Curriculum Vitae

Farnoosh Koleini
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RESEARCH INTEREST

Computational Biology, Genomics, AI & Machine Learning, Biomarker Discovery, LLMs & Protein Design

EDUCATION

University of North Carolina at Charlotte, USA 2023 - present
Ph.D. in Computer Science

East Carolina University, USA 2021 - 2023
M.Sc. in Chemistry & Computer Science (Dual Degree)
- Thesis title: Cancer Subtype Detection Using Biomarker Discovery in Multi-Omics Tensor Datasets

Sharif University of Technology, Iran 2015 - 2019
B.Sc. in Chemistry
- Thesis title: Evaluation of Partial Least Squares Regression with Multivariate Analytical Figures of Merit for Determination of 10 Pesticides in Milk

RESEARCH AND TEACHING EXPERIENCE

University of North Carolina at Charlotte, USA Aug 2023- present
Computer Science Researcher

- Specialized in Deep Learning and Biomechanical models to estimate three-dimensional kinematics; and physics-based simulations to estimate muscle activations and musculoskeletal dynamics.

- Creating a platform for computing both the kinematics (i.e., motion) and dynamics (i.e., forces) of human movement using smartphone videos.

- Developed and successfully integrated code in multiple languages and frameworks including C, Python, and PyTorch, demonstrating wide-ranging technical expertise.

East Carolina University - Collaborated with NIH, USA Aug 2021 - Aug 2023
Data Science Researcher

- Conducted extensive research and literature reviews on biomarker discovery in multi-omics datasets, identifying research gaps and opportunities for improvement.

- Developed and implemented a novel methodology integrating clinical features with biomarker discovery using advanced multivariate analysis techniques, such as ANOVA Simultaneous Component Analysis (ASCA) and Tucker3 modeling, to analyze a multi-omics colon cancer dataset.

- Applied expertise in Supervised Machine Learning methodologies, implementing models like Artificial Neural Networks, Logistic Regression, and Random Forest to drive insights.

- Performed bootstrap analysis and model validation to ensure the robustness and reliability of proposed models, facilitating the identification of significant biomarkers for early mortality risk assessment and personalized therapy development.

East Carolina University, USA Aug 2021 - Aug 2023
Instructor

- Teaching Organic Chemistry, Advanced Analytical Chemistry and General Chemistry labs.

- Mentoring the Research Experiences for Undergraduates (REU) Programs (i.e., Software and Data Analytics ECU program).

Sharif University of Technology, Iran Aug 2018 - Jun 2019
Research Assistant

- Developed and validated a multiresidue method using Gas Chromatography coupled with Flame Ionization Detector (GC-FID) for the simultaneous determination of 10 pesticides in milk.

- Conducted comprehensive sample preparation combining QuEChERS and Dispersive Liquid-Liquid Microextraction (DLLME).

- Utilized Partial Least Squares (PLS) Regression to build a multivariate calibration model, calculated analytical figures of merit (including sensitivity, limit of detection, and limit of quantitation), and adhered to European Union guidelines to achieve relative recoveries of 77.69 % - 147.69% with satisfactory standard deviations.

HONORS AND AWARDS

- University of North Carolina at Charlotte Graduate Scholarship 2023
- Research and Creative Achivement Week Award (RCAW), East Carolina University 2023
- The Chris and Laura Wilson Chemistry Scholarship, East Carolina University 2022
- Sharif University of Technology Undergraduate Scholarship, IR 2015
- Guess Mathematics Contest Award, University of Waterloo, CA 2009

PUBLICATIONS

1. **Koleini, F.**, Balsini, P. and Parastar, H., 2020. Evaluation of partial least-squares regression with multivariate analytical figures of merit for determination of 10 pesticides in milk. International Journal of Environmental Analytical Chemistry, 102(8), pp.1900-1910.

2. **Koleini, F.**, Hugelier, S., Lakeh, M.A., Abdollahi, H., Camacho, J. and Gemperline, P.J., 2023. On the complementary nature of ANOVA simultaneous component analysis (ASCA+) and Tucker3 tensor decompositions on designed multi-way datasets. Journal of Chemometrics, 37(11), p.e3514.

3. **Koleini, F.**, Gemperline, P. and Tabrizi, N., 2023, May. Biomarker discovery in multi-omics datasets using tensor decompositions; A comprehensive review. In Proceedings of International Conference on Bioinformatics and Computational Biology (Vol. 92, pp. 11-24).

4. Movahed, E.A., **Koleini, F.** and Tabrizi, N., 2024. Tensor decompositions in cancer study; A comprehensive review. In Proceedings of 36th International Conference on Computer Applications in Industry and Engineering (Vol. 97, pp. 101-113).

5. Wireman, J., **Koleini, F.** and Tabrizi, N., 2023, July. A Comparison of Public Sentiment on COVID-19 Vaccines on Twitter and Reddit: An Analysis Using VADER. In 2023 Congress in Computer Science, Computer Engineering, & Applied Computing (pp. 1242-1246). IEEE.

6. Thomas, S., **Koleini, F.** and Tabrizi, N., 2022, December. Dynamic defenses and the transferability of adversarial examples. In 2022 IEEE 4th International Conference on Trust, Privacy and Security in Intelligent Systems, and Applications (pp. 276-284). IEEE.

7. Zibaeirad, A., **Koleini, F.**, Bi, S., Hou, T., & Wang, T., 2024. A Comprehensive Survey on the Security of Smart Grid: Challenges, Mitigations, and Future Research Opportunities. arXiv preprint arXiv:2407.07966.

LEADERSHIP AND VOLUNTEER ACTIVITIES

International Student Advisory Committee (University of North Carolina at Charlotte) 2023 - present
Committee Member

- Served in an advisory capacity to the International Student and Scholar Office (ISSO), identifying and monitoring trends affecting international students.
- Represented a diverse group of international students, including various nationalities, genders, levels of study, and academic colleges.
- Promoted understanding, appreciation, and collaboration among international student groups and the wider university community.

Pirates on Water (East Carolina University) 2021 - 2023
Member

- Actively participated in and helped coordinate the annual Tar River Clean Up event, working with ECU and community groups to remove trash while kayaking down the river.
- Joined field trips to observe water issues firsthand, enhancing understanding through practical experiences.

Innovation and Research Club (Sharif University of Technology) 2018 - 2019
Vice President

- Assisted the President in managing club operations and coordinated weekly meetings and workshops.
- Led community outreach programs and facilitated collaborations with industry professionals.