Kaspar Gubler, PhD
kaspar.gubler@unibe.ch
Universität Bern
Historisches Institut
Abteilung für Mittelalterliche Geschichte
Länggassstrasse 49, 3012 Bern
Schweiz

Kaspar GUBLER:

The Digital History Project Repertorium Academicum Germanicum (RAG) and Its Knowledge-Driven Approach to Prosopography

This article aims to offer an overview of the research project Repertorium Academicum Germanicum (RAG), focusing both on its methodological and technical aspects and demonstrating data analysis methods using the example of Hungarian students listed in the RAG database. The RAG is a digital historical research project focusing on scholars and students from the Holy Roman Empire (HRE) between 1250 and 1550, initiated in 2001. It stands as a pioneering project in digital history and prosopography, relying on meticulous data collection from university registers and supplementary sources. The RAG explores research questions concerning the medieval roots and foundations of modern knowledge societies, focusing on the work of scholars and the development of knowledge, particularly in relation to the academisation of European society. While primarily focused on the HRE, the RAG also serves as a valuable resource for studying Hungarian students. Compiling the group of Hungarian scholars within the RAG involves identifying scholars based on their geographical origin, yielding around 1045 scholars up to 1550, with almost a thousand within the timeframe of 1526. Alternative methods, such as examining source texts or Hungarian nation affiliations at the University of Vienna, supplement this process. Despite being smaller in scope compared to databases like the Repertorium Academicum Hungariae (RAH), the RAG provides valuable insights.

Keywords: Prosopography, Holy Roman Empire, Hungary, database, methodology, scholars, knowledge spaces, fourteenth–sixteenth centuries

~~~
ۼ
~~~

Origin, developments and methodology

Since its establishment, the RAG has emerged as a pioneering initiative in digital history and prosopography, driven by the vision of Rainer C. Schwinges from the University of Bern.[1] From the beginning, the decision was made to

---

[1] The following article refers to GUBLER 2024b and aims to provide an English-language overview of the RAG project. It also places greater emphasis on technical aspects to align with the objectives of the Héloïse workshop held in Pécs on 31 August. Atelier Héloïse is a network of European research projects focused on the digital history of universities and knowledge. Further information about the Atelier can be found on its website: https://heloise.hypotheses.org. A review of the workshop is available on the Héloïse blog: https://heloise.hypotheses.org/1076 –

develop a purely digital platform, forgoing printed biographies. This choice has proven to be wise, as the extensive information gathered would now far surpass the capacity of a multi-volume printed work. Central to the RAG's development is its research database. Until 2017, data was collected using Microsoft Access as the frontend and Microsoft SQL Server as the backend. The core of the data primarily derives from scholars mentioned in university registers.[2] Supplemented by additional information from university sources and research literature, aiming to provide comprehensive biographies.[3] In 2017, a major database migration to the web-based nodegoat research environment enhanced collaborative data collection, analysis, and curation among the research teams at the universities of Bern and Giessen (Germany).[4] The RAG project features two notable aspects. First, it draws on a unique source situation, relying on surviving university registers primarily from the Holy Roman Empire in the Middle Ages, which serve as the foundation of its data. Secondly, its methodology of manual data collection underscores the inherent challenges posed by historical sources characterized by inconsistency, fragmentation, and complexity.[5] These factors, deeply embedded within multi-dimensional contexts and developments, illustrate also the limitations of Artificial Intelligence in digital prosopography. In 2020, the RAG was transferred to the Repertorium Academicum (REPAC) and is now operated under the umbrella of REPAC together with the Repertorium Academicum Helveticum (RAH) and the Repertorium Bernense (RB).[6] This merging of the projects is based on a spatial concept.

The spatial approach

As in the RAG, the other two projects also have the primary goal of recording all students and their biographical data for a defined geographical area in the Middle Ages. In the case of the RAH, this is the area of present-day Switzerland and in the case of the RB, the area under the control of the city of Bern. The data collection for the RAH includes dioceses based in present-day Switzerland (Basel, Chur, Lausanne, Genève, Sion) as well as parts of the diocese of Konstanz. If students or scholars are found in the sources who resided in these dioceses, they are included in the database. As the borders of the aforementioned areas were not stable, this must always be taken into account when recording and especially when analysing the biographical data. An important aspect in the recording and also for the evaluation with regard to

---

accessed: 02-09-2024). For an overview of the RAG-project see also SCHWINGES 2022 and on its european perspectives GUBLER – HESSE 2023.

[2] On the special situation of the university registers, which are preserved almost only for the HRE in the Middle Ages see SCHWINGES 2023.

[3] GUBLER – SCHWINGES 2023.

[4] For the database migration see GUBLER 2020, on nodegoat van BREE / KESSELS 2015, and for nodegoat use cases https://nodegoat.net/usecases, for nodegoat related publications: https://www.zotero.org/lab1100/tags/nodegoat – both accessed: 11-09-2024.

[5] GUBLER 2024c.

[6] Project website: http://repac.ch – accessed: 11-09-2024.

knowledge spaces is that a distinction is made between students and scholars who came from a defined area and those who came from outside but were active in these areas as academics. This differentiation makes it clear at a glance when analysing data according to geographical origin, using the RAH as an example, that only around half of all academics came from the area of the Swiss Confederation. The other half came from abroad, which thus testifies already to a considerable 'import' of expertise for the Swiss region.

The RAG initially adopted a different focus. Its original goal was to document all masters and members of the higher faculties (law, theology, medicine) at universities within the HRE, including those from outside its borders. As the project evolved, the inclusion criteria were expanded to encompass scholars who, while not attending a German university, hailed from the HRE and went directly to universities abroad, particularly in Italy or France. Currently, this group consists of around 4,000 individuals out of approximately 62,000, although this number may be slightly higher since the University of Bologna and various French universities have not yet been fully explored for German or Hungarian scholars. As a result, the RAG has also shifted toward recognizing geographical origin from the HRE as a valid criterion for inclusion, even for those who did not attend a German university.

Data collection and analysis

In the RAG project, new methods and tools from digital prosopography and digital history are regarded as valuable complements to traditional historical research approaches. As part of this initiative, digital prosopography was specifically refined for the field of university history and knowledge during the database migration. The prosopographic approach was expanded to include a more contextualized perspective. A generic object-oriented data model was developed to capture the biographies and knowledge of scholars, serving as an observational framework for key life events that form the core of the system.[7] The life points, called events, are categorised into three main groups for data collection: personal events (such as birth, marriage, death, geographical and social origin), events relating to university attendance (such as matriculation, studies, doctorate) and events relating to functions, offices and activities, which also include authorships and correspondence. The other two most important objects in the data model are 'Person' and 'Location'. Locations can include institutions such as universities, schools, churches, monasteries, or courts (episcopal, princely, judicial) and cities. Whenever possible, events are assigned to one of these locations and temporally localized during data collection, enabling their visualization on maps, networks, and in time series as part of the data analysis. These visualizations can also be displayed dynamically to highlight patterns and developments. This approach allows for the analysis of scholars' places of origin, study, and influence. Geographic maps and network visualizations serve as tools for exploratory data analysis,

---

[7] Cf. GUBLER 2022a. p. 21.

providing an initial overview of the material and aiding further investigation. The data model is flexible, allowing objects like events, persons, or locations to be replaced by other entities, such as manuscripts, books, or even abstract concepts like ideas. For example, placing manuscripts at the center of the model enables tracking their movements across maps and networks.[8] Similarly, placing manuscripts and books at the core of the model enables the reconstruction of a collection, such as a scholar's personal library. Additionally, by importing and tagging full texts in nodegoat, more in-depth content analyses become possible.[9] In nodegoat, data and database models are stored in the widely used JSON (JavaScript Object Notation) format, encompassing the aforementioned objects and their contextualization in time and space. To ensure maximum flexibility in data storage, nodegoat employs the specially developed ChronoJSON for temporal data and GeoJSON for spatial data.

A key feature of ChronoJSON is its ability to store even imprecise time and date information and visualize it during data analysis. Additionally, ChronoJSON allows for the chronological listing of objects that lack temporal information, as long as other dated objects are present in the list. For instance, in a chronological list of dated manuscripts, a manuscript without a specific date can be positioned either before or after a dated manuscript.[10]

Building on this, the RAG places particular emphasis on the dissemination and application of academic knowledge. By considering scholars as conduits of knowledge, their mobility and migration enable the tracking of how their expertise spreads across geographic regions. This is further enriched by their written works, correspondence, and the exchange of knowledge within their social networks. This approach aggregates biographical information at the knowledge level, applicable to both individuals and groups, thereby creating a knowledge-based prosopography that integrates 'Person and Knowledge.'[11] When discussing the knowledge spaces that scholars inhabited and influenced, we must consider whether these are geographical spaces or more abstract realms, such as networks. One primary focus of the RAG is the exploration of geographical knowledge spaces, as this allows us to analyze a significant amount of data and provide a detailed description of these areas. These spaces include universities, which attracted individuals and knowledge, facilitating the dissemination, appropriation, and transmission of information that extended beyond their institutional boundaries. Within the RAG framework, universities (and other institutional spaces) are viewed as knowledge hubs. This perspective, combined with digital analysis, enables us to structure the

---

[8] For an example with a data model for manuscripts see BURROWS 2017 and in general VAN HEUVEL – VUGT et. al. 2020.

[9] See a tutorial on importing OCR-Texts from Transkribus into nodegoat created by the author: https://histdata.hypotheses.org/nodegoat-tutorials/nodegoat_tutorials#transkribus_nodegoat – accessed: 20-09-2024

[10] GUBLER 2022b. p. 19 and https://nodegoat.net/blog.s/tag/ChronoJSON and https://nodegoat.net/guide.s/131/storingspatialdata – both accessed: 20-09-2024.

[11] As for this approach see the volume of the RAG series 'Person und Wissen': HESSE – GUBLER – SCHWINGES 2022.

flows of data, representing the movements of people and knowledge, using the RAG data set.

Due to the flexibility of the data model, which extends beyond simply storing persons, events, and locations, the scholars' most important written works are also incorporated and broadly tagged within the project. This approach of combining persons and knowledge seeks to bridge the gap between prosopography and textual studies, enabling a more comprehensive analysis of the production and dissemination of knowledge in the form of a contextualized, knowledge-based prosopography.[12] At this point, it is essential to emphasize that the research data collected during the digital research process must meet contemporary standards. Funding organizations within the research community rely on the concept of open research data (ORD) that can be reused by other projects. When such data is published online like in nodegoat, it is referred to as Linked Open Data (LOD), a concept that has gained traction since 2007 and aims to promote open data that is freely accessible on the World Wide Web, facilitating the creation of so called 'knowledge graphs' for the retrieval and analysis of specific information.[13] However, this poses particular challenges for historical research data. Even with standardization according to LOD, historical data often features a more complex semantic layer than that typically found in natural sciences research, containing many implicit aspects that are not explicitly articulated. Consequently, insights drawn from historical research data must undergo a second layer of source criticism or contextualization to uncover the semantic dimensions of the data.[14]

Data visualisations

To analyze the circulation and dissemination of knowledge and quickly gain insights from large volumes of information, the RAG employs integrated visualization tools within nodegoat, such as maps, networks, and time series. This eliminates the need to export data to other software for analysis, although that option remains available. Visualizations help us identify patterns that can lead to new insights or questions, such as trends in student mobility depicted on geographical maps or within networks. Once these patterns are identified, we can apply traditional historical research methods to interpret the results in their historical context. This approach effectively bridges the gap between the

---

[12] The concept is described with examples in the specific volume of the RAG-series (RAG-Forschungen): HESSE / GUBLER / SCHWINGES 2022.

[13] In nodegoat, Linked Open Data (LOD) can be published through an API (interface for computer readable information), utilizing the JSON-LD format (JSON for 'Java Script Object Notation' and LD for ' Linked Data'). This method fulfils the requirements of LOD as defined by experts. Another popular standard alongside JSON-LD is SPARQL/RDF. SPARQL refers to the type of interface that uses the RDF standard (Resource Description Framework) to describe data in triples (subject-predicate-object). See for the several data export options in nodegoat https://nodegoat.net/guide.s/144/export-data – accessed: 20-09-2024, for general information about ORD and LOD standards see for instance https://handbook.opendata.swiss – accessed: 20-09-2024.

[14] GUBLER 2022b. p. 19.

analogue and digital worlds. Ultimately, however, human interpretation remains essential in order to gain new insights from digital data.[15]

The RAG data model is designed specifically for visualizations, which have become a key area of expertise within the project. To facilitate the creation of these visualizations, each biographical event is linked to a designated 'location' (such as a place, region, or institution) whenever the sources provide relevant information. Additionally, temporal details are included, allowing for the recording of both precise and approximate dates or time periods.

This approach pertains to the data model of the RAG project as well as the underlying generic model in nodegoat. At the core of this data model is an object-oriented structure that allows each object to be contextualized in both time and space. Specifically, users can independently define each object within the model, adding temporal and geographical information. Additionally, an unlimited number of relationships can be established between objects, and they can be classified multiple times, facilitating deeper contextualization and nuanced descriptions. These relationships also serve as the foundation for network analysis, whether in social, institutional, or immaterial contexts, such as a network of ideas or perspectives.[16]

This spatial and temporal data is especially valuable for dynamically visualizing developments on maps and in networks. For instance, maps can illustrate the emergence and decline of university catchment areas (or other institutions such as the above-mentioned location types) over time. Additionally, by visualizing the regions where students and scholars were active after their studies, we can analyze their influence (impact function) on specific geographical areas or within networks, categorized by their fields of study. Public users can obtain an initial overview of such areas characterised by universities on the RAG website. So-called 'scenarios' are published there for each of the 18 universities of the HRE as well as for the University of Krakow, for which the data was also recorded due to its outstanding importance.[17] A scenario is provided for each university, featuring project-defined data and interactive, dynamic visualizations categorized by scholars, nobility, and university positions (professors, rectors, deans). The data can be visualized geographically and in time series for each of these groups. Each map includes a legend that allows users to show or hide specific visualization results (points on the map). By default, universities and dioceses in the HRE serve as the background for the maps. Users can also search for individuals, with variations in name spelling taken into account. Additionally, a filtering option

---

[15] Instructive on the history of knowledge with reference to university history: STECKEL 2015.
[16] See for the core principles of data modeling in nodegoat on the blog of the author, containing also tutorials on nodegoat: https://histdata.hypotheses.org/nodegoat-tutorials/data-modelling-in-nodegoat – accessed: 20-09-2024 and specifically for data modeling for historians: https://nodegoat.net/blog.s/13/data-modeling-and-database-development-for-historians-slides – accessed: 20-09-2024.
[17] https://rag-online.org/datenbank/szenarien – accessed: 20-09-2024.

allows for the combination of various search criteria.[18] A distinction is made as to whether someone was awarded a doctorate at a university, which is shown for Basel with the category 'Basel Promotion Jus', or whether they were studying or teaching at the faculty (category: 'Basel Jurist'). For the doctorates, the master's degrees from the Faculty of Arts are also shown (category: 'Basel Promotion mag. art.'). All these categories can be combined with selected offices in ecclesiastical and secular fields by public users. For each scholar, life points on a map and relationships in a network can also be displayed on the RAG website.

This spatial framework, combined with data visualizations, enables us to reconstruct the significant influences that students and scholars had on specific areas of knowledge, starting with an initial visualization of their places of origin. For example, we can observe the places of origin of all individuals documented in the Project on the *Swiss Confederation* (RAH) from 1250 to 1550. The map highlights the places of origin of individuals from the Confederation in red, while scholars from other regions are marked in blue, indicating those who either worked locally within the Confederation or communicated indirectly through correspondence. This illustrates the substantial influx of scholarly knowledge to the Confederation during the Middle Ages and highlights the exchange of expertise at a European level.

Fig. 1: The places of origin of the students and scholars in the RAH are shown, with some red dots outside the Swiss Confederation indicating people who gave several places of origin in their biographies. Source: https://repac.ch/, visualisation created by the author 03.2024.

---

[18] See the instructions for the possible combinations: https://rag-online.org/datenbank/anleitung – accessed: 20-09-2024.

Hungarian scholars

Hungarian scholars serve as a useful example for gaining an initial overview of knowledge spaces and circulations, as well as illustrating the methodologies of the RAG.[19] The steps outlined here are employed in the project to compile a group based on specific characteristics of interest. Initially, Hungarian scholars are identified within the dataset based on their geographical origins recorded during data collection. To achieve this, the territory of the Kingdom of Hungary was digitally mapped as a polygon using a 1490 map in GeoJSON format.[20] Within the GeoJSON polygon, the data can then be queried for any area, including the map of 1490. A prerequisite for the success of such a query is that geographical coordinates are stored for the data (event: geographical origin). This is generally the case in the RAG, as one of the most important rules of data acquisition is to localise the events whenever possible and also to provide them with temporal information. This method, provided the data includes geocoordination, allows us to define and analyze specific geographical study areas within the RAG. This approach enables us to examine spaces that extend beyond individual institutions or localities, as well as their intersections and dependencies. Such flexibility facilitates targeted analyses of geographical knowledge spaces where innovative scholars were active, identifying them as genuine centers of innovation. A notable example of this is today's Alsace on the Upper Rhine during the late Middle Ages.[21]

The query based on the geographical origins of scholars within the polygon identifies 1045 individuals for the period up to 1550. When narrowing the timeframe to 1526, we still find nearly 1000 scholars (993) among the approximately 62,000 documented in the RAG. However, this figure represents a lower limit, as some scholars have unknown or unidentifiable places of origin, resulting in missing coordinates for the query. Alternative methods exist for associating individuals with the Hungarian group even without exact details of their origins. One approach involves searching the source texts in the database for relevant terms like *ungarus / hungarus*, *pannoninus*, *siculus*, and *croata*. Unfortunately, this search did not yield additional results for the study group. Another method is to examine the Hungarian nation of students at the University of Vienna, as this affiliation is recorded during data collection. However, since this group includes individuals from the Bohemian Crown, each case must be evaluated individually to assess the likelihood of an origin from Hungary. This inquiry identified 86 individuals. A preliminary review of their places of origin showed that most were from the Bohemian region, with some entries being ambiguous and providing only indirect biographical references. Such qualitative analysis requires a specialized study. Therefore, for the purposes of this article, we estimate approximately 1,000 individuals from 1372 (the earliest mention of a scholar's geographical origin in the group) to 1526. This figure underscores that the RAG

---

[19] See for the following also GUBLER 2023.
[20] Cf. GUBLER 2022a. p. 25.
[21] GUBLER 2024a.

encompasses a relatively narrow circle of scholars, while the Repertorium Academicum Hungariae (RAH) has recorded around 12,800 Hungarian students from 1100 to 1526.[22] Unlike the RAG, the RAH includes all Hungarian university visitors.[23] A deeper comparison of the RAG and RAH databases, especially regarding the origins of students by language region, would be a valuable project in its own right.

One additional note on the influence of scholars: while our focus will primarily be on the impact of scholars from the Hungarian region based on their geographical origins, it is important to recognize that this is just one facet of the broader picture. The contributions of foreign scholars who gained or shared knowledge within Hungary are equally significant. This is similar to the previously mentioned foreign academics active in the Swiss Confederation. If we include these 'external' scholars from the RAG for the year 1490, we identify 376 individuals. For each of these scholars, at least one documented point of residence in the 1490 area has been recorded with coordinates, serving as a basis for our data query. Consequently, we estimate around 1500 scholars (according to RAG criteria) associated with the Hungarian region up to 1526. Their influence warrants further examination, especially within a European context, to better understand the exchange of scholarly knowledge between Hungary and other regions.

For this analysis, we will concentrate on the subset of 993 scholars from the Hungarian region. Our approach typically begins with an exploration of their geographical and social backgrounds, followed by an examination of the universities they attended, the disciplines they studied, and their subsequent roles in both secular and ecclesiastical positions. The geographical origins of this study group, as illustrated in the subsequent figure (Fig. 2), represent the European border regions identified in the RAG.

---

[22] Kind information from the project leader Prof. Dr. László Szögi, during the presentation of the project on 31 August 2023 (Workshop of Atelier Héloïse in Pécs). The RAH project website: https://rahprojekt.elte.hu/.
[23] On the state of Hungarian university history, see the overview of Szögi 2017 and the contributions of the HUN-REN-ELTE University History Research Group, for instance: Szögi 2021; Tüskés 2008 and Haraszti Szabó – Kelényi 2019. Nonetheless, the extensive body of Hungarian literature on the history of universities is far too broad to be fully cited here.
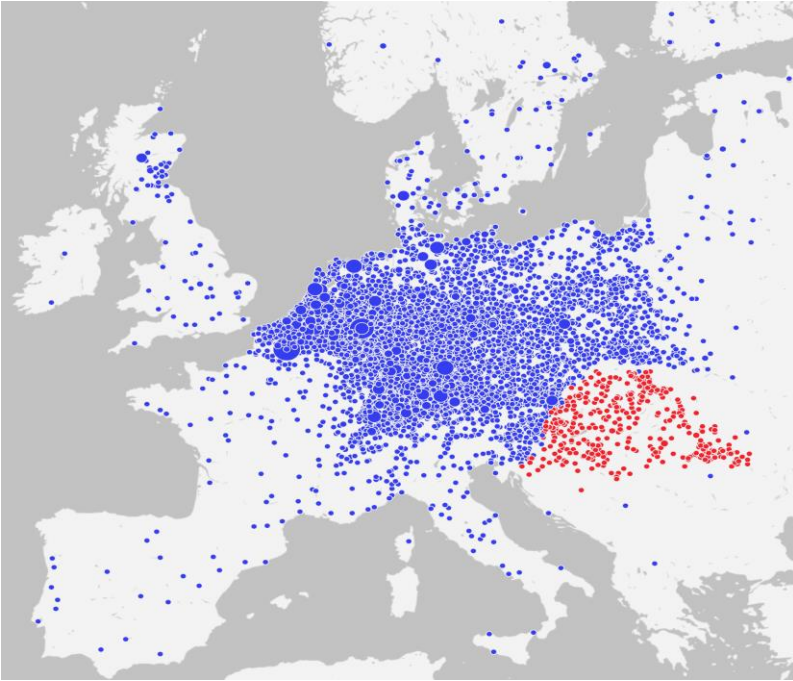
Fig. 2: Areas of origin (blue) of scholars in the RAG alongside the areas of origin (red) of Hungarian scholars from 1372 to 1526. Source: rag-online.org, visualisation created by the author 03.2024.

The origins of all scholars in the RAG are represented in blue, while the Hungarian scholars' origins are highlighted in red. Notable observations include the density of origins within the Kingdom of Hungary compared to Italy, Spain, France, England, and Scandinavia. The white spaces between the red dots indicate mountainous or sparsely populated regions. Additionally, the concentration of origins in the southwest and particularly the northeast of the HRE is significant, largely due to economically important imperial cities in the south and prominent universities in Cologne and Leuven, which collectively account for 60% of the scholars in the RAG.

Next, we turn to the universities attended by this study group (Fig. 3). Unsurprisingly, the University of Vienna had the highest number of attendees (697), followed by the University of Krakow (204) and the University of Prague (22). Notably, Italian universities such as Padua (47) and Ferrara (41) attracted more students than Bologna (22), a discrepancy likely due to the status of the data collected. In the HRE, student numbers were relatively low across universities, with Prague and Cologne being the exceptions (13). Research indicates that significant student mobility from present-day Eastern Europe to the HRE or Western Europe did not begin until the 16th century. Consequently, the RAG primarily captures only a handful of early students and

scholars from Eastern Europe before this period. After the mid-16th century, however, mobility notably increased in both directions, as documented in subsequent research.[24] A study of networks involving scholars from East-Central Europe connected to the University of Basel prior to 1550 reveals similar trends.[25] Geographically, the HRE held little significance for the Hungarian scholars, as only a few ventured westward beyond Prague. The key academic corridor for knowledge acquisition formed along the line connecting Krakow, Vienna, and northern Italy, with the University of Vienna emerging as the most important institution for Hungarian students, clearly illustrated on the map.
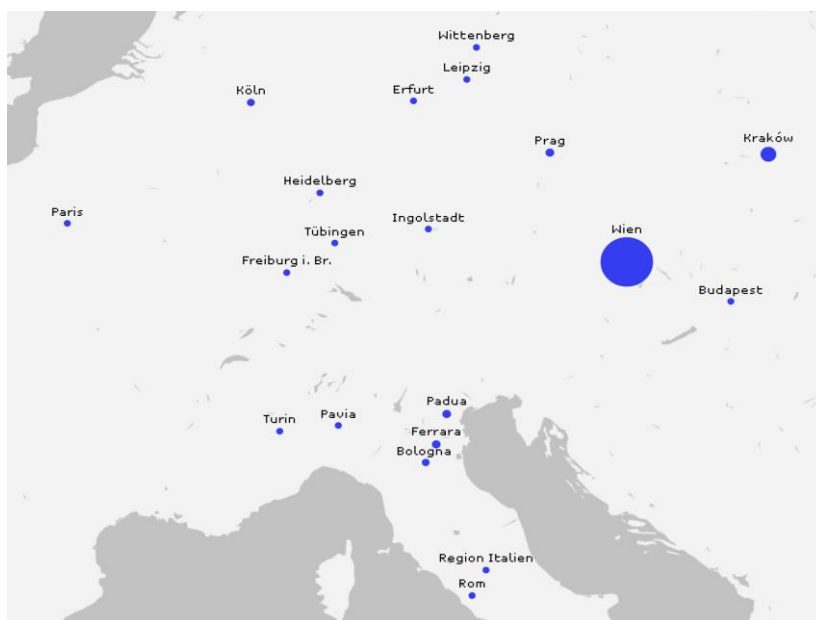

Fig. 3: Universities attended by Hungarian scholars 1372-1526, source: https://rag-online.org/, visualisation created by the author 03.2024.

The University of Vienna served as a vital link to the HRE and other knowledge regions. Notably, 132 individuals from the study group attended multiple universities. Of these, 55 studied at both the University of Vienna and an Italian institution, 42 attended Vienna and Krakow, and 14 went to Vienna and Prague. Interestingly, only five studied in Krakow and Italy without attending Vienna. This indicates that routes to Italy typically went through Vienna, although some students travelled directly to Italy without visiting the

---

[24] Among the many publications by Hungarian students who set off to study in western Europe, the following is representative (with a focus on Switzerland): HEGYI – SZÖGI 2003; see also the example of relations between the University of Heidelberg and Hungary by MEUSBURGER – PRÓBÁLD 2018.
[25] Cf. GUBLER 2023.

major universities in Vienna, Krakow, or Prague (40 total). Ultimately, 99 scholars from the study group pursued studies in Italy.[26]

In the third step, the RAG analyzes the scholars' roles and activities in both ecclesiastical and secular spheres to provide an overview of the group. The next map (Fig. 4) highlights Vienna's central role again, reflecting its significance for university positions such as professors, deans, and other roles. Overall, the activities of Hungarian scholars align closely with their regions of origin, showing a concentration around key cities like Transylvania, Sibiu, and Braşov. A detailed study could further illuminate the types of activities in these areas. This return mobility pattern offers initial insights into how knowledge is transferred from universities to these regions, as demonstrated by color-coding the areas of activity according to academic disciplines, revealing a strong emphasis on law in Hungary.
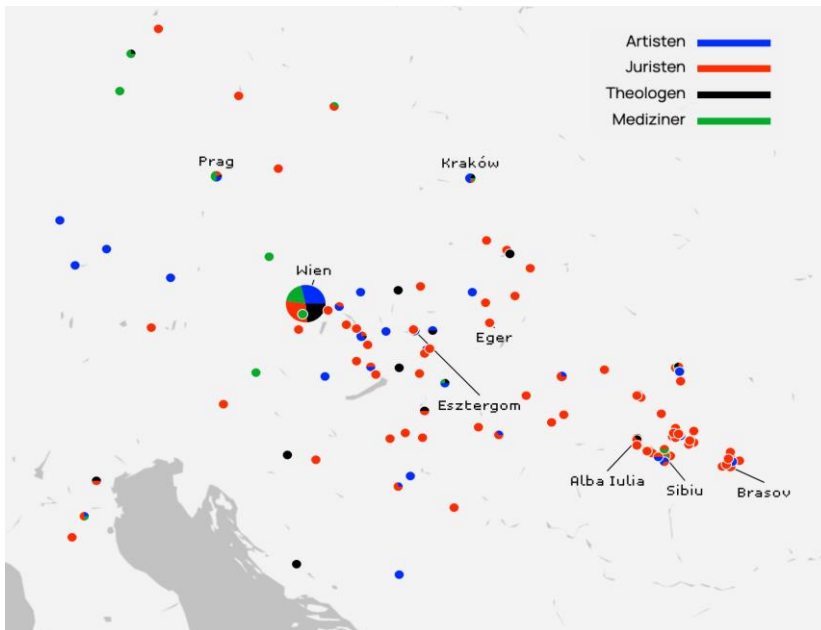

Fig. 4: Areas of Activity of Hungarian Scholars in the RAG by Specialization (1372-1526)
Source: https://rag-online.org/, visualisation created by the author 03.2024.

The study group comprises 646 artists, 373 lawyers, 49 theologians, and 30 doctors, with multiple specializations taken into account. This distribution closely mirrors the proportions found among all RAG scholars, indicating that the Hungarian group is representative of the broader academic landscape.[27]

---

[26] On German students studying in Italy (Padua and Ferrara) see for instance KOSTHORST 2022a and KOSTHORST 2022b. For Hungarian students at Italian universities, see also the earlier significant repositories by VERESS 1915; VERESS 1941.
[27] GUBLER 2022a. p. 27.

Examining the geographical distribution of specializations underscores the significance of these knowledge areas.

Influence on Knowledge Spaces

When we consider scholars as an influential group, the locations where they acquired and shared their knowledge emerge as key impact spaces, primarily represented by universities. The creation and evolution of these spaces were shaped by the presence of students and scholars, as well as the environments themselves.

In the RAG, geographical locations are classified by the mentioned institution types that are grouped under the database object 'Locations.' To assess the impact of these spaces, we analyze them using 'incoming' and 'outgoing' criteria. This approach allows us to identify which individuals or types of knowledge were drawn to a university or another location (incoming) and where they later held positions or disseminated their knowledge (outgoing).[28]

By viewing individuals as carriers of knowledge, we can trace their movements to understand the dissemination of knowledge or ideas, visualizing this flow on maps or within networks. These institutions and locations help structure the pathways and dynamics of both people and knowledge, allowing us to identify knowledge spaces with specific characteristics, such as those related to the activities of artists (Magister artium), lawyers, physicians and theologians. For the Hungarian region, 661 locations have already been recorded in the database, as illustrated in the accompanying graphic. The size of the dots represents the number of distinct locations at each site, rather than the number of individuals or events. The analysis of this knowledge space and the role of individual locations in the production and dissemination of academic knowledge is still underway. This research can be conducted by project staff within the RAG or by external scholars, as the web-based RAG environment facilitates location-independent work.

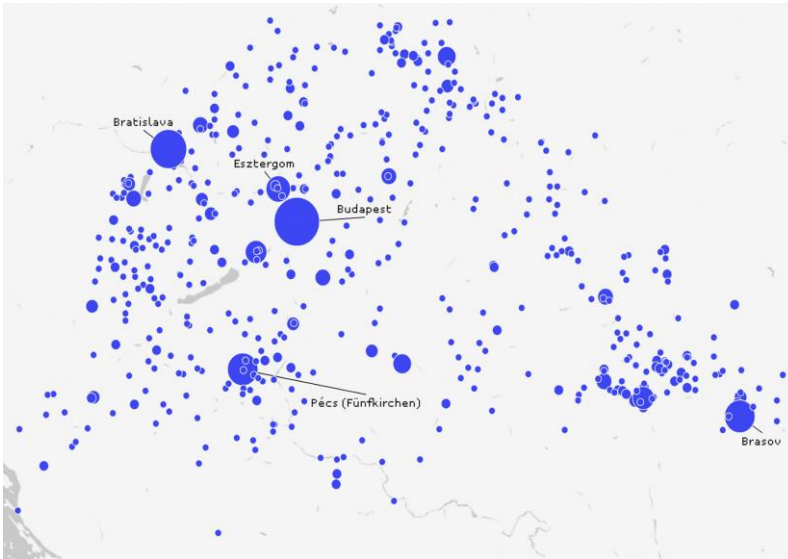[28] On this method of data analysis see SCHWINGES 2018.

Fig. 5: Locations and Institutions in the Hungarian area in the RAG 1372-1526, source: https://rag-online.org/, visualisation created by the author 03.2024.

For now, we must limit our discussion to these brief observations on the RAG and its Hungarian students. A more in-depth study of the Hungarian scholars within the project would be particularly valuable if their biographies could be enriched with information from regional or local archives. However, this requires specialized expertise, including a thorough understanding of Hungarian history. As a result, the depth of the RAG's research varies across European regions, especially concerning biographical events outside the university context. In these cases, the project faces a wealth of available sources and literature, which can only be effectively analyzed by specialists in Hungarian history, ideally through collaborative efforts. One such initiative is being pursued by the Atelier Héloïse research association. In recent years, the Atelier's workshops and exchanges between projects focused on the digital history of universities and knowledge have fostered a shared understanding of diverse approaches to the digital recording and analysis of historical sources. This dialogue laid the foundation for a project that, for the first time, integrates and harmonizes research data from individual projects into a unified database. The solel project, funded by the Swiss National Science Foundation, took a novel approach: instead of attempting to harmonize the data at the source within each project using a common Héloïse data model (which had previously proven ineffective due to differing models) harmonization occurs after the data is imported into the shared database.[29] This allows for comprehensive

---

[29] On this apporach see GUBLER – VAN BREE – KESSELS 2022; GUBLER 2022a.

searches across all participating Héloïse projects that contribute their data to the collective platform.[30]

By linking the data in this manner, new insights can be uncovered. For instance, the visualization of the regions of origin of students from various Héloïse projects (RAG, Studium Parisiense, ASFE Bologna, Padova) was made possible solely through this integration.[31] Moreover, the platform is designed so that projects not only serve as data sources but also allow those without their own database to record and manage data directly within the platform, as a sub-project. This approach facilitates collaborative data curation between projects with independent external databases and those managed within a platform sub-project. This principle of open and flexible collaboration with research data, centered around a clear thematic focus like that of Atelier Héloïse, presents significant potential for cooperation at the European level.

BIBLIOGRAPHY

Sources

Repertorium Academicum Germanicum (RAG): www.rag-online.org
Repertorium Academicum (REPAC): www.repac.ch

Secondary literature

VAN BREE – KESSELS 2015 — VAN BREE, Pim – KESSELS, Geert: Mapping Memory Landscapes in nodegoat. In: *Social Informatics, SocInfo 2014*. Ed. AIELLO, L. – MCFARLAND, D. (Lecture Notes in Computer Science, vol. 8852.) Cham. 2015. (doi: 10.1007/978-3-319-15168-7_34.)

BURROWS 2017 — BURROWS, Toby: The History and Provenance of Manuscripts in the Collection of Sir Thomas Phillipps: New Approaches to Digital Representation. *Speculum. A Journal of Medieval Studies* 92 (2017:1), p. 39–64. (doi: 10.1086/693438.)

GUBLER – HESSE 2023 — GUBLER, Kaspar – HESSE, Christian: Das "Repertorium Academicum Germanicum". Neue Perspektiven im europäischen Verbund. In: *Die römischen Repertorien. Neue Perspektiven für die Erforschung von Kirche und Kurie des Spätmittelalters (1378–1484)*. Hrsg. MÄRTL, Claudia – FEES, Irmgard – REHBERG, Andreas – VOIGT, Jörg. (Bibliothek des Deutschen Historischen Instituts in Rom 145) Berlin–Boston. 2023. p. 121–134. (doi:10.1515/9783110681888.)

GUBLER – VAN BREE – KESSELS 2022 — GUBLER, Kaspar – VAN BREE, Pim – KESSELS, Geert: Server-side Data Harmonisation through Dynamic Data Ingestion. A Centralised Approach to Link Data in Historical Research. In: *Fonti per la storia delle popolazioni accademiche in Europa. Sources for the*

---

[30] The Héloïse platform, which is still a work in progress, can be accessed at the following URL: http://heloise.nodegoat.unibe.ch – accessed: 20-09-2024.
[31] As a case study in the mentioned SPARK project.

	History of European Academic Communities. X Atelier Héloïse. Ed. Brizzi, Gian Paolo – Frova, Carlo – Treggiari, Ferdinando Bologna. 2022. p. 9–14.
GUBLER – SCHWINGES 2023	GUBLER, Kaspar – SCHWINGES, Rainer C.: Academic Degrees from German and Other European Universities (14th-16th Century). Some Empirical Remarks on 'Academization'. in: *Examens, grades et diplômes. La validation des compétences par les universités du XIIᵉ siècle à nos jours*. Ed. KOUAMÉ, Thierry – BELHOSTE, Bruno – NOGUÈS, Boris – PICARD, Emmanuelle. Paris. 2023. p. 337–349.
GUBLER 2020	GUBLER, Kaspar: Database Migration Case Study: Repertorium Academicum Germanicum (RAG). In: *HistData* – accessed 20-09-2024 (doi:10.58079/pldk)
GUBLER 2022a	GUBLER, Kaspar: Forschungsdaten vernetzen, harmonisieren und auswerten: Methodik und Umsetzung am Beispiel einer prosopographischen Datenbank mit rund 200.000 Studenten europäischer Universitäten (1200–1800). In: *Digital Turn und Historische Bildungsforschung. Bestandesaufnahme und Forschungsperspektiven*. Hrsg. OBERDORF, Andreas. Bad Heilbrunn, 2022. p. 127–147. (doi: 10.25656/01:24857)
GUBLER 2022b	GUBLER, Kaspar: Von Daten zu Informationen und Wissen. In: *Person und Wissen. Bilanz und Perspektiven*. Hrsg. GUBLER, Kaspar – HESSE, Christian – SCHWINGES, Rainer C. (RAG Forschungen 4) Zürich. 2022. p. 19–47. (doi:10.3218/4114-9)
GUBLER 2023	GUBLER, Kaspar: Gelehrtennetzwerke an der Universität Basel und ihre Verbindungen nach Ostmitteleuropa 1460–1550. Perspektiven zu Forschungsdaten aus dem Repertorium Academicum Germanicum (RAG). *Acta Universitatis Carolinae – Historia Universitatis Carolinae Pragensis* LXIII. (2023:1), p. 155–174. (doi: 10.14712/23365730.2023.27)
GUBLER 2024a	GUBLER, Kaspar: La création d'un espace d'innovation juridique: démarche et effets à l'exemple de l'université de Dole (1423-1525), in press
GUBLER 2024b	GUBLER, Kaspar: Ungarländische Gelehrte im Repertorium Academicum Germanicum (RAG) 1372–1526. Projekt, Datenbestand und Auswertungsperspektiven. *Gerundium* 15 (2024/1–2), p. 1–1. (doi:10.29116/gerundium/2024/1-2/7)
GUBLER 2024c	GUBLER, Kaspar: From manual work to artificial intelligence: developments in data literacy and research infrastructure using the example of the Repertorium Academicum Germanicum (2001-2024). In: *HistData* – accessed 12-09-2024 (doi:10.58079/126xr)
HARASZTI SZABÓ – KELÉNYI 2019	HARASZTI SZABÓ, Péter – KELÉNYI, Borbála: *Magyarországi diákok francia, angol, itáliai és német egyetemeken a középkorban 1100–1526* [Students from Hungary at the Universities of France, England, Italy and Germany in the Middle Ages 1100–1526]. Budapest. 2019. (Magyarországi diákok a középkori egyetemeken 3.)
HESSE – GUBLER – SCHWINGES 2022	GUBLER, Kaspar – HESSE, Christian – SCHWINGES Rainer C. (Hrsg.): *Person und Wissen. Bilanz und Perspektiven*.

	Zürich. 2022. (RAG Forschungen 4) ([doi:10.3218/4114-9](doi:10.3218/4114-9))
HEGYI – SZÖGI 2003	HEGYI, Ádám – SZÖGI, László: Magyarországi diákok svájci egyetemeken és akadémiákon 1526-1788 (1798), [Students from Hungary at the Universities and Colleges in Switzerland 1526–1788 (1798)], Budapest. 2003.
KOSTHORST 2022a	KOSTHORST, Lotte: Die ultramontane Besucherschaft der Universität Ferrara. In: *HESSE – GUBLER – SCHWINGES 2022*. p. 103–120. ([doi:10.3218/4114-9](doi:10.3218/4114-9))
KOSTHORST 2022b	KOSTHORST, Lotte: Studiare "trans Alpes". La mobilità degli studenti di area germanica verso lo Studio di Padova (XV–XVII secolo). In: *Stranieri. Itinerari di vita studentesca tra XIII e XVIII secolo*. Ed. LA ROCCA, Maria Cristina – ZORNETTA, Giulia. Padova–Roma. 2022. (Patavina libertas. Una storia europea dell'Università di Padova 1222–2022). p. 51–62.
MEUSBURGER – PRÓBÁLD 2018	MEUSBURGER, Peter – PRÓBÁLD, Ferenc: Scientific and Cultural Relations between Heidelberg University and Hungary over Five Centuries. In: *Geographies of the University*. Ed. MEUSBURGER, Peter et al. Cham. 2018. (Knowledge and Space 12) p. 43–134. ([doi:10.1007/978-3-319-75593-9](doi:10.1007/978-3-319-75593-9))
SCHWINGES 2018	SCHWINGES, Rainer Christoph: Doctores so in den püchern lesen. Lebenswege deutscher Gelehrter des 15. bis 16. Jahrhunderts und das Repertorium Academicum Germanicum (RAG). In: *Gelehrte Lebenswelten im 15. und 16. Jahrhundert*. Hrsg. GUBLER, Kaspar – SCHWINGES, Rainer C. Zurich. 2018. (RAG Forschungen 2) p. 1–22. ([doi:10.3218/3929-0](doi:10.3218/3929-0))
SCHWINGES 2022	SCHWINGES, Rainer Christoph: Das Repertorium Academicum Germanicum (RAG) – Ursprung und Entwicklungen. In: *HESSE – GUBLER – SCHWINGES* 2022. p. 1–17. ([doi:10.3218/4114-9](doi:10.3218/4114-9))
SCHWINGES 2023	SCHWINGES, Rainer Christoph: Why were there almost no matriculation registers in late medieval European universities – except in those of the German Empire? *History of Universities* XXXVI (2023:1), p. 34–56. ([doi:10.1093/oso/9780198883685.003.0002](doi:10.1093/oso/9780198883685.003.0002))
STECKEL 2015	STECKEL, Sita: Wissensgeschichten. Zugänge, Probleme und Potentiale in der Erforschung mittelalterlicher Wissenskulturen. In: *Akademische Wissenskulturen. Praktiken des Lehrens und Forschens vom Mittelalter bis zur Moderne*. Hrsg. KINTZINGER, Martin – STECKEL, Sita. Basel. 2015. p. 9–58.
SZÖGI 2017	SZÖGI, László: The Results and Tasks of Writing on Hungarian University History. In: *University and Universality. The Place and Role of the University of Pécs in Europe from the Middle Ages to Present Day*. Ed. FISCHER-DÁRDAI, Ágnes – LENGVÁRI, István – SCHMELCZER-POHÁNKA, Éva. Pécs. 2017. p. 33–46.
SZÖGI 2021	SZÖGI, László: *Studenten an europäischen Universitäten aus dem Gebiet des heutigen Burgenlandes 1377–1919. A mai Burgenland területéről származó diákok az európai egyetemeken 1377–1919*. (Burgenländischen Forschungen Sonderband XXIX.) Eisenstadt. 2021.

Tüskés 2008	Tüskés, Anna: *Magyarországi diákok a bécsi egyetemen 1365 és 1526 között*. Budapest. 2008. (Magyarországi diákok a középkori egyetemeken 1.)
Van Heuvel – Vugt et. al. 2020	van den Heuvel, Charles – van Vugt, Inge – van Bree, Pim – Kessels, Geert: Deep networks as associative interfaces to historical research. In: *The Power of Networks: Prospects of Historical Network Research*. Ed. Kerschbaumer, F. et. al. Routledge. 2020. (Digital Research in the Arts and Humanities; Vol. 5) p. 189–223
Veress 1915	Veress, Endre: *A padovai egyetem magyarországi tanulóinak anyakönyve és iratai. 1264–1864* [The Matriculation Book and Documents Relating to The Hungarian Students of The University of Padova. 1264-1864]. Budapest. 1915.
Veress 1941	Veress, Endre: *Olasz egyetemeken járt magyarországi tanulók anyakönyve és iratai. 1221–1864* [The Matriculation Book and Documents of Hungarian Students Attending Italian Universities. 1221-1864]. Budapest. 1941.
Verger 1997	Verger, Jacques: *Les gens de savoir dans l'Europe de la fin Moyen Âge*. Paris. 1997.

ങ୫୨