A DIGITAL MEDIATION STUDIO
An Overview of the WORKSHOPS of FACTUM ARTE and FACTUM FOUNDATION
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Cover: Ahmed Mater’s Mitochondria: Powerhouses, re-creation of Al-Idrisi’s world map engraved in silver using CNC milling.
FACTUM ARTE: A NEW TYPE OF CREATIVE SPACE

The emergence of computers and the opportunities offered by diverse types of digital mediation in C21st required a radical rethinking of the layout of a creative workshop and the way that contemporary artists work. Factum Arte is a direct response to this need. Its workshops have developed to create an experimental and open environment to meet the needs of artists from around the world.

Factum Arte has been run since it started by Adam Lowe, a painter trained at Oxford University’s Ruskin School of Drawing and at the Royal College of Art in London. Many elements of these two very different institutions have shaped the radical studio that has emerged in Madrid. The Ruskin’s emphasis on traditional techniques and the interdisciplinary intellectual community of Oxford prompted an interest in creative processes that intersect science, art and technology. The Bauhaus environment of the Royal College of Art in 1980s mixing painters, sculptors, printmakers, ceramicists, metalworkers, jewellers, silver and goldsmiths, automotive designers, photographers, textile designers, woodworkers, filmmakers demonstrated the importance of communication across disciplines.

The studios that have grown in San Blas, Madrid over the past 18 years are a direct reaction against a heavily compartmentalised model. Digital mediation has changed how people work together and divisions based on materials are being replaced by a different approach to mediation, transformation, and making. Curiosity, collaboration, innovation and application have come to define Factum Arte’s working spaces that have been set up to maximise artists intentions. Everything is based on transforming an idea into its optimum form and understanding the mediations that are involved in the digital and the physical world.

Over 50 people work together in a space of 8000 sq meters. Their skills are diverse; architects, product designers, scientists, moulders and casters, welders, conservators, fine and applied artists, printers, electrical and physical engineers, machine operators, accountants, photographers, film-makers, 3D scanners, textile specialists, typographers, sculptors and furniture restorers all work together. Teamwork is at the heart of this C21st renaissance and the workshops are only the tip of the iceberg. They connect to precision engineering, CNC milling, foundry work in many materials (at every scale and level of detail), waterjet cutting, laser technologies of various kinds, structural engineering, architecture, museum collaborations, printing, exhibition design, 3D printing, electro-forming and electroplating, wood carving, stone carving, computer programming, film-making, anthropology, scientific innovation... the list responds to needs. The aim has been to create a ‘playground’ for artists who can work supported by skilled and creative digital artisans.

Factum Arte applies these skills to contemporary artists - Factum Foundation applies many of the same tools to the preservation of the past through high-resolution documentation, sharing information and the creation of exact facsimiles. What has emerged is an atemporal and anachronic approach to art - the past shapes the present and is shaped by it - both shape the future.
Paula Crown, Spire, From the Universal Symbols series 2019. Stereolithographic printing, electroplating with copper and nickel encouraging additional growths to form at the extremities of each piece.
Rachid Koraichi This Long Journey into Your Gaze at Casa Árabe in Madrid and Córdoba.
The 'techne' shelves for Madame de Pompadour in the Frame at Waddesdon Manor, May to October 2019. These shelves contain fragments and samples from a range of projects using diverse materials and processes.
Top: Preparing the final details of the case explaining how the facsimile of Boucher’s portrait of Madame de Pompadour was made. The original portrait is in Alte Pinakothek, Munich, while the facsimile hangs in what may be its original frame in Waddesdon Manor. Bottom: Printing the portrait of Madame de Pompadour on Factum’s flatbed printer. The printer can build up layers of pigment to control colour, density and tone.
A team finishing the facsimile of the sarcophagus of Seti I. The 3D recording took place at Sir John Soane’s Museum in London, the CNC milling happened in the north of Spain and the Océ elevated printing was done in Venlo, Netherlands. All other work to prepare the files and make the facsimile happened at Factum Arte.
Jean Nouvel inspecting Jenny Holzer’s installation at Abu Dhabi Louvre.

New CNC routed works for Marina Abramović near completion prior to display at Wilde Gallery during Art Basel 2019.
New experiments in rustication by Charlotte Skene Catling and Adam Lowe, designed to introduce light and shadow into the surface of buildings.

New experiments in rustication by Charlotte Skene Catling and Adam Lowe, designed to introduce light and shadow into the surface of buildings.
Working with Venetian Heritage, Factum Foundation recorded, made and installed a facsimile of the ceiling painting by Salviati into its original location in Palazzo Grimani in April 2019.

A facsimile of the Borgherini chapel was made for the Michelangelo and Sebastiano del Piozzo exhibition at the National Gallery in London in 2017.
Factum Arte have worked with Anish Kapoor since the workshops opened. The concrete printing machine was designed and built at Factum Arte and operated in Anish’s London studio for many years.
The Virgen de las Nieves, from Santa Cruz de la Palma, at different stages of the production of a facsimile and a protective casing to prevent damage to the 12th-century sculpture when it is dressed and paraded through the streets.
Installing the bronze olive tree into Mercado del Duomo in Milan, 2015. The 7 meter sculpture of an olive tree and its roots was made in collaboration with the Italian architect and designer Michele de Lucchi.
The facsimile of the pillared part of the sarcophagus room from the tomb of Seti I on display in Basel at the exhibition *Scanning Seti: The Regeneration of a Pharaonic Tomb* at the Antikenmuseum in 2017-2018.
Recording the frescoes of Dionisy at the Cathedral of the Nativity of the Virgin in the Ferapontov Monastery, Russia. Digitalisation made by Factum Foundation in collaboration with Peri Foundation. Photograph by Shamil Gadzhidadaev.

Jordi Pons doing the final retouching for the colour reproduction of Murillo’s Miracle of the loaves and fishes from the Hospital de la Caridad, Seville.
FACTUM ARTE

Factum Arte consists of a team of artists, technicians and conservators dedicated to digital mediation. The main focus is on the production of works for contemporary artists and to the application of new technologies to the creation of objectively accurate facsimiles that are part of a coherent approach to understand and read the importance of material evidence. The emphasis is on cross-disciplinary communication, innovation and sharing information and ideas. The goal is to demonstrate what can happen when technology is developed and applied by creative thinkers and where the line between the digital and the physical no longer exists.

Established in 2001, Factum Arte was conceived by its founders Adam Lowe, Manuel Franquelo and Nando Guereta as an interdisciplinary studio where diverse skill-sets collide on a daily basis. Artists such as Marina Abramović, Anish Kapoor, Maya Lin, El Anatsui, Ahmed Mater, Paula Crown, Wang Yuyang, Marc Quinn, Gillian Wearing, Cornelia Parker, Grayson Perry, Akram Zaatari, Joana Hadjithomas, Khalil Jorjeie, Rachid Koraichi, Mariko Mori, Abdulnasser Gharem, Manal AlDowayan, Hrair Sarkissian, Shezad Dawood, Sarah Sze, Subodh Gupta, Michael Hansmeyer, Jenny Holzer and many others have enjoyed and taken advantage of Factum Arte’s craftsmanship and bespoke technology to create new works of art. There are now spaces in Madrid, London and Milan. More are planned.

FACTUM FOUNDATION

The Factum Foundation was founded as a non-profit organisation in 2009 by Adam Lowe with the aim of using Factum Arte’s innovative processes and technologies for preservation, education and the development of thought-provoking exhibitions. Factum Foundation’s approach is effective and its facsimiles of Veronese’s Wedding at Cana and the tombs of Thutmosis III, Tutankhamun and Seti I have been widely acclaimed for their forensic accuracy. The Foundation regularly carries out projects and supports the documentation of artworks in institutions such as the British Museum, the Louvre Museum, the Metropolitan Museum of Art, the Museo del Prado, The V&A and the Pinacoteca di Brera. It is running and developing projects in conjunction with the Peri Foundation, Community Jameel, Juma Al Majid centre for Conservation and Heritage, Iconem, and the Fondazione Giorgio Cini. It currently has projects in Egypt, Canada, Russia, Pakistan, Italy, Nigeria, Spain, Chad, Scotland, France, US, England, Saudi Arabia, and many other parts of the world.

Top: The entrance to Factum Arte, occupying one city block in Madrid. The workshop is in a dominantly 1960’s cluster of industrial buildings.
Bottom: All logistics and management are coordinated from this office.
I. DIGITAL INPUT

There are various types of spaces devoted to digital input that are shared by programmers, engineers, digital modellers, colour specialists, photographers, 3D scanning specialists, digital conservators and technicians. Their interdisciplinary background facilitates the development of technologies such as the Lucida 3D Scanner, designed by Manuel Franquelo, and the Veronica Choreographic Scanner, designed by Manuel Franquelo Junior with Factum’s team, but also the refinement of techniques and approaches to digital restoration, composite photography, 3D recording and photogrammetry.

Equipment design and Engineering Studio

The work in and out of the studio requires equipment that is not always available commercially. Over the years, Factum Arte’s engineers have designed and built systems to digitise fragile cultural heritage. Different systems have been developed to record the surface, relief and texture of objects at the highest possible resolution. All systems are 100% non-contact and work with specially written open source software.

Digitisation encompasses a series of activities that have expanded the creative process and the possibilities for making, studying and preserving works or art. Factum Arte’s digital specialists are using these technologies to restore objects digitally and produce applications to visualise data. The move from physical object or idea to digital data and back into the physical world requires new skill sets and a different way of thinking that is transforming the way artists work and the way cultural heritage is preserved and shared.

The technologies are being used to create new works of arts, produce accurate facsimiles of existing objects and to recover and re-imagine lost works based on available records.
Carlos Bayod, Teresa Casado and Óscar Parasiego recording Fra Angelico’s The Annunciation in the Museo del Prado using the Lucida Scanner.
In the colour and composite photography lab Gabriel Scarpa, Teresa Casado and Anna Paola Ferrara work to stitch together and restore digital images.

The 3D and Photogrammetry room is where digitise objects become 3D models that can be printed or milled.

The dark room: a space for experimenting with photography and photogrammetry.

Merging modelled and scanned data to make a silver coffeepot by Piranesi.

Portable manuscript scanner being used at the State Archives in Makhachkala, Dagestan to record their collection of Arabic manuscripts.

Some of Shezad Dawood’s sculptures have been 3D modelled at Factum Arte.

The digital team specialises in digital restoration, colour matching and the production of various application for visualising data.

3D modelling from an 18th-century print.

3D animation produced from etchings by Giovanni Battista Piranesi.
2. DIGITAL OUTPUT IN FACTUM’S WORKSHOPS

The techniques, technologies and processes of re-materialisation adapt to each project. Many projects involve CNC milling in stone or metal and 3D printing prototypes in nylon, resin and plastics. These spaces remain flexible and evolve as new technologies become available. The facilities are equipped with six CNC milling machines, a cement printer, a fulgurite printer, a 7-Axis robot, and small 3D printers. Factum Arte relies on a number of local and international companies for specialised process and large-scale 3D printing.
Large-scale precision engineering.

Robot polishing.

Waterjet cutting.

Large-scale stone lathe.

Laser cutting.

Stone cutting.

Laser sintering.

Elevated printing technology developed by Océ.

Centrifugal casting.

Laser sintering.

Wire-cutting stone.

Large painting chamber.

3D printing with Materialise’s Mammoth SLA printer.

DIGITAL OUTPUTS WITH SUB-CONTRACTORS
3. PRINTING AREA: DIGITAL STUDIO

The digital printing area is at the heart of studios and plays a central role in Factum’s approach to the relationship between tone and form. It has been developed around a flatbed printer designed by Dwight Perry. A new version of this printer is currently being developed by Quinner Baird. Both systems enable Rafa Rachewsky, Jordi Pons and Eduardo López to print onto diverse surfaces (coated in house) by building up layers of colour. This approach has created new possibilities for artists and facilitated the creation of exact facsimiles of paintings.
PRINTING AREA: PHOTOGRAPHIC AND INTAGLIO STUDIO

The cutting-edge digital printing technology co-exists with a traditional printing presses making intaglio and relief prints. Traditional techniques such as mezzotint and woodburytype are being reinvigorated by the possibilities for plate making with CNC machines. Cyanotype is another process that has benefited from the ability to print large scale negatives. Historical photographic process are also in use.
4. THE WORKSHOPS

A number of spaces have been designated for craft work. The ‘dirty workshop’ is for moulding and sculpting in materials such as fibreglass, resin, scagliola, wood and gesso. This space is large and various projects are carried out simultaneously. In this area, different teams work on diverse projects.

The ‘clean studio’ specializes in metal assembly, glass works and special projects requiring precision. The ‘metal studio’ is composed of two designated areas, one for large complex fabrication and the other for precise work with metals. Other spaces are used for experimentation and innovation.

Opposite:
Top left: Factum’s craftsmen working on small and big scale contemporary art pieces in the ‘dirty’ space.
Bottom left: The clean workshop for precision work in glass, stainless steel, silver and many different materials.
Above: Moulding, casting and transforming materials are at the heart of Factum’s production.
The workshop for mould-making and casting.

Metal studio for fabricating works in metal.

The dirty studio in action.

Electronic and audio work being carried out in an experimental studio.

A general finishing space.

A space where the team work with delicate materials such as Murano glass.

A studio for precision finishing.

Different teams carry out different processes and work with diverse materials.
Preparing Jenny Holzer’s installation for Abu Dhabi Louvre in Factum Arte’s largest workshop space.

Bottom: Finishing a 5-meter bronze tree for Marc Quinn.

Experiments with resin and electricity are taking place both in Factum’s studios and in Chicago.
Textile Studios

The textile studio is used for the design and preparation of all digital stages involved in Jacquard weaving. Factum doesn’t have a loom and works with craftsmen in Belgium to weave the tapestries. All finishing and assembly is done in Madrid. The Textile Studio is also involved in making replica tapestries and fabrics for museums and historic buildings where the fragile original materials can no longer be exhibited. Hand-tufting and embroidery is also carried out under the supervision of Blanca Nieto and Isabel Fernández.
6. FRAME STUDIO

3D scanning and printing are leading to new innovations in frame making that depend on both new technology and traditional skill.

7. CONSERVATION STUDIOS

While Factum Arte never restores original objects, many traditional conservation skills are used to finish the works that are being made in the workshops.

8. PAINTING STUDIOS

The transfer of data between image and form means we often depend on painting and manual work as well as printing.

Experts in gilding and conservation create facsimiles of frames. The frame-making studio specialises in traditional gilding and finishing over 3D printed surfaces.

The conservation studio applying traditional restoration techniques to the new objects being made in the workshops.

The workshop also contains a pressurised heated painting chamber for special paintings finishes.
9. MULTIPURPOSE SPACES

This section of the studio is reserved for special activities requiring a large and quiet space. This area is often used to mount exhibitions or to teach special workshops about art techniques and recording technology.

10. LOGISTICS

Multipurpose space used for preparing exhibitions and teaching courses.

Installing Jenny Holzer’s Bilingual Creation Myth at the Louvre Abu Dhabi.

Facsimile of a pair of Lamassu installed at the Rijksmuseum van Oudheden, Leiden.

Facsimile of Michelangelo and Sebastiano del Piombo’s Borgherini Chapel installed at the National Gallery, London.
11. CASTING PROCESS IN DIVERSE MATERIALS

Stainless Steel: Marc Quinn, 8-meter long fragment of a shell cast in stainless steel 316 at Fademesa foundry, Madrid.

Brass tree for the Mercato del Duomo, Milan. Cast at Esfinge, Madrid.

Aluminium: Mariko Mori Möbius strip cast in aluminium.

Flexible alloys - experimentation and material science.

Bronze: Rachid Koraïchi calligraphy cast in bronze.

Concrete: Marc Quinn Eye of History cast in concrete.

Corten: Conrad Shawcross Manifest cast in corten.

Silver: Piranesi’s coffeepot cast in silver cast at Pangolin, UK.

Glass: Canova’s Paulina Borghese cast in glass by Ghiberto Arrivabene, Venice.
12. MATERIAL TRANSFORMATION

- Cast Lava
- Salt: Marina Abramović cast in salt
- Micro CNC milling and gold plating
- Laser engraving glass
- Electroplating
- Electroformed silver
- CNC milled alabaster: Marina Abramović, 5 Stages of Maya Dance
- Fibreglass: Shezad Dawood, Why Depend on Space and Time cast in fibreglass with trichromate paint
- CNC milled woodburytype mould
- CNC mezzotint burnishing
- 3D large-scale stereo-lithographic printing
13. EXHIBITIONS

FACSIMILE OF THE TOMB OF TUTANKHAMUN
Installed at the entrance of the Valley of the Kings, 2014.

THE ARTS OF PIETRO PIRANESI: ARCHITECT, ENGRAVER, ANTIQUARIAN, VEDUTISTA, DESIGNER. THE EXHIBITION
Fondazione Giorgio Cini, Venice, 2010

PENELOPE’S LABOUR - WEAVING WORDS AND IMAGES

MINDFUL HANDS. MASTERPIECES OF ILLUMINATION FROM THE FONDAZIONE GIORGIO CINI
FACTUM FOUNDATION INSTALLATION

MADAME DE POMPADOUR IN THE FRAME
Waddesdon Manor, 2019.

SCANNING SETI: THE REGENERATION OF A PHARAOHIC TOMB

MARINA ABRAMOVIĆ

MADAME DE POMPADOUR IN THE FRAME
Waddesdon Manor, 2019.
Set design by Michael Hansmeyer produced at Factum Arte, for Romeo Castellucci’s opera The Magic Flute presented at the Théâtre Royal de La Monnaie de Munt, Brussels in 2018. © B. Uhlig De Munt La Monnaie and Michael Hansmeyer.
Francesco Cossa, Santa Lucía (detail) a part of the Polittico Griffoni now in The National Gallery of Art, Washington.