Centre for Art Technological Studies and Conservation

SMK
Nationalmuseet
KADK
The Royal Danish Academy of Fine Arts
Schools of Architecture, Design and Conservation

VILLUM FONDEN × VELUX FONDEN

CATS
Centre for Art Technological Studies and Conservation
The purpose of CATS is

- to advance ‘collections research’, which in present-day gallery vocabulary incorporates not only the long-established art historical research of the collections but also the technical research which have increasingly proved to be essential to a proper understanding and appreciation of works of art
The purpose of CATS is

• in-depth art historical and scientific research to explore the material nature of works of art and comparable objects in museums with which CATS is collaborating
• to provide analytical services to other institutions
• to conduct collaborative projects with conservation scientists, conservators and curators from around the world
A selection of conservation science institutions

1888 Chemisches Labor der Königlichen Museen zu Berlin, now Rathgen-Forschungslabor
1902 Versuchsanstalt und Auskunftsstelle für Maltechnik, München
1932 Laboratori di Restauri at the institute of Opificio delle Pietre Dure, Florence
1937 Reichsinstitut für Maltechnik, now Doerner Institut
1921 British Museum, London, founded its Research Laboratory
1928 Center for Conservation and Technical Studies, now Strauss Center for Conservation and Technical Studies at the Fogg Art Museum at Harvard
1930 research and conservation analytical laboratories at the Museum of Fine Arts, Boston.
1934 National Gallery, London
1948 Royal Institute for Cultural Heritage (KIK-IRPA), Brussels
1950 National Gallery of Art, Washington D.C.
1963 Smithsonian, Washington D.C.
1963 Centraal Laboratorium voor Onderzoek van Voorwerpen van Kunst en Wetenschappen, (later ICN, currently RCE), Amsterdam & Amersfoort
1965 Danmarks Nationalmuseum with dept. for Research, Analysis and Advice
1971 School of Conservation with labs for education and research
1985 Getty Conservation Institute, Los Angeles
1998 Centre de Recherche et de Restauration des Musées de France (C2RMF), Paris

Scandinavia had no interdisciplinary research institution focusing on the visual arts

2011 CATS undertook the challenge…
Work Packages CATS 2011-2017

WP1: Management & International Collaboration

WP2: Materials in Dutch & Danish 17th Century Paintings incl. a PhD project

WP3: Nicolai Abildgaard and 18th Century Painting Techniques

WP4: 19th Century Painting Techniques and materials; Danish Golden Age incl. a PhD project

WP5: Works of Art on Paper

WP6: Establishment of a Reference Collection Database & Digital Documentation

WP7: Dissemination/Conferences/Publications
Interdisciplinarity
CATS analytical equipment
(a selection)

Internal
- FT-IR ATR
- FT-IR MIR and FIR
- PY-GC-MS
- Ion chromatography
- HPLC
- XRF ARTAX 400 + Mo and Rh tgt’s
- pXRF
- RAMAN 514nm and 785nm
- SEM-EDX
- Spectroradiometer ASD (UV-VIS-NIR reflectance and radiance/irradiance analysis)
- X-ray
- UV-vis

- Osiris IR, InGaAs-array
- Inframetrics SWIR, PtSi-array
- VIL (IR luminescence)
- Div microscopes pol / trans / UV / epi
- INSTRON tensile testing
- Colour measurement & microfading analysis
- DNA sequencing

External
- OCT
- NMR spectroscopy
- Dendrochronology
Lead ore for lead white

England

Ultramarine blue
(lapis lazuli)

Afghanistan

Carmine red

Latin America

Cross section

Earth pigments

Germany & France

Cinnabar

Spain

Indian yellow

India

Oak

Baltic region
A SCIENTIFIC CONTROVERSY

Investigating ‘Christ Driving the Traders from the Temple’ in the collection of Statens Museum for Kunst, Copenhagen

https://artsandculture.google.com/exhibit/EgLCBVJZ1gD8Jg
A Dark Future?
Before exposure of 3 types of lead white to extreme values of $H_2S$ in a closed desiccator

1. Neutral lead carbonate, Sigma Aldrich
2. Lead white pigment, Kremer
3. Basic lead carbonate, Merch
After 4 hours

1. Neutral lead carbonate, Sigma Aldrich
2. Lead white pigment, Kremer
3. Basic lead carbonate, Merch

© Morten Ryhl-Svendsen, 2016
After 24 hours

1. Neutral lead carbonate, Sigma Aldrich
2. Lead white pigment, Kremer
3. Basic lead carbonate, Merch

© Morten Ryhl-Svendsen, 2016
After 36 days

1. Neutral lead carbonate, Sigma Aldrich
2. Lead white pigment, Kremer
3. Basic lead carbonate, Merch

© Morten Ryhl-Svendsen, 2016
Drawing by Abraham Bloemaert (1564 – 1651), *Seated woman*. All of the lead white highlights have blackened.

We now know that hydrogen sulfide (H₂S) is the chemical compound that causes the blackening of *some* lead white pigments, but far from all.

Why?

A combination of factors that involves the
- geological provenance of lead (lead ore)
- its production methods, including processing and refining methods, which will have varied from one region to another and during different periods
- type and quantity of binding medium
Claus Carstensen

*Ether body*, 1986

2014

© Claus Carstensen

http://www.smk.dk/en/explore-the-art/search-smk/#/detail/KMS7403
CATS established a **Reference Collection Database**

The CATS materials reference collection database contains metadata on reference samples and related analyses as well as non-invasive analyses collected at the three partner institutions since the early 1960’s.

[Reference Collection Database](https://www.cats-cons.dk/services/cats-reference-database/)
Wooden Supports in 12th–16th-Century European Paintings

A New English Translation with Commentary of Jacqueline Marette's

Connaissance des Primitifs par l'étude du bois du XIIe au XVIe siècle

Edited by Jørgen Wadum, Christina Currie, Noëlle Streeton, Jean-Albert Glatigny and Nicole Goetghebeur

Translated by Ted Alkins and Paul van Calster

http://www.wooden-supports-marette.com/
Dendro4Art database (in preparation)

Measurements from more than 7,000 paintings including more than 16,000 chronologies from the 15th - 18th centuries

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Marks on Art database (in preparation)
A dozen different marks – thousands of repetitions
Which match with which?
Can we establish a production chronology?
We will online create order for art historical evidence and authentication?
Watermarks database (in preparation)
ConservationSpace is a web-based digital document management system developed specifically for conservators. It allows users to write, store and retrieve conservation information.

http://conspace.wixsite.com/conservationspace
The consortium joins together major centres of research in Heritage Science, including outstanding research institutes, as well as prestigious research laboratories and conservation centres in both museums and universities.

IPERION CH is affiliated to the Digital Research Infrastructure for the Arts and Humanities, DARIAH ERIC.
Stories from the conservator

Read more about Rubens’ preparations for a journey, the restoration of the smallest work of art in the museum and see x-rays with unexpected details.

Follow the conservators’ work and learn about how the artworks are cared for.

Visit the conservator

The conservators work with documenting, conserving and restoring all kinds of art from the collection.

We treat works created on paper, canvas, parchment, vellum, wood, and copper, as well as, sculptures made of plaster, plastic, and bronze. In addition to this, we also care for the gallery’s collection of contemporary art, which can challenge the conservators due to the combination of numerous materials.

Conservation stories, projects, and films
In our conservation stories section, you can gain insight into the conservator’s everyday work and routine tasks. You can browse our project descriptions to get more detailed information on how conservators work on major restoration projects that include in-depth studies, research, and technical analysis.

You can also watch a number of short films about conservation.
Dissemination 2011-2018

✓ CATS home page www.cats-cons.dk

✓ Exhibitions:
  ✓ Illuminated – on the trail of Bosch og Bruegel (4 May – 21 October 2012)
  ✓ Flower Paintings – Open Studio (22 March - 20 October 2013)
  ✓ Åbent Atelier: Dürer under kniven! (5 September - 19 December 2014)

✓ Publications:
  ✓ On the trail of Bosch and Brueghel - Four paintings united under cross-examination
  ✓ Conservation in the Nineteenth Century
  ✓ PRIMI, Plastics Research and Innovation for Museums and Industry
  ✓ European Paintings 15th-18th Century – Copying, Replicating and Emulating. CATS Proceedings No. I
  ✓ Nicolai Abildgaard – his paintings techniques seen in an European context
  ✓ Studying 18th-Century Paintings and Works of Art on Paper, CATS Proceedings No. II
  ✓ Studying the European Visual Arts 1800-1850 CATS Proceedings No. II

✓ Conferences:
  ✓ 2012: Copying, Replicating & Emulating Paintings in the 15th-18th Century
  ✓ 2013: CiNC - Conservation in the 19th century
  ✓ 2014: Studying 18th-Century Paintings & Art on Paper
  ✓ 2016: Studying the European Visual Arts 1800-1850 - Paintings, Sculpture, Interiors and art on Paper
  ✓ 2018: Trading Paintings and Painters’ Materials 1550-1800
On 21 and 22 June 2018, this two-day Technical Art History conference will be held by CATS, Copenhagen.

The focus of the conference will be on the emerging international markets and their implications for the artistic production in Early Modern Europe (1550-1800), in particular in relation to the trade in paintings and artists' materials.

https://www.cats-cons.dk/conference-2018/

The conference is associated with:
INTERDISCIPLINARY RESEARCH INTO ARTISTS’ MATERIALS AND TECHNIQUES