Rahmat Beheshti

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RESEARCH INTERESTS

Machine Learning, Health Data Science, Computational Epidemiology, Electronic Health Records

Appointments

Assistant Professor ..... 2018 – Present
University of Delaware
Computer & Information Sciences Department
Epidemiology Program (Joint)
Data Science Institute (Resident)
Nemours Children's Health
Research Faculty (Affiliated)

Education

Postdoctoral Trainee/Researcher ..... 05/2015 – 09/2018
Johns Hopkins University
Bloomberg School of Public Health
International Health Department, Global Obesity Prevention Center
Whiting School of Engineering (Joint)
Applied Math & Statistics Department, and Civil Engineering Department
Mentors: Timothy Moran, Takeru Igusa, Thomas Glass, and Jessica Jones-Smith

Ph.D., Computer Science ..... 08/2011 – 05/2015
University of Central Florida (UCF)
Dissertation: "Modeling Social Norms in Realistic Agent-based Simulations"
Advisor: Gita Sukthankar
Committee: Lotzi Bölöni, Samarth Swarup, Annie Wu

M.Sc., Artificial Intelligence ..... 09/2008 – 04/2011
Iran University of Science and Technology (IUST)
Thesis: "A Learning-Based Negotiation Method for Holonic Multi-Agent Systems"
Advisor: Nasser Mozayani — Co-advisor: Adel Torkaman Rahmani

B.Sc., Computer Software Engineering ..... 09/2004 – 09/2008
Kharazmi University (KHU). **graduated in 7 (vs. the normal 8) semesters*

Grants

Funded

NIH Pathway to Independence Award (K99/R00), Role: Sole PI, Total costs: $924,214, Period: 09/2018-09/2023 – Declined the reception of the grant due to starting of the faculty position (impact score: 20, IC: NIH/NIIDDK).

Robert Wood Johnson Foundation, Health Data for Action Award, Data access (to a large national dataset) and professional development award, Role: Lead PI.

UD COBRE (Centers of Biomedical Research Excellence) award, Title: Links of obesity and early adulthood risks

of CVD (P20GM113125-04), Role: Sole PI, Total costs: $78,000, Period: 07/2019-07/2020.

UD Data Science Institute seed grant, Total costs: $10K, Role: Sole PI.

VA (Veterans Affairs) Office collaborative grant, Title: "Multimodal Wandering Behaviors Recognition" Role: Collaborator, My share: $26,171.55.

NIH INBRE Award, DE internal award, Project Title: "Long-term Predictive models of childhood obesity," Role: Lead-PI, My share: $80,000, Total costs: $142,000.

Publications

* indicates my advisees.

Journals

[1] M. Gupta *, T.-L. T. Phan, H. T. Bunnell, and **R. Beheshti**. 2022. Obesity Prediction with EHR Data: A Deep Learning Approach with Interpretable Elements. *ACM Trans. Comput. Healthcare*, 3, 3, Article 32. DOI: 10.1145/3506719.

[2] R. Ramazi *, M. E. Bowen, A. J. Flynn, and **R. Beheshti**. 2022. Developing Acute Event Risk Profiles for Older Adults With Dementia in Long-Term Care Using Motor Behavior Clusters Derived From Deep Learning. *Journal of the American Medical Directors Association*. DOI: https://doi.org/10.1016/j.jamda.2022.04.009.

[3] A. Guo, **R. Beheshti**, Y. M. Khan, J. R. Langabeer, and R. E. Foraker. 2021. Predicting cardiovascular health trajectories in time-series electronic health records with LSTM models. *BMC Medical Informatics and Decision Making*, 21, 1, 1–10.

[4] R. Ramazi *, C. Perndorfer, E. C. Soriano, J.-P. Laurenceau, and **R. Beheshti**. 2021. Predicting progression patterns of type 2 diabetes using multi-sensor measurements. *Smart Health*, 21, 100206. DOI: https://doi.org/10.1016/j.smhl.2021.100206.

[5] **R. Beheshti**, Y. Treesukosol, T. Igusa, and T. H. Moran. 2018. A predictive model of rat calorie intake as a function of diet energy density. *American Journal of Physiology - Regulatory Integrative and Comparative Physiology*, 315, 2, (Aug. 2018), R255–R266. DOI: https://doi.org/10.1152/ajpregu.00337.2017.

[6] **R. Beheshti**, M. Jalalpour, and T. A. Glass. 2017. Comparing methods of targeting obesity interventions in populations: An agent-based simulation. *SSM - Population Health*, 3, (Dec. 2017), 211–218. DOI: 10.1016/J.SSMPH.2017.01.006.

[7] **R. Beheshti**, J. C. Jones-Smith, and T. Igusa. 2017. Taking dietary habits into account: A computational method for modeling food choices that goes beyond price. *PLOS ONE*, 12, 5, (May 2017), e0178348. DOI: 10.1371/JOURNAL.PONE.0178348.

[8] **R. Beheshti**, T. Igusa, and J. Jones-Smith. 2016. Simulated Models Suggest That Price per Calorie Is the Dominant Price Metric That Low-Income Individuals Use for Food Decision Making. *The Journal of Nutrition*, 146, 11, 2304–2311. DOI: 10.3945/jn.116.235952.

[9] **R. Beheshti** and G. Sukthankar. 2015. A hybrid modeling approach for parking and traffic prediction in urban simulations. English. *AI and SOCIETY*, 30, 3, 333–344.

[10] **R. Beheshti** and N. Mozayani. 2014. HOMAN, a learning based negotiation method for holonic multi-agent systems. *Journal of Intelligent and Fuzzy Systems*, 26, 2, 655–666.

[11] **R. Beheshti** and N. Mozayani. 2011. A New Mechanism for Negotiations in Multi-Agent Systems Based on ARTMAP Artificial Neural Network. In *Agent and Multi-Agent Systems: Technologies and Applications*. Lecture Notes in Computer Science. Vol. 6682. Springer Berlin Heidelberg, 311–320.

Conference proceedings (peer-reviewed, full-length)

[1] H. Fayyaz *, T.-L. T. Phan, T. Bunnell, and **R. Beheshti**. 2022. Predicting attrition patterns from pediatric weight management programs. In *Machine Learning for Health (ML4H) Symposium*.

[2] M. Gupta *, B. Gallamoza *, N. Cutrona *, P. Dhakal *, R. Poulain *, and **R. Beheshti**. 2022. An Extensive Data Processing Pipeline for MIMIC-IV. In *Machine Learning for Health (ML4H) Symposium*.

[3] M. Gupta *, T.-L. T. Phan, H. T. Bunnell, and **R. Beheshti**. 2022. Flexible-window Predictions on Electronic Health Records. In *Proceedings of the Thirty-Fourth Annual Conference on Innovative Applications of Artificial Intelligence (IAAI-22)*. AAAI.

[4] R. Poulain *, M. Gupta *, and R. Beheshti. 2022. Few-Shot Learning with Semi-Supervised Transformers for Electronic Health Records. In *Proceedings of the Machine Learning for Healthcare (MLHC-2022)*.

[5] R. Ramazi *, M. E. Bowen, and **R. Beheshti**. 2022. Predicting Acute Events using the Movement Patterns of Older Adults: An Unsupervised Clustering Method. *Proceedings of the 13th ACM International Conference on Bioinformatics, Computational Biology and Health Informatics, BCB 2022*, 1, 22, (Aug. 2022). ISBN: 9781450393867. DOI: 10.1145/3535508.3545561.

[6] M. Gupta *, T.-L. T. Phan, H. T. Bunnell, and **R. Beheshti**. 2021. Concurrent imputation and prediction on EHR data using bi-directional GANs. In *Proceedings of the 12th ACM Conference on Bioinformatics, Computational Biology, and Health Informatics*. Association for Computing Machinery, Gainesville, Florida, Article 7. DOI: 10.1145/3459930.3469512.

[7] R. Poulain *, M. Gupta *, R. Foraker, and **R. Beheshti**. 2021. Transformer-based Multi-target Regression on Electronic Health Records for Primordial Prevention of Cardiovascular Disease. In *2021 IEEE International Conference on Bioinformatics and Biomedicine (BIBM)*, 726–731. DOI: 10.1109/BIBM52615.2021.9669441.

[8] R. Ramazi *, C. Perndorfer, E. Soriano, J.-P. Laurenceau, and **R. Beheshti**. 2019. Multi-Modal Predictive Models of Diabetes Progression. In *Proceedings of the 10th ACM International Conference on Bioinformatics, Computational Biology and Health Informatics* (BCB '19). Association for Computing Machinery, New York, NY, USA, 253–258. ISBN: 9781450366663. DOI: 10.1145/3307339.3342177.

[9] G. Sukthankar and **R. Beheshti**. 2019. Using Agent-Based Models to Understand Health-Related Social Norms. In *Social-Behavioral Modeling for Complex Systems*. John Wiley & Sons, Ltd. Chap. 27, 633–654. ISBN: 9781119485001. DOI: 10.1002/9781119485001.ch27.

[10] **R. Beheshti**, R. Barmaki, and N. Mozayani. 2016. Negotiations in Holonic multi-agent systems. In *Recent Advances in Agent-based Complex Automated Negotiation*. Springer, 107–118.

[11] **R. Beheshti**, A. M. Ali, and G. Sukthankar. 2015. Cognitive Social Learners: An Architecture for Modeling Normative Behavior. In *Proceedings of the Twenty-Ninth AAAI Conference on Artificial Intelligence*. Austin, TX, (Jan. 2015), 2017–2023.

[12] **R. Beheshti** and G. Sukthankar. 2014. A Normative Agent-based Model for Predicting Smoking Cessation. In *Proceedings of the International Conference on Autonomous Agents and Multi-agent Systems (AAMAS)*, 557–564.

[13] **R. Beheshti** and G. Sukthankar. 2013. Analyzing Agent-based Models using Category Theory. In *IEEE/WIC/ACM International Conference on Intelligent Agent Technology (IAT)*, 280–286.

[14] **R. Beheshti** and G. Sukthankar. 2013. Improving Markov Chain Monte Carlo Estimation with Agent-Based Models. In *Proceedings of the International Conference on Social Computing, Behavioral-Cultural Modeling, and Prediction (SBP)*, 495–502.

[15] **R. Beheshti** and G. Sukthankar. 2012. Extracting Agent-Based Models of Human Transportation Patterns. In *Proceedings of the ASE/IEEE International Conference on Social Informatics*, 157–164.

[16] **R. Beheshti** and N. Mozayani. 2011. A New Mechanism for Negotiations in Multi-Agent Systems Based on ARTMAP Artificial Neural Network. In *Agent and Multi-Agent Systems: Technologies and Applications*. Lecture Notes in Computer Science. Vol. 6682. Springer Berlin Heidelberg, 311–320.

[17] **R. Beheshti**, M. Analui, and B. Minaei-Bidgol. 2009. A Pairwise Classification Method with Support Vector Machines, Based on Game Theory and Alpha-beta Algorithm. In *Proceedings of the International Conference of Iranian Operation Research Society.*

[18] **R. Beheshti** and N. Mozayani. 2009. Predicting opponents offers in multi-agent negotiations using ARTMAP neural network. In *Proceedings of International Conference on Future Information Technology and Management Engineering (FITME)*, 600–603.

[19] **R. Beheshti**, N. Mozayani, and A. T. Rahmani. 2009. A New Hybrid Evolutionary Method With Ant Colony and PSO Algorithms Based on Fuzzy Decision Making. In *Proceedings of the International Conference of Iranian Operation Research Society.*

[20] **R. Beheshti** and A. T. Rahmani. 2009. A multi-objective genetic algorithm method to support multi-agent negotiations. In *Proceedings of International Conference on Future Information Technology and Management Engineering (FITME)*, 596–599.

Short/Workshop Papers

[1] **R. Beheshti** and G. Sukthankar. 2015. Modeling Tipping Point Theory using Normative Multi-agent Systems. In *Proceedings of the 2015 International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, 1731–1732.

[2] **R. Beheshti**, R. Barmaki, and N. Mozayani. 2014. Negotiations in Holonic Multi-agent systems. In *Proceedings of the International Workshop on Agent-based Complex Automated Negotiations (ACAN).*

Honors & Awards

Early Career Award Competition Finalist 2017
The Obesity Society (TOS) Annual Meeting

Postdoctoral Fellowship 2015-17
UC San Francisco CTCRE. Awarded, but declined to accept.

Graduate Research Excellence Fellowship 2013-15
University of Central Florida

Doctoral Student of the Year award 2015
UCF Department of Computer Science (first runner-up among 132 PhD students)

Dissertation Completion Scholarship 2014
UCF College of Engineering and Computer Science

Master thesis research grant 2009-11
Telecommunication Research Center (ITRC) Research Grant

Invited talks

"Complex Models to Understand Complex Health Behaviors"

Christiana Care Value Institute. ..... Dec 2018
University of Utah ..... Sep 2018
Washington University in St. Louis, Institute for Informatics (I2) ..... May 2018
University of Nevada, Reno ..... May 2018
Virginia Tech (Blacksburg, VA) ..... May 2018
Cincinnati Children's Hospital ..... Apr 2018
University of Delaware ..... Apr 2018
Case Western Reserve University ..... Apr 2018
University of North Texas ..... Apr 2018
Virginia Tech Carilion School of Medicine (Roanoke, VA) ..... Apr 2018

Rochester Institute of Technology ..... Apr 2018
University of South Carolina ..... Mar 2018
Wake Forest School of Medicine ..... Mar 2018
University of Maryland, Baltimore County ..... Feb 2018
George Mason University ..... Mar 2017
University of North Carolina at Charlotte ..... Mar 2017
The Ohio State University ..... Apr 2017

"How price affects our food decision-making? an agent-based model simulation"
NIH Pathways to Prevention [Travel Award recipient] ..... Dec 2017
The Obesity Society (TOS) Annual Meeting ..... Nov 2016

"An Agent-based Transportation Simulation of the UCF Campus"
SwarmFest Conference ..... July 2013

Industry research

Researcher 2006-2007
Data Mining Research Group, Bank Mellat Research Center

Teaching

University of Delaware
Data Mining (CISC483) ..... Fall 2022, Spring 2022
Human-Centered AI (CISC889) ..... Spring 2021
Artificial Intelligence (CISC481) ..... Fall 2018, Spring (2019, 20, 21)
Artificial Intelligence (CISC681) ..... Fall (2018, 19, 20, 21, 22), Spring (2019, 20, 21, 22)

MOOC on Coursera platform
Systems science and obesity 2015

Johns Hopkins Bloomberg School of Public Health
Complex systems and obesity ..... Summer 2016, 17

Semnan University (Aradan branch)
Software Engineering ..... Spring 2011

Mentoring

Doctoral students
Fahmida Liza Piya (early stage) ..... Since Fall 2022
Mirza Farhan Bin Tarek (early stage) ..... Since Fall 2022
Jon Kilgannon (early stage) ..... Since Summer 2022
Pranjal Dhakal (early stage) ..... Since Fall 2021
Hamed Fayyaz (post prelim) ..... Since Spring 2021
Raphael Poulain (post prelim) ..... Since Fall 2020
Ramin Ramazi (post candidacy) ..... Since Winter 2019
Mehak Gupta (post candidacy) ..... Since Winter 2019
Md Mozaharul Mottalib (post prelim) ..... Since Fall 2018

Undergrad students (research supervision)
Haritima Manchanda ..... Since Summer 2022
Stephen Li ..... Since Winter 2022

Brennan Gallamoza ..... Fall 2021–Spring 2022
Sohan Gadiraju ..... Fall 2021–Winter 2022
Akshat Katoch ..... Fall 2019–Fall 2021
Tyler Ballance ..... Fall 2019–Spring 2021

Dissertation committee

Lauren Olson (CS PhD) ..... Since 2022
Aman Sawhney (CS PhD) ..... Since 2022
Pengyuan Li (CS PhD) ..... Graduated 2021
Gongbo Zhang (CS PhD) ..... Graduated 2021
Xiaoyuan Liu (CS PhD) ..... Graduated 2021
Siqi Wang (CS MS Thesis) ..... Graduated 2020
Manjula Ibrahim (MSDS Thesis) ..... Graduated 2020
Kevin Corder (CS PhD) ..... Since 2020

Professional activities

Chair/Vice President 2012-14
UCF Graduate Students Association (GSA) Advisory Board/Executive Branches

Graduate Students Representative 2012-13
UCF Admissions and standards committee

University Representative 2006-2007
Elected as KHU scientific associations representative in the Ministry of Science, Research & Tech

Editor in chief 2006-07
Abacus (Chortkeh in Persian) magazine (in IT & CS), published in KHU

Internal committee service

Chair

CIS Marketing Committee ..... Fall 2019 - Summer 2021, Fall 2022 - Present

Member

CIS Alumni/Development Committee ..... Fall 2018 - Present
CIS Marketing Committee ..... Fall 2021 - Summer 2022
CIS Graduate Admissions Committee ..... Fall 2018 - Summer 2020
CIS Associate Professor in AI/IR Search Committee ..... Fall 2019 - Spring 2020

Faculty advisor

Brazilian Jiu Jitsu Club ..... Fall 2019 - Present
Iranian Graduate Association ..... Spring 2022 - Present

Co-organizer

COVID-19 Hackathon ..... Spring 2020

External panels

Government of Canada's Strategic Science Fund 2022
CRA Undergraduate Research Awards Committee 2022
Robert Wood Johnson Foundation, Paradigm Data, and Methods Panel 2021
NSF SBIR/STTR Panel 2020

NSF Information Integration and Informatics (III) SMALL Panel 2020
Swiss National Science Foundation (SNSF) panel for the COVID-19 call 2020

Program committee

AAAI Conference on Artificial Intelligence ..... AAAI-14, 20, 21 & 22
International Joint Conference on Artificial Intelligence ..... IJCAI 2015, 17, 19 & 20
Conference on Autonomous Agents and Multi-agent Systems ..... AAMAS-16-19 & 21
ACM Bioinformatic, Comp Bio, and Health Info ..... BCB-21 &22
ACM Conference on Health, Inference, and Learning ..... CHIL-21 & 22
Machine Learning for Healthcare ..... MLHC-21 & 22
International Conference on Complex Systems ICCS-20
Conference on Complex Systems ..... CCS-17, 18, 19 & 20
IEEE Artificial Intelligence and Virtual Reality ..... AIVR 2018
American Medical Informatics Association ..... AMIA-19, 20, 21 & 22

Journal reviewer

American Journal of Epidemiology ⋆ Appetite ⋆ BMC Medical Informatics and Decision Making ⋆ International Journal of Behavioral Nutrition and Physical Activity ⋆ International Journal of Medical Informatics ⋆ IEEE/ACM Transactions on Computational Biology and Bioinformatics ⋆ Journal of AI and Society ⋆ Journal of Autonomous Agents and Multi-Agent Systems ⋆ Journal of Physical Activity & Health ⋆ Journal of Medical Internet Research ⋆ Journal of Nutrition ⋆ Lancet Digital Health ⋆ npj Digital Medicine ⋆ Pattern Recognition Letters ⋆ Symmetry