Stefan Dernbach

Curriculum Vitae

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Research Interests

Graph Signal Processing

Machine Learning

Deep Learning

Education

2015–2020 **PhD in Computer Science**, *University of Massachusetts, College of Information and Computer Sciences*, Amherst, MA.
Advisor: Don Towsley, Computer Networks Research Group

2012–2015 **MS in Computer Science**, *University of Massachusetts, College of Information and Computer Sciences*, Amherst, MA.
Advisor: Sridhar Mahadevan, Autonomous Learning Lab

2008–20012 **BS in Computer Science and BA in Mathematics**, *Whitworth University*, Spokane, WA.

PhD Dissertation

Title **Utilizing Graph-Structure in Machine Learning**

Committee Don Towsley (Chair), Andrew McCallum, Ben Marlin, Weibo Gong

Description Graphs provide a powerful model for structuring objects and relationships. Machine learning methods can utilize the geometry and dynamics of these graphs to improve modeling capability in comparison to other methods. Methods are proposed for signal processing, node embedding, and domain alignment.

Master's Thesis

Title **Cache Content-Selection Policies for Streaming Services**

Advisors Sridhar Mahadevan and Jim Kurose

Description Matrix factorization is used to model demand for VoD content at the individual and regional levels. These models are then utilized to predict future demand and pre-fetch content for regional caches.

Research Experience

2017– **Machine Learning Consultant**, *Stream Dx*.
Machine Learning methods for medical device signal denoising and processing.

2017–2020 **Research Assistant**, *Computer Networks Research Group*, University of Massachusetts, College of Information and Computer Science.
Deep learning methods for graph signal processing.

2016 **Research Intern**, *Pacific Northwest National Labs*, Seattle, WA.
Recurrent neural networks for anomaly detection in medical data.

2014 **Research Intern**, *Technicolor*, Los Altos, CA.
Recommendation systems and geographically based demand modeling.

2013–2015 **Research Assistant**, *Autonomous Learning Lab*, University of Massachusetts, College of Information and Computer Science.
Modeling and predicting regional demand for VoD services.

2012–2013 **Research Assistant**, *Autonomous Learning Lab*, University of Massachusetts, College of Information and Computer Science.
Manifold alignment methods for transfer learning.

2011 **NSF Research Experience for Undergraduates**, *Washington State University*, Pullman, WA.
Activity recognition on Android Smartphones.

Teaching Experience

2015–2016 **Teaching Assistant**, *Introduction to Computation (CS 250)*, University of Massachusetts, College of Information and Computer Science.

Publications

2020 Dernbach, S and Towsley, Don. *Filtered Manifold Alignment*. Arxiv.

2020 Dernbach, S *Utilizing Graph-Structure for Machine Learning*. PhD Dissertation. UMass Press.

2020 Dernbach, S and Towsley, Don. *Asymmetric Node Similarity Embedding for Directed Graphs*. Complex Networks XI.

2019 Dernbach, S., et al. *Quantum Walk Neural Networks with Feature Dependent Coins*. Applied Network Science. Special Issue of the 7th International Workshop on Complex Networks and Their Applications.

2018 Dernbach, S., et al. *Quantum Walk Neural Networks for Graph-Structured Data*. Seventh International Conference on Complex Networks and Their Application.

2017 Dernbach, S., et al. *Quantum Walk Neural Networks*. Quantum Techniques in Machine Learning.

2016 Rosenbaum, C., Durugkar, I., Dernbach, S. et al. *Deep Reinforcement Learning with Temporal Abstraction.* Arxiv.

2016 Dernbach, S., et al. *Cache Content-Selection Policies for Streaming Video Services.* Infocom.

2012 Dernbach, S., et al. *Simple and Complex Activity Recognition Through Smart Phones.* Intelligent Environments (IE), 8th International Conference on. IEEE.