Pittsburgh, PA

Mark Heimann

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Current Position

Postdoctoral Researcher — **Lawrence Livermore National Laboratory** — **Aug 2020-Present**
Center for Applied Scientific Computing — Remote (COVID-19)

- Working on graph mining methodology and scientific applications.

Education

University of Michigan — **Ann Arbor, MI** — **2015-2020**

- Ph.D in Computer Science. Research: graph data mining, multi-network analysis, node embedding

Washington University in St. Louis — **St. Louis, MO** — **2011-2015**

- M.S. in Computer Science with a certificate in data mining and machine learning.
- A.B. in Economics and Mathematics *cum laude* with high distinction in economics.

Publications

- Jiong Zhu, Yujun Yan, Lingxiao Zhao, **Mark Heimann**, Leman Akoglu, and Danai Koutra. "Generalizing Graph Neural Networks Beyond Homophily." *ArXiv preprint, 2020.*
- Junchen Jin, **Mark Heimann**, Di Jin, and Danai Koutra. "Understanding and Evaluating Structural Node Embeddings." *KDD MLG Workshop, 2020*. **Top submission invited for contributed talk**
- Kai Qin, Flora D. Salim, Yongli Ren, Wei Shao, **Mark Heimann** and Danai Koutra. "G-CREWE: Graph CompREssion With Embedding for Network Alignment." *CIKM 2020.*
- Xiyuan Chen, **Mark Heimann**, Fatemeh Vahedian, and Danai Koutra. "CONE-Align: Consistent Network Alignment with Proximity-Preserving Node Embedding." *CIKM 2020.* **Also accepted at KDD MLG Workshop**
- **Mark Heimann**, Tara Safavi, and Danai Koutra. "Distribution of Node Embeddings as Multiresolution Features for Graphs." *ICDM 2019.* **Best Student Paper**
- Di Jin, **Mark Heimann**, Ryan Rossi, and Danai Koutra. "node2bits: Compact Time- and Attribute-aware Node Representations for User Stitching." *PKDD 2019.*
- Di Jin*, **Mark Heimann***, Tara Safavi, Mengdi Wang, Wei Lee, Lindsay Snider, and Danai Koutra. "Smart Roles: Inferring Professional Roles in Email Networks." *KDD 2019.*
- **Mark Heimann**, Haoming Shen, Tara Safavi, and Danai Koutra. "REGAL: Representation Learning-based Graph Alignment." *CIKM 2018.* **Taught in graduate classes at UMich, Purdue**
- **Mark Heimann***, Wei Lee*, Shengjie Pan, Kuan-Yu Chen, and Danai Koutra. "HashAlign: Hash-Based Alignment of Multiple Graphs." *PAKDD 2018.*
- Yujun Yan, **Mark Heimann**, Di Jin, and Danai Koutra. "Fast Flow-based Random Walk with Restart in a Multi-query Setting." *SDM 2018.*
- **Mark Heimann** and Danai Koutra. "On Generalizing Neural Node Embedding Methods to Multi-Network Problems." *KDD MLG Workshop, 2017.*

** equal contribution*

Teaching Experience

- University of Michigan (2016-17): Foundations of Computer Science (EECS 376, ~500 students), Introduction to Artificial Intelligence (EECS 492/592, ~200 students), Advanced Data Mining (EECS 576, ~50 students)
- Washington University in St. Louis (2014-15): Introduction to Machine Learning (CSE 417A, ~100 students), Multi-Agent Systems (CSE 516A, ~30 students), Fair Division (CSE/Pol Sci 245A, ~50 students)

Work Experience

Visiting Research Assistant | **Information Sciences Institute** | **Jun 2019-Aug 2019**
Artificial Intelligence Group | Marina Del Rey, CA

- Used node embeddings to identify cyberbullying in social media sessions. *Python*
- Theoretically analyzed algorithmically fair node embedding methods and proposed new techniques. *Python*

Data Science Research Intern | **Adobe Research** | **Jan 2019-Apr 2019**
Big Data Experience Lab | Remote

- Performed large-scale entity resolution on cross-device web log data with millions of users. *Python*

Graduate Research Intern | **Oak Ridge National Laboratory** | **Apr 2018-Aug 2018**
Computational Data Analytics Group | Oak Ridge, TN

- Developed dimensionality reduction algorithm with applications to unmixing of hyperspectral image data.
- Developed matrix factorization formulations for graph mining problems. *Python, Tensorflow, PyTorch*

Software Engineer Intern | **Algorithmia** | **Jun 2015-Aug 2015**
Algorithm Development Team | Seattle, WA

- Made cutting edge machine learning algorithms easy to use through a standardized API. *Python*
- Created applications to demonstrate their potential (Face Recognition demo in top 10 on Hacker News).

Researcher | **Harvey Mudd College** | **Jun 2014-Aug 2014**
NSF REU Program | Claremont, CA

- Designed and implemented an algorithm to generate more harmonically structured jazz solos. *Java*

Researcher | **University of North Carolina, Greensboro** | **Jun 2013-Jul 2013**
NSF REU Program | Greensboro, NC

- Resolved open mathematical questions with applications to computer science and biology. *Java*

Student Trainee | **Washington University School of Medicine** | **Jun 2012-Jul 2012**
NHLBI Summer Institute for Training in Biostatistics (SIBS) | St. Louis, MO

- Studied biostatistics and analyzed biomedical datasets as part of an accompanying practicum. *R*

Awards

- **Best Student Paper, ICDM 2019**: Best paper whose first author was a full-time student.
- **Travel grants (KDD 2017,2019,2020; CIKM 2018; SDM 2019; ICDM 2019):** Attend and present work.
- **Adam Smith Prize for Excellence in Economics (2015):** For writing an outstanding senior thesis.
- **Arnold J. Lien Scholarship (2011):** Four-year full-tuition merit scholarship.

mentoring

- Jing Zhu (UG, SU2020). Paper on node embedding in preparation. *Applying to MS/PhD programs.*
- Xingyu Lu (UG, SU2020). Paper on node embedding in preparation. *Applying to MS programs.*
- Xiyuan Chen (UG, FL2019-WN2020)**.** Wrote senior thesis and published paper on network alignment. Contributed to second paper in preparation. **Next:** MS at Stanford CS.
- Mark Jin (UG, WN2019-WN2020)**.** Published paper on evaluating structural node embeddings. Journal version in preparation. **Next:** MS at Northwestern Data Science.
- Haoming Shen (MS, SU17-SU18). Published paper on network alignment. **Next:** PhD at UMich IOE.

Reviewing

- **Program Committee:** SDM, ICANN, CompleNet, CIKM Demos, PKDD GEM Workshop, ICDM Demos
- **Invited Reviewer:** Trans. on Computers, Trans. on Cybernetics, TKDE, KAIS, Neural Computation
- **Subreviewer:** KDD, WWW, SDM, AAAI, PKDD, DAMI (Springer)

Invited talks and tutorials

- *REGAL: Representation Learning-based Graph Alignment.* NABD Conference, Criteo Labs, Ann Arbor, MI. May 2019.
- *Machine Learning in Materials Science: An Introduction through Python.* Tutorial (co-instructor), Center for Nanophase Materials Science User Meeting, Oak Ridge National Laboratory. August 2018.

OTHER ACTIVITIES

- **Chess:** Active USCF Senior Master and FIDE Master (highest rating-based national and international titles). Multiple scholastic/collegiate national championship, state open championship titles. 10+ years teaching.
- **Other interests:** Powerlifting (USAPL competitor and state referee), music (experimental acoustic/electric)

REFERENCES

- Available upon request.