

Beazley Archive  
Classical Art Research Centre  
Ioannou School for Classical and Byzantine Studies

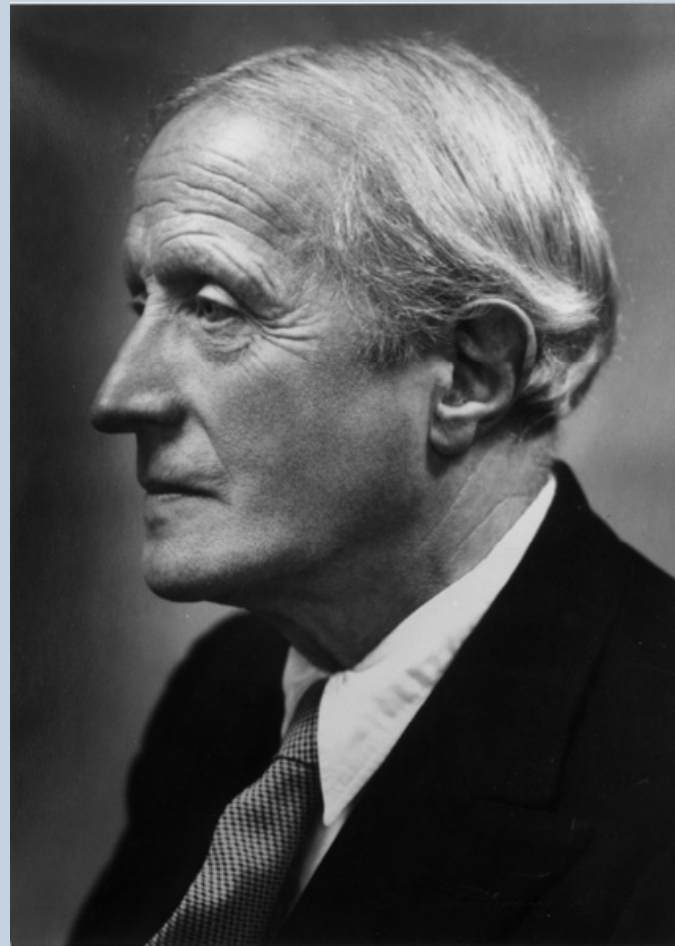


# Digital imaging: objects

The Beazley Archive, CLAROS and The World  
of Ancient Art

Donna Kurtz, Beazley Archive  
Sebastian Rahtz, OUCS  
Andrew Zisserman, Engineering Science

# Sir John Beazley



1885-1970  
Photograph by Cecil Beaton



<http://news.bbc.co.uk/1/hi/england/oxfordshire/8347232.stm>

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Ioannou Centre for Classical and  
Byzantine Studies  
66 St Giles'  
Oxford  
OX1 3LU

Tel: +44 (0)1865 288391

## Welcome

to the website of the Faculty of Classics at the University of Oxford and of its two sub-faculties of Classical Languages & Literature and Ancient History & Classical Archaeology.

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### Lectures:

This term's [Lecture Lists](#) and [today's lectures](#)

### Public Lectures:

**Nellie Wallace Lecture : Thur 3rd Jun (wk 6)** "Etymology in discourse: thinking with language in antiquity and the middle ages". 5pm, Ioannou Centre

**The Gaisford Lecture : Thur 10th June (wk 7)** Prof. Leslie Kurke (Berkeley), "Imagining Chorality: Plato's Puppets, Wonder and Moving Statues". 5pm, Ioannou Centre

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### Conferences:

**'Laughter in the Library' - a colloquium on Old Comedy for Penny Bulloch**

To be held at the Ioannou Centre on Sat 5th June 2010 10:30am-5pm. For further details see <http://www.classics.ox.ac.uk/pennyfest.htm>

**Oratory and Politics in the Roman Republic**

An international conference to be held at Oxford, 1-3 September 2010. For further details see <http://www.classics.ox.ac.uk/oratory/>

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### Prizes:

**The 2010 Conington Prize** will be offered for a dissertation on a subject chosen by the writer and approved by the Board of the Faculty of Philosophy within the field of Ancient Philosophy and Ideas. The value of the prize will be about £1,000.

For further details see [Conington Prize 2010](#)

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### Update on graduate funding:

see [Funding](#)

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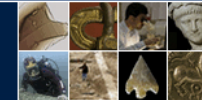
### Information for Schools & Colleges:

Visit our outreach website : [Classics Outreach Website](#)

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#### About Us

About the School  
People

## Welcome to the School of Archaeology



Archaeology is a subject with great popular and academic appeal which sheds light on six million years of human history as well as on sites of local interest in Britain and elsewhere. Fieldwork is carried out in many parts of the world; from the Mediterranean to southern Africa, Iceland to New Guinea.

Members of the School conduct major programmes of research into human origins & dispersals, climate change, dating of sites & materials, human diet & health, the nature of the ancient city and Medieval settlement & burial. The School supports teaching in two major undergraduate degrees – Archaeology & Anthropology and Classical Archaeology & Ancient History, as well as a range of post-graduate degrees.

#### News and Announcements

##### University Open Days

The University of Oxford Open Days will take place on Wednesday 30 June 2010, Thursday 1 July 2010 and Friday 17 September 2010. Register for a place and find out more here.

[Read more ...](#)



##### Dining and Death

Dining and Death: interdisciplinary perspectives on the 'funerary banquet' in ancient art, burial and belief This Conference will be held on 25 and 26 September 2010, at Ioannou Centre for Classical and Byzantine Studies, St. Giles', Oxford

[Read more ...](#)



##### Palaeolithic and Quaternary ('PalQuat') seminars



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The art of ancient Greece and Rome, and its collection and reception since antiquity

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Athenian clay vase. Zeus and Nike, 5th c. BC



### Highlights

#### Queen's Anniversary Prize

Podcasts - Sir John Boardman and Professor Donna Kurtz

A gem of a collection - article in Blueprint - March 2010 (pdf)

One of the great treasure hunts

CLAROS - bringing classical art to a global public - paper given at the 5th IEEE International Conference on e-Science (pdf)

Timelines

The future of the past - lecture slides now available

Classical antiquities and fine art

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THE QUEEN'S  
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2009

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### Sculpture

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[Ashmolean Long Gallery](#)

[Opening of present Cast Gallery](#)

[Ashmolean Museum casts](#)

### History of the cast collection - introduction

The Ashmolean Museum's collection of plaster casts is one of the oldest and best preserved in Britain. Its history begins almost two hundred years ago, when plaster casts of ancient Greek and Roman statues could be found in several parts of the University. They served to decorate rooms, especially libraries, and to proclaim the Glory of Greece and the prestige of Oxonians who had made the Grand Tour to the Mediterranean.



[\[View larger image\]](#)  
Interior of the Cast Gallery.  
Photograph: Beazley Archive, Ian Hiley



[\[View larger image\]](#)  
Aerial view of Oxford.  
Photograph: Skyscan Balloon

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# Classical Art Research Centre

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### Pottery

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### Pottery from:

[University of Catania](#)

## Attic red-figure

### Berlin Painter's name vase



[\[View larger image\]](#)



**Museum:** Berlin, Staatliche Museen

**Size:** 69cm. ([amphora of Type A](#) with lid preserved; unusually painted glossy black inside)

**Function:** storage and display

**Technique:** red-figure

**Style:** a careful and highly structured style that leads on to the classical Achilles and Phiale Painters.

**Subject/s:** A. [Hermes](#) (named) with jug and large kantharos, satyr (named *Oreimachos*) with barbiton and plectrum, and fawn, overlapping and radiating their limbs in a sophisticated design that fills the great black space (there are no panels, only minimal pattern bands). B. A single satyr (named *Orochares*), leaning forward towards the [kantharos](#) held in the right hand. The left holds a barbiton; the tail is arched.

**Date:** early 5th c.

**Analysis:** large size, fine potting and painting, unusual radiating design on black vase with minimal, but unusual, patterns, and naming of the satyrs suggest a very special piece. Exported in antiquity to northern Italy.

[More from Berlin Painter](#)

Next »  
[Kleophrades Painter 'Sack of Troy' hydria](#)

View all  
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# Ashmolean Museum, Cast Gallery basement



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### Cast Gallery catalogue number: A094



Two goddesses; probably [Aphrodite](#) in the lap of [Dione](#).

- Plaster cast: Height: 1.3m, Width: 2.33m.
- Copy of a marble group.
- The group:
  - is from the east pediment of the [Parthenon](#).
  - was made about 430 BC.
  - was brought from [Athens](#) to London in the early 1800s
  - is now in London, British Museum, 303E and 303F.

Look at [casts from the Parthenon](#)  
More about the [Parthenon](#) | [east pediment](#)  
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### Parthenon



The temple of [Athena](#) Parthenos on the [Acropolis](#) at [Athens](#), started in the early 5th century BC, but re-designed and completed under [Perikles](#), about 450-430 BC. [Iktinos](#) was the architect, and [Pheidias](#) was the principal designer of the sculpture. It was the greatest and most subtle of all Greek classical temples. Its rear room housed a [Treasury](#), and it was the goal of the annual Panathenaic processions, but had no altar of its own, the older [Athena](#) Temple altar being used.

Above: View of the Parthenon from the north-west. © S. Mavrommatis Licence Plate 11 UK 1007 180

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### East Pediment of the Parthenon



The Basel reconstruction (by Berger), John Boardman, *Greek Sculpture Classical Period*, fig.78

The sculpture from the centre of this pediment was destroyed when an apse was built at the east end, to convert the Parthenon into a Christian church. We know the pediment showed the birth of Athena, who sprang fully grown and armed from the head of her father Zeus after Hephaistos struck him with an axe. The centrepiece must have comprised these three and probably Hera. The surviving sculptures are of other gods witnessing this event, and of horses drawing the chariots of the Sun (far left) and Moon (far right).

Look at [casts from the Parthenon](#)

More about the [Parthenon](#) | [west frieze](#) | [north frieze](#) | [south frieze](#) | [east pediment](#) | [west pediment](#) | [north metopes](#) | [south metopes](#)

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### Gems

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- Greco-Persian
- Etruscan
- Late antique, early Christian and Jewish
- Tassie Gems
- Classical Phoenician Scarab Corpus
- The Danicourt collection
- The Poniatowski collection
- The Marlborough collection
- Paoletti impressions

### Dexamenos

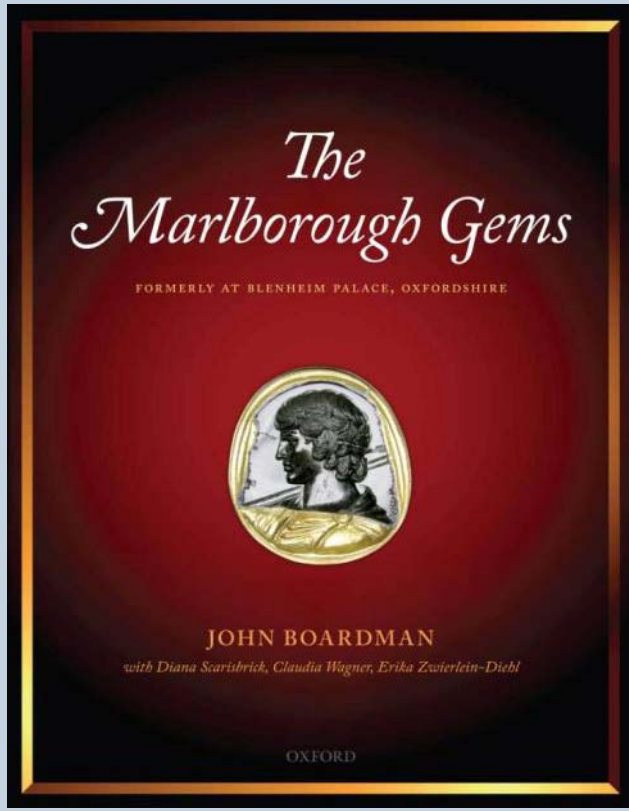
The master Dexamenos, of Chios, signs four gems, and others can be assigned to him for their style and command of detail, sometimes engraved by hand and not by the cutting wheel. He worked in the third quarter of the 5th century, and seems to have had a fondness for mottled jaspers for his work.

### Classical

- Women
- > Dexamenos
- Animals
- Myth and divinity
- Genre



Red and yellow mottled jasper scaraboid from Kara, Attica. The portrait head of a man. Signed



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### The Ancient World - Archaeology and Art Six continents over ten millennia



### Further resources

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Shangsunjiashai

Zongri

Majiayao

Shizhaocun

Zhuangbai

Zhangjiapo

Jinsha

Sanxingdui

Mashan

Baoshan

Taosi

Beizhao

Banpo

Xiasi

Yinxu

Ao

Erlitou

Xiasi

Leigudun

Baoshan

Niuheiliang

Zhoukoudian

Beifudi

Zhongshan

Yinxu

Ao

Erlitou

Qiujiahuayuan

Leigudun

Dayangzhou

Dadianzi

Dongshanzui

Chengziya

Bo

Yaoshan

Data SIO, NOAA, U.S. Navy, NGA, GEBCO  
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34°57'07.38" N 109°49'54.58" E elev. 0 m

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Eye alt 3131.31 km



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### Sites

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You need JavaScript enabled on your browser to view the map. If you cannot see the map use the [list of places](#) instead.

**Babylon**

**Hanging Gardens of Babylon**  
16th century engraving by Dutch artist Martin Heemskerck

Map | Map | Satellite | **Terrain**

Uzbekistan

Turkmenistan

Atrak River

Maraz River

Euphrates River

Iraq

Syria

Türkiye

Gerze Limani

R-3 Arabka (P-3) (Арабка)

Pivnichno-Kryms'kyi (Північно-Кримський)

Ochakiv's'ke (Очаківське)

Balıkçı Barnağı

Cyprus

الأردن

Europe

Africa

200 mi

200 km

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### 1, GREECE, ATHENS, ACROPOLIS



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- **Site:** GREECE, ATHENS, ACROPOLIS
- **Image Date:** 1869
- **Photographer:** STILLMAN, WILLIAM JAMES
- **Comments on Photo:** 24 x 18 cm. ALBUMEN PRINT. SIGNED 'WS', NO.4
- **Comments on Subject:** DESCRIBED IN STILLMAN AS "THE ACROPOLIS, FROM THE HILL ABOVE THE ILISSUS, LOOKING NORTHWEST. AT THE RIGHT ARE THE RUINS OF THE TEMPLE OF JUPITER, AND AT THE EXTREME LEFT THE MUSAEUM HILL, WITH THE MONUMENT OF PHILOPAPPUS."
- **Bibliography:** STILLMAN, WILLIAM JAMES, ACROPOLIS OF ATHENS, ILLUSTRATED PICTURESQUELY AND ARCHITECTURALLY IN PHOTOGRAPHY, LONDON 1970  
DELIVORRIAS, A. ET AL, ATHENS 1839-1900, A PHOTOGRAPHIC RECORD, ATHENS 1985

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- *Site:* City Walls
- *City:* Istanbul
- *Country:* Turkey
- *Publication:*
- *Function:* city wall



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# CLAROS

Classical Art Research Online Services



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Virtual integration of digital assets on classical art

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**Partner Institutions:**  
Beazley Archive,  
Oxford

German Archaeological  
Institute, Berlin

Lexicon of Greek  
Personal Names

Lexicon  
Iconographicum  
Mythologiae Classicae  
- LIMC Basel

Lexicon  
Iconographicum  
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- LIMC Paris

Research Archive for  
Ancient Sculpture,  
Cologne



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ClarosWiki - technical  
information about ClarosWeb

### MILARQ Project

### Updates

CLAROS - bringing classical  
art to a global public -  
paper given at the 5th IEEE  
International Conference on  
e-Science (612kb pdf)

The Future of the Past -  
lecture slides (3MB pdf)

Screen cast demonstration  
of CLAROS (40MB mov)

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## CIDOC: supporting museum documentation

Documentation is essential to all aspects of a museum's activities. Collections without adequate documentation are not true "museum" collections.

CIDOC, ICOM's International Committee for Documentation, provides the museum community with advice on good practice and developments in museum documentation.



### Community

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### Conferences

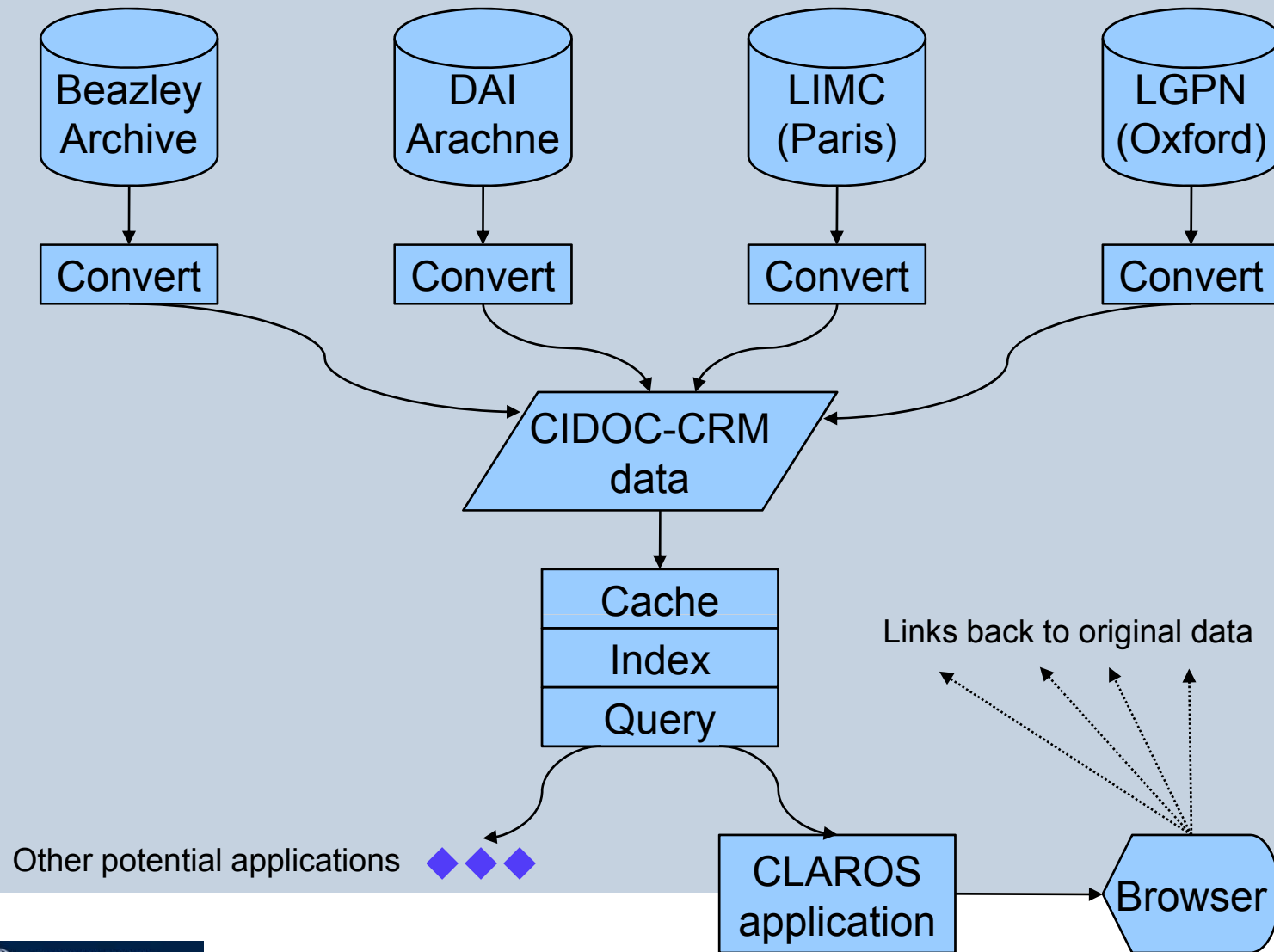
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## Welcome to the Oxford e-Research Centre



The **Oxford e-Research Centre (OeRC)** works with research units across the whole of Oxford University to enable the use and development of innovative computational and information technology in multidisciplinary collaborations.

You can find out more about the centre in the [About Us](#) section of the [site](#).

## News

**OSC Manager Jon Lockley on BBC News**  
31st May '10

**OeRC member plummets for charity**  
31st May '10

**Launch of the James Martin Institute for the Future of Computing**  
28th April '10

**OSC Training Courses, May-June 2010**  
27th April '10

**OeRC successes in European funding**  
26th April '10

## Upcoming Events

**Course on CUDA Programming on NVIDIA GPUs**  
Monday 26th July '10, 9.00am

**Evolution of Computation Needs for Earth Observation**  
Tuesday 23rd November '10, 2.00pm

To see full details of all [OeRC](#) events, past and future, visit our [Events](#) page.



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Personal tools

## Image Bioinformatics Research Group home page



The Image Bioinformatics Research Group (IBRG) undertakes research and development and builds tools and services to publish and enhance the value of biological research data, particularly image data, by the application of Web and Semantic Web technologies

The Image Bioinformatics Research Group (IBRG) is a unique informatics research group embedded in a world-class biological research and teaching department, the [Zoology Department](#) of the University of Oxford. It also forms part of the distributed [Oxford e-Research Centre](#).

### Search

Search

### Recent IBRG news

#### [Plenary Lecture at Integrative Bioinformatics](#)

3 March 2010

On 22 March 2010, David Shotton will deliver the opening plenary address at the 6th annual meeting of the [International Symposium on Integrative Bioinformatics](#)

#### [OUCS Linked Data Workshop](#)

3 March 2010

David Shotton, Jun Zhao and Graham



OxfordVases  
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Shape is **amphora neck** (click for shape timeline).

Uploaded vase-image



Foreground separation



Top 3 matches



('amphora',  
'neck')



('amphora',  
'neck')

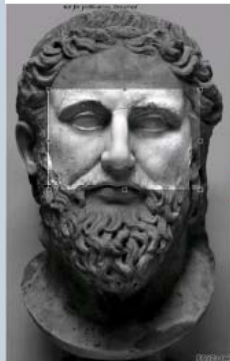


('amphora',  
'neck')

# Example

# Search results

query



?



1

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2

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[0 other images of the same object](#)



3

Ab:sp:th:1/images/Abbildungen/FA/Dateien/la bb0090/FA971-05\_753\_11.jpg  
Score: 11.0

[Details](#)  
[0 other images of the same object](#)

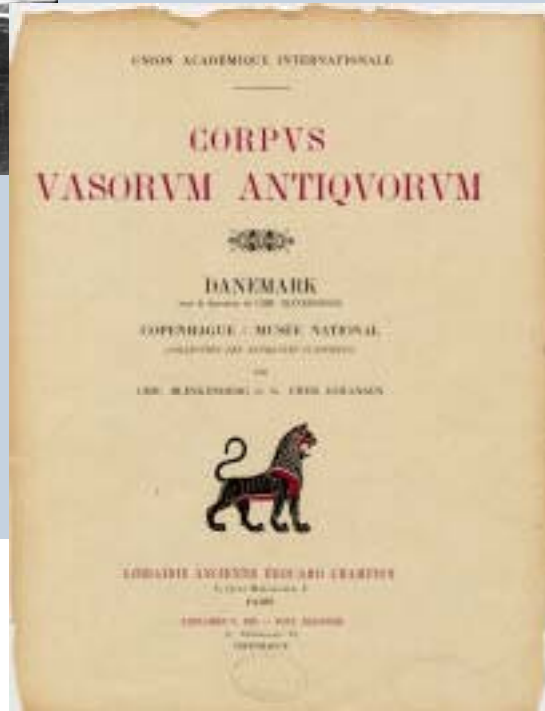
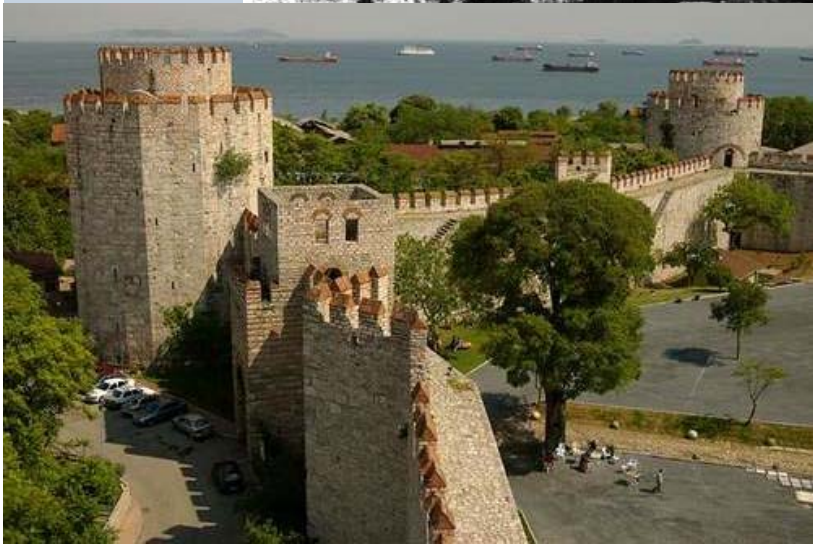
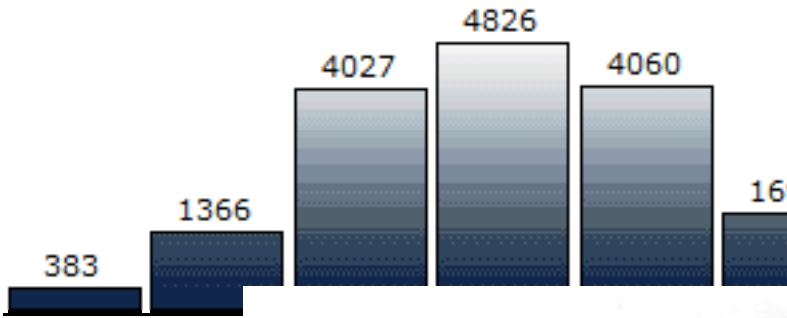


4

Ab:sp:th:1/images/Abbildungen/FA/Dateien/la bb0090/FA971-02\_753\_08.jpg  
Score: 9.0

[Details](#)  
[0 other images of the same object](#)





# The place of images

<b>representation of real-world objects</b>	pottery, gems, sculpture
<b>objects as holders of textual sources</b>	images of inscriptions and coins
<b>representations of time and place</b>	chronological mapping
<b>input and interaction</b>	“what is this pottery shape I am showing you?”
<b>first class objects</b>	antiquarian photographs
<b>visualization</b>	charts, plots, etc

# Behind CLAROS

- The CLAROS infrastructure relies upon a set of technology standards:
  - a common ontology – CIDOC CRM conceptual reference model
  - a common approach to data management – RDF
- working practices:
  - federation not aggregation – devolved responsibility
  - collaboration – more than Oxford
  - proportionality and subsidiarity – no attempt at a universal model
  - open data – we are not the only users
- and assumptions:
  - open licensing – no data hoarding
  - no limits – world wide
  - a range of impact models – not limited to academia

# CLAROS initial collaborators

- Beazley Archive:
  - ✓ 150,000 Pottery records and 130,000 images
  - ✓ 50,000 Engraved gem and cameo records and 30,000 images
  - ✓ 900 cast records of classical sculpture and 2000 images
  - ✓ 900 Antiquarian photographs
- Lexicon of Greek Personal Names:
  - ✓ 400,000 recorded individuals. Over 35,000 unique personal names from 2500 places
- Cologne Research Sculpture Archive
  - ✓ 250,000 Sculpture records, 490,000 images
- German Archaeological Institute:
  - ✓ 1,500,000 photographs
- Lexicon Iconographicum Mythologiae Classicae (Paris):
  - ✓ 100,000 records, 180,000 images of mythological and religious iconography from 2,000 museums and collection

# Disparate technologies

## **Beazley Archive**

- 'XDB' – XML data, SQL Server Database, ASP front end

## **Cologne Research Archive and German Archaeological Institute**

- 'Arachne' - MySQL database, PHP front end.

## **LIMC**

- MySQL database, PHP front end.

## **LGPN**

- Ingres relational database, also available as an eXist XML database serving TEI-XML data. XQuery front end.

# The CLAROS data web approach

- **No changes** to the databases of the individual sources
- **Semantic differences** between data sources are resolved by mapping selected metadata from each source to CIDOC-CRM
- **Syntactic differences** between data sources are resolved by converting the selected metadata to RDF, accessed from a single triple store using SPARQL
- CLAROS is a **resource discovery service** – all results link back to host databases

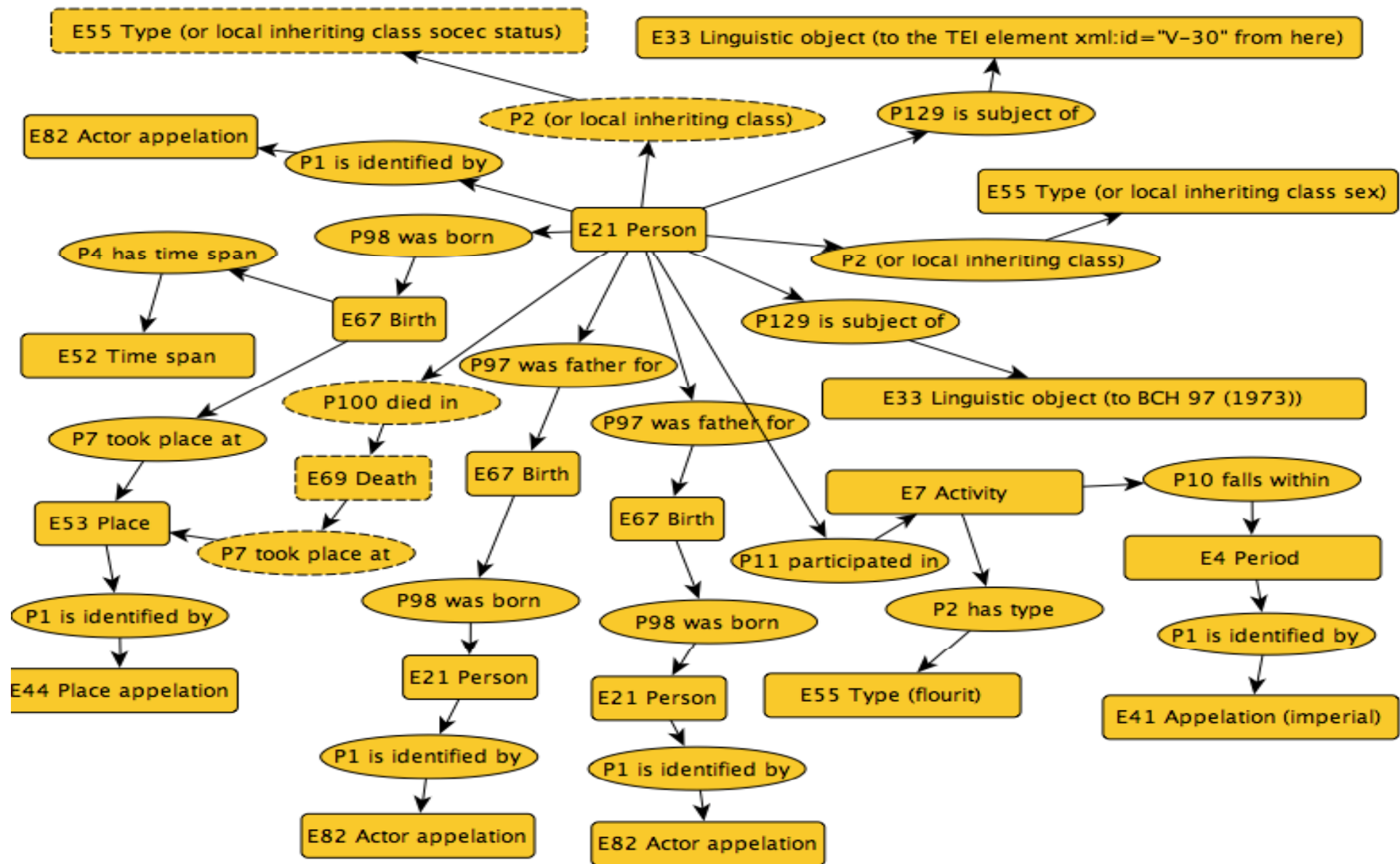
The job of CLAROS is provide **cacheing, indexing** and **querying** services



# CIDOC Conceptual Reference Model (CRM)

# CIDOC CRM in CLAROS

- CIDOC CRM Core can describe the complex provenance of **artefacts** and their relationships with key **events**, **people**, **places** and **times**
- The CIDOC CRM "E55.Type" system is particularly useful to permit faceted/drill-down queries, e.g. restricting results by the shape of a pot
- We focused initially on the CIDOC CRM Core terms, and employed additional terms as necessary. Some additional RDF vocabulary for time metadata relating to imprecise periods and eras i.e. `<claros:not_before>` and `<claros:not_after>`, applied to a `<crm:E61.Time_Primitive object>`



# The CIDOC route to 2<sup>nd</sup> century BC Athenian amphorae

E22.Man-Made\_Object

P2.has\_type

E55.Type

P127.has\_broader\_term "Amphora"

P108I.was\_produced\_by

E12.Production

P4.has\_time-span

E52.Time-Span

P82.at\_some\_time\_within

E61.Time\_Primitive ;

not\_before "-0300"

not\_after "-0200"

P16I.was\_used\_for

E7.Activity

P2.has\_type "Object"

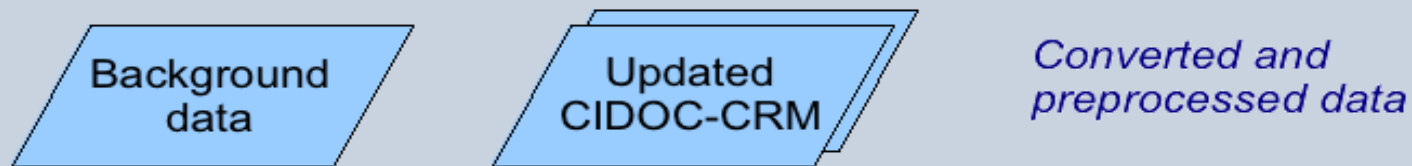
P7.took\_place\_at

E53.Place

P87.is\_identified\_by

E48.Place\_Name "Athens"

*E.g., dates for named eras used in Arachne*



*Also known as a “triple store”. Captures CIDOC-CRM structural information*

*Index of keywords in textual data fields; e.g. “Herakles” in object inscription or description*

*SPARQL is a web-standard query language for RDF data. The Jena/LARQ query engine allows Lucene index queries to be accessed via SPARQL queries.*

*The CLAROS application uses SPARQL queries to access data for user interface display*

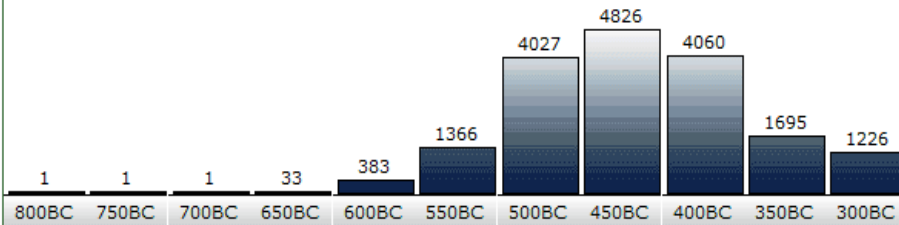
Each data partner may create their own interface, e.g.:





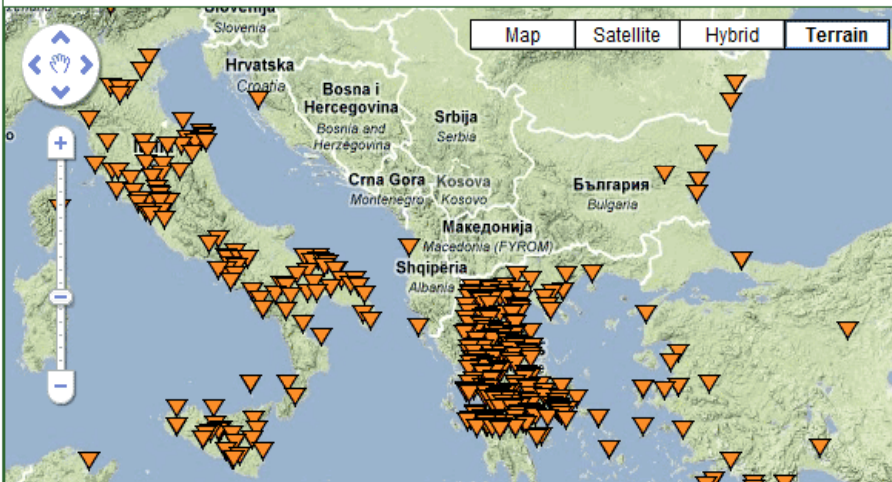
### Timeline for calyx and krater

The timeline shows the number of occurrences in each period. Click on the bar to show the distribution within the period or [click here to view the distribution for all periods.](#)



### Distribution of calyx and krater for all time periods

Click on the marker ▼ on the map and a balloon will pop up with the site name and number of occurrences of the name found at that site.



### Summary results 27 to 51 of 6445 for calyx and krater [Next](#) [Previous](#)

- 214619, Bologna, Museo Civico Archeologico, 217
- 217501, Berlin, lost, F2642
- 206500, Rome, Mus. Naz. Etrusco di Villa Giulia, XXXX0.6500
- 214605, Ferrara, Museo Nazionale di Spina, T66AVP
- 214871, Athens, Agora Museum, P21535
- 29128, Kiel, Antikensammlung, B795
- 28435, Cyrene, Museum, 81.6
- 9010393, London, British Museum

### Web page search results 1 to 10 of about 13 for calyx and krater [Next page](#)

- [Calyx-krater - Shapes - Pottery](#)  
The handles of the **calyx-krater** are placed low down on the body, at what is termed the cul. ... **Calyx-krater**. The handles of the **calyx** ...  
<http://www.clarosnet.org/pottery/shapes/calyx.htm> - 8k - 2008-10-09
- [Column-krater - Shapes - Pottery](#)  
skip links. You are here: Home > Pottery > Shapes > Kraters > Column-krater. ...  
Column-krater. ... Athenian red-figure column-krater ht. 35cm. ...

### Loading new results...

- Pottery 102155 records
- Rundplastik 37905 records

# Some ongoing partner projects

- MILARQ (Oxford)
  - ✓ investigate performance issues with complex queries in RDF
- Metamorphoses (Oxford)
  - ✓ establish a working co-reference system for name, place and date information
  - ✓ develop and document import for into the CLAROS RDF database
  - ✓ provide web-based tools for geo-temporal cross-searching and visualization of the database
- STAR/Stellar (Glamorgan)
  - ✓ extraction of semantic data from unstructured text (archaeological report)
- Zoology (Oxford)
  - ✓ flyweb, semantic web, and text mining projects
- Oxford Roman Economy project
  - ✓ adding new types of economic data



# Lessons

- We are in a very different state from 10 years ago, with
  - ✓ mapping and satellite services from Google and others
  - ✓ semantic web technologies which deliver on their promise
  - ✓ Web 2.0 approaches which let us write exciting interfaces
  - ✓ an increasing assumption of free access to data
  - ✓ an expectation of data for computers, not just humans
- CLAROS is an exemplar virtuous virtual collaboration with no centre and no boundaries, a club anyone can join
- We demonstrate that the RDF approach based on a wide-ranging ontology is not exotic, constraining or hard to use

# Challenges

- Deliver a system in which searching for “Athens” does not take 5 minutes to respond (there are a lot of references to Athens...)
- Join data relating to places in a more formal way
  - ✓ linking via a common gazetteer
  - ✓ modelling changes of name and location across time
  - ✓ understanding degrees of accuracy in provenance claims
- Establish appropriate interfaces across the spectrum
  - ✓ SPARQL endpoint for deep access
  - ✓ RESTful URIs for common data queries
  - ✓ Explorer-style data exploration
  - ✓ Dynamic data-driven visualizations for teaching
  - ✓ Intelligent Companions to formulate queries
  - ✓ Rich mobile-delivered resources for museum visitors
  - ✓ Linked community-led collections



# Visual Access to Classical Art Archives within CLAROS

Relja Arandjelović and Andrew Zisserman

Department of Engineering Science

University of Oxford

# The Objective ...

To enable an image archive to be searched on its visual content with the same ease and success as a Google search of the web (text documents).

## The Beazley Vase Archive



Visually defined query

?



Currently: 111 thousand images

# Example

## Search results

Search results 1 to 20 of 122196

query



1

**Abspath:** /data3/vases/allcc001001/Images100/00/7207.colour2/CC001001.JPE  
**Score:** 444.0



2

**Abspath:** /data3/vases/allcc001001/Images100/00/7207.part/CC001001.JPE  
**Score:** 11.0



3

**Abspath:** /data3/vases/allcc001001/Images100/00/7207.colour/CC001001.JPE  
**Score:** 11.0



Results are:

- immediate
- unaffected by scale and image rotation (affine transformations)
- for exact matches only

Upload query image from a file or web page or a mobile phone



## Matches in the Beazley vase archive

Query from URL



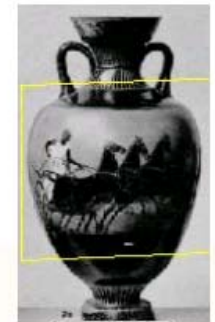
1

**Abspath:** allcc001001/Images200/011012/303121.B/CC001001.jpe  
**Score:** 10.0



2

**Abspath:** allcc001001/Images200/GB01/CVA.GB01.31.2b/CC001001.jpe  
**Score:** 5.0  
Warning: Score is low - result may be incorrect



<http://arthur.robots.ox.ac.uk:8084/>

# Meta-information for matches

1

**Abspath:** allcc001001/Images200/011012/303121.B/CC001001.jpe

**Score:** 10.0

**vaselID:** {08AF0C4C-E15B-48D7-A927-003AF9400CA1}

**Shape:** panathenaic amphora;

**Fabric:** athenian;

**Technique:** black-figure;

**Provenance:** teucheira;

**Date:** 425-375;

**Artist:** kuban group;

**Scholar:** beazley;

**Decoration:** chariot;

athena between columns surmounted by cocks, device, star;

**CAVI-Subject:** a: athena. shield device: star. b: chariot.;

**CAVI-Inscriptions:** a: τον αβενεθεν αβλον.;



2

**Abspath:** allcc001001/Images200/GB01/CVA.GB01.31.2b/CC001001.jpe

**Score:** 5.0

Warning: Score is low - result may be incorrect

**vaselID:** {08AF0C4C-E15B-48D7-A927-003AF9400CA1}

**Shape:** panathenaic amphora;

**Fabric:** athenian;

**Technique:** black-figure;

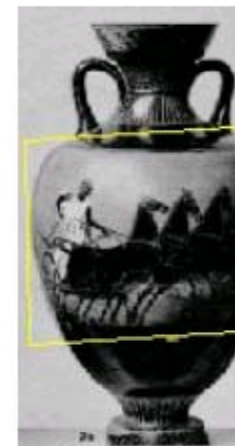
**Provenance:** teucheira;

**Date:** 425-375;

**Artist:** kuban group;

**Scholar:** beazley;

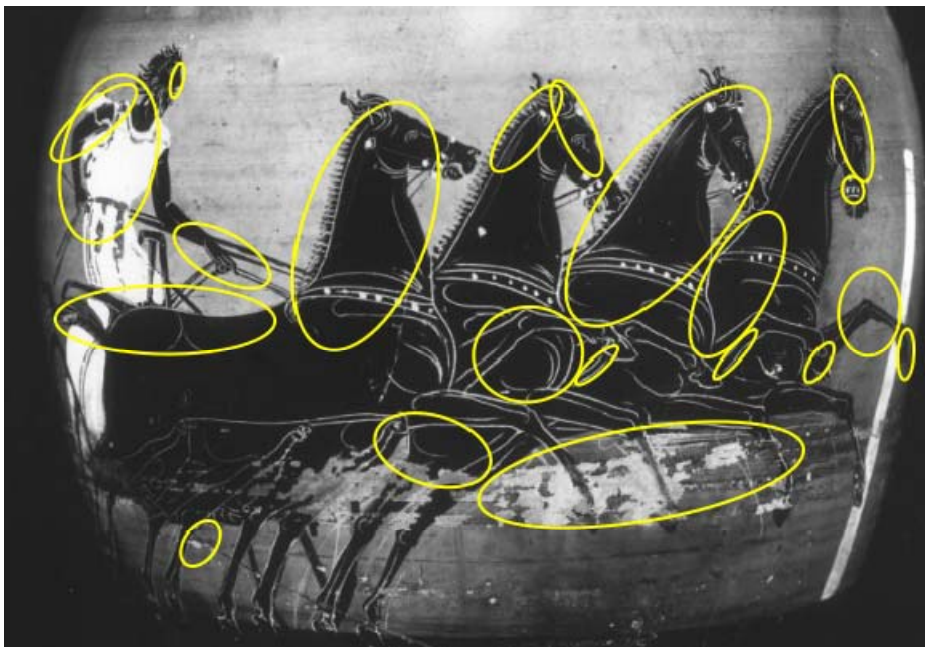
**Decoration:** chariot;



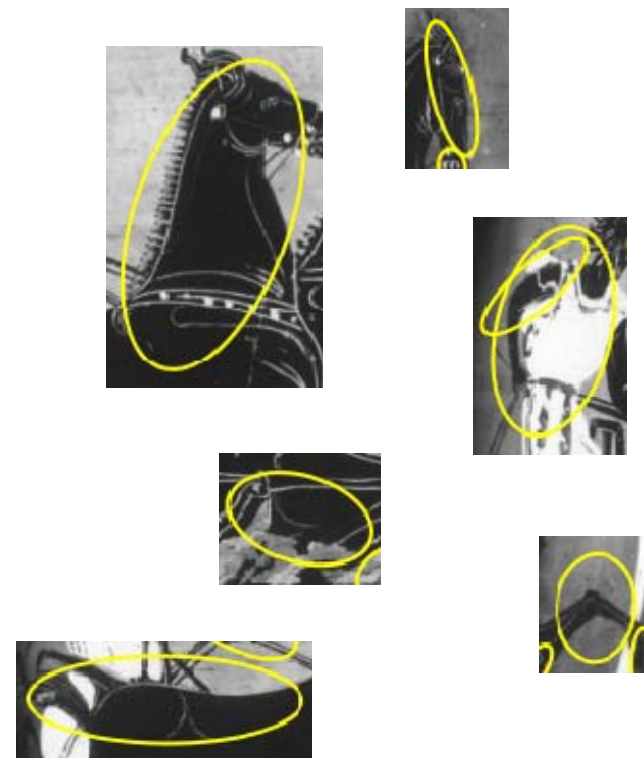
# How it works

Representation: bag of (visual) words

- Visual words are 'iconic' image patches or fragments



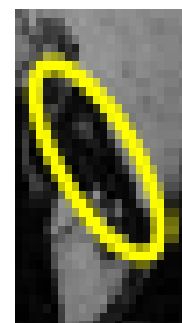
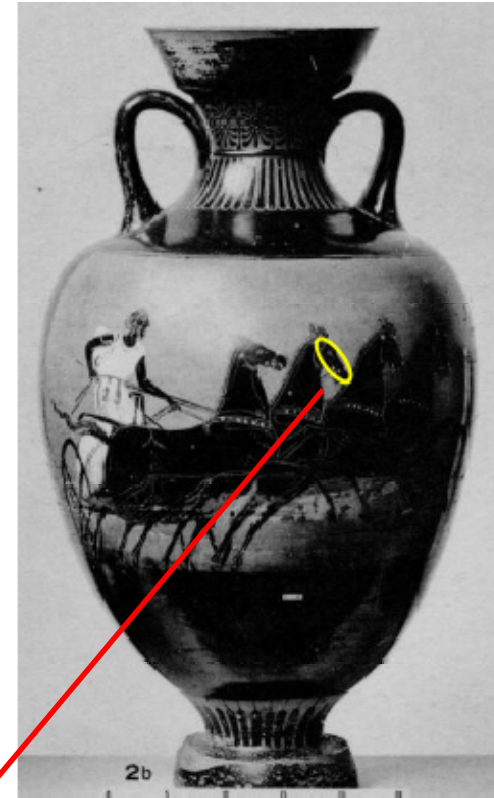
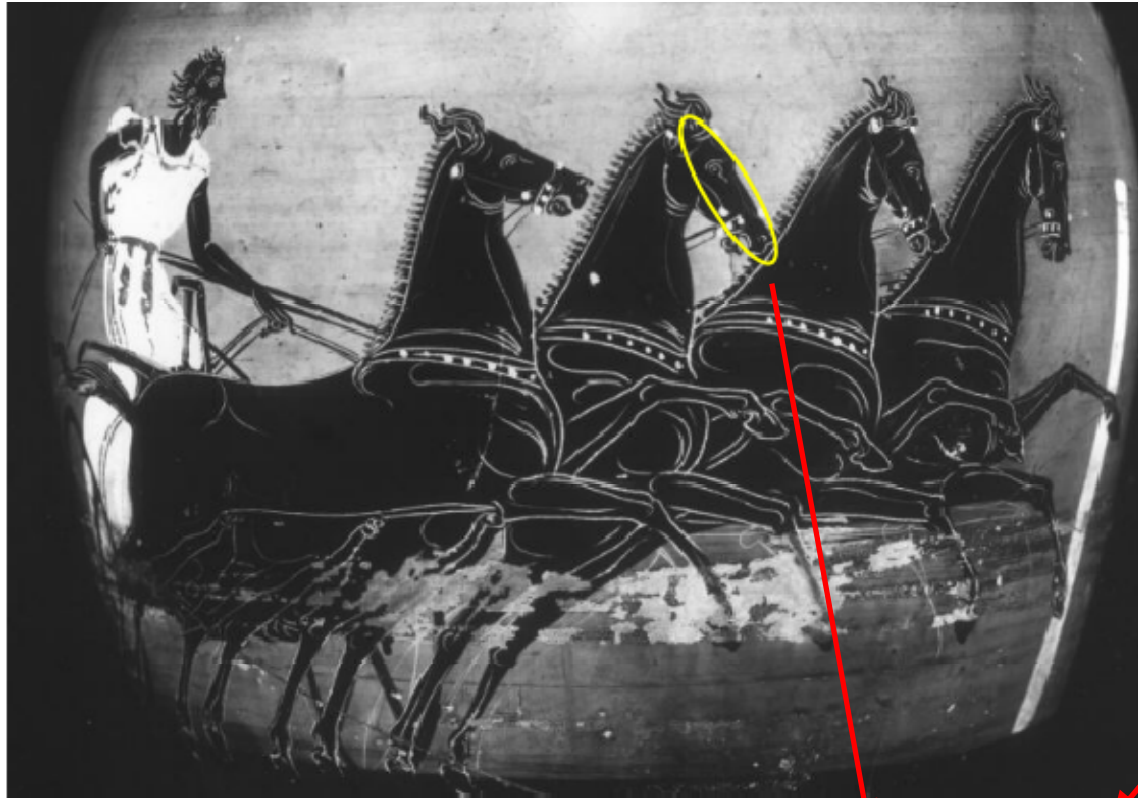
Image



Collection of **visual words**

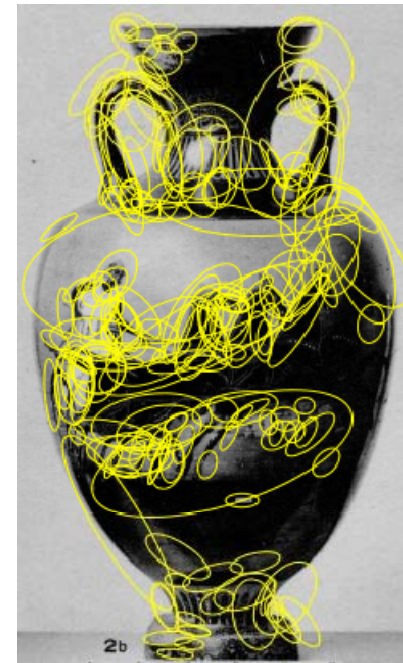
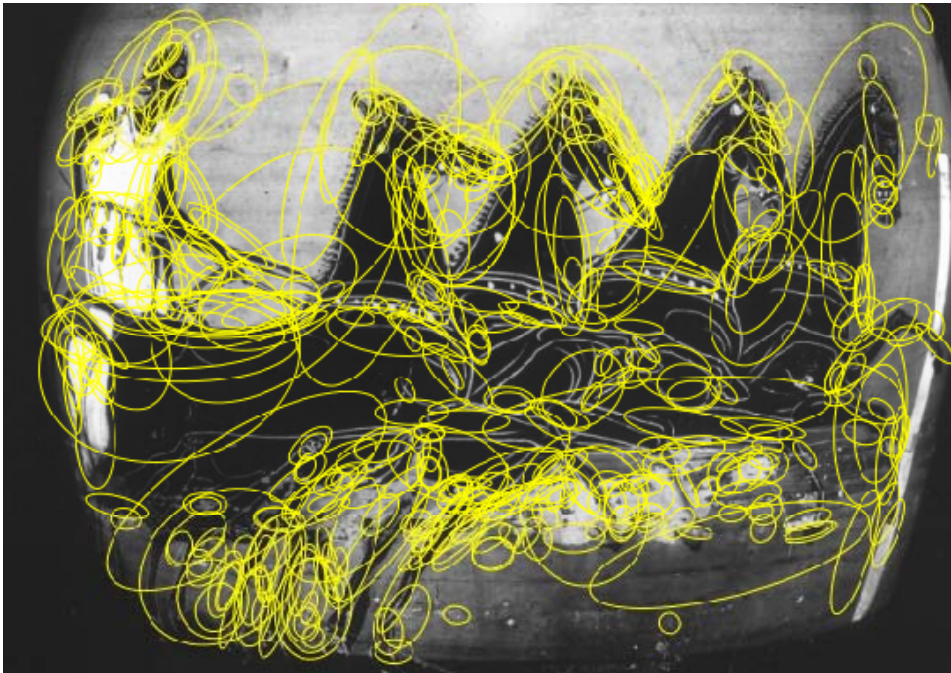


# Visual vocabulary unaffected by scale and viewpoint



The same visual word

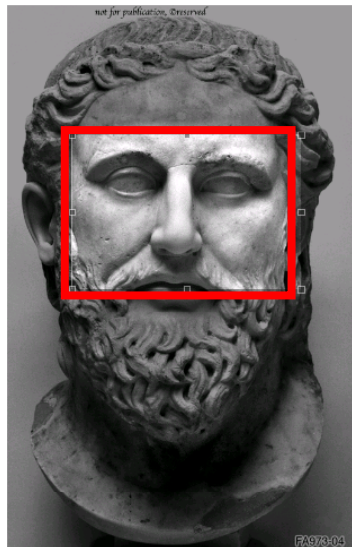
# Image representation using visual words



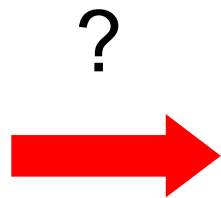
Use efficient Google like search on visual words

# The Arachne Classical Sculptures Archive

Retrieve images from the collection using only visual information



Visually defined query

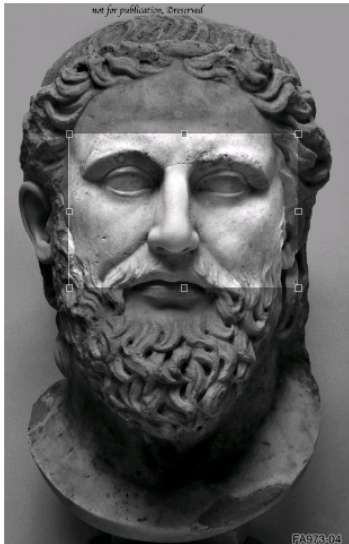


Currently: 89 thousand images  
21 thousand objects

# Example

## Search results

query



?



1

Abspath: images/Abbildungen/FADatenbank/bb0090/FA973-04\_7523\_02.jpg  
Score: 608.0

[Detail](#)  
[Other images of the same object](#)



2

Abspath: images/Abbildungen/FADatenbank/bb0090/FA1404-05\_7523\_01.jpg  
Score: 14.0

[Detail](#)  
[Other images of the same object](#)



3

Abspath: images/Abbildungen/FADatenbank/bb0090/FA973-05\_7523\_11.jpg  
Score: 11.0

[Detail](#)  
[Other images of the same object](#)



4

Abspath: images/Abbildungen/FADatenbank/bb0090/FA973-02\_7523\_08.jpg  
Score: 9.0

[Detail](#)  
[Other images of the same object](#)



# Upload query image from file or URL

## Search results

### Query from URL



?



2

**Abspath:** images/Abbildungen/FADatenbankabb0092/FA-Kae5788\_19620,5.jpg  
**Score:** 35.0

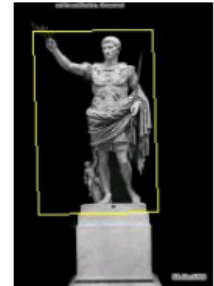
[Details](#)  
[Other images of the same object](#)

**PS\_ID:** 19620

**PS\_ObjektID:**  
19620

**GattungAllgemein:**  
Rundplastik Portrait

**KurzbeschreibungObjekt:**  
Panzerstatue des Augustus von Prima Porta



3

**Abspath:** images/Abbildungen/FADatenbankabb0092/FA-Kae5818\_19620,177.jpg  
**Score:** 29.0

[Details](#)  
[Other images of the same object](#)

**PS\_ID:** 19620

**PS\_ObjektID:**  
19620






# Visual search for the archivist

- Check visually if an item is already in the archive, or check for duplicate entries
- For example, in the Beazley vase archive ...

## Method:

- use each image in turn as a query for retrieval
- determine if all the matching vases have the same id

# Example:

1	<p><b>Abspath:</b> / data3/ vases/ allcc001001/ Images200/ DEN10/ CVA.DEN10.33.1/ CC001001 .jpe <b>Score:</b> 1668.0</p> <p><b>vaselD:</b> noID.10567</p> <p><b>Shape:</b> spouted vase; <b>Fabric:</b> minoan;</p>	
2	<p><b>Abspath:</b> / data3/ vases/ allcc001001/ Images200/ DEN10/ CVA.DEN10.509.1/ CC001001 .jpe <b>Score:</b> 144.0</p> <p><b>vaselD:</b> 23995786-286D-435E-A701-4506305551F7</p> <p><b>Shape:</b> stamnos; <b>Fabric:</b> athenian; <b>Technique:</b> red-figure; <b>Provenance:</b> italy, orvieto; <b>Date:</b> 450-400; <b>Artist:</b> kleophon p; <b>Scholar:</b> beazley; <b>Decoration:</b> komos, youths, one with staff, one playing pipes, man playing lyre; komos, draped youths, one with staff, one with cup, draped man with staff; <b>CAVI-Subject:</b> a-b: komos. ; <b>CAVI-Inscriptions:</b> . . ?? .(1) . under the foot, gr.: .(2);</p>	
3	<p><b>Abspath:</b> / data3/ vases/ allcc001001/ Images200/ DEN10/ CVA.DEN10.510.1/ CC001001 .jpe <b>Score:</b> 33.0</p> <p><b>vaselD:</b> 23995786-286D-435E-A701-4506305551F7</p> <p><b>Shape:</b> stamnos; <b>Fabric:</b> athenian; <b>Technique:</b> red-figure; <b>Provenance:</b> italy, orvieto; <b>Date:</b> 450-400;</p>	

2 copies with different IDs, and different fabric

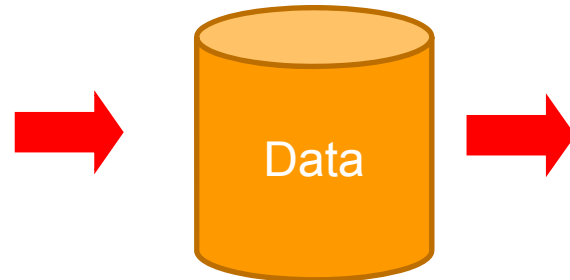
# Image Classification

- previously: search for exact matching vase
- now: classify vase by its shape

Visually defined query



What is this?



“It is an amphora

... and here are similar objects in the archive”

Next [0](#) [1](#) [2](#) [3](#) [4](#) [5](#) [6](#) [7](#) [8](#) [9](#) ... [17](#) Showing vases 1 to 50 of 858.





# Shape Representation

original image



foreground separation



silhouette representation



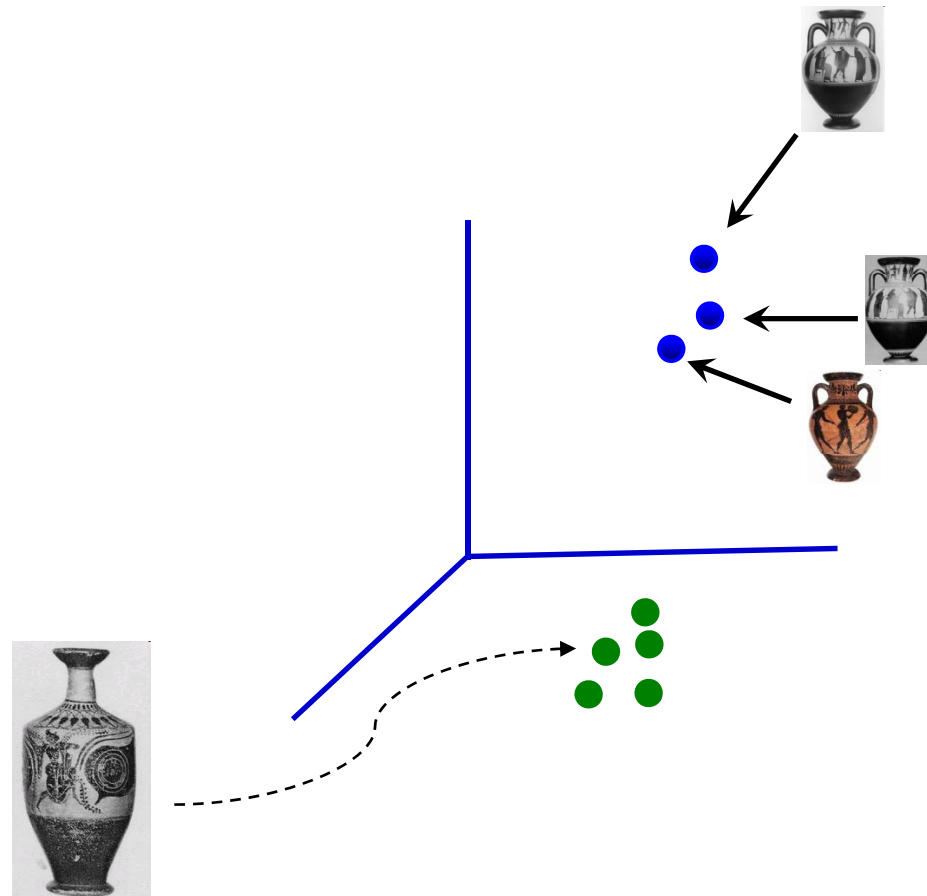
vector

$$\begin{bmatrix} X_1 \\ X_2 \\ \cdot \\ \cdot \\ \cdot \\ X_n \end{bmatrix}$$

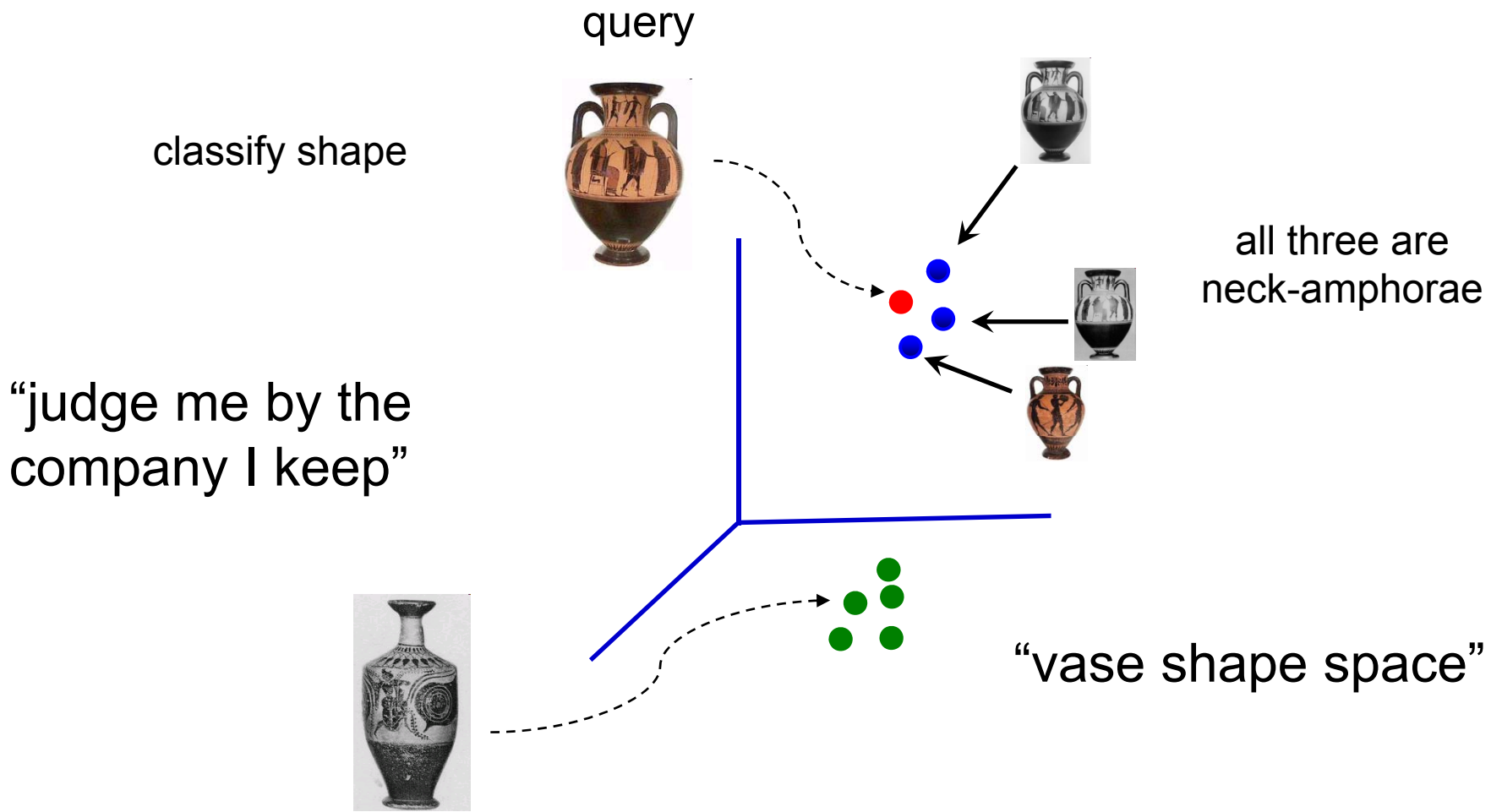
X

- No representation of patterns or surface markings
- 100-dimensional “vase shape space”

# Vase shape space

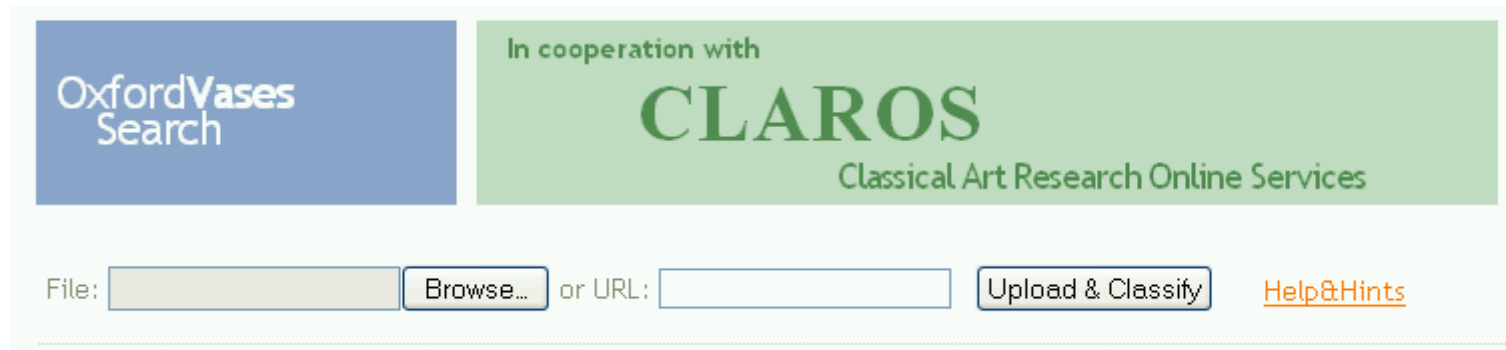


# Compute three nearest neighbours for each vase



# Step by step demonstration:

## Step 1: upload image



The screenshot shows the top section of the Oxford Vases Search website. On the left, there is a blue box with the text "OxfordVases Search". To the right, a green banner contains the text "In cooperation with CLAROS Classical Art Research Online Services". Below these elements, there is a search interface with a "File:" label, a text input field, a "Browse..." button, the text "or URL:", another text input field, an "Upload & Classify" button, and a "Help&Hints" link.

OxfordVases Search

In cooperation with  
**CLAROS**  
Classical Art Research Online Services

File:  Browse... or URL:  Upload & Classify [Help&Hints](#)

# Step by step demonstration:

## Step 2: classify shape





OxfordVases Search

In cooperation with  
**CLAROS**  
Classical Art Research Online Services

File:  Browse... or URL:  Upload & Classify [Help&Hints](#)

Shape is **amphora neck** (click for shape timeline).

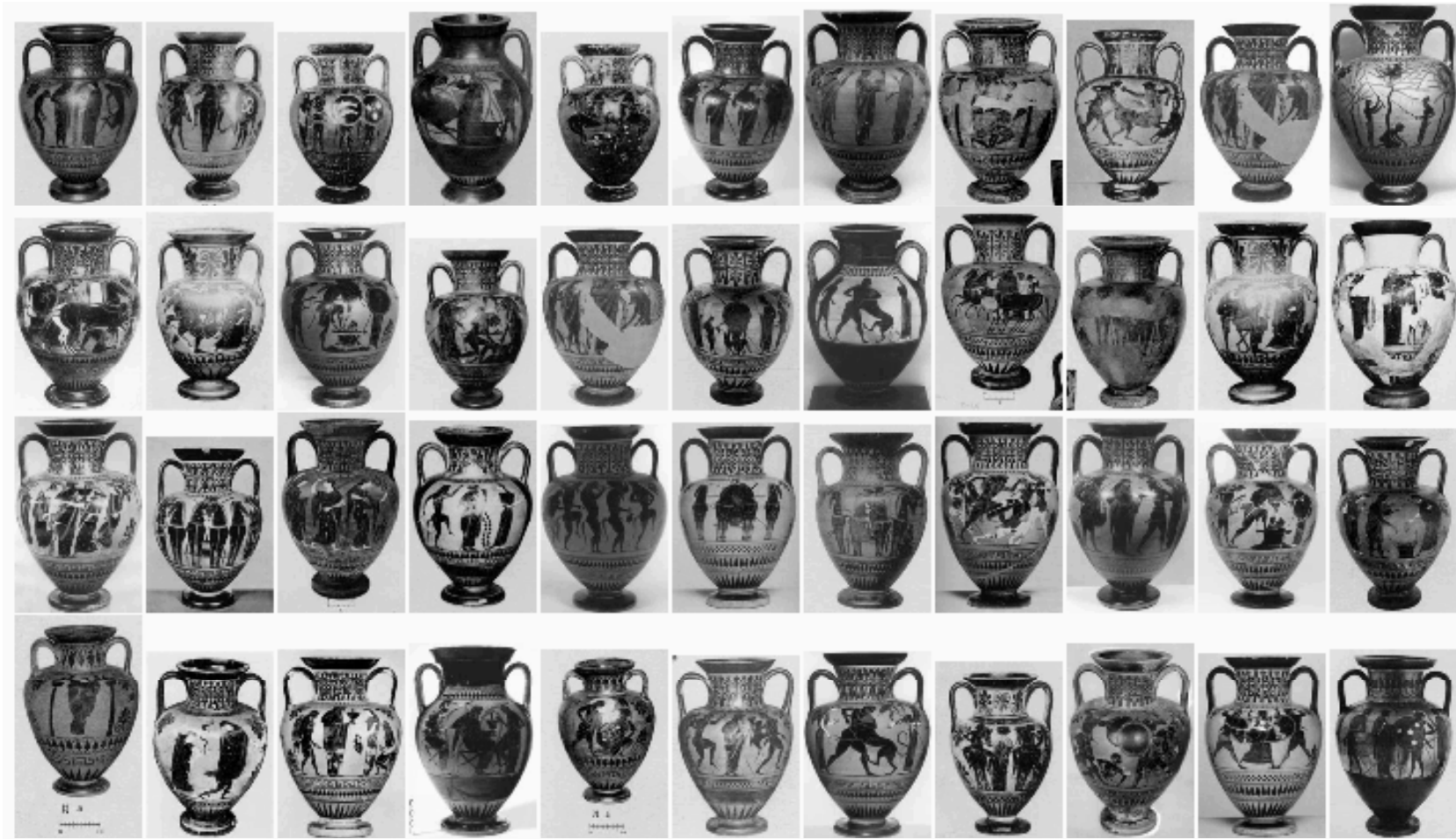
Uploaded vase-image      Foreground separation      Top 3 matches

('amphora', 'neck')      ('amphora', 'neck')      ('amphora', 'neck')

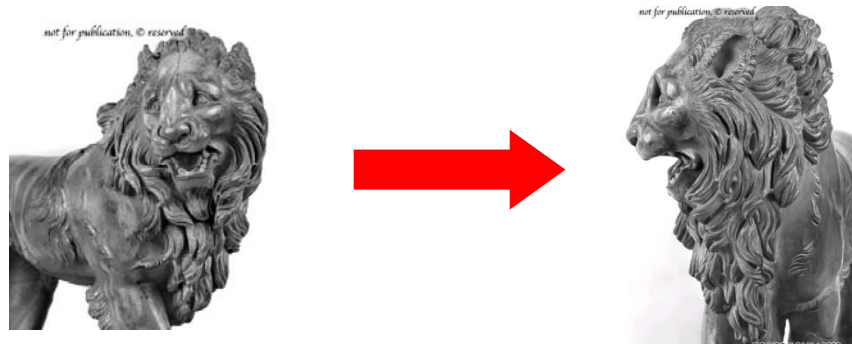
# Step by step demonstration:

## Step 3: matches in CLAROS



# Future Developments

Short term (this year): 3D retrieval



Medium term: classification of decorations



“Herakles and the lion”

Longer term: predict artist/age

