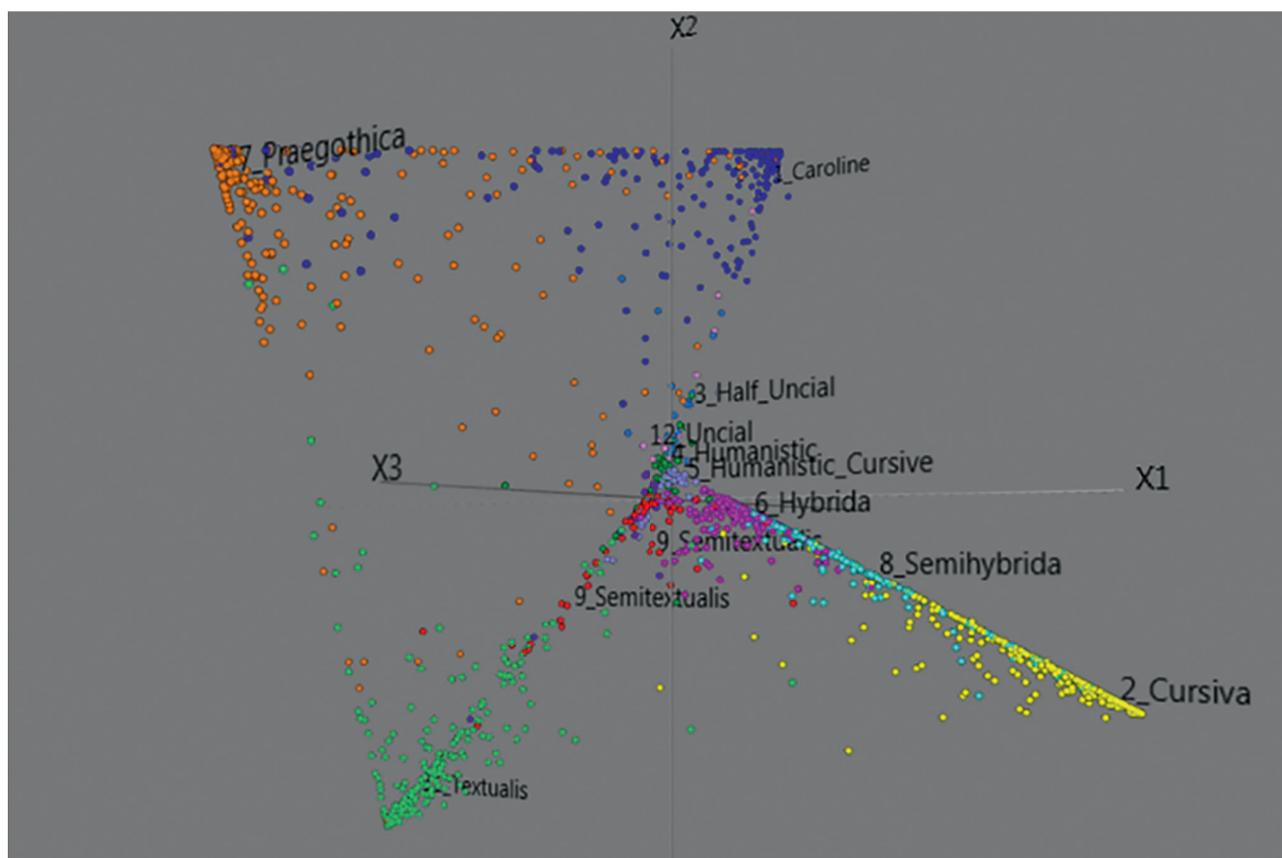


manuscript cultures

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Natural Sciences, Technology and Informatics in Manuscript Analysis

Edited by Oliver Hahn, Volker Märgner, Ira Rabin, and H. Siegfried Stiehl

Proceedings of the third *International Conference on Natural Sciences and Technology in Manuscript Analysis* and the workshop *OpenX for Interdisciplinary Computational Manuscript Research* that took place at the University of Hamburg, Centre for the Study of Manuscript Cultures, on 12–14 June 2018.

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Image of ICDAR2017 Tensmeyer's distance matrix (axes 2 and (1 and 3)), see article by Dominique Stutzmann, Christopher Tensmeyer and Vincent Christlein in this volume.

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Editorial

Natural Sciences and Technology in Manuscript Analysis

The Centre for the Study of Manuscript Cultures (CSMC) in Hamburg strives to enhance the field of interdisciplinary manuscript studies by providing a forum for dialogue between the humanities, the natural sciences and informatics. This dialogue leads to well-defined research questions and frequently provides scientifically grounded answers to questions that could not be solved by historical and philological methods alone.

In recent years, considerable progress has been made in multi- and hyperspectral imaging to recover erased texts in palimpsests. However, digital imaging and image processing still require serious research and development, not to mention the establishment of standard procedures for imaging protocols and benchmarking, for example. In addition to conducting non-destructive material analyses of pigments and dyes, which have become standard in modern studies of illuminated manuscripts, CSMC's interdisciplinary teams are currently working on establishing guidelines for studies of writing inks. Finally, digital image processing and analysis are also gaining recognition in the fields of palaeography and codicology.

The third *International Conference on Natural Sciences and Technology in Manuscript Analysis* was held on 13–14 June 2018. Like previous conferences, it brought scientists and scholars together who were engaged in this field of interdisciplinary research and provided a forum for discussion and for presenting new methods and findings. Some of the research presented in this volume was conducted at SFB 950 'Manuscript Cultures in Asia, Africa and Europe' of the University of Hamburg and sponsored by the German Research Foundation (Deutsche Forschungsgemeinschaft, DFG)

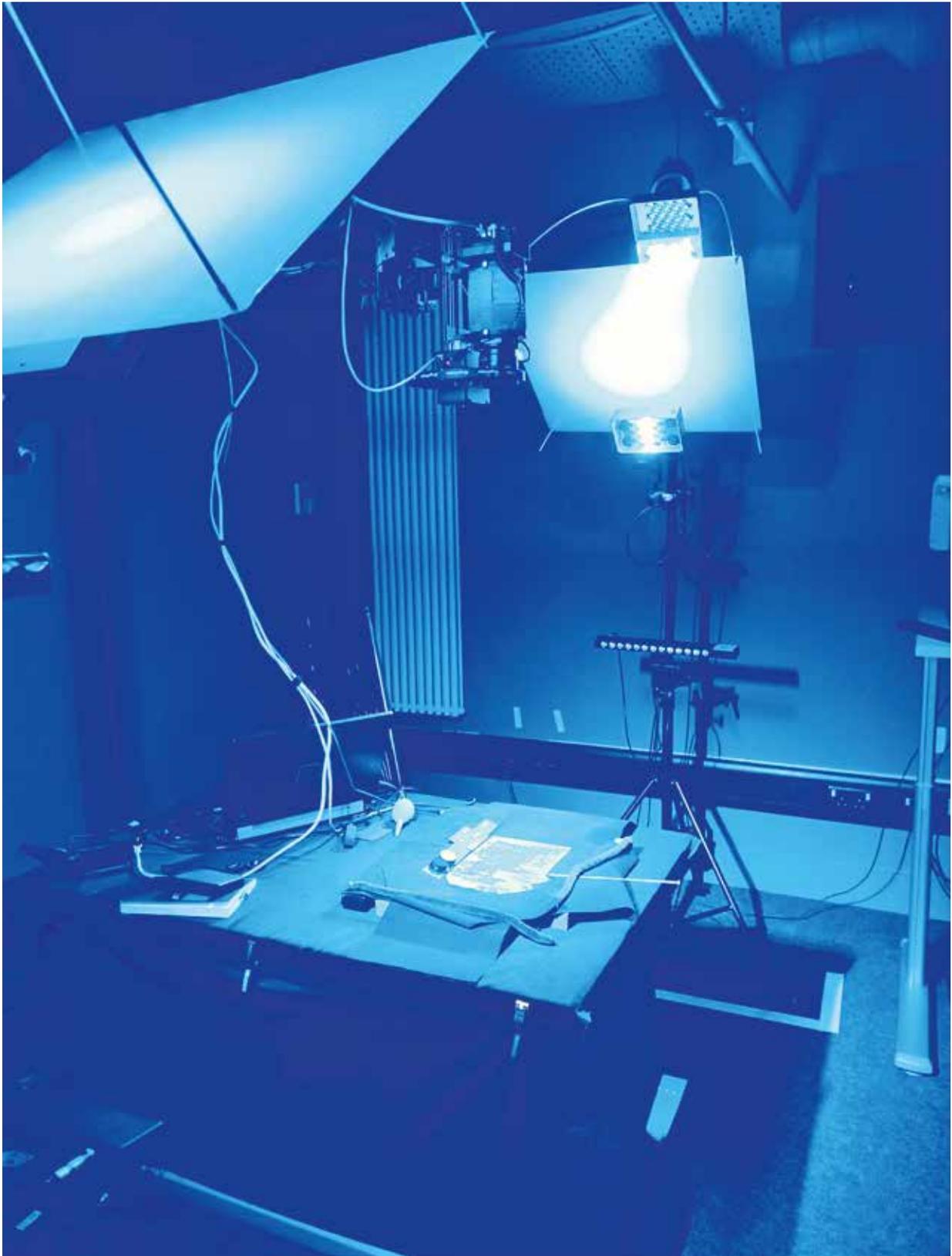
A two-day pre-conference workshop entitled *OpenX for Interdisciplinary Computational Manuscript Research* took place on 12–13 June directly before the conference. Scientists from leading European research groups presented and discussed their research results (marked by *) in the context of the ever-growing adoption of the Open Science

paradigm in computational manuscript research. In this vein, OpenX not only refers to open-source software and open data in the classic sense, but to open services and platforms now on the Web and consequently involves legal implications such as copyright, licensing and data-privacy issues. The scientific, technical, and local organisation was done by the CSMC team (SFB 950, Scientific Service Project Z03 and Department of Informatics, University of Hamburg) headed by H. Siegfried Stiehl of Z03 in close cooperation with Andreas Fischer (DIVA, University of Fribourg, Switzerland), Vinodh Rajan Sampath (Department of Informatics, University of Hamburg), and Marcel Gygli (Würsch) (then DIVA, University of Fribourg, Switzerland). Funding by the German Research Foundation and support by DIVA and the Department of Informatics at the University of Hamburg are gratefully acknowledged.

This issue of manuscript cultures contains a selection of peer-reviewed papers presented at the workshop and conference along with some additional contributions presenting unique case studies. The articles were solicited for original research work illuminating the role of the natural sciences, technology and informatics in manuscript analysis. All in all, this special issue represents the state of the art, illustrating how different techniques and methodologies can be successfully applied to analytical and computational investigations in the field of manuscript analysis. We hope it will help to incorporate the natural and applied sciences and informatics into the field of manuscript studies.

We would like to express our gratitude to all the authors for submitting up-to-date papers and to all the anonymous reviewers for their valuable and constructive comments.

Oliver Hahn, Volker Märgner, Ira Rabin, and H. Siegfried Stiehl



The CSMC Multispectral Imaging System in operation – recovering illegible writing of the *Manichaean Papyrus Collection* at the Chester Beatty Library in Dublin, Ireland (<https://chesterbeatty.ie/conservation/revealing-the-mystery-of-mani/>). This very illumination setting has proven to be key for the recovery of faded ink on these particular papyrus fragments. By projecting blue, 450nm, light and the use of a Wratten R25 long pass filter in front of the lens – we were able to capture the fluorescence of the papyrus and thus finally see the dark traces of the ink which now appeared in higher contrast and enabled us to read the text with ease.

Written Artefacts as Cultural Heritage

Ed. by Michael Friedrich and Doreen Schröter

Written Artefacts as Cultural Heritage was established in 2020. The series is dedicated to the double role of written artefacts as representations and generators of humankind's cultural heritage. Its thematic scope embraces aspects of preservation, the identity-defining role of artefacts as well as ethical questions.

The mix of practical guides, colloquium papers and project reports is specifically intended for staff at libraries and archives, curators at museums and art galleries, and

scholars working in the fields of manuscript cultures and heritage studies.

Every volume of *Written Artefacts as Cultural Heritage* has been peer-reviewed and is openly accessible. There is an online and a printed version..

If you wish to receive a copy or to present your research, please contact the editorial office:

<https://www.csmc.uni-hamburg.de/publications/cultural-heritage.html>



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CENTRE FOR THE
STUDY OF
MANUSCRIPT
CULTURES

WRITTEN ARTEFACTS
AS CULTURAL HERITAGE

CENTRE FOR THE STUDY
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**STEP BY STEP GUIDE TO MANUSCRIPT SURFACE
CLEANING AND MAKING E-FLUTE PHASE BOXES
FOR MANUSCRIPTS**

BIDUR BHATTARAI | MICHAELLE BIDDLE

NO 1



manuscript cultures (mc)

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CSMC's academic journal was established as newsletter of the research unit 'Manuscript Cultures in Asia and Africa' in 2008 and transformed into a scholarly journal with the appearance of volume 4 in 2011. *manuscript cultures* publishes exhibition catalogues and articles contributing to the study of written artefacts. This field of study embraces disciplines such as art history, codicology, epigraphy, history, material analysis, palaeography and philology, informatics and multispectral imaging.

manuscript cultures encourages comparative approaches, without regional, linguistic, temporal or other limitations

on the objects studied; it contributes to a larger historical and systematic survey of the role of written artefacts in ancient and modern cultures, and in so doing provides a new foundation for ongoing discussions in cultural studies.

Every volume of *manuscript cultures* has been peer-reviewed and is openly accessible:

<https://www.csmc.uni-hamburg.de/publications/mc.html>

If you wish to receive a copy or to present your research in our journal, please contact the editorial office:

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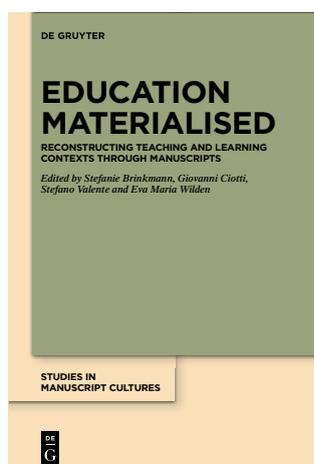
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Forthcoming



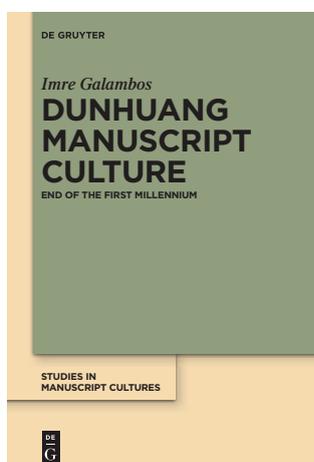
23 – *Education Materialised: Reconstructing Teaching and Learning Contexts through Manuscripts*, edited by Stefanie Brinkmann, Giovanni Ciotti, Stefano Valente and Eva Maria Wilden

Manuscripts have played a crucial role in the educational practices of virtually all cultures that have a history of using them. As learning and teaching tools, manuscripts become primary witnesses for reconstructing and studying didactic and research activities and methodologies from elementary levels to the most advanced.

The present volume investigates the relation between manuscripts and educational practices focusing on four particular research topics: educational settings: teachers, students and their manuscripts; organising knowledge: syllabi; exegetical practices: annotations; modifying tradition: adaptations.

The volume offers a number of case studies stretching across geophysical boundaries from Western Europe to South-East Asia, with a time span ranging from the second millennium BCE to the twentieth century CE.

New release



22 – *Dunhuang Manuscript Culture: End of the First Millennium*, by Imre Galambos

Dunhuang Manuscript Culture explores the world of Chinese manuscripts from ninth–tenth century Dunhuang, an oasis city along the network of pre-modern routes known today collectively as the Silk Roads. The manuscripts have been discovered in 1900 in a sealed-off side-chamber of a Buddhist cave temple, where they had lain undisturbed for almost nine hundred years. The discovery comprised tens of thousands of texts, written in over twenty different languages and scripts, including Chinese, Tibetan, Old Uighur, Khotanese, Sogdian and Sanskrit. This study centres around four groups of manuscripts from the mid-ninth to the late tenth centuries, a period when the region was an independent kingdom ruled by local families. The central argument is that the manuscripts attest to the unique cultural diversity of the region during this period, exhibiting – alongside obvious Chinese elements – the heavy influence of Central Asian cultures. As a result, it was much less ‘Chinese’ than commonly portrayed in modern scholarship. The book makes a contribution to the study of cultural and linguistic interaction along the Silk Roads.

Studies in Manuscript Cultures (SMC)

Ed. by Michael Friedrich, Harunaga Isaacson, and Jörg B. Quenzer

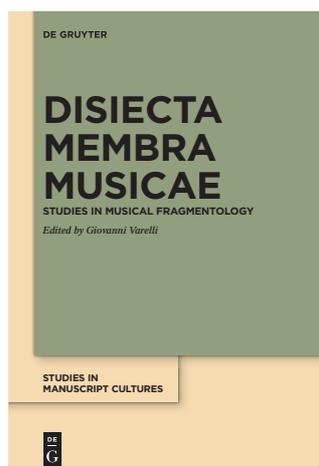
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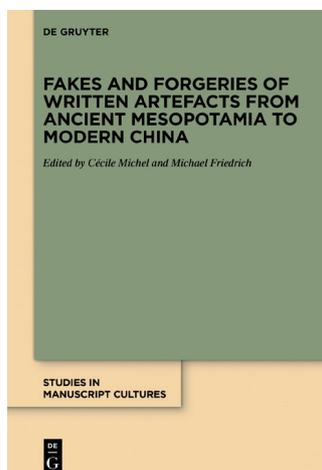
New release



21 – *Disiecta Membra Musicae: Studies in Musical Fragmentology*, edited by Giovanni Varelli

Although fragments from music manuscripts have occupied a place of considerable importance since the very early days of modern musicology, a collective, up-to-date, and comprehensive discussion of the various techniques and approaches for their study was lacking. On-line resources have also become increasingly crucial for the identification, study, and textual/musical reconstruction of fragmentary sources. *Disiecta Membra Musicae. Studies in Musical Fragmentology* aims at reviewing the state of the art in the study of medieval music fragments in Europe, the variety of methodologies for studying the repertory and its transmission, musical palaeography, codicology, liturgy, historical and cultural contexts, etc. This collection of essays provides an opportunity to reflect also on broader issues, such as the role of fragments in last century's musicology, how fragmentary material shaped our conception of the written transmission of early European music, and how new fragments are being discovered in the digital age. Known fragments and new technology, new discoveries and traditional methodology alternate in this collection of essays, whose topics range from plainchant to *ars nova* and fifteenth- to sixteenth-century polyphony.

New release



20 – *Fakes and Forgeries of Written Artefacts from Ancient*

Mesopotamia to Modern China, edited by Cécile Michel and Michael Friedrich

Fakes and forgeries are objects of fascination. This volume contains a series of thirteen articles devoted to fakes and forgeries of written artefacts from the beginnings of writing in Mesopotamia to modern China. The studies emphasise the subtle distinctions conveyed by an established vocabulary relating to the reproduction of ancient artefacts and production of artefacts claiming to be ancient: from copies, replicas and imitations to fakes and forgeries. Fakes are often a response to a demand from the public or scholarly milieu, or even both. The motives behind their production may be economic, political, religious or personal – aspiring to fame or simply playing a joke. Fakes may be revealed by combining the study of their contents, codicological, epigraphic and palaeographic analyses, and scientific investigations. However, certain famous unsolved cases still continue to defy technology today, no matter how advanced it is. Nowadays, one can find fakes in museums and private collections alike; they abound on the antique market, mixed with real artefacts that have often been looted. The scientific community's attitude to such objects calls for ethical reflection.

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