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Mark Heimann

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Education

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

- Ph.D candidate in Computer Science. Advisor: Danai Koutra.
  - Scalable data mining methods for large networks
  - Connections between representation learning, matrix factorization, and low-rank approximation

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

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

Publications

- Wei Lee, Mark Heimann, Shengjie Pan, Kuan-Yu Chen, and Danai Koutra. Fast Multi-Network Alignment with Locality-Sensitive Hashing. *Under Review, PAKDD 2018.*
- Mark Heimann, Haoming Shen, and Danai Koutra. Multi-Network Representation Learning with Applications to Network Alignment. *Under Review, SDM 2018.*
- Yujun Yan, Mark Heimann, Di Jin, and Danai Koutra. Fast Flow-based Methods for Solving Linear Systems in a Distributed Multi-query Setting. *Under Review, SDM 2018.*
- Mark Heimann and Danai Koutra. On Generalizing Neural Node Embedding Methods to Multi-Network Problems. *KDD Workshop on Mining and Learning with Graphs (MLG)*, 2017.

Teaching Experience

- University of Michigan (2016-17): Foundations of Theoretical Computer Science, Introduction to Artificial Intelligence
- Washington University in St. Louis (2014-15): Introduction to Machine Learning, Multi-Agent Systems, Fair Division

Other Experience

Software Engineer Intern — **Algorithmia** — **Summer 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** — **Summer 2014**
NSF REU Program — Claremont, CA

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

Researcher — **University of North Carolina, Greensboro** — **Summer 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** — **Summer 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*

Chess Instructor — **Freelance/North Pittsburgh Homeschoolers** — **Summer 2010-2012**
Freelance instructor — Pittsburgh, PA

- Designed and taught chess lessons to individuals and groups of students of varying ages and skill levels.

External service

- Subreviewer for:
  - SDM 2018
  - AAAI 2018
  - ECML/PKDD 2017
  - Data Mining and Knowledge Discovery (DAMI, Springer) 2017

Grants

- Contributed to Writing (under review):
  - Qualcomm Innovation Research: "Temporal graph generation using scaled Generative Adversarial Networks." November 2017.
  - Amazon Research Award: "Using Representation Learning for Network Data Alignment." Total $83,000. October 2017
  - Alibaba Innovation Research: "DeepAlign: Representation Learning meets Graph Matching." $99,384. *August 2017.*

Awards

- **KDD Travel Grant (2017):** Funding from conference to 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.

Skills

- **Languages:** Python, Java, R, Pure Data
- **Frameworks:** Tensorflow

Selected Projects

- **Deep Learning for Node Representation and Graph Alignment:** Designed and implemented algorithm novel algorithm to jointly learn node representations and alignments. Supervised undergraduate and masters' students. *Python, Tensorflow*
- **Intonation Analysis:** Allowed user to play or sing into a microphone and computed the best fit musical tuning in real time. Visualized intonation accuracy according to this tuning with Matplotlib. *Python*
- **Augmented Thumb Piano with Inertial Tracking:** Tracked a thumb piano's gyroscope information and used it to allow a performer to control the instrument's volume and delay in real time. *Max/MSP*
- **Time-Inconsistent Planning:** Provided and mathematically analyzed novel methods for motivating time-inconsistent agents, a problem at the intersection of behavioral economics and theoretical computer science.

selected coursework

- Theory of Machine Learning
- Randomness and Computation
- Advanced Artificial Intelligence
- Advanced Machine Learning
- Linear Statistical Models
- Engineering Applications in the Media Arts

other activities

- **Chess:** Active USCF Senior Master and FIDE Master (highest rating-based national and international titles). Multiple scholastic and collegiate national championship and state open championship titles.
- **Other interests:** Music (experimental acoustic and electronic genres), competitive powerlifting (USAPL)