2a1 and 2a2. Description of the proposed research
(Max. 2,000 words on no more than six pages)

2a1. Overall aim and key objectives, including:
  - scientific relevance and challenges;
  - originality and innovative character;
  - methods and techniques.

2a2. Research plan, including:
  - practical timetable/timeline over the grant period;
  - local, national and international collaboration;
  - work plan.

Innovating Knowledge: Isidore's *Etymologiae* in the Carolingian Period

Subject and Aim

The so-called Carolingian renaissance (second half of the 8th – end of the 9th century) was the first of the three major periods of the flourishing that Europe experienced before the dawning of the Modern Era. Its significance for European intellectual life can be gleaned from the fact that almost 8,000 manuscript books survive from the ninth century (Bischoff, 1998-2014), while only roughly 2,000 manuscripts survived for the entirety of the previous centuries (Lowe, 1934-1966). The intensity of this boom is also evidenced by the existence of at least seventy intellectual centers that are attested in the Carolingian territory (Contreni, 1995). All of the centers, chiefly monasteries and cathedral schools, which served as seats of learning in this period, participated to some extent in the accumulation, exchange and refinement of knowledge that greatly accelerated during the Carolingian renaissance (Ganz, 1995). Importantly, while the intellectual flourishing was enabled by the conquest, political centralization and religious reforms of the Carolingian dynasty, this rapid innovation was not a centralised process. Rather, monasteries and other religious communities formed a complex scholarly network, in which innovations arose in individual nodes and were then sustained by the participation of connected centers in the newly emergent intellectual practices and traditions (Contreni, 1995, 2014). The aim of this project is to study this dynamic aspect of innovation in the Carolingian renaissance: which factors stimulated the emergence of novel practices or traditions in this period, and what were the mechanisms and media for their dissemination in the Carolingian scholarly network?

To carry out an examination of this kind, I will use a probe: the *Etymologiae* of Isidore of Seville. This twenty-book encyclopedia, produced in seventh-century Spain, covered all aspects of early medieval learning and served as a staple referential work of the Carolingian period (Porzig, 1937). Every Carolingian monastery or cathedral school probably possessed a copy or two (Bischoff, 1961). Indeed, more than 70 complete manuscripts and over 200 fragments of this work survive from before the year 1000 (Cardelle de Hartmann, 2014), a number exceptionally high for any work other than the Bible. Because of the wide distribution of the encyclopedia, it is possible to scan a larger part of the Carolingian scholarly network rather than just individual nodes by examining Carolingian copies of this work.

The *Etymologiae* has another interesting trait: it was not a static but rather a highly dynamic text. As new intellectual practices and traditions were adopted, the *Etymologiae* was edited, reworked and upgraded by its users to reflect their changing concerns, perspectives, and ideas. It became a repository of innovation, resembling in this respect the modern Wikipedia.

As a result, the textual differences between the oldest Spanish manuscripts of the *Etymologiae* and the younger generation of Carolingian copies are sometimes so extensive that it is necessary to talk of 'the Carolingian *Etymologiae*', a set of text versions that reflect appropriation for the use in a Carolingian context and reflect Carolingian realities. The *Etymologiae*, in other words, ideally captures the dynamics of knowledge culture and because of the ubiquity and centrality of this work to the Carolingian thinkers, it is possible to map it across a large segment of the Carolingian scholarly network. It, thus, provides an unmatched eagle-eye perspective on this period of intellectual flourishing and, by extension, on the processes that were involved in other periods of intense innovation and intellectual growth.

The large-scale comparative analysis will answer three questions in particular: first, in which scholarly centers the innovation took place most intensely and where, on the contrary, development was slow; second, which topics attracted most attention, and which were, on the contrary, neglected; and third, how the cases of rewriting are correlated to changes in the intellectual, cultural, religious and political life in the period.

Innovative aspects of the project
This project will study a text and use philological methods, but its objectives are not philological. Rather, intellectual tools developed by both traditional textual criticism and New Philology will be adapted to a new task: the study of the dynamics of innovation and the mapping of scholarly networks. The innovative character of this project is best evidenced by its contrast to previous scholarship concerning the *Etymologiae*. Philological tools have been used to reconstruct the archetypal text of the *Etymologiae* produced in seventh-century Spain and its stemma (Lindsay, 1911; Beeson, 1913; Porzig, 1937; Bischoff, 1961; Reydellet, 1966). In this enterprise, additions, omissions, and other cases of rewriting of the encyclopedia were seen as contaminations. Manuscripts that were most heavily altered were excluded from consideration, because they did not represent the 'authentic Isidore'. By contrast, I shift my attention specifically to those manuscripts which offer variants and rewritings. The manuscripts which were, up to now, neglected, are precisely the manuscripts that will be central to this project. For the first time, their potential to analyze them as sources for the dynamics of European knowledge culture will be exploited.

In addition to the innovative use of the philological method, the scale of my comparison between Carolingian scholarly centers will be completely new and unprecedented. While studies of individual important Carolingian monastic and cathedral centers certainly exist (Contreni, 1971; Bischoff, 1989; Mostert, 1989; Ganz, 1990; Iogna-Prat et al., 1991; Grotans, 2006), this project aims to include many, both large and small, showing their mutual links and interdependency. For my research into the rewritings of Isidore, the traditional scale of 'importance' and 'insignificance' in terms of cultural value is invalid. This task is made possible by two recent developments in the field of manuscript studies. First, the ongoing digitization of historical collections in European libraries makes it possible for the first time to study large numbers of manuscripts, including many previously inaccessible. While until recently scholars had to limit their research to particular centers or collections (Porzig, 1937; Reydellet, 1966), I will now be able to study manuscripts from different parts of Europe, not only those available in particular libraries or countries, side by side. Second, this project will make a full use of the recently completed survey of ninth-century Western manuscripts by Bernhard Bischoff (Bischoff, 1998-2014), which offers the first consistent blueprint for assessing them against the background of Carolingian scholarly centers that produced them.

A third innovative aspect is the use of digital tools for the analysis and visualization of data collected by the project. Specifically, I plan to cooperate with specialists on network analysis from Huygens ING to develop a digital model for representing manuscript metadata and exploring links between Carolingian scholarly centers via textual genetics using GEPHI.

Employing an approach previously deployed on data from other historical periods (Weingart, 2011), I will design a digital platform to present the results of this project in visual form to both specialist and non-specialist audiences.

Methods and techniques
The basis for the network analysis outlined above will be a corpus of Carolingian manuscripts containing the *Etymologiae*. These will be first assigned to centers and regions on the basis of Bischoff's survey and other works (Lowe, 1934-1966; Beeson, 1913), and assessed in the context of scholarly centers in which they were produced and used. Once placed on the map, textual innovations present in these manuscripts will be analyzed with the help of two methodological frameworks: the traditional stemmatic method of tracing the lineage of particular innovations that allows one to establish vertical relationship between manuscripts, and the methods of textual genetics (*génétique textuelle*) pioneered by Goullet and Heinzelmann (2003, 2010) that will allow for tracing horizontal dependencies between manuscripts and assess them in the light of environmental influences.

I will focus specifically on seven types of textual innovations: a) the addition of chapters or significant changes to the original text; b) the omission of chapters or significant removal of material; c) the presence of paratextual features, specifically of annotations and alternative chapter headings; d) changes in layout and formatting; e) the highlighting of material, for example by the use of distinct script, colour, ornamentation or annotation symbols (Steinova, 2016); f) re-ordering or re-division of the chapters; and g) the separate transmission of material from the first two books or the first two books. I will assess the proximity between manuscripts from the corpus based on the presence of these seven features and identify patterns of rewriting that involve multiple manuscripts and tie them together as a group. By means of contextual codicological-palaeographical and historical examination, I will connect these patterns of rewriting to geographic regions, temporal frames, and knowledge communities to analyze how certain innovations spread and to map how they were handed from one community to another.

Research plan
The first half year of the project will be dedicated to establishing the manuscript corpus to be analyzed and testing the methodological and theoretical frameworks on the available data. This includes the development of a suitable digital model for the analysis and visualization of manuscript data. I also plan to undergo relevant training in data-analysis and visualization with digital tools in the first year. The bulk of the manuscript analysis will be carried out in the first two years of the project, while the development of a digital platform for the presentation and visualization of the results of the analysis will take place in the second and the third year of the project. An international workshop, in which the results of the project will be presented, is planned for the third year of the project. The last half-year of the project will be dedicated to launching an online platform for presenting the research results.

In the course of the project, I will write three journal articles to be submitted to top peer-reviewed journals in my field (*Speculum*, *Viator, Early Medieval Europe*). I will also present my research results and case studies at international conferences every year (International Medieval Congress, Medialatinitas, Colloque International de Paléographie Latine). The results of this project will be published as a research report at the end of the project and also presented at the project workshop organized in the last year of the project.

A special research output of this project will be an online platform presenting the results of the research in a visual format accessible to non-specialist users. This platform will also entail a downloadable dataset that can be reused for further research purposes.

First year
○ establishing a corpus, refinement of methodological and theoretical framework ○ training in computational data-analysis and visualization ○ development of data model ○ beginning of the data analysis ○ presentation of the project in the History of Science cluster and at an international conference ○ first journal article
Second year
○ continuation of the data analysis ○ field work in European libraries ○ development of the platform for analysis and visualization ○ presentation of two case studies at international conferences ○ presentation of preliminary results in the History of Science cluster ○ second journal article ○ blueprint for an international workshop
Third year
○ completion of the data analysis ○ completion of the platform for analysis and visualization ○ international workshop ○ research report summarizing the findings of the research project ○ third journal article ○ launching of the platform online

Institutional embedding of the project
This project will take place between September 2017 and August 2020 at Huygens ING (KNAW). It will be embedded in the research group history of knowledge cultures, with scholars whose specialisms range from the early Middle Ages to the early modern period. Moreover, a large department for the development of digital tools for humanities research is housed there, which has, as one of its focuses, the making of tools for manuscript scholars. I will collaborate closely with both scholars and ICT developers at Huygens ING for the setting up of the digital tools needed for this project. Moreover, this will allow me to benefit from the ties between Huygens ING and Utrecht University, which hosts one of the leading European research groups dealing with the early Middle Ages.

2b. Knowledge utilisation
(Max. 750 words on max. two pages)

Potential, including:
- contribution to society and/or other scientific areas;
- disciplines and organisations that might benefit from the results.

Implementation, including:
- action plan to allow the outcomes of the research project to benefit the potential knowledge users;
- if and how the potential knowledge users will be involved;
- (concrete) outcomes for society and other academic disciplines;
- the period over which knowledge utilisation is expected to occur.

Relevance and objectives
In the last decades, both public and specialist discourses have been concerned with the

question of intellectual and technological growth: what makes certain civilizations or societies experience multiple periods of flourishing and others not, and which factors contribute to the sustainability or, on the contrary, to only a short-lived or local success of certain developments? A search for the understanding of the nature of renaissances – those periods in human history where intellectual, technological and cultural innovations were greatly accelerated and brought about a quick succession of transformations – led us to focus on the role of networks in these intellectual booms. We acknowledge that the design of intellectual networks and the resilience of knowledge infrastructure are elements in intellectual renaissances, equally important as economic prosperity, political stability, or ideological setting. This is not true only for historical scenarios. Our understanding of the role of intellectual networks for the emergence, spreading and sustained existence of new knowledge, technologies and skill sets in the European past may help us to understand how to develop better knowledge infrastructures for the European future.

The Carolingian renaissance has two unique qualities that add to this inquiry. In the first place, it was the first of the series of truly European renaissances that propelled this continent on a path of twelve centuries of uninterrupted rise towards a major intellectual and technological power. To study it means to study the very inception of the knowledge infrastructure that proved to be a successful recipe in the long-term. Because of the distance in time, moreover, Carolingian intellectual networks inform us about *long durée* impacts of certain designs, choices or unintentional aspects, both positive and negative. Second, Carolingian renaissance unfolded in a less complex environment than our present-day society. This makes it easier to study the phenomenon of intellectual networks and trace the spreading of innovation for the Carolingian period than for modern settings. However, the general conclusions that can be reached will offer anchors to understand the dynamics of innovation in other historical frameworks, for which we either lack evidence because of loss, or for which we are, on the other hand, confronted with too many complicating factors.

Beneficiaries
The results of this project will not only benefit specialists in Carolingian cultural history, but also the wider circle of humanist scholars interested in knowledge cultures, their transmission and transformation in different historical periods. The results will also be disseminated to a wider public of those interested in medieval culture in general and medieval manuscripts in particular, a very large and active group, easily reached via social media, where countless pictures and news items are shared on a daily basis. Furthermore, it will benefit scholars who want to be involved in the development of digital tools for humanities research. New tools will be developed for the analysis of the network dynamics, and these will be shared as open source software.

Knowledge dissemination
I intend to use three channels to communicate the results of this project. First and foremost, the online platform developed as a part of the project will be used. In addition to building a Virtual Research Environment that will make my data available to specialists from my own discipline, I plan to experiment with modes of visualization and data presentation that would allow me to communicate my research results to all kinds of audiences. My intention is to enable an interactive engagement with my data, tailored for each audience.

Second, I will write several e-articles and/or blog posts devoted to case studies stemming from my research, as I also have done during my previous projects with much satisfaction and success. These will be published on various platforms accessible to the interested public.

Third, I plan to establish digital humanities hubs in two hackerspaces (Amsterdam, Bratislava), with which I have been already collaborating on various projects. I will use the

know-how provided by hacker communities to improve my Virtual Research Environment. In return, I plan to use hackerspaces for education about medieval knowledge culture, organizing events in the hackerspaces that will be aimed at a specialist public with a background in digital technology and modern information infrastructures (e.g. talks, THAT camp).

activity	time schedule	beneficiary
project online platform	second and third year	specialists from other fields and general public
popularizing articles and blog posts	first and second year	general public
social media activity	all three years	general public
public lectures organized via hacker community	first and second year	general public, specialists from technological domains

2c. Number of words used

Section 2a: 1984 words (max. 2,000 words)

Section 2b: 747 words (max. 750 words)

2d. Literature references

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