilal, M**., Kumar, K., Church, P., Liu R. & Cohen, Y, (Ready for submission). NanoDatabank: A Flexible Database Management System for Nanomaterials. Beilstein J. Nanotechnol.

[18] Cohen, Yoram; Zhou, Yang; **Khan, Bilal**; Gu, Han (2021), UF pre-treatment of seawater RO feedwater - performance data , Dryad, Dataset. https://doi.org/10.5068/D1310B

[19] Khan, Wasiq, Crockett, Keeley, O'Shea, James, Hussain, Abir, **Khan, Bilal M**, (2020). Deception in the eyes of deceiver: A computer vision and machine learning based automated deception detection, Expert systems with applications. 10.1016/j.eswa.2020.114341

[20] Rahardianto, A, H. Gu, **B.M. Khan**, M. H. Plumlee, et al., (2020). Real-Time RO Monitoring to Select Antiscalant Dose for Advanced Treatment of Wastewater, AWWA Water Science, Topical Collection on Potable Water Reuse, DOI:10.1002/aws2.1196.

[21] **Bilal, M**., Oh E., Liu, R., Breger, J., Medintz, I. & Cohen, Y, (2019). Bayesian Network Resource for Meta-Analysis: Cellular Toxicity of Quantum Dots. Small, 1900510. https://doi.org/10.1002/smll.201900510
Appeared as cover figure on the journal

[22] S. Kim, Y. Cohen, K.J. Moses, S. Sharma, **M. Bilal**, (2019).Polysulfone surface nano-structured with tethered polyacrylic acid. Appl. Surf. Sci., 470, pp. 411-422. https://doi.org/10.1016/j.apsusc.2018.11.114

[23] Soomin Kim; Kari Moses; Shivani Sharma;, **Muhammad Bilal**, Yoram Cohen, (2019). Polysulfone Surface Nano- Structured with Tethered Polyacrylic Acid. Data in Brief, https://doi.org/10.1016/j.dib.2019.103747

[24] **Bilal, M**., Khan, W., Muggleton, J., Rustighi, E., Jenks, H., Pennock, S.R., Atkins, P.R., & Cohn, A. (2018). Inferring the most probable maps of buried

underground utilities using Bayesian mapping model. (2018), vol. 150, pp. 52-66,https://doi.org/10.1016/j.jappgeo.2018.01.006

[25] Yoram Cohen,**Muhammad Bilal**., & Haoyang Liu (2018). Comment on "Assessing the Risk of Engineered Nanomaterials in the Environment: Development and Application of the nanoFate Model". Environ. Sci. Technol. DOI: 10.1021/acs.est.8b00486

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[28] **Bilal, M**., Liu, H., Liu, R., & Cohen, Y. (2017). Bayesian Network as Support Tool for Rapid Query of the Environmental Multimedia Distribution of Nanomaterials. Nanoscale. doi: 10.1039/C6NR08583K

[29] Romero, M., Godwin, H., **Bilal M.**, Cohen Y. (2017). Needs and Challenges for Assessing the Environmental Impacts of Engineered Nanomaterials (ENMs), Beilstein J. Nanotechnol. 8, 989–1014. DOI: 10.3762/bjnano.8.101

[30] Thompson, J., Rahardianto, A., Kim, S., **Bilal M**., Breckenridge, R., Cohen, Y. (2017) Real-time direct detection of silica scaling on RO membranes. J of Membrane Science, Vol 528, 15, Pp. 346-358. https://doi.org/10.1016/j.memsci.2017.01.027

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[32] Liu R, Rallo R, **Bilal M**., Cohen, Y. (2015) Quantitative structure-activity relationships for cellular uptake of surface- modified nanoparticles, Combinatorial Chemistry & High Throughput Screening. 18(4): 365-375. DOI: 10.2174/1386207318666150306105525

[33] H. Liu, **M. Bilal**, A. Lazareva, A. Keller & Y. Cohen. (2015). Simulation tool for assessing the release and environmental distribution of nanomaterials. Beilstein J. Nanotechnol. 2015, 6, 938–951. doi:10.3762/bjnano.6.97

[34] **M. Bilal**, P.M.L. Chan, W. Khan. (2016). Cooperative Network for Emergency Communications: Fair Distribution of Reward among Players based on their Marginal Contribution. JSAT.

[35] Khan, W., Darren, A., Kuru, K. & **M. Bilal**. (2018). The Flight Guardian: Autonomous Flight Safety Improvement by Monitoring Aircraft Cockpit Instruments. J of Aerospace Inf. Systems. V. 15, No. 4, pp. 203- 214.https://doi.org/10.2514/1.I010570

[36] Wasiq Khan, Keeley Crockett, **M. Bilal**. (2018). Adaptive framing based similarity measurement between time warped speech signals using Kalman filter. ntl Journal of Speech Technology. Vol. 21. pp. 1- 12. https://doi.org/10.1007/s10772-018-9511-z

[37] W. Khan, P. Jiang, P. Chan, **M. Bilal**. (2014). A Creative Application of Wavelet Transform and Kalman Filter for Children Proof-reading and Continuous Speech

Tracking in Online Stories and TV Programs, Inderscience publishers.

[38] **M. Bilal**. Osborne. O., Liu, R., Harper, S., & Cohen, Y. (ready for submission). Assessment of embryonic zebrafish (EZ) toxicity of diverse nanomaterials based on meta-analysis. Nanotoxicology.

Conference proceedings

[1] J. K. Jin, K. Dajani, M. Kim, S. D. Kim, B. Khan and D. H. Jin, "Reinforcement Learning Architecture for Facial Skin Treatment Recommender," 2024 IEEE/ACIS 22nd International Conference on Software Engineering Research, Management and Applications (SERA), Honolulu, HI, USA, 2024, pp. 47-54, doi: 10.1109/SERA61261.2024.10685645

[2] K. Mahida, D. Jin, B. Khan, W. Khan, K. Dajani and J. Jin, "A Deep Learning Approach for Liver Segmentation and Lesion Detection in Medical Images Using U-Net Segmentation Model," 2023 16th International Conference on Developments in eSystems Engineering (DeSE), Istanbul, Turkiye, 2023, pp. 116-121, doi: 10.1109/DeSE60595.2023.10469514

[3] M. Y. Ayub et al., "A non-Restraining Sheep Activity Detection and Surveillance using Deep Machine Learning," 2023 16th International Conference on Developments in eSystems Engineering (DeSE), Istanbul, Turkiye, 2023, pp. 66-72, doi: 10.1109/DeSE60595.2023.10469582

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[5] W. Khan, **B. M. Khan**, L. Topham, S. Yasen, A. Al-Dahiri, H. Kolivand, M. B R Vellasco, A. Hussain "Acceptance and Perception of Covid-19 Vaccination for Children" 2022 International Joint Conference on Neural Networks (IJCNN), 2022, pp. 1-6. doi: 10.1109/IJCNN55064.2022.9892983

[6] B. Alexander, Y. Hou, **B. Khan** and J. Jin, "Learn Programming In Virtual Reality? A Case Study of Computer Science Students," 2022 IEEE Global Engineering Education Conference (EDUCON), 2022, pp. 270-275, doi: 10.1109/EDUCON52537.2022.9766621

[7] W. Khan, A. Hussain, **B. Khan**, R. Nawaz & T. Bakar (2019). Novel Framework for Outdoor Mobility Assistance and Auditory Display for Visually Impaired People. 12th IEEE Intl. Conf. on Developments in e-Systems Engineering, Russia.

[8] Liu, H. H. **Bilal, M**., Lazareva, A., Keller, A., Cohen, Y., (2014). Regional multimedia distribution of nanomaterials and associated exposures: A software platform. 2014 IEEE International Conference on Bioinformatics and Biomedicine. 2014, 10. DOI: 10.1109/BIBM.2014.6999368

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Conference on Broadband, Wireless Computing, Communication and Applications, Victoria, BC, pp. 534-539. doi: 10.1109/BWCCA.2012.94

[10] **M. Bilal**, A. Yar, S. Mockford, W. Khan, & I. Awan, (2012). Tracesaver: A Tool for Network Service Improvement and Personalized Analysis of User Centric Statistics. 6th, Power control and optimization; Proceedings of the Sixth Global Conference on Power Control and Optimization; 2012; Las Vegas, NV. DOI: 10.1063/1.4768990

[11] **M. Bilal**, M. O. Hussain and P. M. L. Chan, (2012). A Reception Based Node Selection Protocol for Multi-hop Routing in Vehicular Ad-hoc Networks. 2012 IEEE 11th International Conference on Trust, Security and Privacy in Computing and Communications, Liverpool, pp. 1593-1600. doi: 10.1109/TrustCom.2012.52

[12] **M. Bilal**, P.M.L. Chan, F.S. Meddings, A. Konstadopoulou. (2011). Learner Centered EAssessment with a Universal Marking Scheme. IEEE Int. Conf. Teaching & Learning. ICTL. Penang, Malaysia.

[13] **M. Bilal**, P.M.L. Chan. (2011). Student Coursework Repository (SCORE): The hub for online assessment and learner support repository. Conf. Teaching & Learning. LTA. Bradford, United Kingdom.

[14] **M. Bilal**, P.M.L. Chan, (2011). A Coalitional Incentive Scheme based on Game Theory for Multi-hop Routing in Vehicular Ad hoc Networks. IEEE 6th int. Conf. FCST 2011. Changsha, China. DOI: 10.1109/TrustCom.2011.227

[15] **M. Bilal**, P. M. L. Chan and P. Pillai. (2010). A fastest multi-hop routing scheme for information dissemination in Vehicular Communication systems. SoftCOM 2010, 18th International Conference on Software, Telecommunications and Computer Networks, Split, Dubrovnik, 2010, pp. 35-41. arnumber: 5623628

[16] **M. Bilal**, P. M. L. Chan and P. Pillai, (2010). Fastest-Vehicle Multi-hop Routing in Vehicular Ad hoc Networks. 2010 10th IEEE International Conference on Computer and Information Technology, Bradford, 2010, pp. 773-778. doi: 10.1109/CIT.2010.148

[17] C. Evans and **M. Bilal**, (2007). Developing a WAP Application for Mobile Retail Customers. 2007 2nd International Conference on Pervasive Computing and Applications, Birmingham, 2007, pp. 328-332. doi: 10.1109/ICPCA.2007.4365463

Invited Talks and Presentations

[1] Nathan A. Kelly, Abir J. Hussain, Khalil Dajani, Yunfei Hou, Wasiq Khan, Bilal M. Khan. "A Deep Learning Approach to Sheep Segmentation and Activity Classification Utilizing U-Net and Long Short Term Memory Models". Poster presentation in 11th IEEE International Conference on Data Science and Advanced Analytics (DSAA 2024) San Diego, CA, United States: October 6th-10th, 2024

[2] Marki, N., Cohen, Y., Zhou, Y., Jarma, Y., Soto, M., Aguilar, C., Strauss, P., Khan, B. - "Distributed Membrane-Based Water Desalination and Purification Systems: Automation, Data-Driven Operational Models, and Performance Forecasting," Oral 200, North American Membrane Society (NAMS). Annual Meeting, Santa Fe, NM, May 15, 2024.

[3] Zhou, Y., Khan, B., Marki, N., Cohen, Y. "Development of Machine Learning Models of Intermittent Operation of Multiple RO Systems based on Transfer AdaBoost and Adaptive Broad Learning Techniques," Poster 56, North American Membrane Society (NAMS). Annual Meeting, Santa Fe, NM, May 13, 2024.

[4] Marki, N., Y. Cohen, Y. Zhou, B. Khan, and Y. Cohen, "Brackish Water RO (BWRO) Membrane Transport Properties and Performance Based on High Resolution Field Data," Poster Presentation, 5.10.2, National Alliance for Water Innovation (NAWI), Annual Meeting, Denver, CO, March 12, 2024.

[5] Cohen, Y., B. Khan, and P. Rao, "Analytics for Causal Analysis and Decision Support Models for Autonomous and Smart Water Treatment," National Alliance for Water Innovation (NAWI), Annual Meeting, Denver, CO, March 13, 2024.

[6] Marki, N., Y. Zhou, C. Aguilar, K. L. Yip, Y. Jarma, B. Khan,and Y. Cohen. 612d,"Nitrate and Salt Transport Coefficients for Spiral-Wound RO Membranes Derived from Field Data of Treatment of Impaired Brackish Groundwater," in Session 02D - Membrane-Based Separations, AIChE Annual Meeting, November 5 – 10, 2023, Orlando, FL.

[7] Zhou, Y., N. Marki, B. Khan, C. Aguilar,and Y. Cohen. 199a- "Machine Learning Modeling of Intermittent Operation of Reverse Osmosis Wellhead Water Treatment and Desalination Systems Via Transfer Learning and Long Short-Term Memory," in Session 10E - Information Management and Intelligent Systems, AIChE Annual Meeting, November 5 – 10, 2023, Orlando, FL.

[8] Sekhon, J., Y. Zhou, B. Khan, and Y. Cohen, "A Graph Attention Network Based Approach for Interpretable and Domain-Aware Modeling of a Wellhead Water Treatment System," Poster 59n in Session 10E - Information Management and Intelligent Systems, AIChE Annual Meeting, November 5 – 10, 2023, Orlando, FL.

[9] Bilal Khan, Eunkeu Oh, Andre Nel, Igor Medintz, Khalil Dajani, and Yoram Cohen. Predictive Nanotoxicology: Probabilistic Framework for Toxicity Data Analysis of Nanomaterials. Poster No. 259. SoCal Data Science Day, KDD2023, Long Beach Convention & Entertainment Center, August 6 – 10, 2023. https://kdd.org/kdd2023/posters/#socal-data-science-day

[10] Bilal Khan, Khalil Dajani, and Yoram Cohen. NanoDataBank: A Flexible Database Management System for Nanomaterials. Poster No. 260. SoCal Data Science Day, KDD2023, Long Beach Convention & Entertainment Center, August 6 – 10, 2023. https://kdd.org/kdd2023/posters/#socal-data-science-day

[11] James Flora, Wasiq Khan, Jennifer Jin, Daniel Jin, Abir Hussain, Khalil Dajani, and Bilal Khan. Usefulness of Vaccine Adverse Event Reporting System for Machine-Learning Based Vaccine Research: A Case Study for COVID-19 Vaccines. Poster No. 261. SoCal Data Science Day, KDD2023, Long Beach Convention & Entertainment Center, August 6 – 10, 2023. https://kdd.org/kdd2023/posters/#socal-data-science-day

[12] Marki, N., Y. Zhou, K. L. Yip, C. Aguilar, Y. Jarma, B. Khan and Y. Cohen, "Nitrate and Salt Transport Coefficients Determination for Spiral-Wound RO Membranes Derived from Field Data of Treatment of Impaired Brackish Groundwater," Paper 56

in Session "Desalination and Osmotic Processes," North American Membrane Society, 32nd Annual Meeting, May 13-17, 2023, Tuscaloosa, AL. https://membranes.org/wp-content/uploads/2023/05/NAMS 2023-Program-Book-05122023.pdf Page 71

[13] Y. Zhou, , N. Marki, C. Aguilar, K. L. Yip, B. Khan and Y. Cohen, "Machine Learning Modeling of Intermittent Reverse Osmosis Desalination System Operation via Transfer Learning and Long Short-term Memory," paper 94 in Session "Molecular and Process Modeling," North American Membrane Society, 32nd Annual Meeting, May 13-17, 2023, Tuscaloosa, AL. https://membranes.org/wp-content/uploads/2023/05/NAMS-2023-Program Book-05122023.pdf Page 87

[14] Jarma, Y., B. Akhavain, and Y. Cohen, "Flexible operation of RO desalting in the mode of partial concentrate recycle, " Poster 7, presented at the North American Membrane Society, 32nd Annual Meeting, May 13-17, 2023, Tuscaloosa, AL. https://membranes.org/wp content/uploads/2023/05/NAMS-2023-Program-Book-05122023.pdf Page 41

[15] Cohen, Y., Marki, N., Y. Zhou, K. L. Yip, C. Aguilar, Y. Jarma, B. Khan, "Analysis of Nitrate and Salt Passage Based on Extensive Field Data of RO Purification and Desalination of Impaired Brackish Groundwater," 13th International Congress on Membranes and Membrane Processes, July 9-14, 2023, Chiba, Japan.

[16] Rao., P., Y. Cohen, and B. Khan, "Analytics for Causal Analysis and Decision Support Models for Autonomous and Smart Water Treatment," Topic Area: AOI A-3, National Alliance for Water Innovation (NAWI), Annual Meeting, February 27-29, 2023

[17] Bilal Khan. Usefulness of vaccine adverse event reporting system for machine-learning based vaccine research: A case study for COVID-19 vaccines. World Conference on Data Science and Statistics. June26 - 29, 2023. Hilton Garden Inn Frankfurt City Centre, Frankfurt, Germany.

[18] Yoram Cohen & **Bilal M. Khan**. Environmental Impact Assessment of Engineering Nanomaterials: Integration of Models, Data and the Body of Evidence for Decision-Support. Nanoinformatics: Spanning Scales, Systems and Solutions. Beilstein Nanotechnology Symposium 2022. https://www.beilstein-institut.de/en/symposia/nanoinformatics/

[19] Yang Zhou, **Bilal, M**,Nora Marki and Yoram Cohen. (2022). Modeling of RO System Water Treatment Operation for Nitrate and Salt Removal using Long-Short Term Memory (LSTM) Machine Learning Model with Attention Coefficient. (Contaminant Removal from Surface Water, Groundwater, and Wastewater session) North American Membrane Society (NAMS) annual meeting (Computing and Systems Technology Division), 31st Annual Meeting, May 14-18, 2022, Tempe, Arizona.

[20] Yoram Cohen, **Bilal, M**, Yang Zhou, Nora Marki (2022). Monitoring Nitrate and Salt Passage, Their Correlation, and Data Imputation Via Data-Driven Process Models for Distributed Membrane-Based Water Purification Systems, AIChE annual meeting (Computing and Systems Technology Division), November 13-18, 2022.

[21] Cohen, Y., **B. khan**, C. Aguilar, M. Rogers, Y. Zhou, N. Marki. (2022). Remote Monitoring, Supervisory Control and Technoeconomic Evaluation of Advanced High Recovery Wellhead Water Purification and Desalination Systems, Env. Div. Poster

Session 533, AIChE Annual Meeting (2022), November 13-18, 2022, Phoenix, Arizona.

[22] **Bilal, M** and Yoram Cohen. (2022). Association Rule Mining of the Relationships Among Biological Responses of Embryonic Zebrafish Exposed to Nanoparticles, AIChE annual meeting (Nanoscale Science and Engineering Forum), November 13-18, 2022.

[23] **Bilal, M**, Yang Zhou, Nora Marki and Yoram Cohen. (2022). Process Modeling of Intermittent Wellhead RO Water Treatment Operation Via Integration of Self-Organizing Maps and Long Short-Term Memory Recurrent Neural Network (RNN), in Session 469 - Water Treatment, Desalination, and Reuse II, AIChE Annual Meeting, Nov. 13-18, 2022, Phoenix, Arizona.

[24] Rao., P., Y. Cohen, **B. Khan**, N. Marki, and Y. Zhou (2022). Analytics for Causal Analysis and Decision Support Models for Autonomous and Smart Water Treatment, in Topic Area: AOI A-3, NAWI Alliance Spring Meeting 2022: Research Program Immersion.

[25] Zhou, Y., **B. Khan**, J-Yong Choi, and Y. Cohen. 749a (2021). Exploration and Forecasting of Water Usage for Treatment Process Development in Small Disadvantaged Agricultural Communities, 2021 AIChE annual meeting November 7-19, 2021, Boston, MA.

[26] Zhou, Y., **B. Khan**, H. Gu, and Y. Cohen. 534f (2021). Modeling of UF Performance in Pretreatment of Seawater RO Feedwater Using Neural Network with Evolutionary Algorithm and Bayesian Binary Classification, 2021 AIChE annual meeting November 7-19, 2021, Boston, MA.

[27] **Bilal, M**, Yang Zhou, Jin Yong Choi and Yoram Cohen. (2020). Machine learning models for water use patterns analysis in small rural agricultural communities for informed decision and deployment of membrane-based water system, AIChE annual meeting - The increasing diversity of chemical engineering, November 15-20.

[28] Yang Zhou, **Bilal, M** and Yoram Cohen. (2020). Operational improvements of ultrafiltration treatment of RO feedwater driven by neural network models of UF fouling and backwash, AIChE annual meeting - The increasing diversity of chemical engineering, November 15-20.

[29] Yoram Cohen, Jin Yong Choi, Madelyn Glickfeld, **Bilal, Khan**, Christian Aguilar, Tae Lee, Yian Chen and Anditya Rahardianto. (2020). RO treatment of small community wellhead water for containment removal and salinity reduction, AIChE annual meeting - The increasing diversity of chemical engineering, November 15-20.

[30] **Bilal, M**. (2018). A Framework for the Assessment of Adequacy of Information for Environmental Impact Assessment of Engineered Nanomaterials, (Oral Presentation), AIChE, Pittsburgh, PA, Oct 28. 2018.

[31] **Bilal, M**. (2018). Real-time Online Membrane Surface Monitor (MeMo™) and Operator Decision Support, ACE Innovation Lounge, June 14, 2018, Las Vegas.

[32] **Bilal, M**. (2018). NanoDatabank Training: Flexible Database Management System for Nanomaterials Research, CEIN Workshop on Data Management, Jan 12, 2018, University of California Santa Barbara, Santa Barbara.

[33] **Bilal, M**. Liu, R. & Cohen Y. (2017). Association Rule Mining for Assessing the

Relationships among Biological Responses of Embryonic Zebrafish, (Oral Presentation) AIChE, Annual Meeting, October 31, 2017, Minneapolis.

[34] **Bilal, M**. & Cohen, Y. (2017). NanoDatabank: A Flexible Database Management System for Nanomaterial Research and Integration. Nano Working Group Webinar, NanoStandards, UCLA (Oral Presentation), June 1, 2017.

[35] **Bilal, M**. (2017). Nanoinformatics platform for environmental impact assessment of engineered nanomaterials. American Chemical Society (ACS) National Meeting, (Oral Presentation), April 2-6, 2017, San Francisco.

[36] **Bilal, M**. (2016). Meta-Analysis of Cellular Toxicity of Cadmium-Containing Quantum Dots Using Bayesian Networks. AIChE Annual Meeting, 11/14/2016, San Francisco.

[37] Cohen, Y. & **Bilal, M**. (2016). et al. Environmental Decision Analysis for Nanomaterials. NSF Review, UC Center for Environmental Implications of Nanotechnology (UC CEIN). May 6, 2016.

[38] **Bilal, M**. (2015). ToxNano: A Toolkit for Toxicity Data Analysis of Engineered Nanomaterials. Gordon Research Conference, (Oral Presentation), June 21-26, 2015, West Dover, VT.

[39] **Bilal, M**. (2015). Development of a Framework for Environmental Impact Assessment of Engineered Nanomaterials (ENMs). Gordon Research Conference, (Oral Presentation), June 21-26, 2015, West Dover, VT.

[40] **Bilal, M**. (2015). Probabilistic Assessment of the Potential Environmental Impact of Engineered Nanomaterials. Nanoinformatics Workshop, (Oral Presentation), Jan 26-28, 2015, Arlington, VA.

[41] **Bilal, M**. (2015). Nanoinfo.org: An integrated Nanoinformatics Web Portal., Nanoinformatics Workshop, (Oral Presentation), Jan. 28, 2015, Arlington, VA

[42] **Bilal, M**. (2014). Probabilistic Nanoinformatics Modeling Platform for Assessing the Potential Environmental Impact of Engineered Nanomaterials. American Chemical Society, National Meeting, (Oral Presentation), August 11, 2014, San Francisco, CA

[43] **Bilal, M**. (2014). Nanoinformatics platform for assessing the potential environmental distribution and exposure levels of engineered nanomaterials (ENMs). American Chemical Society Meeting, (Oral Presentation), Aug. 11, 2014, San Francisco, CA

[44] **Bilal, M**. (2012). RA Reception Based Node Selection Protocol for Multi-hop Routing in Vehicular Ad-hoc Networks. Int. conf. IEEE IUCC, (Oral Presentation), Liverpool, UK, 25-27 June 2012.

[45] **Bilal, M**. (2011). Learner Centered E-Assessment with a Universal Marking Scheme. IEEE Int. Conf. Teaching & Learning, (Oral Presentation). ICTL. Penang, Malaysia, Nov, 2011.

[46] **Bilal, M**. (2010). A Fastest-Vehicle Multi-Hop Routing in Vehicular Ad hoc Networks. IEEE Conf. CIT – 2010, Bradford, UK (Oral Presentation).

[47] **M. Bilal**, (2007). "Developing a WAP Application for Mobile Retail Customers," 2007 2nd International Conference on Pervasive Computing and Applications, Birmingham,

2007. (Oral presentation)

Technical Reports and Short Papers

[1] **Haase, & Klaessig**. (2018). EU US Roadmap Nanoinformatics 2030. EU Nanosafety Cluster. http://doi.org/10.5281/zenodo.1486012 Chapters 5,6 & 8

[2] Cohen Y. & **Bilal, M**. et al. (2019). Environmental Decision Analysis for Nanomaterials. UC CEIN, Final Project Progress Report, April 22, 2019.

[3] Cohen, Y., Godwin, H., **Bilal, M**. & Romero, M. F. (2018). Evaluating and Integrating the Body of Evidence for Environmental Decision Analysis of Engineered Nanomaterials (ENMs). Background Paper in University of California Los Angeles Workshop on Alternative Testing, Feb. 20 – 21, 2018.

[4] Cohen Y. & **Bilal, M**. (2017). A nanoinformatics Platform for Environmental Impact Assessment of Manufactured Nanomaterials. Herman Skolnik Award Symposium.

[5] **Bilal, M**. et al. (2017). QSAR Model Development. Short paper: QSAR Modeling. 2018 (under review).

[6] **Bilal, M**. et al. (2018). An information assessment tool for nanomaterials (IANano) for assessment of the adequacy of the body of evidence for conducting environmental impact assessment. UC CEIN, NSF/EPA Review, Progress Report.

[7] **Bilal, M**. et al. (2017). Online data exploration techniques for assessing the associations among biological responses for the development of nano-structure activity relationships. UC CEIN, NSF/EPA Review Report.

[8] **Bilal, M**. et al. (2017). Web-based data repository for Nanomaterial data and integration with environmental impact assessment tools. NSF/EPA Review Report.

[9] **Bilal, M**. et al. (2016). Development of a CEIN framework for environmental impact assessment (EIA) of Engineered Nanomaterials. UC CEIN, NSF/EPA Review Report.

[10] **Bilal, M**. et al. (2016). Bayesian Networks platform as a decision support tool for exploration of toxicity geared at assessing causal relationships. CEIN Report.

[11] **Bilal, M**. et al. (2015). Environmental impact analysis for Nanomaterials. UC Center for Environmental Implications of Nanotechnology (UC CEIN), NSF/EPA Review, Progress Report, 2015.

[12] **Bilal, M**. et al. (2015). Computational models of Nanomaterials Toxicity. UC CEIN, NSF/EPA Review Report.

[13] **Bilal, M**. et al. (2015). Multimedia Analysis of the Environmental Distribution of Nanomaterials. UC CEIN, NSF/EPA Review Report.

[14] **Bilal, M**. et al. (2014). QSARs of Nanomaterials Toxicity and Physicochemical Properties. UC CEIN, NSF/EPA Review Report.

Academic competitions

- Lead Faculty member - 2022 CSUSB Innovation Challenge - Udrop - a global messaging application (May 2022) **Runner up**
- Lead Faculty member - 6th Annual Sigma Nu Tau Video Pitch Competition. (2021) 1Knock **1st prize**
- Lead Faculty member - 2021 CSUSB Innovation Challenge. 1Knock **Runner up**. 4/22/2021

Editorial and Chair Services

- Member: Editorial board. Journal of Water Technology (JOWT). World Scientific
- Member: Editorial board. International Journal of Bioinformatics and Intelligent Computing (IJBIC)
- Special Session Chair: The 16th International Conference on the Developments in eSystems Engineering (DeSE2023) - Special Session 1– Applied Artificial Intelligence for Industrial Innovation: Current State of the art and New Directions, USA
- Track chair and reviewer. The First International Conference on Data Science and Emerging Technologies 2022. DaSET 2022. December 21-22, 2022
- Technical Session Chair Nanotechnology: Advanced Materials: Issues in Nanoinformatics & Nanosafety Data, ACS Annual Meeting, 2017

Reviewed Textbooks

- Ravi Sethi, Software Engineering: Principles and Practices. (University of Arizona). Cambridge University Press. 07/09/2021

Synergistic Activities

- Reviewer, Nature Scientific Data. 2019 - Present
- Expert Systems with Applications (Elsevier) 2022 - Present
- Current Opinion in Chemical Engineering - 2024 - Present
- Reviewer, Neurocomputing. 2021 - Present
- Reviewer, Neural Networks. 2020 - Present
- Reviewer, Science of Total Environment 2021 - Present
- Reviewer, Beilstein Journal of Nanotechnology. 2014 - Present
- Reviewer, ACS Nano. 2014 - Present
- Reviewer, Advanced Intelligent Systems. 2018 – Present

- Reviewer, Sensors. 2017 - Present
- Reviewer, Nanotoxicology. 2014 - Present
- Reviewer, Nanoscale. 2016 – Present
- Reviewer, Frontiers Pharmacology. 2018 - Present
- Reviewer, Natural Language Engineering. 2018 - Present
- **Technical Session Chair Nanotechnology**: Advanced Materials: Issues in Nanoinformatics & Nanosafety Data, ACS Annual Meeting, 2017

Program Committee Member

- Annual IEEE International Conference on Advances in Computing and Communication Engineering (ICACCE-2018)
- The 2014 6th International Conference on Computational Intelligence in Security for Information Systems (CISIS-2014), Birmingham, UK,
- The 2013 International Workshop on Informatics for Intelligent Context-Aware Enterprise Systems (ICAES-2013)
- The 2012 Smart Internet of Things (IoT) Summit Conference at Old Trafford Stadium, Manchester UK
- 6th Annual international conferences on Advanced Information Networking and Applications (AINA)
- Advances in Computing and Communications Engineering (ACCE)
- 2011 UK Performance Engineering Workshop (UKPEW) at University of Bradford
- 2010 7th International Conference on Computing and Information Technology (CIT)

Organizing Committee Member

- 2018 UC CEIN Alternative Testing Workshop. UCLA
- Organizer: 2012 Windows phone Camp by Microsoft. University of Bradford

Professional Societies and Scientific Groups

- EU US Roadmap Nanoinformatics 2030 (member and co-author)
- American Chemical Society, (ACS)
- American Institute of Chemical Engineers
- American Water Works Association (AWWA)
- UC CEIN Alternative Testing Workshop (senior member and author)

- Nano Working Group (Nano Standards) (Member since 2013)
- nanoHUB: Collaborator and Developer

Technical Skills

Programming	**Proficiency** in Python, C/C++, Java, R, MATLAB, JavaScript, NodeJS, AngularJS (Web development: d3.js, PHP, Bootstrap)
Web Development	Visualization (d3.js), CSS, HTML, angularJS, Bootstrap
Machine Learning/Data mining	TensorFlow, PyTorch, OpenCV, real-time object detection and recognition, 3D modeling and reinforcement learning. Extensive practical experience in deep neural networks, Large Language Models (LLMs), Bayesian Networks, self-organizing maps, hierarchical clustering, regression/classification, SVM, multidimensional scaling, decision trees (forests), and association rule mining.
Amazon Web Services	EC2, LightSail, S3, VPC, CloudFront, Route53, DNS
High performance computing/OS	Linux, Windows, Rocks cluster, Sun Grid Engine, Ganglia
RDMS	MongoDB, MySQL, PostgreSQL, Apache, DHCP

Professional Training

2022	**Badge** of Completion: Microcredential Course on Promoting Active Learning Online, The Association for College and University Educators (ACUE)
2021	**Certificate** of Completion: Culturally Responsive Teaching, California State University San Bernardino
2020	**Certificate** of Completion: ISSUES-X Summer School for New Faculty Learning Committee, California State University San Bernardino
2010	**Certificate** of Completion in Wireless Technologies for Healthcare University of Bradford, United Kingdom (International Workshop on Wireless Technologies)
2009	**Certificate** of Completion in Wireless Technologies in Sensor Networks University of Salzburg, Salzburg, Austria (SATNEx Summer School)
2008	**Certificate**: Game Theoretic Concepts in Wireless Sensor Networks University of Pisa, Italy (SATNEx Summer School)
	Online Courses: A-Z Data Science, Computer Vision, Big Data Analytics, Deep Reinforcement Learning, Python Programming Bootcamp

Recent Research Projects

Analytics for Causal Analysis and Decision Support Models for Autonomous and Smart Water Treatment: This 3-year long research project is aimed at enabling

the development of autonomous, adaptive, and co-learning water treatment and desalination systems by developing fundamental process operation building blocks to predict the operational performance of such systems. Specifically, models will be developed that integrate data-driven approaches, algorithms, and process/system knowledge, derived from deterministic models and domain knowledge, via developed workflows that make use of physical and calculated ("soft sensor") information to predict process/system performance. The models and algorithms will be critical enablers for adaptive operation in accordance with water supply and demand conditions, water quality variability, and will facilitate identification of process and sensor faults and provide information needed for taking corrective actions. The proposed approach will pave the way toward the development of intelligent water systems through models and algorithms in support of the evolution of the "Digital Twin" for water treatment and desalination systems.

Environmental Impact Assessment (EIA) of Engineered Nanomaterials (ENMs): An online nanoinformatics platform (https://nanoinfo.org) was developed based on 10 years of research and development at the UC CEIN to support nanotechnology community by developing and providing state-of-the-art resources and tools dedicated to the EIA of ENMs. Nanoinfo.org is pivotal to solving critical challenges for assessing the impact of nanotechnology in an avalanche of consumer applications and is serving with community-contributed resources for education, professional networking, and developing learning platform. To date, https://nanoinfo.org has been accessed/utilized in over 50 countries and currently has more than 500 registered members from diverse fields of research and education. The platform has also been made available as part of one of the largest hub for nanotechnology discovery and learning community (nanoHUB).

Bayesian Networks as online Meta-analysis resource for toxicity of ENMs: A web-based resource for meta-analysis of nanomaterials toxicity is developed whereby the utility of Bayesian networks (BNs) is illustrated for exploring the cellular toxicity of Cd-containing quantum dots (QDs). BN models are developed based on a dataset compiled from 517 publications comprising 3,028 cell viability data samples and 837 IC_{50} values. BN QD toxicity (BN-QDTox) models are developed using both continuous (i.e., numerical) and categorical attributes. Using these models, the most relevant attributes identified for correlating IC_{50} are: QD diameter, exposure time, surface ligand, shell, assay type, surface modification, and surface charge, with the addition of QD concentration for the cell viability analysis. Data exploration via BN models further enables identification of possible association rules for QDs cellular toxicity. The BN models as web-based applications can be used for rapid intelligent query of the available body of evidence for a given nanomaterial and can be readily updated as the body of knowledge expands.

Real-time direct membrane surface monitoring in water and power industry: A patent pending software platform was developed that is capable of real-time direct and unambiguous detection of surface fouling and mineral scaling under operating conditions that resemble high pressure water and power plants. A virtual platform and data driven decision support system was designed while utilizing an array of computer vision (CV) algorithms and statistical methods to detect surface scaling and fouling of membranes and heat exchangers. For scaling detection, the initial state of the (clean) surface is trained with previously captured data of known characteristics. A set of regional heuristics are trained which are then utilized to periodically segment fouled/scaled regions.

Detection is further refined using several morphological and normalization operations for unwanted noise removal and result refinement. Additionally, an embedded deep-learning engine was developed for online identification/ recognition of the types and rates of fouling. The engine utilizes a large customized set of learnable filters and provides the capability to automatically produce annotations along with their confidence scores (i.e., the probabilities the detected object belongs to a certain type of foulants/scalants).

Assessment of information availability for the EIA of ENMs: EIA of ENMs can be hampered by the lack of data/information and thus delay the development of effective regulatory policies. To address this issue, a systematic approach (IANano) was developed for assessing information availability for the EIA. In IANano, following the typical EIA process, the required information elements for exposure and hazard potential assessments are classified based on major categories, sub-categories, and attributes. Scores for the different information attributes are then assigned, based on a selected scoring scale and weights, and aggregated up to the level of exposure and hazard potential information (EPI and hazard potential information [HPI], respectively), considering both available and unavailable information, via the Dempster-Shafer algorithm. The utility of IANano was demonstrated for several specific EIA scenarios for nano-TiO2, nano-Cu-CuO, and nano-ZnO. Results suggested that information screening, as illustrated via IANano, can be valuable for ranking the adequacy of the available information for conducting specific EIAs and for identifying information needs for designing safer nanomaterials.

Flexible database management system for nanomaterials research data and integration: The largest online database of nanomaterial data was developed that contains over 1000 investigations and linked to various computational models as part of https://nanoinfo.org. NanoDatabank tackles numerous technical challenges of data management, storage, sharing and integration within nanotechnology, being advantageous over traditional database management systems. In NanoDatabank, data of each investigation is stored as part of a study which may contain one or more investigations. Studies and investigations are linked to specific nanomaterials that are stored in a nanomaterials Catalog. Meta data are automatically generated in conjunction with dynamic summary reports of the uploaded. NanoDatabank has also been made publicly available at nanoHUB for wider community outreach. NanoDatabank has also been featured in the EU-US roadmap (2030) which has been focused on developing standard data management and analysis procedures for safe and sustainable nanotechnology.