A Digital Exploration of 16th-Century Heretical Networks in the Italian Medical Context

Methodological Challenges and Research Perspectives

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JIHI 2018

Volume 7 Issue 14

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Methodological Challenges and Research Perspectives *

Alessandra Celati **

After the Reformation began in 1517, Protestant ideas soon crossed the Alps and spread out of Italian cities, fascinating (especially, but not exclusively) the humanists and scholars who were part of the late-Renaissance intellectual environment. In particular, between the 1530s and the 1590s a great number of Italian physicians absorbed, promoted, and re-elaborated, often in radical terms, the reformed and heretical discourse. In this article I am presenting some research perspectives and methodological challenges concerning the application of social network research and digital humanities tools to the history of 16th-century religious dissent. In particular, I will discuss and examine the reconstruction, out of a sample of 200 cases, of a network of dissident physicians who faced religious repression and opposed dogmatic confessional boundaries in Italy, and in their European diaspora, as a part of my own ongoing interdisciplinary research.

1. Introduction: social network analysis, digital humanities research and historical studies

In this paper I will discuss potentials and limitations in the application of social network research and digital humanities tools to the study of early modern religious dissent. I shall do so by firstly considering the theoretical and methodological aspects of this kind of approach, and secondly showing how the latter can be applied to a specific case-study, which comes from my ongoing research: a network of dissident physicians in the Confessional age. I will finally summarize my conclusions and suggest some further research perspectives.

"In the most basic sense, a network is any collection of objects in which some pairs of these objects are connected by links"[1]. Network analysis focuses on some *nodes*, that is to say the people/objects that populate the network and their attributes (such as gender, education, class, age, capacity, etc.), and some *edges*, that is to say the connections that link nodes together, and their classification. In this flexible definition, it is implicit how the concept of network could be applied to a wide range of situations. Whenever objects stand in relation to one another, we could think of these relationships in a networked perspective. Networks composed by words, concepts, places and various kind of objects, besides people, operate at a social, intellectual, epistemic, scientific or spatial level[2]. Hence, a network-based methodology can be exploited by scholars in all fields in the humanities, not exclusively by sociologists.

In particular, individuals connected by one or more social relationships form a *social network*, whether these relationships are the result of a conscious choice, or are developed by chance (as it happens, for instance, in the case of familial kinships). Social network research focuses on the origins, functioning, consequences and meaning of the social relationships that tie individuals, rather than on the individuals themselves. These ties can be of different kind: more or less conscious, frequent, formal, affect-laden, utilitarian, etc. Social network analysts examine the pattern, content, weight/intensity and direction of these

[1] David Easley, Jon Kleinberg, *Networks, Crowds and Markets: Reasoning about a Highly Connected World* (Cambridge: Cambridge University Press, 2010), 2.
[2] On the multiple potential applications of network analysis see Albert-László Barabási, *Network Science* (Cambridge: Cambridge University Press, 2016).

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interactions, by identifying the type of relationship that occurs within and between social units[1]. Such relationships constitute the basic elements of a *structure*, which could be examined through statistical and mathematical procedures aimed at measuring the relative centrality of the different members of the network[2]. The social network approach is grounded in the assumption that reality is relational, that social relationships shape the context in which individual action is made possible, and that the pattern that these relationships produce has important consequences for those actors[3].

Social networks have always been operating in complex societies. Indeed, they can be thought of as a crucial characteristic of the life in the past, probably even more so than in our own society—regardless of the revival of the concept of network that has recently invested both the public and the academic discourse (as a consequence of the success of digital social networks platforms like *Facebook* or *Twitter*), and which has been defined as "the relational turn"[4]. We

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[1] The *content* of a tie refers to the meaning that one individual involved in the network gives to his or her relationships, on the basis of the interest or goal that the individual nourishes in cultivating those ties; *intensity* is a parameter applied to inquiry into the sense of social responsibility that the fact of being involved in one specific tie produces on one given individual; *direction* indicates whether the interaction takes place moving from one person to another, or is mutual. Federica Ruspio, "Network analysis e microstoria: il caso della nazione portoghese", in *Microstoria. A venticinque anni dall'eredità immateriale*, ed. Paola Lanaro (Milan: Franco Angeli, 2011), 143; Reed E. Nelson, "The Strength of Strong Ties: Social Networks and Intergroup Conflict in Organizations", *The Academy of Management Journal* 32, no. 2 (1989): 380.

[2] Linton C. Freeman, *The Development of Social Network Analysis. A Study in the Sociology of Science* (Vancouver: Empirical Press, 2004), 2.

[3] The concepts of network and network analysis arose between the 1950s and the 1960s, due to the initiative of a group of British social anthropologists from the *School of Cambridge*, who rejected the structural paradigm (and its interpretation of society as essentially static) as inappropriate to describe large and complex communities. Instead, in their approach they emphasized themes like change, discontinuity and conflict, proposing the idea that reality is fluid and unstable. In particular, reality needs to be examined historically, and history is the result of the set of connections that took place in the past. Fortunata Piselli, "Il network sociale nell'analisi del potere e dei processi politici", *Stato e Mercato* 50, no. 2 (1997): 288-289; Federica Ruspio, "Network analysis e microstoria: il caso della nazione portoghese", in *Microstoria. A venticinque anni dall'eredità immateriale*, ed. Paola Lanaro (Milan: Franco Angeli, 2011), 133.

[4] Claire Lemercier, "Formal network methods in history: why and how?", *Social Networks, Political Institutions, and Rural Societies*, Brepols (2015), 281-310, 978-2-503-54804-3, 3, online version visited on Sept. 30, 2018. It is indicative of this historiographical shift: Niall Ferguson, *The Square and Tower: Networks and Power, from the Freemasons to Facebook* (New York: Penguin Press, 2018). This book

can speak about social networks any time individuals provide each other with practical support, in a more or less formal and structured way. Social network analyses can also be carried out upon groups who exchange goods, money, and other items. Furthermore, we can think in terms of networks when we want to deal with people who share, or facilitate by means of a collective effort, the circulation of ideas, information and knowledge, through letters, conversations or other forms of interaction[1]. With this in mind, social, cultural and economic historians, micro-historians, historical demographists and political scientists with an interest in past societies have long, more or less formally and explicitly, exploited historical records in order to examine communities of people all over the world under the light of social networks[2]. In this article I will try to contribute to such a historiographical approach, by showing that the understanding of historical networks can be useful when one deals with intellectual history too, provided that the latter is conceived of as "the study of historical actors whose ideas derive from the interaction of different contexts"[3].

reinterprets the whole history of humanity under the light of networks.

[1] Simone Testa, *Italian Academies and their Networks, 1525-1700. From Local to Global* (New York: Palgrave Macmillan, 2015), 7.

[2] I will not attempt to provide a complete display of this kind of works, and I will just mention some of the most significant: Alan Macfarlane, Sarah Harrison and Charles Jardine, *Reconstructing Historical Communities* (Cambridge: Cambridge University Press, 1977); Natalie Zemon Davis, "The Sacred and the Social Body in Sixteenth-Century Lyon", *Past & Present* 90, no. 1 (Feb 1981): 40–70; John F. Padgett and Christopher K. Ansell, "Robust Action and the Rise of the Medici, 1400-1434", *American Journal of Sociology* 98, no. 6 (May, 1993): 1259-1319; Roger V. Gould, *Insurgent Identities: Class, Community, and Protest in Paris from 1848 to the Commune* (Chicago—London: Chicago University Press, 1995); Francesca Trivellato, *The Familiarity of Strangers: The Sephardic Diaspora, Livorno, and Cross-Cultural Trade in the Early Modern Period* (New Haven and London: Yale University Press, 2009); Tijl Vanneste, *Global Trade and Commercial Networks: Eighteenth-Century Diamond Merchants* (London–New York, Routledge, 2011); Georg Fertig, ed., *Social Networks, Political Institutions, and Rural Societies* (Turnhout: Brepols, 2015). The debate about the application of social network analysis to historical research is still lively: an interesting venue for this kind of discussion was recently provided by the conference *Reconstructing Historical Networks Digitally, New Approaches, Opportunities and Epistemological Implications of Social Network Analysis*, held October 25-27, 2018 at the German Historical Institute, Washington.

[3] Manuela Albertone, Enrico Pasini, "Editorial", *History of European Ideas* 40, no. 4 (2014): 452, available at https://www.tandfonline.com/doi/abs/10.1080/01916599.2013.826433, visited on Nov. 10, 2018. For an introduction to the application of network research to intellectual history, and its value, see Rachel Midura, "Conceptualizing Knowledge Networks: Agents and Patterns of 'Flow'", in *Empires of Knowledge*, ed. Paula Findlen (New York: Routledge, 2018).

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But how can social network analysis count as a relevant scientific paradigm, when applied outside social sciences? The question is not rhetorical, and in the application of network analysis to historical studies some methodological remarks are necessary. Networks did exist in the past, but their structure, building mechanisms, function and functioning changed across cultures and over different historical periods and circumstances. For this reason, when trying to reconstruct historical networks, it is crucial to take into consideration the precise context in which the networks were shaped. In other words, when defining the very research question that we want to tackle by attempting to reconstruct networks; when classifying the properties of nodes and edges; and when examining the network itself, we need to have in mind the political, cultural and social historical background. While this is true in all the scholarly examinations which want to draw from social network research, it becomes especially urgent in the case of historical studies, where a qualitative approach needs to remain essential. In the historical field, the understanding of social networks has to be thought of as subsidiary method, although useful[1].

Moreover, in order to make network analysis relevant to historical research, one needs to interpret the regular interaction among actors in an 'abstract' way. The task of the social network historian is to focus on the patterns produced by some meaningful ties (whose content and other characteristics we have previously defined in a standardized way), carefully considering their origins and change in response to external events[2]. In this process, abstraction is indispensable. When working on historical networks, we do not try to reconstruct reality as a whole (which would be impossible and not really scientifically relevant): as sociologists would put it, the network is not the picture. What we do is defining connections in order to study their configuration, interpreting them in order to produce a specific *representation* of the historical reality, relevant to answer our

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[1] This is the reason why in my research I have not attempted a formal/statistical application of social network analysis and prefer to integrate such an approach within a more 'qualitative' discourse (the same is also due to the fact that my sample is not large enough to justify a strictly mathematical approach). This does not mean that I use the word network in merely metaphorical terms. I do think, with Lemercier, that social network analysis should be considered in its epistemological specificity and that the term network refers to a conceptually dense construct, as I am trying to show in this introduction. See Lemercier, *Formal Networks*, 3.

[2] Ivi, 8.

research question. As it is implicit in such an approach, "the reduction of the data comes at a price", no matter how uncertain, unique, and open to interpretation are the data that humanists, by definition, deal with[1]. The necessity to treat these data in an abstract and standardized manner needs to be strictly combined with the qualitative aspects of the analysis: only in this way, the understanding of historical networks can be fruitful for historians, allowing them to connect the general and the individual, the micro and the macro levels of the analysis.

Finally, historical networks can only be reconstructed by mapping the social connections implicated in the sources. The dependence on the sources is both the strength and the weak point of historical network research. As all historians know, archival sources are often fragmented and incomplete, and their reliability is always affected by the biases of the institution/actor that produced them. However, as Lemercier has explained, "we should not overestimate the easiness of the task of asking people about their relationships: sociologists, as ourselves, although for different reasons, hardly ever get 'complete information'"[2]. On the contrary, once clearly stated that sources are not complete, and that the network is not the picture, we can exploit historical documents "to observe traces of actual exchange and interaction of various sorts, not only consciously designed discourses on social relationships"[3].

In the past, as much as in the present, the production of a network is the result of collective or individual strategies, which aim, more or less consciously, at creating or reproducing social relationships that are useful and usable[4]. From this perspective, the reconstruction and examination of historical networks is a relevant tool in the hands of historians. By examining the interactivity between ties and attributes, and between historical frames and the actual existence of communities in the past, we can investigate the result of specific social mechanisms, such as trust, cooperation, circulation of goods/knowledge, social strategy, etc.

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[1] Scott Weingart, "Demystifying Networks, Parts I & II", *Journal of Digital Humanities* 1, no. 1 (2011), available at http://journalofdigitalhumanities.org/1-1/demystifying-networks-by-scott-weingart/, visited on Nov. 11, 2018.

[2] Lemercier, *Formal Networks*, 8.

[3] Ibid.

[4] Paul D. McLean, *The Art of the Network, Strategic Interaction and Patronage in Renaissance Florence* (Duke: Duke University Press, 2007), 11.

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Network analysis needs the aid of sophisticated technological tools for data visualization. Today, this is made possible thanks to the use of advanced platforms for the representation of networks and the exploration of historical data, such as *Stanford Palladio*, *Gephi*, *Nodegoat*, or *ENA* (Epistemic Network Analysis), just to mention some of them[1]. These differently customized 'digital humanities tools' provide a synoptic representation of a given relational phenomenon and, in so doing, they make observable some aspects of the research topic otherwise not examinable. The expression *digital humanities* refers to the interaction between computational methods and humanistic research. This discipline (or is it rather a methodology?) moved its first steps in the early 1970s, thrived between the late 1980s and the start of the 21st century, and is today established in the American academic context, progressively gaining relevance in the European one. The core aspect of digital humanities is the possibility to carry out textual, spatial or (as in our case) network analysis out of a large amount of data, which are interconnected and can be examined as such. In so doing, digital humanities allow one to reconstruct and visualize networks thoroughly. They represent the density and scale of networks, they expose anomalies and interruptions within them, they help the researcher to individuate people and sources that require more research, and they dig up micro-histories from the past that we may have overlooked[2]. Digital humanities research indeed has both descriptive and heuristic values. The chance to concretely visualize the interconnections among big data illustrates expected patterns as much as it makes emerge surprising facts. Moreover, the very process of modelling our data for the visualization compels us to look closely at the information we have, resulting in "numerous silent corrections to minor errors, assumptions that have solidified into facts, and other problems that arise when we take information for granted"[3]. Applying a digital perspective to the historical analysis can therefore help to test hypothesis, correct biases and formulate new research questions. Without necessarily producing revolutionary results, this kind of ap-

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[1] *Palladio* and *Gephi*, in particular, are the tools that I have used to produce the visualisations shown in the related section of this article.
[2] Giovanna Ceserani, Caroline Winterer, Dan Edelstein, Paula Findlen, Nicole Coleman, "Historical Research in a Digital Age: Reflections from the Mapping the Republic of Letters Project", *The American Historical Review* 122, no. 2 (Apr. 2017), 10.
[3] Ivi, 9.

proach adds a quantitative, hands-on, relational perspective to the qualitative one and, in so doing, allows to refine, deepen, confirm or refute insights that scholars within a given field of studies have put forward over time[1]. One could argue that historical sources have a complicated nature and hinder a perfect reconstruction of social or intellectual relationships. However, this is both a challenge and an opportunity for digital humanities, whose aim, when applied to social network research, is to understand a given configuration of relationships as much as to expose incongruities within it. Being an exploratory methodology, the results produced through digital humanities visualizations should not be intended as definitive. They are mainly supposed to orient investigation and always require further verification, to be performed by carefully re-examining the sources.

In the next pages I shall present part of my own ongoing research, in order to discuss practical functioning, potential and limitation of the application of social network analysis and digital humanities tools to a historical early modern case-study: a network of unorthodox physicians in the confessional age.

2. Historical problem, sources and methodology

As Inquisition records show, right when the peninsula was the torchbearer for medical research, it was experiencing the most turbulent phase in its religious history and many Italian physicians absorbed and promoted heretical doctrines. During the Renaissance, the epistemological boundaries of disciplines of knowledge were not as sharp as they became after the Scientific Revolution. In particular, medicine and religion were, in many respects, strongly interconnected. It is therefore arguable that, in times of intellectual crisis, the

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[1] Ibid.

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turmoil which was occurring within one field could affect the other. Considering this, it is worth examining the intersection between the scientific and the religious, choosing Italian physicians as the primary characters of study. Why were physicians so exposed to the influence of the Reformation? And what effects did this interaction have, in terms of the development of scientific and theological culture?

In order to answer these questions, in the last few years I have been working on a database which records as many cases of religiously dissident physicians as I could find by searching archives and studying the scholarly literature. The database takes into consideration entries like: the date and place of birth of heretical physicians; the places where they accomplished their education and where they worked as physicians; the year of any Inquisition trials (and, where appropriate, the result of the trial, namely recantation or prison/death sentence); their possible *religionis causa* migration; the type of non-Catholic religious doctrine they embraced; and the type of medical approach they developed. From the examination and comparison of the cases collected in this database, I have been able to put forward some preliminary conclusions on the relationship between medicine and heresy, describing some general trends[1]. This database still constitutes the main source material for my current project.

So far, I have found evidence of 200 Italian physicians who, over the course of the 16th century, grew distant from conventional Roman Catholicism. Particularly useful in this reconstruction have been the very large and important trials, now published, that took place in the 1550s and 1560s. In this phase, important characters of the Italian religious dissent were brought before the Inquisition[2]. Through their depositions they provided information about the

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[1] Alessandra Celati, "Medici ed eresie nel Cinquecento italiano" (PhD diss., University of Pisa, 2016); Alessandra Celati, "A Peculiar Reformed Minority: Italian Protestant Physicians between Religious Propaganda, Inquisition Repression and Freedom of Thought", in *Reformed Majorities and Minorities, Confessional Boundaries and Contested Identities*, eds. Simon Burton, Michał Choptiany and Piotr Wilczek (forthcoming).

[2] These important historical sources have been edited and published: Massimo Firpo and Dario Marcatto, eds., *Il processo inquisitoriale del Cardinal Giovanni Morone. Nuova edizione critica,* voll. I-III (Vatican City: Libreria Editrice Vaticana, 2011-2015); Eidem, *I processi inquisitoriali di Pietro Carnesecchi, 1557-1567: Il processo sotto Pio V, 1566-1567*, voll. 1-3 (Rome: Archivio Segreto Vaticano, 2000); Eidem, *I processi inquisitoriali di Vittore Soranzo: (1550-1558)*, vol. 1 (Rome: Archivio Segreto Vaticano, 2004); Carlo Ginzburg, *I costituti di Don Pietro Manelfi* (Florence—Chicago: Sansoni—The

people involved in the spread and promotion of heterodoxy. The data drawn from these trials, along with the names provided during his interrogatories by Girolamo Donzellini, the first case-study I analyzed in my research (and whom I am going to address in the next section), were originally the core of my sample. The latter was progressively enriched by the study of a great amount of further historiography on the Italian Reformation. As far as original sources are concerned, I searched the Inquisition archives in Milan, Trent, Pisa, Belluno and above all Venice. Indeed, at the point when I had collected 140 cases of dissident physicians, I noticed that almost half of them had been working, for at least some time, in Venice. I therefore decided to focus the research especially on the Republic of Venice (whose Inquisition archive is the richest in Italy) and I studied all the Inquisition trials held in Venice between 1543 and 1575. This ongoing work increased the sample with many more cases.

Regarding the sample, some clarifications are necessary. First of all, I need to point out that the category 'heretical/dissident physicians' can be misleading, and I am just using it as a comfortable synthesis to refer to a more complex phenomenon[1]. Many and varied were the non-conformist religious views which these physicians embraced, many were the ways they approached medicine: trying to pigeonhole them under the same label might yield a superficial representation of quite a multifaceted historical phenomenon. It is also necessary to point out that I am not just dealing with characters who were put on trial by the Inquisition, because I think that being on trial is not a sufficient research criterion. On the one hand, many physicians were never brought before the Inquisitors, although they were mentioned as 'heretics in other people's trials or migrated abroad *religionis causa*; on the other hand, many of those who were indeed tried were not entirely aware that their search for personal theological solutions had crossed the line. Since my work aims to provide a first recognition of the religious dissent in the Italian medical context, I think that it is relevant to consider in the database both the cases of those who were indeed tried

Newberry Library, 1970).

[1] In particular, in this article I am adopting a fluid usage of the terms 'heretic', 'heretical', and 'heresy', as well as 'dissident' and 'religious dissent'. I consider these terms as synonyms, which can be applied to a wide range of unorthodox positions and experiences related to the questioning of the Roman Church authority and to the promotion of an alternative religious discourse (in some cases, not reducible to the Protestant Reformation either).

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and of those who were not, but whose criticism against the Roman Church is documented. The scenario of the so-called Italian Reformation was multiform, and it can't be analyzed following a strict dogmatic approach: the very charge of 'Lutheranism' addressed by the Inquisitors to the accused does not imply a specific confessional connotation. The lack of any institutional guiding reference in the doctrinal and ecclesiological debate and the clandestine nature of the theological elaboration and propaganda resulted in the weakness of the reformed movement but, simultaneously, it guaranteed a great chance to develop independent religious views[1]. Physicians played a major role in this process[2].

Moreover, I have only chosen characters whose professional and religious experience took place in the first century of the Reformation and the last century of medical humanism, before the Scientific Revolution: that is to say in the 16th century. The challenge is to focus on the slippery times in which medicine was swinging between the reliance on the *auctoritas* and the personal search for independent solutions, between the critical reading of the ancients and the elaboration of new methodological and epistemological grounds[3]. It is not possible to go into this topic here, but, as it is well known, during the 16th century, Italian universities were the center of the reformation of medicine[4]. Also, the subjects that were being discussed there, above all the debate about the destiny of the individual soul and Pomponazzi's reading of Aristotle, contributed to the radicalization of intellectual elaborations and epitomized the most fertile ground for the rise in interest in non-conventional theological speculations. At the same time, in the humanistic age, the rediscovery of Galenism emphasized the link between body and soul and stressed the philosophical sides of the med-

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[1] It is not possible to sum up here the complex theme of the specificity of the 'Italian Reformation', in its relationship with the political, institutional, economical and religious situation of the Peninsula. For an introduction to this subject see Massimo Firpo, *Riforma Protestante ed eresia nell'Italia del Cinquecento* (Rome–Bari: Laterza, 1993).

[2] Alessandra Celati, "Heretical Physicians in Sixteenth-Century Italy: The Fortunes of Girolamo Massari, Guglielmo Grataroli, and Teofilo Panarelli", *Society and Politics* 12, no. 1 (2018): 11-31, available at `http://hdl.handle.net/11562/987411`, visited on Nov. 4, 2018.

[3] On the renewal of the epistemological and methodological grounds of medicine in the early modern age see Simone Mammola, *La ragione e l'incertezza. Filosofia e medicina nella prima età moderna* (Milan: Franco Angeli, 2012).

[4] Paul F. Grendler, *The Universities of Italian Renaissance* (Baltimore and London: Johns Hopkins University Press, 2002).

ical profession. This encouraged physicians to administer remedies to both the bodies and to the souls of their patients and stimulated a personal and rational inquiry into the sacred. From there to the conscious embracing of heretical positions the step was short. Moreover, in the 16th century, the crisis of the Catholic Church and the advent of the Protestant Reformation resulted in the particular urgency with which men and women felt the theme of personal salvation. This explains the liveliness of the theological debate even among illiterate people. We can imagine, and it is confirmed by historical sources, that this was even more the case among men of culture. If we are to investigate the relation between early modern medicine and the Reformation, we must therefore focus on the 16th century. Considering this, it's easy to understand why the dates of birth of the figures I am analyzing only fall between 1470 and 1564[1].

While there were certainly theoretical and methodological connections between late-Renaissance medicine and 16th-century heretical thought, Inquisition sources also show the social importance that physicians had in early modern society and which made them significant actors in the heretical movement. When in 1560, the physician Girolamo Donzellini defended himself in front of the Venetian Inquisition, he stated that his medical profession had put him in touch "with all sorts of people, especially those who are learned and literate"[2]. According to Donzellini, men of culture were particularly inclined to absorb and promote reformed and heretical doctrines. No wonder that, as a physician and a humanist, he had found himself involved in a dense network of religious dissenters. Although we can certainly think that Donzellini's statement was instrumental in his defense, these 16th-century physicians were indeed part

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[1] The first physician to be interested in the Reformation I have found evidence of is Girolamo Buonagrazia, born in Florence in 1470 and brought before the Inquisition for "Lutheranism" in 1531, see Domizia Weber, "Girolamo Buonagrazia tra conformismo e dissenso", in *Girolamo Buonagrazia, De provisione et cura morborum pestilentialium*, eds. Barbara Maria Affolter and Laura Rossi (Florence: Arciconfraternita della Misericordia, 2015), 33-38. The youngest physician whose heterodox religious experience still took place in the 16th -century was Giuseppe Perrotta, born in Frattamaggiore, in the area of Naples, in 1564 and specialised in surgery; he was put on trial for having developed a dangerous interest in reading Jewish books, see Pierroberto Scaramella, *Inquisizioni, eresie, etnie, dissenso religioso e giustizia ecclesiastica in Italia (secc. XVI-XVIII)* (Bari: Cacucci, 2005), 147.
[2] Archivio di Stato di Venezia (hereafter ASV), Sant'Uffizio, *Processi, Contro Girolamo Donzellini*, Busta (hereafter Bu.) 39, 48*v*.

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of a European community of humanists, who corresponded about knowledge and discoveries and travelled between confessional zones. They were also involved in other forms of networking, especially at an underground level. When a heretical group arose, I have found that there was often a physician leading it. Physicians exchanged and smuggled prohibited books, they dealt with heretical propaganda, they explained the meaning of the Scriptures to less learned members of heretical cliques and, in some cases, they published works in defense of religious peace, exploiting their international connections. In so doing, these oddly central figures contributed to the growth of what I call a "network of dissent physicians", whose reconstruction has never been attempted. Through the network analysis I enact as part of my current research project, I precisely want to visualize and examine the contexts, practices, and patterns of connection relating to humanistic heretical doctors. What did they share in terms of knowledge, readings, religious attitude, and/or social practice? How did social dynamics interfere with their religious choices? And did these secret ties provide doctors with the ground for the development of further discussions and experimentation in science and religion?

Historians of the Reformation and Counter-Reformation have long implicitly relied on the concept of networks in order to examine heretical biographies of important figures in the history of 16th-century religious dissent. Since the pioneering work of Delio Cantimori in 1939, historians have studied the experience of Italian heretics by examining the originality of the ideas that they brought about and the influence that humanistic culture exerted on those ideas. They have also often taken into consideration how such ideas circulated through religious and intellectual connections, being aware that personal interactions constituted an essential aspect in the promotion and perpetuation of religious dissent[1]. In spite of this awareness, they have adopted the concept of network

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[1] See for instance: Delio Cantimori, *Eretici Italiani del Cinquecento. Ricerche storiche* (Florence: Sansoni, 1939); Adriano Prosperi, *L'eresia del Libro Grande. Storia di Giorgio Siculo e della sua setta* (Milan: Feltrinelli, 2000); Antonio Rotondò, *Studi di storia ereticale del Cinquecento* (Florence: L.S. Olschki, 2008); Luca Addante, *Eretici e libertini nel Cinquecento italiano* (Rome - Bari: Laterza, 2011); Massimo Firpo, *Valdesiani e Spirituali. Studi sul Cinquecento religioso italiano* (Rome: Edizioni Storia e Letteratura, 2013). Within the history of Italian religious dissent, the micro-historical works by Carlo Ginzburg have led the way to historiographical approaches more and more engaged with a meticulous reconstruction of contexts and the emphasis on the individual scale. Micro-history and

(*rete*; *rete ereticale*) allegorically and instrumentally, referring to this concept in a generic way, to point out religious affinities and interactions within the Reformation world, and without fully exploiting its potential. As a result, they have never attempted to thoroughly reconstruct heretical networks within a specific geographical or social context, nor have they ever tried to visualize them. Scholars' skepticism is partly due to the very nature of early modern sources, which are all too often incomplete, fragmented, and hence generally considered inappropriate for an examination based on historical networks, as I have anticipated in the first section of this paper. Moreover, especially within Italian historiography, this skepticism has been reinforced by a preference for the history of ideas, that has produced crucial studies, but which has especially focused on the philological, theoretical (and in this case theological) aspects of the historical analysis, while neglecting the social ones.

Although I understand intellectual scholars' concerns, when considering how crucial the social dimension was in the medical profession (and in the Reformation movement), I think that it can be worthwhile to try to include a social perspective *within* the history of ideas. In particular, *mapping* the circulation of ideas, by *visualizing*—through digital humanities tools—the networks that heretical physicians shaped, can contribute to put in context major historiographical categories like Reformation, Confessionalization, Renaissance medicine, etc.[1] Building on the excellent results produced by intellectual historians in the field of 16th-century religious dissent, my research incorporates some of the insights which come from new methodologies (such as digital humanities and historical social network analysis) and from innovative historiographical approaches, like *connected history* or *histoire croisée*—which in turn draw from social sciences and adopt a relational perspective in the investiga-

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historical social network research are, indeed, highly compatible. Carlo Ginzbug, *Il formaggio e i vermi* (Turin: Einaudi, 1976); Ruspio, "Network analysis e microstoria".

[1] This methodological shift has been inspired by some recent works, which rely on a network-oriented methodology to inquiry into religious or intellectual history, such as: Ole Peter Grell, *Brethren in Christ: A Calvinist Network in Reformation Europe* (Cambridge: Cambridge University Press, 2011); Simone Testa, *Italian Academies and their Networks, 1525-1700. From Local to Global* (New York: Palgrave Macmillan, 2015); Vivienne Larminie, *Huguenot Networks, 1560–1780. The Interactions and Impact of a Protestant Minority in Europe* (New York and London: Routledge, 2018); Ruth Ahnert, Sebastian E. Ahnert, "Protestant Letters Networks in the Reign of Mary I: A Quantitative Approach", *English Literary History* 82, no. 1 (2015): 1-33.

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tion of practical and intellectual inter-crossings, over different ages and spaces[1]. Choosing to focus on individuals and their strategies, identifying connections and interactions on different levels (intellectual, social, geographical, etc.) and thoroughly contextualizing actors, objects, and practices, such an interdisciplinary approach can help to bring about "a 'total' but also a 'situated' history" of religious dissent[2].

For this kind of work, my main sources are Inquisition trials, especially from the Venetian archive. These records allow one to depict dissenters' daily life in its dynamic aspects, providing information on who the members of the heretical circles were, what books they read, where they used to gather, what kind of heretical activity they performed together, etc.[3]. In addition to Inquisition sources, I consider, when available, private correspondence, books written by physicians (dedications and quotes), common memberships in Academies—important hotspots for the circulation of non-conformist ideas—, notary sources and documents related to the medical activity carried out in Italian cities. By organizing the information abstracted from different kind of sources into significant spreadsheet cells, which communicate with each other and are set according to categories and attributes previously established as relevant for my research question, I try to 'translate' my sources into a new representation, bringing together social, intellectual, and religious aspects.

Close and distant reading between the sources and the visualization, and circularity between the micro and macro historical levels of the analysis, are at the core of my work[4].

Having described sample, methodology and sources, I shall now present a few case-studies from my work-in-progress research.

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[1] Michael Werner, Bénédicte Zimmermann, "Beyond Comparison: Histoire Croisée and the Challenge of Reflexivity", *History and Theory* 45, no. 1 (2006): 30-50. Caroline Douki, Philippe Minard, "Histoire globale, histoires connectées: un changement d'échelle historiographique? Introduction", Revue d'histoire moderne et contemporaine 5, no. 54-4bis (2007): 7-21. `https://www.cairn.info/revue-revue-d-histoire-moderne-et-contemporaine-2007-5-page-7.htm`, visited on Nov. 27, 2018.

[2] Ibid., 15.

[3] Silvana Seidel Menchi, *Erasmo in Italia, 1520-1580* (Turin: Bollati Boringhieri, 1987), 14.

[4] I borrow this expression from Franco Moretti, *Distant Reading* (London–New York: Verso, 2013).

3. A network of dissident physicians

While it is certainly valuable to picture the overall network of medical religious dissent, in this paper I shall first focus on an 'ego-network perspective', in order to provide an examination of the phenomenon that is as detailed as possible and to better describe the methodology. Then in the final part of this section, I will attempt a broader reconstruction.

An ego-network perspective requires one to choose particular figures and to reconstruct their entire networks out of different sources. If we limit the focus of the inquiry to heretical ties, we could potentially commit the same mistake as the Inquisitors, reducing the 16th-century doctors involved in the heretical movement to a stereotypical representation. In order to avoid this, in the next pages I will provide an analytical examination of three case-studies, by combining Inquisition sources with other kind of records that can tell us more about the social and professional dimensions in which an alleged heretical doctor was involved. In order to put the history of religious dissent in context, I have first chosen three physicians in my database, who were active in Venice in the mid-16th-century, were involved in a dense set of social and intellectual relationships and are particularly well-documented. I have then reconstructed their ego-networks, out of different records, and I have finally compared the cases and overlapped the visualizations, in order to evaluate what these sample-physicians shared in terms of religious accomplices, social strategy, medical attitudes and religious and philosophical leanings. A microscopic description of non-conformist medical circles in a city which was a major crossroad and was considered the "gateway" of the Reformation in Italy[1].

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[1] On the Reformation movement in Venice see John Martin, *Venice's Hidden Enemies. Italian Heretics in a Renaissance City* (Berkeley: University of California Press, 1993).

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3.1. Girolamo Donzellini's ego-network

The first case-study is that of the above-mentioned doctor Girolamo Donzellini[1]. Born in 1513, Donzellini was a well-respected Italian physician, involved in the heretical movement and in the smuggling of prohibited books for almost 50 years. Put on trial by the Inquisition 5 times, Donzellini was sentenced to death in 1587. The minutes of his trials and his correspondence with Protestant humanists such as Theodor Zwinger and Joachim Camerarius, along with the medical and philosophical books he published, allow us to depict the experience of a dissident physician in great detail. In particular, the abundance of sources concerning Donzellini enables one to reconstruct his network over a wide range of time, which in turn highlights how a dissident doctor reshaped his role in the heretical movement as a result of external events.

In the case of Donzellini, as much as in that of the other networks I am reconstructing, I am applying the following pattern: I define and examine the nodes from the point of view of their profession, since I am especially interested in understanding the social profile of heretical physicians' connections, and/or from the point of view of their gender (occasionally I consider the scientific/philosophical or religious attitude of nodes). As for the edges, I have set them according to either the place in which the connection took place (in fact in the history of the Italian Reformation the choice to operate in one specific city/country can potentially reveal specific religious trends), or the 'category' of the relationship, which defines the content of the interaction (heresy; medicine; healing; patronage, etc.—most of the time, the 'category' is a combination of these classifications as I shall soon explain).

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[1] On the biography of Donzellini as a heretical physician see in particular: Ann Jacobson Schutte, entry "Girolamo Donzellini", in *Dizionario Biografico degli Italiani* 41 (Rome: Istituto dell'Enciclopedia Italiana, 1992), available online at http://www.treccani.it/enciclopedia/girolamo-donzellini_(Dizionario-Biografico)/, visited on Nov. 28, 2018; Palmer Richard, "Physicians and the Inquisition in Sixteenth-Century Venice: The Case of Girolamo Donzellini", in *Medicine and the Reformation*, ed. Ole Peter Grell and Andrew Cunningham (London–New York: Routledge, 1993), 118-133.
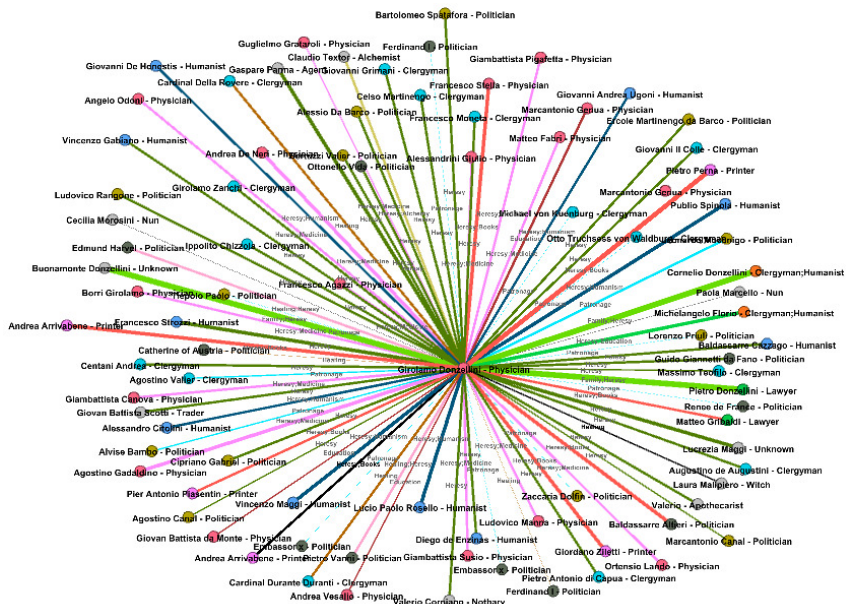
Fig. 1: The network.

The first visualization shows the breadth of the network that a heretical physician could develop in 16th-century Italy[1]. Furthermore, the variety of the professions of the nodes (labelled next to the nodes' names) shows the network's complexity, suggesting a rather eclectic social strategy in Donzellini's experience. Donzellini could initiate relationships with the most important political figures of his time (even with the Emperor Ferdinand I), but he was also in touch with clergymen, quacks, printers, and an alleged witch (Laura Malipiero), whom he healed in prison.

Moreover, as this detail of the network shows, a heretical kind of tie often overlapped with a different kind of tie.

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[1] In this first case (as much as in figures 12 and 13), the visualization is meant, in particular, to provide the scale of the network. See the detailed picture below (Fig. 2) for a better readability of the composition and nature of Donzellini's network.

Fig. 2: Detail of Donzellini's ego-network.

A heretical relationship could be developed from a common humanistic background (in this case I defined the category/content of the tie as *heresy-humanism*); from the exchange of books (*heresy-books*); from familial relationship (*family-heresy*); from a common passion for alchemical research (*heresy-alchemy*); from a relationship of patronage with a patrician (*heresy-patronage*); or from the practice of medicine, both with colleagues (*heresy-medicine*) and patients (*heresy-healing*). In order to define the content of the ties, I have examined the nature of the relationships that linked the nodes together by taking into account the 'qualitative' detail implicated in the sources. For instance, the category 'heresy;medicine' is the result of a process of interpretation and abstraction, applied to all the relationships that Donzellini presented to the judges as characterized by both the performance of medical practice and the discussion and sharing of non-conformist religious views. I have used the same model to categorize the ties of Panarelli and Bellebuono. The possibility to treat the content of the edges in a standardized way allows me to compare the relevance of

one type of tie against all the others and to examine the importance of medical activity in the perpetuation of heretical thought and practices. Although this sort of representation is necessarily approximate, it reveals that the religious dissent of physicians resulted from, or at least strongly intermingled with, crucial aspects of their profession: their humanistic background, their professional contacts, their education, their social status, their attitude towards books as learned physicians, and so on[1].

Because Donzellini's case is documented over a long period of time, I am able to examine the evolution of his dynamic network. The data show that Donzellini's travels to Germanic lands (1554-1559) marked a turning point in his experience as a heterodox doctor. From the beginning of the 1560s, his Venetian heretical network was less dense than it had been in the previous decades.

Fig. 3: Donzellini's Venetian heretical network in the 1540s-early 1550s: 53 nodes.

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[1] I have intentionally adopted such an approach, aggregating multiple categories in the same edge. A different possibility would be to use only one line/edge for each pair of nodes, replicating the same edge for all the different categories of relationship between two nodes (i.e.: the relationship between Donzellini and Ortensio Lando could be described as 'heresy' in one line, and 'medicine' in another line; instead of having a one-line edge categorized as 'heresy-medicine'). The approach I have chosen allows me to highlight the deep intermingling between heresy and other aspects of the case-studies' experience.
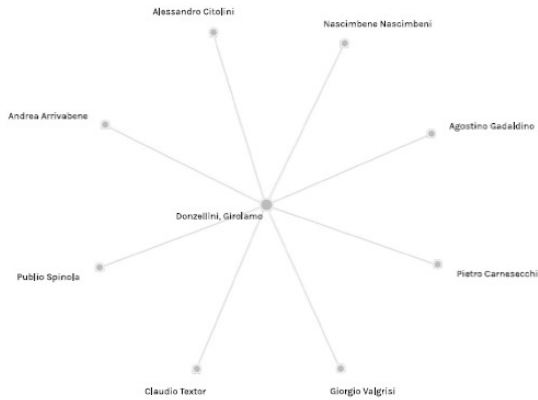
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Fig. 4: Donzellini's heretical network 1560-1587.

However, in the same period, the network related to his activity as a book smuggler increased.

Fig. 5: Donzellini's books network through 1553.

Fig. 6: Donzellini's books network after 1553.

This suggests that while Inquisitorial repression was growing stronger, and Donzellini was growing older, he progressively diverted his activity as a dissident, from an open rejection of the Roman Church and from the adherence to Lutheranism, to a commitment in favor of the free circulation of knowledge. Simultaneously, he took up a latitudinarian conception of Christianity, which was opposed to both Catholic and Protestant intransigence, as it is demonstrated by an examination of his philosophical production[1]. Like many other Italian exiles, he was disappointed by the intolerance of the new Protestant churches (epitomized by the execution of Miguel Servet in October 1553, a few months before Donzellini left Italy). Already when in Germanic lands, Donzellini rearranged his network according to this disillusionment, consolidating ties with people who shared the same rejection of theological conflict (like the printer Pietro Perna, with whom he started to collaborate in the 1540s, and the humanist Theodor Zwinger, with whom he networked in Basel in 1559)[2]. Donzellini

[1] See in particular Girolamo Donzellini, *Themistii Euphradae philosophi peripatetici orationes octo elegantissimae ac eruditione varia refertissimae* (Basel: Perna, 1559) and Idem, *Remedium ferendarum iniuriarum sive de compescenda ira* (Venice: Ziletti, 1586).
[2] See Antonio Rotondò, "Pietro Perna e la vita culturale e religiosa di Basilea fra il 1570 e il 1580", in *Studi e ricerche di storia ereticale italiana del Cinquecento* (Turin: Giappichelli, 1974), 273-392.

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abandoned any confessional rigidity (which also explains why he decided to go back to Italy) and he more and more identified himself as a member of what he defined as the *Respublica medicorum*: a network of humanist physicians which involved both catholic and protestant learned men, and that operated in the service of the diffusion of knowledge across the religious divide, fostering a religious debate grounded in rationality and mutual understanding[1]. Considering Donzellini's case, one can argue that being part of a network of religious-non-conformists implied more strongly an opposition against theological fights than against Catholicism itself. This does not mean that he stopped being a dissident, because his ideas were definitely marginal in this century of religious wars—and he was sentenced to death precisely because of his possession of prohibited books and his involvement in the circulation of books across the confessional divide—but it means that after 1553 he shaped his religious dissent in a more nuanced and complex way.

3.2. Heretical physicians' ego-networks in the Republic of Venice (interconnected)

Even though for the other two case-studies we do not have the same quantity of sources, I have been able to reconstruct their networks (although they have resulted in more static visualizations). The second case-study is that of Teofilo Panarelli, a physician originally from Puglia, who was the leader of a Calvinist clique in Venice in the second half of the 16th century and, like Donzellini, was executed by the Inquisition (1571)[2]. The third ego-network I have reconstructed is that of Decio Bellebuono, who was born, like Panarelli, in southern Italy and moved to Venice in order to escape a murder charge in Naples[3].

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[1] I draw this expression from Donzellini's correspondence with Theodor Zwinger, see Universitätsbibliothek, Abteilung Frey-Gryn, GII 37.

[2] ASV, Sant'Uffizio, *Processi, Contro Teofilo Panarelli e Lodovico Abioso,* Bu. 32. About Panarelli's religious experience and his network see Celati, "Heretical Physicians", 18-23 (the visualisation of the network below has already been published in this article).

[3] About Bellebuono see: William Eamon, The Professor of Secrets: Mystery, Medicine, and Alchemy in Renaissance Italy (Washington: National Geographic Society, 2010), 188, 292; ASV, Sant'Uffizio, Processi, Ad defensam Antonii Volpe de Ferrandina, Bu. 23; Ivi, Contra Decio Bellimboni medico.
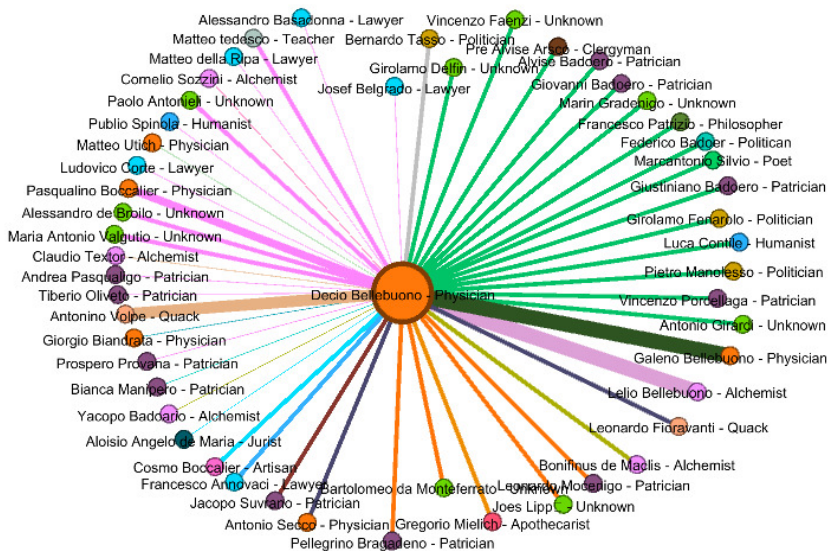
Fig. 7: Decio Bellebuono's ego-network (1555-1567).

Nodes: see label.   *Edges*: "type of tie".
Green = Venetian Academy   *Grey* = Venetian Academy-Heresy (Bernardo Tasso)
Dark green (Galeno Bellebuono) = Family-Alchemy-Medicine
Purple (Lelio Bellebuono) = Family-Alchemy
Pink = Heresy   *Blue-Green* (Giorgio Biandrata) = Heresy-Medicine-Intermediary
Light orange (Antonino Volpe) = Heresy-Alchemy   *Yellow-green* = Alchemy
Light blue = Accuser   *Blue* = Heresy-Accuser
Dark blue = Medicine-Defender   *Brown* = Collaborator-Defender   *Orange* = Patient-Defender

In both Panarelli and Bellebuono's networks, patricians were highly represented. In the case of Bellebuono, they even accounted for one third of the total nodes, while in that of Panarelli patricians followed the most represented professional category which was the medical one (the high presence of physicians and pharmacists confirms the *porosity* between medicine and the heretical movement and discourse). I shall come back on the proper social class aspects of the analysis soon, but for now I want to highlight that Bellebuono got in

touch with aristocrats thanks to his profession (they were his patients), and because of his membership in the Venetian academy between 1556 and 1561 – an institution engaged, among other things, in the circulation of knowledge across the religious boundaries, which is similar to Donzellini's case. In the case of Bellebuono, it is also worthwhile to highlight that, although he participated in heretical meetings, sources say that he would never risk his reputation and freedom for the cause of the Reformation. The ostensible lightness of Bellebuono's involvement in the movement seems at first glance to be confirmed by the fact that the quantity of heretical ties in his network is inferior to that of other kinds of social ties. However, this lightness is contradicted by one specific edge. Bellebuono was in touch with the court physician and religious exile Giorgio Biandrata, who was active in Eastern Europe. In one later trial from the mid-1570s, Bellebuono was referenced as the person in charge of distributing the money and the other resources that Biandrata would send them from Poland among Venetian heretics[1].
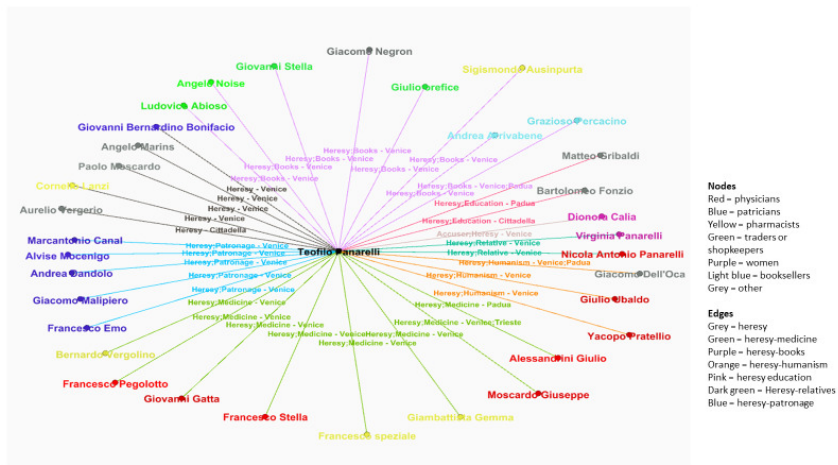

Fig. 8: Teofilo Panarelli's ego-network (1550s-1571).

[1] ASV, Sant'Uffizio, *Processi, Contro Niccolò Buccella*, Bu. 36, witness delivered by Jacobum Gatis on July 31, 1574.

After reconstructing the ego-networks, I have combined them. Even if there is no evidence that these three doctors, who operated in the Republic of Venice in the same period, knew each other, they had enough in common to be considered as part of the same network. In particular, the intersection between the three networks has suggested to me what I think can be a fruitful research line.
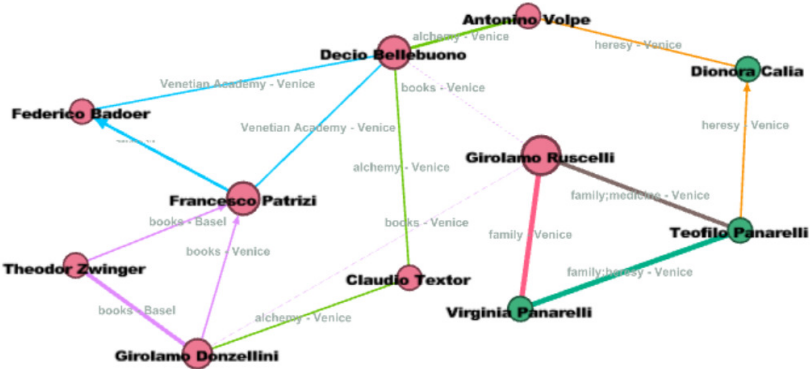

Fig. 9: Detail of the interconnected ego-networks.

Some of the contacts that these physicians had in common were scholars, writers, and alchemists, involved in a scientific and spiritual programme, which conceived of the universe as animated by the spirit of God and thought of man as the privileged creature able to unveil the hidden sympathies between microcosm and macrocosm, man and God, Creation and Creator. A programme which engaged in the disclosure of the secrets of nature through the pursuit of alchemical activities and other occult disciplines. A programme, finally, that in its pantheistic views, was inherently open-minded and tolerant, meaning to overcome religious dogmas and to fight back against religious violence, which is particularly relevant in a century of religious conflict.
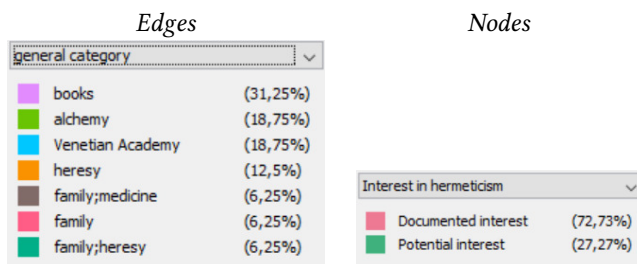
The figures that cover the highest degree of centrality in this network are not physicians, nor can they easily be categorized under the same label, since their professional and social profiles were strongly different[1]. The first one is Girolamo Ruscelli, who was Teofilo Panarelli's brother in law. Ruscelli was a source of inspiration for the preparation of self-made remedies in the event of plague for Donzellini, and he was probably Bellebuono's companion of alchemical activities and academic networks. Ruscelli was a man of letters (although he did not gain a university education), a polygraph, a publisher, and an alchemist.

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[1]   In this visualization, I have applied network analysis parameters such as weight and direction of the edges (I have not done so in the previous visualizations because I have prioritized readability—thick lines and arrows can hinder from clearly reading names and attributes of the nodes). In this case, the following are directed: the edge between Panarelli and Dionora Calia (he was her employer and accuser); that between Donzellini and Ruscelli (the former read, and quoted in his own work, books of the latter); the one between Patrizi and Badoer (they were both part of the Venetian Academy and the former dedicated to the latter a book—never printed—called *Badoero*, as a sign of gratitude for Badoer's cultural commitment); those between Zwinger and Patrizi and Donzellini and Patrizi (Zwinger and Donzellini both supported Patrizi's editorial projects); and that between Ruscelli and Bellebuono (Ruscelli quoted Bellebuono in his *Lettura di Girolamo Ruscelli, sopra un sonetto dell'illustriss. signor marchese Della Terza alla signora marchesa Del Vasto* in order to boost the breadth of his cultural connections). All the others are undirected, which means that the tie was mutually operating for both the nodes involved. As for the intensity, the weight of ties varies from the pick of a familial brother-and-sister kinship combined with common heretical leanings, as it is the case of Teofilo and Virginia Panarelli (in this case I assigned the maximum weight, 6), to a minimum of 1.5 in the cases in which the connections only operate through book dedications or quotations (Girolamo Donzellini/Girolamo Ruscelli and Girolamo Ruscelli/Decio Bellebuono—it is actually likely that Ruscelli took part in the Venetian Academy and cultivated a 'heavier' tie with Bellebuono, but there is no evidence of this yet). One last clarification is necessary with respect to the category 'Books': the latter is adopted in an all-embracing way to identify ties produced by books' exchange, reading or editing.

Conceiving of the universe as the result of the complex aggregation and rejection among different natural elements, he became inclined to inquire into the most hidden parts of nature, and, between the 1550s and the 1560s, he gained a reputation as a writer of "books of secrets"[1]. We do not know how Ruscelli met his wife, Virgina Panarelli; nor do we know whether he met his wife's brother Teofilo independently or through Virginia[2]. The familial kinship between Teofilo Panarelli and Ruscelli is nonetheless interesting in itself. It suggests that a doctor in medicine and philosophy could have much in common with a man who belonged to a lower social (and intellectual) class. Ruscelli and Panarelli lived together in Venice until Ruscelli died in 1567. In the same year, Panarelli published his *Secreti nuovi*, a book on "new secret remedies" prepared through distillation and other hands-on practices. It is arguable that, living under the same roof as Ruscelli, Panarelli had the chance to learn innovative techniques of the manipulation of nature from his brother-in-law. In the same context, he was familiarized with a specific form of knowledge, which swung between the fascination for the most hidden parts of nature and a practical craft that was to converge into the river of the Scientific Revolution—as the studies of Pamela Smith and Edgar Zilsel have shown[3].

Ruscelli was connected to the Venetian Academy as well, although his membership is not yet documented[4]. We know that the librarian of the academy,

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[1] William Eamon, *Science and the Secrets of Nature. Books of Secrets in Medieval and Early Modern Culture* (Princeton: Princeton University Press, 1994), in particular: 134-167, Idem and Françoise Peheau, "The Accademia Segreta of Girolamo Ruscelli: A Sixteenth-Century Italian Scientific Society", *Isis* 75 (1984): 327-342; Stefano Gulizia, "Ruscelli's Book of Secrets in Context: A 16th-Century Venetian 'Museum in Motion'", *Society and Politics* 8, no. 2 (2014): 8-22; Paolo Procaccioli, entry "Ruscelli, Girolamo", in *Dizionario Biografico degli Italiani* 89 (Rome: Istituto dell'Enciclopedia Italiana, 2017), available online at `http://www.treccani.it/enciclopedia/girolamo-ruscelli_(Dizionario-Biografico)/`, visited on Nov. 29, 2018.

[2] About Virginia Panarelli, see Federica Ambrosini, *Una gentildonna davanti al Sant'Uffizio. Il processo per eresia a Isabella della Frattina 1568-1570* (Geneve: Droz, 2014), 53-55.

[3] Edgar Zilsel, "The Sociological Roots of Science", *Social Studies of Science* 30, no. 6 (2000): 935-949; Pamela Smith, *The Body of the Artisan: Art and Experience in the Scientific Revolution* (London–Chicago: The University of Chicago Press, 2004).

[4] Ruscelli was affiliated with several academies over the course of the century: in particular he founded the *Accademia della Fama* in Rome in 1541 (of which he remained a member until 1543—in the same period Donzellini was in Rome as well, and the two may have had connection or potential for connection), and a secret Academy in Naples in the 1550s. Paolo Procaccioli, "Accademia come

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Francesco Patrizi, edited Girolamo Ruscelli's *Le imprese illustri con espositioni, et discorsi del s.or Ieronimo Ruscelli* in 1567. In addition, Ruscelli and the Academics shared the same commitment towards the vulgarization of Latin texts about alchemy, secrets of nature, natural philosophy, and Neoplatonism. The Venetian Academy was founded in 1556 by the Venetian nobleman Federico Badoer, as part of the political ambition to represent the official state culture of the Venetian Republic[1]. Its cultural activity was a form of encyclopedism, which aimed at covering a range of knowledge that was as wide as possible. In this programme, an important part was played by the effort of translating into vernacular a large number of philosophical, mathematical and rhetorical works, published in the classical age or in more recent times. Even more important, with respect to our subject, was the Academics' commitment (through translations, editions, and new publications) in favour of the hermetic and Neoplatonic traditions and the stress put on the concept of *antiquissima sapientia*, in continuity with Marsilio Ficino's work. Included in the list of books that the Venetian Academy compiled in order to make its own editorial programme known to the public, the *Somma*, were *De harmonia mundi totius* by Francesco Giorgio Veneto (who had the reputation of a heretic), along with Platonic texts, and an edition of the work of Themistius, the orator who defended religious tolerance in the late Roman empire[2]. It is highly relevant that Donzellini edited Themistius's orations in 1559, and published the text at the Perna's printing house in Basel. The restored version of Themistius' text was prefaced by a short treatise called *De successione doctrinae ab origine mundi* (On the Continuity of The Doctrine from The Origin of The World), in which Donzellini expressed his adherence to the concept of *antiqua sapientia* or *prisca theologia*. This entailed the idea that there was only one true religion *and* philosophy, whose main goal

palestra e come tribuna: Girolamo Ruscelli sdegnato, ardente, dubbioso, fratteggiano", in The Italian Academies 1525–1700: Networks of Culture, Innovation and Dissent, eds. Jane E. Everson, Dennis V. Reidy, and Lisa Sampson (New York: Routledge, 2016).

[1] On the Ventian Academy see: Paul Lawrence Rose, "The Accademia Veneziana. Science and Culture in Renaissance Venise", *Studi Veneziani* 11 (1969): 191-242; Lina Bolzoni, "'Rendere visibile il sapere': L'Accademia Veneziana tra modernità e utopia", in *Italian Academies of the Sixteenth Century*, eds. David Chambers and Francois Quivigier (London: The Warburg Institute University of London, 1995), 61-75; Testa, *Italian Academies*, in particular 96-122.

[2] Bolzoni, "'Rendere visibile il sapere'", 68.

was to worship the only one God, common to all human kind in all places and all times[1].

The Venetian Academy was shut down in 1561 because of the economic bankruptcy provoked by its main promoter Federico Badoer. However, it is arguable that some other reasons contributed to bringing an end to this cultural experiment. The activity of the Academy was considered suspect from a religious point of view, as Lina Bolzoni has highlighted[2]. In the late 1540s and early 1550s censorship and repression increased in Venice. It is no coincidence that the Academy was founded precisely in this oppressive context, in order to increment the circulation of knowledge.

The utopian syncretism and cosmopolitism of the Academy, however, had no territory in confessional Europe. And when the Academics tried to strike a deal with Italian Protestant refugees (like Pier Paolo Vergerio), in order to spread their editorial programme, they failed on the assumption that these projects embodied a "pagan humanism", which was banned in Reformed lands as much as in Catholic Italy[3]. Regardless of such an increasingly suffocating climate, this cultural programme was repeatedly brought to life (and fought against by political and religious institutions) over the course of the century, by former members of the Academy who found new networking paths. The manuscript by Francesco Patrizi *Philosophiae thesaurus* was edited by Girolamo Donzellini, and the latter also tried to find channels to publish the text, although with no success. Moreover, Patrizi's *Discussiones peripateticae* circulated among Donzellini's friends and colleagues (such as Theodor Zwinger, Ulisse Aldrovandi, Crato von Craffheim and Girolamo Mercuriale) and were published by his first collaborator Pietro Perna in 1581[4].

From this intersection of cultural and professional connections among scholars, doctors and printers, we can draw the existence of a community which

[1] Donzellini, *Themistii Euphradae.*

[2] Bolzoni, "'Rendere visibile il sapere'", 73-75.

[3] Ibid., 74.

[4] Alessandra Quaranta, "Umanesimo medico e culture confessionali nell'Europa del Cinquecento. Carteggi inediti di Girolamo Donzellini, 'physicus et philosophus'", *Giornale di storia* 15 (2014), https://www.giornaledistoria.net, 1-32; Margherita Palumbo, "Books on the Run: The Case of Francesco Patrizi", in *Fruits of Migration. Heterodox Italian Migrants and Central European Culture*, eds. Cornel Zwierlein and Vincenzo Lavenia (Leiden–Boston: Brill, 2018), 45-71.

shared the same inclination towards philosophy (hermeticism and Neoplatonism), religion (a tolerant and ecumenic form of Christianity) and science (which needed to be revitalized by alchemy and other occult disciplines). Further research will help to clarify this hypothesis.

The application of this methodology has played a heuristic role in my research also from a 'spatial' point of view. As Fig. 10 shows, this medical-heretical network gravitated around Padua and Basel, besides Venice, confirming the existence of specific extra spatial hubs within a 'Venetian' network: a crucial element to plan, and narrow, the additional archive research.
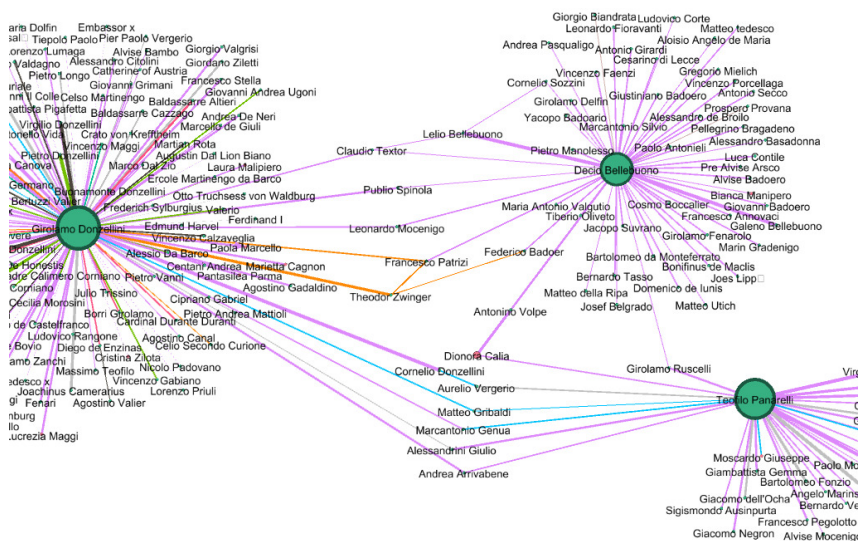

Fig. 10: Donzellini, Panarelli and Bellebuono's networks.

Nodes legend—Gender   Edges legend—Place
Green = male   Purple = Venice
Pink = female   Light blue = Padua
                           Orange = Basel

Moreover, the visualization has been beneficial also from the point of view of what I would define as a social history of religious dissent. If Panarelli and Donzellini, more 'conventional' heretical physicians, shared heretical contacts relating to their heretical militancy, to their profession, to the distribution of books, or to their education (the bookseller Andrea Arrivabene, professor Marcantonio Genua, the nephew of Pier Paolo Vergerio, who was a former bishop and religious exile, Aurelio, and the radical jurist Matteo Gribaldi Mofa), the node that linked Bellebuono and Panarelli is more surprising. She was Dionora Calia, Panarelli's housekeeper, and a friend of Antonino Volpe, an alchemist (and former priest) who in turn was Bellebuono's first collaborator *and* rival. Women have always been considered marginal in the Italian heretical movement, unless they were powerful aristocrats. This case seemed to contradict this narration and I thought it deserved better attention. Therefore, I went back to the Venetian archive in search of Dionora's Inquisition trial[1].

The study of this trial has allowed me to expand Teofilo Panarelli's network. Dionora stated that Panarelli lived and collaborated with the alchemist Girolamo Ruscelli (whom we have encountered in the great utopia network) and with an engineer from Puglia, called Antonio Gelli (soon to be put on trial by the Inquisition in Monopoli because of his association with Panarelli). This is relevant because, considering that Gelli, Panarelli, Dionora Calia, Ruscelli, Bellebuono and Volpe were all from southern Italy (in particular from Puglia, except Bellebuono, who came from Naples), it shows that, within the wider Venetian heretical network of physicians, some local *sub-networks* existed and were connected to circles of heretics and knowledge practitioners in southern Italy. As much as in the case of the connections that linked Venetian heretical physicians with Basel and Padua, this element contributes in collocating the case-studies in a wider context, where the micro and macro level of the analysis are combined. Moreover, Dionora's trial is relevant because it sheds light on the kind of medicine, and more broadly speaking scientific activity, practiced by learned heretical physicians. Panarelli collaborated with alchemists and engineers, and in so doing he himself accomplished two engineering projects in the 1560s. One was a hydraulic system the aim of which was to "dig canals"; the other was a "vite perenne" (cochlea) he had designed, through which it was possible "to op-

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[1] ASV, Sant'Uffizio, *Processi, Contra Dionoram Caliam*, Bu. 21.

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erate mills and to lift very heavy weights"[1]. These projects provide proof of his interest in mechanical arts and his curiosity for new forms of producing and circulating knowledge.

Panarelli's lively intellectual attitude, versatility, and openness toward practical knowledge mirrored his religious experimentalism and non-conformism, which in turn could lead him to manifest his dissent through scandalous behaviors. In fact, Dionora also declared that Panarelli used to bring home prostitutes, scandalizing the neighborhood—and we know that he had two daughters from a woman with whom he lived without being married[2]. He did not follow Catholic precepts in the performance of his sexual and sentimental life and in his, like in many other cases, religious heresy and transgressive behaviors were two sides of the same coin[3].

The visualization of the ego-networks and the study of Dionora Calia's trial has also allowed me to have a better insight on the impact of class dynamics on a specific professional group of religious dissenters. Dionora was 60 years old and she was a literate, although working-class, woman. She was certainly a charismatic person, since she was known under the nickname of "*madama*", the epithet usually applied to noble women. Her trial shows that she had connections with radical heretics and charlatans and that she was able to actively operate for the benefit of her accomplices and the strengthening of her own network. When Volpe left the priesthood, she tried to convince one of her friends to marry him, so that all of them could escape to Germany. In this scenario, physicians like Panarelli and Bellebuono, whose ties ranged from important patricians to humble housekeepers, acted like a bridge between the somewhat *incompatible* worlds of aristocrats and working-class people, favouring the circulation of ideas in very different contexts and through different networks. Such an amphibious position could be fruitfully exploited by medical doctors in order to obtain personal benefits. One year before being put on trial, and when he was already highly involved in the Reformation movement, Panarelli accused of heresy Dionora Calia, who lived in his house (being his housekeeper)

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[1] See the last will of Teofilo Panarelli, published in Domenico Orano, *Liberi pensatori bruciati in Roma dal XVI al XVIII secolo* (Rome: Tipografia dell'unione cooperativa editrice, 1904), 47-48.
[2] Ivi, 46.
[3] On the connection between heresy and sexual promiscuity see Giovanni Romeo, *Amori proibiti. I concubini tra Chiesa e Inquisizione* (Rome–Bari: Laterza, 2008), in particular: 96.

and who shared Panarelli's religious views[1]. Probably he was concerned about preserving himself and his wealthy, and male, accomplices from a potential Inquisitorial inquiry, so he covered his beliefs by denouncing a lower-class ideological ally. As for Bellebuono: he collaborated with the empirical doctor, and former priest, Antonino Volpe, close friend of Dionora, but he did so instrumentally in order to provide himself with the alchemical knowledge and tools he wanted to gain. Indeed, Bellebuono stole from Volpe some money and some "secret remedies", and then denounced him to the Inquisition in order to get rid of him (his strategy was not successful though, because Volpe denounced him in turn). Social strategy impacted the way heretical physicians continuously shaped and reshaped their networks combining professional ambitions, religious/philosophical militancy and "survival instinct" in times of persecution.

3.3. A network of dissident physicians: from the Republic of Venice to Italy and beyond

Donzellini, Panarelli and Bellebuono were far from being the only physicians "experimenting" with medicine and theology in 16th-century Italy. The following visualizations represent the extensive diffusion of Italian heretical physicians in the Italian Peninsula and, after their religious diaspora, in the European continent.

The geographical distribution of Italian heretical physicians was widespread, which highlights the scale of the phenomenon and confirms the fruitfulness of the research questions. Their diffusion covered all of Italy, including Sardinia, where the radical Antonio Gallo grew up in the mid-1530s. It stretched to the rest of the European continent too, from France to Eastern Europe (Poland and Transylvania hosted the most radical religious exiles, including a good number of Italian physicians) and from British territories (where an important heretical physician like Fabio Nifo escaped) to Candia in Crete (the homeland of Manusso Maran, the heretical doctor condemned in Venice in 1567).

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[1] ASV, Sant'Uffizio, Processi, Contra Dionoram Caliam, Bu. 21. Deposition delivered by Teofilo Panarelli on July 31, 1566.

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Fig. 11: Places of activity chosen by heretical physicians in Italy and abroad.

As part of my current research I have attempted the reconstruction of a general network which takes into consideration the whole sample of heretical physicians (200 cases) on which I work. The following preliminary visualizations illustrate the level of interconnectivity among the members of the Italian Reformation movement, and the role of physicians (purple dots) as intermediaries and *hubs* in this phenomenon. In these pictures, the borders of the networks are somewhat 'arbitrary', and the edges shown in the visualisations do not cover the whole spectrum of connections that each character cultivated (visualising which is beyond the goal of my research): they represent the most meaningful relationships that heretical physicians initiated. The real historical network was much denser and more expanded; as I mentioned already, the network is not the picture. In fact, delineating the borders of a network and deciding what to include and what to leave out is one of the most problematic issues in social network analysis. In this case, in order to evaluate how physicians contributed to the spread, the promotion, and the endurance of the heretical movement over the 16th-century, I have chosen to populate the visualization with the 200 cases of heretical doctors I have in my database, with well-known (more or less radical) Italian heretics, with Reformers and humanists. In ad-

dition, I have integrated in the network some nodes that are instrumental in connecting the figures I wanted to inquire into (like Dionora Calia), and some 'unexpected' nodes whose presence in the network can add to our knowledge about the link between medicine, heresy and some of the most advanced fruits of late Renaissance philosophical thought.

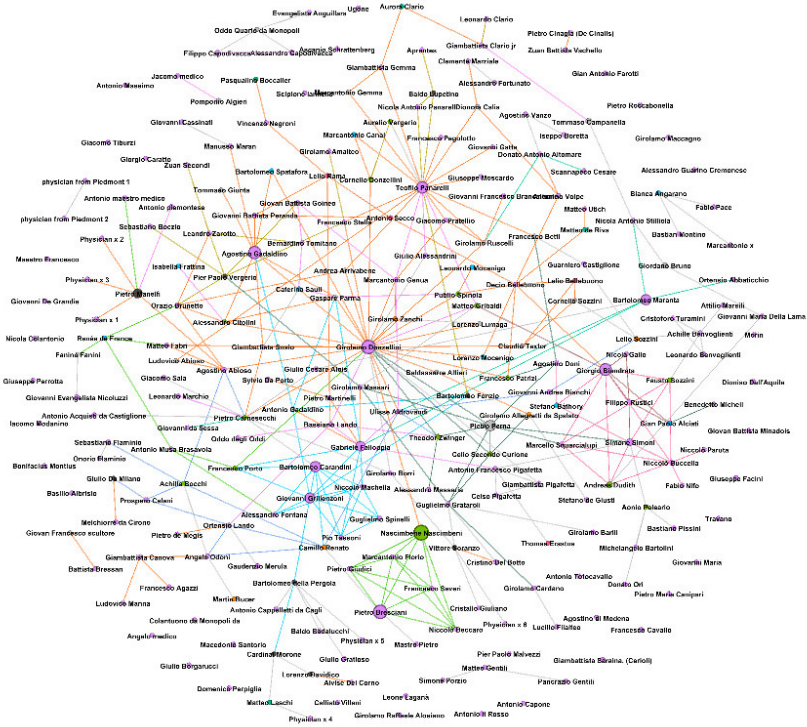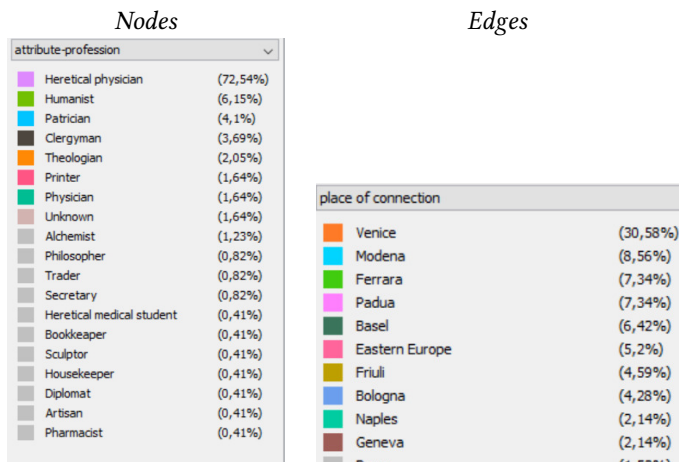Fig. 12: Overall network. The edges are set by place of activity.

In these visualizations, some of the nodes do not show any connections in the graph. This is due to the fact that, as a work in progress, I haven't yet been able to determine whether these heretical physicians (of which I have found traces in the archives) had any connection in common with some of the most linked

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people in the network. I have decided to include them in the network graphs nonetheless. In fact, they contribute by showing that, along with a core group of heretical physicians involved in the European intellectual and religious circles where medicine and theology were debated, there existed a less central group of reform-minded doctors ready to embrace and propagate innovative religious (and sometimes philosophical) ideas.

Nodes

attribute-profession	⌄
Heretical physician	(72,54%)
Humanist	(6,15%)
Patrician	(4,1%)
Clergyman	(3,69%)
Theologian	(2,05%)
Printer	(1,64%)
Physician	(1,64%)
Unknown	(1,64%)
Alchemist	(1,23%)
Philosopher	(0,82%)
Trader	(0,82%)
Secretary	(0,82%)
Heretical medical student	(0,41%)
Bookkeeper	(0,41%)
Sculptor	(0,41%)
Housekeeper	(0,41%)
Diplomat	(0,41%)
Artisan	(0,41%)
Pharmacist	(0,41%)

Edges

place of connection	
Venice	(30,58%)
Modena	(8,56%)
Ferrara	(7,34%)
Padua	(7,34%)
Basel	(6,42%)
Eastern Europe	(5,2%)
Friuli	(4,59%)
Bologna	(4,28%)
Naples	(2,14%)
Geneva	(2,14%)

The first visualisation (Fig. 12) shows the existence of specific regional networks, which nonetheless intermingled with one another, and whose core center was Venice. This indicates that this group of *medici philosophi*, as they would define themselves, indeed accounted for a European network of dissent.

Considering the category of the edges, in addition to the kinds of ties that we have already seen operating in the Donzellini, Bellebuono and Panarelli's networks, in this visualisation I have added the category of *heresy-support* referring to all those occasions in which heretical complicity would result into practical help (in terms of hiding or defending one another from the Inquisitors, but also of the provision of forms of intercession/recommendation that granted professional positions, and of job offers). This shows that the network would mobilise when one of the members was in need of help.
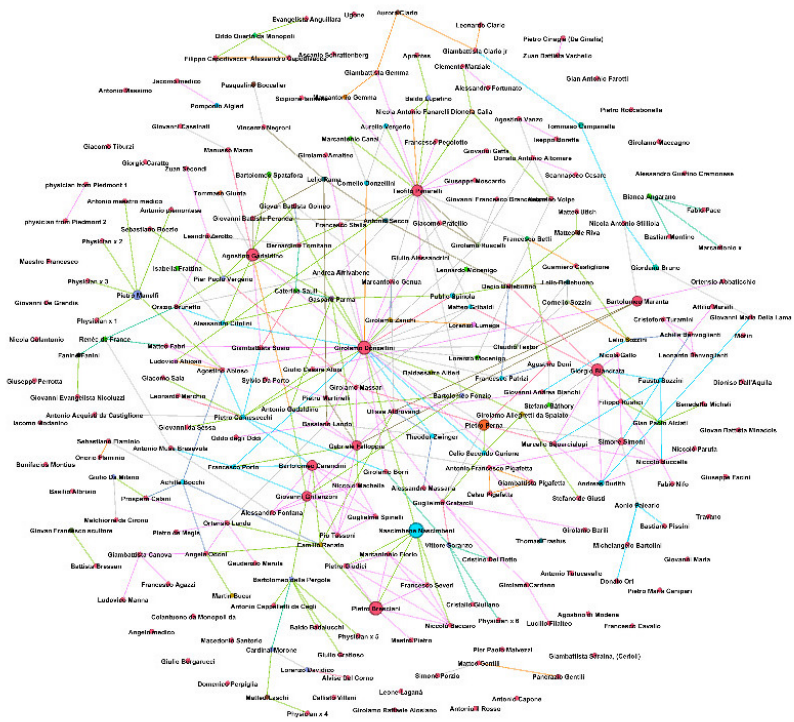
Fig. 13: Overall network. The edges are set by category of the relationships.

3.4. Prisons

For my personal use, I have added a column in my spreadsheets that better defines the nature of the edges, further clarifying the context and content of the relationships (if applicable). I will not use this column for the visualisation, because digital humanities tools require a certain degree of generalisation and this column goes in the opposite direction, but nonetheless I think it can be interesting to examine networking patterns among dissident physicians. The

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Nodes

general category

Color	Category	Percent
	Heresy;Medicine	(30,84%)
	Heresy	(24,3%)
	Heresy;Humanism	(7,17%)
	Heresy;Family	(5,3%)
	Heresy;Support	(4,05%)
	Heresy;Patronage	(4,05%)
	Humanism	(3,74%)
	Heresy;Books	(3,74%)
	Medicine	(3,74%)
	Heresy;Education	(2,49%)
	Books	(2,49%)
	Education	(2,18%)
	Patronage;Healing	(1,56%)
	Heresy;Alchemy	(1,56%)
	Patronage	(0,93%)
	Reading	(0,62%)
	Alchemy	(0,62%)
	Heresy;Healing	(0,62%)

Edges

attribute-profession

Color	Profession	Percent
	Heretical physician	(72,54%)
	Humanist	(6,15%)
	Patrician	(4,1%)
	Clergyman	(3,69%)
	Theologian	(2,05%)
	Physician	(1,64%)
	Unknown	(1,64%)
	Alchemist	(1,23%)
	Book-seller	(0,82%)
	Philosopher	(0,82%)
	Printer	(0,82%)
	Trader	(0,82%)
	Secretary	(0,82%)
	null	(0,41%)
	Heretical medical student	(0,41%)
	Bookkeeper	(0,41%)
	Sculptor	(0,41%)
	Housekeeper	(0,41%)
	Diplomat	(0,41%)
	Pharmacist	(0,41%)

sub-categories I have adopted in this additional column ranged from university teaching-learning relationships; to the common effort for the publication and circulation of books; from the mutual reading of scientific and philosophical works, to the common militancy in Renaissance Academies. Of all these sub-categories, there is an unexpected one, which I defined as *prison*: indeed, as we know, many of these men of culture were brought to Inquisition prisons,

	Source	Source ID	Target	Target ID	General category	Sub-Category	Place of connection
293	Teofilo Panarelli	85010-00274	Marcantonio Canal	81360-00242	Heresy		Venice
294	Teofilo Panarelli	85010-00274	Marcantonio Genua	78240-00243	Heresy;Education		Padua
295	Teofilo Panarelli	85010-00274	Matteo Gribaldi	68250-00117	Education	Education	Padua
296	Teofilo Panarelli	85010-00274	Girolamo Ruscelli	80740-00226	Medicine	Remedies;Family	Venice
297	Teofilo Panarelli	85010-00274	Dionora Calia	40880-00196	Heresy	Heresy;Accuser	Venice
298	Teofilo Panarelli	85010-00274	Aurelio Vergerio	76000-00025	Heresy	Heresy;Co-studying	Cittadella
299	Teofilo Panarelli	85010-00274	Francesco Betti	71830-00055	Books	Reading	Venice
300	Theodor Zwinger	41540-00275	Marcello Squarcialupi	41540-00275	Heresy;Support	Heresy;Humanism;Sup	Basel
301	Ulisse Aldrovandi	88910-00154	Camillo Renato	20000-00035	Heresy	Heresy	Bologna
302	Vincenzo Negroni	24970-00280	Lelio Rama	95120-00339	Medicine	Support	Venice
303	Zuan Secondi	53410-00525	Leandro Zarotto	36550-00496	Heresy;Medicine		Friuli
304	Antonio Gadaldino	64830-00018	Giovanni Grillenzoni	38190-00481	Heresy	Academy;Books	Modena
305	Agostino Gadaldino	64830-00018	Gabriele Falloppia	61740-00383	Heresy;Medicine	Books	Venice
306	Ortensio Abbaticchio	15240-00509	Bartolomeo Maranta	64850-00449	Heresy;Medicine	Prison	Naples
307	Nicola Antonio Stilliola	43700-00503	Giordano Bruno	19460-00569	Heresy;Humanism	Reading;Prison	Rome
308	Nicola Antonio Stilliola	43700-00503	Tommaso Campanella	71920-00568	Heresy;Humanism;Frie	Reading;Prison	Rome
309	Nicola Antonio Stilliola	43700-00503	Bartolomeo Maranta	64850-00449	Heresy;Education		Naples
310	Andrea Dudith	07520-00570	Giovanni Maria Della Lama	98350-00482	Heresy;Humanism	Support	Eastern Europe
311	Andrea Dudith	07520-00570	Marcello Squarcialupi	87640-00111	Heresy;Humanism	Co-publishing	Eastern Europe

Fig. 14: Screenshot of the spreadsheet. Tthe sub-category column is visible.
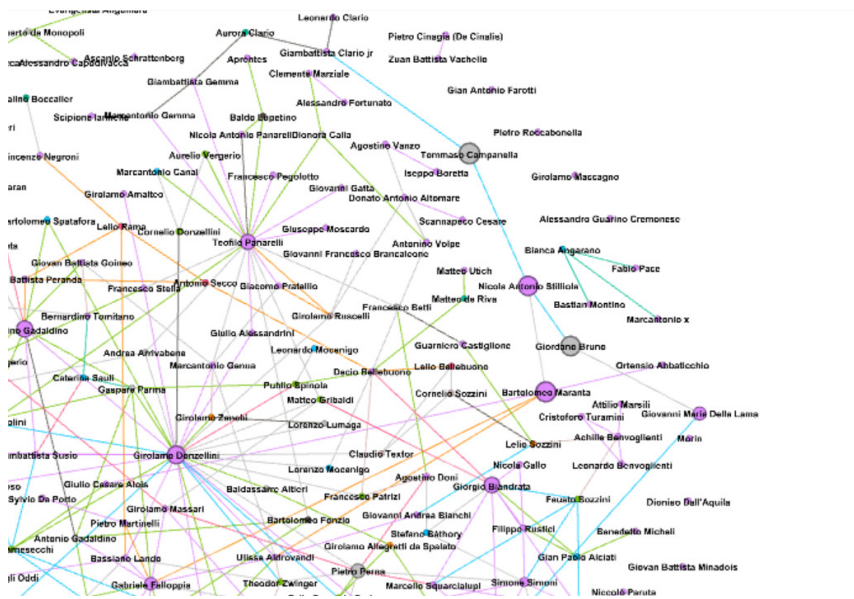
Fig. 15: detail of the overall network whose edges are set by category of the relationships (see legend above).

and there they met, shared ideas, spoke, fraternized and often initiated relationships which, in the future, would develop into further forms of collaboration. To the detriment of the Inquisitors' plans, in many cases the Inquisition jails did not stop the circulation of ideas and did not break the network. They increased it.

It is in Inquisition prisons that we meet, as part of the network, two well-known philosophers such as Giordano Bruno and Tommaso Campanella, who lived in the same dungeons in Rome, along with the physician, architect and astronomer Nicola Antonio Stigliola[1]. I think that the presence, in the network of these nodes, of two of the most important philosophers in the late Renaissance age,

[1]   Nicola Badaloni, "Il programma scientifico di un bruniano: Colantonio Stelliola", *Studi Storici* 26, no. 1 (1985): 161-175; Saverio Ricci, *Nicola Antonio Stigliola enciclopedista e linceo* (Rome: Accademia Nazionale dei Lincei, 1996).

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is absolutely meaningful[1]. It suggests that there was a connection between the second generation of heretical physicians (such as Stigliola) and the ripest results of 16th-century philosophy, a research perspective that I want to further examine as part of my investigation.

Stigliola had been one of the first readers of Giordano Bruno, and a personal friend of Campanella. Stigliola had also been a pupil of Bartolomeo Maranta, a physician from Naples, who, in turn, had been part of Valdesian heretical circles and, as a botanist involved in spagyric, alchemical and even magical activity, and as a philosopher interested in the revival of hermeticism and Platonism, can be considered a member of the European-spread *"Beyond frontiers of knowledge network"*[2]. As it is well-known, Bruno and Campanella shared the same utopian and pantheistic philosophical notions, they distanced themselves, like many others in this "heretical physicians'" network, from confessional disputes, and, despising the Protestants for the schism they had produced and for their religious intransigence, embraced a tolerant and inclusive form of "Christianity". Scholars have mostly denied that there were any connections between the Reformation, religious heresy and philosophical heresies (for which Campanella and Bruno were imprisoned). I think that, by mapping the circulation and development of ideas through the visualization of the connections among people, one could argue something different. It is undeniable that, in the 16th century, the epistemological boundaries of such subjects like theology, philosophy, science/medicine and occult disciplines (like astrology, magic, alchemy, and so on) were fluid and porous. And it seems to me quite evident that there were personal, intellectual, educational, and religious exchanges and affinities between Bruno and Campanella and the world of Italian heretical physicians: in particular, the second generation. In addition to the case of Stigliola, one should think of that of Giovanni Maria Della Lama, a physician and religious

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[1] The bibliography about Giordano Bruno and Tommaso Campanella is massive. For the purpose of this paper see at least Michele Ciliberto, "Giordano Bruno: dalla 'nova philosophia' alla 'reformatio mundi'", in *Le filosofie del Rinascimento*, ed. Cesare Vasoli (Milan: Mondadori, 2002); Saverio Ricci, *Giordano Bruno nell'Europa del Cinquecento* (Salerno: Salerno Editrice, 2000); Idem, *Davanti al Santo Uffizio. Filosofi sotto processo* (Viterbo: Edizioni Sette Città, 2009); Luca Addante, *Tommaso Campanella. Il filosofo immaginato, interpretato, falsato* (Rome–Bari: Laterza, 2018).
[2] Francesco Saverio Minervini, *Didattica del linguaggio poetico in un retore del Cinquecento: Bartolomeo Maranta* (Bari: Adriatica Divisione Arte, 2012).

exile involved in radical circles in Eastern Europe, who introduced Bruno in the Emperor's court in Vienna in 1588; or that of Gian Battista Clario who was arrested in Padua along with his friend Campanella, in 1592—it will not be coincidence that Clario had a strong interest in Platonic and Pythagorean philosophy and probably denied the Catholic idea of the immortality of the soul. Moreover, both Campanella and Bruno had been influenced by the philosophy of Telesio, who was in contact with Donzellini and Bellebuono's friend Francesco Patrizi—while the latter had used Telesian philosophy as a source of inspiration for his own philosophical elaboration. Moreover, in Giordano Bruno's religious heresy, which was multifaceted and peculiar, there recurred an element common to the radical experience of many Italian heretics, in particular physicians (from Miguel Servet onwards): the negation of the dogma of the holy trinity and the idea that the Son and Holy spirit are "manifestations" of the only one God, who is spiritual and pervades everything—something which Donzellini himself stated in his *Remedium ferendarum iniuriarum* (1586)[1]. In a different season of the 16th century compared to the early one in which Protestant ideas had been flowing into Italy, and when confessional boundaries were irretrievably established, some heretical physicians and two heretical former friars, like Burno and Campanella, shared the same original, utopian and anti-authoritarian response to the Counter-Reformation, of which they eventually became victims. The obscure and, in many respects, underground world of Italian heretical *medici philosophi*, and the experimental attitude in science and theology that they embraced, can hence be interpreted as a stream which flowed into, and nourished, the most innovative currents of late-Renaissance philosophy.

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[1] Donzellini, *Remedium ferendarum iniuriarum*, 49*r* et *passim*.

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4. Conclusions

Sociologists speak of *social movements* to refer to groups that focus on specific political, social, religious, or cultural issues, and aim to produce, resist, or undo certain historical change. Social movements are also characterized by urbanization, which crucially allows people to interact on a regular basis. They are also defined by the use of communication technology and infrastructures such as the printing press and the postal system, which make the circulation of knowledge possible through the exchange of books and letters.[1] With these features in mind, heretical physicians were more than just an intellectual movement; they were also a social one, a community that clustered into formal groups or in more formal types of aggregations (i.e. affiliation to Colleges, universities, or editorial projects). The understanding of heretical networks can therefore help to shed new light on the history of 16th-century Italian religious dissent, fostering a reflection upon the historical transformation that heretical physicians wanted to bring about or fight back against. I hope I have been able to show that this transformation was something more than the Protestant Reformation. Attempting to reconstruct heretical physicians' networks does not at all mean neglecting the importance and specificity of (religious or medical) ideas, thus reducing them to sociology. On the contrary, it is an attempt to reinvigorate the tradition of intellectual history, putting it in conversation with different disciplines and methodologies. The so-called *Italian Reformation* was more than a set of positions about the coeval theological debate: it was a proper movement in which specific social categories, like physicians, became particularly central, covered specific social and intellectual roles, and promoted precise cultural views—also favoring the circulation of ideas from one religious context to another, from one social class to another, from one profession to another. In pursuing personal and also collective goals, heretical physicians continuously reshaped their networks, consequently offering insight into the meaning of religious dissenters' experiences that resulted from complex social dynamics against a wide historical backdrop.

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[1] Testa, *Italian Academies*, 7. For a thorough examination of the concept of social movements see Donatella Della Porta, Mario Diani, ed., *Social Movements. An Introduction* (Malden: Blackwell Publishing, 2006, 2nd edition).

While the application of such a methodology to the history of 16th-century religious dissent can add beneficial aspects to the analysis, this approach is not exempt from limitations. One of the most valuable aspects of social network analysis is the possibility to observe the evolution of networking patterns over time, as we have observed in Donzellini's case. Such evolution highlights how social actors shaped and reshaped their connections and how they arranged their social strategy with respect to their ambitions. However, as I have shown when discussing the case of Panarelli and Bellebuono, the lack of sources which could provide diachronic information on the social biography of the nodes, prevents one from reconstructing networks dynamically. This problem can only be overcome by expanding the research to different archives and different typologies of sources. With a hint of luck, additional research will hopefully help to visualize a network as close as possible to the real picture.

Moreover, due to the very nature of the historical sources, the data visualizations can only provide blurry pictures of a multifaceted intellectual and social dynamic, while the rigidity of the tools, and of the very methodology (which compels one to make choices about how to define the nature of the edges and the profile of the nodes, and does not allow to add much detail), results in visualisations that cannot completely represent the intricacies of such a complex historical phenomenon. While this is certainly true, in my experience the adoption of this methodology has allowed me to shift from the abstract level of ideas, to the very concrete one of the people who embraced, promoted and re-elaborated them, in their daily historical dimension. This has entailed the possibility to bring to light a number of (micro)stories which deserve better attention, as they can deepen our knowledge on the interaction between medicine, heterodoxy, confessionalization, craft knowledge, class, and gender, in a situated context. From this perspective, what is important is the process, more than the product, which, in fact, should never be considered as final, but more appropriately as an explorative instrument.

Another potentially weak point of this methodology is related to the risk "to use a cyclotron to squash a nut" (as Franco Venturi ironically put it[1] when questioning the quantitative shift that had invested historiography in the 1960s). Why should we engage in digital history, when traditional scholarship has already

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[1] Franco Venturi, *Utopia e Riforma nell'Illuminismo* (Turin: Einaudi, 1970), 12.

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come to crucial results that innovative methodologies often just confirm? I believe that such an opposition between 'tradition' and 'digitization' is useless and dangerous, since I consider digital humanities a method which can complement the historical analysis without altering its epistemology and its results. Yet I do understand the doubts of those who wonder why we should engage in time-consuming activities like data setting and production of visualizations. After all, one could argue, historians interested in interconnections of whatever kind have always had the chance to draw their networks on some piece of paper, obtaining relevant results from the study of these sketches. One first reason why I think that the adoption of digital humanities tools can be somewhat useful, even in the case that it indeed just confirmed what we already knew, is because these tools 'democratize' knowledge, synthesizing in a graphic and accessible dress, decades of studies on some specific subject. Moreover, they allow to easily show scale and density of a certain phenomenon. In addition to these illustrative virtues, and more importantly, the process of building one's data, deeply reflecting upon how to classify ties and nodes, and the explorative circularity between sources and visualisations can have heuristic virtues, as I hope I have been able to show. Nonetheless, the choice to adopt such a methodology depends essentially on what one's research question is about, and this kind of approach should not be undertaken for the sake of it.

What I have presented in this article has no ambition to represent a manifesto, nor does it want to dismiss the outstanding scholarship that has preceded my work, and to which I owe my (limited) knowledge and my (strong) passion for these subjects. This paper has just tried to highlight what kind of methodologies and tools are available today and how they can be integrated within an interdisciplinary approach to intellectual history. In particular, I have provided a few case-studies from my personal ongoing research, in order to describe a methodology which can actually be fully exploited only when applied to large collective projects[1]. The next steps towards a social history of religious dissent

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[1] See for instance the *Mapping the Republic of Letters* project carried out at Stanford University, the *Cultures of knowledge* project based at the University of Oxford (`http://www.culturesofknowledge.org/`, `http://republicofletters.stanford.edu/`), or the *Six Degrees of Francis Bacon* platform, developed at the Carnegie Mellon University (`http://www.sixdegreesoffrancisbacon.com`), just to mention some of the most famous (webpages visited on Nov. 23, 2018).

could include mapping the entire heretical network in Venice, over time and through a spatial perspective, in order to evaluate how religious heresy could shape a sense of urban secret community and solidarity. While a more intellectual dimension could be tackled by considering the whole set of ties that heretical physicians cultivated, not only among each other and with people involved in the heretical movement, but also with important members of the Republic of Letters in Europe. This would allow to better understand and evaluate how the medical profession could help develop connections which in turn fostered the scientific and theological debates.

"Colored Jellyfish". Photo by Hari Nandakumar on Unsplash
(`https://unsplash.com/photos/wCZRoeS0Wio`).