

ABOUT ME

EDUCATION

- **Doktor der Naturwissenschaften (Dr. rer. nat.) (= PhD), Computer Science**, 2016, Karlsruhe Institute of Technology (KIT)
- **Diplom (= Master's Degree), Computer Science**, 2012, Karlsruhe Institute of Technology (KIT)



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CONNECT



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stackoverflow.com/users/626537/



github.com/clstaudt

ABOUT ME



EXPERIENCE

- **Independent Data Scientist & Consultant**, 2016 -
- **Doctoral Researcher**, 2012 - 2016, Karlsruhe Institute of Technology (KIT)
- **Visiting Researcher**, 2015, University of Illinois at Chicago
- **Student Research Assistant**, 2007 - 2010, Karlsruhe Institute of Technology (KIT)

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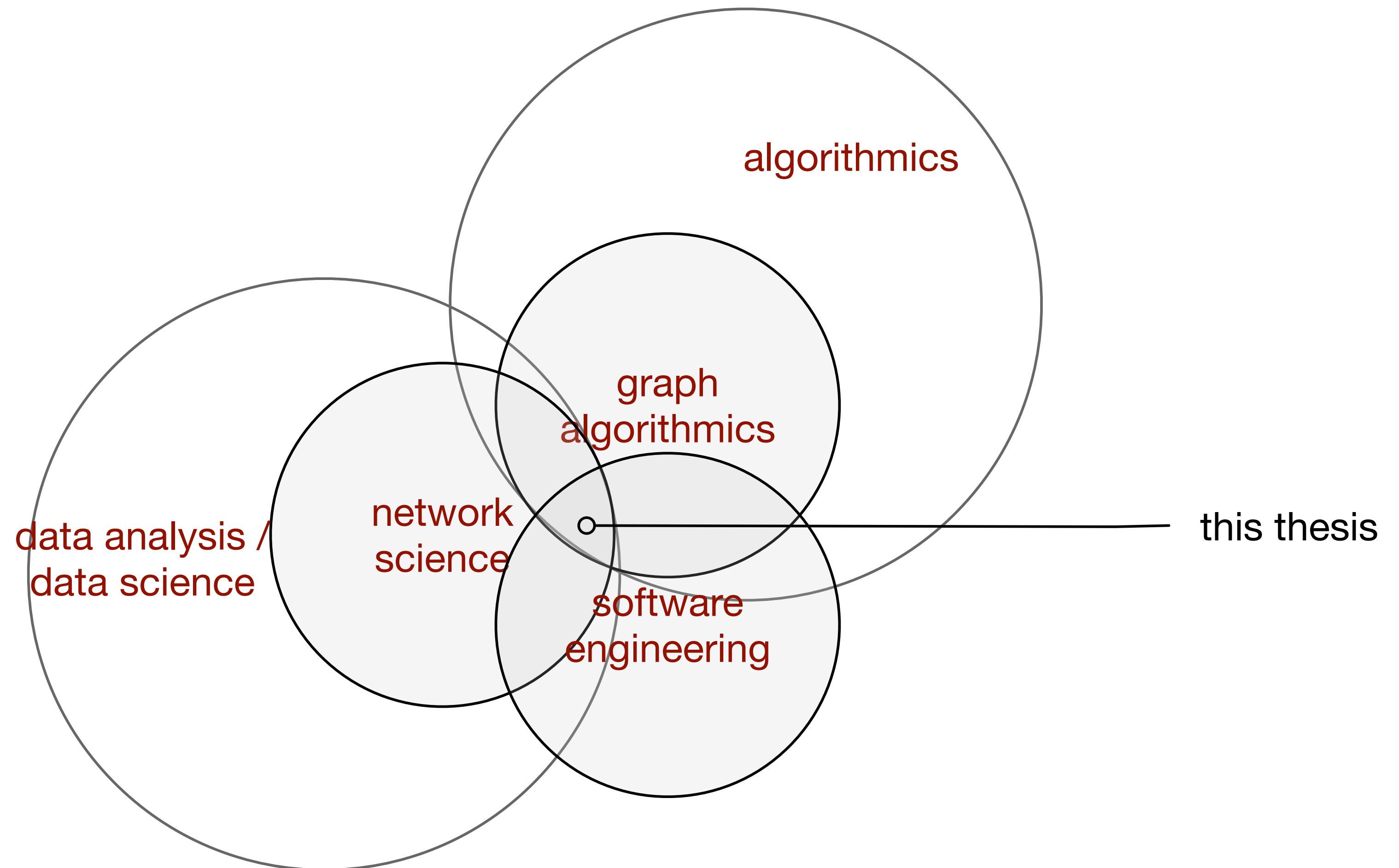


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RESEARCH

EFFICIENT (PARALLEL) GRAPH ALGORITHMS FOR NETWORK SCIENCE

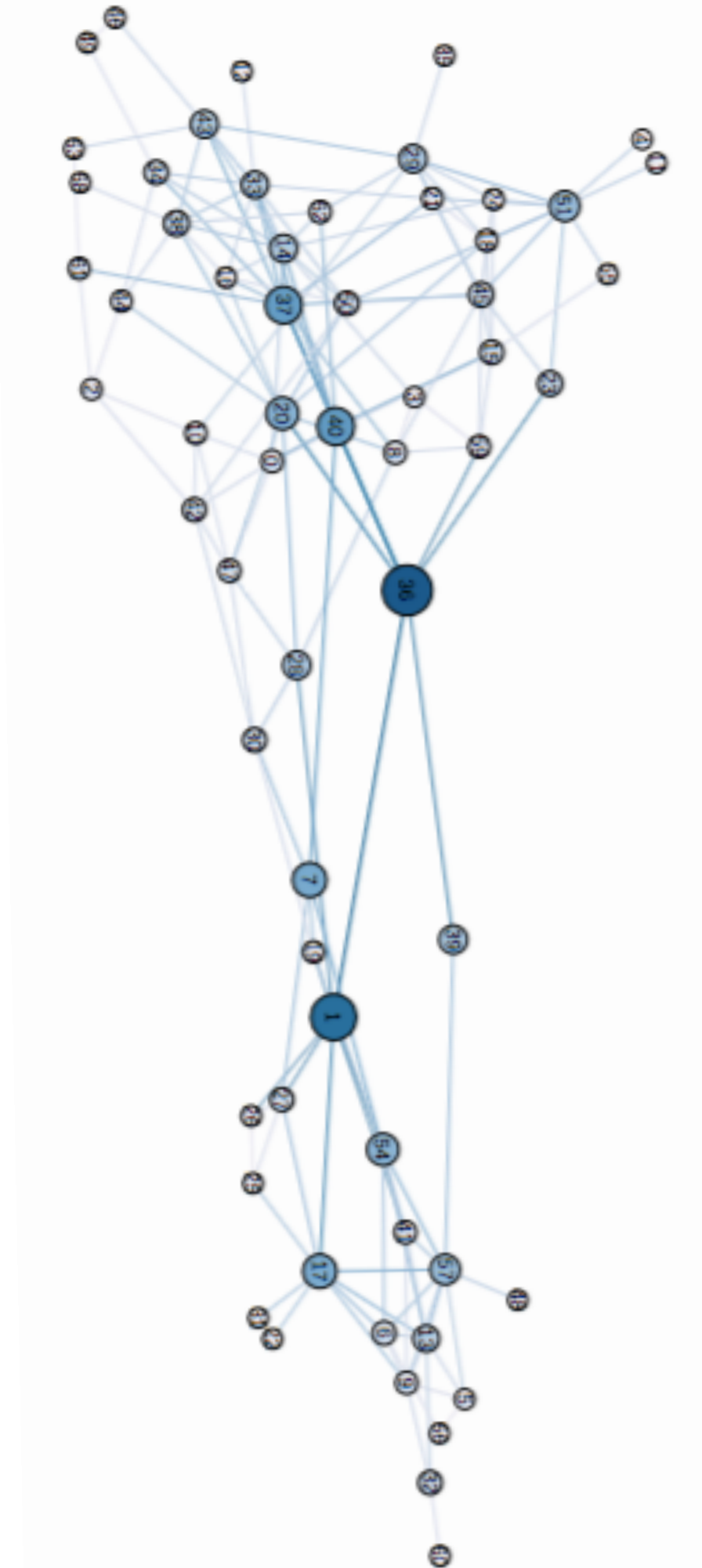
*Thesis: Algorithms and Software
for the Analysis of Large Complex
Networks, 2016, Karlsruhe
Institute of Technology*



RESEARCH

EFFICIENT (PARALLEL) GRAPH ALGORITHMS FOR NETWORK SCIENCE

- **network science:** branch of data science concerned with understanding network data (e.g. social networks)
- **graph algorithms** for network analysis: centrality metrics, clustering, generators...
- **scalability** via parallelism, heuristics, high-performance implementation...
- **algorithm engineering:** iterative, empirical approach to algorithm development (develop, analyze, implement, experiment, repeat)



RESEARCH

SOME RELATED JOURNAL ARTICLES

- **high-performance parallel graph clustering algorithms:**
2015 *Engineering Parallel Algorithms for Community Detection in Massive Networks*, IEEE Transactions on Parallel and Distributed Systems, with H. Meyerhenke.
- **network analysis framework:**
2016 *NetworKit: A Tool Suite for Large-scale Complex Network Analysis*, Network Science, with A. Sazonovs, H. Meyerhenke.
- **distributed graph computation:**
2016 *An empirical comparison of Big Graph frameworks in the context of network analysis*, Social Network Analysis and Mining, with J. Koch, M. Vogel, H. Meyerhenke.

PROJECT

NETWORKIT

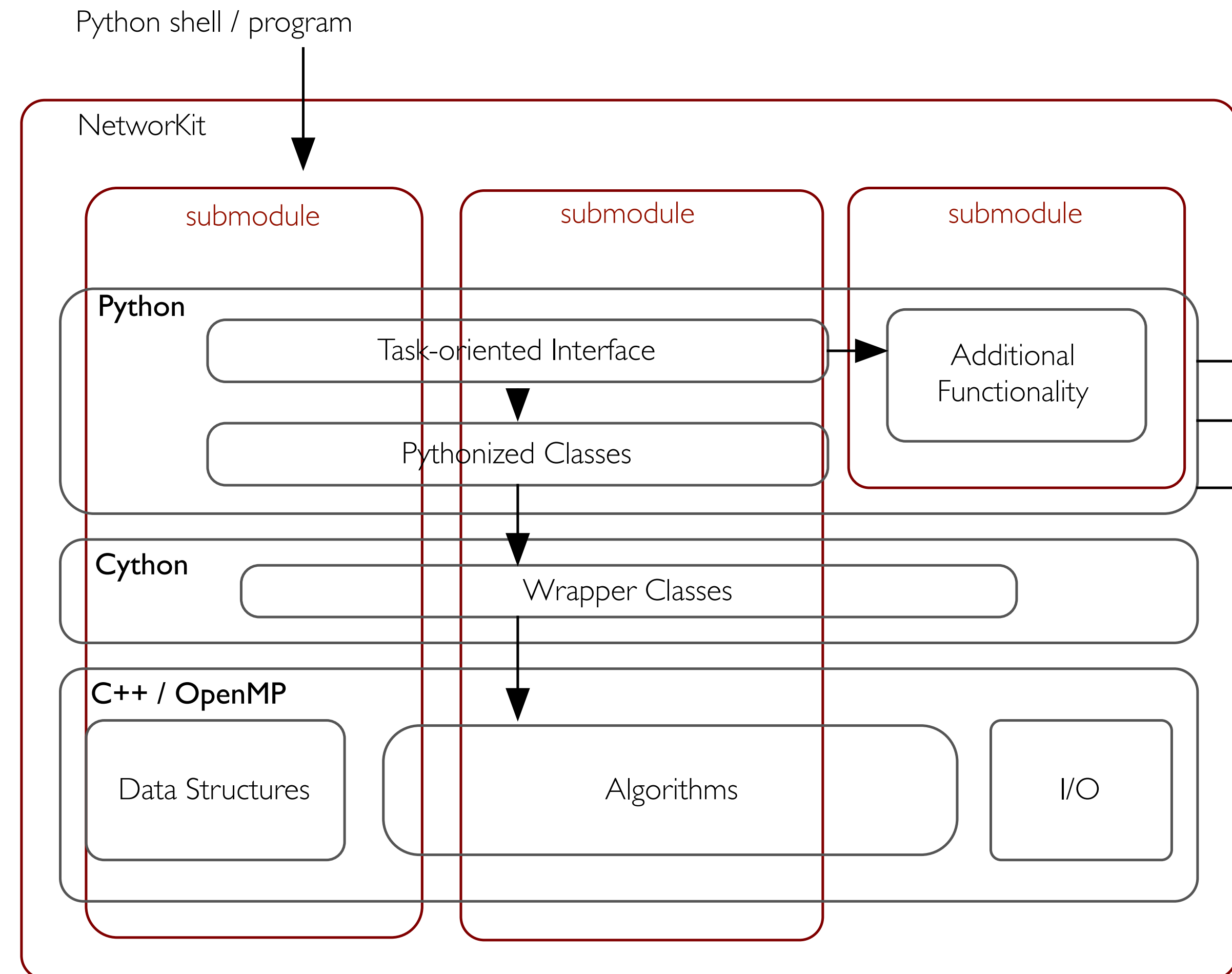
- a **tool suite** of algorithms and data structures for the analysis of large complex networks
 - the currently fastest shared-memory parallel library for several analytics tasks
- a **Python module** with a **C++/OpenMP core**
- **open-source** project sponsored by KIT, small but global **community**
- **my role**: initiator, algorithm engineer, software architect, developer, maintainer



PROJECT

NETWORKIT: WHAT MADE IT WORK

- **performance & scalability**
 - engineer memory-efficient graph **data structure**
 - parallel graph API
 - select and innovate **algorithms**
 - approximate result is often good enough in practice...
 - have good **coding standards**
 - understand how to achieve high performance in C++/OpenMP
 - establish profiling & benchmarking
- **practicality & usability**
 - build a hybrid, layered C++/Cython/Python architecture
 - develop a modular design



ABOUT ME



CORE SKILLS & CURRENT INTERESTS

- **software engineering**
 - **software architecture**
 - **high-performance programming**
- **algorithm engineering**
 - **algorithmic innovation**
 - **parallelization**
- **data science**
 - **network science**
 - **machine learning**

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CHRISTIAN STAUDT - Researcher | Developer | Consultant - Independent Data Scientist