

Danai Koutra

CONTACT INFORMATION	University of Michigan, Ann Arbor Computer Science and Engineering 2260 Hayward (3633 Beyster bldg) Ann Arbor, MI 48109	Work: (+1) 734-764-4237 Mobile: (+1) 412-320-9996 E-mail: dkoutra@umich.edu Webpage: http://danaikoutra.com
POSITIONS	University of Michigan, Ann Arbor, USA <i>Assistant Professor, CSE</i>	September 2015-
	Carnegie Mellon University, USA Graduate Researcher	Sep 2010-Aug 2015
	Technicolor Research Lab, Los Altos, USA <i>Research Intern</i>	Oct-Dec 2013, May-July 2014
	Microsoft Research, Redmond, USA <i>Research Intern</i>	May-Aug 2013
	IBM TJ Watson Research Center, Hawthorne, USA <i>Research Intern</i>	May-Aug 2012
	Institute for the Management of Information Systems, Greece <i>Undergraduate Research Intern</i>	Oct 2009-June 2010
EDUCATION	Carnegie Mellon University, USA <i>PhD in Computer Science, Computer Science Dept.</i> Thesis: "Exploring and Making Sense of Large Graphs" Advisor: Christos Faloutsos ACM SIGKDD 2016 Dissertation Award. Honorable Mention for the SCS Doctoral Dissertation Award. Nominated to ACM for the Doctoral Dissertation Award.	August 2015
	Carnegie Mellon University, USA <i>MS in Computer Science, Computer Science Dept.</i>	May 2015
	National Technical University of Athens, Greece <i>Diploma in Computer Science, 9.82/10.00 (Summa Cum Laude)</i> Thesis: "Approximate sequence matching with MapReduce" Advisors: Prof. Timos Sellis, Dr. Theodore Dalamagas, Dr. Thanasis Vergoulis	July 2010
RESEARCH INTERESTS	Data mining, exploration and sense-making of large graphs, graph similarity, graph alignment, graph summarization and visualization, applied machine learning	
AWARDS & HONORS	<ul style="list-style-type: none">◇ Adobe Digital Experience Research Award◇ Best paper runner-up award, EDBT/ICDT'18◇ Best paper candidate, ICDM'17, IEEE◇ Best paper candidate, AusDM'16◇ ACM SIGKDD Dissertation Award winner.◇ Early Career Travel Award for SDM, supported by NSF.◇ Honorable Mention for the SCS Doctoral Dissertation Award, CMU.◇ Nomination to ACM for the Doctoral Dissertation Award.◇ Rising Stars in EECS Workshop Selected to attend (1 of the 40 Ph.D./Postdoctoral scholars) and offered a travel award.	March 2018 March 2018 Nov. 2017 Dec. 2016 August 2016 May 2016 Nov. 2015 November 2015 November 2014

- ◇ **Heidelberg Laureate Forum** *September 2014*
Young researcher of the US delegation (1 of the 19 students), sponsored by NSF.
- ◇ **MLConf Invited Speaker** Travel Grant, Atlanta *September 2014*
The only Ph.D. student to present, among professors, managers, and senior scientists.
- ◇ **Best student paper runner-up award**, PAKDD. *May 2014*
- ◇ **PAKDD Travel Award** to present my research. *May 2014*
- ◇ **Best paper nominee**, SDM. *April 2014*
- ◇ **SDM Travel Award** to present a tutorial and a paper. *April 2014*
- ◇ **ICDM Travel Award** to present my research at the conference. *December 2013*
- ◇ **CSD Nomination** for the **IBM fellowship** (1 of 2 students). *October 2013*
- ◇ **IBM First Patent Application Invention Achievement Award** *December 2013*
- ◇ **SDM Travel Award** to present my research at the conference. *May 2013*

Conference Travel Awards:

Undergraduate Awards and Scholarships:

- ◇ **Award from the Technical Chamber of Greece** *2012*
for ranking first among the students (over 500) of the School of ECE, NTUA.
- ◇ **Thomaideio Award** *2010*
for graduating first among the students (over 500) of the School of ECE, NTUA.
- ◇ **Kondoulis Award** *2010*
for graduating first among the students of NTUA, from 9 academic schools.
- ◇ **Chrysovergis Award** *2010*
for graduating first among the students (over 500) of the School of ECE, NTUA.
- ◇ **Multiple Scholarships** from **IKY** (Greek State Scholarships Foundation) *2005-2010*
for ranking first among over 500 students in ECE, NTUA.
- ◇ **Karydogianni Award** (every year) *2005-2010*
for excellent performance - awarded to students of the School of ECE and the School of Mechanical Engineering (over 3,500), NTUA.
- ◇ **Christos Papakyriakopoulos Award** *2006-2007*
for ranking first in Math among the students of the School of ECE, NTUA.

Other Awards and Scholarships:

- ◇ **Award from General Secretariat for Youth** *2004-2005*
for ranking first among the students of Arsakion-Tositsio Ekalis School.
- ◇ **Multiple Awards from the Hellenic Mathematical Society** *2000-2002*
for excellent performance in "Thalis", nation-wide math competition.
- ◇ **Filekpedeutiki Society Scholarship** *1999-2005*
for ranking 1st among the students of Arsakion-Tositsio Ekalis School, every year.
- ◇ **Multiple Awards from the Greek Ministry of National Education and Religious Affairs** (every year) *1999-2005*

BOOKS

1. [Danai Koutra](#) and Christos Faloutsos. Individual and Collective Graph Mining: Principles, Algorithms, and Applications. Synthesis Lectures on Data Mining and Knowledge Discovery, October 2017, 206 pages. Morgan & Claypool publishers.

JOURNALS

11. Yike Liu, Tara Safavi, Abhilash Dighe, [Danai Koutra](#). Graph Summarization Methods and Applications: A Survey. **ACM Computing Surveys**, 2018. (to appear)
10. Geoffrey D. Hannigan, Melissa B. Duhaime, [Danai Koutra](#), Patrick D. Schloss. Biogeography & environmental conditions shape bacteriophage-bacteria networks across the human microbiome. **PLOS Computational Biology**, April 2018.
9. Yike Liu, Tara Safavi, Neil Shah, [Danai Koutra](#). Reducing Large Graphs to Small Supergraphs: A Unified Approach. Social Network Analysis and Mining (**SNAM**), Springer, 8, February 2018.
8. Neil Shah, [Danai Koutra](#), Lisa Jin, Tianmin Zou, Brian Gallagher, Christos Faloutsos. *On*

Summarizing Large-Scale Dynamic Graphs. **Data Engineering Bulletin**, 40 (3), pp. 75-88, September 2017.

7. Di Jin, Aristotelis Leventidis, Haoming Shen, Ruowang Zhang, Junyue Wu, [Danai Koutra](#). PERSEUS-HUB: Interactive and Collective Exploration of Large-Scale Graphs. **Informatics**, 4(3), pp. 1-22, June 2017.
 6. Pravalika Devineni, [Danai Koutra](#), Michalis Faloutsos, Christos Faloutsos. *Facebook Wall Posts: A Model for User Behaviors*. Social Network Analysis and Mining (**SNAM**), Springer, 6, pp. 1-15, January 2017.
 5. [Danai Koutra](#), Neil Shah, Joshua T. Vogelstein, Brian Gallagher, Christos Faloutsos. *DELTA-CON: A Principled Massive-Graph Similarity Function with Attribution*. ACM Transactions on Knowledge Discovery from Data (**TKDD**), pp. 1-43, February 2016.
 4. [Danai Koutra](#), U Kang, Jilles Vreeken, Christos Faloutsos. *Summarizing and Understanding Large Graphs*. **Special Issue of Statistical Analysis and Data Mining**, "Best of SDM 2014", Wiley, pp. 183-202, May 2015.
 3. Miguel Araujo, Spiros Papadimitriou, Stephan Guennemann, Christos Faloutsos, Prithwish Basu, Ananthram Swami, Evangelos E. Papalexakis, [Danai Koutra](#). *Discovery of 'comet' communities in temporal and labeled graphs (Com²)*. Knowledge and Information Systems (**KAIS**), pp. 657-677, May 2015.
 2. Stephen Ranshous, Shitian Shen, [Danai Koutra](#), Steven Harenberg, Christos Faloutsos, and Nagiza F. Samatova. Anomaly Detection in Dynamic Networks: A Survey. **WIRES Computational Statistics**, Wiley, 7(3), pp. 223-247, May/June 2015.
 1. Leman Akoglu, Hanghang Tong, [Danai Koutra](#). *Graph-based Anomaly Detection and Description: A Survey*. Data Mining and Knowledge Discovery (**DAMI, Springer**), pp. 626-688, April 2014.
- CONFERENCE PUBLICATIONS
33. Tara Safavi, Maryam Davoodi, [Danai Koutra](#). Career Transitions and Trajectories: A Case Study in Computing. ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (**KDD'18**), 2018. (acceptance rate 22%)
 32. Mark Heimann, Wei Lee, Shengjie Pan, Kuan-Yu Chen, [Danai Koutra](#). HashAlign: Hash-based Alignment of Multiple Graphs. Pacific-Asia Conference on Knowledge Discovery and Data Mining (**PAKDD'18**), 2018.
 31. Yujun Yan, Mark Heimann, Di Jin, [Danai Koutra](#). Fast Flow-based Random Walk with Restart in a Multi-query Setting. SIAM International Conference on Data Mining (**SDM'18**), 2018.
 30. Jie Song, [Danai Koutra](#), Murali Mani, H.V. Jagadish. GeoAlign: Interpolating Aggregates over Unaligned Partitions. International Conference on Extending Database Technology (**EDBT / ICDT'18**), 2018. (regular paper). **Best paper runner-up award**
 29. Tara Safavi, Chandra Sripada and [Danai Koutra](#). *Scalable Hashing-Based Network Discovery*. IEEE International Conference on Data Mining (**ICDM'17**), 10 pages, November 2017. (9% acceptance rate, long paper) **Selected as one of the best papers of ICDM'17. Invited for potential publication at the KAIS Journal, Springer. Integrated into production systems that guide Google's network planning and operation workflows.**
 28. Di Jin and [Danai Koutra](#). *Exploratory Analysis of Graph Data by Leveraging Domain Knowledge*. IEEE International Conference on Data Mining (**ICDM'17**), 10 pages, November 2017. (9% acceptance rate, long paper)
 27. Josh Gardner, [Danai Koutra](#), Jawad Mroueh, Victor Pang, Arya Farahi, Sam Krassenstein, Jared Webb. *Driving with Data: Modeling and Forecasting Vehicle Fleet Maintenance in Detroit*. Data for Exchange Conference (**D4XG'17**), pp. 1-8, September 2017.
 26. Allie Cell, Bhavika Reddy Jalli, Adam Rauh, Xinyu Tan, Jared Webb, Joshua Bochu, Arya

- Farahi, [Danai Koutra](#), Jonathan Stroud, Colin Tan. *Understanding Blight Ticket Compliance in Detroit*. Data Science for Social Good Conference (**DSSG'17**), pp. 1-8, September 2017.
25. [Danai Koutra](#), Abhilash Dighe, Smriti Bhagat, Udi Weinsberg, Stratis Ioannidis, Christos Faloutsos and Jean Bolot. *PNP: Fast Path Ensemble Method for Movie Design*. ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (**KDD'17**), pp. 1527-1536, August 2017. (acceptance rate 9%, oral presentation)
 24. Amanda Minnich, Nikan Chavoshi, [Danai Koutra](#) and Abdullah Mueen. *BotWalk: Efficient Adaptive Exploration of Twitter Bot Networks*. IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (**ASONAM'17**), 10 pages, July 2017. (acceptance rate 19%, full paper)
 23. Pravalika Devineni, Evangelos Papalexakis, [Danai Koutra](#), Michalis Faloutsos. *One Size Does Not Fit All: Profiling Personalized Time-Evolving User Behaviors*. IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (**ASONAM'17**), 10 pages, July 2017. (acceptance rate 19%, full paper)
 22. Oshini Goonetilleke, Kewen Liao, [Danai Koutra](#), Timos Sellis. *Edge Labeling Schemes for Graph Data*. Statistical and Scientific Database Management (**SSDBM '17**), 12, pp. 1-12, June 2017. (acceptance rate 23%, full paper)
 21. Di Jin, [Danai Koutra](#). *Exploratory Analysis of Graph Data by Leveraging Domain Knowledge*. International School and Conference on Network Science (**NetSci'17**), 1 page (abstract), June 2017.
 20. Asso Hamzehei, Jiang Qiang, Raymond Wong, [Danai Koutra](#), Fang Chen. *TSIM: Topic-based Social Influence Measurement for Social Networks*. Australasian Data Mining Conference (**AusDM'16**), 9 pages, December 2016. (acceptance rate 40-45%) **Selected as one of the best papers of AusDM'16. Invited to Australasian Journal of Information Systems.**
 19. Venkata Krishna Pillutla, Zhanpeng Fang, Pravalika Devineni, [Danai Koutra](#), Christos Faloutsos, Jie Tang. *On Skewed Multi-dimensional Distributions: the FusionRP Model, Algorithms, and Discoveries*. SIAM International Conference on Data Mining (**SDM'16**), pp. 783-791, May 2016. (acceptance rate 25.9%)
 18. Neil Shah, [Danai Koutra](#), Brian Gallagher, Christos Faloutsos. *TIMECRUNCH: Interpretable Dynamic Graph Summarization*. ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (**KDD'15**), pp. 1055-1064, August 2015. (acceptance rate ~ 19%, full paper)
 17. Wolfgang Gatterbauer, Stephan Gunnemann, [Danai Koutra](#), Christos Faloutsos. *Linearized and Single-Pass Belief Propagation*. Proceedings of the VLDB Endowment, Volume 8 (**VLDB'15**), pp. 581-592, August 2015. (acceptance rate 21%)
 16. Pravalika Devineni, [Danai Koutra](#), Michalis Faloutsos, Christos Faloutsos. *If walls could talk: Patterns and anomalies in Facebook wallposts*. IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (**ASONAM'15**), pp. 367-374, August 2015. (acceptance rate 18%, full paper)
 15. [Danai Koutra](#), Paul N. Bennett, Eric Horvitz. *Events and Controversies: Influences of a Shocking News Event on Information Seeking*. International World Wide Web Conference (**WWW'15**), pp. 614-624, May 2015. (acceptance rate 14%) **Covered in the press: MIT Technology Review, Technology.org and more.**
 14. Walter S. Lasecki, Mitchell Gordon, [Danai Koutra](#), Malte Jung, Steven P. Dow and Jeff P. Bigham. *Glance: Rapidly Coding Behavioral Video with the Crowd*. ACM Symposium on User Interface Science and Technology (**UIST'14**), pp. 551-562, October 2014. (acceptance rate 22%)
 13. U Kang, Jay-Yoon Lee, [Danai Koutra](#), Christos Faloutsos. *Net-Ray: Visualizing and Min-*

- ing Web-Scale Graphs*. Pacific-Asia Conference on Knowledge Discovery and Data Mining (**PAKDD'14**), pp. 348-361, May 2014. (acceptance rate 16.2%)
12. Miguel Araujo, Spiros Papadimitriou, Stephan Guennemann, Christos Faloutsos, Prithwish Basu, Ananthram Swami, Evangelos E. Papalexakis, Danai Koutra. *Com2: Fast Automatic Discovery of Temporal ('Comet') Communities*. Pacific-Asia Conference on Knowledge Discovery and Data Mining (**PAKDD'14**), pp. 271-283, May 2014. (acceptance rate 16.2%) **Best student paper runner-up award**.
 11. Danai Koutra, U Kang, Jilles Vreeken, Christos Faloutsos. *VoG: Summarizing and Understanding Large Graphs*. SIAM International Conference on Data Mining (**SDM'14**), pp. 91-99, April 2014. (acceptance rate 15.4%) **Selected as one of the best papers of SDM'14. Taught in graduate courses (Saarland University at Department of Databases and Information Systems, "Topics in Algorithmic Data Analysis" by Dr. Pauli Miettinen and Dr. Jilles Vreeken)**.
 10. Yibin Lin, Agha Ali Raza, Jay-Yoon Lee, Danai Koutra, Roni Rosenfeld, Christos Faloutsos. *Influence Propagation: Patterns, Model and Case Study*. Pacific-Asia Conference on Knowledge Discovery and Data Mining (**PAKDD'14**), pp. 386-397, May 2014. (acceptance rate 16.2%)
 9. Danai Koutra, Hanghang Tong, David Lubensky. *BIG-ALIGN: Fast Bipartite Graph Alignment*. IEEE International Conference on Data Mining (**ICDM'13**), pp. 389-398, December 2013. (acceptance rate 11.6%)
 8. Michele Berlingerio, Danai Koutra, Tina Eliassi-Rad, Christos Faloutsos. *Network Similarity via Multiple Social Theories*. IEEE/ACM International Conference on Advances in Social Networks Analysis and Mining (**ASONAM'13**), pp. 1439-1440, August 2013. (acceptance rate 13%)
 7. Ted Senator, Danai Koutra et al. *Detecting Insider Threats in a Real Corporate Database of Computer Usage Activities*. ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (**KDD'13**), pp. 1393-1401, August 2013. (acceptance rate 25%, government and industry track)
 6. Jay-Yoon Lee, U Kang, Danai Koutra, Christos Faloutsos. *Fast anomaly detection despite the duplicates*. **WWW 2013** (Companion Volume), pp. 195-196, May 2013. (acceptance rate 15%)
 5. Danai Koutra, Joshua Vogelstein, and Christos Faloutsos. *DeltaCon: A Principled Massive-Graph Similarity Function*. SIAM International Conference on Data Mining (**SDM'13**), pp. 162-170, May 2013. (acceptance rate 14.4%) **Taught in graduate courses (Rutgers University at Department of Computer Science, "Information in Networks: Theory, Algorithms, and Applications" by Prof. Tina Eliassi-Rad)**.
 4. Danai Koutra, Vasileios Koutras, B. Aditya Prakash, Christos Faloutsos. *Patterns amongst Competing Task Frequencies: Super-Linearities, and the Almond-DG model*. Pacific-Asia Conference on Knowledge Discovery and Data Mining (**PAKDD '13**), pp. 201-212, April 2013. (acceptance rate 16.1%) **Taught in graduate courses (Virginia Tech at Department of Computer Science, "Data Mining Large Networks and Time Series" by Prof. B. Aditya Prakash)**.
 3. Danai Koutra, Evangelos Papalexakis, Christos Faloutsos. *TENSORSPLAT: Spotting Latent Anomalies in Time*. Panhellenic Conference on Informatics with international participation (**PCI'12**), pp. 144-149, October 2012. (acceptance rate ~ 46%)
 2. Keith Henderson, Brian Gallagher, Tina Eliassi-Rad, Hanghang Tong, Sugato Basu, Leman Akoglu, Danai Koutra, Lei Li, Christos Faloutsos. *RoIX: Structural Role Extraction & Mining in Large Graphs*. ACM SIGKDD International Conference on Knowledge Discovery and Data Mining (**KDD'12**), pp. 1231-1239, August 2012. (acceptance rate 17.6%)
 1. Danai Koutra, Tai-You Ke, U Kang, Duen Horng (Polo) Chau, Hsing-Kuo Kenneth Pao, and Christos Faloutsos. *Unifying Guilt-by-Association Approaches: Theorems and Fast Algorithms*. European Conference on Machine Learning and Principles and Practice of Knowledge (**ECML PKDD'11**), pp. 245-260, September 2011. (acceptance rate 20%) **Taught in graduate courses (CMU at Tepper School of Business, Business Technology Seminar by Prof. Wolfgang**

- OTHER REFEREED PUBLICATIONS
20. Jie Song, [Danai Koutra](#), Murali Mani, H.V. Jagadish. GeoFlux: Hands-Off Data Integration Leveraging Join Key Knowledge. ACM SIGMOD (SIGMOD'18), 2018 (demo).
 19. Yujun Yan and [Danai Koutra](#). *Fast, Distributed Graph Methods in a Multi-query Setting*. In the 12th Women in Machine Learning Workshop (WIML'17), NIPS, 1 page (abstract), December 2017.
 18. [Danai Koutra](#) and Markos Koutras. *Random order statistics probability models for networks*. In the the European Conference for Statistics of Network Data Science (**COSTNET '17**), 1 page (abstract), October 2017.
 17. Mark Heimann and [Danai Koutra](#). *On Generalizing Neural Node Embedding Methods to Multi-Network Problems*. ACM SIGKDD Workshop on Mining and Learning with Graphs (**SIGKDD MLG'17**), 4 pages, August 2017.
 16. Saba Al-Sayouri, Pravallika Devineni, Sarah S. Lam, Evangelos E. Papalexakis and [Danai Koutra](#). *GECS: Graph Embedding Using Connection Subgraphs*. ACM SIGKDD Workshop on Mining and Learning with Graphs (**SIGKDD MLG'17**), 4 pages, August 2017.
 15. Lisa Jin and [Danai Koutra](#). *ECOViz: Comparative Visualization of Time-Evolving Network Summaries*. ACM SIGKDD Interactive Data Exploration and Analytics workshop (**SIGKDD IDEA'17**), 8 pages, August 2017.
 14. Tara Safavi, Chandra Sripada, [Danai Koutra](#). *Scalable Inference of Functional Networks from Time Series Data*. SDM Workshop on Inferring Networks from Non-Network Data (**NetInf'17**), 4 pages, April 2017.
 13. Yike Liu, Tara Safavi, Neil Shah, [Danai Koutra](#). *Reducing Million-Node Graphs to a Few Structural Patterns: A Unified Approach*. ACM SIGKDD Workshop on Mining and Learning with Graphs (**SIGKDD MLG'16**), 8 pages, August 2016.
 12. Di Jin, Christos Faloutsos, [Danai Koutra](#), Ticha Sethapakdi. *PERSEUS3: Visualizing and Interactively Mining Large-Scale Graphs*. ACM SIGKDD Workshop on Mining and Learning with Graphs (**SIGKDD MLG'16**), 4 pages, August 2016.
 11. [Danai Koutra](#), Di Jin, Yuanchi Ning, Christos Faloutsos. *Perseus: An Interactive Large-Scale Graph Mining and Visualization Tool*. Hellenic Data Management Symposium (**HDMS'16 Demo**), July 2016.
 10. Sai Gouravajhala, Walter Lasecki, [Danai Koutra](#). *Towards Crowd-Assisted Data Mining*. CHI Workshop on Human-Centered Machine Learning, 5 pages, May 2016.
 9. Jinyeong Yim, Jeel Jasani, Aubrey Henderson, [Danai Koutra](#), Steven Dow, Winnie Leung, Ellen Lim, Mitchell Gordon, Jeffrey P. Bigham, Walter S. Lasecki. *Coding Varied Behavior Types Using the Crowd*. ACM Conference on Computer Supported Cooperative Work and Social Computing Companion (**CSCW '16 demo**), pp. 114-117, February 2016.
 8. Yike Liu, Neil Shah, [Danai Koutra](#). *An Empirical Comparison of the Summarization Power of Graph Clustering Methods*. Neural Information Processing Systems (NIPS) Workshop on Networks in the Social and Information Sciences, 9 pages, December 2015.
 7. [Danai Koutra](#), Di Jin, Yuanchi Ning, Christos Faloutsos. *Perseus: An Interactive Large-Scale Graph Mining and Visualization Tool*. Proceedings of the VLDB Endowment (**VLDB'15 Demo**), August 2015.
 6. [Danai Koutra](#), Paul N. Bennett, Eric Horvitz. *Influences of a Shocking News Event on Web Browsing*. **SIGIR 2014 Workshop** on Temporal, Social and Spatially-aware Information Access (TAIA'14), 4 pages, July 2014. [Covered in the press: MIT Technology Review, Technology.org and more.](#)

	<ol style="list-style-type: none"> 5. Danai Koutra, Yu Gong, Sephira Ryman, Rex Jung, Joshua Vogelstein, Christos Faloutsos. <i>Are all brains wired equally?</i>. Organization for Human Brain Mapping (OHBM'13), June 2013. 4. Michele Berlingerio, Danai Koutra, Tina Eliassi-Rad, Christos Faloutsos. <i>A Scalable Approach to Size-Independent Network Similarity</i>. Workshop on Social Network and Social Media Analysis, Methods, Models, and Applications (NIPS'12 Workshop), 12 pages, December 2012. 3. Michele Berlingerio, Danai Koutra, Tina Eliassi-Rad, Christos Faloutsos. <i>NetSimile: A Scalable Approach to Size-Independent Network Similarity</i>. Workshop on Information in Networks (WIN'12). September 2012. 2. Leman Akoglu*, Duen Horng Chau*, U Kang*, Danai Koutra*, and Christos Faloutsos. (*: authors in alphabetical order). <i>Large Graph Mining System for Patterns, Anomalies & Visualization</i>. Pacific-Asia Conference on Knowledge Discovery and Data Mining (PAKDD'12 Demo), 4 pages, May 2012. 1. Leman Akoglu*, Duen Horng Chau*, U Kang*, Danai Koutra*, and Christos Faloutsos. <i>OPAvion: Mining and visualization in large graphs</i>. ACM SIGMOD Conference (SIGMOD'12 Demo), 4 pages, May 2012. <i>Note: Did the integration of the systems for the demo.</i> 	
UNREFEREED PUBLICATIONS	<ol style="list-style-type: none"> 3. Wolfgang Gatterbauer, Stephan Gunnemann, Danai Koutra, Christos Faloutsos. <i>Linearized and Turbo Belief Propagation</i>. arXiv:1406.7288, October 2014. 2. Jay-Yoon Lee, U Kang, Danai Koutra, Christos Faloutsos. <i>Fast anomaly detection despite the duplicates</i>. CMU Technical Report, CMU-CS-12-146. December 2012. 1. Danai Koutra, Aaditya Ramdas, Ankur Parikh, Jing Xiang. <i>Algorithms for Graph Similarity and Subgraph Matching</i>. Report, CMU. 2011. 	
SELECT PRESS COVERAGE	<ul style="list-style-type: none"> ◇ Venture Beat. <i>Trove's AI scans company emails to unlock professional networks</i>. Aug 2017 ◇ MIT Technology review. <i>Sandy Hook, the Gun Control Debate, and the Insidious Influence of the Filter Bubble</i>. May 2014 ◇ Technology.org. <i>Ideological Internet bubbles stay strong, study shows</i>. May 2014 	
PATENTS	<p>With Hanghang Tong, and David Lubensky, IBM Thomas J. Watson Research Center. Serial No. 14032105, September 2013.</p> <ol style="list-style-type: none"> 7. Method and System for Bi-partite Graph Matching. <i>Obtained "rate-1" score (top score) = "extremely high potential business value for IBM".</i> 6. Method and System for Cross-Population Community Alignment. 5. Method and System for Matching Dynamic Networks. 4. Method and System for Linking Heterogeneous Networks. 3. Method and System for Linking Multi-Relational Data sets. 2. Method and System to Explorative Cross-Network Data Analytics. 1. Method and System to Predictive Cross-Network Data Analytics. 	
TEACHING EXPERIENCE	<ul style="list-style-type: none"> ◇ Mining Large-Scale Graph Data, Winter 2018 EECS 598, Special Topics, University of Michigan Ann Arbor. (51 students) ◇ Data Mining (new course), Fall 2017 EECS 498-001, University of Michigan Ann Arbor (64 students) ◇ Summarizing Large-Scale Graph Data: Algorithms, Applications, & Open Challenges, April 2017 Tutorial at SDM'17. (sole instructor) ◇ Database Management Systems, Winter 2017 EECS 484, University of Michigan Ann Arbor. (283 students) ◇ Mining Large-Scale Graph Data, Fall 2016 	

- EECS 598, Special Topics, University of Michigan Ann Arbor. (34 students)
- ◇ **Tutorial on Mining Large-scale Graphs,** August 2016
BIRS Workshop on Models and Algorithms for Crowds and Networks, Mexico.
- ◇ **Database Management Systems,** Winter 2016
EECS 484, Winter 2016, University of Michigan Ann Arbor. (120 students)
- ◇ **Graph Mining and Exploration at Scale: Methods and Applications (new),** Fall 2015
EECS 598, Special Topics, University of Michigan Ann Arbor. (21 students)
- ◇ **“Node and graph similarity: Theory and Applications”** Dec. 2014
Tutorial at ICDM’ 14. Co-instructors: Tina Eliassi-Rad, Christos Faloutsos.
(acceptance ratio: 22%)
- ◇ **Node similarity, graph similarity and matching: Theory and Applications** April 2014
Tutorial at SDM’14. Co-instructors: Tina Eliassi-Rad, Christos Faloutsos.

- ◇ **Teaching Assistant** for “Database Applications” (15-415) Spring 2013
- ◇ **Teaching Assistant** for “Artificial Intelligence: Representation and Problem Solving” (15-381). Fall 2012
Also designed the webpage, which is still in use.
- ◇ **Teaching Assistant** for the NSA Graph Analytics Workshop, CMU. September 2012
- ◇ **Guest Lecture** on B-trees (15-826), Spring 2012
- ◇ **Guest Lecture** on Sorting and Query Optimization (15-415), Spring 2012

STUDENTS
MENTORED

Ph.D. Students

- ◇ Mark Heimann, CSE, University of Michigan (Jan. ’17-)
- ◇ Di Jin, CSE, University of Michigan (Aug. ’16 - before M.S. in Computational Data Science, CMU)
- ◇ Yike Liu, Physics / CSE, University of Michigan (Sept. ’15-Dec. ’16)
- ◇ Tara Safavi, CSE, University of Michigan (Ph.D. Sep. ’17-, Undergrad Jan.-Dec. ’16, senior thesis Jan.-April ’17)
- [NSF Graduate Research Fellowship, 2018-2021](#)
- [1st year Rackham Dean’s and Named PhD Fellowship, 2017-2018](#)
- [Google Women Techmakers Scholarship, 2017](#)
- [University of Michigan Outstanding Research Award, 2017](#)
- ◇ Neil Shah, CSD Ph.D. student, CMU (advisor: Christos Faloutsos, June ’13-Aug. ’14)
- ◇ Yujun Yan, CSE, University of Michigan (Ph.D. CSE Sep.’17-, M.S. ECE May ’16-’17)

M.S. Students

- ◇ Cheng Chang, CMU (currently at Amazon)
- ◇ Kuan-Yu Chen, University of Michigan, ECE (Sept. ’16-May ’17)
- ◇ Zhaojun Chen, University of Michigan, ECE
- ◇ Maryam Davoodi, Eastern Michigan University, visiting scholar (May ’16-April ’17, currently PhD at Purdue University)
- ◇ Abhilash Dighe, University of Michigan (currently at Google)
- ◇ Yu Gong, CMU (currently at Amazon)
- ◇ Jay-Yoon Lee, LTI (currently CSD Ph.D. student)
- ◇ Wei Lee, University of Michigan (independent study, Jan’16-May’17 - currently at Trove AI)
- ◇ Yuanchi Ning, Institute of Software Research, CMU (currently at Uber)
- ◇ Yaohua Shi, University of Michigan, ECE (Jan.-Jul. ’17)
- ◇ Haoming Shen, University of Michigan, ECE (March ’17-)
- ◇ Renhan Zhang, University of Michigan. ECE (independent study, Winter ’16)
- ◇ Tianmin Zou, Institute of Software Research, CMU (currently at Google)

Undergraduate Students

- ◇ Jiongsheng Cai, University of Michigan (Feb ’17-)
- ◇ Neophytos Charalambides, University of Michigan (independent study)
- ◇ Jennings Jin, University of Michigan (Feb ’17-May ’17)
- ◇ Lisa Jin, University of Michigan (Aug. ’16-Aug. ’17)

- ◇ Brigid Johnson, University of Michigan (Sept. '15-May '16, UROP)
- ◇ Paige Frederick, University of Michigan (May '16- May '17, independent study)
- ◇ Zhiyuan He, University of Michigan (Sept. '16-)
- ◇ Il Jae Lee, University of Michigan (Feb '17-)
- ◇ Aristotelis Sigiouan Leventidis, University of Michigan (Feb '17-)
- ◇ Santosh Mohan, University of Michigan (Winter '16, now at Amazon)
- ◇ Chalse Okorom, University of Michigan (Sept. '15-May '16, UROP)
- ◇ Shengjie Pan, University of Michigan (Jan. '16-May '17)
- ◇ Charles Wang, University of Michigan (Sept.-Dec. '16, now at Palantir)
- ◇ Esther Wang, CMU CSD (2015)
- ◇ Junhao Wang, University of Michigan (Sept. '16- , independent study)
- ◇ Fan Yang, University of Michigan (Sept.-Dec. '16)
- ◇ Xiaochen Yu, University of Michigan (May '16-Jan. '16)
- ◇ David Zhang, University of Michigan (2015)

Dissertation Committee Member:

- ◇ Dolan Antenucci (advised by: Mike Cafarella)
- ◇ Nikan Chavoshi, University of New Mexico (advised by: Abdullah Mueen)
- ◇ Pin-Yu Chen (advised by: Al Hero, now at IBM Watson)
- ◇ Frank Cheng (advised by: Michael Wellman)
- ◇ Srayan Datta (advised by: Eytan Adar)
- ◇ Pravallika Devineni, UC Riverside (advised by: Michalis Faloutsos and Evangelos Papalexakis)
- ◇ Jeffrey Folz (advised by: Raoul Kopelman)
- ◇ Elizabeth Hou (advised by: Al Hero)
- ◇ Shibamouli Lahiri (advised by: Rada Mihalcea)
- ◇ Tianxi Li (advised by: Liza Levina and Ji Zhu)
- ◇ Tianpei Xie (advised by: Al Hero)
- ◇ Fang-Yi Yu (advised by: Grant Schoenebeck)

FUNDING

- ◇ **P&G / UM Advanced Machine Learning Collaborative** *Sept 2018-Aug 2021*
'Large-Scale Multimodal Analytics of Consumer Behavior'. Co-PI (total: \$1.5M)
- ◇ **Michigan Institute for Data Science (MIDAS):** *Sept 2018-Aug 2019*
'Understanding and Mining Patterns of Audience Engagement and Creative Collaboration in Large-scale Crowdsourced Music Performances'.
PI (total: \$75,000; Co-PI: Walter Lasecki).
- ◇ **Rackham** Recruiting Bootcamp Grant (ReBoot) (PI: \$8,000) *Apr 2018-April 2019*
- ◇ **College of Engineering and CSE** 'Explore Graduate Studies in CSE Workshop Series' (PI: \$5,000 from CoE; \$8,000 from CSE) *Apr 2018*
- ◇ **Adobe** Digital Experience Research Award on 'User Stitching: A Representation Learning and Hashing Perspective' (PI: \$50,000) *Mar 2018*
- ◇ **IBM:** Part of the 'UM-IBM Sapphire Project' on conversational systems (Total: \$4.5M; supports 1 student) *Jan 2018-Aug 2018*
- ◇ **Trove AI:** 'Making Sense of Communication-based Social Graphs' (PI: \$309,877) *Aug 2017-Aug 2019*
- ◇ **NSF:** 'EAGER: Collaborative Research' (total: \$100,000; UM: \$50,000) *Aug 2017-Jul 2018*
'Correspondence Discovery in Disparate Networks'
- ◇ **Microsoft:** Azure Research Award (PI: \$20,000) *July 2017-July 2018*
- ◇ **Amazon:** AWS Cloud Credits for Research (PI: \$3,000) *May 2017-March 2018*
- ◇ **Intel:** Server Hardware Donation (~\$5,500) *Oct 2016*
- ◇ **Michigan:** New Faculty Fellowship (\$3,000) *Sep 2016*
- ◇ **Michigan:** Center of Research on Learning and Teaching: Teaching Grant (\$1,000) *Jan 2016*
- ◇ **Michigan, UROP:** Supplementary Research Funding *Sep 2015-May 2016*
for advising two undergraduate students (\$1,208).

- ◇ **Amazon:** AWS in Education Grant (\$1,800) Sep 2015

Contributed to writing:

- ◇ NSF Proposal “Know Thy Enemy: Data Mining Meets Networks for Understanding Web-Based Malware Dissemination”, National Science Foundation (Award #1314603), **\$1.0M total**. 2013-2017
- ◇ Lawrence Livermore National Laboratory Subcontract, “Quantifying Network Changes”, **\$30k**. June-Sep 2013
- ◇ White paper on Social Networking. May 2012
- ◇ Participated in **DARPA’s \$35 million project** Anomaly Detection at Multiple Scales (ADAMS) with ultimate goal to detect insider threats in the military. 2012-2013

INVITED TALKS
AND KEYNOTES

48. *Inferring, Summarizing and Mining Large-scale Graph Data* (tentative title)
Dagstuhl Seminar, “High-Performance Graph Algorithms”, Germany June 2018
47. *Scalable Inference and Summarization of Multi-source Network Data*
Graph Exploitation Symposium, Dedham, Massachusetts April 2018
46. *Inferring, Summarizing and Mining Multi-source Graph Data*
Corelab, Electrical and Computer Engineering, National Technical University of Athens, Greece Dec 2017
45. *Inferring, Summarizing and Mining Multi-source Graph Data*
“Athena” Research and Innovation Center in Information, Communication and Knowledge Technologies, Information Management Systems Institute (IMSI), Greece Dec 2017
44. *Inferring, Summarizing and Mining Multi-source Graph Data*
Management of Data, Information, and Knowledge (MADgIK) Group of the Dept of Informatics & Telecommunications of the University of Athens, Greece Dec 2017
43. *Inferring, Summarizing and Mining Multi-source Graph Data*
ICDM High Performance Graph Data Mining and Machine Learning workshop (HPGDML’17) Nov 2017
42. *Inferring and Summarizing Large-scale Graph Data*
NSF-sponsored workshop on Machine Learning for Discovery Science, Armenia Oct 2017
41. *Inferring, Summarizing and Mining Large-scale Graph Data*
University of Michigan, Ann Arbor. MIDAS seminar. May 2017
40. *Exploring Large-Scale Graph Data.*
University of Michigan, Ann Arbor. Quicken Loans. February 2017
39. *Summarizing Large Static and Time-evolving Graphs.*
Hasso Plattner Institute, Berlin November 2016
38. *Mining large-scale graphs.*
Explore Graduate Studies in Computer Science and Engineering
University of Michigan, Ann Arbor October 2016
37. *Mining Large-scale Graphs (tutorial).*
BIRS Workshop on Models and Algorithms for Crowds and Networks
Oaxaca, Mexico August 2016
36. *Exploring and Understanding Large Graphs*
SIGKDD 2016 Dissertation Presentation, CA August 2016
35. *Studies of Brain Networks and Creativity.*
The Origins and Future of Pattern Processing and Intelligence:
From Brains to Machines, AZ. March 2016
34. *Summarizing and Understanding Large, Static and Dynamic Graphs.*
Santa Fe Institute, New Mexico. December 2015
33. *Exploring and Understanding Large, Static and Dynamic Graphs.*
Toyota AI Seminar, University of Michigan Ann Arbor. October 2015

32. *What's in my data? Fast, principled algorithms for exploring large graphs*
Special Session, ASMDA'15, Piraeus, Greece. July 2015
31. *What's in my data? Fast, principled algorithms for exploring large graphs*
Cognitive Science Department, UC San Diego. May 2015
30. *What's in my data? Fast, principled algorithms for exploring large graphs*
Tableau Research, Seattle. May 2015
29. *What's in my data? Fast, principled algorithms for exploring large graphs*
Computer Science Department, Cornell University. April 2015
28. *What's in my data? Fast, principled algorithms for exploring large graphs*
Department of Computer Science, Univeristy of Toronto. April 2015
27. *What's in my data? Fast, principled algorithms for exploring large graphs*
Department of Computer Science, Purdue University. April 2015
26. *What's in my data? Fast, principled algorithms for exploring large graphs*
Computational Science & Engineering, Georgia Tech. April 2015
25. *What's in my data? Fast, principled algorithms for exploring large graphs*
Department of Computer Science, USC. April 2015
24. *What's in my data? Fast, principled algorithms for exploring large graphs*
Computer Science and Engineering, UC San Diego. April 2015
23. *What's in my data? Fast, principled algorithms for exploring large graphs*
Computer Science and Engineering, EECS, University of Michigan, Ann Arbor. March 2015
22. *What's in my data? Fast, principled algorithms for exploring large graphs*
College of Computer and Information Science, Northeastern University. March 2015
21. *What's in my data? Fast, principled algorithms for exploring large graphs*
Creative Technologies Lab, Adobe Research, San Francisco/Seattle. March 2015
20. *What's in my data? Fast, principled algorithms for exploring large graphs*
Algorithms Research Group, Google Research, New York. March 2015
19. *What's in my data? Fast, principled algorithms for exploring large graphs*
Tepper School of Business, CMU. March 2015
18. *What's in my data? Fast, principled algorithms for exploring large graphs*
Computer Science and Engineering, Ohio State University. February 2015
17. *What's in my data? Fast, principled algorithms for exploring large graphs*
Department of Computer Science, University of Pittsburgh. February 2015
16. *What's in my data? Fast, principled algorithms for exploring large graphs*
Department of Computer Science, Dartmouth College. February 2015
15. *Large Graph Mining and Sense Making by Comparison and Summarization.*
MLconf, Atlanta. September 2014
14. *VoG: Summarizing and Understanding Large Graphs.*
HDMS, Athens, Greece. July 2014
13. *MovieDesign: How to capture this audience?*
Technicolor, Los Altos. July 2014
12. *Understanding Large Networked Data: Summarization and Similarities.*
Microsoft Research, Redmond. July 2014
11. *Graph Understanding: Similarities and Summarization.*
Stanford University. May 2014
10. *Large Graph Mining and Sense-making.* [Thesis proposal]
Carnegie Mellon University. March 2014
9. *BiG-Align: Fast Bipartite Graph Alignment.*
CMU/Pitt Joint DB Monthly Meetup, University of Pittsburgh. February 2014
8. *Do external events burst your filter bubble?*
Microsoft Research, Redmond. August 2013

7. *Unifying Guilt-by-Association Approaches and Future Directions.*
Speaking Skills Talk, SCS Student Seminar Series, CMU. May 2013
6. *DeltaCon: A Principled Massive-Graph Similarity Function.*
Database Seminar, CMU. April 2013.
5. *Patterns amongst Competing Tasks: Super-Linearities, and the Almond-DG model.*
Database Seminar, CMU. April 2013
4. *A scalable approach to size-independent network similarity.*
Database Seminar, CMU. September 2012
3. *FBI-Match: Fast Bipartite Graph Matching.*
IBM Watson. August 2012
2. *Unifying Guilt-by-Association Approaches: Theorems and Fast Algorithms.*
University of Maryland. March 2012
1. *Unifying Guilt-by-Association Approaches: Theorems and Fast Algorithms.*
University of Athens, Greece. Jan. 2012

SERVICE

Program Committees

- ◇ CIKM (senior PC member) 2017
- ◇ KDD 2016, 2018
- ◇ WWW (senior PC member) 2018
- ◇ WWW 2012, 2013, 2014, 2016, 2017
- ◇ PKDD 2016, 2017, 2018
- ◇ SDM 2017, 2018
- ◇ WSDM 2017, 2018
- ◇ AAAI 2013, 2016, 2018
- ◇ Conference on Complex Networks and their Applications 2017
- ◇ HDMS 2017
- ◇ ASONAM 2016
- ◇ ICDM demos 2014, 2015, 2016
- ◇ ICDM PhD Forum 2016, 2017
- ◇ Intl. Workshop on Big Data Visual Exploration and Analytics (BigVis 2018,
in conjunction with EDBT/ICDT) 2018
- ◇ MLG (KDD Workshop on Mining and Learning with Graphs) 2016
- ◇ IDEA (KDD Workshop on Interactive Data Exploration and Analytics) 2015, 2016, 2017
- ◇ BGM (WWW Workshop on Big Graph Mining) 2014

Leading Roles

- ◇ Associate Editor, ACM TKDD Journal 2017-
- ◇ Editorial Board Member of Data Mining and Knowledge Discovery
(DAMI, Springer) 2017-
- ◇ Program Director of the SIAM Activity Group on Data Mining and Analytics (elected) 2018-2019
- ◇ Co-chair of the ICDM Demos, Singapore 2018
- ◇ Co-chair of KDD Cup, Halifax, Canada 2017
- ◇ Co-chair of the ICDM Ph.D. Forum, New Orleans 2017
- ◇ SIGKDD Dissertation Award Committee 2017
- ◇ Publicity co-chair of SDM, Houston 2017
- ◇ Co-organizer of the Workshop on Mining and Learning with Graphs (MLG) 2016-2018
- ◇ Secretary of the SIAM Activity Group on Data Mining and Analytics (elected) 2016-2017

Reviews

- ◇ NSF Proposals Panel 2017
- ◇ NSF/NIH Proposals Panel 2016
- ◇ Transactions on Knowledge Discovery from Data (TKDD, ACM) 2014-2017
- ◇ Data Mining and Knowledge Discovery (DAMI, Springer) 2013-2017
- ◇ Signal Processing Letters (SPL, IEEE) 2014, 2015
- ◇ Knowledge and Information Systems (KAIS, Springer) 2012-2014

	◇ Data and Information Quality (JDIQ, ACM)	2015-2017
	◇ Discrete Applied Mathematics (Elsevier)	2016
INTERNAL SERVICE	◇ CSE Graduate Admissions Committee, University of Michigan	2017-2018
	◇ DS Undergraduate Honors and Awards (Chair), University of Michigan	2017-2018
	◇ Data Science Program Committee, University of Michigan	2015-2018
	◇ Data Science Undergraduate Advising, University of Michigan	2015-2017
	◇ ECSEL Committee, University of Michigan (outreach)	2016-2017
	◇ Served on the CSD Admissions Committee	2014
	◇ Student Volunteer for CS Open House	2011-2014
VOLUNTEERING AND OUTREACH	◇ 'Explore Graduate Studies in CSE Workshop Series' (lead organizer), University of Michigan	2018
	◇ Project leader and instructor at Big Data Summer Institute (undergraduate summer program), University of Michigan	2018
	◇ Summer Undergraduate Research (1 CS student), University of Michigan	May-Aug 2018
	◇ Lecture at Sports Analytics Summer Camp, part of the Exercise and Sports Science Initiative (ESSI), University of Michigan	2018
	◇ Panelist at 'Preparing Future Faculty seminar' <i>Nationally-recognized, month-long program that prepares advanced graduate students for academic careers</i>	2018
	◇ Speaker at 'Amaizin' Blue Preview Seminar Series' for admitted freshman class University of Michigan	2018
	◇ Faculty Mentor, MDST (Michigan Data Science Team), University of Michigan	2017-2018
	◇ Faculty Mentor, MSAIL (a student-run, MIDAS-affiliated reading group on Machine Learning), University of Michigan	2017-2018
	◇ ECSEL Committee, University of Michigan	2016-2017
PROFESSIONAL MEMBERSHIPS	◇ IEEE Computer Society	2014-2017
	◇ IEEE Special Community for Big Data	2014-2017
	◇ IEEE Special Community for Knowledge and Data Engineering	2014-2017
	◇ Association of Computing Machinery (ACM)	2014-2017
	◇ Society for Industrial and Applied Mathematics (SIAM)	2014-2017
	◇ SIAG on Data Mining and Analytics Membership	2014-2017
	◇ SIAG on Optimization Membership	2014, 2015
	◇ Member of Graduates' Union of Filekpedeutiki Society	2005 - present
INVITED WORKSHOPS & SYMPOSIA	◇ Dagstuhl Seminar on "High-Performance Graph Algorithms", Schloss Dagstuhl, Germany	June 2018
	◇ Graph Exploitation Symposium (GraphEX 2018), Dedham Massachusetts	April 2018
	◇ ICDM High Performance Graph Data Mining and Machine Learning workshop (HPGDML), New Orleans, LA.	Nov. 2017
	◇ NSF-sponsored workshop on Machine Learning for Discovery Science, Armenia	Oct. 2017
	◇ BIRS Workshop on Models and Algorithms for Crowds and Networks, Mexico.	Aug. 2016
	◇ NSF CISE Career Workshop, Washington DC.	Apr. 2016
	◇ The Origins and Future of Pattern Processing and Intelligence: From Brains to Machines, AZ.	Mar. 2016
	◇ Inference on Networks Workshop, Santa Fe Institute.	Dec. 2015
	◇ Rising Stars in EECS. An Academic Workshop for Women. (invited 40 Ph.D. Candidates and Postdoc Researchers from the U.S.)	Nov. 2014

- ◇ Second Heidelberg Laureate Forum. Heidelberg, Germany *Sept. 2014*
(10% invitation ratio)
- ◇ Machine Learning Conference (MLconf ATL), Atlanta. *Sept. 2014*
- ◇ CRA-W Graduate Cohort Workshop, Boston, MA. *Apr. 2011*

LANGUAGES

- ◇ **Greek:** native language
- ◇ **English:** fluent, Proficiency of Cambridge, Proficiency of Michigan, TOEFL (115/120)
- ◇ **French:** Diplôme d'Études en Langue Française du 1er et 2nd degré (European Levels A1, A2, B1, B2)
- ◇ **Spanish:** Diploma de Español (Nivel Inicial - B1)

REFERENCES

Upon Request.