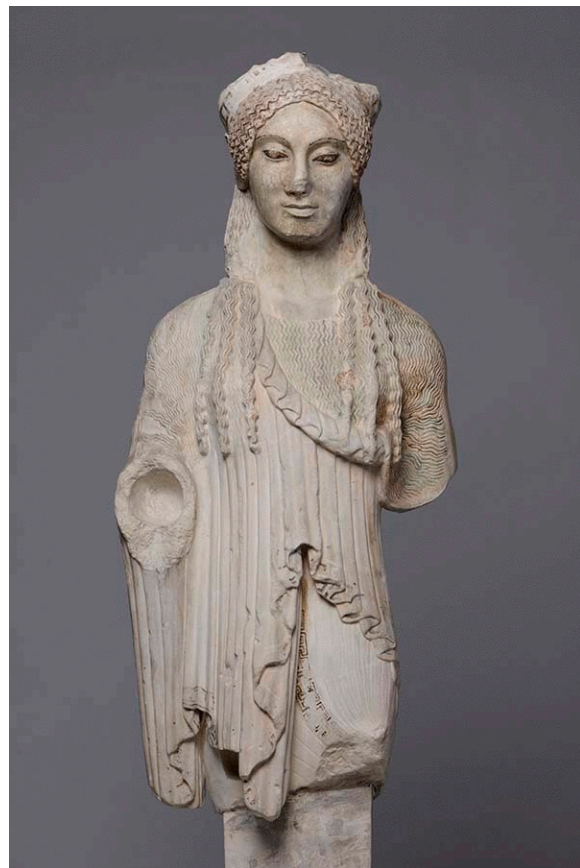


## I. CHALLENGES

# 1 What is Digital Image and Artefact Science actually researching?

Prof. Dr. Martin Langner

Schreibman / Siemens / Unsworth (2004) Kap. 1–12; Schreibman / Siemens / Unsworth (2016) Kap. 32–37; Jannidis / Kohle / Rehbein (2017) Kap. 1. 2



? WHAT IS A DIGITAL IMAGE AND ARTEFACT SCIENTIST?



## 1. IMAGE AND ARTEFACT SCIENCES

- a) Image Studies
- b) Material Culture Studies

## 2. DIGITAL HUMANITIES / EHUMANITIES

- a) History
- b) Tasks and goals
- c) Reservations and the opportunities

## 3. AREAS OF APPLICATION

- a) Overview
- b) Strengths and weaknesses





## FUNDAMENTALS OF IMAGE STUDIES

The **expanded concept of the image** encompasses all historical and medial forms of the image: two-dimensional images and graphics, plastic pictorial works and artefacts, photographs, electronic and digital images, virtual spaces.

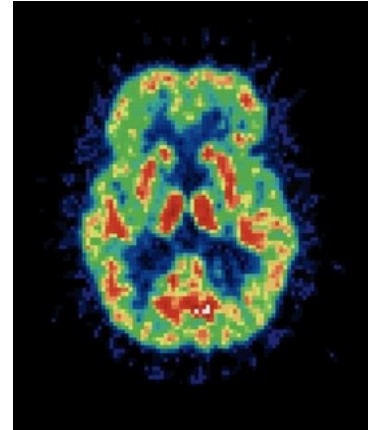


Image Studies go beyond analogue and virtual pictures and also research immaterial images and ideas.





## FUNDAMENTALS OF IMAGE STUDIES

The orientation towards a system of images and thus a **general concept of the image** that covers historical, social or religious differences is controversially discussed.



## FUNDAMENTALS OF MATERIAL CULTURE

**Material Culture Studies** attempt to interpret things not as expressions of an idea, but as expressions of human actions and emotions, and to determine their significance ("**Dingbedeutsamkeit**") in the everyday lives of their owners and users.



Krater = Mixing wine



Strigilis = Toilet



Alabastron = Cosmetics



Coin = Payment



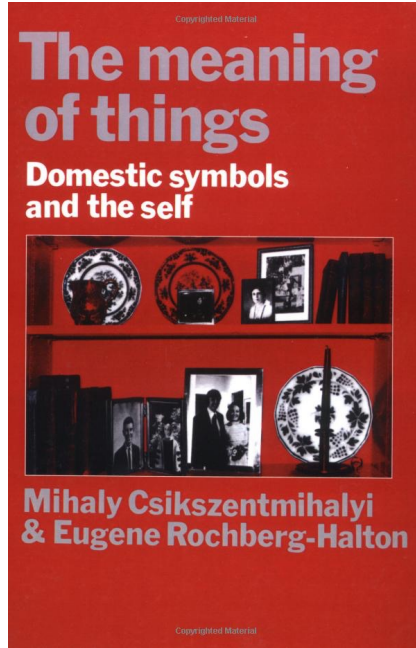
## FUNDAMENTALS OF MATERIAL CULTURE

Things constitute the everyday environment, the living environment and living ambience of people and shape the possibilities of their actions ("**environmental intentionality**"). They make people become the owners of things and define their identity.



## RECEPTION ANALYSIS

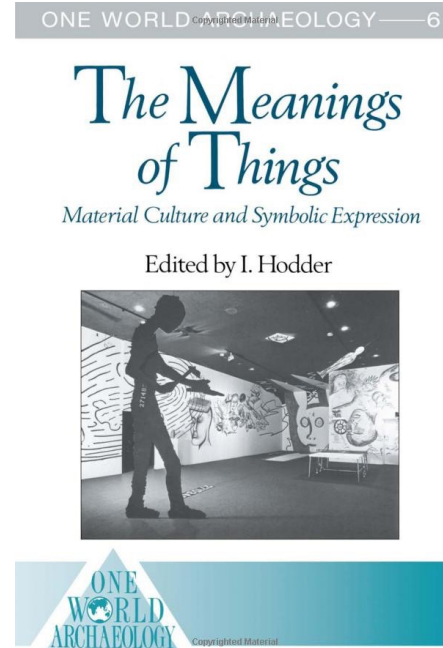
Importance  
as relevance, as  
subjective  
importance, as  
perception



(Cambridge 1981)

*"Meaning as an  
expression of  
experience"*

## SEMIOTICS



(London 1989)

Meanings form  
structures with a  
character-  
theoretical  
function

*"Things mean  
something that is  
communicated with  
them"*







## DISCIPLINES OF VISUAL STUDIES



Art history as a **paradigmatic image science** or

Horst Bredekamp, Bildwissenschaft, in: Metzler Lexikon Kunstwissenschaft. 2nd edition (Metzler: Stuttgart 2011)

as an **interdisciplinary research area** that combines stylistic and art historical research with scientific analyses and media analytical methods.

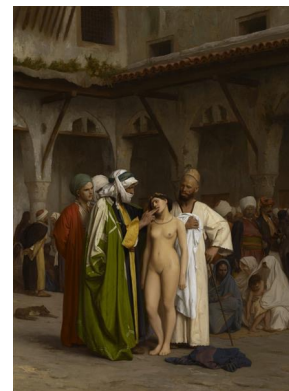
Hans Belting, Bild-Anthropologie. Entwürfe für eine Bildwissenschaft. 4th edition (Fink: München 2011)





## DISCIPLINES OF VISUAL STUDIES

In empirical disciplines such as ethnology, a distinction is made between **objectivations** (i.e. materially tangible and physically perceptible images) and **subjectivations** (i.e. "inner images" such as pictorial memories, ideas, prejudices and stereotypes).



Accordingly, the **practice of using images** represents a central research focus, as production methods, distribution (dissemination and marketing), reception (perception) and communication (passing on, handing down) of images are examined.

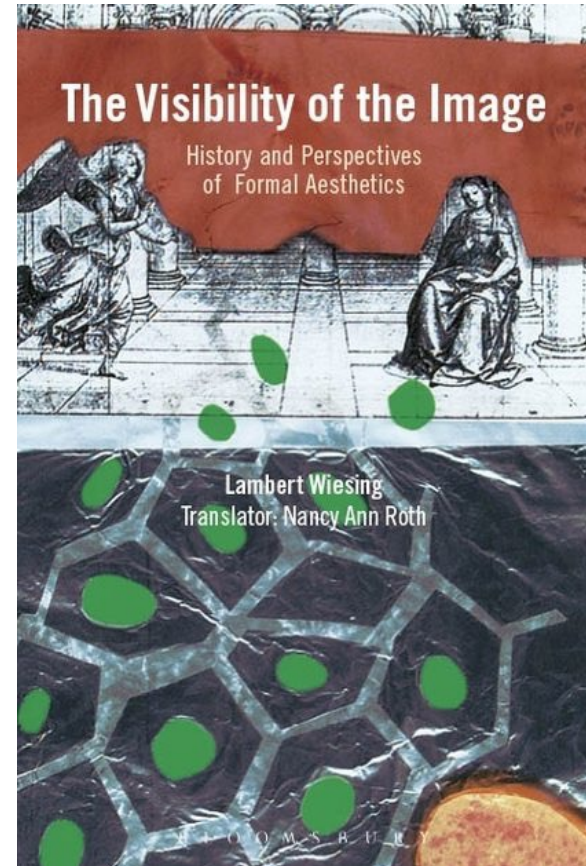




## DISCIPLINES OF VISUAL STUDIES

**Image theory**, as the complementary question of what an image is in the first place, is not concerned with what has already been categorised as an image, but with the categorisation itself.

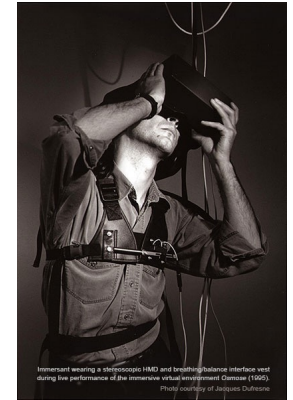
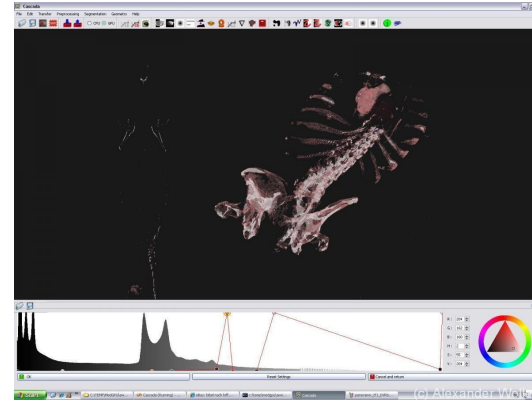
Lambert Wiesing, *The Visibility of the Image. History and Perspectives of Formal Aesthetics* (Rowohlt: Reinbek bei Hamburg 1997).





## DISCIPLINES OF VISUAL STUDIES

**Computational visualistics** as the Computer science part of image science includes all pictorial information ("image data") such as computer graphics, digital image processing or information visualisation and their algorithmic formalisation.



In the digital world, we are not only talking about image itself, but increasingly about image spaces that are organised in a panoramatic or virtual manner. Oliver Grau has been advocating a "theory of complex images" since the 2010s.

Oliver Grau, *Virtuelle Kunst in Geschichte und Gegenwart. Visuelle Strategien* (Reimer: Berlin 2002)





## Orientation of Image Studies

Image Studies is a **cross-sectional discipline** (or an interdisciplinary area) at the interface of

Archaeology,  
Art History,  
Philosophy,  
Anthropology,  
Psychology,  
Aesthetics,  
Cultural Studies,  
Visual Communication and Design,  
Folklore/European Ethnology,  
Sociology,  
Media Studies,  
Communication Studies,  
Film Studies.

but also Semiotics,  
Political Science,  
History,  
Computer Science,  
Cognitive Science,  
Psychology,  
Biology,  
Physics,  
Medicine.

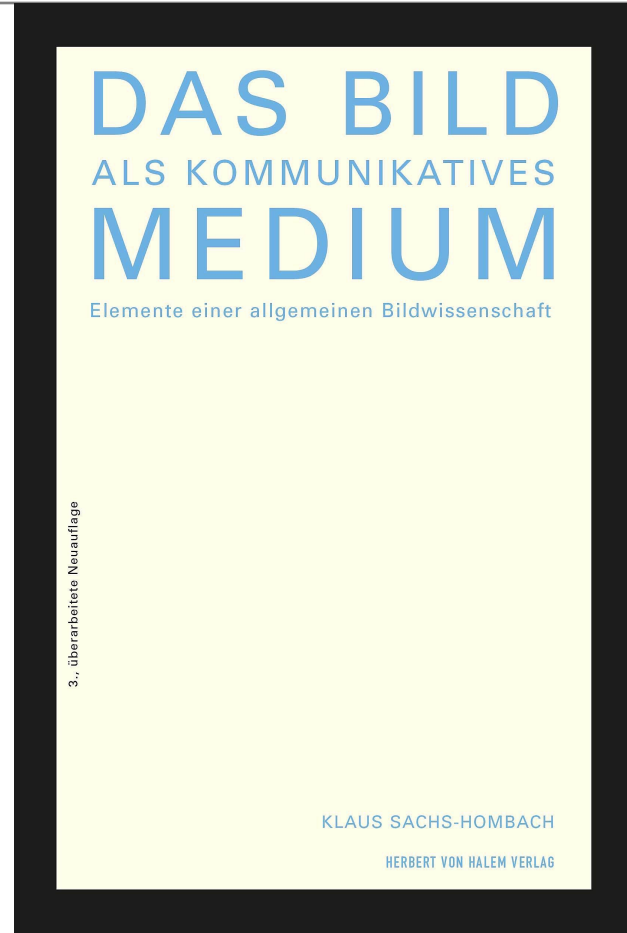




## FUNDAMENTALS OF IMAGE STUDIES

- **image syntax**
- **image semantics**
- **image pragmatics**

Klaus Sachs-Hombach, Das Bild als kommunikatives Medium. Elemente einer allgemeinen Bildwissenschaft (Köln 2003); [http://www.gib.uni-tuebingen.de/netzwerk/glossar/index.php?title=Pragmatik, Semantik, Syntax](http://www.gib.uni-tuebingen.de/netzwerk/glossar/index.php?title=Pragmatik,_Semantik,_Syntax) (with literature)

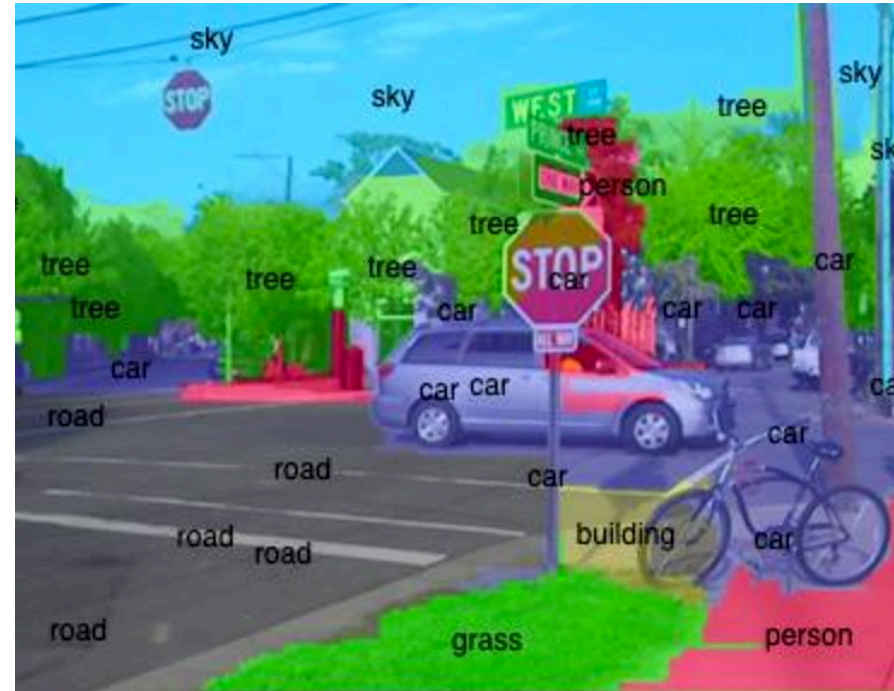




## IMAGE SYNTAX

formal (measurable) structure of images  
and visual phenomena

<http://www.gib.uni-tuebingen.de/netzwerk/glossar/index.php?title=Bildsyntax> (mit Literatur)



Measurement and interpretation of shapes and colour values (e.g. computer vision, image retrieval, face recognition)

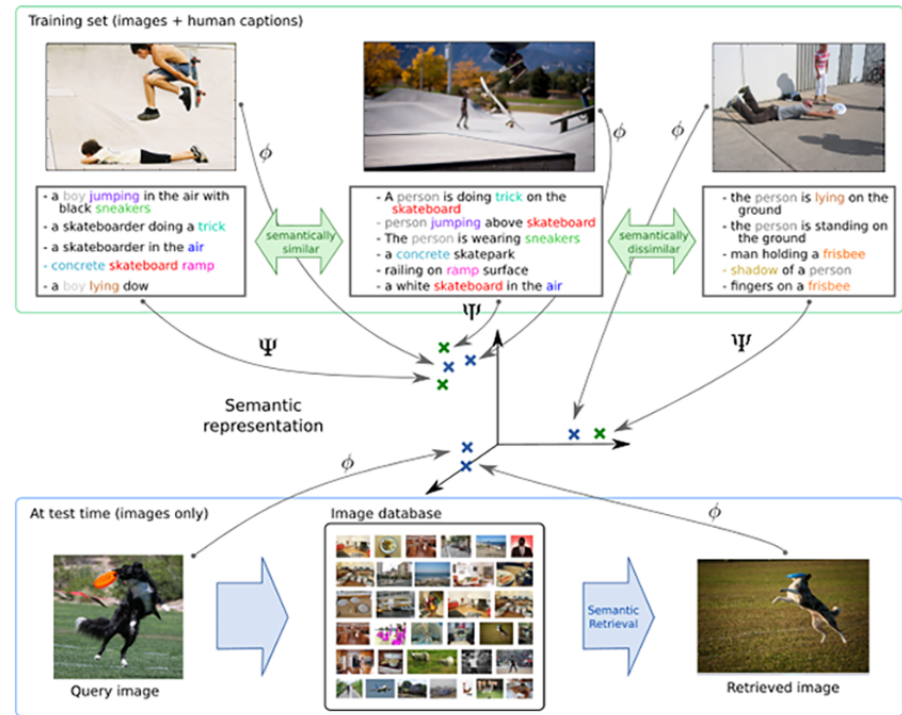




# IMAGE SEMANTICS

Reference to pictorial signs, distinction between intensional meaning (pictorial content) and extensional meaning (pictorial reference, e.g. symbols)

<http://www.gib.uni-tuebingen.de/netzwerk/glossar/index.php?title=Bildsemantik> (mit Literatur)



Measurement and interpretation of similarity relations (e.g. semantic image retrieval, concept mining)







## IMAGE PRAGMATICS

Use and reception of pictures, i.e. comparison of the meaning of the sign with the situation in which the sign is used.

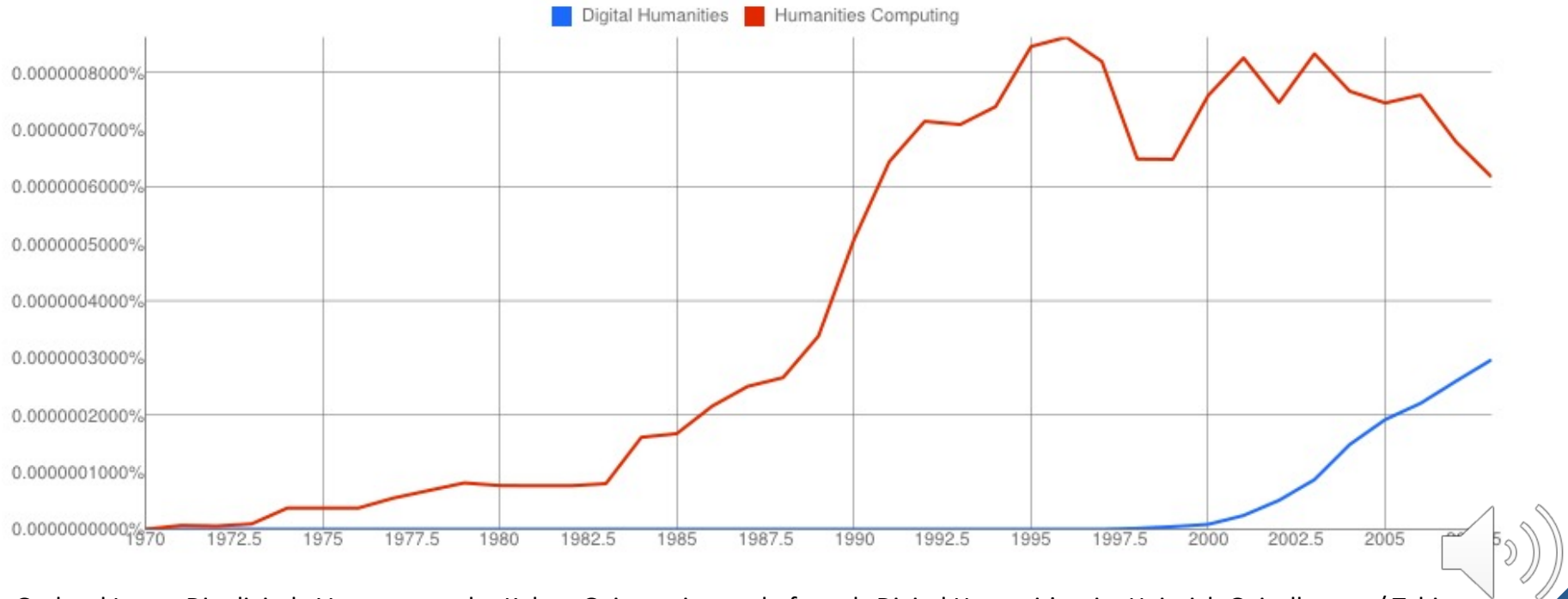
<http://www.gib.uni-tuebingen.de/netzwerk/glossar/index.php?title=Bildpragmatik> (with Literatur)



Reconstruction and measurement of the production and reception context (e.g. eye tracking, virtual museums)



## Humanities Computing (Fokus auf Informatik) wurde zu einem neuen Feld in den Geisteswissenschaften: Digital Humanities (Fokus auf den Geisteswissenschaften)



Gerhard Lauer, Die digitale Vermessung der Kultur. Geisteswissenschaften als Digital Humanities, in: Heinrich Geiselberger / Tobias Moorstedt (Hrsg.), Big Data. Das neue Versprechen der Allwissenheit (Berlin 2013) 99–116



## THE EARLY BEGINNINGS

1949

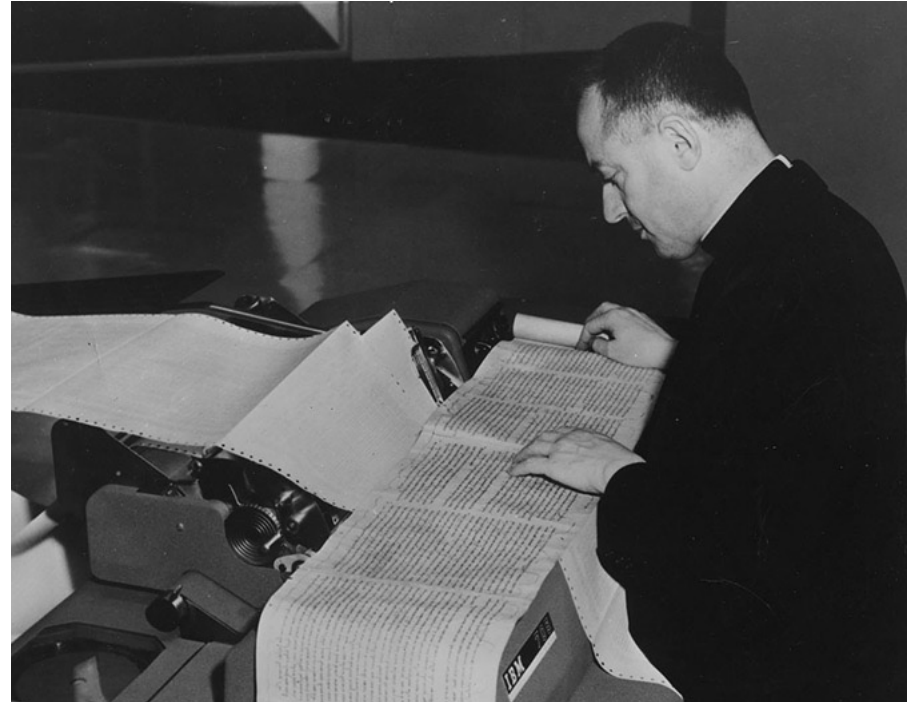
Roberto Busa SJ (1913-2011) &  
Thomas J. Watson (Founder of IBM)

Research on the term "presence" (praesens /  
praesentia)

Concordance of the complete works of St.  
Thomas

Edition in 56 volumes

<http://www.corpusthomisticum.org>



Roberto Busa in 1956 at a IBM Computer



“It is not right  
to say ‘no’  
before you  
have tried.”

„I knew, the day I was to meet Thomas J. Watson, Sr., that he had on his desk a report which said IBM machines could never do what I wanted. I had seen in the waiting room a small poster imprinted with the words: ‚The difficult we do right away; the impossible takes a little longer.‘ (IBM always loved slogans.) I took it in with me into Mr. Watson's office. Sitting down in front of him and sensing the tremendous power of his mind, I was inspired to say: ‚It is not right to say „no“ before you have tried.‘ I took out the poster and showed him his own slogan. He agreed that IBM would cooperate ... ‚provided that you do not change IBM into International Busa Machines.‘ „



R. Busa, *The Annals of Humanities Computing*. *The Index Thomisticus*, Computers and the Humanities 14 no. 2, 1980, 83–90



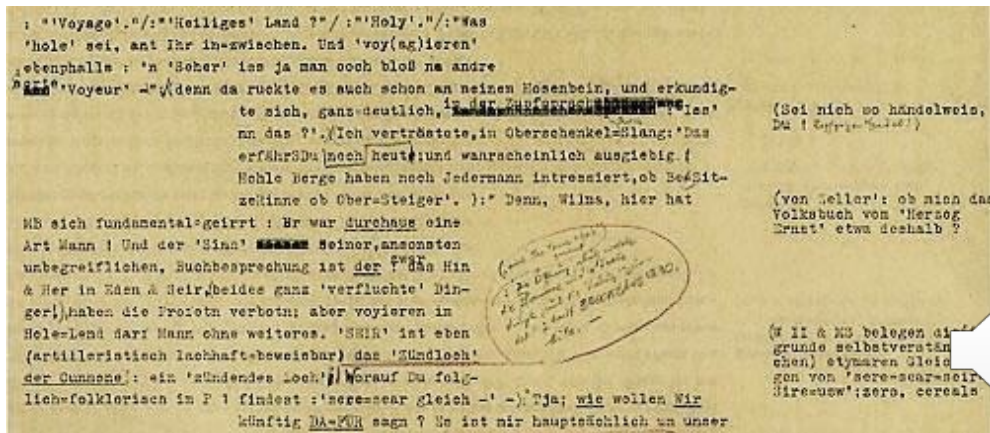
## ... DIGITAL

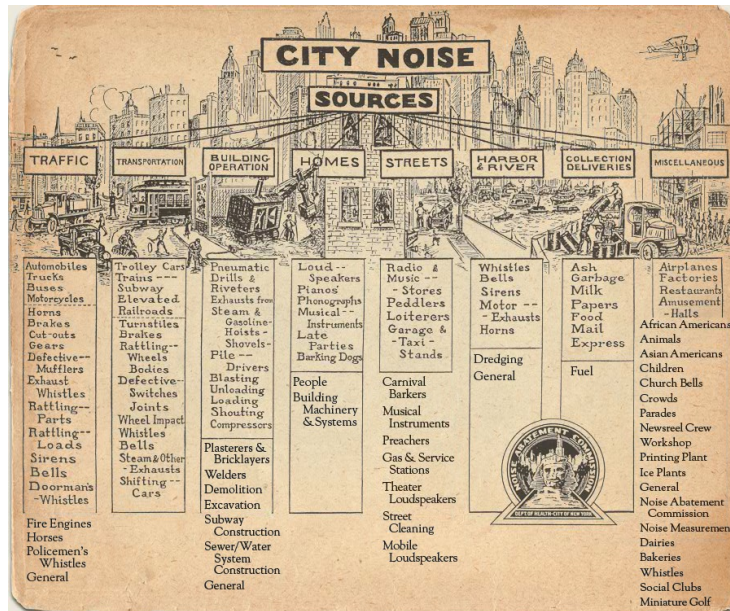
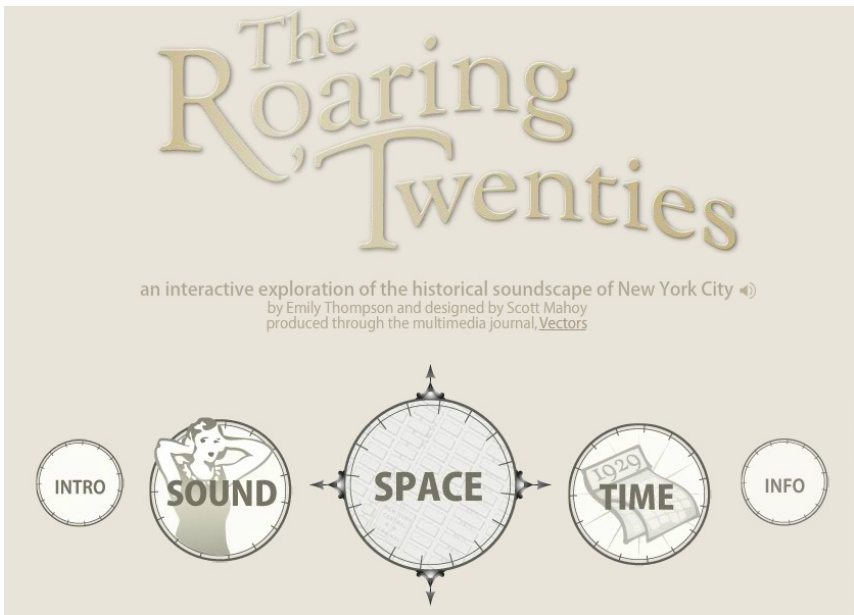
- editing
- researching
- archiving



## ... TOGETHER

- kollaborativ
- orts- und zeitunabhängig
- IT-unterstützt





E. Thompson (2004). The Soundscape of Modernity: Architectural Acoustics and the Culture of Listening in America, 1900-1933;

<http://vectorsdev.usc.edu/NYCSound/777b.html>

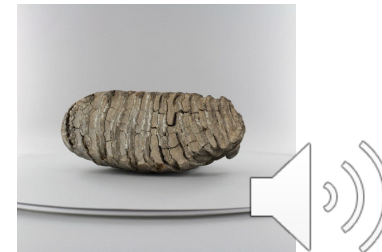
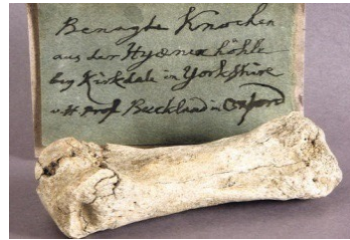
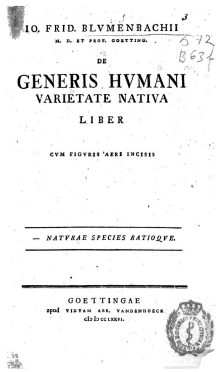


## Blumenbach online

Academy of Sciences, 15-year project

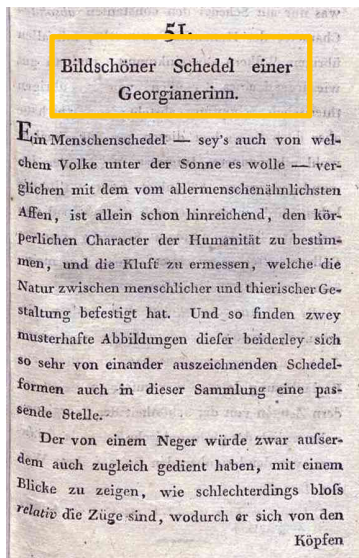
Johann Friedrich Blumenbach (1752–1840), founder of zoology and anthropology as scientific disciplines

approx. 10,000 printed pages & approx. 8,000 analog objects that are digitized in 2D and 3D



## Fachwissenschaftliche Beschreibungen

Digitized (text) with indexing in terms of form and content



Transcription with TEI metadata, e.g. title, place names, personal names, etc.

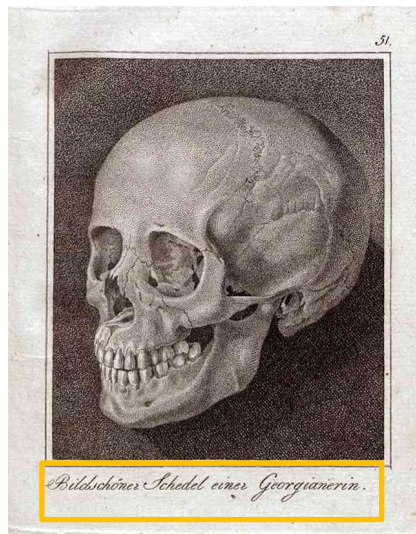
[Abbildungen naturhistorischer Gegenstände Heft 6 (1802)]

51.  
Bildschöner Schedel einer Georgianerin

Ein Menschenschedel — sey's auch von welchem Volke unter der Sonne es wolle — verglichen mit dem vom allermenschenähnlichsten Affen, ist allein schon hinreichend, den körperlichen Character der Humanität zu bestimmen, und die Kluft zu ermessen, welche die Natur zwischen menschlicher und thierischer Gestaltung befestigt hat. Und so finden zwey musterhafte Abbildungen dieser beiderley sich so sehr von einander auszeichnenden Schedelformen auch in dieser Sammlung eine passende Stelle.

Der von einem Neger würde zwar ausserdem auch zugleich gedient haben, mit einem Blicke zu zeigen, wie schlechterdings bloss *relativ* die Züge sind, wodurch er sich von den Köpfen

Digitized source (image in text) with metadata



3D digitisation with content-related and subject-specific metadata





# Digital Editions: Blumenbach online

The screenshot shows the website header with the title "Blumenbach – online" and a navigation menu with categories: HOME, Sammlungsobjekte, Literatur, Volltexte, and Bibliographie. Below the menu is a list of collection objects:

- Tahitler "Malayisch"**  
1794, Schädel-Decaden III (1795, S. 46-47)Dissertation Blumenbach (deutsche Ausgabe, 1798, Verzeichnis, S. 3)
- (297) Franzose**  
Franzose, blumenbachSammlung Nr. 382 (297); übermittelt durch Prof. v. Leveling
- Georgierin Caucasisch**  
Schädel-Decaden III (1795, S. 39)Dissertation Blumenbach (deutsche Ausgabe, 1798, Verzeichnis, S. 2)
- Wolfsammernmül, Backenzahn**  
1797, Handbuch der Naturgeschichte (6 ed., 1799: 121f.)
- Daxil-Ponhyr "Porfido rosso antico"**  
1761, Handbuch der Naturgeschichte (4 ed., 1791: 562, 620; 6 ed., 1799: 609)
- Vulkanischer Sand aus der Lava des Tanaga-Vulkans**  
Fundort: Tanaga Island, Andreanof Islands - Aleutian Islands - Aleutians West - Alaska - United States - North and Central America - World

Red arrows point from these items to various related content:

- A photograph of a human skull.
- A scientific illustration of a mole and a pencil.
- A photograph of a meteorite and a handwritten note: "Brocken von der äroolithen von Mauerkirchen 1768.".
- A snippet of XML code from a digital edition.
- A snippet of the original German text from a 1735 publication.

Meteorit von Mauerkirchen, Oberösterreich (ded. König Ludwig I von Bayern (1786 – 1868))





## THE MILLION BOOKS SITUATION

Of the approx. 130 million books published in the world, 30-40 million are digitised, e.g. in Google Books, Gutenberg, Early English Books online, ECCO, Evans, British National Corpus, Gallica, VD 16. / VD 17./ VD 18., TextGrid, Deutsches Textarchiv (DTA), Zeno.org ...



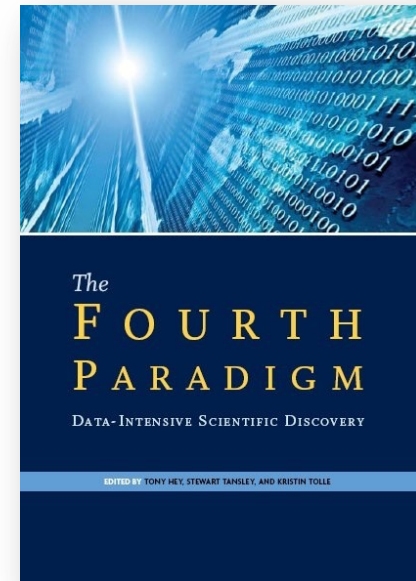
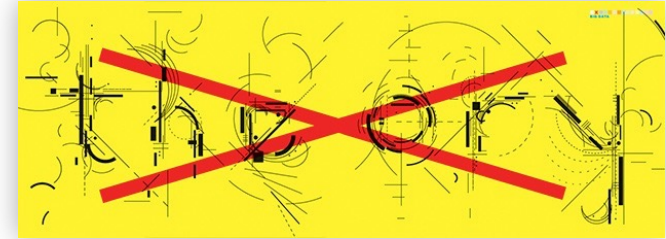


# A NEW PARAGDIGN?

Dealing with Data, Science Special (2011)

Chris Anderson, The End of Theory (2008)

Tony Hey, The Fourth Paradigm (2009)





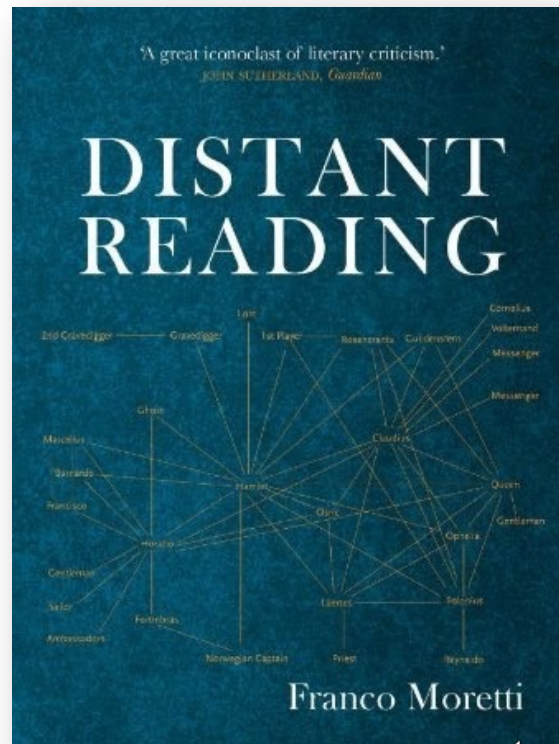
# CLOSE AND DISTANT READING

## Close Reading (≈qualitative)

Historical-hermeneutical  
interpretation of canonical  
texts

## Distant Reading (≈quantitative)

Indirect, formal search for  
(cultural) patterns in  
millions of sources



Franco Moretti, *Distant Reading* (Verso: London / New York 2013)



# CLOSE AND DISTANT VIEWING

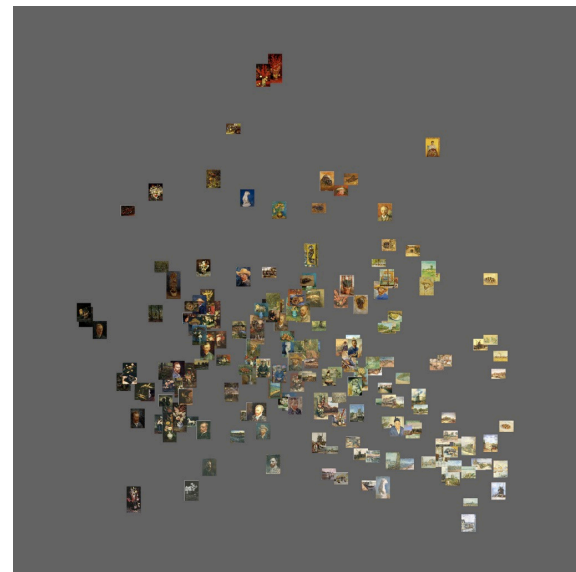
## Close Viewing (≈qualitative)

Historical-hermeneutical  
interpretation of works of art

Taylor Arnold & Lauren Tilton, Distant Viewing. Analyzing Large Visual Corpora, Digital Scholarship in the Humanities 2019, fqz013

## Distant Viewing / Cultural Analytics (≈quantitative)

Indirect, formal search for  
(cultural) patterns in  
millions of images



<http://lab.softwarestudies.com/2011/08/style-space-how-to-compare-image-sets.html>



# EXTENSION OF THE METHODS: ALGORITHMIC CRITICISM

Figure 4 shows how the combinations of the six terms, under two different

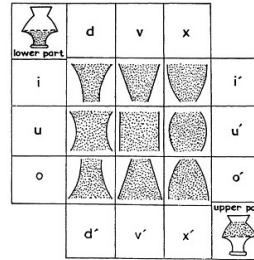


FIGURE 4. Pottery, main body: 9 elementary profiles.

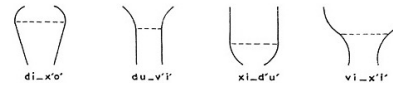
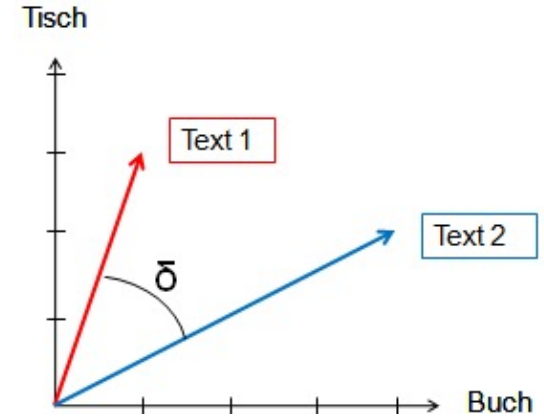


FIGURE 5. Pottery, main body: examples of code words for different shapes.



- Annotation and its standards
- Formalisation of questions and algorithmic thinking
- Learning statistical methods also in the humanities



## 'DIGITAL TURN'

a) Technical / technological situations for historical research have been improved considerably:

- new formats and tools (e.g. databases, GIS, 3D)
- new forms of communication (Web 2.0)
- Digital publishing
- Forms of visualisation

b) "Big data" enable new questions and answers in combination with conventional hermeneutics

c) Who is driving the development? Control or process from below?

Flat hierarchies in specialist communication and networking (specialist groups <-> "seizure of power by the nerd")



## ARE DIGITAL HUMANITIES A DISCIPLINE IN THEIR OWN RIGHT?

**Research tradition:** systematic development of infrastructure (corpora etc.)

**Aim:** more precise answers to traditional questions  
new answers to new questions?

**Working methods:** depending on the limitation / unlimitedness of the sources

Enabling tools (such as databases and digital editions) generate new research questions through the processes of quantification and visualisation.

=> Dynamism, new possibilities for knowledge development, empirical turnaround in the humanities? Genesis of a new discipline!





## METHODS

John Unsworth, *Scholarly Primitives: What methods do humanities researchers have in common, and how might our tools reflect this?* (2000)

Discovering / Retrieval

Annotating

Comparing

Referring

Sampling

Illustrating

Representing





## ACQUISITION AND MANAGEMENT

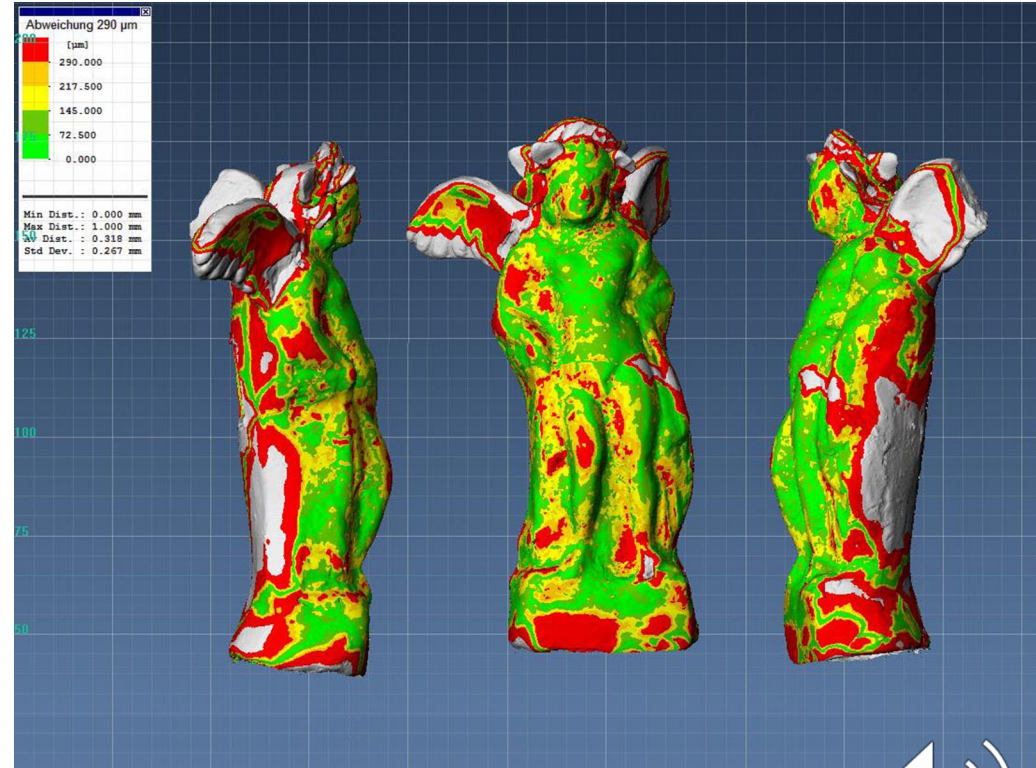
Accurate 3D digitisation of collections documents the current state of cultural assets, makes them globally accessible in repositories and enables further analysis.





## ANALYSIS AND VISUALISATION

Dimensional comparisons help to determine similarity in terms of workshops and trade networks, object mining and the reconstruction of historical perception.





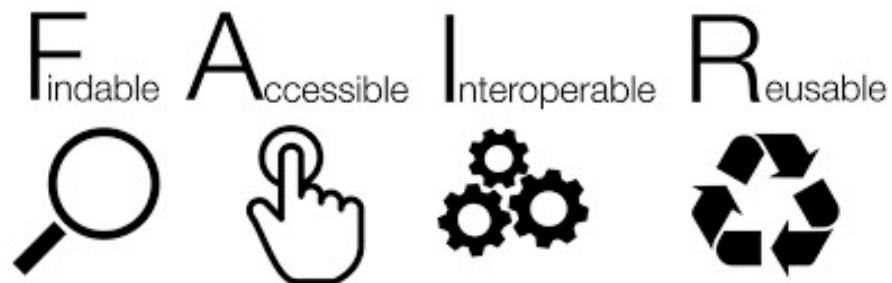
## PRESENTATION AND SIMULATION

Lost exhibitions can be reconstructed virtually and thus made tangible again.





## WORKING DIGITALLY



The Association of European Research Libraries recommends the application of the "FAIR Guiding Principles for scientific data management and stewardship" as a standard for data management. So far, only a few projects fully comply with these principles.





## Tasks of Digital Image and Artefact Science

- Further development of the digital capture of images and objects with regard to optimal digitisation methods in each case
- Development of database and archiving strategies for visual media products,
- Further development of working tools for (historical) comparative image and object analysis,
- Analysis and discussion of imaging methods,
- Deepening interdisciplinary research in the field of visual processes of thinking, learning and understanding,
- Exploration of historical and contemporary contexts of production, reception, adaptation, manipulation and distribution of designed works with digital methods,
- Theoretical specification of the term "digital image".



## PROBLEMS OF TRADITIONAL RESEARCH WITH THE DIGITAL HUMANITIES:

**normative** (usage rights)

**referential** (source criticism: problem of quotation, individual performance, unscientific provision of information / opinion)

**economic** (cost intensity with continuity / sustainability and time expenditure)

**mental** (researchers want to use data exclusively, individual research <-> research groups)

**institutional** (universities as 'chambers of the heart of knowledge' are superfluous)

**haptic** (knowledge of materiality is lost)

**in general** (feasibility determines the solution and thus often also the question)



## PROBLEMS OF TRADITIONAL RESEARCH WITH THE DIGITAL HUMANITIES

**=> The needs of researchers / research must be the yardstick! Here, too, the question determines the methods, i.e.**

- **Name content and goals ('roadmap')!**
- **Transparency of the algorithms**
- **Quality assurance / control of the data**

in general (feasibility determines the solution and thus often also the question)





## ASSOCIATIONS

Literary and Linguistic Computing (LLC)

Digital Humanities Quarterly (DHQ)

Humanist Discussion Group: <http://dhhumanist.org/>

Digital Humanities im deutschsprachigen Raum: <http://www.dig-hum.de/>

Assoc. Comp. Ling. SIG Lang. Tech. Humanities (SIGHUM): <https://sighum.wordpress.com/>

Computer Applications and Quantitative Methods in Archaeology (CAA): <http://caa-international.org>

IANUS - Forschungsdatenzentrum Archäologie & Altertumswissenschaften:  
<http://www.ianus-fdz.de>



## INTRODUCTIONS TO DIGITAL HUMANITIES

Schreibman, Susan / Siemens, Ray / Unsworth, John (Hg.), A Companion to Digital Humanities. Oxford 2004. (vgl. [www.digitalhumanities.org/companion/](http://www.digitalhumanities.org/companion/))

Schreibman, Susan / Siemens, Ray / Unsworth, John (Hg.), A New Companion to Digital Humanities. Oxford 2016.

Jannidis, Fotis / Kohle, Hubertus / Rehbein, Malte (Hg.), Digital Humanities. Eine Einführung. Stuttgart 2017.

Kohle, Hubertus, Digitale Bildwissenschaft. Glückstadt 2013.

Warwick, Claire / Terras, Melissa / Nyhan, Julianne, Digital Humanities in Practice. Facet Publishing 2012.

Virtuelles DH Museum der Uni Trier: <http://dhmuseum.uni-trier.de>



## I. CHALLENGES:

1. What does Digital Image and Artefact Science do?

## II. DIGITALISATION AND DATA MANAGEMENT:

2. Text Digitisation
3. Image Studies, the Digital Image
4. Materiality
5. Databases

## III. ANALYSIS:

6. Analysis of Images
7. Analysis of Objects
8. Analysis of Space and Time
9. Quantifying Meth



## IV. PRESENTATION:

10. Reconstruction,  
Simulation and Virtual  
Reality

11. Mediation (Virtual  
Museums, Augmented  
Reality and Gamification)

## V. WORKING DIGITALLY:

12. Project Planning,  
Collaboration and Research  
Data Management

13. Data Security, Law and  
Society

## TUTORIUM

with Marta Kipke

online

Please enroll at Stud.IP !





BASIC CONCEPTS OF  
IMAGE STUDIES

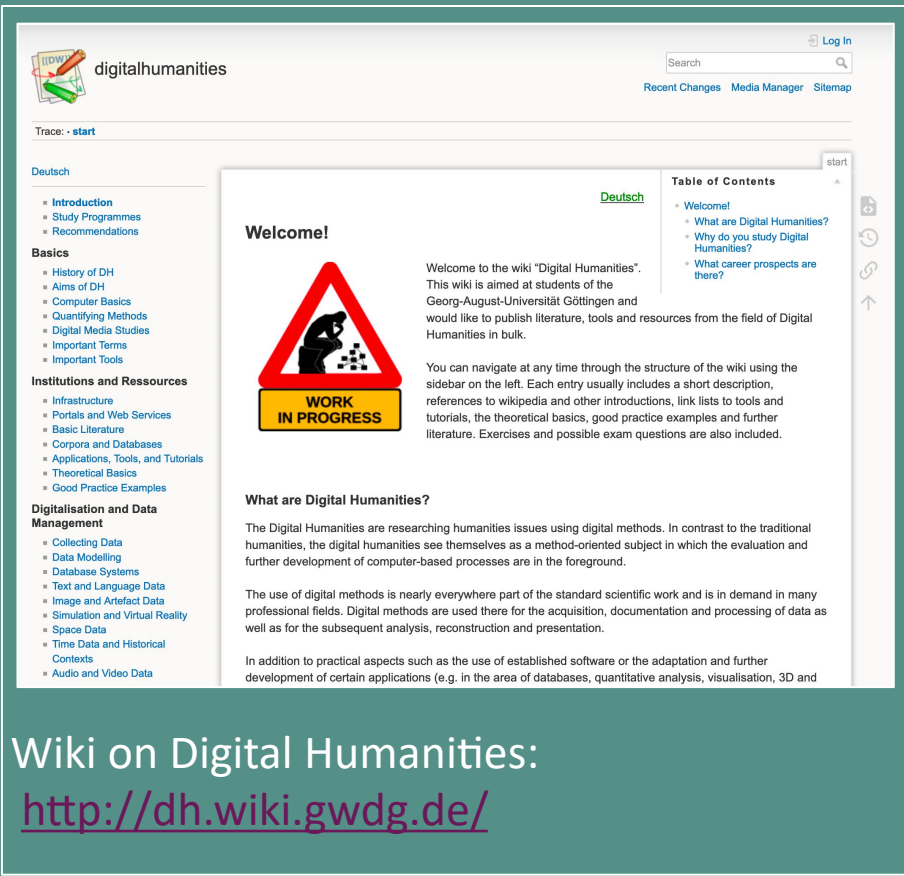
TASKS AND GOALS OF  
DIGITAL HUMANITIES

GOOD PRACTICE  
EXAMPLES



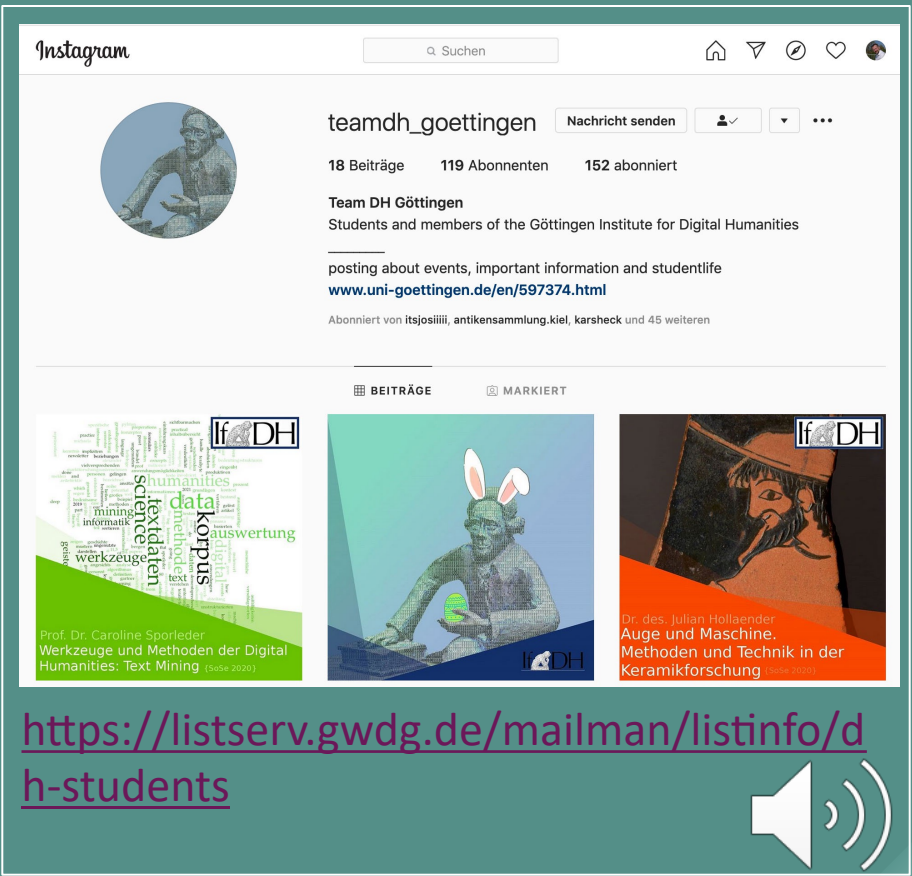


# WHAT YOU SHOULD KNOW

The screenshot shows the homepage of the digitalhumanities wiki. At the top left is the logo with the text "digitalhumanities". A search bar and navigation links like "Recent Changes", "Media Manager", and "Sitemap" are visible. The main content area features a "Welcome!" section with a red triangle warning sign that says "WORK IN PROGRESS". Below this, there are sections for "What are Digital Humanities?" and "Digitalisation and Data Management". A sidebar on the left lists various topics like "Introduction", "Basics", and "Institutions and Ressources".

Wiki on Digital Humanities:  
<http://dh.wiki.gwdg.de/>



The screenshot shows the Instagram profile for "teamdh\_goettingen". The profile picture is a circular image of a man with glasses. The bio states "Team DH Göttingen" and "Students and members of the Göttingen Institute for Digital Humanities". It mentions "posting about events, important information and studentlife" and provides the URL "www.uni-goettingen.de/en/597374.html". Below the bio are three posts: a word cloud, a man with a rabbit-ear filter, and a portrait of a man.

<https://listserv.gwdg.de/mailman/listinfo/dh-students>





# WHAT YOU SHOULD KNOW



**GEORG-AUGUST-UNIVERSITÄT GÖTTINGEN**

**Institut für Digital Humanities**

STUDIUM PERSONEN FORSCHUNG INSTITUT EVENTS

Q SUCHEN ENGLISH

**Institut für Digital Humanities**

PHILOSOPHISCHE FAKULTÄT

Die Digital Humanities (deutsch: „Digitale Geisteswissenschaften“) widmen sich der Erforschung geisteswissenschaftlicher Fragestellungen mit digitalen Methoden. In Abgrenzung zu den traditionellen Geisteswissenschaften verstehen sich die Digital Humanities als ein methodenorientiertes Fach, in dem die Evaluation und Weiterentwicklung von computerbasierten Verfahren im Vordergrund stehen.

Erweitern Sie Ihre digitalen Kompetenzen! Studieren Sie am Institut für Digital Humanities und profitieren Sie von den exzellenten Studien- und Forschungsbedingungen in Göttingen!

Das Institut wurde am 04.02.2019 in der Paulinerkirche feierlich eröffnet. Einige Impressionen finden Sie [hier](#). Bis zum Umzug in das neue Institutsgebäude befindet sich die Abteilung "Text und Sprache" im Heynehaus, Papendiek 16, und die Abteilung "Bild und Objekt" im Heinrich-Düker-Weg 12.

**SCHNELLEINSTIEG**

Lehrveranstaltungen im SoSe 2019 [Mehr... >](#)

Bachelor/Master [Mehr... >](#)

Zertifikatsprogramm Digital Humanities [Mehr... >](#)

[www.uni-goettingen.de/digitalhumanities](http://www.uni-goettingen.de/digitalhumanities)

**GCDH**

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Q

**Study DH in Göttingen**

DH in the MSc program applied computer science or in the MA program of the humanities faculty

[READ MORE](#)

**The Göttingen Centre for Digital Humanities (GCDH)**

GCDH is the cross-faculty institution of the [Georg-August-Universität Göttingen](#) that coordinates, carries out, and further develops research, teaching, and infrastructure activities at the [Göttingen Research Campus](#) in the field of Digital Humanities.

Digital Humanities (DH) is an area of research, teaching, and development concerned with the intersection of computing and the various disciplines of the Humanities. In Göttingen, DH is understood more broadly to also include the Social Sciences, Economic Sciences, and Law.

[www.gcdh.de](http://www.gcdh.de)





In your opinion, what are the challenges facing Digital Image and Artefact Science?

Slides 1–40

What are the reservations about Digital Humanities?  
How can you meet them?

Slides 39–40

What is Distant Reading /  
Distant Viewing?

Slides 28–29

What concept of the image underlies (digital) image studies?

Slide 4

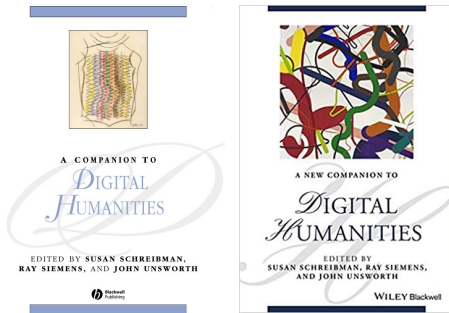
What are the tasks of Digital Image and Artefact Studies?

Slide 38

What would you like to see in the study of Digital Humanities?



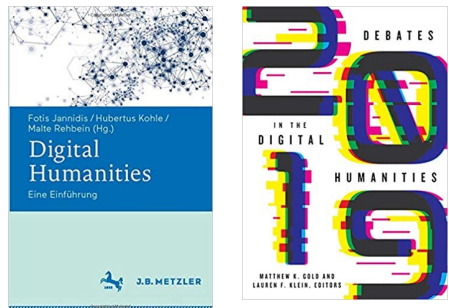




Susan Schreibman / Ray Siemens / John Unsworth (Hrsg.), A Companion to Digital Humanities (Blackwell 2004):

<http://digitalhumanities.org:3030/companion/>

Susan Schreibman / Ray Siemens / John Unsworth (Hrsg.), A New Companion to Digital Humanities, 2. Auflage (Blackwell 2016)



Fotis Jannidis / Hubertus Kohle / Malte Rehbein (Hrsg.), Digital Humanities: Eine Einführung, 2. Aufl. (J.B. Metzler 2019)

Matthew K. Gold / Lauren F. Klein (Hrsg.), Debates in the Digital Humanities 2019 (University of Minnesota Press 2019)



Hartmut Ernst / Jochen Schmidt / Gerd Beneken, Grundkurs Informatik: Grundlagen und Konzepte für die erfolgreiche IT-Praxis - Eine umfassende, praxisorientierte Einführung, 6. Auflage (Springer Vieweg 2016)

Jochen Schmidt, Grundkurs Informatik – Das Übungsbuch: 148 Aufgaben mit Lösungen (Springer Vieweg 2019)

Folie 1:

Folie 2:

Folie 3:

Folie 4:

Folie 5:

Folie 6:

Folie 7:

Folie 8:

Folie 9:

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Folie 16:

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