

Research Fellowship (ARTICT | Art through the ICT Lens Project: Big Data Processing Tools to Support the Technical Study, Preservation and Conservation of Old Master Paintings)

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THE NATIONAL GALLERY

The National Gallery exists so that people can engage with great art

It is a public museum with a uniquely important collection of pictures for the benefit of all. It tells a coherent story of European painting spanning seven centuries and reflects how artists and the societies in which they lived have responded to myth and religion, history and contemporary events, landscape and the human form, and to the tradition of art itself.

The National Gallery constitutes a living legacy of humanity's highest cultural achievements in painting and is an inestimable resource for understanding the world as we have inherited it.

We who currently have responsibility for the Gallery want to share this resource, and our enthusiasm for it, with the widest possible audience.

Established in 1824, the National Gallery is a national responsibility ultimately underwritten by Parliament. A quarter of a century ago the Gallery's statutory responsibilities were set out: to care for and add to the collection, to display it for the public, to advance scholarship and research, and to promote enjoyment and understanding.

Millions of people now visit the National Gallery every year and we reach many more online. We are committed to the idea of the National Gallery as a place of learning and enjoyment and we aim to realize the Gallery's potential as a source of inspiration for this and future generations.

From its inception the National Gallery has been free for all to visit. We believe that free admission represents a commitment to the public which must be reaffirmed and developed, a commitment to visitors of all ages, from Britain and abroad, and from all walks of life.

The National Gallery has an important role to play in enabling people to understand and negotiate the changes that society is undergoing by providing long-term historical perspective, mediated access to works of art of great significance and beauty, and a safe environment for reflection on questions of identity, beliefs, and on the relationship between the past and the present.

STRUCTURE

The Gallery has charitable status, and is a non-departmental public body sponsored by the Department for Culture, Media and Sport (DCMS). The Director acts as the Accounting Officer.

The Gallery is governed by a Board of Trustees, chaired by Hannah Rothschild. The Board of Trustees of the Gallery holds the pictures in trust on behalf of the nation.

Under the overall leadership of the Director, the Gallery's staff work across two main areas:

- Chief Operating Officer (Human Resources, Buildings & Facilities, Directors of Finance, Public Programmes and Digital).
- Collections and Research (Art Handling, Conservation, Collections, Collection Registrars, Curatorial, Framing, Photography, Research and Scientific).
- The Director of Public Programmes and Partnerships covers (Education, Exhibitions, National Programmes and developing partnerships with external bodies).
- The Digital Director is responsible for the Gallery's digital strategy (including Digital, Information Services, Creative, Press and PR).

The Gallery currently employs approximately 240 full-time and part-time staff with plans for growth during the coming year to 300. A significant portion of the Gallery's services is handled by a range of commercial partners, who provide in-house and front-of-house services. The Gallery is supported by the activities of the National Gallery Company Ltd, a commercial entity which contributes financially to the National Gallery. It is owned and operated by the National Gallery Trust, an independent Trust which generates and manages additional charitable contributions to the National Gallery.

STRATEGIC PRIORITIES 2018-2023

Dr Gabriele Finaldi, the National Gallery's Director, has articulated a new, ambitious vision for the Gallery, clearly identifying its strategic priorities until 2023. Under Dr Finaldi's leadership, the overarching vision for the Gallery is to be a stronger, more resilient museum, well prepared to fulfil our large ambitions for the decades ahead.

1. We will significantly expand our programmes and activities and work more with contemporary artists. Museum learning will be central to our ambition to foster engagement with the public.
2. We will seek to acquire major paintings and to build up the collection in little-represented or unrepresented areas of the history of art.
3. We will create a National Gallery with digital at its heart, to reflect a more digital world.
4. We will share our pictures with people across the UK and we will share our expertise to support regional museums.
5. We will invest in and develop our research capabilities to be an intellectual leader in the fields of technical art history and conservation science.
6. We will make a significant investment in our staff and undertake a major infrastructure project to accommodate them on a single site, the One Gallery Accommodation Hub.
7. To deliver these plans, we will grow our income with the aim of being 50% self-funding by 2022/3.

Further detail is available [here](#).

THE DEPARTMENT

Scientists at the Gallery investigate the materials and techniques of paintings in the collection, advise the conservators and the curators, and recommend the best conditions for display of the pictures. The Gallery scientists are part of a research-active culture and regularly lecture on and publish the results of their work for a variety of audiences both inside and outside the Gallery. In addition to Gallery publications of various types, including the annual National Gallery Technical Bulletin, the research is also published in the international scientific and conservation science literature.

The National Gallery Scientific Department is a world leader in all aspects of the technical study and care of old master pictures. Particular areas of expertise include the analysis of the materials of paintings (supports, grounds, paint media, pigments, dyestuffs, layer structure, varnishes, adhesives and consolidants); the history and technology of painting materials; the history and development of European painting technique; and the literature of painting practice. The Gallery maintains a well-equipped scientific laboratory for the analysis of paint micro samples with techniques such as: optical microscopy; scanning electron microscopy with energy-dispersive X-ray analysis (SEM-EDX); gas chromatography – mass spectrometry (GC-MS); high performance liquid chromatography (HPLC); Fourier transform infrared microscopy (transmitted and ATR-FTIR) and other advanced techniques. It has in addition a range of advanced non-invasive analytical imaging techniques including macro-X-ray fluorescence scanning (MA-XRF) and hyper spectral imaging, as well as 3D scanning. The Scientific Department has also developed a leading presence in the field of high-resolution digital imaging of paintings, image processing, accurate colour printing, and digital presentation and documentation methods.

Within conservation science, the strengths are in preventive conservation, monitoring and environmental management of picture galleries (control of light, temperature, relative humidity, dust and chemical pollutants) and their design to preserve easel paintings, as well as the assessment and monitoring of other factors potentially damaging to pictures such as shock and vibration within buildings, and for paintings travelling on loan. In addition, studies are undertaken into the deterioration of traditional painting materials and materials used in conservation (fading, darkening, chemical interactions, changes in optical properties and so on), the factors responsible, and also on the safety and reliability of conservation procedures for paintings, particularly cleaning.

In addition to the Scientific Department, the Collections Directorate contains Conservation, Curatorial, Art Handling, Collections Registrars, Framing and Photography & Imaging. The Director of Collections and Research is part of the Gallery's senior management team. The present staff of the Scientific Department consists of 10 scientists, technical specialists or research fellows (some part-time and some on fixed-term contracts for externally funded projects). Students of conservation and outside researchers are frequent visitors to the Scientific Department, and it is expected to discharge a national expert role. Within the National Gallery, close links are maintained by scientists with curators and conservators, with whom joint research work is undertaken, and with many other departments across the organisation both for collection care matters and for public engagement activities.

THE ROLE PROFILE

Research Fellowship (ARTICT | Art through the ICT Lens Project: Big Data Processing Tools to Support the Technical Study, Preservation and Conservation of Old Master Paintings)

JOB CONTEXT

The National Gallery Scientific Department is a world leader in the technical study and care of old master pictures. Particular areas of expertise include: analysis of the materials of paintings; history, technology and development of European painting technique and materials, and the literature of painting practice. The Department also has a leading presence in the field of high resolution digital imaging of paintings and image processing. The Gallery acquired macro X-ray fluorescence (MA-XRF) scanning equipment in 2017 and recently constructed a hyperspectral imaging (HSI) system operating over the range 400–2500 nm with very high spectral resolution, making it one of the very few (and only UK) institutions worldwide with access to both of these cutting edge non-invasive spectroscopic imaging methods, generating large volumes of multidimensional data.

JOB PURPOSE

The post holder will join the Scientific Department as part of a team undertaking innovative research to improve how the wealth of analytical imaging data now available through the application of MA-XRF scanning, hyperspectral and more traditional imaging techniques, is interrogated, interpreted and presented. This cutting-edge research will be undertaken as part of the EPSRC-funded three-year ARTICT | Art Through the ICT Lens project which brings together ICT and Heritage Science researchers from University College London, Imperial College London and the National Gallery to co-create and apply novel signal analysis and processing algorithms to support the technical study, conservation and preservation of artworks. The ARTICT project started on 1 October 2018 and the post holder will be one of three research fellows working within it: see <http://gow.epsrc.ac.uk/NGBOViewGrant.aspx?GrantRef=EP/R032785/1>

SCOPE OF JOB

The Research Fellow, as part of the wider ARTICT research team, will undertake cutting-edge research that will allow improved identification, characterization, and visualisation of the materials and features of interest in a painting, including in sub-surface layers. The post holder's role will be to provide analytical, spectroscopic and (chemical) imaging expertise to all aspects of the research. The post holder will therefore need knowledge of the physics of data acquisition and materials response to radiation, as well as hands-on practical experience of data acquisition and chemical interpretation of the resulting data, ideally within a heritage science context. An understanding of materials ageing and degradation or the historical evolution in old master painting materials and techniques would be advantageous.

They will have particular involvement in delivering the research phases involving data collection and preparation, and conducting the case-studies, but will also contribute specialist expertise to the work on data pre-processing and analysis. The post-holder will additionally deliver a key coordination role in the project, ensuring that the work of the other two ICT researcher fellows (who will be appointed 6-12 months after the project starts) is fully integrated into the wider project to guarantee the continuity of the research and of the dissemination, exploitation, innovation and impact activities and in delivering the data management plan.

The post holder will also play an essential role in helping to more fully integrate complex analytical imaging technologies, image-based analytical data and signal processing approaches into the wider work of the Scientific, Conservation and Curatorial departments at the National Gallery, as well as the heritage sector more generally.

SUPERVISORY/ MANAGERIAL RESPONSIBILITY

No direct managerial responsibilities but the post-holder will have a key liaison role in the project and may have some supervisory input in relation to the PhD students associated with the project.

KEY DELIVERABLES

To contribute analytical, spectroscopic and (chemical) imaging expertise to ensure the successful delivery of the ARTICT project, for which the key stages are:

- Data collection and preparation, including creation of multimodal datasets comprising MA-XRF & HSI data cubes, and incorporating other technical images, analytical data from point analysis/cross-sections and heritage sector-specific knowledge to support the development of automatic data interrogation tools;

- Creation of new and extension of existing (automatic) algorithms for data pre-processing tasks e.g. correction, mosaicking, registration of images/data etc;
- Development of new (automatic) heritage science-informed sparsity-driven nonlinear unmixing algorithms for materials characterization within relevant features (including sub-surface features) in a painting and visualization of such features;
- Undertaking case studies to illustrate applicability of the new algorithms;
- Pursuing a series of dissemination, exploitation, innovation and impact activities, including developing robust, user-friendly software tools and championing and sustaining a co-creation culture across ICT and Heritage Science and the emerging area of 'Signal processing for Art Investigation'.

KEY RELATIONSHIPS

The jobholder will report to the supervising Principal Scientist who in turn reports directly to the Head of Science at the National Gallery. The jobholder will also work with a range of other members of staff at the National Gallery, especially scientists, conservators and curators.

The job holder will also work closely with the ARTICT project Principal and Co-Investigators and other research fellows and PhD students at University College London and Imperial College London, and will liaise with members of the project advisory board and other project partners.

ESSENTIAL ROLE CRITERIA

Qualifications

- First degree and a PhD in a scientific subject (e.g. chemistry, physics, mathematics, computer science or engineering), or alternatively, equivalent post-graduate research experience in a relevant subject may be considered.

Experience

- Demonstrable research experience in a relevant area (e.g. involving hyper/multispectral or chemical imaging, analytical or spectroscopic methods (ideally in a heritage science context) or possibly advanced image or signal processing, machine learning or computer programming)
- Proven track-record in interpretation and dissemination of analytical/technical/specialist research for both professionals and non-scientists/non-specialists via a range of different media including: (i) authoring and publishing in peer reviewed journals/conference proceedings and (ii) experience with public engagement activities and/or development of web-based resources

- Demonstrable computing experience, ideally with (bespoke) spectroscopy, image processing or mathematical software, preferably with some familiarity with programming

Knowledge

- Expertise in multi/hyper spectral or chemical imaging, spectroscopy or in X-ray based analysis/imaging (including in the principles underlying these techniques) and/or (statistical) analysis of the resulting data, ideally in a cultural heritage context
- Hands-on, practical experience in acquiring and interpreting data with (bespoke) imaging or analytical equipment and ability to trouble-shoot any analytical, technical or computing issues

Communication and interpersonal skills

- Excellent reporting, communication and interpersonal skills and ability to confidently engage and communicate with all internal and external project stakeholders with a range of different specialisms.
- Ability to communicate effectively and authoritatively about their specialism to a wide audience within the Gallery in support of joint activities with other departments
- Problem-solving, initiative and specialised skills.
- A high level of initiative, ability to adapt to new ideas, to work collaboratively in problem solving, responding to the work of other project partners, and to make detailed decisions in area of expertise.
- Meticulous and logical approach, capable of prioritising tasks and achieving deadlines, with excellent attention to detail, record keeping and organisational skills

Personal Attributes

- Able to work effectively in a research environment of dispersed inter-disciplinary teams, with colleagues within and outside the Gallery, and with the wider national and international heritage science and ICT communities.
- Strongly self-motivated and able to independently determine priorities within an overall framework of deadlines and responsibilities, but with understanding of when to seek advice from senior colleagues/project leaders.

ADDITIONAL CRITERIA

- A high level of dexterity and the ability to work in close proximity with paintings of very high value and with analytical/imaging equipment.

- Experience of working in a museum environment and an interest in Western European painting and/or conservation is highly desirable.
- Knowledge of health and safety.

DIVERSITY AND EQUAL OPPORTUNITES

- To value and respect your colleagues and members of the public regardless of their background.
- To cooperate and contribute to measures introduced by the Gallery to ensure equality of opportunity and encourage diversity.

SUMMARY OF TERMS AND CONDITIONS OF EMPLOYMENT

Research Fellowship (ARTICT | Art Through the ICT Lens Project: Big Data Processing Tools to Support the Technical Study, Preservation and Conservation of Old Master Paintings)

Contract Type

Full time

Fixed-term

Salary

This post is on the Gallery's Band D. The salary is £31,500 p.a. pro rata.

Pay Review

Pay increases are dependent upon government public sector pay policy and affordability, and the Gallery's pay settlement arrangements.

The following are for employee status:

- Occupational defined benefit scheme (Civil Service Alpha, details available through the Civil Service website); transfer from another Civil Service employer with an existing scheme (e.g. Classic) will be recognised.
- Annual leave entitlement begins at 26.5 days pro rata, rising to 31.5 days at five years' service.
- Flexible benefits from three months' service, including discounts, holiday trading, cycle to work and other benefits which vary from time to time according to availability via the Gallery's 'Palette' scheme.
- Flexible working arrangements to suit.
- Participation in the reciprocal arrangement between cultural institutions for free entry.
- Employee discount in the Gallery's retail and catering outlets, as well as a number of outlets in the vicinity of Trafalgar Square.
- Free tickets to Gallery exhibitions, up to four to share with friends and family.
- Employee Assistance Programme and Occupational Health, including annual 'flu vaccination on request.

HOW TO APPLY

It is important to complete all sections of our application form in order to ensure that we have all the information necessary to consider you for the job you are applying for. There are a number of sections to complete before submitting your application. However, you can save your application form at any stage and return at any time prior to the closing date to complete.

If you have any questions on the information you should provide, or have any difficulties completing the form, please contact the Human Resources Department at recruitment@ng-london.org.uk or on 020 7747 5909.

Employment & Academic History

Due to the value of our collection the Gallery undertakes extensive pre-employment screening, including a criminal record check. As part of our security screening process we need to account for all of your time over the past 3 years and will verify the information provided. However we are interested in all of your relevant work experience so please provide us with your career history.

Supporting Information

Candidates are encouraged to submit a covering letter with their application and to ensure that in either this letter or the Supporting Information section of the application form they have clearly indicated why they are applying for the role, their understanding of the requirements of the role, their suitability and what they believe they can bring to the role.

By using the role profile, you should outline how your skills, knowledge and experience match the requirements of the post.

Selection

For some roles at the Gallery we will ask you to complete a variety of selection activities to allow candidates to demonstrate your abilities and suitability for the post. These may include ability tests, personality questionnaires, work simulation exercises, interviews, etc. Details of the specific activities will be advised to you as part of the process.

Equal Opportunities Monitoring

The Gallery is committed to equal opportunities for all job applicants and employees. Our policy is that no job applicant or employee should receive less favourable treatment than

another on grounds of gender (including gender reassignment), sexual orientation, marital or family status, civil partnership status, race, colour, nationality, ethnic or national origins, religion or similar belief, disability, age or trade union membership or any other condition or requirement which cannot be shown to be justifiable.

Information you provide such as ethnic origin, gender and disability will be used solely for monitoring purposes and identifiable information will not be disclosed.