PROMOTION RECOMMENDATION
The University of Michigan
College of Engineering
Department of Electrical Engineering and Computer Science

Danai Koutra, assistant professor of electrical engineering and computer science, Department of Electrical Engineering and Computer Science, College of Engineering, is recommended for promotion to associate professor of electrical engineering and computer science, with tenure, Department of Electrical Engineering and Computer Science, College of Engineering.

Academic Degrees:
Ph.D.   2015   Carnegie Mellon University, Computer Science, Pittsburgh, PA
M.S.   2015   Carnegie Mellon University, Computer Science, Pittsburgh, PA
Diploma 2010   National Technical University of Athens, Computer Science, Athens, Greece

Professional Record:
2020 – present   Morris Wellman Faculty Development Assistant Professor, Department of Electrical Engineering and Computer Science, University of Michigan
2019 – present   Affiliated Faculty, Computational Medicine and Bioinformatics, University of Michigan
2015 – present   Assistant Professor, Department of Electrical Engineering and Computer Science, University of Michigan

Summary of Evaluation:
Teaching: Professor Koutra is an outstanding instructor. She has taught ten courses in her time at Michigan (average enrollment 55): two offerings of a large senior class on Data Management (EECS 484), and eight offerings of data and graph mining classes of her own creation. Two of her data mining courses (EECS 476 and 576) now have permanent places in the curriculum. Her teaching scores are very good; indeed, no course quality or instructor quality score is below 4.0. The student evaluations from Professor Koutra's smaller data mining courses are consistently excellent (all instructor quality scores above 4.5), especially at the graduate level. Her student letters are uniformly positive, with many students noting not only her technical knowledge and organizational skills, but also her kindness, patience, and passion for the field. In addition to her excellent work inside the classroom, Professor Koutra also engages in extensive educational outreach. She has participated in the MIDAS Data Science Summer Camp for high school students, and the Big Data Summer Institute, which is targeted at undergraduates. She has also taught numerous workshops and seminars at various conferences and other events.

Professor Koutra leads a thriving research group of eight Ph.D. students, two post-doctoral scholars, and numerous undergraduates. She supports this enterprise with over $3M in funding from diverse sources, including an NSF CAREER award, an Army Young Investigator award, and research faculty awards from Toyota, Facebook, and Google. Moreover, several of her Ph.D. students have been awarded national fellowships. To date she has graduated one Ph.D. student, with three more on track to finish in the next year or so (one as co-chair).

Research: Professor Koutra is a prolific and influential researcher in the field of graph data mining, an area of machine learning that focuses on extracting knowledge and building useful models from large-scale network-structured data. In her time at Michigan, she has published over 50 papers, five

of which have won awards. To date, her publications have attracted over 3500 citations (Google Scholar), yielding an h index of 26, an outstanding tally for a 2015 Ph.D. Her work in network summarization and multi-network analysis is especially well-known and regarded by her research community. For this work, she was one of two selected for the inaugural ACM SIGKDD Rising Star Award, given by the leading data mining society to celebrate individual contributions in the first five years post-Ph.D. The external letter writers express in-depth appreciation for Professor Koutra's specific research contributions and extensive service efforts.

Recent and Significant Publications:
T. Safavi, C. Belth, L. Faber, D. Mottin, E. Müller, D. Koutra, "Personalized Knowledge Graph Summarization: From the Cloud to Your Pocket," *IEEE International Conference on Data Mining (ICDM)*, 10, 2019.
Y. Yan, J. Zhu, M. Duda, E. Solarz, C. Sripada, D. Koutra, "GroupINN: Grouping-based Interpretable Neural Network-based Classification of Limited, Noisy Brain Data," *ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (KDD)*, 9, 2019.
C. Belth, X. Zheng, J. Vreeken, D. Koutra, "What is normal, What is Strange, and What is Missing in a Knowledge Graph: Unified Characterization via Inductive Summarization," *The Web Conference (WebConf or WWW)*, 12, 2020.
M. Heimann, H. Shen, T. Safavi, D. Koutra, "REGAL: Representation Learning-based Graph Alignment," *ACM International Conference on Information and Knowledge Management (CIKM)*, 10, 2018.
M. Heimann, T. Safavi, D. Koutra, "Distribution of Node Embeddings as Multiresolution Features for Graphs," *IEEE International Conference on Data Mining (ICDM),* 10, 2019.

Service: Professor Koutra has excelled in service since joining Michigan. Internally, she has served on the CSE Executive Committee and the Graduate Admissions Committee, and is the faculty advisor to both ECSEL+ (group supporting graduate women and gender minorities in CSE), and the Michigan Data Science Team. She regularly participates in the MIDAS Annual Symposium. Professor Koutra works actively to promote diversity, reaching out to women and underrepresented minorities through various outlets, such as the MIDAS Summer Camp (as noted above) and the CSE Explore Grad Studies program. One-third of her mentees and advisees are women or underrepresented minorities. Externally, Professor Koutra regularly participates on behalf of all the major publication venues in her field, such as serving on programming committees and reviewing manuscripts. Other notable external activities include serving on the SIAM Activity Group on Data Mining and Analytics, where she helped plan and develop a new conference, the SIAM Conference on Mathematics of Data Science; serving as co-chair of the KDD Cup in 2017. She serves as an associate editor for the flagship journal in data science, *Transactions in Knowledge Design and Discovery*.

External Reviewers:
Reviewer A: "...Prof. Danai Koutra is an outstanding researcher, teacher, mentor and would be an asset to any team engaged in an intellectual quest and education. I most enthusiastically recommend her for promotion with tenure. Moreover, I think Prof. Koutra is a thought leader, I rank her among the very best in her field and am watching her career closely..."

Reviewer B: "Despite having graduated only 5 years ago, Dr. Koutra's CV contains achievements that even more senior researchers would envy. She has a remarkable track record with many contributions in top venues, and her work is attracting a lot of attention and a lot of citations."

Reviewer C: "I am truly impressed by the outstanding quality of her research and her potential to become a leader in whatever area she chooses to work. Danai's greatest strength is her ability to identify good research problems, study and understand them thoroughly, and then produce remarkably effective solutions to these problems. Her dedication to research, her eagerness to contribute, her leadership abilities, and her outreaches to other disciplines will make her a research area leader in the related fields. Based on her research achievements, I feel that she is highly qualified for **Associate Professor with tenure** in a highly reputed university."

Reviewer D: "Prof. Koutra's record is consistently impressive by all reasonable standards. She would easily exceed the bar for promotion and tenure at my own university and, I suspect, at essentially any university. Indeed, it is difficult for me to realistically imagine a better case for promotion and tenure in Prof. Koutra's research area. I strongly and enthusiastically recommend that you tenure her now."

Reviewer E: "Danai has published over 30 papers in these top tier conferences along with more than 18 papers in traditional archival journals. This level of scholarly productivity and high quality of publications puts Danai amongst the very best researchers who are at her stage in the career in our field."

Reviewer F: "I understand Dr. Koutra's major duties also include teaching, supervision of graduate students, and communal, departmental, collegiate services. I believe that Dr. Koutra has gone above and beyond what an assistant professor is expected to accomplish in multiple ways as demonstrated in her CV and I am truly impressed by her passion, energy, and leadership..."

Summary of Recommendation: Professor Koutra is an established leader in data mining with demonstrated leadership in teaching, research, and service. It is with the support of the College of Engineering Executive Committee that I recommend Danai Koutra for promotion to associate professor of electrical engineering and computer science, with tenure, Department of Electrical Engineering and Computer Science, College of Engineering.

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Alec D. Gallimore, Ph.D.
Robert J. Vlasic Dean of Engineering
College of Engineering

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