

# Huygens ING

## Institute programme for 2018-2023

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## 1. The Institute's mission

The Huygens Institute for the History of the Netherlands performs analytical research into Dutch literature, history and the history of knowledge, using innovative digital methods. Through the fundamental, advanced and interdisciplinary investigation of source material, Huygens ING provides new insights in the (long-term) development of the Netherlands, without losing sight of Europe and the rest of the world.

We use advanced digital infrastructure that we largely design, build and manage ourselves with partners in the Netherlands and abroad. An important part of our scholarly production takes the form of high quality editions, data sets and access to historical sources. We publish these in our digital infrastructure, and we are at the forefront of digital innovation in this field.

With our research results (studies, editions and analytic tools) we contribute to the ongoing debate in science, education and society. It means that Huygens ING not only enables the work of fellow researchers from the humanities and the social sciences, but also serves the heritage sector, the education sector, the business world, media, and anyone who needs relevant and reliable knowledge about the history and culture of the Netherlands.

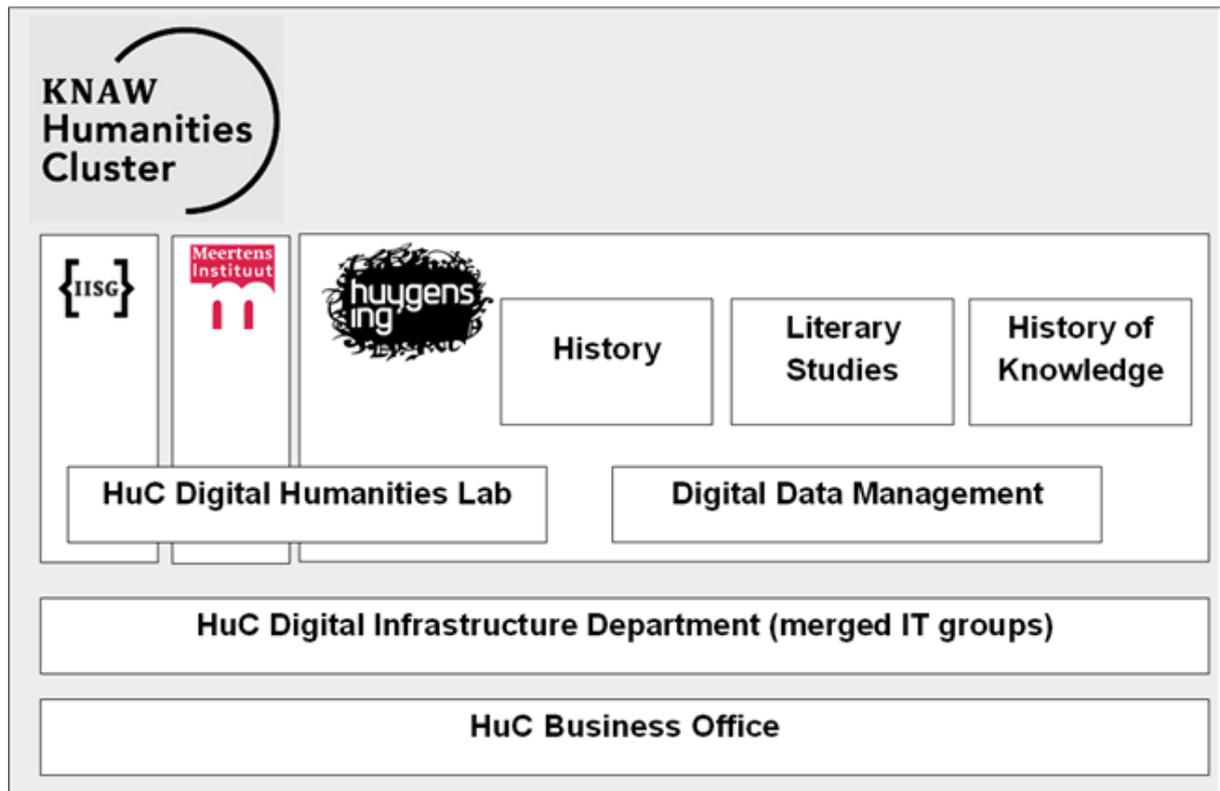
## 2. Targets for 2018-2023

The Huygens Institute for the History of the Netherlands (Huygens ING) aspires to be a central point for establishing the digital infrastructure for humanities in the Netherlands. In 2018 -2023 Huygens will do so by:

- making scientific text editions available and providing access to sources and other high-quality scientific content;
  - The volume is set to increase from 354 million to 407 million words (from 0,6 to 1,2 billion words, if we include as well associated data sets, for example in the context of CLARIAH),
  - from 50 to 60 data sets,
  - from 22 million to 110 million triples,
  - and from 0.5 terabytes to 2 terabytes of images.
  - 15 editions and 4 data sets will be completed, including a few very substantial ones (Hermans, Erasmus).
- developing the digital infrastructure;
  - In 2018, the images of the resources of Huygens ING are migrating to an IIIF repository.
  - Pergamon Text will be delivered in 2018, Antioch in 2020, a series of research portals in 2022. Alexandria will become the standard text repository between 2020 and 2023.
- offering this content via websites and portals in ways tailored to research requirements;
- prolonging and reinforcing our prominent role in Digital Humanities;
- expanding the valorisation of the institute, primarily in relation to the culture and history of the Netherlands;
- publishing in relevant (open access) media;
- publications and external funding to grow in line with the targets we laid down for ourselves.

### 3. Organisation of the Institute

Huygens ING is one of the research institutes of the KNAW (Royal Netherlands Academy of Arts and Sciences). Together with the International Institute of Social History (IISG/IISH) and the Meertens Institute, Huygens ING has been part of the KNAW Humanities Cluster (HuC) since 2016. The support (accounts, staff management, facilities management) of the three institutes is shared in the HuC's business office.



Huygens ING has three research departments: history, literature and history of knowledge. The research is supported by the Digital Data Management department of Huygens ING and the IT department. In the course of 2018, the three IT departments of the HuC will be merged into Digital Infrastructure (DI) department. Since this programme of the institute is about the work of Huygens ING, we will continue to refer to the IT department, and only as the HuC department's DI in relation to the collaboration in HuC.

Digital Humanities research is carried out in each of the three research departments, as well as in the IT department. In addition, Huygens ING shares a recently established Digital Humanities group with the HuC partners. The researchers in the three research departments set up experiments together with the Digital Humanities Lab, using digital humanities research methods, such as *distant reading*, *network analysis* and *topic modelling*, in collaboration with the expertise in Digital Data Management of Huygens ING and DI HuC. The three departments and the DH Lab have lines of research that are described below in 5a, 5b, 5c and 5d.

### *Key areas*

The institute has five key areas that transcend the interdepartmental boundaries, although the respective focal point sometimes lies in one department. They are 1) *Governance of the Netherlands*, based on the strong tradition the Institute has in terms of administrative sources with often rich data and long data series, eminently suitable for research into essential developments in Dutch society and also suitable for new digital analyses, thanks to their serial nature. The key area 2) *Debate culture* focuses on development processes and the acceptance of knowledge, the formation of a canon, concepts and ideas in society and the mechanisms of control and authority. Debating culture is being investigated from the early Middle Ages until now, for example in science and literature, by means of correspondence, for instance, and the modern-day internet. A strong transdepartmental key area is 3) *Innovative Editing*. It will be described in greater detail in paragraph 5e. Key area 4) is *Impact of Circulation*, which links in with existing lines of research conducted by the HuC partners, studying the effect of migration and various types of networks. Key area 5) *Infrastructure for digital Humanities*, supports our research and that of others. This area is addressed in Chapter 6b.

In 2015/6, Huygens ING divided the research of the institute into key areas and identified core projects for each of those keys areas. The division was the result of an internal substantive discussion, with the objective of applying more structure to the research, of boosting collaboration across the departmental boundaries and to provide a point of reference for prioritising the allocation of scarce resources. In the course of the programme, this approach and the choice of key areas and core projects will be evaluated and adjusted if necessary.

## 4. Developments and strategy

### *Developments thanks to the digitisation of humanities*

Huygens ING is in the middle of developing from an institute that concentrated on the analogue research of texts and sources and producing scholarly editions to an institute that is primarily doing so in a digital manner, more than before in parallel with analytical research.

### *Substantive developments*

In the analogue situation, a fairly general consensus existed among researchers (at least, per scientific discipline) about the work of the scholarly editor and the optimal format of a scholarly edition. This consensus is now being questioned in the digital world. The first generation of digital products were often digital in name only. The editions were still produced in the traditional way and made available online, often in addition to the publication of a book. It seemed the obvious thing to do, also for Huygens ING, and this is still the case today. Scholarly editions are often long-term projects, and it can be confusing for users if interim changes are made to the manner in which the work is made available. Anything already available in book format, is nowadays naturally also made available online.

The tried and trusted scholarly edition remains the best option for some new projects, be it with a digital end result. In other respects, Huygens ING is busy experimenting in all sorts of ways with digital innovations for researching sources and texts, and for making them available for scientific research. These experiments range from the foundations for our research to making practical improvements and are carried out in large as well as smaller projects. It means that we can be flexible in many different ways: we can explore all aspects of innovations arising from the digital revolution, and we can engage with new developments, both technical (new technology, new tools) and substantive (the choice of works for publication may depend on concrete preferences following developments in science and society).

### *Influence of speed and dynamics of the digital world*

Aside from this major substantive impact of digitisation on the opening up of sources, digitisation has a second impact on our work. On numerous levels and in a multitude of forms, digital information is also becoming available through several other channels, a process set to increase still in volume and intensity in the next few years. The challenge for Huygens ING consists of making sources and texts available in this dynamic digital environment while preserving the quality required for scientific research. Those rapid developments demand close collaboration between analytical researchers and the scholarly editors who edit the texts and create access to the sources. The scholars working at Huygens ING tend to combine those two specialisms.

Heritage institutions are faced with a similar challenge. They too need to develop new ways to make their digitised heritage available in an adequate manner. With its expertise in research, in making research data and sources available, Huygens ING forms an attractive partner for heritage institutions. A strategic collaboration has been formed with a number of prominent heritage institutions (RKD, KB, Nationaal Archief, Literatuurmuseum). This collaboration will be expanded and intensified in the next period.

### *Interoperability: network of sources*

With the increase in digitisation, it is also becoming increasingly necessary to make all texts and tools, relevant to science, compatible with each other. The same applies to digital information sources other than texts, such as structured data (databases with research data, but also metadata), images, audio and video. The scholarly editions and other sources and texts opened up for access thus become part of one huge digital infrastructure for humanities-based research and they can be analysed in any combination. Huygens ING is actively working to achieve this by making its own sources available online in open access and by playing a leading role in the construction of digital infrastructure CLARIAH (Common Lab Research Infrastructure for the Arts and Humanities).

### *IT department and Digital Data Management department*

Also at international level, Huygens ING is a pioneer in the shift to the digital humanities. Thanks to its early insight, the institute has been able to build a substantial and innovative IT department, which is actively contributing ideas to the design and development of our research and the layout of the digital infrastructure. A further increase in scale is needed to optimise this infrastructure. From 2018 onwards, the IT departments of the IISH, the Meertens Institute and Huygens ING will therefore merge into one IT department (Digital Infrastructure HuC) for the KNAW Humanities Cluster (HuC). Huygens ING has a Digital Data Management department in order to let researchers within and outside the HuC make optimal use of our resources and infrastructure. This department supports researchers with data correction and data management, for the primary purpose of increasing the quality and usability of the texts and data, also with a view to the long term.

In the institute's programme, the infrastructure that we built and developed and the operation of the Digital Data Management department is addressed at relatively great length. Those aspects have not yet been addressed in depth elsewhere, but understanding them is necessary to view our research ambition from the right perspective and indispensable for evaluating our institute's overall ambition. Whereas it is practically standard to find research and IT departments in comparable institutes, the presence of a Digital Data Management department makes Huygens ING stand out.

### *Infrastructure as a challenge*

Recent developments in digitisation, also globally, have made it possible, desirable and urgent to build an advanced digital infrastructure for the Humanities. This process will pose a technical and scientific challenge in the next few years. Huygens ING has more than proven itself in that respect in the past and the Institute is therefore facing this challenge with relish. In our view, intensive collaboration between researchers, data experts and developers is essential to build the infrastructure concerned. The researchers play a crucial role in identifying the relevant research questions and the opening up of material required for the purpose. There is a risk that personal research questions and specialist knowledge lead to a fragmented, overtly bespoke approach to the editing or analysis of sources. Huygens ING prevents this by arranging for researchers and developers to collaborate in their search for an optimal method to create access to a body of data, using and further developing the technical possibilities, while the compatibility and substantive coherence of the different parts of the infrastructure remain safeguarded. The data specialists

and researchers remain jointly responsible for the infrastructure to remain customised to the research questions, as well as a reflection of the restrictions and opportunities of the sources. We will endeavour to continuously strike the right balance, through our close collaboration.

The collaboration between IT engineers, data specialists and researchers will be encouraged in several ways. To that effect, Huygens ING is investing in humanities researchers with IT skills and in developers with an understanding of humanities research. We have already done so in the past and this will continue. In addition, we encourage expertise by investing in the IT/DI and DDB departments, which serves to safeguard the knowledge. As a result of the *digital turn*, the Digital Infrastructure (DI) and Digital Data Management (DDB) departments have become indispensable to the institute. This substantive relationship will not change under influence of the IT department's collaboration in the HuC.

#### *Collaboration within the KNAW Humanities Cluster*

Another perspective of collaboration in HuC context exists in the field of Digital Humanities (DH). Each of the three collaborating institutes already excels in its own discipline in Digital Humanities and the formation of a HuC group in this area will provide a targeted boost and an additional string to their bow. We will elaborate on this point (in paragraph 5.d) below.

The recent embedding of Huygens ING in the Humanities Cluster of the KNAW also stimulates further substantive collaboration. Talks have started with the Meertens Institute regarding a potential amalgamation of both institutes in one institute aimed at Dutch culture, history and language, embedded in an international comparative context. Both directors consider such profile opportune to perform scientifically relevant research that will also have a large societal impact, given the manner in which broadly based discussions regarding Dutch culture and identity have attracted public attention. The associated debate stands to gain from the high-quality, scientific intensification that the researchers from both institutes can deliver.

It has been agreed with staff in both institutes that each institute must prioritise evaluating and writing its own research programme, before the options for a common research profile will be discussed, starting from the spring of 2018. Those discussions will also consider what other institutes and research groups could contribute to the joint research profile and the preferred organisational format of the collaboration.

It is still too early to speculate about the potential outcome of those discussions for the current structure of the research at Huygens ING into key areas and core projects. The international collaboration between institutions will also need to be reviewed at that point. In various projects, Huygens ING cooperates with researchers in the Netherlands and abroad. It will be considered whether research institutes comparable to Huygens ING can form an international association, which can contribute to intensifying and fertilising our international contacts.

## 5. Lines of research and key areas

### 5a. History department

Connections with and influences from other countries and cultures are crucially important for any society. Together, they form the building blocks of our modern-day networked society, carried by social connections and interactive media networks. However, each society is unique, since the specific combination of 'borrowed' elements is always idiosyncratic. The Netherlands differs from other countries in its specific combination of geographic, economic, political, cultural and social characteristics, whereas many elements of 'our' politics, economy and culture are comparable to the same elements elsewhere.

In previous centuries, the Dutch have shaped their country and society in interaction with physical and geographic circumstances and foreign cultural and political influences. The roots of those dynamics can be found in the period before national states and identities even existed. The research programme of Huygens ING investigates the origin of the idiosyncratic Netherlands society from that pre-national or proto-national period, with networks that were formerly more focused on exchange and debate than on the formation of a geographically rooted society. The geographic focal point gradually started to carry more weight and to gain a strong internal dynamic, but the interaction with countries abroad also remained strong in later periods. From the seventeenth century on, some overseas communities developed with strong ties to the Netherlands and here the transnational elements exerted influences that differed in comparison with those on the European continent. In north-west Europe, Dutch society took on an increasingly recognisable shape thanks to the use of writing and the development of the Dutch language, supported by institutions that were highly efficient for that period, and a well-developed commercialised society. In the seventeenth century, the Netherlands could rightly be considered as a unique society, which nevertheless involved a continuous interaction between specifically Dutch arrangements and foreign countries. At the same time, a dynamic existed in the Netherlands inclined to perpetuate 'specifically Dutch' elements, a tendency that became particularly strong with the formation of national states in the nineteenth century. Similar to elsewhere, the same national society is currently coming under pressure again from increasing globalisation, which affects the interactions with 'abroad' in an unprecedented manner.

#### *Arenas*

Analytically, we can pinpoint three 'arenas' (specific social fields) where Dutch society distinguished itself from the rest of the world, which continues to this date. Firstly, it is the arena of moving **entities**: people, goods and ideas crossing the 'national borders'. Secondly, it is the arena of **networks**, the flow processes that facilitate transfers, particularly thanks to mediators and centrally positioned persons and institutions. Thirdly, the arena of **institutions** that, once formed, perpetuate the development of society in a particular direction, making it harder to move in a different direction.

The three arenas (entities, networks, institutions) strongly overlap each other; aside from being an administratively defined entity, an institution is also a group of people who form part of one or more networks, whereas the concept of that institution may also be internationally transferable. However, they can be analytically distinguished and the differentiation can also be made on a methodological basis. This analytical perspective can also be found in the other lines of research, with small substantive variations.

#### *Research question*

This line of research studies the above processes in the three arenas from the following perspective (as part of which the terms between quotation marks were subject to constant substantive change, and sometimes did not even have a nature that we would currently distinctly recognise as 'Dutch'):

**Research question: How did the Dutch time and again go about shaping the idiosyncratic elements of 'the Netherlands' and its society in interaction with foreign countries?**

As mentioned before, many aspects of the Dutch identity arose and are rooted in the period in which the Netherlands did not yet exist by that name: the Middle Ages. Territorial demarcations (such as country borders and provincial boundaries), political and administrative institutions (such as participation by representative institutions) and social and cultural characteristics (for example, urban culture, the Dutch language) have changed considerably throughout the centuries, including the annexation and detachment of overseas territories. Our programme thus encompasses the period of the Middle Ages to the present day and not only takes in the developments in the Netherlands itself but also looks across the borders of our former and current territory to study mutual influences in transnational, comparative terms.

Identities are not isolated, but find their *raison d'être* in relation to other (foreign) identities. The subject of research are these processes, which eventually resulted in what can be termed the modern-day Dutch uniqueness. It must be noted that every individual in the Netherlands belongs to or feels connected to various local, social and cultural, religious, political or other groups and therefore has multiple identities. These groups are also highly liable to change and the subject of our research. The area of tension among multiple identities is visible in the different regions within the Netherlands and within the different religious groups, strata, classes, etc. The dominant 'Netherlands' discourse was and has always been a point of contention. That internal area of tension can also be found within each of the three aforementioned arenas.

#### *Substantive elaboration*

We further elaborate on those fields or arenas with the following topics:

##### *Entities (key areas Impact of Circulation and Debating culture)*

Connections via persons are mainly studied through patterns in migration and mobility. Our research also takes into account the heritage and knowledge that migrants carried with them, for example, in the core project about Dutch Australian migration. That migration was also influenced by the means of transport (ships, aviation). New transport techniques paved the way for new patterns in migration; the issue of landing rights was crucial for aviation, for example. The shipping industry itself is furthermore in the spotlight in the Prize Papers project and in the new maritime history of the Netherlands ('Nieuwe Maritieme Geschiedenis van Nederland'), whereas the research into colonial connections mainly focuses on the links between 'East' and 'West'. For the transfer of ideas, we look

at the origin of written texts in the medieval Netherlands - which was closely related to foreign developments and had major consequences for governance and administration - and also to literary culture. The transnational exchange of the latter is studied on the basis of translations and other sorts of adaptations, particularly in exchange with England and Eastern Europe. The exchange of knowledge with foreign countries was also extremely important for water management in the Netherlands. Political practices and economic knowledge also benefited from transnational assignments.

*Networks* (key area Debating culture)

The way we study networks is primarily through the correspondence of prominent political and social personalities, such as William of Orange, Constantijn Huygens, Johan de Witt and the stadtholders' wives and in diaries such as that of the Netherlands Trading Society's secretary Willem de Clercq. In relation to literary history, we will perform research into cultural associations and circuits of artists and literary critics, scholars, teachers, translators or economic agents such as publishers and book shops. A history of knowledge study about the manner in which documentary sources were dealt with in Dutch historiography is embedded in the culture of scholar networks in the early modern period and the international methodological discussions in the 19th and 20th century. The resilience of networks during an economic and political crisis is studied based on case studies from the Napoleonic era.

*Institutions* (key area Governance of the Netherlands)

Huygens ING has a strong tradition in the history of political institutions and we want to continue it. A core project is REPUBLIC, a project about the States General. The highest public body of the Republic took a very eclectic approach to designing institutions and decision-making, with demonstrable foreign influences, while the interaction with the different provincial 'identities' is also a topic of research. A spotlight is turned on the scope and significance of urban institutions in a project about the register of decisions of the aldermen of Den Bosch (14th–19th century). We also perform research into a more recent institution: the creation of support for the welfare state. Governance is specifically studied in relation to the provision of information, for example, in the use of categories in migration flows. Institutions are also important in the history of language and literature education and in philology. The relation between State and Religion is the topic of a number of smaller research projects. Two separate projects study the progress of institutionalisation around 1618 and 1816. Historiography has shed insufficient light on state-building in the colonies. The core project Netherlands Overseas (Nederland Overzee) changes this, by continuing to edit the General Missives of the Dutch East India Company (VOC) as well as comparable government correspondence in the West using innovative digital techniques. For a long period of time, the administration of the Netherlands has been dominated by relatively small dynasties, which are the subject of a comparative study.

A scholarly, but also strongly public-oriented project 'World history of the Netherlands' covers all three arenas. In over one hundred short contributions, Dutch history is placed in a surprisingly new global historical and interdisciplinary perspective.

## 5b. Literary Studies

Literature is an important enriching element in any society. Literature as an art form embodies the power of imagination, new ideas and understanding of others. Literature is also the art in which a society searches for new forms, debates, clashes and develops itself. The study of literature and its history is therefore also the study of the creative and intellectual development of society and thus crucially important to that society. Literature can delight in a large group of enthusiasts and interested parties from outside (and inside) the world of science.

The literary studies department at Huygens ING is explicit in its desire to render services to the academic sector as well as to the wider public. The work of the department - both in terms of publishing resources and research in the more narrow sense - fits in well with several of the institute's key areas. Literature is the medium in which ideas and styles transcend national and language borders, and literature is furthermore indispensable for the key area Impact of circulation. As one of the vehicles of social discourse, literature is also crucially important to the key area Debating culture. Due to the richness of formats, layers and the complex creation of literary texts, the key area Innovation in editing is also very important for the department.

### *Research topic*

#### **Research topic: Which factors determine the function of 'Dutch' literature in national and international context and how does this function change?**

This line of research focuses on the Netherlands literature in social, historical and international context. The object of research are both highbrow and lowbrow literature, as well as types of text from the past that are not currently considered literature but that have traditionally also been studied by literary historians (such as 'artes' texts). Using new methods and techniques from digital humanities, we investigate the role of literature in contemporary society and in the past. Not only the texts themselves, but also the readers, critics, online reading communities, publishers and literary and academic literature critics are the objects of research. Globalisation and research of translations and adaptations also play a part.

### *Research into canon formation*

The project The Riddle of Literary Quality (commenced in 2012) will be complete by 2019. This project investigated what contemporary readers understand by literature, by comparing readers' opinions with computational style research. For example, an enlightening picture has emerged of the must-have features of a contemporary text or author before it stands a chance of being considered as literature. The project is followed up with a pilot project called The Riddle of the Literary Canon, in which additional finance is sought for a more substantial project. It will continue to build on the results from the first project, with another creative combination of methods from different disciplines (stylometry, literary history and cultural history, sociology) in order to shed more light on the development of the literary canon in the period 1800–2000. The emphasis lies on novels that were published as (literary) novels in the Netherlands while receiving scant attention; these are compared with novels that roused interest, for example, measured by the number of reviews in magazines or on websites, in a defined period. Are there clear-cut textual or extra-textual differences? In order to closely monitor developments in the literary canon, the ambition exists to organise a second edition of the large-scale national reader survey (Het Nationale Lezersonderzoek),

first held in 2013. The follow-up survey is partly extending the former Riddle study, including the impact of preconceptions in relation to groups of marginalised authors. The relationship between ideas on the author's gender and preconceptions regarding literary quality was studied in the context of a dissertation as part of *The Riddle of Literary Quality*. Computational analyses are used to demonstrate the problematic nature of this relationship. A new aspect of the follow-up research is research into narrative structures. It is examined how perspective, plot and narrative structure can be computationally analysed and whether a relationship exists between the different structures and how much readers appreciate them.

#### *Research into gender*

Attention to gender in relation to the way opinions are formed on recent literature will be linked to research into the role of gender in the work of female authors before the 20th century, and in the comments on that work, for example, in the press at the time and in early historical accounts on literature. This research is carried out in a research environment (recently renewed thanks to HERA funding) documenting the work and reception given to female authors from across Europe, which is currently operational as part of the DARIAH Working Group on Women Writers in History (a hugely successful global collaborative arrangement with 90 members in approximately 25 countries).

#### *Research into readers*

The ongoing research into online repertoire building will be continued. In the previous period, a start was made on the design of a large body of online book reviews. There are still a great many questions that can be investigated on that basis. What criteria do readers use for the evaluation of a book? What are the effects that books have on readers? What opinions exist on literature? How do publishers and writers use book sites for marketing their books? In what way do responses depend on the genre of the book? What are the demographic characteristics of the visitors to such sites? To what extent do they function as reading clubs, as communities? How do online book reviewers use Facebook and Twitter to support their sites? For this research into readers, it is furthermore examined whether and how important but impermanent websites can be archived and made available for research in the context of the infrastructural task of the institute, and to what extent it is possible to align these efforts with the requirements and practices of scholarly editing.

Together with researchers of the CWI, the KB and private partners from the publishing sector, small projects related to the research are carried out on topics such as the evaluation of literary manuscripts and the development of better recommendation software for readers. Our projects regularly attract the media's attention and that of the general public. We are described as pioneers

in devising and implementing new opportunities in our research and in derived products with a clear economic and social relevance.

#### *Research into the writing process*

One question often asked by aficionados of literature (both readers and academics) is that of how the literary work came about. In the past, the text genesis of a work could be investigated by comparing manuscripts and typescripts; since most writers work (partially) digitally and the advance material of the text versions are far less visible, other methods will need to be found to make the genesis of a text more transparent. With the help of software that tracked the writing process of four young writers, we performed a high-profile pilot study and shared the results on the site of the Literature Museum. We will look for funding to perform another study on a larger scale.

#### *Research into editions*

A link with what is discussed under 5e, producing editions, forms the analytical research based on those editions. This is illustrated by a study performed as part of a doctoral thesis on the work of Willem Frederik Hermans, based on the edition produced at Huygens ING of the Complete works of Hermans (*Volledige Werken*). Another link is the work on 'computational editing', a form of editing based on descriptive and analytical algorithms, as part of which the source code replaces the traditional explanations as an extremely precise description of the (scientific) editorial process. This experimental research can easily be positioned at international level and links in with previous successfully developed algorithms in the Huygens ING (including CollateX) and with ongoing research.

## 5c. History of knowledge

In *What is the History of Knowledge?* (2016), Peter Burke describes the history of knowledge as a new field: it is a research field that studies the translation of information into knowledge in social processes, in sequence: discussion, verification, order, classification and dissemination. Next, various groups in society appropriate the knowledge for various purposes. The line of research of the history of knowledge group underwrites this approach. The old, positivist approach of the history of science as a linear development that led to the advent of modern science is herewith replaced by a model that offers more scope for complexity and nuance. The dynamic processes of knowledge production and changes in knowledge are studied along these lines over a long period, from the early Middle Ages to the eighteenth century.

However, whereas Burke develops his approach mainly endorsing the traditional methods of intellectual history and philology, our line of research in fact applies new methods and approaches: New/Material Philology and Visual and Material Cultures of Science. This is how the history of knowledge department is working vigorously on the materiality of texts and knowledge objects. The networks, historical contexts and paratexts of primary sources that emerge as a result are considered crucial for a deeper insight into historical knowledge cultures and the associated dynamic processes. It should be noted that as a result, the department makes a powerful contribution to a general trend in the field of research, where the focus has been shifting for some time from the author to the reader and from the retailer to the consumer. Apart from a strong emphasis on materiality, the department is convinced that new research methods arising from Digital Humanities will bring about a transformation in the field with methods such as distant reading, network analysis and topic modelling. Experiments are hence already fully in progress, in collaboration with the developers of Huygens ING; they will continue and undergo further development. Aside from these methods based on pattern recognition, the promising developments in *digital hermeneutics* are particularly closely monitored.

With this combination of old and new methods, we interpret the dynamic processes of knowledge cultures throughout the centuries: the production of knowledge (mostly in the form of texts, but also in the form of objects), its dissemination and appropriation, but also its failure, consignment to oblivion and disappearance. This happens based on many sources: manuscripts, heated public and scientific debates, correspondence and annotations penned by scholars, scientific instruments, drawings and art objects. In short: the research focuses on the dynamics of knowledge cultures in the pre-modern era, with a strong emphasis on new methods.

### *Research questions*

**Research questions: Which factors are decisive for the dynamics of knowledge, not only in terms of knowledge production, dissemination and appropriation, but also for the suppression, failure, consignment to oblivion and disappearance of information and knowledge? How can we optimally use methods of Material Philology, material knowledge culture and digital humanities to analyse these dynamic processes in knowledge cultures and to contribute to the emerging discipline of the digital history of knowledge?**

Supplementary questions are: Who had access to knowledge? Who was excluded from knowledge or information, and why? How does old knowledge transform into something new? How do we need to interpret these processes in a globalising world?

### *Research into knowledge*

Processes of exclusion are at the core of the project *Knowledge Regulation and Censorship*, of transformation of the project *Innovating Knowledge: Isidore's Etymologiae in the Carolingian period*, which was recently granted. Translation – both in the meaning of a translation into other languages, as in that of a translation into other registers for other audiences – is an important factor in the distribution and reformation of knowledge and the main theme of the project *Transnationality in the History of Knowledge and Literature*. In this project, the culture of the Dutch Golden Age is interpreted from an international perspective: it considers the Republic of the Seven United Netherlands as a cultural, scientific and literary trading zone, an entrepôt involving accumulation and cross-fertilisation.

### *Research into the dissemination of knowledge*

In the dynamics of Dutch knowledge cultures in the early modern period, the role of globalisation can barely be over-estimated: the exploration of the world in the wake of global trade enriched Dutch society with numerous new products, observations and experiences. In the project called *The Republic of Materials*, the emphasis lies on the global dissemination and transformation of knowledge in the Republic. Here, the dynamics of interest to us can be found in material objects rather than in texts. In the project *Golden Agents: Creative Industries and the Making of the Dutch Golden Age*, knowledge is also partly considered as an economic, cultural consumer good ('merchandise'). Knowledge and cultural heritage institutions collaborate in this project on a digital infrastructure in order to analyse interactions between the production and consumption of creative industries and between the various branches (material and intangible) in the Dutch Golden Age.

### *Debates*

Changes in the cultural environment, values and knowledge practices rarely occurred without any protest; societies are intrinsically conservative and only prepared to embrace innovations in moderation. The processes studied by the department are therefore extremely relevant for the second key area of Huygens ING: Debating culture. The rules of play of the scientific debate, with a constant requirement to establish what common opinion is reliable knowledge, are crucial to the dynamics of knowledge cultures. The processes as part of which these rules of play need to be continuously ascertained are the object of the project *The Art of Reasoning: Techniques of Scientific Argumentation in the Medieval Latin West (400-1400)*. The new application *Contested Knowledge: Cultures of Regulation in Medieval Western Europe (500-1200)* studies processes of restriction, suppression, but also adjustment and peer review in medieval knowledge cultures. The *CKCC/ePistolarium* project, a digitally available collection of correspondence from scholars as part of the Republic of Letters, in which Dutch intellectuals from the seventeenth century Republic fully participated, makes it possible to detect and follow discussions on controversial topics. The participants in the debates, their arguments and the consequences can be mapped out with digital tools, helping to visualise time and place.

On the flip side of embedding, transfer, appropriation and the deliberate suppression of knowledge are processes of the unintentional disappearance and oblivion of knowledge. This theme, *Forgetting Knowledge*, is explored in collaboration with colleagues of the Max Planck Institut für Wissenschaftsgeschichte in Berlin, the Vossius Centre of the University of Amsterdam and the Descartes Centre of the History and Philosophy of Science of Utrecht University in the form of joint workshops and conferences.

### *Digital Humanities research and digital infrastructure*

*CKCC/ePistolarium* and *Marginal Scholarship* were early experiments of the history of knowledge department to apply the infrastructures and tools of Digital Humanities for its own research. These two projects and the *Art of Reasoning* project will now be integrated in the digital infrastructure of Huygens ING and HuC. The recent grant awarded to these two projects gives kudos to the digital humanities research in this line of research. The project *Virtual Interiors as Interfaces for Big Historical Data Research* offers researchers a real opportunity to familiarise themselves with the practical aspects of using digital hermeneutics for researching the history of knowledge. This project is aimed at developing user interfaces in the form of multidimensional virtual spaces. They make it possible to analyse data from the *Golden Agents* project from multiple perspectives and to reflect ambiguities in data and interpretation. Furthermore, it is a practical implementation of the Amsterdam Time Machine project awarded a grant by CLARIAH, as part of which Huygens ING is collaborating with several KNAW institutes, the University of Amsterdam and AdamNet to make the historical reality of Amsterdam palpable. The project *Digital Forensics for Historical Documents* is also a reinforcement of this line of research. In this project, digital image analysis is used to build tools for identifying writing hands and for the automatic, artificial dating and localisation of medieval writing. The case studies in this project will produce their own, historically specific data sets, which can be used (and supplemented) for the artificial analysis of handwriting in other collections – notably in subcollections of NIOD, Naturalis, Nationaal Archief and Literatuurmuseum.

## 5d. Digital Humanities

This programme of the institute is written at a time when Digital Humanities are broadly considered as the most crucial ongoing development in the Humanities. Huygens ING has prepared itself at an early stage for this shift, and much of the research presented in the above lines of research forms part of Digital Humanities. The institute aspires to remain on the cutting edge of this development, and to continuously increase the interaction between the different lines of research within the institute in the narrow sense and the HuC in the broad sense, and researchers elsewhere, in the Netherlands and abroad.

### *Data scopes and digital hermeneutics*

The presence of the Digital Data Management and IT departments offers new opportunities for combining big data with digital humanities research. Researchers in the Humanities have raised some critical reservations about the use of digital methods for the analysis and visualisation of patterns in big data, suggesting alternative hermeneutic methods (Drucker 2011, 2013; Fickers 2013). So far, the many new methods are particularly valuable for the close reading of small data sets. Promising methods, such as algorithmic and tool criticism (Fickers 2016) are in principle also applicable to big data, but require a large-scale infrastructure and sustained data management for their development, testing, validation and implementation.

The Digital Data Management and IT departments are working closely together at Huygens ING on the development of what is termed data scopes that enable researchers to analyse and annotate big data from several perspectives in an iterative manner, using user-friendly interactive interfaces. A data scope is a process analysis of all selection, adaptation and interpretation rounds that a composite data set underwent, enabling scholars, engineers and data specialists to work with the data. By combining these approaches of hermeneutics with big data, Huygens ING makes a real contribution to the development of innovative methods for (digital) humanities research (see also 6a).

### *Proposed research HuC DH Lab*

The Digital Humanities Lab (DH Lab) at HuC has the mission to advance humanities research through digital methods. DH Lab will work cross-disciplinary and inter-institutionally to bring together expertise from different departments within HuC to answer current and new research questions with digital methods. Since its start in September 2017, the group has interviewed researchers from all three institutes associated with the cluster. These interviews were used to obtain an overview of the ongoing research and planned research, with a focus on textual data. The inventory serves as input for the research direction of DH Lab, which consists of three themes: 1) change, 2) connections, and 3) entities and events. The theme 'Change' researches how concepts are represented through time in text, both how their meaning shifts as well as their verbalisation. The second theme 'Connections' focuses on the interaction of concepts, entities and events, in detecting, modelling and investigating its implications. The final theme 'Entities and Events' deals with recognising, modelling and contextualising entities and events.

### *Collaboration between researchers of Huygens ING and HuC DH Lab*

The HuC engaged the Digital Humanities Lab because it considered it preferable to provide an additional, targeted input from the evolving computational approach. The programme developed so

far ties in well with the developments and strategy of the research at Huygens ING. The relevant researchers of Huygens ING will collaborate closely with the recently formed Digital Humanities Lab of the HuC. We may well offer dual membership to anyone interested in it: researchers attached to a department also becoming a member of the DH Lab. The organisational structure still needs to be finalised to that effect.

## 5e. Innovative editions, creating access to sources and data sets

In the coming years, Huygens ING will continue to build digitally on the successful tradition of the institute of producing editions and of creating access to the content of important sources for Dutch (and international) culture and history. We do so using innovative, digital methods, in combination with our analytic research as described in the previous four lines of research. Editions and other text files and data sets are not only rich but also complex. We anticipate that in the foreseeable future, research in the Humanities will increasingly be carried out by teams of analytical and substantively specialised researchers, IT developers building specific tools and interfaces, and data specialists like those gathered in the digital data management department at Huygens ING. In the longer term, this distinction will probably become less relevant, as the skills of these three groups become more shared.

Huygens ING has tested out the technical innovations necessary for opening up large bodies of text in a number of projects and pilots. We use HTR technology, innovative technology for the automatic recognition of handwriting that operates interactively and predictively to convert handwritten digitised texts into machine-legible texts, and we provide material to train those tools. In the project 'Digital Tools for Manuscript Scholars', we experiment with the development of digital tools and apps for studying handwritten material. This has led to the project 'Digital Forensics for Historical Documents', which was recently funded by the KNAW, in which digital image analysis was applied in two case studies to perform pioneering research into handwriting (see a description under 5c). This experiment has great potential for other projects dealing with the analysis of handwritten sources, such as Golden Agents, the Resolutions of the States General, the General Missives, etc. A related project, the Medieval Paleographic Scale, that automatically dates medieval handwriting, will be completed in the planning period.

Both for historical and literary editions and for creating access to sources, we collaborate closely with heritage institutions, such as Nationaal Archief and Literatuurmuseum. The efforts of researchers are often indispensable for opening up the actual sources, for transcription, the addition of metadata and for placing the source in a broader historical context. Our editions are made available in the repositories of the IT department of the HuC, in Timbuctoo (for structured data), Pergamon (unstructured data: Pergamon text for texts; Pergamon images for scans and other images), and in the longer term, advanced Alexandria (for text editions).

### *Enrichment*

Scholarly editions were and still are crucially important for the development and practice of the Humanities. With the *digital turn*, it has become possible to question, connect and contextualise texts in new ways. It is therefore useful to combine the editions with other texts and data files in a digital infrastructure and to examine them in connection with other data and interpretations. It also provides numerous reference points for new types of editions and annotations.

In order to make this innovation possible, texts have been enriched, both manually and (semi-)automatically with data from vocabularies and ontologies, and different structured data sets are confronted with each other, resulting in the data sets providing context for each other. Other enrichment is provided by running the texts through pipelines that can recognise pressure or handwriting, correct the recognised text or parse it. These processes are iterative, at least

potentially. As data sets, tools and pipelines improve, the texts can be enriched again. High-quality enrichments will remain available next to the original texts in shared annotation layers for future research. Such annotation layers, which frequently have a domain-specific context, can only be generated through intensive collaboration between researchers, engineers and data specialists.

#### *Relationship with the infrastructure*

For some research purposes, researchers will be satisfied with automatic recognition or texts transcribed through crowdsourcing. For other research purposes, they will still need texts with a quality guarantee as provided by a traditional scholarly edition. All these different types of texts will be analysed from different perspectives and in variable combinations. For that purpose, they must be incorporated in one digital infrastructure for humanities and related research. It must be as interoperable as possible. The way we picture this is outlined in Our Lab (6). Our innovative editions and other data products are digitally born and will become an intrinsic part of that infrastructure. Our analytical research in the other lines of research, and our work on the editions, simultaneously contribute to the terms of reference for that infrastructure.

#### *Digital editions and forms of presentation*

The editors of Huygens ING aim for a fundamental technical and methodological integration of different disciplinary practices in editing and opening up sources. We are convinced that this is necessary in order to make editions, produced from literary or historical backgrounds, collectively searchable and to enrich them in an advanced humanities digital infrastructure. We will also remain actively engaged with the design of digital editing tools, since not only the internal technical quality is very important to users but also the quality of the interfaces. After all, the digital infrastructure offers more space and flexibility for a wide range of presentation formats. For that reason, we consider reflecting and working on practical interfaces for our digital editions as an important part of our task as scholarly editors. One point requiring attention is the creation of more annotation options in digital editions for individual users. With that facility, the digital edition which is currently mainly consulted in the same way as its paper predecessor, can become an interactive research instrument. The user can decide to share his own annotations with the outside world, actively enriching it as a result.

#### *International research*

Huygens ING plays a prominent role in the developments in scholarly editing. In a global context, the research domain is often referred to as Textual Scholarship, a collective name for various forms of textual research, from palaeography and textual criticism to scholarly editing. Much of the research on the innovation of editions takes place at the European level. Huygens ING is an important link in the European network of editing institutions. The Literary Studies department took part in the European DiXiT project for training young editors and it will take part in the follow-up project (provided funding is available). Special attention will be paid to publishing correspondence by artists. We aim to remain the leading centre in the Netherlands in terms of digital editions, and to build a notable international reputation in that field.

#### *Planning*

For each of the three research departments, the plans for editing and creating access to sources are closely aligned to the analytical research of the department concerned. Much of what is set out in the overview has therefore already been mentioned in paragraphs 5a, 5b and 5c.

The plans of the *History department* with far-reaching opening up of sources tally directly with what is set out in line of research 5a: Prize Papers (hijacked letters), and the three core projects Resolutions of the States-General, General Missives of the Dutch East India Company (the Netherlands abroad), and Dutch Australian migration history. In relation to CLARIAH, the researchers are involved in a project aimed at making links between various large data sets in Timbuctoo. The Prize Papers project links data from Timbuctoo to data in Pergamon. This is how structured and unstructured data become part of a bigger context. Although many of these processes are (semi-)automated, the input made by researchers remains crucial. Another innovation enables existing and new source publications and editions to provide as much context to each other as possible, based on digital infrastructure. That is how we build compound sources providing several perspectives and aspects on persons, institutions and phenomena. It increases the usability of the sources, shows interrelationships and facilitates larger-scale research presenting historians with new challenges. One example is a project linking up data bases relating to 'Foreign Policy' in the second half of the twentieth century, such as on development cooperation, the Netherlands and European integration, Netherlands Emigration and Relations between the Netherlands and Indonesia, opening them up using advanced methods.

In addition, the History department is working on expanding existing data sets that can be conducive to historical research, such as the correspondence of William of Orange, the data base about the Patriots, the Repertory of Office Bearers and Civil Servants 1588-1795 and the Sports data base. For the department's central research question of 'how people shaped the Netherlands', the content of the Biographical Portal (managed by the Digital Data Management department) is particularly significant. After all, many of our nodes (intersections in networks) are people. The Digital Charter Bank Netherlands project will be continued; it focuses on a large-scale opening up of a crucial group of resources, paving the way for plenty of new research into the Middle Ages. Existing charter books are linked to the charter bank, which enriches those collections and makes them better available.

The Maritiem Portal (Maritime Portal), which collaborates intensely with several heritage institutions, is due for further expansion and will in turn provide a foundation for the Prize Papers and the 'New Maritime History of the Netherlands'. Another overseas project concerning legislation in colonial West-Africa is nearing completion. Furthermore, steps have been taken towards a Portal History of Water, in collaboration with public partners (water authorities).

The History department also wants to develop an online guide that offers a structured overview of digitally available sources, both in a rough conditions and as digital editions, and that provides a guide for evaluating and valorising these sources. Even for researchers, it is not always easy to ascertain the reliability of a digital publication. A guide can also assist records preservation institutions with digital archiving and for the digital work flows that are becoming increasingly commonplace, for instance, in government departments. Once again, it involves researchers cooperating closely with the IT and DDB departments.

The *Literary Studies department* continues to produce editions of Dutch literary heritage, concentrating on innovations in editing methods. The project on the complete works of Willem Frederik Hermans (*Volledige Werken van Willem Frederik Hermans*) is expected to be finalised by 2021. The work will be published in 24 collection bundles, and all text variations will be stored in XML-TEI format. The edition-related research will also culminate in a comparative literature dissertation, delving into the creative process in the early novels of Hermans, based on the edition and using digital tools. Further editions of letters and theoretical pieces of writing by Piet Mondriaan will depend on whether external finance can be raised. A plan is in progress to make the letters of Belle van Zuylen available online.

These (big) names bear testimony of the interdisciplinary approach. It is all about textual creations of artists from different branches, with our expertise vouching for a scientific and reliable edition. This edition is both the result of research into the texts itself and a solid foundation for future contextual research in either comparative literature or art history. In addition to these larger projects, the process of renewal in editing practices is also taking shape in smaller projects, in which an innovation can be tested without a long-term edition project depending on it.

The *history of knowledge department* is involved in several editions, some on paper, as products of traditional philological work, some digital. In the 2018-2023 period, the group will complete a number of long-running existing edition projects: the Aristoteles Semitico-Latinus Volume 5, Erasmi Opera Omnia (ASD), Europa Humanistica, and the projects on the works of Antonie van Leeuwenhoek and Jan Swammerdam. They are continued in the traditional ways in which they were begun; at the same time, however, they will be analysed using computational methods, such as authorship attribution for some contested texts of Erasmus.

The projects CKCC/ePistolarium and Marginal Scholarship were among the first truly digital endeavours of the group in the realm of digital humanities. Both projects will be further integrated into the digital infrastructure of Huygens ING and HuC. The database of Marginal Scholarship developed with the IT group will be enriched, and the ePistolarium will be republished in a new version as ePistolarium 2.0, with annotation facilities as part of the Digital Infrastructure. The current project Art of Reasoning is building a similar database that will be compatible with these infrastructures. The semantic web architecture and data management of the Golden Agents project are directly compliant with the Timbuctoo/Alexandria and the CLARIAH infrastructures of the IT and Digital Data Management departments of Huygens ING. By creating semantic web based user interfaces, the Republic of Materials initiative connects to the Enlightenment Architectures project related to the Sloane collections of the British Library and British Museum.

## 6. Our Lab. Infrastructure for Digital Humanities

### 6a. Digital Data Management

#### *Background:*

The role and meaning of research data in the Humanities have gone through profound changes in previous years. Enormous quantities of data have become available through the digitisation of historical documents, literary works, structured data and visual objects. This digital data is increasingly gathered within shared infrastructures. It is often necessary to process and structure the substance of this data, in order to optimise it for relevant research topics. This is all the more applicable to the Humanities, where research data is characterised by an enormous diversity and heterogeneity. Data often differs by location, period and social context, and furthermore often testifies of wide variations in vocabulary, format and completeness. Only when this data is interlinked and the idiosyncratic classification is converted into common structures does it lend itself for new data-driven research. Data management has therefore become a basic condition for much humanities research. Insofar researchers did not yet already acknowledge it, the national and European research funders increasingly emphasise the importance of accessibility, compatibility and reusability of research data. Sharing data therefore becomes increasingly important in the Humanities.

#### *Primary tasks*

Against this background, Huygens ING has clustered the activities in relation to data management and processing in a Digital Data Management department. The primary responsibility of the department is to develop digital data bases and resources and to make them sustainably available for humanities research. In addition, the department aspires to facilitate the (re)use of data by researchers and to stimulate new data-driven research. Centrally within the activities of Digital Data Management are the use and substantive development of innovative, shared infrastructures (Timbuctoo and Pergamon), in which digital research data are gathered, bundled and made available as linked open data. The objective of these infrastructures is to enable researchers to share, verify and analyse data with each other, in an accessible manner. In the context of the NWO projects of CLARIAH and Golden Agents, major steps have been taken in the meantime to enable a big data approach of humanities material. This pioneering work - since there are very few comparable initiatives in the humanities field that process and correct research data on this scale - made clear that working with these data infrastructures also requires research practice to undergo a major adjustment. After all, for the organisation and use of these large-scale facilities, there are always methodological and organisational matters that fall outside the scope of individual research projects. How can we link up data sets and assess whether they can also be used for other research topics? How can the origin and quality of research data remain transparent and verifiable, even after

intensive processing by different parties? What are the rights and obligations for researchers and data suppliers when sharing research data? Which formats and ontologies are most suited to specific types of research? How can we use structured data sets to improve the process of information extraction from data sources? How can we work in a demand-driven way without losing uniformity and coherence? The complexity of these issues requires the use of a specific type of professional and data specialist, with a high level of control and data expertise to weigh off all interests and to drive this process. The need for such expertise is also acknowledged in the Netherlands by the National Coordinating Point Research Data Management (LCRDM, Landelijk Coördinatiepunt Research Data Management) and internationally by the Research Data Alliance, among others. In its recent mission statement, the European Open Science Cloud called for a considerable cultural change that will see scientific research more solidly based on a common data management culture. That is why at Huygens ING, we are increasingly working in small project teams, combining different disciplines (research, data management and IT). The data specialists are increasingly responsible for the substantive operation of the infrastructures. When those tasks are carried out well, in close collaboration with the software engineers who develop and maintain the infrastructures, data management can effectively spur on humanities research and facilitate new lines of research.

### *Challenges and perspectives*

Data infrastructures in the humanities are increasingly developing into gigantic, ever changing data clouds, in which research data are processed and used by different parties, independent from each other. As a result, many of the actions within the data life cycle are no longer directly related to separate research projects, but have become common as a result of the research data being shared. The traditional distinction between data management 'during' and 'after' research is gradually becoming more difficult to make. More important still are the substantive and methodological challenges associated with this development. In the forthcoming programme period, the department will therefore aim to find pragmatic, workable solutions for these important matters that feature largely with big data, but also with smaller-scale projects.

The first challenge is that the new options for aggregating and analysing research data also raises new questions about the provenance of information. For humanities scholars, it is essential to know the context of the data and which sources, methods and digital tools were applied in order to generate a specific research result. After all, it is the only way to gain insight into the representativeness, quality and reproducibility of data. Huygens ING therefore advocates making the provenance of data explicit in the broadest sense: from the selection criteria of the original data to all the subsequent operations, from complex algorithms to apply automatic links to justifying the choices made for data extraction. For doing so gives digital hermeneutics scope for development, in order to smooth the path for the gradual establishment of new standards for the scientific reliability of data.

Another, related issue is the disambiguation of research data. Disambiguation is about tracing and designating data entities that relate to the same symptoms in reality (such as persons, locations, organisations, objects). For a large part, we are able to tackle this semi-automatically using smart tools, although we will always still need to perform substantive checks. But what uncertainties are we still faced with? How do we deal with them? Due to the heterogeneity of material in the humanities, disambiguation will always remain strongly context-related and it can vary per data set or research domain. However, it is still possible to pinpoint best practices.

An innovative way to handle these complex big data questions is the application of data scopes. Such scopes offer researchers a perspective on all the operations that a specific set of data elements has undergone in the context of a research project. They show how this process, frequently iterative, is tailored to the research project at hand (see [Article on Data Scopes](#)). Data scopes are fundamental for the (re)usability of research data and therefore an important element of data management and research. They enable the research community to evaluate to what extent the treatment processes data have undergone are compatible with the researcher's own research topics. In addition, data scopes offer relevant reference points for the further development of digital methods for the Humanities.

### *Three fields*

Apart from data support for research projects, the department is active in the following fields, in which the big data approach is in each case reflected:

1. In many respects, the research-oriented data management, requested by researchers goes beyond the services that archives, libraries, museums and other heritage institutions can deliver. After all, the focus of these organisations often lies on creating access to their own (thematic) collections, usually as generic as possible. The Digital Data Management department therefore works in close collaboration with heritage institutions on the one hand and researchers on the other hand, in order to establish relevant and meaningful links between different data collections and to translate complex research questions into practical processing steps and data models. For example, we do this in the context of the national collaborative project Digital Heritage Network (DEN), aimed at developing a linked data system for improving visibility, usability and sustainability of digital heritage sources. We will make efforts to develop broad, appealing thematic data clusters, in order to improve the visibility of divergent collections from across the Netherlands in a new context. Such thematic perspectives can help to demonstrate the operation and options of linked data to a wider public and to heritage institutions. Before too long, Huygens ING hopes to make a start on a Network of Maritime Sources with heritage partners who are also active in the Maritime Portal. Other thematic clusters will also be set up whenever possible.

2. In the context of the Digital Heritage Network, the department is also working on a portal for historical figures. Heritage collections and historical data systems in the Netherlands contain a treasure of information about Dutch figures and the group formations they lived in – ranging from simple references to objects to more systematic biographies. To date, the data is frequently only accessible at the level of individual collections. This makes it difficult to retain an overview of the multitude of digital information and to extract the relevant details. Our ambition is to set up a data infrastructure that makes it possible to link up person-related data from the various collections, for them to be analysed in context. The project continues to build on the Biographical Portal administered by Huygens ING, which assembles the main biographical sources. We recently tried to uplift this ambition to the European level by submitting H2020 and COST applications (BiograVIS and PEDIGrEE). A strong network is indispensable for this purpose, which is why we were actively involved in organising international workshops about biographical data (Amsterdam 2015 and 2017, Linz 2017). In the coming years, we hope to be able to realise this collective ambition with European partners.

3. The department is also responsible for managing the content of Huygens ING's resources. It is a substantial digital collection of historical and literary sources for scientific research. Very few comparable collections in Europe can measure up to its size and focus. In order to make this collection more versatile for digital humanities research, we will transfer these resources to more advanced infrastructures (Timbuctoo and Pergamon) in close collaboration with researchers and IT engineers. The outcome will be that the resources can easily be connected and combined with other, external digital sources, resulting in a significant increase of research options. This move will presumably also lead to new experiments for historic and literary editions: after all, it creates more freedom to combine and present material in new ways. The department therefore intends to arrange a few projects of that nature to be set up with researchers in the next few years. In addition, this transition means that the structured data in the Huygens ING resources will be included in a knowledge structure (a Knowledge Graph), for an overarching semantic layer to become available with information on persons, places and things featured in the sources. Since it is a major undertaking that demands a lot of capacity, this transfer will be prioritised based on the research projects discussed in Chapter 5.

## 6b. Digital Infrastructure

### Background

As indicated above, the digital infrastructure is the fifty key area of Huygens ING. This key area is crucially important for substantive research. The incorporation of digital methods in humanities research has soared over the last decades. Over the last ten years, Huygens ING IT has been a front-runner in this development and grown to more than twenty engineering staff. The focus of the department shifted away from single project delivery, and towards more generic domain-orientated infrastructural products and services. This is necessary both with an eye to interoperability, and with an eye to cost efficiency. The IT department will however continue to collaborate with Huygens ING staff in their innovative projects that require specific experimental products. Huygens ING plays a leading role in it but cannot manage it on its own, which has led to the above mentioned pooling of resources in HuC context. Within the scope of CLARIAH, the Digital Infrastructure department is responsible for setting up a national infrastructure for digital humanities.

### Primary tasks

#### *Infrastructure*

The Digital Data Management department is responsible for building, expanding and maintaining the shared infrastructures built by the IT department. By choosing the standards to be met by the digital data wisely, the IT department guarantees that all data can currently and in the future be usefully linked up. The data are secured for the long term by being stored in a sustainable, maintainable way. At the same time, it is possible to make the data visible and useful in new ways, including for lines of research that we cannot yet anticipate at this stage. It will also become possible to give external parties access to the data. This set-up offers interesting possibilities for collaboration with research groups and heritage institutions. Huygens ING offers open access to its own resources, on websites with or without a bespoke format for specific fields of research or data types. The collaboration with the Digital Data Management department is particularly important for this infrastructural task of the department.

#### *Research and Development*

In order to maintain a strong link to research, a separate R&D team was set up in 2015. This group has the dual tasks to closely cooperate with Humanities scholars in research projects with challenging digital components; as well as to turn these experiments into a steady stream of new ideas for products. The team focusses on data models and methods that support complex use cases and the richness of data sets in the Humanities. The primary output of the R&D group is measured in papers and presentations. Results are also made available as open source prototypes. Many of the developments mentioned below, like the experiments with stand-off annotation (Antioch) and text-as-a-graph (Alexandria), originated as experiments with scholars. Between 2018 and 2020, the R&D team expects to continue both lines of research, as well as invest significant time in the study of specific perspectives and scopes of research data, typical for the hermeneutical humanities and

required for digital history. Each line of research is carried out jointly with textual scholars and historians within the institute, or outside.

### *Ambitions*

Huygens ING will continue to be at the forefront of developing an Infrastructure for Digital Humanities, both as a separate activity essential to the research conducted at the institute itself, and more broadly for digital humanities in the Netherlands and abroad in the context of the CLARIAH project, in cooperation with its HuC partners and other relevant institutes.

### Planning

#### *Infrastructure*

Huygens ING actively pursues national and international consortia of partners in order to secure continued funding for infrastructure. The consolidation of the three institutional IT-departments into a single organisational unit for Digital Infrastructure (DI) at HuC in 2018 will be helpful in this. Proof of the success of this pursuit are the close technical ties with the European ESFRI infrastructures CLARIN-ERIC and DARIAH-EU, as well as the bilateral agreements for the provision of infrastructure to the Universities of Oxford, Luxembourg, Goettingen and the Austrian Academy in Vienna. The solid basis laid in 2015-17 now allows Huygens ING IT to cement its position as a crucial leading international actor in the humanities in the years ahead.

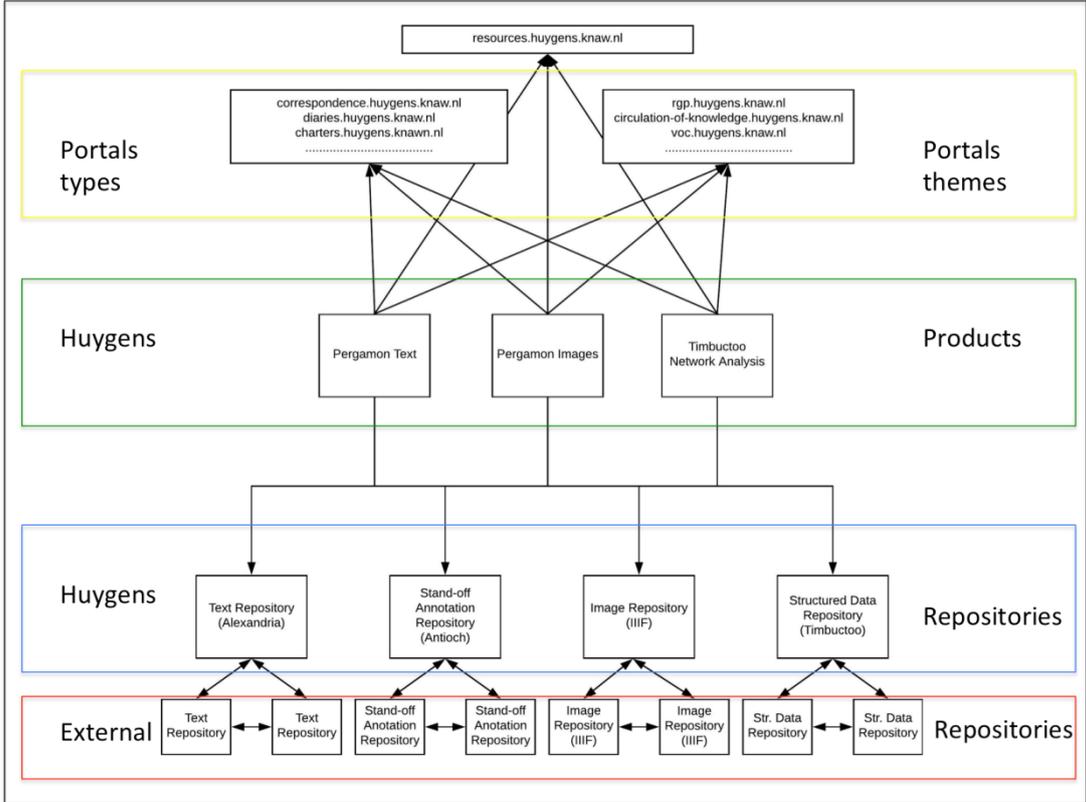
For many policy agencies, in the Netherlands as well as abroad, the social sciences and humanities (SSH) have merged. We will explore the possibility of contributing to the integration of infrastructure in SSH over the coming years. Our cooperation with socio-economic historians in CLARIAH and HuC is already a step in that direction.

Thus Huygens ING will be among the first to benefit from these new technologies, and the predicted containment of maintenance and sustainability costs. These developments will directly benefit scholars and scientific programmers in the (inter)national humanities and social disciplines as well as the cultural heritage sector. They are the primary user community of the products and services developed by Huygens ING IT. Documentation, testing and well-designed usable programming interfaces enable third-party developers to add custom-tailored functionality specific to individual research interests. External scientific engineers may implement product components fully or partially in their projects, hosted either at home or as a service provided by Huygens ING.

Few institutions outside Huygens ING are able to offer such service beyond a five-year project scope. Guaranteeing a long-term commitment to its products and continued Dutch support to European infrastructures, serve as further justification for the institute's role in supplying scholarly infrastructure. More importantly, this obligation marks the shift from project- to product-based development. It adds a new layer of significant opportunities to the highly dynamic amalgam that is modern humanities research. Simultaneously, it turns the IT-department into a compelling work environment that is excitingly different from other groups in (academic) libraries, archives and commerce.

Huygens ING IT expects to release its new infrastructure in various stages over (the first half of) the planning period. This infrastructure is distinctly different from the many independent tools for research projects that were constructed in the past, and benefits highly from the integration efforts in CLARIAH and the various other large-scale projects mentioned above.

The new infrastructure has four distinct levels: (I) research products and portals; (II) generic software Products that power level I and through which user interfaces and the functionality of the research products are implemented; (III and IV) a distributed data infrastructure that feeds curated research data back to the portals, and that maintains a coherent administration of provenance, versioning & variations, logging etc. Huygens ING data is stored in local repositories (level III) that are connected through standardized APIs with external national repositories (level IV) in CLARIAH, as well as other significant research data repositories across the globe.



The overview above illustrates the relations between the various layers and components. The top-level offers a series of portals and research environments that are powered by software products in level II: Pergamon Text, Pergamon Images and the Timbuctoo front-end tool for Network Analysis. These products provide humanly accessible user interfaces, visualisation and analysis environments, and these are shared by all the research products. In this manner, the portals and research environment become sustainable since added features, bug-fixes and replacements automatically propagate to all portals. The various front-end products interact with a network of internal or external underlying data repositories for Text, Stand-off Annotation, Structured Data (including metadata) and Images. Some of these repositories are developed by Huygens ING IT, while others are provided by third parties under open source licenses. The repository components are in various

stages of development and closely mirror the lay-out of the national infrastructure program CLARIAH. The whole infrastructure is fully compliant with both CLARIN and DARIAH requirements. Each repository component is designed as a distributed system capable of handling large amounts of data across standardised network connections to other repositories and stores at research facilities in the Netherlands and abroad.

The whole suite of infrastructure products will result in a range of research portals that, by 2022, will serve and analyse generic humanities big datasets, or (very) specific research tailored sub-selections. The aim is to allow users to become as independent as possible and eventually create their own research environment and upload their own data collections, without mediation from IT. Access to the entire infrastructure is provided both through GUIs as well as standardised and documented webAPIs for users that rather run their own tools.

Several experiments within Image in Context (a mobile app that allows researchers to photograph and store resources with their metadata as personal collections directly in the image repository), Timbuctoo (users upload and map their own spreadsheets and generate semantic data, search and edit interfaces and visualisations), and the creation of personal annotations in resources, are already showing the first results of user empowerment. This will allow Huygens ING IT to focus on the support and development of the infrastructural layer. In close cooperation with the Data Management department, IT expects to migrate most of its existing tools and datasets into the new fully interoperable and long-term sustainable infrastructure between early 2018 and late 2019.

### *Text*

The current solution for text are XML-files stored on servers, and indexed by ElasticSearch (<http://elasticsearch.org>). Although this configuration functions properly, it limits the possibilities for research and decentralised querying of overlapping hierarchies in text. The IT R&D team initiated experiments with the storage of text-as-a-graph in 2015. The preliminary results (<http://www.balisage.net/Proceedings/vol19/html/Dekker01/BalisageVol19-Dekker01.html>) are quite exciting and have resulted in a first experimental graph repository called Alexandria, which is compatible with XML but also designed - at least in principle - to eventually replace it. Research into the Alexandria repository will continue over the coming years. If it is successful, Alexandria is expected to become the institute's default text repository, but not before 2020. In the more immediate future, Pergamon Text will run on standardised XML and become available in the first months of 2018. Initially as the [correspondence.huygens.knaw.nl](http://correspondence.huygens.knaw.nl) portal, but soon followed by other text resource portals such as diaries, state papers, literature etc. in the second half of 2018 and beyond. The 2017 correspondence portal (<http://correspondence.huygens.knaw.nl>) serves as a first implementation of Pergamon Text. In the standardisation of XML for scholarly resources, Huygens ING IT works closely with various experts on textual scholarship at the institute. The first of a set of standardised schemas in XML/TEI is expected early in 2018.

### *Stand-off Annotation*

In line with developments in Alexandria, Huygens ING IT plans to switch to a fully stand-off annotation repository between mid-2018 and 2019. Experiments within CLARIAH-CORE in 2016 and 2017 have been successful and provided essential input for the generic infrastructure as proposed in CLARIAH-PLUS. With stand-off annotation, remote digital resources provided by e.g. the national

library, the Huygens ING data management department, or NISV (Netherlands Institute for Sound and Vision, *Beeld & Geluid*), can be annotated with both user and machine generated data stored and searched across a network. This allows for a separation of concerns between data providers and academic groups, and enables the data provider to accept some annotations while rejecting others, without negatively affecting progress of students and scholars. Experiments by Huygens ING and NISV have resulted in a first experimental stand-off annotation repository named Antioch in 2017. Depending on available funding, Antioch is expected to be implemented as a product by 2020.

### *Structured Data*

Development of the Timbuctoo product (<https://timbuctoo.huygens.knaw.nl>) was initiated in 2014 and is furthest advanced. It benefitted from significant funding through CLARIAH-CORE and Golden Agents, resulting in version 5, which was released in December 2017. Timbuctoo is a data store capable of handling the essential provenance and variation in interpretation that is typical for humanities hermeneutical research. It is also scalable to large amounts of structured semantic data. Timbuctoo is implemented for various parties such as Huygens ING, Oxford University, CLARIAH and the Golden Agents project, and requests have been received from Luxembourg University and ACDH-ÖAW in Vienna. National and international usage of Timbuctoo is expected to significantly grow over the next several years.

The new Huygens ING structured data portal <https://data.huygens.knaw.nl> launched in 2017 serves as one of the implementations of Timbuctoo. Through the portal, datasets like the Biographical compendium to Dutch academia (DWC), the Charter Portal, and data in the Migrant: Mobilities and Connection project have been released. A second Timbuctoo 5 implementation serves CLARIAH datasets (<http://anansi.clariah.nl>).

### *Images*

Huygens ING makes available a large number of images such as facsimiles of original sources as well as digitised books. IT ran several experiments with existing image repository systems in late 2015, and eventually settled on IIF (<http://iif.io>). Since then, IIF has grown significantly and provides interoperability with a large number of international image repositories varying from the Oxford Bodleian Library, the Vatican Archives and many national libraries. The Huygens ING IIF repository was first implemented in 2016. Tests were performed, and features like Pergamon Images were added throughout 2017. Final migration of the Huygens ING collection is expected by mid-2018 with the large RGP (Rijks Geschiedkundige Publicatiën/ National Historical Publications) resource available on <https://rgp.huygens.knaw.nl> late 2017. A beta for the entire collection is available at <https://beta.resources.huygens.knaw.nl>.

## 7. Collaboration and valorisation

### 7a. Collaboration

Huygens ING maintains a broad range of alliances and is well embedded in the world of research. Eight senior employees are professors at a Dutch university and hence provide an active link with the humanities research and education at universities. Many humanities students complete a placement at Huygens ING. In research projects, Huygens ING collaborates with a large number of national and international partners. However, the institute is keen to make use of new collaborations when the opportunity presents itself and it goes actively in search of new connections. Below, we will describe the outlines of ongoing and anticipated new joint ventures. A list of partners is attached in annex to this programme.

#### ***Collaboration in HuC context***

In the Humanities Cluster, Huygens ING cooperates closely with the Meertens Institute and the International Institute of Social History. That collaboration already covers the business operations and support functions. The IT departments will be merged in the course of 2018. Collaboration also exists in relation to the development and management of collections. The institutes collaborate closely on developing CLARIAH, the infrastructure for digital humanities. Content is exchanged, including in shared research projects. In the course of 2018, it will be investigated whether the Meertens Institute and Huygens ING would benefit from collaborating more closely in terms of content.

Collaboration on research projects also takes place with other KNAW institutes in the domain of Humanities (NIOD, KITLV, NIDI, Fryske Akademy), or the options for collaboration are at least explored. The ambition is to intensify any promising collaboration.

#### ***Collaboration projects with universities and research institutes***

Huygens ING is an active **partner** in significant international organisations in the field of text editions and opening up sources. This applies to the European Society for Textual Scholarship (ESTS), the most important European organisation in relation to scholarly editions, and to Porta Historica, an organisation for researchers and institutes dedicated to opening up historical sources. Huygens ING was a partner in the successful Digital Scholarly Editions Initial Training Network (Marie Curie) and is committed to acquiring grants for a follow-up to this European training project for scholarly editors, together with international partners. The University of Antwerp in particular is an important partner, including for research into the origin of literary works and the process of creative writing.

Furthermore, the institute participates in the COST Action CA16204 Distant Reading for European Literary History.

Not only has Huygens ING already been substantially active for a very long time in the **Digital Humanities**, but also on an organisational level, it is strongly involved in developing new initiatives. The institute played a role in the international Text Encoding Initiative community, and it still does. Researchers of Huygens ING were closely involved in setting up Digital Humanities Benelux (DH Benelux), an informal alliance of digital humanities researchers and research groups from Belgium,

the Netherlands and Luxembourg. Annually, this collaborative arrangement organises a conference held at a different institute each year in one of the three countries. In 2014, Huygens ING organised the first DH Benelux in The Hague in association with the National Library of the Netherlands, and in 2018, it is organising the fifth edition in Amsterdam, together with the HuC partners. DH Benelux has English as its main working language and it also attracts researchers from outside the Benelux. Several employees of Huygens ING sit on the DH Benelux Steering Committee. One colleague is currently Chair of the Steering Committee of the Alliance of Digital Humanities Organizations (ADHO), the umbrella association of digital humanities associations around the world.

Huygens ING is the **budget holder** for two organisations that are important for the work of Huygens ING. The Royal Netherlands Historical Society (KNHG) is the main professional organisation of Netherlands historians and it publishes the leading magazine for Dutch history (*BMGN/Low Countries History Journal*). Together with the KNHG, Huygens ING maintains the website Historici.NL. The Research School for Political History fulfils an important role in training doctoral candidates in the area of political history and scientific exchange at national and international level. Just as Huygens ING, KNHG and OPG contribute to the infrastructure for the discipline of history in the Netherlands. When synergies are an option, that collaboration will receive further impetus in the next period.

Huygens ING maintains strong ties with all university history departments in the Netherlands and Flanders, in the form of joint grant applications, teaching and guest teaching, professorships, PhD supervision and examination and co-authorship of publications. This is also true for a number of universities outside the Netherlands and Flanders, if less frequently and less intensely. Huygens ING also participates in most research schools in the relevant fields in the Netherlands, not just in the in-house Research School for Political History. These different channels offer convenient ways to directly disseminate Huygens ING publications and data sets to the academic community. They also provide our projects with a steady influx of trainees and volunteers.

Huygens ING has already an intensive **collaboration** with the Descartes Centre for the History of Science and Science Philosophy of the University of Utrecht, but also collaborates with similar, recently established centres at other universities such as the University of Amsterdam and the VU Amsterdam. In order to promote national and international collaboration, the History of Knowledge department is exploring the feasibility of a centre in which research into the dynamic processes in knowledge cultures of this research group can be reinforced by experts, post-doctoral researchers, doctoral students and research master students from within and outside the Netherlands, to continue shaping this line of research and to give it greater visibility. Also internationally, there is a lot of collaboration in the field of the history of science, such as with the Max Planck Institut für Wissenschaftsgeschichte in Berlin, Princeton University and the University of Minnesota for the project Transnationality in the History of Knowledge and Literature. The collaboration with the University of Oxford for the Huygens ING CKCC/ePistolarium project and the Cultures of Knowledge project in Oxford will be continued. Close collaboration is anticipated with the Czech Academy of Science, the Thomas Institut in Cologne and the Institut de recherche et d'histoire des textes (IRHT-CNRS) in Paris.

### **Heritage institutions**

Our work on editions and opening up sources involves intensive contact with heritage institutions. With the main ones, we already have ongoing collaboration projects that are referred to elsewhere in this programme. The institutes concerned are the Dutch National Archives (Nationaal Archief), the National Library of the Netherlands (Koninklijke Bibliotheek), the Royal Archives (Koninklijk Huisarchief), the Literary Museum (Literatuurmuseum), the RKD - Netherlands Institute for Art History (RKD-Nederlands Instituut voor Kunstgeschiedenis), and the Rijksmuseum. The collaboration with the Van Gogh Museum regarding the letters by Vincent van Gogh will continue in the next programme period in order to update [www.vangoghletters.org](http://www.vangoghletters.org). In addition, this project has led to a similar collaboration with the RKD on the written material of Piet Mondrian, which will span the entire programme period. The correspondence of artists will become a key subject for the follow-up to the Digital Scholarly Editions Initial Training Network, provided the European grant applied for is awarded.

With all these institutions, new collaboration projects are in the pipeline in addition to those already in progress. Huygens ING endeavours to be a logical collaboration partner for these institutes to create access to their collections for scholarly research. Furthermore, there is international collaboration with heritage institutions that hold or are interested in collections of Dutch material, such as the (Women's) Early Modern Letters Online resource of Oxford University/the Bodleian Library, as part of which Huygens ING makes data sets available with metadata and digitised letters of the correspondence of Dutch and Frisian stadtholder's wives and those of Johan de Witt, or the National Archives in Kew, where Huygens ING is opening up Dutch letters in the Prize Papers.

### **7b. Valorisation**

Huygens ING shares its knowledge in many ways and with different groups that partially overlap each other: a broad and interested public, colleagues, lecturers and students, fellow researchers and policymakers. In some cases, sharing knowledge leads to a collaboration with private partners, with additional economic objectives.

#### **Broad audience**

The general public can learn in different ways about the research performed by Huygens ING. Some of the editions attract a wide range of interest. Within the Dutch language region, much interest exists in the edition of works by Willem Frederik Hermans, which are visibly present in book shops. Far outside the Dutch language region, the same applies for book editions from the Erasmus project and for the edition of letters written by Vincent Van Gogh, in book format in various languages but particularly also on a website (in English) accessible to everyone. With the edition of letters and writing by Piet Mondrian, the institute has a valuable successor on its hands for the Van Gogh letter project in the next programme period.

In 2018, a project will be completed called *Wereldgeschiedenis van Nederland*, to be published in book format. Partly thanks to the publisher Ambo-Anthos, it will receive large-scale public attention. A few other projects target a broad audience in their dissemination, including the concluding book publication on *The Riddle of Literary Quality*.

Together with the Literatuurmuseum, Huygens ING publishes the website [www.literatuurmuseum.nl](http://www.literatuurmuseum.nl), where employees of Huygens ING publish accessible contributions about Dutch literature in context. Every year, at least two substantial Huygens ING contributions will be published on this website obtaining a wide reach. The collection of the Literatuurmuseum not only determines the topics of these contributions but also influences the selection of new, short-term Huygens ING projects that on completion can also be presented to a wider audience of interested readers via the website [literatuurmuseum.nl](http://literatuurmuseum.nl).

As in previous years, researchers will also submit their contributions to **radio and television**. With the Maritiem Portal and the forthcoming Portal for Water History, the Huygens ING reaches the public at large as well as an extensive range of the (heritage) institutions involved. Researchers also regularly pick exhibitions to share knowledge with a wider audience, for example a hall in the Mondriaanzalen in the Town Hall of The Hague, dedicated to correspondence that will be included in the permanent De Stijl section of this museum. Huygens ING is involved in the preparation of an **exhibition** in the Rijksmuseum about *Curiosity and Wonder in the Early Modern Low Countries* (1550-1730), to be shown in 2019, and it expects to also make other contributions to exhibitions.

#### *Colleagues, lecturers and students*

In the coming years, Huygens ING goes in search for new forms of disseminating editions that will pay special attention to the education system. It will happen in collaboration with institutions such as the Literatuurmuseum.

In some projects, anyone interested with an affinity for academic research can make their own contributions to the research, such as in a number of Huygens ING online editing projects in which people from outside the institute collaborate, for example by transcribing handwritten texts, which are made available as scans on a special web page for that purpose. This is a form of *citizen science* which Huygens ING already has broad experience in, and which it would like to develop further in HuC context and possibly in collaboration with existing platforms such as 'Veel handen'. For that purpose, it will be examined how the support of the citizen scientists can best be organised in order to optimise the mutual usefulness for the public and for the research projects.

#### *Fellow researchers*

In addition to editions and source publications, many scientific articles will be published as usual, stemming from the work on the editions and from analytical research. Huygens ING aims to get its work published not only in scientific publications in international peer-reviewed journals, but also in prestigious Dutch (language) journals. Researchers are furthermore encouraged to share their knowledge with a wider public when the subject is suitable. For the selection of new research projects, we try to strike a balance between projects likely to have a broader appeal and projects likely to generate primarily scholarly debate.

#### *Policymakers*

The research and work performed by Huygens touch on a great number of individual questions on the National Science Agenda (NWA), particularly involving the route 'Living history'. This is for instance the case for the new project *The Riddle of the Literary Canon*, which answers the NWA question 'How objective are canons?' (<https://vragen.wetenschapsagenda.nl/cluster/hoe-objectief->

[zijn-canons](#)) The almost completed project The Riddle of Literary Quality has demonstrated that prevailing opinions on what is literature are to a large extent subconsciously influenced by the gender of the author, following on from implicit preconceptions, including regarding differences in the worth of literary genres. Since this has become more measurable in the works themselves, it is possible to analyse the development of the literary canon more objectively than ever before. We expect patterns of cultural exclusion to become more exposed in a manner useful to a wider social discussion on inclusiveness and diversity.

Another project relevant to policymakers is research into the process of creative writing; it is particularly significant for literary museums and archives. Since the creative process of modern authors largely occurs in a digital context, it has major consequences for the type of legacy left by authors and for the ways in which literary museums collect their material and make or keep it accessible. Huygens ING will be able to play an advisory role for those institutes.

#### *Private partners*

The project The Riddle of Literary Quality in particular generated a huge amount of interest in the publishing industry. Huygens ING is collaborating with the national research institute for mathematics and computer science (Centrum Wiskunde en Informatica, CWI) and with several private publishing partners on a pilot study, including into the creation of stilometric resources for the evaluation of literary manuscripts and the correction of software to compile recommendations for different types of readers. We are looking for a form of collaboration that will allow researchers to expand their scope for research, with the support of publishers, while the result of the research would not only benefit the publishing world as a whole, but could also lead to fundamental scientific publications that can be built on in the future. This form of collaboration with the commercial sector is still quite uncommon in the disciplines in which Huygens ING operates, but it is expected to generate practical new options to valorise research outcomes, once the right balance has been struck.

If closer collaboration can be achieved with the Meertens Institute in relation to Dutch culture, history and language in the forthcoming programme period, it will undoubtedly result in more and sometimes also different valorisation opportunities than those outlined above.

Annex: Institutions collaborating with Huygens ING

*STRUCTURE AND CONTENT*

Meertens Instituut  
Huygens ING  
CLARIN  
DARIAH  
INT  
Beeld en Geluid  
KNHG  
Fryske Academie  
(W)EMLO

*Heritage institutions*

Nationaal Archief  
Brabants Historisch Informatie Centrum (Den Bosch)  
Regionaal Historisch Centrum Limburg te Maastricht  
Stadsarchief Den Bosch  
Regionaal Archief Tilburg  
RKD  
Rijksmuseum  
Literatuurmuseum  
KB  
Centrum Internationale Erfgoedactiviteiten  
UBA  
Stichting Réveil Archief  
Coornhert Stichting  
Expat Archive Centre  
National Archives, Kew/Londen  
UBL  
Koninklijk Huisarchief  
Maatschappij der Nederlandse Letterkunde  
Tresoar  
Katholiek Documentatie Centrum Nijmegen  
Rijksdienst voor Cultureel Erfgoed RCE  
Maritiem Museum Rotterdam MMR  
Het Scheepvaartmuseum HSM  
DEN – Netwerk Digitaal erfgoed  
International Network of Editors of Diplomatic Documents

*Universities and research institutes*

Ecole Nationale des Chartes  
Institute of Historical Research  
Institut für Mittelalterforschung Wenen  
Commission Royale d'Histoire / Koninklijke Commissie voor Geschiedenis, Brussel  
OPG  
RUG  
OU  
VU  
UU

UvA  
EUR  
UL  
UDeft  
UWageningen;  
Leuven University  
Gent University  
Antwerp University  
Universiteit Maastricht  
Universität Oldenburg  
Universität Wien  
Oxford University  
Curtin University  
Edith Cowan University  
Central Queensland University  
NIDI  
NIOD  
Max Planck Institut für Geistesgeschichte, Berlin  
University of Oxford  
Czech Academy of Science  
Austrian Academy  
Thomas Institut (Cologne)  
Institut de recherche et d'histoire des textes (IRHT-CNRS)  
Princeton University  
University of Minnesota  
University of Luxembourg  
University of Goettingen  
Austrian Academy  
Nederlands Instituut, St. Petersburg  
Eötvös Loránd Universiteit, Boedapest

*Private partners*

Microsoft  
Several Publishing houses and organisations of publishers

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