

ARTMYN

(re)discover Art

MATLAB EXPO

Bern – 22 June 2017



MathWorks®



ÉCOLE POLYTECHNIQUE
FÉDÉRALE DE LAUSANNE



ARTMYN



(re)discover Art

Key Takeaways

- Why and how digitize artworks ?
- How to enjoy artworks online ? Use *ARTMYN*
- From research to prototype to product, elaboration of a complex and robust solution

Why digitizing Artworks?

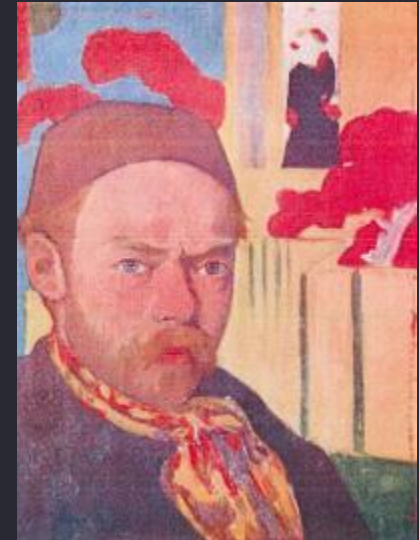




Crowd at Louvre Museum in front of Mona Lisa painting



Storage facilities of the Collections d'art de la Confédération , Bern.



Self Portrait, Meyer de Haan 1890



Girl In Front Of Open Window, Gauguin 1898



Charing Cross Bridge, Monet 1901



Reading Girl In White And Yellow, Matisse 1919



Harlequin Head, Picasso 1971



Woman with Eyes Closed, Lucian Freud 2002



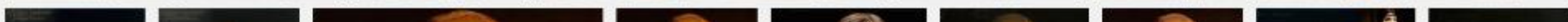
Waterloo Bridge, Monet 1901

Do you enjoy art **online** ?

Art sharing in the age of internet



Now think of a painting...





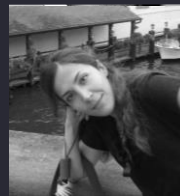
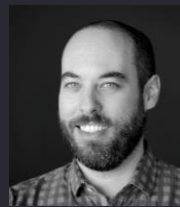
A tapestry of beautiful half-truths



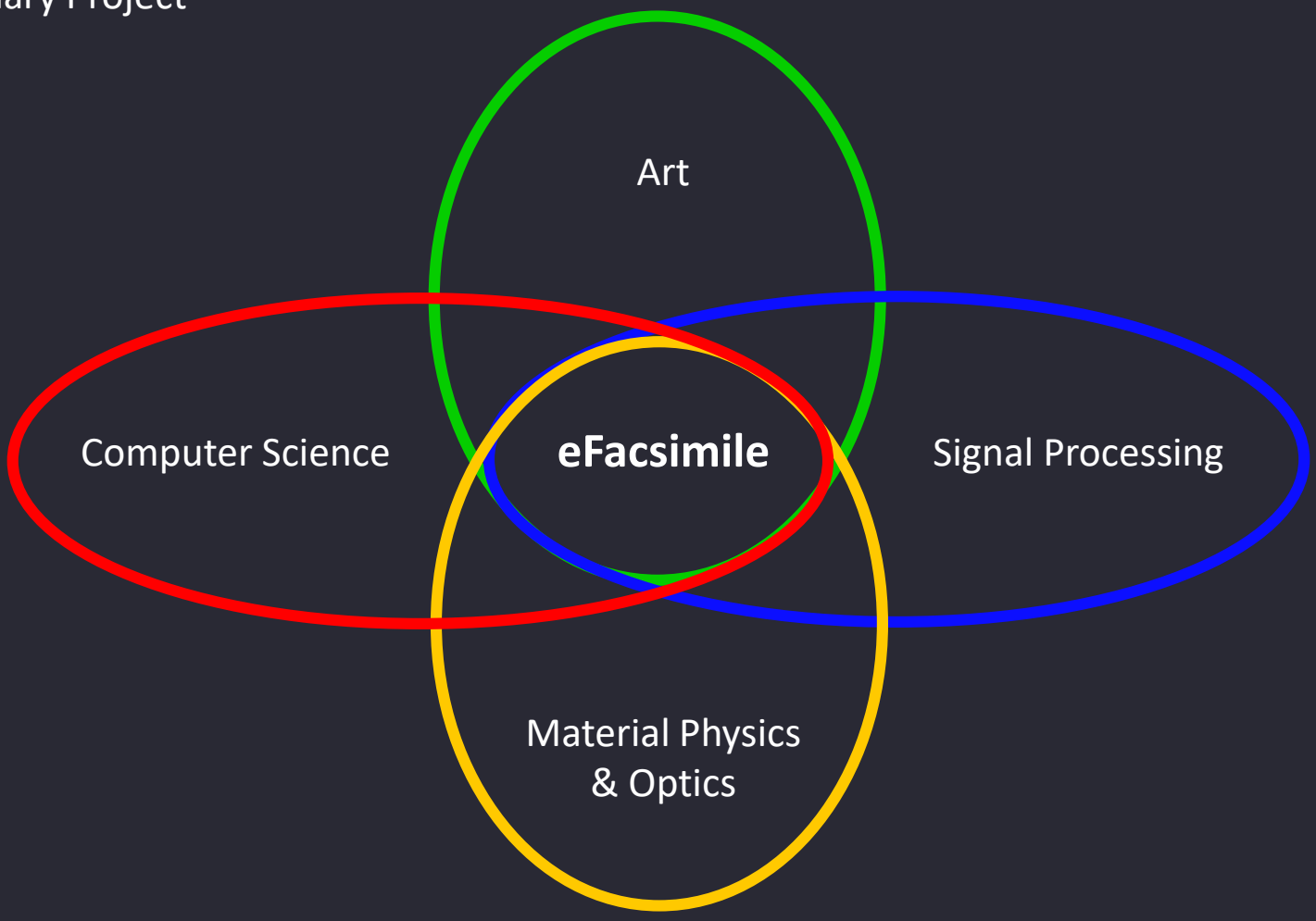
17 Ladies with Ermines,
Leonardo Da Vinci

eFacsimile: How to faithfully represent an artwork digitally?

- Google Focus Research Award (2011-2014)
- PI: Professor Martin Vetterli
- Project members:
 - Loïc Baboulaz, senior researcher (project lead)
 - Paolo Prandoni, senior researcher (advisor)
 - Julien Lalande, senior research engineer
 - Gilles Baechler, PhD student
 - Mitra Fatemi, PhD student
 - Niranjana Thanikachalam, PhD student
 - Zhou Xue, PhD student
 - Matthieu Rudelle, MS student
 - Pierre Gabioud, MS student
- Collaborations with Professor Sabine Süsstrunk (on light-field and mobile imaging)



Interdisciplinary Project



Art

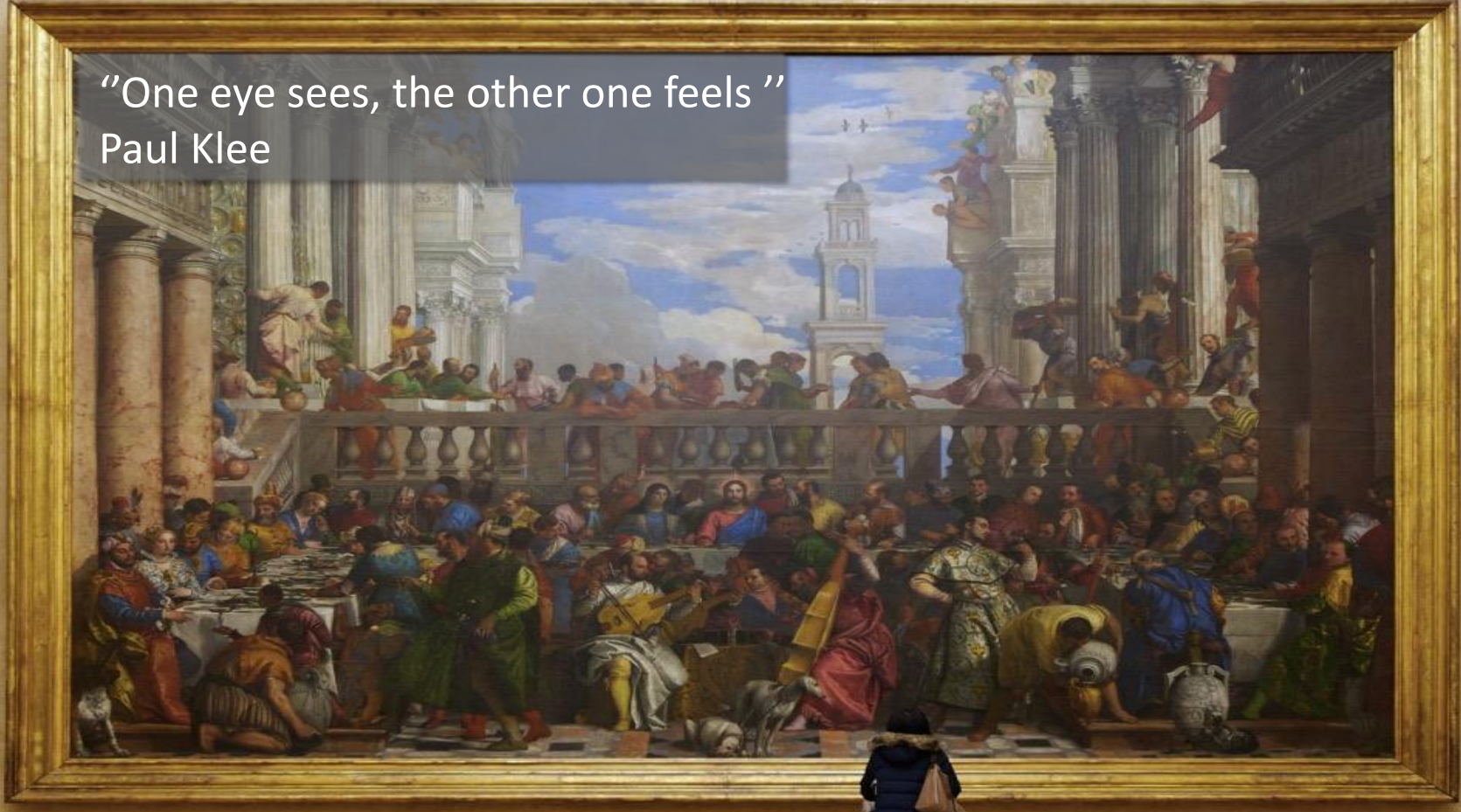
Computer Science

eFacsimile

Signal Processing

Material Physics
& Optics

“One eye sees, the other one feels ”
Paul Klee



Woman looking at Cana's Wedding painting (Veronese)

Source: <http://talktog.wordpress.com/>

In front of a real Artwork

The Miraculous Draught of Fish, Witz



Meta-information

- Historical relevance
- Artist's biography
- Viewer's a priori knowledge
- ...

Guernica, Picasso



Aesthetics & Semantics

- Pictorial content
- Symbolic content
- Emotional response
- ...

Portrait of Adele Bloch-Bauer I, Klimt



Materiality

- Visual cues for sensuality
- Key to perceptual primitives
- Key to artist's techniques
- ...

In front of its digital photograph

The Miraculous Draught of Fish, Witz



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Guernica, Picasso



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Portrait of Adele Bloch-Bauer I, Klimt



Materiality

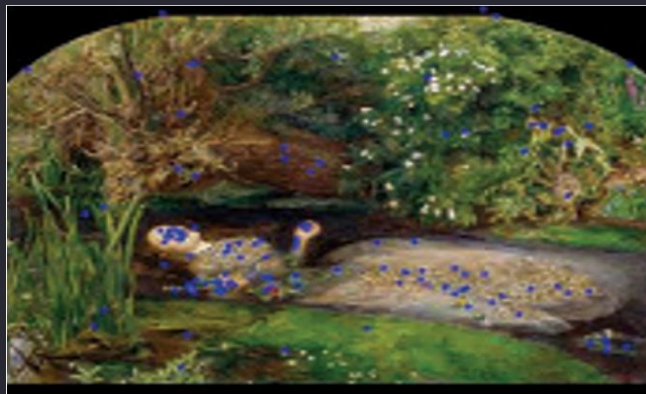
- Visual cues for sensuality
- Key to perceptual primitives
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- ...

“What distinguishes a collection of images on a screen
is the evaporation of texture and physical depth”

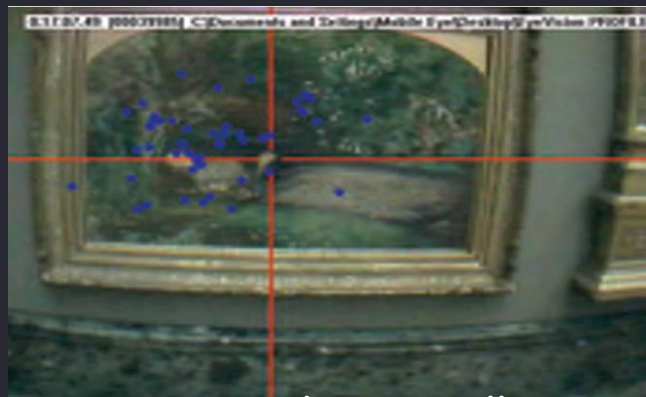
Miles S. Hall , *The Anatomy of an Image Painting in the Digital Age* , PhD thesis, 2010

Consequences of the Loss of Materiality

Ophelia, Sir John Everett Millais,

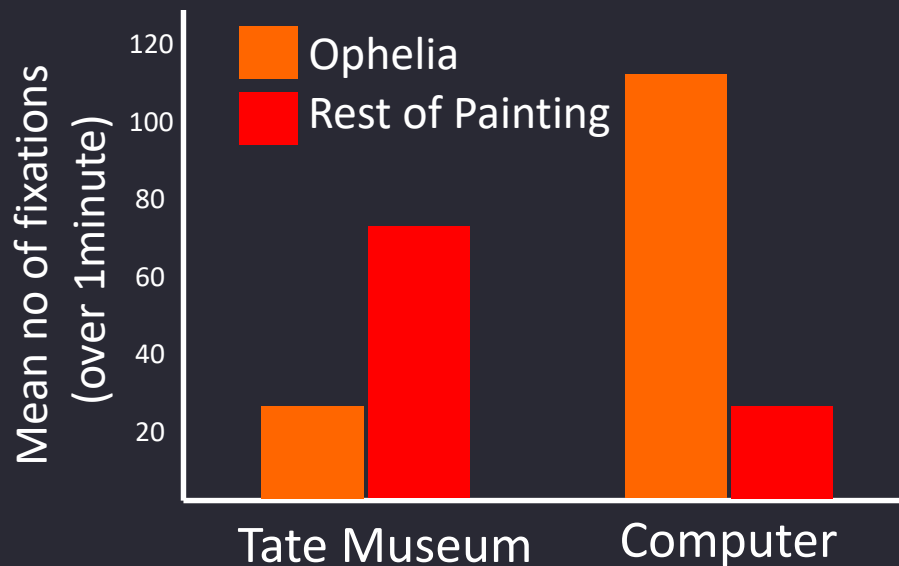


Gaze tracking on computer screen



Gaze tracking in gallery

Ophelia v Rest of Painting



“If we zoom into details in the museum, we see brushstrokes and the texture of the paint, whereas if we do the same in the lab, we just see pixels”

Dynamic image for Art



Portrait of Fayoum

Deep zoom

3D surface topography



Cuneiform tablet



Hommage à Vallotton, Yoki

Free viewpoint

Free illumination



Bible of Gutenberg



Introducing... **ARTMYN**

The Miraculous Draught of Fish, Witz



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Guernica, Picasso



Aesthetics & Semantics

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Portrait of Adele Bloch-Bauer I, Klimt



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Innovation Challenges

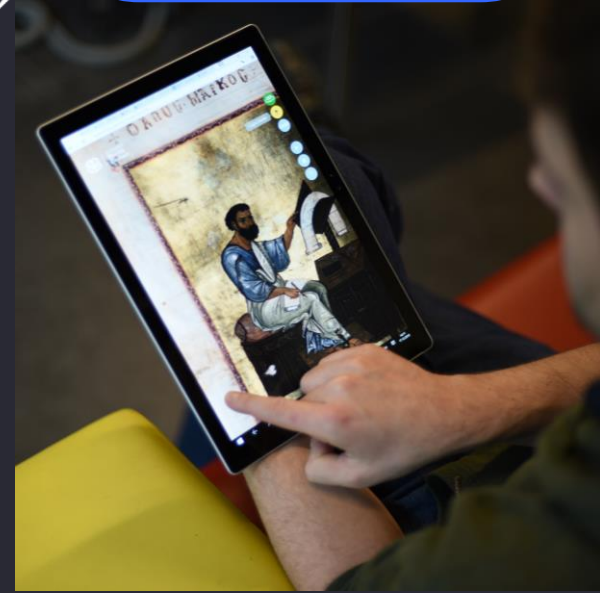
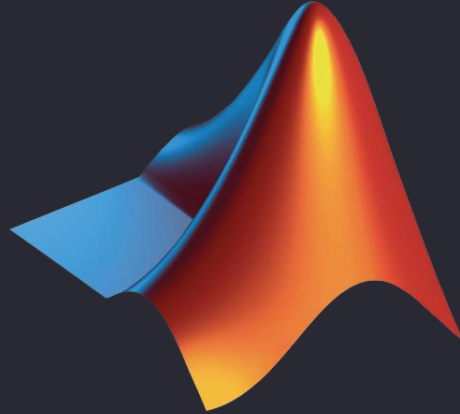
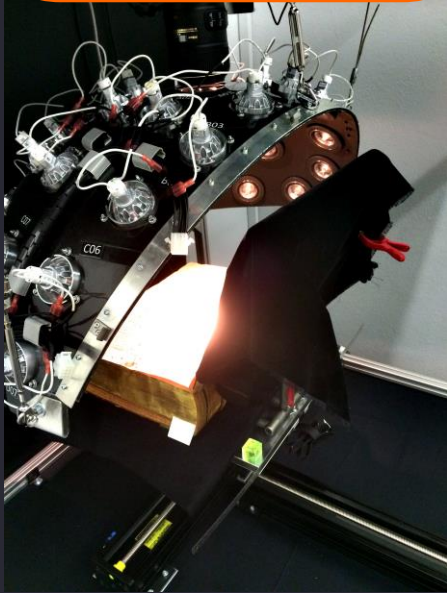
- A **huge quantity of information** to be processed within a small time frame
- **An important variability** between object structure and reflectance, i.e. painting, cuneiform tablet
- Ability to represent artwork truthfully with **little information**, accessible online fluidly
- **A completely new first of its kind solution**

ARTMYN: computational imaging for art

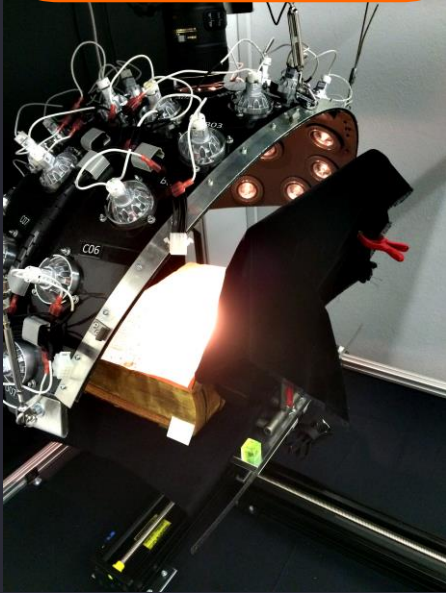
Acquisition

Processing

Rendering

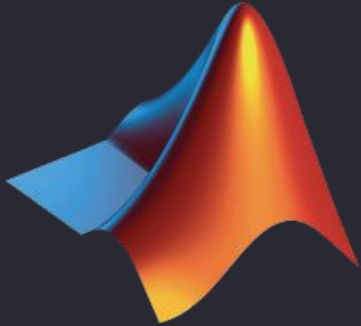


Acquisition



- A fully automatized system
- 2 computed controlled motorized axes
- 58 illuminations
- A Fast camera taking 29 images/s
- 25,2 Mo pixels par image
- 730 Mo/s of information

Processing



- Fully automated algorithm
- Stitching and blending seamless hundred of images
- Huge topography variability
- From 700Go of data to few Go compression
- Reflectance and topography extraction

Rendering



- Online Solution
- Real time interaction
- Web based (django, web-gl)
- Accessible on any device, any platform, any browser

Cuno-Amiet: *Grammont*, 1936





Application and Benefits of MATLAB

- Flexible and robust to deal from 4 lines of codes to a product delivery quality algorithm
- It was pure R&D, develop a new solution that could become a product, efficiency was the key as well as innovation
- A big user community of developers and researchers
- Debugging capabilities

Concluding remarks

- Better, Faster, Stronger
- Extending solution to new types of artworks
- Creating new tools for the art community (expert, teachers, restorer,...)
- Looking for talents

Thank you

ARTMYN.COM

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