Islam Akef Ebeid, Ph.D.

Assistant Professor of Computer Science | Principal Investigator of AI in Biomedicine | Engineer

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Texas Woman's University

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About

Computer and Information Scientist specializing in Data Engineering and Artificial Intelligence in the Sciences, especially Biomedicine. Currently, I am an Assistant Professor at Texas Woman's University and a Principal Investigator on an active $600K collaborative National Science Foundation (NSF, CISE/CCF) grant.

My **graduate academic studies** spanned 8 years at the University of Texas at Austin (UT Austin) and the University of Arkansas at Little Rock (UA Little Rock), where I earned a Ph.D. in Computer and Information Science in 2022. I worked under the guidance and mentorship of John Talburt and Elizabeth Pierce at UA Little Rock and Jacek Gwizdka and Ying Ding at UT Austin.

Other mentors I worked with in the past years: Serdar Bozdag, Mariofanna Milanova, Ningning Wu, Yan Zhang, Abhra Sarkar, Mohammed Yassine Belkhouche, Carolina Cruz Neira, Dirk Reiners, Roger Fang, Jerry Wood, and Larry Morell.

My **research interests** and experience are centered on the roles of Data Quality, Curation, and Engineering in Artificial Intelligence (AI), as well as their applications in Life Sciences. I develop Graph Neural Network Models and Large Language Models based on methods and frameworks rooted in Graph Theory, Network Science, Natural Language Processing, Computer Vision, and Deep Learning. The frameworks are typically validated for practical use via human-computer interaction-based approaches and are usually tested in information retrieval and user-centered systems.

My **vision** is to aid and automate scientific discovery in Life Sciences by developing human-centered, ethical, and artificially intelligent systems that efficiently integrate, clean, organize, and mine scientific data.

My **mission** is to educate and mentor students to become independent researchers through a guild-based, rigorous, hands-on approach. In addition, I aim to empower underrepresented groups in computational, data, and information sciences.

Funding & Grants

External Competitive Grants

National Science Foundation (NSF) - CISE/CCF

Role: Principal Investigator (PI)

Project: Collaborative Research: CISE-MSI: RDP: SCH: Towards auto-prompt textual annotations generation with domain knowledge for multimodal medical image segmentation.

Funding: $210,000 (TWU Portion) / $600,000 (Total Collaborative Award with the University of Texas at Rio Grande Valley).

Duration: October 2025 – May 2028.

Internal & Institutional Funding

Texas Woman's University Internal Research Grant

Role: Principal Investigator

Project: High Performance Computing Infrastructure Memory Upgrade for AI Model Training

Amount: $5,000

Year: 2025

Texas Woman's University Startup Fund

Role: Principal Investigator

Purpose: Establishment of the Data2AI4LifeSciences Lab.

Amount: $66,000

Year: 2023

Education

<u>University of Arkansas at Little Rock</u>, Little Rock, Arkansas (2014-2022)

   MSc, Ph.D. in Computer and Information Science

<u>The University of Texas at Austin</u>, Austin, Texas (2017-2021)

   MSc, Ph.D. (Transferred) Graduate work at the School of Information and the

Department of Statistics and Data Sciences

<u>Arkansas Tech University</u>, Russellville, Arkansas (2011-2013)

   Professional MSc in Computer and Information Science

<u>Ain Shams University</u>, Cairo, Egypt (2003-2008)

   BSc in Electrical & Computer Engineering

<u>The English School in Cairo</u> (El Nasr School), Cairo, Egypt (2000-2003)

   General Secondary Diploma in Mathematics

Certifications: <u>FE</u>, <u>ITIL</u>

Honors & Awards

The Hanover Grants Academy Award, Texas Woman's University (2023)

Outstanding Doctoral Graduate, University of Arkansas at Little Rock (2022)

Accepted at the Data Science for Social Good fellowship (2020)

The Graduate School Professional Development Award, The University of Texas at Austin (2019)

Best Short Paper Award, ACM SIGCHI Symposium on Eye Tracking Research (2019)

The Graduate Recruitment Fellowship Award, The University of Texas at Austin (2017)

Distinctive Capstone Project, Ain Shams University (2008)

Scholarly Work & Disseminated Research

Journal Articles (refereed, n=7)

Ebeid IA, Tang H, and Gu P (2025). Inferred global dense residue transition graphs from primary structure sequences enable protein interaction prediction via directed graph convolutional neural networks. **Front. Bioinform**. 5:1651623. doi: 10.3389/fbinf.2025.1651623. <u>Link</u>.

Ebeid, I. A. (2022). MedGraph: A semantic biomedical information retrieval framework using knowledge graph embedding for PubMed. ***Frontiers in Big Data***, *5*. <u>Link.</u>

Ebeid, I. A., Talburt, J. R., Hagan, N. K. A., & Siddique, M. A. S. (2022). ModER: Graph-based Unsupervised Entity Resolution using Composite Modularity Optimization locality-sensitive hashing. *International Journal of Advanced Computer Science & Applications*, *13*(9). Link.

Yu, Q., Wang, Q., Zhang, Y. et al. Reply to issues about entity metrics & paper-entity citation network. *Scientometrics* 127, 2127–2129 (2022). Link.

Ma, J., Ebeid, I. A., De Wit, A., Xu, M., Yang, Y., Bekkers, R., & Wiepking, P. (2021). Computational Social Science for Nonprofit Studies: Developing a Toolbox & Knowledge Base for the Field. *Voluntas*, *34*(1), 52–63. Link.

Yu, Q., Wang, Q., Yang, Z., Chen, C., Ryu, H., Park, N., Baek, J., Li, K., Wu, Y., Li, D., Xu, J., Liu, M., Yang, J. J., Zhang, C., Lu, C., Zhang, P., Li, X., Chen, B., Ebeid, I. A., . . . Bu, Y. (2021). Analyzing knowledge entities about COVID-19 using entity metrics. *Scientometrics*, *126*(5), 4491–4509. Link.

Xu, J., Kim, S., Song, M., Jeong, M., Kim, D., Kang, J., Rousseau, J. F., Li, X., Xu, W., Torvik, V. I., Bu, Y., Chen, C., Ebeid, I. A., Li, D., & Ding, Y. (2020). Building a PubMed knowledge graph. *Scientific Data*, *7*(1). Link.

Conference Papers and Proceedings (peer-reviewed, n=7, mean acceptance rate=25%)

Gu, P., Tang, H., Ebeid, I. A., Nunez, J. A., Vazquez, F., Adame, D., et al. (2025, June). Adapting a Segmentation Foundation Model for Medical Image Classification. In 2025, IEEE 38th International Symposium on Computer-Based Medical Systems (**CBMS 2025**) (pp. 167-172). IEEE. Link.

Ebeid, I. A., Talburt, J. R., & Siddique, M. A. S. (2022, February). Graph-based hierarchical record clustering for unsupervised entity resolution. In the proceedings of the *19th International Conference on Information Technology-New Generations ITNG 2022* (pp. 107-118). Cham: Springer International Publishing. Link.

Ebeid, I. A., Hassan, M., Wanyan, T., Roper, J., Seal, A., & Ding, Y. (2021). Biomedical Knowledge Graph Refinement & Completion Using Graph Representation Learning & Top-K Similarity Measure. In *the proceedings of iConference 2021, Springer eBooks* (pp. 112–123). Link.

Chen, C., Ebeid, I. A., Bu, Y., & Ding, Y. (2020). Coronavirus Knowledge Graph: A Case Study. *Workshop paper did not appear in the proceedings ACM SIGKDD International Conference on Knowledge Discovery in Databases, KDD 2020*. Link.

Ebeid, I. A., Bhattacharya, N., Gwizdka, J., & Sarkar, A. (2019). Analyzing gaze transition behavior using Bayesian mixed effects Markov models. In *Proceedings of the 2019 ACM SIGCHI Symposium on Eye Tracking Research & Applications* **ETRA 2019**. Link.

Ebeid, I. A., & Zhang, Y. (2019). A systematic review of the literature in nature on human-computer interaction: Preliminary results. In *the proceedings of* **iConference 2019**. Link.

Ebeid, I. A., & Gwizdka, J. (2018). Real-time gaze transition entropy. In *Proceedings of the 2018 ACM SIGCHI Symposium on Eye Tracking Research & Applications* **ETRA 2018**. Link.

Ebeid, I. A., Cruz-Neira, C., Jaiswal, M., & Zybaylov, B. (2016). Protein Chemical Cross-linking/Mass Spectrometry: From raw data to fully immersive visualizations. *Electronic Imaging Symposium* **EI 2016**, 28(19), 1–1. Link.

Theses & Dissertations (committee reviewed)

Ebeid, I. A. (2022). Graph-Based Unsupervised Entity Resolution for Identifying Entity Profiles in Ambiguous Data (Doctoral dissertation, University of Arkansas at Little Rock). Link.

Ebeid, I. A. (2021). MedGraph: An experimental semantic knowledge graph-based information retrieval method and simple search engine for the biomedical citations indexed in PubMed (Master's report, University of Arkansas at Little Rock). Link.

Honorary mention in the following doctoral dissertation:

Jaiswal, M. S. (2015). Analysis of protein-protein interactions using chemical cross-linking mass spectrometry (CXMS): Novel computational approaches (Doctoral thesis, University of Arkansas at Little Rock). Link.

Ebeid, Islam A. (2013). Displaying Data Structures & Algorithms in a Graphical User Interface for Genesis Programming Language. Arkansas Tech University. Link.

Ebeid, Islam Akef, et al. (2008). Vehicle Infrastructure Integration & Intersection Collision Avoidance System for Automated Traffic Systems. Link.

Books, Chapters, & Technical Reports (editor, advisor, or instructor-reviewed creative work)

Ebeid, Islam Akef. (2021). Biomedical Multi-source Data Integration using Knowledge Graphs & Entity Resolution: Understanding author expertise in Cancer Epigenetics research. Link.

Ebeid, Islam Akef. (2020). Knowledge Graph Mining: A Survey of Methods, Approaches, & Applications. Link.

Ebeid, Islam Akef. (2020). Knowledge Profiling Using Biomedical Word Embedding & Knowledge Graph. <u>Link.</u>

Ebeid, Islam Akef. (2019). A Literature Review On The Automatic Generation of Chest X-ray Medical Reports using Deep Learning. <u>Link.</u>

Ebeid, Islam Akef. (2019). Promoting the evaluation of the credibility & quality of online health information through online web applications. <u>Link.</u>

Ebeid, Islam Akef. (2018). A Comparison Between the Gaze Transition Entropy & The Bayesian Semi-Parametric Mixed Effects Markov Model in Comparing Scanpaths & Gaze Transitions. <u>Link.</u>

Ebeid, Islam Akef. (2018). Simple Eye Tracker Calibration for Tiled Display Walls. <u>Link.</u>

Ebeid, I. A., Bhattacharya, N., & Gwizdka, J. (2018). Evaluating The Efficacy of Real-time Gaze Transition Entropy. Research Gate, 1(1), 1-8. <u>Link.</u>

Ebeid, Islam Akef. (2017). Analysis of Children's Reading Performance: An Eye Tracking Experiment. <u>Link.</u>

Ebeid, Islam Akef. (2017). Intel VME Simultaneous Localization & Mapping. <u>Link.</u>

Ebeid, I., & Arango, J. (2016). Mallet vs. Gensim: Topic modeling evaluation report. University of Arkansas at Little Rock. <u>Link.</u>

Ebeid, Islam Akef. (2015). Global Big Data Management & Governance in Health Care Information Systems. <u>Link.</u>

Ebeid, Islam Akef. (2015). Real-time Object Scanning & Manipulation in the CAVE. <u>Link.</u>

Ebeid, Islam Akef. (2014). The National Visualization Laboratory. <u>Link.</u>

Published Op-eds and Blog entries (non-peer-reviewed creative work)

Ebeid, I. A. (2023, July). Opinion: What distinguishes selective universities? Illumination. Medium. <u>Link.</u>

Ebeid, I. A. (2023, June). Opinion: The link between information science theory and artificial intelligence explains the recent scare. AI monks. Medium. <u>Link.</u>

Invited Talks, Lectures, Seminars, and Conferences

The MidSouth Computational Biology & Bioinformatics Society Talk: MedGCN: Query-time Character Level Embedding for Biomedical Named Entity Recognition via Bidirectional Graph Convolutional Neural Networks (2024)

University of Arkansas at Little Rock, Donaghy College of Engineering, Science & Mathematics Graduate Seminar: Knowledge Representation & Data Mining using Knowledge Graphs. (2022)

Poster Participant, The MidSouth Computational Biology & Bioinformatics Society (2015-2016)

Ebeid, I. A., Jaiswal, M., Cruz, C., & Zybaylov, B. (2016). VisInt-X: Visualizing Interactions in Cross-linked Proteins. ResearchGate. Link.

Ebeid, I. A., Jaiswal, M., Cruz, C., & Zybaylov, B. (2015). XLPM Map Viewer: A Protein-Protein Interaction Map Viewer. ResearchGate. Link.

Poster Participant, University of Arkansas at Little Rock Research Expo Poster "Protein-protein interaction visualization." (2015)

Positions Held

Academic

Assistant Professor of Computer Science, Texas Woman's University, Denton, Texas (2023-Current)

- Research: Established the Data2AI4LifeSciences Lab, recruiting and mentoring undergraduate and graduate students.
- Research: Secured external federal funding (NSF) in the first year of tenure-track appointment.
- Teaching: Foundations of Data Science, Fundamentals of Informatics, Data Warehousing, Statistical Programming.
- Service: Serving on the University Sustainability Committee and the AI Initiative Committee

Assistant Professor of Computer Science, Southern Arkansas University, Magnolia, Arkansas (2023)

- Taught Computer Science II, Database Management Systems, and Unix Operating Systems. 14
- Served as Faculty Advisor for the Computer Science Club

Postdoctoral Research Associate | April 2022 – Jan 2023 *University of North Texas, Denton, TX*

- Conducted NIH-funded research on Drug Repurposing using Graph Neural Networks with Dr. Serdar Bozdag.
- Developed novel algorithms for identifying drug candidates for complex diseases.

- Contributed to the development and writing of an NIH R01 grant proposal focused on graph representation learning in drug discovery.

Research Assistant, Department of Information Science, University of Arkansas at Little Rock (2021-2022)

- Research funded by NSF focused on Unsupervised Learning for Entity Resolution and Matching

Teaching Assistant, School of Information, The University of Texas at Austin (2019-2020)

Research Assistant, School of Information, The University of Texas at Austin, Funded by the ALA (2018-2019)

Research Assistant, Texas Advanced Computing Center, The University of Texas at Austin, Funded by Intel Corporation (2018)

Research Fellow, School of Information, The University of Texas at Austin (2017-2018)

Research Assistant, Emerging Analytics Center, University of Arkansas at Little Rock (2014-2017)

Graduate Assistant, International & Multicultural Student Services Office, Arkansas Tech University (2012)

Graduate Assistant, Department of Computer & Information Science, Arkansas Tech University (2011-2013)

Professional

Data Science Research Intern, AbbVie Inc., Urbana-Champaign, Illinois (2020)

- Collaborated with the commercial data science team to develop predictive models

Software Engineering Intern, Intel Corporation, Santa Clara, California (2016-2017)

Software Developer, Arkansas.gov/National Information Consortium Inc., Little Rock, Arkansas (2013-2014)

Software Developer, WeDo Technologies, Cairo, Egypt (2010-2011)

Software Developer, Orange Telecom, Cairo, Egypt (2009-2010)

Software Developer, Xpress Integration, Cairo, Egypt (2009)

Electronics Engineer, Hanna Instruments, Cairo, Egypt (2008)

Software Engineering Intern, Giza Systems, Cairo, Egypt (2007-2008)

Software Engineering Intern, Vodafone, Cairo, Egypt (2005-2006)

Service

Professional

Peer Reviewing

Journals

Nature Quality & Quantity (2025)

Journal of Supercomputing (2025)

Journal of Nonprofit Management and Leadership (2024)

Journal of Natural Language Engineering, Cambridge University Press (2022-2023)

Journal of Imaging Science & Technology (JIST) (2016-2018)

Conferences

International Conference on Bioinformatics & Biomedicine (BIBM) (2022)

29th ACM International Conference on Information & Knowledge Management (CIKM) (2020)

26th ACM SIGKDD Conference on Knowledge Discovery & Data Mining, International Workshop on Knowledge Graphs (KDD) (2020)

ACM SIGCHI Symposium on Eye Tracking Research & Applications (ETRA) (2018-2019)

Conference Participation

Attendee, The Texas Advanced Computing Center Symposium (TACCSTER), Austin, Texas (2024-2025)

Attendee, ACM SIGCSE The Early Research Scholars Program Meeting, Virtual (2024)

Attendee, Islamic Society of North America Conference (ISNA), Dallas, Texas (2024)

Attendee, The MidSouth Computational Biology & Bioinformatics Society Meeting (MCBIOS), Atlanta, Georgia (2024)

Student Volunteer, ACM SIGCHI Symposium on Eye Tracking Research & Applications (ETRA), Denver, Colorado (2019)

Student Volunteer, International Conference on Advanced Technologies (ICAT), Little Rock, Arkansas (2017)

Representative, The International Conference for High-Performance Computing, Networking, Storage & Analysis (SC), Salt Lake, Utah (2016)

Editorial

Member, Research in Biomedical Engineering and Technology (2025-Present)

Fellow, The Journal of Information & Culture, published by The University of Texas Press (2019)

Editor for the following publication (2017)

Emami, Yasaman, & Coskun Bayrak. "EEG analysis of evoked potentials of the brain to develop a mathematical model for classifying tinnitus datasets." 2017 IEEE International Symposium on Medical Measurements & Applications (MeMeA). IEEE, 2017.

Professional Memberships

Professional Member, ACM (2011)

Professional Member, IEEE (2008)

Professional Member, Egyptian Syndicate of Engineers (2008)

Professional Member, American Association of University Professors (2024)

Institutional Service

Member, Curriculum Committee, Division of Computer Science, Texas Woman's University (2024)

Member, AI Initiative at TWU, Texas Woman's University (2024)

Member, Sustainability Committee, Texas Woman's University (2024)

Recruitment Coordinator, The Recruitment Committee, The Division of Computer Science, Texas Woman's University (2023, 2024)

Faculty Advisor, The Computer Science Club, Southern Arkansas University (2023)

Student Member, The Diversity & Inclusion Committee, School of Information, The University of Texas at Austin (2018-2019)

Dissertation, Thesis, and Capstone Advising and Committee Memberships

Predicting Alzheimer's disease progression via machine learning - Capstone project - Jordan Frazier (Spring, 2024)

Exploring the Link Between Oral Bacteria and Systemic Diseases: Identifying Cardiovascular Risks and Preventative Measures in the Oral Microbiome - Dominique Pettway (Fall, 2024)

Statistical and Exploratory Analysis of Fraudulent Credit Card Transaction Predictions - Heaven Campbell (Fall, 2024)

Credit Card Fraud Detection: Predictive Modeling for Fraudulent Transactions - Marilly Bobo (Fall, 2024)

Drug Repurposing: An Analysis of Machine Learning Algorithms for Predicting Disease and Drug Relations - Peggy Berko (Fall, 2024)

First-Generation student success at R1 institutions: An analysis on retention and graduation completion rates - Yesenia Martinez (Fall, 2024)

Building an Automated EDW Architecture for Cybersecurity Incident Analytics - Munira Karim (Spring, 2025)

Community Service

Volunteer, Refugee Services of Texas, Austin, Texas (2018-2020)

Volunteer, Resala Foundation, Cairo, Egypt (2003-2008)

Court Appointed Special Advocate Volunteer in training, Dallas CASA, Dallas, Texas (2023)

Volunteer, Citizens' Climate Lobby, Dallas, Texas (2024)

Volunteer and Member, Islamic Association of North Texas (2024)

Teaching

Texas Woman's University (mean overall evaluation: 4.2/5.0)

Course Developer, CSCI 5773 Artificial Intelligence (under review)

Instructor, CSCI Principles of Data Mining. Syllabus.

Instructor, CSCI 4623 Big Data and High Performance Computing. Syllabus.

Instructor, CSCI 1423 Programming Fundamentals I. Syllabus.

Instructor, CSCI 3603/5173, Foundations of Data Science, Fall (2023). Syllabus.

Instructor, CSCI 5103 Fundamentals of Informatics, Fall (2023). Syllabus.

Instructor, CSCI 5001 Programming for Informatics, Spring (2024). Syllabus.

Instructor, CSCI 4513/5803 Data Warehousing, Spring (2024). Syllabus.

Instructor, CSCI 5663 Statistical Programming, Summer (2024). Syllabus.

Instructor, CSCI 3603 Foundations of Data Science, Fall (2024). Syllabus.

Instructor, CSCI 5103 Fundamentals of Informatics, Fall (2024). Syllabus.

Southern Arkansas University (mean overall evaluation: 4.5/5.0)

Instructor, CSCI 2113 Computer Science II, Spring (2023). Syllabus.

Instructor, MSIS 5133 Database Management Systems, Spring, Summer (2023). Syllabus.

Instructor, MSIS 5033 The Unix Operating System, Summer (2023). Syllabus.

The University of Texas at Austin (mean overall evaluation: 4.75/5.0)

Instructor, Fundamentals of Computer Vision & Machine Learning, Summer (2018), Summer (2019). Syllabus.

Teaching Assistant, INF 385T Presenting Information, Spring (2019)

Teaching Assistant, INF 380E Perspectives on Information, Spring (2019), Fall (2019), Spring (2020)

Teaching Assistant, INF 397C Understanding Research, Spring (2019)

Teaching Assistant, INF 385T Virtual Environments, Fall (2019), Spring (2020)

Teaching Assistant, INF 385T Artificial Intelligence in Healthcare, Spring (2020)

Teaching Assistant, INF 385T Data Semantics, Spring (2020)

Teaching Assistant, INF 385T Human-AI Interaction, Fall (2020)

University of Arkansas at Little Rock

Teaching Assistant, IFSC 4345 Information Visualization, Spring (2016)

Teaching Assistant, IFSC 5399 Programming in Python, Fall (2016)

Arkansas Tech University

Teaching Assistant, COMS 1411 Introduction to Computer Programming, Spring (2012), Fall (2012)

Teaching Assistant, INFT 5703 Computer Networks I, Fall (2012), Spring (2013)

Skills

Main research specializations:

      Graph neural networks

      Entity resolution and matching with graph theory and natural language processing

      Biomedical information retrieval with graph representation learning

Secondary research specializations:

Human factors in computing and information seeking with eye tracking

Scientific visualization of biological data

Data modalities:

Unstructured Networks and Graphs

Unstructured Free Text

Structured Relational Models

Structured Longitudinal Data

My current skillset (Python, C/C++, Unix):

Graph theory and network mining algorithms

Applied linear algebra algorithms

Natural language processing algorithms

Deep learning (LLMs, GNNs) models and experimentation with TensorFlow

Machine learning algorithms with Scikit Learn and other libraries

Setting up high-performance computing environments and data management systems

My older skillset (C\C++, Java, SQL):

Experimental design and statistical analysis in eye-tracking studies

Image processing with OpenCV, mainly for filtering, localization, and mapping

Computer graphics with OpenGL and WebGL for creating scientific visualizations

Software engineering, especially web applications and services based on the MVC design pattern and backend ETL operations