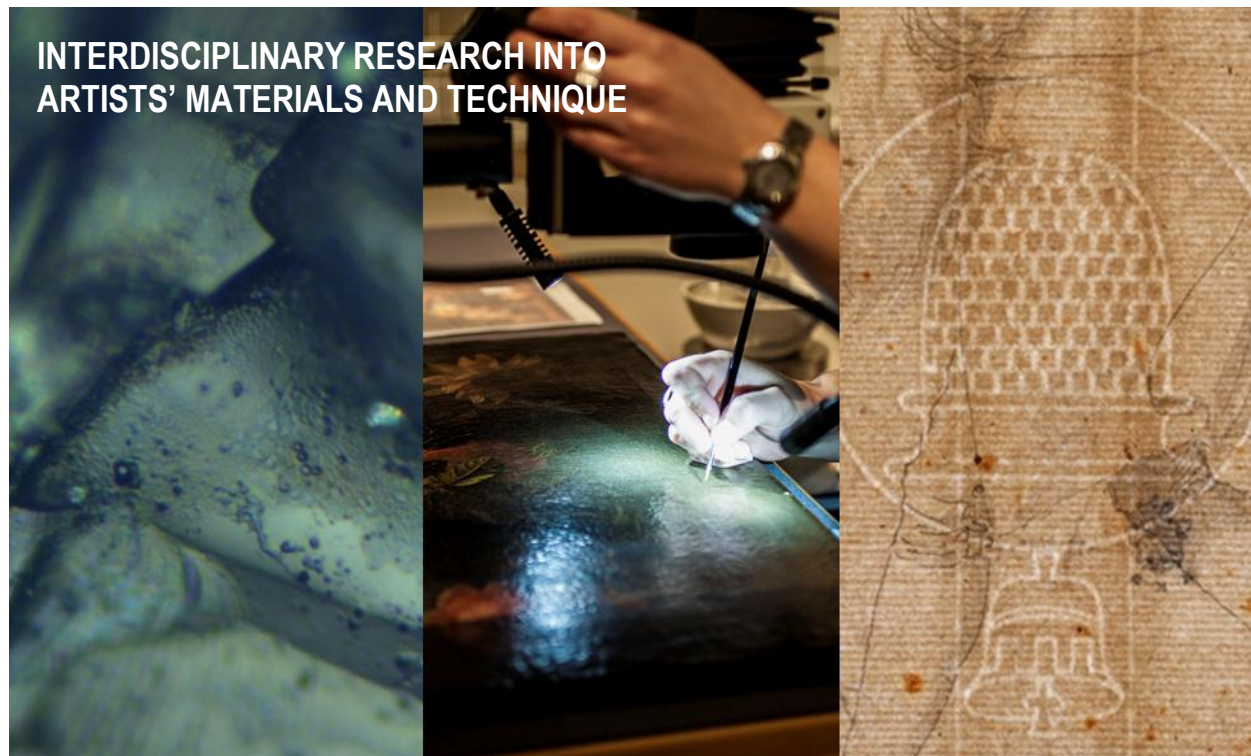


CATS



Centre for Art Technological
Studies and Conservation



ANNUAL REPORT

JANUARY – DECEMBER 2013

VILLUM FONDEN  VELUX FONDEN

CATS

Centre for Art Technological Studies and Conservation

The establishment of the research collaboration *Centre for Art Technological Studies and Conservation*, abbreviated CATS, was made possible in 2011 by a considerable donation from the VILLUM FOUNDATION and the VELUX FOUNDATION.

The centre is a partnership between three Copenhagen based research institutions

- Statens Museum for Kunst (SMK)
- The National Museum of Denmark (NMD)
- The School of Conservation at the Royal Danish Academy of Fine Arts, Schools of Architecture, Design and Conservation (SoC)

The cornerstone of CATS is technical art history, which is an interdisciplinary field of research between conservators, natural scientists and scholars from art historical and cultural studies. Technical art history investigates the making and meaning of art works, painting techniques and artists' materials.

A main objective of the research centre is to develop new and more exact methods to diagnose, treat and preserve our art historical heritage. The exploration of artistic practices is aimed at shedding light on the complex and fascinating cartography of ageing processes within works of art – to contribute to and advance the field of technical art history.

Contact CATS

Website: www.cats-cons.dk
E-mail: cats-cons@smk.dk

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Introduction

By Director of CATS, Prof. Dr. Jørgen Wadum

The current CATS Annual Report covers the year 2013 and as such it is the second of its kind. In 2013 the most exciting moment arose when during spring the carefully selected high-end scientific equipment was acquired and installed in the CATS-labs at SMK, Nationalmuset (NMD), and KADK School of Conservation (SoC) alike. The equipment, acquired in close consultation with external advisors Kim M. Funk (SLKE) and Finn Physant Christensen (FRIT), comprised the following:

- RAMAN SENTERRA (BRUKER), at SMK
- ARTAX 400 μ XRF (BRUKER), at SMK
- FTIR BRUKER Hyperion 3000-TENSOR 27 with a FPA detector, at SMK
- GC-MS system (BRUKER SCION TQ GC-MS), at NMD
- NIR (Near-infrared), at SoC

Following the installation tests and protocols for the use of the equipment was carried out and in July the research activities could commence. The GC-MS system was end of 2013 still in testing mode but will be ready for research activities early in 2014. During autumn 2013 the scientific team have been carrying out research at objects from SMK, NMD as well as on request for private parties. The reports have been resulting in articles, papers, and posters as well as serving as reference for other researchers in different disciplines.



The XRF ARTAX during examination of Edvard Munch's *Workers Coming Home*. Oil on canvas, 160 x 130 cm., SMK inv. No. KMS3823, in preparation for presentation of a poster at the MUNCH150 Conference in Oslo: 'Artist's technique and / or environmental influences: developing a preservation strategy for two problematic paintings by Edvard Munch', by Kamila Korbela, Conservation Department, SMK & CATS, Copenhagen, Denmark. www.hf.uio.no/iakh/english/research/projects/aula-project/munch-150/poster-abstracts/ (25.2.2014)

Results 2013

Concluded, ongoing and future activities and projects

The research projects of CATS are realised through interdisciplinary teams including conservation scientists, conservators, curators and other related professionals. Most projects take place in collaboration with an equally diverse network of individuals or groups active at other institutions in Europe and overseas.

One of the first projects was initiated by a colleague at Perugia University, Prof Dr. A. Sgamellotti, Accademia Nazionale dei Lincei, Dipartimento di Chimica, who invited CATS to submit an interdisciplinary based research article including conservators, art historians and scientists. A CATS team comprising Troels Filtenborg (conservator), Kasper Monrad (art historian), Anna Vila (scientist), and Jørgen Wadum (conservator), have now delivered an article, 'As time passed by came sunset. Christen Købke's 'View of Lake Sortedam', its genesis and colour changes', for the book *Science and Art. The Painted Surface*, to be published in 2014 by the Royal Society of Chemistry (RSC), England.

Research on the materials and techniques of Nicolai Abildgaard has been carried out by Troels Filtenborg in collaboration with Anna Vila and Jacob Skou-Hansen. The results of this multi-year project within WG 3 will be published in a monograph 'Between Formula and Freestyle. Nicolai Abildgaard and Eighteenth-Century Painting Technique', to appear in May 2014 published in collaboration with Archetype Publications Ltd., London, as number two in the CATS Series of Technical Studies.

The dendrochronologist, Dr. Aoife Daly, has been added to the CATS staff as a Scholar in Residence. Her first assignment under the CATS flag has been to develop non-invasive dendrochronological analysis of selected church inventory from Norway. The tree-ring measurement is proving possible wherever the rings are exposed, purely non-invasively, the subject of paper to be given at a forthcoming conference and the topic of an extensive research collaboration between Oslo University and CATS (see below) from 2014-2016.

Furthermore a research assistant (one day a week), Cecilie Lindholm Andersen, a master student at the Chemistry Department of the University of Copenhagen, was (temporarily) appointed. She assisted in and carried out XRF analysis on a large number of pigments, both historically and contemporary, and participated in writing a paper with the science staff of CATS.

Within the year 2013, CATS has collaborated with individual research consortia in Scandinavia, Germany and The Netherlands, as well as with university faculties concerned with establishing work relationships and more formalised research projects with the Centre. At the point of writing this annual report CATS has established formal research agreements with:

- University of Copenhagen, Department of Chemistry
(*prof. Ole Hammerich*)
University of Copenhagen, Department of Scandinavian Research: Care and Conservation of Manuscripts (*prof. Ragnheiður Mósesdóttir*)
University of Copenhagen, NanoGeoScience research section, Nano-Science Center
(*prof. Sorin Nedel*)
- DTU, Technical University of Denmark
(*prof. Lars-Ulrik Aaen Andersen*)

- Universitetet i Oslo, Institutt for arkeologie, konservering og historie (IAKH)
(Associate prof. Noëlle L. W. Streeton)
- Metropolia University of Applied Sciences, Helsinki
(Associate prof. Tannar Ruuben)
- Nationalmuseum, Stockholm
(Director of Conservation, Kriste Sibul)
- Moderna Museet, Stockholm
(Director of Conservation, Lars Byström)
- Kadriorg Kunstmuseum, Tallinn
(Curator, Greta Koppel)

Between CATS-SMK agreements to share technical evidence of our collection of eighteen Lucas Cranach (1472 – 1553) and two Rembrandt van Rijn (1606-1669) paintings was established with the Cranach Digital Archive (Stiftung Museum Kunsthpalast, Düsseldorf / Cologne University of Applied Sciences) and with the Rembrandt Database (RKD, The Hague). In these ways scholars world-wide will have access to all analytical and technical photography of these important art works prompting direct and unrestricted knowledge transfer as well as offering an indirect invitation to instigate further collaborative research.

The following research projects not part of the CATS work packages has been initiated in 2013:

STUDIES IN PAINTING SIZES (STIPS)

STIPS systematically explores the introduction and extend of the use of regulated standard formats of primarily panel paintings and their frames in the Netherlands from 1400 to 1800. From this long and highly important chapter in the history of Western art, many tens of thousands of paintings and frames have been preserved. The aim is to inventory and describe this enormous quantity of massively important art works and their frames in order to facilitate their conservation and to increase public awareness of its significance. The project will generate significant background information for conservators and art historians alike to acknowledge and understand the importance of sizes and formats of paintings and their frames. The significance of this reaches even further as it involves not only all panel paintings but also paintings on other supports like canvas and copper plates. Research on these aspects constitutes a crucial contribution to the expertise necessary to understand the painted heritage of the Low Countries, which is a precondition to be able to preserve it.

Research team:

M. Bijl, Alkmaar, A. Jager, University of Amsterdam, E. Schavemaker, Amsterdam, J. Vander Auwera, Musées des Beaux-Arts, Brussels, J. Wadum, CATS, Copenhagen, S. Weidema, RKD, Den Haag.

The ideal and sustainable climate for Panel Paintings (Science4Arts)

The Science4Arts research program aims to investigate changes in artworks with regard to an object's chemical and physical dynamics, significance and substance, as well as its frame of reference. Collaboration between specialists in the fields of conservation, humanities, physical and chemical sciences is pivotal as they collectively investigate an object or group of related objects in a museum environment.

The program aims to develop and strengthen interchange between the research of various research institutions and the museological field. Controlling the museological environment is thus important. However, sustaining a stable environment requires a large energy consumption and financial resources. The team will based on scientific research investigate which type of climate regimes best compromises the well-being of the art works and the financial restraint of current museums.

Reserch team:

H.L. Schellen, TU Eindhoven, Holland, P. van Duin, Rijksmuseum, Holland, J. Wadum, CATS, Denmark,
External partners:

Rijksdienst voor Cultureel Erfgoed (RCE), Vienna University of Technology, Technical University Denmark,
Polish Academy of Sciences, Royal Institute of Technology (KTH), UCL Centre for Sustainable Heritage,
Metropolitan Museum of Art, Museum Conservation Institute (Smithsonian Institution Washington), Kasteel
Amerongen.

After the Black Death: Painting and Polychrome Sculpture in Norway, 1350-1550 (ABD)

The project centres on c. 65 examples of late-medieval church art owned by the Museum of Cultural History (KHM) University of Oslo (UiO). This research, based in Conservation Studies (UiO), straddles the divide between the Humanities and Physical Sciences. The objective is to publish new narratives for this collection, drawing on the interdisciplinary practices common to conservation. Publications will be coupled with exhibitions to engender more positive attitudes to objects imported to Norway after 1350.

Research team:

K. Randin, University of Oslo, N. Streeton, University of Oslo, T. Frøysaker, University of Oslo, J. Wadum, CATS, A. Vila, CATS, A. Daly, CATS & Dendro.dk, R. Willerslev, University of Oslo, H. Kutzke, Museum of Cultural History, Oslo, J. von Bonsdorff, University of Uppsala, Sweden.

CATS has also participated as partner in three Joint Project Initiative (JPI-JHEP) calls on

- Safeguarding Modern Oil Paintings, under the leadership of Prof. Maria Perla Colombini, Dipartimento di Chimica e Chimica Industriale, Università di Pisa.
- Multi method approach to Study the Effects of Museum lighting on Modern pigment Stability, under the leadership of dr. Costanza Miliani, Istituto CNR di Scienze e Tecnologie Molecolari (CNR-ISTM), Dipartimento di Chimica, Università di Perugia.
- Development and testing of Innovative Ahesives for Recovery of Paint Layers in Damaged works of Art, under the leadership of Prof. Oscar Chiantore, Professore Ordinario, CHIM/04 - chimica industrial, Università degli Studi di Torino.

Unfortunately, despite good scores, none of the projects were successful in acquiring funding. However, work will proceed to secure a better score next time when relevant.

The following pages present the Work Packages (WP) of CATS and the state the primary results achieved within 2013, the time frame covered by this report. The Tasks (T) and Deliverables (D) describe the activities in short form within each WP.

On the next page is a Gannt Diagram for the WP activities and deliverables of CATS, followed by the WP presentations.

Gantt Diagram for CATS

Description	Year 1	Year 2	Year 3	Year 4	Year 5
WP1: Establishment of SMK lab					
T 1.1 Designing & building					
T 1.2 Recruitment of new staff	D1				
T 1.3 Purchasing equipment	D3	D2			
T 1.4 Implementing protocols		D4			
WP2: Dutch & Danish 17th century					
T 2.1 Catalogue raisonné Dutch paintings					D1
T 2.2 Bosch-Brueghel		D2			
T 2.3 Artists' practice in DK 17th century	D3			D3	D3
WP3: Abildgaard & 18th century					
T 3.1 Architecture & drawings				D3	D1
T 3.2 Easel paintings technique		D2		D3	
T 3.3 Abildgaard's graphic works				D3	
WP4: Danish Golden Age					
T 4.1 Layer structure & treatment			D1		
T 4.2 Multispectral analysis				D2	
T 4.3 Varnish degradation	D3		D3	D3	D3
WP5: Works on paper					
T 5.1 Degradation cellulosic material				D1	D1
T 5.2 X-ray paper structure & watermarks				D2	D2
WP6: Reference Collection Database					
T 6.1 Design and construction of database		D1	D1		
T 6.2 Input and digitalization			D2		D2
T 6.3 Web-based resources & infrastructures				D3	D3
WP7: Dissemination					
T 7.1 Professional announcement	D1			D1	
T 7.1 Creation of CATS web-platform	D2				
T 7.2 Seminar CATS (inauguration + annual)		D3	D3	D3	D3
WP0: Administration					
Kick-off meeting					
Project Meetings					
Fundraising for consolidation & continuation					

Gantt diagram for WP activities and deliverables.
Deliverables accomplished are marked in green (D).

Annual Report 2013

WP1 Establishment of lab facilities at SMK

WP leaders

Prof. Dr. Jørgen Wadum, MSc Mads Chr. Christensen, Assoc. Prof. Mikkel Scharff

The establishment of the lab facilities at SMK is the primary task of WP1. During 2011-2012 the staff was recruited, labs and offices were established and the equipment purchased and implemented.

Tasks

- T1.1 Designing and Building the lab and research facilities at SMK
- T1.2 Recruiting and training of new staff
- T1.3 Selecting and purchasing equipment
- T1.4 Implementing Protocols on lab work routines and on reporting

Deliverables

- D1. Recruitment of staff – *accomplished*
- D2. All equipment installed and lab facilities working – *accomplished*
- D3. Description of the lab-facilities on the home-page (WP7) – *accomplished*
- D4. Seminar presenting new facilities and equipment – *accomplished*

T1.1 Designing and building CATS laboratory facilities at SMK

The laboratories, the office and the reading room were established in 2011-2012, i.e. four laboratories, five workspaces and six research and study spaces. The four laboratories are designed to cover specific analysis and research purposes within the scope of CATS activities.

T1.2/D1 Recruitment of staff

Prof. Dr. Jørgen Wadum is the Director of CATS and the following staff is employed:

- **Research Coordinator & Administrator - Mette Kokkenborg**
Full time position from 1 June 2012 (Miriam Watts gave notice 31 July 2013)
- **Lab Technician - Johanne Marie Nielsen**
Full time position from 25 June 2012
- **Senior Researcher & Conservation Scientist - Dr. Anna Vila**
Full time position from 1 July 2012
- **Conservation Scientist – Dr. David Buti**
Full time position from 13 January 2014
- **Project Assistant Clara Lauridsen**
Full time position from 1 October 2012 - 30 June 2013
- **Research assistant and intern – Cecilie Lindholm Andersen**
Full time position from 1 September 2013 – 31 December 2013

T1.3 & 1.4/D2 Acquisition of equipment and implementing protocols

The acquisition of lab equipment has taken place in close collaboration between the Senior Researcher & Conservation Scientist and researchers and scientists of the CATS partners: Jørgen Wadum, Mads Chr. Christensen and Kim Pilkjær Simonsen, with the administrative support of Christian Svanning Mikkelsen and Kim Gundersen. International colleagues from the field such as Marco Leona, Silvia Centeno, Masahiko Tsukada, Hae Young Lee (MET), Núria Ferrer (UB), Marika Spring and David Pegg (National Gallery

London) and Jana Sanyova (IRPA) were involved as consultants, as were the Danish state institution SLKE and the private consultancy company FRIT¹.

The following equipment was installed in 2013 in CATS:

- RAMAN SENTERRA (BRUKER), at SMK
- ARTAX 400 μ XRF (BRUKER), at SMK
- FTIR BRUKER Hyperion 3000-TENSOR 27 with a FPA detector (BRUKER), at SMK
- GC-MS system (BRUKER SCION TQ GC-MS), at NMD
- NIR (Near-infrared), at SoC

D3 Description of the lab facilities on the CATS home page

A description of the equipment has been added to the CATS website.

D4. Seminar by CATS staff presenting the new facilities and equipment

A seminar was held by the CATS staff on 21 June 2013 presenting the facilities and equipment in CATS.



The FTIR Hyperion 3000-TENSOR 27 with a FPA detector ready for analysis at the CATS labs, SMK.

¹ From SLKE, Slotte og Kulturejendomme, Head Consultant Kim Funk delivered information about the administrative processes of purchase. FRIT, Forskningsrådenes Instrument Tjeneste, was a valuable support in their capacity of consultancy bureau that advises on issues pertaining to major investments in scientific equipment.

WP3 Nicolai Abildgaard and 18th century painting techniques

WP leader

Senior Conservator Troels Filtenborg

In depth technical examination of Nicolai Abildgaard's (1743-1809) easel paintings, graphic work and architectural designs and decorations is in progress in CATS. The approach is structured according to media, and in 2011-2013 the focus has been on Abildgaard's easel paintings. Examination of his works on paper is underway while the study of his architectural designs is in an initial phase.

Tasks

- T3.1 Examination of Abildgaard's architecture and architectural drawings
- T3.2 The technique of Abildgaard's easel paintings
- T3.3 Abildgaard's graphic works

Deliverables

- D1. Article in an international architectural journal with a technical and art historical review of Abildgaard's architectural decorations as seen in a European perspective – *planned for 2016*
- D2. Articles on and conference presentation of Abildgaard's painting technique and its development – *accomplished, but further presentations possible*
- D3. Symposium on Abildgaard and his technique in a European perspective – *planned for 2014*

T3.1/ D2 Examination of Abildgaard's architecture and architectural decorations

Buildings and interiors with surviving fragmented or complete decorations by Abildgaard have been identified, and so have designs in the collection of the Statens Museum for Kunst. Contours of the project have been outlined in an initial meeting with Conservator Line Bregnhøi from NMD, who has carried out examination of some of the interiors designed by Abildgaard. Data from these and other surveys conducted by the museum will be condensed and re-assessed in an architectural and art historical context. On a technical level results from the investigations of Abildgaard's interiors will also be compared against the data assembled from his paintings to establish potential parallels or differences in the use of materials such as pigments in easel and decorative painting.

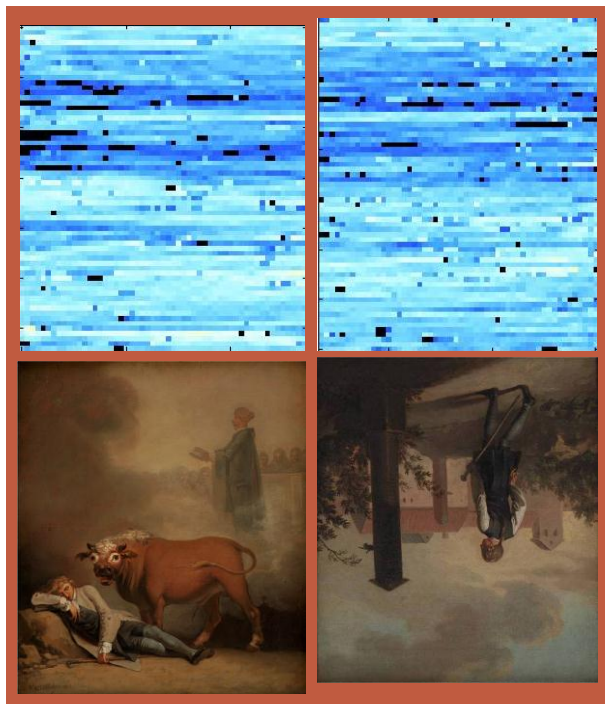
T3.2/D2/D3 Technical examination of Abildgaard's easel paintings

A technical investigation of 55 easel paintings by Abildgaard and a smaller number of reference paintings by contemporary Danish and French artists has been completed. The investigation was supplemented by a study of written sources as well as Abildgaard's personal papers and letters. The aim was to illuminate Abildgaard's use of materials and working methods and to identify potential patterns or evolution in his technique as well as to clarify its relation to contemporary painting practices.

Painting canvases, grounds, underdrawings, paint and varnish layers were studied in terms of stratigraphy, pigments and binding media. Methods of analysis included X-radiography, Infrared reflectography, spectroscopic and elemental analysis. As part of the X-radiography study the thread-count and weave-density of a number of painting canvases were analysed with automated weave-mapping computer software, designed for working with digital X-radiographs. This was used in the comparison of weave patterns in order to establish matches between the canvases of various paintings. The verification that different canvases originate from the same source (i.e. canvas roll) can be used as a tool to substantiate assumptions of a shared date.

Infrared reflectography recording was used to reveal underdrawings – or in some instances the lack of underdrawings – in paintings applied on top of various types of grounds. A number of paint samples and a couple of preliminary drawings were selected for further pigment and media analysis by Raman spectroscopy, FTIR spectroscopy, XRF and SEM_EDX analysis. This investigation had a particular focus on blue and yellow pigments and dye stuffs and on intermediary varnish layers.

The results are discussed in a forthcoming publication. The results are compared with data from investigations of works by eighteenth-century painters in Denmark and abroad, primarily Italy and France, in order to view Abildgaard's practice in the context of his contemporaries. The book with the title *Between Formula and Freestyle: Nicolai Abildgaard and Eighteenth-Century Painting Technique* is in the course of publication and will be available by May 2014. Likewise, a paper, with a focus on supports and grounds in paintings by Abildgaard, is planned for the upcoming CATS conference in June 2014.



Matching weave density maps, colour-coded on the basis of automated vertical and horizontal thread counts of the canvases of two paintings by Abildgaard. The match shows that the canvases originate from the same strip where they were located side by side.

T3.3/D1 Abildgaard's graphic works

The classification of Abildgaard's works on paper has been initiated with a registration of the watermarks in the paper. Out of 508 works approximately two thirds have been found to carry partial or complete marks. The data will enable the use of the marks as a tool in the dating and localizing of the works on paper in Abildgaard's oeuvre and as such supplement the art historical assessment.

After a preliminary phase of test recordings of a number of watermarks, photography by transmitted light was chosen as the primary method of documentation. This will be complemented at a later stage by recording by digital X-radiography in a number of cases where marks are partly or entirely concealed by the design on top of the paper, and thereby difficult to assess by the photographic recording alone. The data generated by this part of the WP will have a double use, as they will also be entered into the CATS-SMK database of watermarks (see WP5). A following phase will be identification of the various media employed by Abildgaard in his works on paper. The results will be compared against the records of the watermark investigation in order to determine any patterns or evolution in Abildgaard's practice.

WP4 19th century painting techniques and materials with a focus on Danish Golden Age painting

WP leader

Assoc. Prof. Mikkel Scharff

The layered structure in Danish Golden Age paintings and the choice of conservation methods is investigated in this work package. Incorporated in the research are treatment history and the approach of early practitioners such as conservator at the Royal Paintings Collection I.P. Møller (1783-1854).

Tasks

- T4.1 Investigation of the layered structure and treatment of Danish Golden Age paintings
- T4.2 Innovations in Danish Golden Age paintings. Research coupled with multispectral analysis
- T4.3 Studies of varnish degradation

Deliverables

- D1 PhD thesis (Cecil K. Andersen), presentations at conservation conferences, publication in peer-reviewed journals - *accomplished*
- D2. Publication on the materials and technique of Danish Golden Age painters, covering their use of materials and their influences – *in progress*
- D3. Publication in a journal on polymer chemistry. Presentation at a conservation conference - *accomplished and plans for future publications*
- D4. Conference on 19th century conservation practices in Denmark and their effect on today's practice and reception of the works of art - *accomplished*

T4.1/T4.2/D1/D2 PhD thesis and dissemination and publication

Dr. Cecil Krarup Andersen defended her PhD thesis "Lined canvas paintings : Mechanical properties and structural response to fluctuating relative humidity, exemplified by the collection of Danish Golden Age paintings at Statens Museum for Kunst (SMK)" on 28 May 2013. The research and results of the PhD have helped understand how 19th century Danish painters worked in a European context and how their choices of materials affect the preservation state of the collections of SMK.

Further studies of the reaction of paintings to wax-resin treatments has been delivered for inclusion at the ICOM-CC 2014 conference in Melbourne, Australia, and a poster "Lining on the Stretcher: Glue paste lining techniques in 19th century Denmark", discussing a historical lining techniques was included at the CATS conference in May 2013, thus, task 4.1 has seen deliveries within D1 as well as D4. The ongoing study of traditional paste glue lining techniques in collaboration between the universities of Madrid and Valencia (supported partially by the Spanish Government: Project no. HAR2011-24217, Project title "Materiales y métodos en los tratamientos de refuerzo de pintura sobre lienzo mediante entelados a la gacha: documentación, función y conservación", Project leader prof. Ana M^a Macarrón Miguel), as well as researchers from the Louvre, the National Gallery (UK), the SRAL in Maastricht and CATS continues and is expected to provide further information on the specific lining techniques and its impact on the structural stabilization of the traditional canvas painting structures. A conference, reported in the previous CATS annual report (2011-2012), laid the foundation for a series of experiments on lining compositions and preparations, in progress.



On the lower left edge of this oil painting by Købke (*Portrait of sculptor H. E. Freund, Kunstakademiets Samling, inv.no. KS114, 1838*) dark discoloration due to wax-resin impregnation of the fibres of select vertical threads are seen and the painting is known to exhibit more prominent reactions to high relative humidity than comparable paintings in the same room not having been lined with a wax-resin adhesive.

A paper has been presented within task 4.2 (and thus D2) analyzing a painting by Købke, its paintings technique and colour changes. The task subject on innovations in Danish golden age painting and technical analyses of selected paintings is continued and further presentations and papers will appear the coming years.

T4.3/D.3 Studies of varnish degradation

The effect of different air pollutants on varnishes and how this may affect their long term stability/solubility has been studied during the EU-FP7-supported "MEMORI"² international research project. The research project ended 30 November, 2013, a final project report is in preparation by the MEMORI project, various papers and posters have been presented and a number of papers are in preparation, all within D3. The impact on natural varnishes on paintings by internally generated volatile acids within microclimate frames has been acknowledged but appears to be of minor importance compared with the well-known impact of radiation (light and UV-radiation) on varnishes, although a combined and enhanced effect of acid and radiation was recognized.

D4 Conference on 19th-Century Conservation Practices

The conference *Conservation in the Nineteenth Century* (CiNC) took place at the National Museum of Denmark, 13-16 May 2013 with oral presentations and a poster session focusing on both the theoretical and technical aspects of conservation in the nineteenth century, as well as their impact on the profession today. The conference had 110 participants from 15 countries. All oral presentations were available as preprints in the anthology "Conservation in the Nineteenth Century", edited by senior Researcher Isabelle Brajer and published by Archetype Publications.

² MEMORI: Measurement, Effect Assessment and Mitigation of Pollutant Impact on Movable Cultural Assets. Via the School of Conservation CATS is involved in the project together with researchers from 13 other European research institutions and one SME (Small and Medium Sized Enterprises).

WP5 Works on paper and watermark research

WP leader

Assoc. Prof. Dr. Ingelise Nielsen

The establishment of a CATS-SMK database of watermarks for the use in research into paper history and art history on a Danish and international level (T5.2/D.2) was commenced in January 2013. The database is built on the open source software from the EU-funded “Bernstein project” and will be linked to and made searchable through their “Memory of Paper” server.

Tasks

- T5.1 Degradation of cellulosic materials, canvas, paper and wood
- T5.2 X-ray imaging of paper structure & watermarks

Deliverables

- D.1 Studying the degradation of celluloses and integrating theories and research from other fields than paper, e.g. textile, wood etc. – *planned for 2015 and 2016*
- D.2 The establishment of a database built on the open-source software from Memory of Paper – *In progress*

T5.2/D.2. The establishment of a database

The collection of Nicolai Abildgaard’s works of art on paper at SMK has been chosen as a pilot project in the establishment of a watermark database at CATS/SMK. This collection comprises approximately 550-600 drawings and sketches, and around two-thirds of the items contain watermarks. The examination of these watermarks will also form part of T3.3/D1 Abildgaard’s graphic works.

The watermarks are recorded by digital photography in transmitted light and by digital X-radiography. A procedure for the recording of the watermarks has been established and tested. At present (December 2013) 130 watermarks have been recorded. The database software has been tested, and a procedure for the registration of the watermarks is now established. The database software will be implemented at the SMK server in spring 2014.



Watermark from one of Abildgaard’s drawings (KKSgb3757). Photo: Jacob Skou-Hansen, SMK

WP6 Establishing a CATS Reference Collection Database & digital documentation

WP leader

Mag.art Kim Brasen

Work package 6 entails the design and construction of a CATS reference database and development of software that can facilitate a shared infrastructure of metadata between the partner institutions of CATS and beyond.

Tasks

- T6.1 Design and Construction of the database
- T6.2 Input and digitalization of technical documentation, firstly from CATS partners
- T6.3 Web-based resource system built and placed in a shared infrastructure, firstly amongst CATS partners

Deliverables

- D1. Design and construction of the database – *in progress*
- D2. Development of software – *planned for spring 2014*
- D3. Implementation of CATS Reference Collection – *planned for 2015-2016*

T6.1 D1 Design and construction of the database

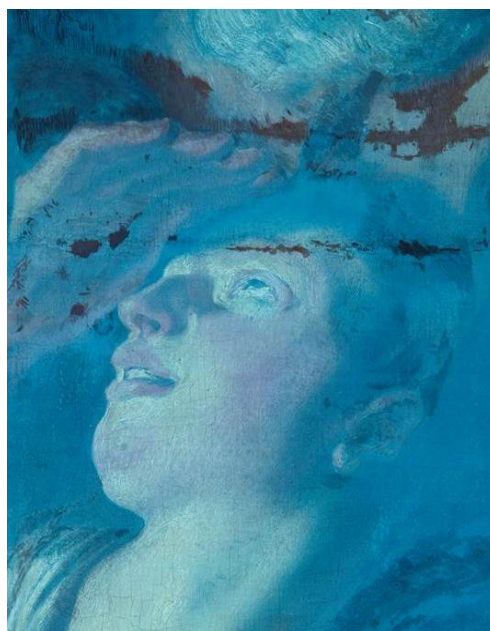
CollectionSpace is the platform for the database which will make the system easily accessible from each of the partner institutions. The database will also ease integration with other systems and make extended search possible to the public (professional or in general). The design and construction of the database is in progress and will continue during the development of the software.

D2 Development of software

The development of software for the database is planned for spring 2014 and it will take around one month for a developer full time to build the database. Afterwards the database will be tested and necessary adjustments will be made.

T6.2/T6.3/D3 Implementation of the CATS Reference Collection

Each of the three partner institutions of CATS will select a smaller section of their respective sample collections for the initial documentation tasks, after which registration of the remaining material will follow. The implementation of CATS Reference Collection across partner institutions and the integration with CATS website is planned for 2015-2016.



UV fluorescence: Sample from the collections to be registered in the CATS Reference Collection Database. Foto: SMK/BVA

WP7 Dissemination

WP leaders

Prof. Dr. Jørgen Wadum, MSc Mads Chr. Christensen, Assoc. Prof. Mikkel Scharff

Work package 7 showcases CATS devotion to promote exchange of knowledge, to advocate good practices in conservation and conservation science, and to define common work-parameters to improve the comparability of results and levels and quality of research.

Tasks

- T7.1 Results of CATS research disseminated within professional circles
- T7.2 Creation of CATS work platform on the web
- T7.3 CATS Inauguration seminar, annual seminars, and the research centre's work and results disseminated to a broader public

Deliverables

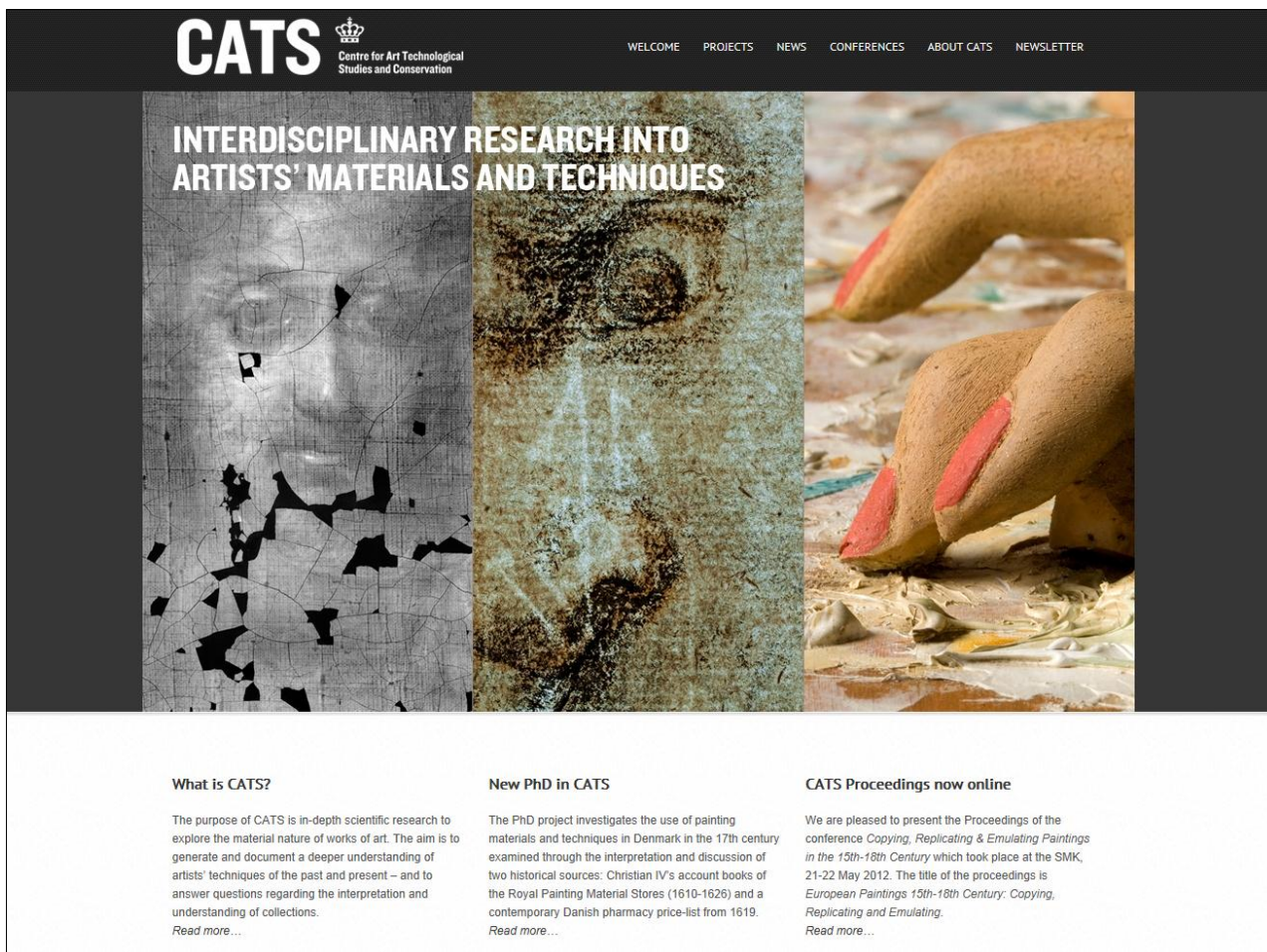
- D1. The creation of a CATS web-site with a clear public profile – *accomplished and in further development*
- D2. The establishment of an intranet work-platform for CATS and its partners/associates – *in progress*
- D3. Seminars and conferences to exchange knowledge with colleagues in the field – *accomplished and further activities planned*

T7.2/D1/D2 Intra-networking

CATS Intra-networking aims at establishing optimal communication, information exchange and transfer of knowledge among CATS-participants across the network. Three examples of intra-networking activities with staff from the three CATS institutions are listed below.

- The official presentation of CATS was held at the CATS offices at SMK 21 June 2013. All collaborative partners and other interested people/institutions were invited.
- A lecture on the painter Elias van den Broeck was held at SMK 6 June 2013 in connection to the exhibition *Flowers and World Views* at SMK. The lecture was arranged by CATS and the speakers were Meaghan Monaghan, conservator and KRESS Conservation Fellow and Eva de la Fuente Pedersen, Senior Research Curator.
- Ida Bronken from Department of Touring Exhibitions, National Museum of Art, Architecture and Design in Oslo and Prof. Dr. Jaap Boon from JAAP Enterprise for Art Scientific Studies in Amsterdam and SIK Art Research in Zurich gave each a lecture on liquefying paint. The lectures took place 24 October 2013 at CATS/SMK.
- Collaboration agreements are made between CATS and a number of collaborative partners such as universities, museums, research projects and scientific firms. All the collaborative partners are listed at the CATS website with logos and names.

The website of CATS is maintained by the Research Coordinator & Administrator. The site informs users about CATS organisation, programme and activities, news items, events and staff activities. It is based on information from the three partners and is continuously under development, waiting for more research results to tick in.



The front page of the CATS website, www.cats-cons.dk

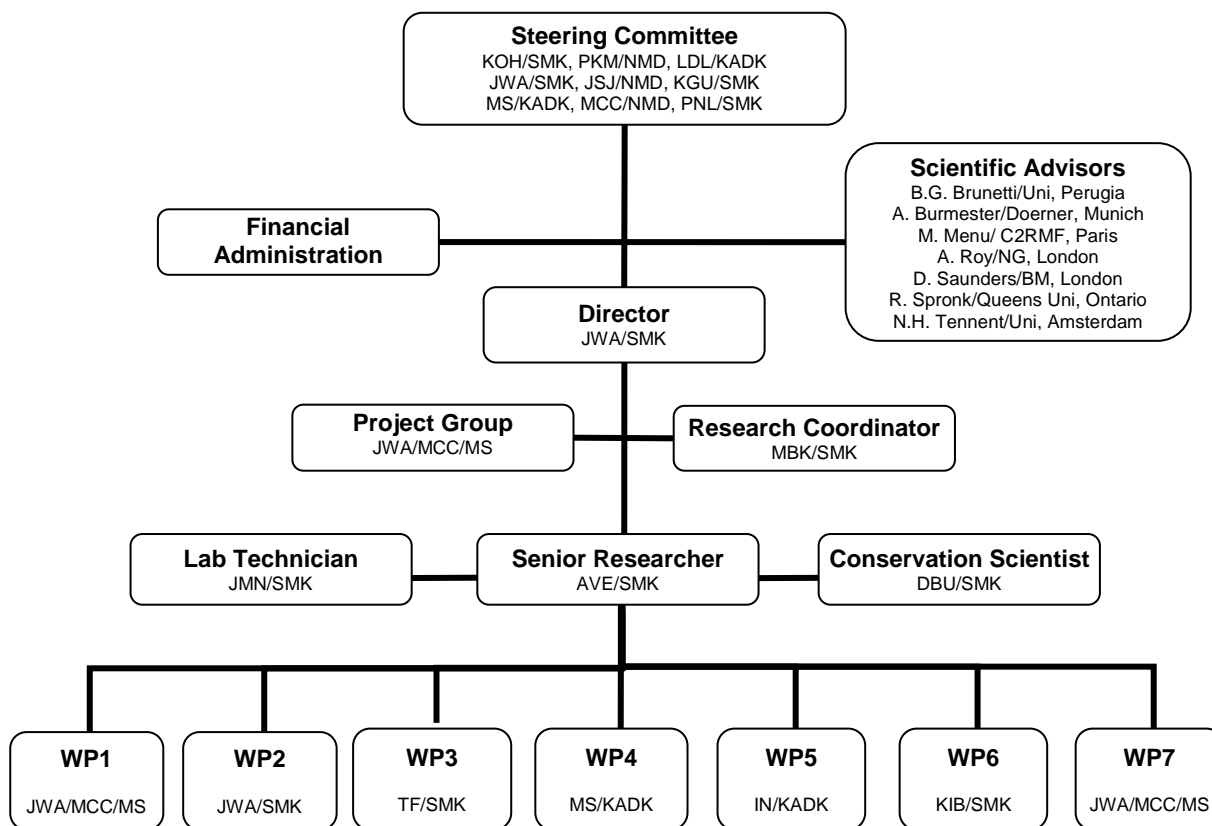
T7.3/D3 Out-reach networking

CATS works to enhance interdisciplinary communication, research programmes and the presentation of new knowledge about the collections to colleagues and the public at large. To examples of the out-reaching network for the last year is listed below.

- Three day conference on *Conservation in the Nineteenth Century (CiNC)* in Copenhagen, 13th-15th May 2013, arranged by CATS, held at the National Museum of Denmark.
- The CATS Newsletter vol. 1 and 2 was sent out to all our subscribers and collaborative partners in October and December 2013. The newsletter describes latest news in CATS, upcoming conferences and lectures at the three partner institutions etc. People can subscribe to the CATS newsletter via our website.

The activities and work results of CATS research will be disseminated to professional conservation and museum communities, as well as aimed at a broader, general audience through museum exhibitions and catalogues and public lectures. The publications list p. 23pp accounts for presentations at conferences and colloquia, publications in professional peer-reviewed journals, and technical workshops organized by members of CATS.

Appendix 1 Structure and Management



Structure of CATS. See titles and names in full on the following pages.

Steering Committee

The Steering Committee consists of the directors and representatives from each partner institution.

The frequency of meetings within the Committee is twice a year. The Committee members are:

- **Karsten Ohrt (KOH)**
Director, SMK (KOH gave notice 31 December 2013)
- **Dr. Per Kristian Madsen (PKM)**
Director, National Museum of Denmark
- **Lene Dammand Lund (LDL)**
Rector, The Royal Danish Academy of Fine Arts Schools of Architecture, Design and Conservation (KADK)
- **Prof. Dr. Jørgen Wadum (JWA)**
Director of Conservation and Director of CATS, SMK
- **Dr. Jesper Stub Johnsen (JSJ)**
Director of Conservation, National Museum of Denmark
- **MSc Kim Gundersen (KGU)**
Director of Administration, SMK
- **Assoc. Prof. Mikkel Scharff (MS)**
Head of School and Paintings Department, School of Conservation, The Royal Danish Academy of Fine Arts Schools of Architecture, Design and Conservation (KADK)
- **MSc Mads Chr. Christensen (MCC)**
Conservation Scientist, National Museum of Denmark (Senior Consultant since January 1st 2014)
- **Dr. Peter Nørgaard Larsen (PNL)**
Director of Collections & Research, SMK

Financial Administration

The Financial Administration of CATS is located at SMK and operates in close collaboration with the other two partners. Responsible for all financial and legal issues within and related with CATS, the main Financial Administration staff is listed below.

- **MSc Kim Gundersen (KGU)**
Director of Administration, SMK
- **MSc Bo Veibel Petersen (BVP)**
Controller, SMK

International Committee of Scientific Advisors

The International Committee of Scientific Advisors is an expert panel of individuals to which CATS can turn for support and exchange of knowledge that relates directly to a specific project or an activity of a considerable importance and impact. The members of this Committee are listed below.

- **Prof. Dr. Bruno G. Brunetti**
Dipartimento di Chimica and Centre SMAArt, Universita' di Perugia, Italy
- **Prof. Dr. Andreas Burmester**
Director, Doerner Institut, Bayerische Staatsgemäldesammlungen, München, Germany
- **Dr. Michel Menu**
Centre de recherche et de restauration des musées de France (C2RMF), Palais du Louvre, Paris, France
- **Dr. Ashok Roy**
Director of Science, Scientific Department, National Gallery, London, United Kingdom
- **Dr. David Saunders**
Keeper of Conservation and Scientific Research, The British Museum, London, United Kingdom
- **Prof. Dr. Ron Spronk**
Professor of Art History, Queen's University, Kingston, ON, Canada / Hieronymus Bosch Chair, Radboud University, Nijmegen, The Netherlands
- **Prof. Dr. Norman H. Tennent**
Conservation Scientist, University of Amsterdam, The Netherlands

Project Group

The Project Group is responsible for keeping the course of CATS and developing the research activities. The project group members meet regularly for activities and decision making within CATS, and in addition to this have a regular meeting once a month. The members of the Project Group are listed below.

- **Prof. Dr. Jørgen Wadum (JWA)**
- **MSc Mads Chr. Christensen (MCC)**
- **Assoc. Prof. Mikkel Scharff (MS)**

CATS Office of research

The group of CATS staff employed in the Centre has their offices and labs at SMK. This part of the CATS staff is listed below.

- **Director of CATS**

- Prof. Dr. Jørgen Wadum (JWA)

- The Director of CATS is head of the daily activities within the Centre and is part of the Project Group and the Steering Committee. In the day to day running of the Centre he refers primarily to the rest of the Project Group and is backed by the financial administration.

- **Senior Researcher & Conservation Scientist**

- Dr. Anna Vila (AVE)

- The Senior Researcher & Conservation Scientist of CATS is responsible for the coordination of all scientific analysis carried out within the partnership of CATS, and is head of the labs and science activities located at CATS/SMK.

- **Conservation Scientist**

- Dr. David Buti (DBU)

- The Conservation Scientist of CATS is responsible for the scientific analysis carried out within the partnership of CATS. The conservation scientist refers to the Senior Researcher & Conservation Scientist.

- **Lab Technician**

- BSc / Chemical & Biotechnical Science Technician, Johanne Marie Nielsen (JMN)

- The Lab Technician assists the Senior Researcher & Conservation Scientist and the Research Assistant. She is responsible for the daily upkeep of the labs located at SMK, for lab supplies and consumables, inventories of chemicals, health and safety documentation.

- **Research Coordinator & Administrator**

- MSc in Conservation, Mette Kokkenborg (MBK)

- The coordinator of CATS deals with the administrative tasks, recurring dissemination activities and long term strategies, and works closely together with the Director of CATS, the Project Group and the Senior Researcher & Conservation Scientist.

- **Student**

- BSc student in Chemistry, Andreas Swane (ASW)

- The student performs the scientific analyses of samples for the reference database and assists in other routine tasks.

Appendix 2 CATS Partners and staff

SMK

- **Prof. Dr. Jørgen Wadum (JWA)**
Senior Researcher & Keeper of Conservation, MSc in Conservation (Director of CATS & research in 17th century Dutch and Flemish painting techniques)
- **Dr. Anna Vila (AVE)**
Senior Researcher & Conservation Scientist (Head of CATS-SMK lab & research)
- **Dr. David Buti (DBU)**
Conservation Scientist
- **MSc Mette Kokkenborg (MBK)**
MSc in Conservation, Research Coordinator & Administrator (webmaster CATS)
- **Senior Conservator Troels Filtenborg (TF)**
MSc in Conservation (early Italian & Spanish art)
- **Senior Conservator Niels Borring (NBO)**
MSc in Conservation (Art on Paper)
- **MSc Louise Cone (LCO)**
MSc in Conservation, Contemporary Art
- **MSc Karen Esser (KES)**
MSc in Conservation (Art on Paper)
- **MSc Anne Haack Christensen (AHC)**
MSc in Conservation, Paintings (Netherlandish art), PhD student
- **Chemical & Biotechnical Science Technician Johanne Marie Nielsen (JMN)**
BSc in Conservation / Chemical & Biotechnical Science Technician, Lab Technician
- **Mag.art Kim Brasen (KIB)**
Mag.art in Art History
- **Dr. Aoife Daly (ADA)**
PhD in dendrochronology, Research Fellow
- **Senior researchers from the Collection and Research Department (SAFO)**

NMD

- **MSc Mads Chr. Christensen (MCC)**
Head of Laboratory (from 1 January 2014 Conservation Scientist)
- **Senior Researcher Jens Glastrup (JG)**
MSc (PY-GC-MS binding media analysis)
- **Senior Researcher Isabelle Brajer (IB)**
MSc in Conservation (Theory and history of conservation)
- **Dr. Yvonne Shashoua (YS)**
Senior Researcher (FT-IR spectroscopy, polymers)
- **Dr. Michelle Taube (MT)**
Researcher (XRF-spectroscopy, SEM-EDS, analysis of inorganic materials)
- **Dr. Martin N. Mortensen (MNM)**
Researcher (Oxygen measurement, GC-MS, degradation of organic materials)
- **PhD student Karin Vestergaard (KV)**
MSc in Conservation (Colour history of Danish church furniture)

KADK

- **Assoc. Prof. Mikkel Scharff (MS)**
Head of the Conservation School and Paintings Department, MSc in Conservation (Multispectral analysis, research on 19th century art and conservation processes)
- **Assoc. Prof. Dr. Rene Larsen (RL)**
MSc in Conservation (Amino acid analysis, parchment and protein research)
- **Assoc. Prof. Dr. Ingelise Nielsen (IN)**
Head of Graphics Department & MSc in Conservation (research on paper technology & water-marks)
- **Assoc. Prof. Dorte Vestergaard Poulsen (DVP)**
MSc in Conservation (Amino acid analysis, research on organics, HPLC)
- **Assoc. Prof. Dr. Kim Pilkjær Simonsen (KPS)**
(Research on inorganics and organics)
- **Assoc. Prof. Beate Federspiel (BF)**
MSc in Conservation (Research on technology and ethics)
- **Assoc. Prof. Dr. Arne Redsted Rasmussen (ARR)**
(DNA analysis)
- **Krassimira Frangova (KF)**
MSc in Conservation (Research on wall paintings technology and conservation)
- **Bent Eshøj (BE)**
MSc in Conservation (Light measurement and weathering equipment)

Collaborative Partners

- **University of Copenhagen**, Department of Chemistry
- **University of Copenhagen**, Department of Scandinavian Research
- **Technical University of Denmark, DTU**, Department of Photonics Engineering
- **University of Amsterdam**, Amsterdam
- **Metropolia University of Applied Science**, Helsinki
- **Nationalmuseum**, Stockholm
- **University of Oslo**, Oslo
- **The Getty Foundation**, Los Angeles
- **CDA, Cranach Digital Archive**, Stiftung Museum Kunstpalast, Düsseldorf and University of Applied Sciences, Cologne
- **The Rembrandt Database**, RKD, The Hague
- **Gerson Digital: Dutch and Flemish Painting of the Golden Age in European Perspective**, RKD, The Hague

CATS Publisher

- Archetype Publications Ltd., London, c/o International Academic Projects, 1 Birdcage Walk, London, SW1H 9JJ. Tel: Int +44 207 380 0800 Fax: Int +44 207 380 0500. info@archetype.co.uk

Appendix 3 CATS Dissemination list

Publications

Andersen, Cecil K. 2013. 'Lined canvas paintings : Mechanical properties and structural response to fluctuating relative humidity, exemplified by the collection of Danish Golden Age paintings at Statens Museum for Kunst (SMK)'. Ph.D. dissertation. The Royal Danish Academy of Fine Arts, Schools of Architecture, Design and Conservation, Copenhagen, 145 p.

Andersen, Cecil K. 2013, 'Konservatorer med ph.d.: Lined canvas paintings, Mechanical properties and structural response to fluctuating relative humidity'. *NKF Bulletin*, no. 89/2013, p. 10.

Pedersen, Eva de la F. and Filtenborg, T. 2013. 'Two versions of a Boutsian Virgin and Child painting: questions of attribution, chronology and function', in *European Paintings 15th-18th Century: Copying, Replicating and Emulating*, Hermens, E. (ed.) pp. 36-49. London: Archetype Publications.

Wadum, J. 2013. 'The management of aesthetics and decay', in *Managers of Decay – Conservation and Restoration*, Gossens, A. (ed.) pp. 10-19, University of Amsterdam, Lecturis bv, Eindhoven.

MEMORI, Measurement, Effect Assessment and Mitigation of Pollutant Impact on Movable Cultural Assets, Final project report, 2013, (in preparation).

Brajer, I. (ed.) 2013. *Conservation in the Nineteenth Century*. London: Archetype Publications, 243 p.

Brajer, I. and Ørum, S. 2013. 'Jacob Kornerup and the conservation of wall-paintings in nineteenth-century Denmark', in *Conservation in the Nineteenth Century*, Brajer, I. (ed.) pp. 116-128. London: Archetype Publications (peer reviewed).

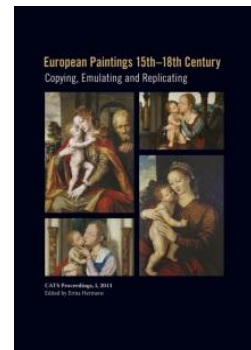
Brajer, I., Schädler-Saub, U. and Ørum, S. 2013. 'Documentation of medieval wall-paintings in Denmark and Germany in the nineteenth century and its impact on conservation and contemporaneous art', in *Conservation in the Nineteenth Century*, Brajer, I. (ed.) pp. 129-146. London: Archetype Publications (peer reviewed).

Cone, L. and Lundbye, L. 2013. *PRIMI – Plastic Research and Innovation for Museums and Industry*. Lundbye, L. (ed.). Copenhagen: Förlagshuset Nordens Grafiska AB, SMK/CATS, 76 p.

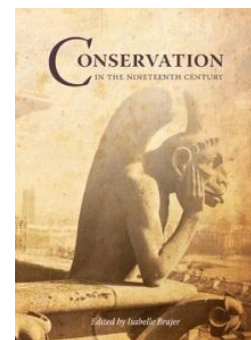
Vila, A. et al. 2013. 'An Initial Investigation into Japine: Willis's Proprietary Paper'. *Topics in Photographic Preservation*, Vol. 15. Proceedings presented at the PMG session of the 2012 AIC Annual Meeting in Albuquerque, New Mexico.

Vila, A. et al. 2013. 'Characterization of Early Platinotype Papers by Raman, FTIR and XRF'. *Microchemical Journal*.

Bonaduce, I., Colombini, M.P., Scharff, M. et al. 2013. 'The impact of organic acids on varnishes in museum environments' (in preparation).



*European Paintings
15th-18th Century:
Copying, Replicating
and Emulating*



*Conservation in the
Nineteenth Century*



*PRIMI – Plastic
Research and
Innovation for
Museums and Industry*

Lectures, conference presentations, workshop talks, etc.

The CATS conference *Conservation in the Nineteenth Century* (CiNC), the National Museum of Denmark, 13-16 May 2013.

Vila, A. et al. 2013. 'Technical Study of Pictorialist Photographies at the Collection of the Metropolitan Museum of Art'. *The Metropolitan Museum of Art, Technical Bulletin*, Conference postprints.

Odlyha, M., Bozec, L., Hackney, S. et al. 'Non-destructive and Minimally Invasive Test methods for the evaluation and assessment of movable organic-based heritage materials'. Proceedings 2nd European Workshop on Cultural Heritage Preservation EWCHP-2012, Oslo, September 24th-26th 2013 p.12-19 (peer reviewed).

Bonaduce, I., Colombini, M.P., Scharff, M. et al. 'The impact of organic acids on varnishes in museum environments'. The 3rd European Workshop on Cultural Heritage Preservation, EWCHP – 2013, Bolzano, Italy (peer reviewed).

Odlyha, M., Bozec, L., Hackney, S. et al. 'Surface Analysis of varnishes and collagen-based materials (parchment and leather): physicochemical characterisation and effect of nanoparticle-based conservation treatment'. The 3rd European Workshop on Cultural Heritage Preservation, EWCHP – 2013, Bolzano, Italy.

Tempest, H. et al. 2013. 'Sensitivity of Oil Paint Surfaces to Aqueous and other Solvents'. Conference postprints from Cleaning 2010, New Insights into the Cleaning of Paintings, Valencia, 26.-28. May 2013.

Kristiansen, K. V. 2013. 'Re-creation of 17th to 18th century polychromy and development of paint archaeological methodology in the late nineteenth century'. Poster presented at the conference Cinc Conservation in the Nineteenth Century, Copenhagen, 13-16 May 2013.

Tempest, H., Haack, A. and Hermens, E. 2013. 'A master and his pupil: the painting techniques of Daniël Seghers and Andries Bosman'. Conference poster presented at the Conference: Painting Techniques, History, Materials and Studio Practice, Rijksmuseum, Amsterdam, September 2013.

Tempest, H. and Haack, A. 2013. 'A master and his pupil: the painting techniques of Daniël Seghers and Andries Bosman'. Minutes of the meeting for the ArchLab website, Archives of Museums and Cultural Heritage Institutions.

Vila, A., Filtenborg, T., Wadum, J. et al. 2013. 'Prussian blue: New Interpretation of Paintings'. Invited lecture at the 2nd Nordic Conference on Vibration Spectroscopy, October 2013.

Vila, A., Filtenborg, T., Wadum, J. et al. 2013. 'Raman Spectroscopy: New Interpretation of paintings'. Invited lecture for the Bruker Infrared and Raman microscope seminar, November 2013.

Vila, A. 2013. 'From Macro to Micro'. Invited lecture at the National Museum Stockholm, October 2013.

Vila, A. 2013. 'CATS Copenhagen and the Interdisciplinary Collaboration between Art and Science'. Invited lecture for the Colloquium entitled Beyond the Look. Through the looking glass, and what Alice found there. How scientific research serving the heritage?, Museum of Fine Arts Ghent (Belgium), November 2013.

Borring, N. and Nielsen, I. 2013. 'Vandmærke-databasen'. Invited talk for the ODM Fagligt Orienteringsmøde, 14 - 16 November 2013.

Andersen, Cecil K. 2013. 'Dublering og kantdublering af lærredsmalerier'. Invited talk for the ODM Fagligt Orienteringsmøde, 14 - 16 November 2013.

Andersen, Cecil K. 2013. 'Heritage Science and Sustainable Development for the Preservation of Art and Cultural Assets'. Invited lecture at the Staatliche Museen zu Berlin, April 2013.

Andersen, Cecil K. 2013. 'Lining canvas paintings, mechanical properties in changing relative humidity exemplified by the collection of Danish Golden Age paintings at Statens Museum for Kunst (SMK)'. Poster presented at the Academy Exhibitions - studies and research. The Royal Danish Academy of Fine Arts, Schools of Architecture, Design and Conservation, Copenhagen.

Andersen, Cecil K. 2013. 'Nyeste forskning inden for strukturel konservering af lærredsmalerier'. Workshop at Fælleskonserveringen Vest, 22.11.2013

Monaghan, M. et al. 2013. 'Lining on the Stretcher: Glue-paste lining techniques in 19th Century Denmark'. Poster presented at the conference Conservation in the Nineteenth Century (CiNC). The National Museum of Denmark, 13-16 May 2013.

Appendix 4 Press coverage

Coverage of CATS activities and events 2013 (Listed by date)

6 May 2013, SMK TV: Conservation: One on One, YouTube link, www.youtube.com/watch?v=52aOeKISBJk

28 May 2013, Ingeniøren: *Konservering får kunst til at krympe.*

28 May 2013, DR P1 Morgen: *Konservering skader gamle malerier.*

28 May 2013, DR P1 Radioavisen: *Konservering skader malerier.*

28 May 2013, DR P1 Kulturnyt, interview with Jørgen Wadum: *Konservering skader malerier.*

28 May 2013, DR P4 Radioavisen: *Behandling med voks risikerer at skade malerier.*

28 May 2013, Jyllands-Posten: *Van Gogh-malerier risikerer at krympe.*

28 May 2013, TV2 Lorry: *Konservering skader malerier over hele kloden.*

28 May 2013, Politiken: *Danske forskere opdagede maleri-fare: "Jeg var lige så overrasket som alle andre".*

28 May 2013, Politiken: *Conservation damages world paintings.*

28 May 2013, TV2 News, Kulturen på News: *Konservering skader malerier.*

28 May 2013, Radio24syv: *Konservering skader malerier.*

21 June 2013, CATS Seminar by the CATS staff: *Presenting CATS, the facilities and the equipment.*

19 August 2013, TV2 News, Kulturen på News, interview with Jørgen Wadum: *PRIMI - Plastic Research and Innovation for Museums and Industry.*

15 September 2013, Ingeniøren: *Højteknologi opklarer mysterium om falmende blomstermalerier.*

23 September 2013, AD, Dutch Newspaper, p. 11: *Schrijfster Donna Tartt is verzet op Het Puttertje.*

1 October 2013, *CATS Newsletter*, Vol 1.

15 October 2013, Politiken, Art Section, *Ekspert om nyopdaget Van Gogh-værk: "Der er jo også nogle skæverter indimellem".*

24 October 2013, CATS Lecture by Prof. Dr. Jaap J. Boon: *Investigating dried oil paintings that start to weep and form drips.*

24 October 2013, CATS Lecture by Ida A.T. Bronken: *The formation of drips and softening paint in paintings by Jean-Paul Riopelle.*

1 December 2013, *CATS Newsletter*, Vol 2.

15 December 2013, Dansk Kemi, Vol 12, p. 30-34: N.E.A. Reeler et al. (ed): *Raman af hvide pigmenter.*

24 December 2013, Radio24syv, interview with Jørgen Wadum: *Christmas and paintings.*

Appendix 5 Financial contribution to CATS

The period 1 January – 31 December 2013

The table below sums up the financial contribution to CATS from the Villum Foundation and the Velux Foundation as well as from the CATS partner institutions.

The numbers equal salaries in WP2-7, while WP1 also includes operational costs.

1.000 kr.	2011	2012	2013	Total
Total of partners contribution to CATS				
School of Conservation	342,2	786,8	381,5	1.510,6
wp1	20,6	137,7	77,6	
wp2	36,2	53,3	-	
wp3	-	-	42,2	
wp4	285,4	595,4	261,7	
wp6	-	0,4	-	
The National Museum	216,0	432,0	1.213,4	1.861,4
wp1	36,0	48,0	1.120,0	
wp2	60,0	102,0	6,9	
wp3	-	-	1,8	
wp5	-	-	8,7	
wp6	90,0	120,0	-	
wp7	30,0	162,0	75,9	
Statens Museum for Kunst	257,2	357,2	253,3	867,8
wp1	162,3	142,5	-26,5	
wp2	84,2	91,9	-	
wp3	-	58,9	157,6	
wp4	-	-	63,9	
wp5	-	59,3	53,4	
wp6	-	-	4,9	
wp7	10,7	4,6	-	
Total of the foundations contribution to CATS	1.172,4	3.487,9	6.187,4	10.847,6
wp1	1.102,0	3.344,0	6.187,4	
wp7	70,4	143,9	-	
Total cost for the CATS project	1.987,8	5.064,0	8.035,6	15.087,4

1.000 kr.	2011	2012	2013	Total
Other external supported project under CATS				
PRIMI	410,2	721,4	-	1.131,6
Operating costs	407,6	360,2	-	
Salary	2,6	361,2	-	
Bosch Bruegel	155,3	439,6	-	594,9
Operating costs	74,7	420,2	-	
Salary	80,6	19,4	-	
Total cost for other projects	565,5	1.161,0	-	1.726,5