

Local scientific collaboration networks: a case study

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Abstract

Scientific collaboration networks have become a central object of study for understanding how knowledge is produced, disseminated, and validated within the scientific system. By modeling researchers and their joint publications as evolving graphs, publication networks make it possible to quantify patterns of cooperation, specialization, and interdisciplinary exchange at multiple scales. These networks capture not only who collaborates with whom, but also how scientific communities emerge, fragment, and reorganize over time in response to funding structures, institutional incentives, and emerging research topics [4, 5].

State-of-the-art research in this area combines large-scale bibliographic data with methods from network science, scientometrics, and computational social science. Recent advances include the identification of core–periphery structures, the detection of research communities and topical clusters, and the modeling of collaboration dynamics using temporal and multilayer networks. In particular, publication networks are increasingly used to study productivity, impact, and inequality in science, as well as to evaluate how collaborative structures influence innovation and the diffusion of ideas across disciplinary boundaries [1, 2].

The present study builds on these approaches by analyzing publication data from the Hungarian Scientific Bibliography (MTMT) [3], accessed through a Python-based data collector and processing pipeline that relies on the MyCite2 API. By systematically retrieving and harmonizing metadata on authors, affiliations, and co-authored publications, our framework constructs faculty-level collaboration net-

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works for multiple Hungarian university faculties. This enables a comparative network-analytic assessment of how collaboration structures differ across institutions and disciplines, providing empirical insight into the organizational and social dynamics of academic research in the national context.

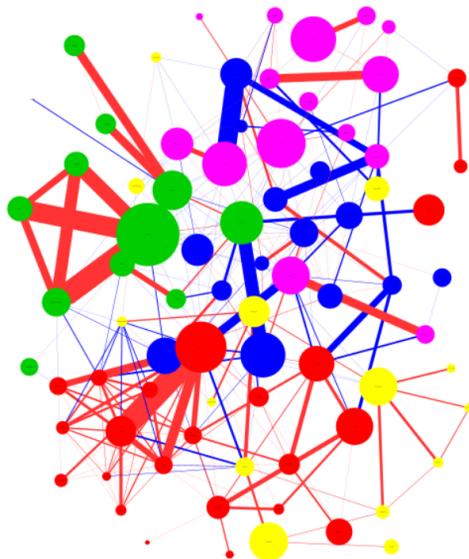


Figure 1. The publication network of the Faculty of Informatics, University of Debrecen.

Weighted multiplex networks are generated from MTMT data. An example is presented in Figure 1. The simple graph metrics of these networks are compared statistically to discover and highlight the main significant differences and similarities.

References

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