

# Julian Busch

I'm a PhD student in computer science at the [Database Systems and Data Mining \(DBS\)](#) group at LMU Munich, working on various topics in machine learning. My research focuses on learning representations of complex data, including graphs and high-dimensional data.

My areas of expertise include, but are not limited to, machine learning, deep learning, data mining, data science, artificial intelligence, big data management and analytics, and algorithm design.

I have 5+ years of research experience and 2+ years of experience working in industry and with industrial partners.

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 [github.com/buschju](https://github.com/buschju)

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## Education

**04/2016 – 06/2021 (expected)**

**Dr. rer. nat. (PhD) Computer Science**

LMU Munich, Munich, Germany

*Supervisor: Prof. Dr. Thomas Seidl*

**10/2013 – 03/2016**

**M.Sc. Computer Science**

RWTH Aachen University, Aachen, Germany

*Minor: Mathematics*

*Thesis supervisor: Prof. Dr. Thomas Seidl*

*GPA: 3.9/4.0 (German grading system: 1.30)*

**10/2009 – 09/2013**

**B.Sc. Computer Science**

University of Hamburg, Hamburg, Germany

*Minor: Applied Bioinformatics*

*Thesis supervisor: Prof. Dr. Ulrike von Luxburg*

*GPA: 4.0/4.0 (German grading system: 1.12)*

***Awarded as best bachelor graduate***

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## Experience

**04/2016 - present**

**LMU Munich** - Research Assistant

Database Systems and Data Mining Group

*Munich, Germany*

**04/2019 - 09/2019**

**Siemens Corporate Technology** - Research Intern

Research Group for Big Data and AI Technology for Business Analytics and Monitoring  
*Princeton, NJ, USA*

**11/2018 - 12/2018**

**George Mason University** - Visiting Scholar

Department of Geography and Geoinformation Science  
*Fairfax, VA, USA*

**05/2015 - 02/2016**

**RWTH Aachen University** - Student Research Assistant

Data Management and Data Exploration Group  
*Aachen, Germany*

**12/2010 - 03/2011**

**University of Hamburg** - Student Teaching Assistant

Discrete Mathematics Group  
*Hamburg, Germany*

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## Industry Projects

Third-party funded research projects at LMU Munich.

**03/2018 - 09/2018**

**Explanation of Classification Results on Multivariate Time Series by Convolutional Neural Networks**

Siemens AG

**09/2017 - 02/2018**

**Data-driven Methods for Pre-Ignition Cause Analysis**

IAV Automotive Engineering GmbH

Supervised external master theses at LMU Munich.

**07/2020 - 01/2021**

**Federated ClusterGAN: Latent Space Clustering on Decentralized Datasets**

Rohde & Schwarz GmbH & Co. KG

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## Publications

**NF-GNN: Network Flow Graph Neural Networks for Malware Detection and Classification**

*Julian Busch, Anton Kocheturov, Volker Tresp, and Thomas Seidl*  
(under submission)

[\[pdf\]](#)

### **Learning Self-Expression Metrics for Scalable and Inductive Subspace Clustering**

Julian Busch, Evgeniy Faerman, Matthias Schubert, and Thomas Seidl

*NeurIPS 2020 Workshop: Self-Supervised Learning - Theory and Practice*

[\[pdf\]](#) [\[poster\]](#) [\[code\]](#)

### **Ada-LLD: Adaptive Node Similarity for Node Classification Using Multi- Scale Local Label Distributions**

Evgeniy Faerman, Felix Borutta, *Julian Busch*, and Matthias Schubert

*2020 IEEE/WIC/ACM International Joint Conference on Web Intelligence and Intelligent Agent Technology (WI-IAT'20)*

**Best Student Paper Award**

[\[pdf\]](#)

### **Grace - Limiting the Number of Grid Cells for Clustering High-Dimensional Data**

Anna Beer, Daniyal Kazempour, *Julian Busch*, Alexander Tekles, and Thomas Seidl

*2020 Conference on Learning, Knowledge, Data, and Analysis (LWDA'20)*

[\[pdf\]](#)

### **PushNet: Efficient and Adaptive Neural Message Passing**

*Julian Busch*, Jiaxing Pi, and Thomas Seidl

*24th European Conference on Artificial Intelligence (ECAI'20)*

[\[pdf\]](#) [\[slides\]](#) [\[talk\]](#) [\[code\]](#)

### **Structural Graph Representations based on Multiscale Local Network Topologies**

Felix Borutta, *Julian Busch*, Evgeniy Faerman, Adina Klink, and Matthias Schubert

*2019 IEEE/WIC/ACM International Joint Conference on Web Intelligence and Intelligent Agent Technology (WI-IAT'19)*

[\[pdf\]](#)

### **Semi-Supervised Learning on Graphs Based on Local Label Distributions**

Evgeniy Faerman, Felix Borutta, *Julian Busch*, and Matthias Schubert

*14th International Workshop on Mining and Learning with Graphs at ACM SIGKDD 2018 (MLG'18)*

[\[pdf\]](#)

### **Towards Learning Structural Node Embeddings using Personalized PageRank**

Felix Borutta, *Julian Busch*, Evgeniy Faerman, and Matthias Schubert

*2017 Conference on Learning, Knowledge, Data, and Analysis (LWDA'17)*

[\[pdf\]](#)

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## **Teaching Experience**

Teaching assistance at LMU Munich.

### **Algorithm Design (Elite master's program Data Science)**

Lecture

[Winter 2019](#)

## **Big Data Management and Analytics**

Lecture

Winter 2017

## **Innovation Lab Big Data Science**

Practical

Summer 2017

## **Knowledge Discovery in Databases I**

Lecture

Summer 2016, Winter 2018

## **Knowledge Discovery in Databases II**

Lecture

Summer 2020

## **Machine Learning**

Lecture

Summer 2018

## **Recent Developments in Data Science**

Seminar

Winter 2016, Summer 2017, Summer 2021

## **Software Development Lab**

Practical

Summer 2016, Winter 2016, Winter 2020, Summer 2021

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# **Supervised Theses**

Bachelor and master thesis supervision at LMU Munich.

### **ongoing**

#### **Neural Hough Transform for Subspace Clustering**

Master Thesis

#### **Generalized Neighborhood Aggregation for Graph Neural Networks**

Bachelor thesis

### **2020**

#### **Federated ClusterGAN: Latent Space Clustering on Decentralized Datasets**

Master thesis

### **2019**

#### **Neural End-To-End Subspace Clustering**

Master thesis

#### **Spatio-Temporal Link Prediction**

Bachelor thesis

#### **Inductive Subspace Clustering**

Master thesis

2018

**Recommendations on Dynamic Heterogeneous Networks with Metapath-RNNs**

Master thesis

**Deep Conformance Checking**

Bachelor thesis

**Graph Classification**

Bachelor thesis

2017

**Dynamically Adapting Vertex Embeddings**

Bachelor thesis

2016

**Visualizing High-Dimensional Data with t-SNE**

Bachelor Thesis

**Accelerating Minimax Hierarchical Clustering**

Bachelor Thesis

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## Academic Service

External reviews for academic conferences, journals and workshops.

- **CIKM** [2017](#), [2020](#)
- **DAMI** [2019](#), [2020](#), [2021](#)
- **DSAA** [2018](#)
- **ECIR** [2021](#)
- **EDBT** [2018](#)
- **ICDE** [2018](#)
- **IDEA** [2016](#)
- **KDD** [2019](#), [2020](#)
- **Machine Learning** [2017](#)
- **Pattern Recognition** [2020](#)

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## Selected Skills

### Languages

C, C++, CSS, HTML, Java, Latex, Markdown, Matlab, Python, R, SQL

### Frameworks

Bokeh, DGL, Keras, MLflow, Matplotlib, NetworkX, Numba, NumPy, Pandas, PyTorch, PyTorch Geometric, Scikit-Learn, SciPy, Seaborn, Spark, Tensorflow

### Tools

Docker, Git, Linux, Slurm

### Soft Skills

Certificate of advanced training in self-management, leadership and teaching skills awarded by the [LMU Center for Leadership and People Management](#)

### Natural Languages

German (native), English (proficiency), Latin (Latinum), Mandarin (beginner), French (beginner)