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## Dr. Moshe Unger

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### **Summary**

Moshe holds a Ph.D. and an M.Sc in Software and Information Systems Engineering, as well as a B.Sc in Software Engineering from Ben-Gurion University (BGU) of the Negev, Israel. His research focuses on personalization, Data Mining, Machine Learning, and Recommender Systems, with an emphasis on context inference through deep learning techniques. He is currently an assistant professor at the Collier School of Management, Tel Aviv University, and an Amazon visiting academic in AWS, where he works on time-series personalization and forecasting. Before joining Tel Aviv University, Moshe was a post-doctoral research scientist at NYU Stern School of Business and an associate research scientist at the NYU Stern Fubon Center of Technology, Business, and Innovation. Prior to his Ph.D. studies, he held various engineering and management positions in the high-tech industry and collaborated with companies like Dell EMC, Deutsche Telekom, and Spotify.

### **Research Interests**

Recommendation systems, big data, machine learning, deep learning, time-series forecasting, cyber security.

### **Education**

2014 – 2018 PhD in Software and Information Systems Engineering, Ben-Gurion University, Israel.

2012 – 2014 MSc in Software and Information Systems Engineering, Ben-Gurion University, Israel.

2009 – 2012 BSc in Software Engineering, Ben-Gurion University, Israel.

### **Work Experience**

2022 – Today *Amazon Visting Academic*  
AWS, Amazon

2021 – Today *Assistant Professor of Management of Technology and Information Systems*  
Collier School of Management, Tel Aviv University

2020 – 2021 *Associate Research Scientist*  
NYU Stern Fubon Center for Technology, Business, and Innovation

2018 – 2020 *Postdoctoral Researcher*  
New York University, Stern School of Business

2013 – 2018 *Research Assistant, Project Manager*  
Deutsche Telekom Innovation Laboratories, Beer-Sheva, Israel Cyber Security  
Research Center at Ben-Gurion University (BGU)

## Teaching Experience

- Introduction to Big Data Analytics (Fall, Spring 2023), Tel-Aviv University  
Evaluations: 6.4 (out of 7)
- Recommender Systems (Spring 2022), Tel-Aviv University
- Data Mining and Business Analytics – Tech (Fall 2020), NYU
- Analysis and Design of Information Systems, Ben-Gurion University  
Evaluations: 4.3, 4.6 (out of 5)
- Principles of Programming Languages, BGU  
Evaluations: 4.5 (out of 5)
- Introduction to Information Systems, Shamoon College of Engineering, Israel
- Analysis and Design of Information Systems in Object Oriented Approach, Shamoon College of Engineering, Israel

## Publications in Refereed Conferences

- Adomavicius, Gediminas, et al. "Workshop on Context-Aware Recommender Systems 2023." Proceedings of the 17th ACM Conference on Recommender Systems. 2023.
- Unger, Moshe, and Alexander Tuzhilin. "Hierarchical Contextual Embeddings for Context-Aware Recommendations." *2023 IEEE 39th International Conference on Data Engineering (ICDE)*. IEEE, 2023.
- Adomavicius, Gediminas, et al. "CARS: Workshop on Context-Aware Recommender Systems 2022." Proceedings of the 16th ACM Conference on Recommender Systems. 2022.
- Adomavicius, G., Bauman, K., Mobasher, B., Ricci, F., Tuzhilin, A., & Unger, M. (2021, September). Workshop on Context-Aware Recommender Systems (CARS) 2021. In *Fifteenth ACM Conference on Recommender Systems* (pp. 813-814).
- Unger, M., Shapira, B., Rokach, L., & Bar, A. (2017, July). Inferring contextual preferences using deep auto-encoding. In *Proceedings of the 25<sup>th</sup> Conference on User Modeling, Adaptation and Personalization* (pp. 221-229). ACM.
- Bar, A., Shapira, B., Rokach, L., & Unger, M. (2016, December). Scalable attack propagation model and algorithms for honeypot systems. In *Big Data, 2016 IEEE International Conference on* (pp. 1130-1135). IEEE.
- Bar, A., Shapira, B., Rokach, L., & Unger, M. (2016, June). Identifying Attack Propagation Patterns in Honeypots Using Markov Chains Modeling and Complex Networks Analysis. In *Software Science, Technology and Engineering (SWSTE), 2016 IEEE International Conference on* (pp. 28-36). IEEE.
- Unger, M., Shapira, B., Rokach, L., & Bar, A. (2016). Deep Auto-Encoding for Context-

Aware Inference of Preferred Items' Categories. In RecSys Posters.

- Unger, M. (2015, September). Latent context-aware recommender systems. In Proceedings of the 9th ACM Conference on Recommender Systems (pp. 383-386). ACM.
- Unger, M., Bar, A., Shapira, B., Rokach, L., & Gudes, E. (2014, September). Contexto: lessons learned from mobile context inference. In Proceedings of the 2014 ACM International Joint Conference on Pervasive and Ubiquitous Computing: Adjunct Publication (pp. 175-178). ACM.

### **Publications in Scientific Journals**

- Bauman, Konstantin, Alexander Tuzhilin, and Moshe Unger. "HyperCARS: Using Hyperbolic Embeddings for Generating Hierarchical Contextual Situations in Context-Aware Recommender Systems." *Information Systems Research* (2024).
- Unger, M., Wedel, M. & Tuzhilin, A. Predicting consumer choice from raw eye-movement data using the RETINA deep learning architecture. *Data Min Knowl Disc* (2023). <https://doi.org/10.1007/s10618-023-00989-7>
- Unger, Moshe, et al. "Don't Need All Eggs in One Basket: Reconstructing Composite Embeddings of Customers from Individual-Domain Embeddings." *ACM Transactions on Management Information Systems* (2023).
- Unger, M., Tuzhilin, A., & Livne, A. (2020). Context-Aware Recommendations Based on Deep Learning Frameworks. *ACM Transactions on Management Information Systems (TMIS)*, 11(2), 1-15.
- Unger, M., & Tuzhilin, A. (2020). Hierarchical Latent Context Representation for Context-Aware Recommendations. *IEEE Transactions on Knowledge and Data Engineering (TKDE)*.
- Unger, M., Shapira, B., Rokach, L., & Livne, A. (2018). Inferring contextual preferences using deep encoder-decoder learners. *New Review of Hypermedia and Multimedia*, 24(3), 262-290.
- Unger, M., Bar, A., Shapira, B., & Rokach, L. (2016). Towards latent context-aware recommendation systems. *Knowledge-Based Systems*, 104, 165-178.

## **Work Under Review**

- Unger, M., Cohen, B., Brost, B. & Tuzhilin, A. Deep Multi-Objective Multi-Stakeholder Music Recommendation (Joint work with *Spotify*)- *Major Revision R&R (Management Science)*

## **Chapters in Books**

- Gediminas Adomavicius, Konstantin Bauman, Alexander Tuzhilin and Moshe Unger. Context-Aware Recommender Systems: From Foundations to Recent Developments, Recommender systems handbook (2021)

## **Conference Participation**

- Twentieth Symposium on Statistical Challenges in Electronic Commerce Research (SCECR), Lisbon, Portugal
- Biz AI Conference: AI in Business Research, The University of Texas at Dallas, March 2024
- The 17th ACM Conference on Recommender Systems (RecSys), Singapore, 18th-22nd September 2023 (*CARS Workshop Organizer*)
- The 39th IEEE International Conference on Data Engineering (ICDE 2023), Anaheim, California, USA, April 3 – 7, 2023
- The 16th ACM Conference on Recommender Systems (RecSys), Seattle, WA, USA, 18th-23rd September 2022 (*CARS Workshop Organizer*)
- Statistical Challenges in Electronic Commerce Research (SCECR), June 21st - June 22nd, 2022, Madrid, Spain
- The 15th ACM Conference on Recommender Systems (RecSys), Amsterdam, Netherlands, 27th September-1st October 2021 (*CARS Workshop Organizer*)
- The 14th ACM Conference on Recommender Systems (RecSys), Online, Worldwide, September 22-26, 2020 (*CARS Workshop Organizer*)
- The 29th Workshop on information technologies and systems (WITS 2019), December 18-20, 2019, Munich, Germany (*CARS Workshop Organizer*)
- International Conference on Information Systems (ICIS), December 15-18, 2019, Munich, Germany
- Conference on Information Systems and Technology (CIST), October 19-20, 2019 (Seattle, WA)
- The 13th ACM Conference on Recommender Systems (RecSys), Copenhagen, Denmark, September 16-20, 2019

- The 25th ACM Conference on User Modelling, Adaptation and Personalization (UMAP), Bratislava, 2018
- 11th ACM Conference on Recommender Systems (RecSys), Como, Italy, 2017
- 10th ACM Conference on Recommender Systems (RecSys), Boston, 2016
- 2016 IEEE International Conference on Software Science, Technology and Engineering (SWSTE), Israel
- 2016 IEEE International Conference on Big Data, Washington
- 9th ACM Conference on Recommender Systems (RecSys), 2015
- 2014 ACM International Joint Conference on Pervasive and Ubiquitous Computing (UbiComp), 2014

### **Patents**

- Recommendation System and Method for a Mobile Device Based on Raw Data Which is Collected from Sensors of the Mobile Device.
- A Method for Extracting Latent Context Patterns from Sensors.
- Designing Context Aware Recommendations Systems Based on Latent Contexts.
- Model for Identifying Attack Propagation Patterns in a Monitored Sensor-Based System.
- Method for Classifying Attack Sources in Cyber-Attack Sensor Systems.
- Prediction System Configured for Modeling the Expected Number of Attacks on a Computer or Communication Network.

### **Academic Services**

Referee for RecSys, MIS Quarterly (MISQ), Information Systems Research (ISR), International Conference on Information Systems (ICIS), IEEE Transactions on Knowledge and Data Engineering (TKDE), Knowledge-Based Systems, Transactions on Data Science, IEEE Access