

From PhD to Professor: Global Faculty Placement Trends in GIScience

Yanbing Chen ^{a,*}, Jonathan K. Nelson ^a, Yuhao Kang ^b

^a University of Wisconsin – Madison - yanbing.chen@wisc.edu, Jonathan K. Nelson - jknelson3@wisc.edu

^b University of Texas at Austin, Yuhao Kang – yuhao.kang@austin.utexas.edu

* Corresponding author

Keywords: GIScience, Faculty Placement, Academic Mobility, Hiring Network

Abstract:

Academia is profoundly shaped by the dynamics of faculty hiring networks, acting as a pathway for knowledge dissemination and collaborative research formation in higher education. While the influence of hierarchical hiring patterns has been widely examined in disciplines like economics, computer science, and urban planning (Lee, 2022; Wapman et al., 2022), such insights are notably lacking in the context of GIScience. With rapid technological advances and a surging demand for spatial analysis, GIScience is transforming research and industry alike, underscoring the need to examine how hiring practices influence academic networks and research trajectories. This study addresses the gap by analyzing data provided via the GISphere project (*GISphere Institution Guide*, 2023) on 946 GIScience faculty members from 384 universities across 27 countries. We employ network and word cloud analyses to demonstrate the connections between PhD-granting institutions and faculty affiliations, revealing global placement patterns, diversity in hiring trends, and the thematic evolution in GIScience research interests between year 1990 and 2024. These findings contribute to the broader discourse on faculty hiring (in)equities and provide insight into the formation of research clusters within the GIScience community.

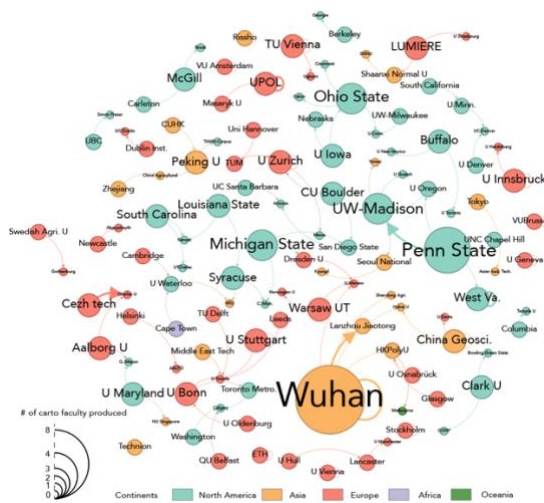


Figure 1. Figure 1. Network graph of 116 faculty with research interests in cartography-related topics.

The literature on faculty hiring has consistently highlighted the existence of prestige-driven, hierarchical hiring patterns, where elite institutions primarily recruit from one another, thereby creating a “closed doctoral ecosystem” (Clauset et al., 2015). Hiring networks not only influence faculty placement but also shape research agendas, as the ideas and methodologies learned at PhD-granting institutions are carried into new academic environments. Existing studies on faculty hiring tend to be U.S.-centric, or focusing on single-country datasets, and they often overlook the global mobility of scholars. This study investigates GIScience faculty mobility on a global scale, offering a comprehensive analysis of continental level, country level, and institutional level diversity in faculty hiring. Given the increasing globalization of GIScience, understanding these patterns is critical for fostering a more equitable academic environment.

The data for this study was leveraged from the GISphere project, and the focus was narrowed to 946 faculty members who specialize in GIS. Only tenure-track or tenured faculty were included as they have relatively stable career paths and greater

capacity to mentor students. GISphere data were aggregated from university websites, personal web pages, and academic platforms. Each faculty member’s academic trajectory was examined, identifying their PhD-granting institution and their current faculty position. Network analysis was conducted to visualize hiring patterns, with universities represented as nodes and faculty flows represented as edges. Of all faculty members, 116 explicitly listed cartographic interests; their network graph is shown in Figure 1.

The network analysis of GIScience faculty placements reveals that hiring is predominantly concentrated within the Global North. North America, Asia, and Europe collectively account for 92% of GIS faculty positions, with the United States (28.54%), China (26.74%), and the United Kingdom (8.35%) leading in faculty placements. The analysis shows that certain institutions play a dominant role in the GIS hiring network. For example, Wuhan University, Chinese Academy of Sciences, University of California Santa Barbara, The Ohio State University, and Peking University are

responsible for 15.43% of all global GIS faculty placements. While faculty hiring in other fields, such as computer science and economics, follows a clear prestige-driven hierarchy (Clauset et al., 2015; Wapman et al., 2022), the GIS hiring network appears more decentralized, with a wider distribution of contributing institutions. However, this relative decentralization does not eliminate regional inequalities. The network structure reveals localized recruitment patterns within continents. For instance, North American GIS faculty often originate from U.S. or Canadian PhD programs, while European institutions tend to hire graduates from within Europe. This regional clustering reflects the limited cross-continental mobility of GIS faculty, likely influenced by geographic proximity, immigration policies, and reduced recruitment costs for regional candidates.

The diversity index refers to the proportion of faculty originating from a particular region relative to the total affiliated faculty within that same region. It examines regional disparities in hiring patterns at the continental, country, and institutional levels. At the continental level, North America has the lowest diversity index, with only 11.01% of GIS faculty holding PhDs from outside the continent. Asia (24.37%) and Oceania (64.00%) show higher cross-continental hiring, though often from neighboring regions or countries with historical ties. Europe reports 11.15% diversity overall, with nine countries having 0% diversity, as all GIS faculty obtained PhDs within Europe. The country-level diversity index highlights varying patterns of domestic retention. For example, in the United States, 87.70% of faculty obtained their PhD domestically, while China exhibits a similar pattern, with 79.45% of GIS faculty holding domestic PhDs. Conversely, Singapore and Thailand have the highest country-level diversity indices (100%), indicating reliance on external academic talent. At the institutional level, external recruitment is common. On average, 92% of GIS faculty at global universities were externally recruited. These trends suggest that while universities value external perspectives to promote intellectual diversity, internal recruitment practices persist in countries with smaller academic systems.

The movement of ideas within GIScience is not only shaped by where faculty are placed but also by their research interests. By categorizing the stated research interests of 946 GIS faculty, this study reveals clear shifts in research priorities over time. Faculty were grouped into four cohorts based on their PhD graduation year (pre-1990, 1991–2000, 2001–2010, and 2011 onward) to visualize the evolution of GIS research. Faculty who graduated before 1990 focused primarily on soil science, transportation, and hydrology. From 1991 to 2000, topics like climate, biogeography, and environmental modeling gained prominence. The 2001–2010 period saw a significant growth in cartography-related topics. This prominence can be attributed to advancements in computational power and the increasing availability of geospatial data, which facilitated more sophisticated approaches to spatial analysis and visualization, reinforcing the importance of cartography and geovisualization in addressing data-driven challenges. Faculty who graduated after 2011 emphasized human-centered GIS themes, including participatory GIS, Volunteered Geographic Information (VGI), and GeoAI, reflecting the rise of human-centric computing and big data applications. This progression underscores the adaptability of GIScience in response to technological advances and societal priorities.

The findings of this study have important implications for GIScience education and hiring policies. The preference for internal recruitment at continental and country levels highlights the need to promote international mobility. While GIS faculty placement appears less hierarchical than in other fields, the concentration of placements within a small subset of universities highlights a potential inequity in access to faculty positions. Universities seeking to foster a more inclusive academic environment should consider promoting mobility pathways for PhD graduates from less influential institutions. The analysis of research interests reveals that GIScience is increasingly interdisciplinary. This has direct implications for cartography, as its growing intersection with computational and participatory approaches relies on diverse ideas and expertise. Global representation in GIScience education and hiring is essential for advancing cartographic methods to address region-specific challenges. In conclusion, hiring patterns and thematic shifts in GIScience highlight the importance of fostering a more inclusive, globalized GIS community, ensuring that ideas from across the world are equitably represented in GIS education and research.

References

- Clauset, A., Arbesman, S., & Larremore, D. B. (2015). Systematic inequality and hierarchy in faculty hiring networks. *Science Advances*, 1(1), e1400005. <https://doi.org/10.1126/sciadv.1400005>
- GISphere Institution Guide. (2023). GISphere. <https://gisphere.info/school>
- Lee, C. A. (2022). Who Gets Hired at the Top? The Academic Caste System Theory in the Planning Academy. *Journal of Planning Education and Research*, 0739456X2211216. <https://doi.org/10.1177/0739456X221121611>
- Wapman, K. H., Zhang, S., Clauset, A., & Larremore, D. B. (2022). Quantifying hierarchy and dynamics in US faculty hiring and retention. *Nature*, 610(7930), 120–127. <https://doi.org/10.1038/s41586-022-05222-x>