QUALIFICATIONS

A special focus on one of the Society's specialist accreditations

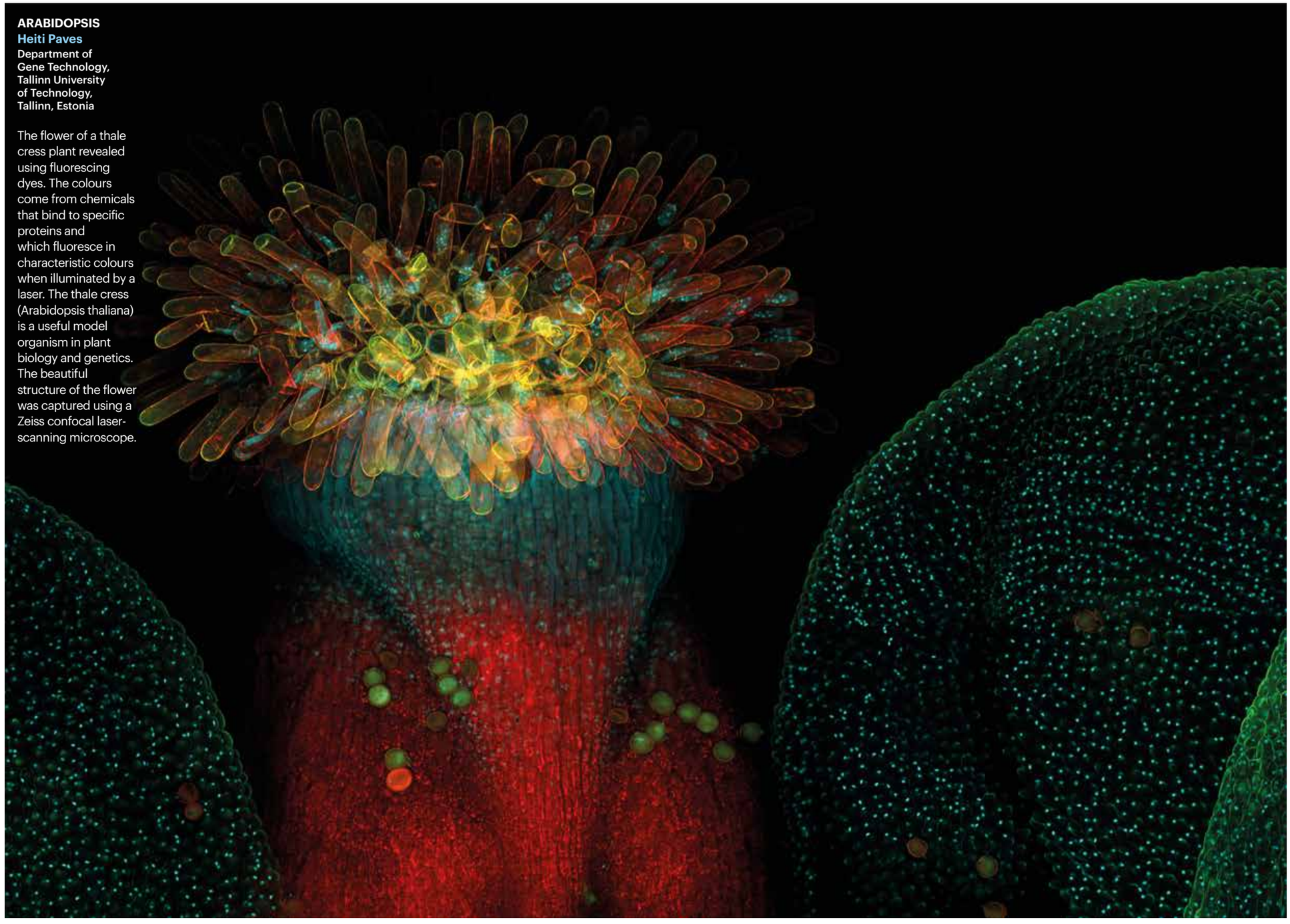
Get your skills recognised by the RPS

Imaging Scientist Qualifications (ISQ)
for those who have professional careers within the fields of engineering, science and technology

Creative Industries Qualifications (CIQ)
for those working in the media – including picture editors, art directors and curators

REAP Distinction
applicants submit an academic paper, essay or website, illustrated with images, in which they share knowledge and develop aspects of photography

Film Distinction
to support and encourage the production of innovative, challenging, high-quality moving-image work



ARABIDOPSIS
Heiti Paves
Department of Gene Technology, Tallinn University of Technology, Tallinn, Estonia

The flower of a thale cress plant revealed using fluorescing dyes. The colours come from chemicals that bind to specific proteins and which fluoresce in characteristic colours when illuminated by a laser. The thale cress (Arabidopsis thaliana) is a useful model organism in plant biology and genetics. The beautiful structure of the flower was captured using a Zeiss confocal laser-scanning microscope.

IMAGING AND SCIENCE

Crucial roles within the world of science are recognised with Society qualifications, writes Professor Afzal Ansary ASIS FRPS

AUTHOR PROFILE

Professor Afzal Ansary ASIS FRPS is a Fenton Medallist and chair of the Society's imaging scientist qualifications board

THE SOCIETY FACILITATES learning and promotes the highest standards of achievement in the art and science of photography through its internationally renowned Distinctions and Qualifications programme.

Although science has always been an integral part of the Society's activities, in 1993 – in recognition of the lack of vocational qualifications in the area of imaging science – it introduced four unique levels of Imaging Scientist Qualifications (ISQ) for those professionally engaged in the field and its applications. This initiative was the first to provide a vocational qualification structure for all engineers, scientists and technologists working in disciplines relevant to the diversity of current imaging systems.

IMAGING SCIENCE AND SCIENTIFIC IMAGING

Imaging and science are inextricably connected, and scientific imaging is as old as photography itself. Indeed, soon after the invention of photography, French neurologist Duchenne de Boulogne used it to document facial expressions triggered by electric stimulation in order to study the 'physiology of emotion'. And, in 1872, British photographer Eadweard Muybridge used photography to study and analyse horses in motion.

STILETTO
Volker Brinkmann
Max-Planck Institute for Infection Biology, Berlin, Germany

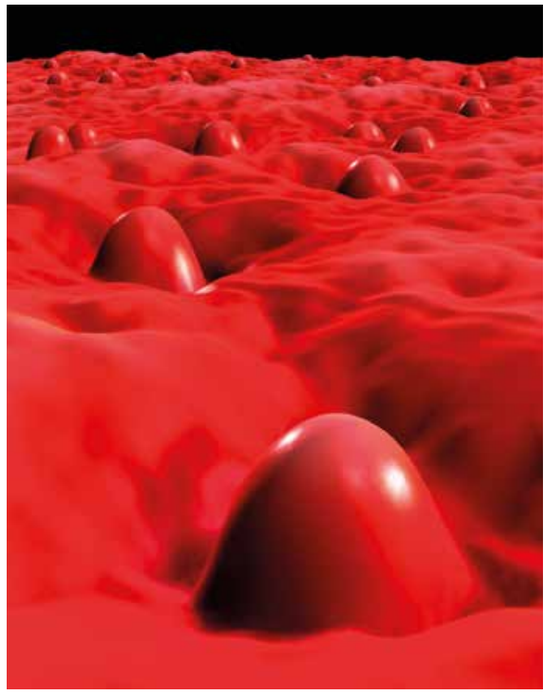
Coloured scanning-electron micrograph of the proboscis of a mosquito, Anopheles gambiae. At the upper left is the outer sheath, or labium, enclosing the tip of the stylet (green). The stylet is made of the maxillae and mandibles, and is used to pierce the skin of the host animal to find and penetrate a blood vessel. The blood that escapes is sucked up through the labium. In mosquito species, such as the A. gambiae, the labium is relatively long and forms a proboscis. The section of stylet seen here is about 0.2mm long. This image was created in monochrome then digitally colourised.

HYACINTH-GROWTH-SEQUENCE BELOW
Hugh Turvey HonFRPS
Artist in residence, British Institute of Radiology, London, UK

The delicate and intricate inner structures showing growth of hyacinth bulbs captured using X-rays. The Xogram technique used here involves multiple X-ray exposures made at different densities which are then digitally combined and colourised by the artist.

MALARIA-INFECTED HUMAN RED BLOOD CELL BELOW
Steven Morton FRPS
School of Physics, Monash University, Victoria, Australia

Atomic-force microscope (AFM) image of the surface of a human red blood cell from a patient infected with the malaria parasite (Plasmodium sp.). This image was created from surface-height data gathered by the AFM, then processed through a 3D-visualisation package.



Imaging science is a multidisciplinary field concerned with the generation, collection, duplication, analysis, modification and visualisation of images. It involves the gamut of science subjects – physics and chemistry in the invention and production of image sensors, as well as optics, psychology, mathematics and computer science, to name just a few. With all the scientific and technological issues involved the final image must be of the highest quality and accuracy to satisfy its intended purpose.

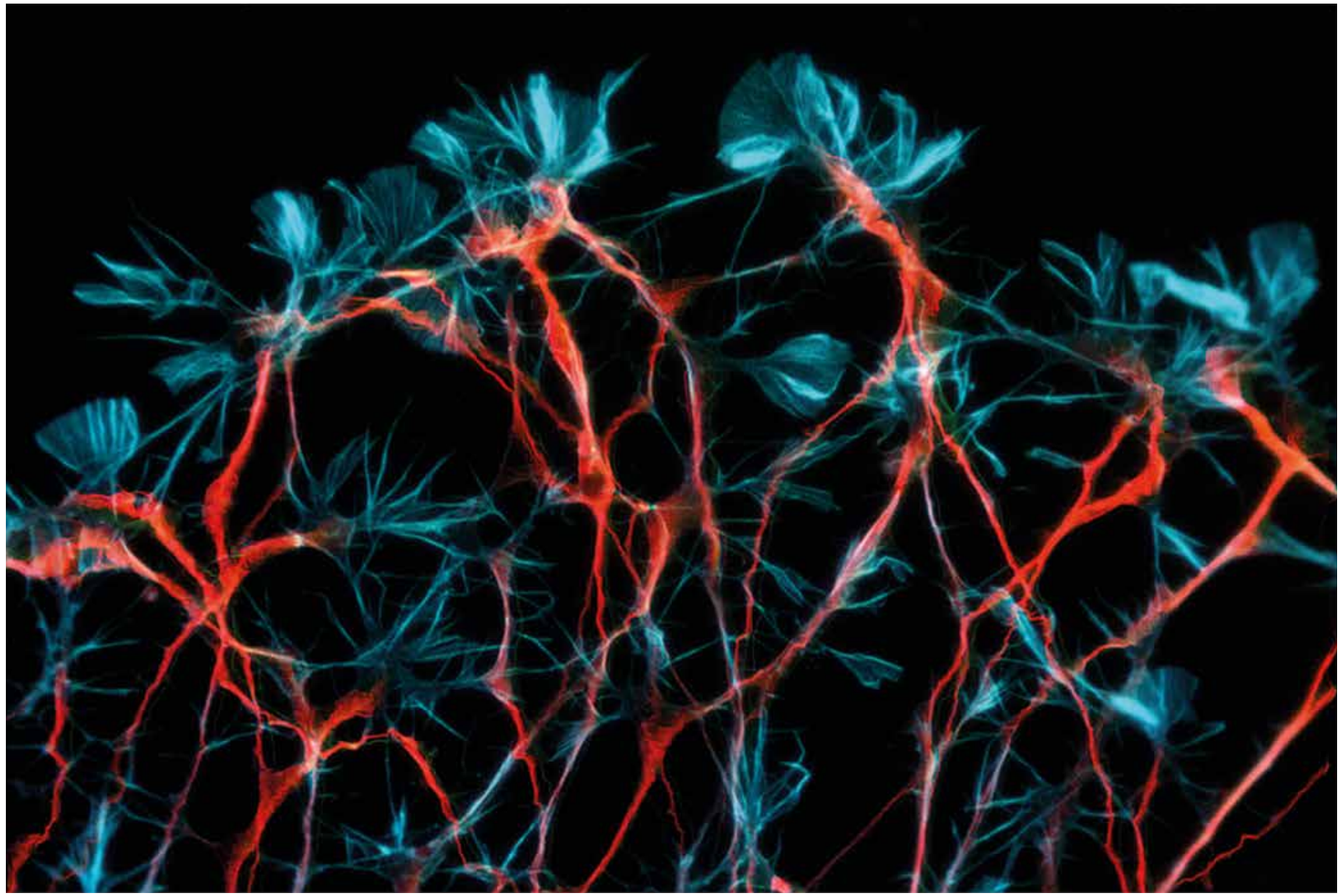
Scientific imaging plays an important role in diverse fields, from astronomy through telescopes to microbiology through microscopes. In astronomy, for example, it is used to study the composition of the nebulae; in oceanography it records changing sea-floor geological formations; in geography it aids mapmaking; in medicine it aids diagnosis and provides an accurate and non-invasive tool for monitoring the progression and regression of many diseases.

Highly sophisticated digital imaging systems, made to precise specifications, are capable of simplifying complicated scientific data, revealing information that might not be visible to the naked eye and making visible events that are too slow, too fast, too small, too large, or beyond the visible region of the electromagnetic spectrum. There are a number of scientific applications, such as micro and macro photography, ultraviolet (UV) and infrared (IR) photography, time-lapse and high-speed, electron microscopy, thermography, fluorescein angiography, retinal photography, schlieren photography … the list goes on. These techniques of scientific imaging are beneficial in almost all areas of technology and science where the documentation of the research process and research findings are equally important.

‘The final image must be of the highest quality and accuracy to satisfy its intended purpose’

APPLYING FOR A DISTINCTION

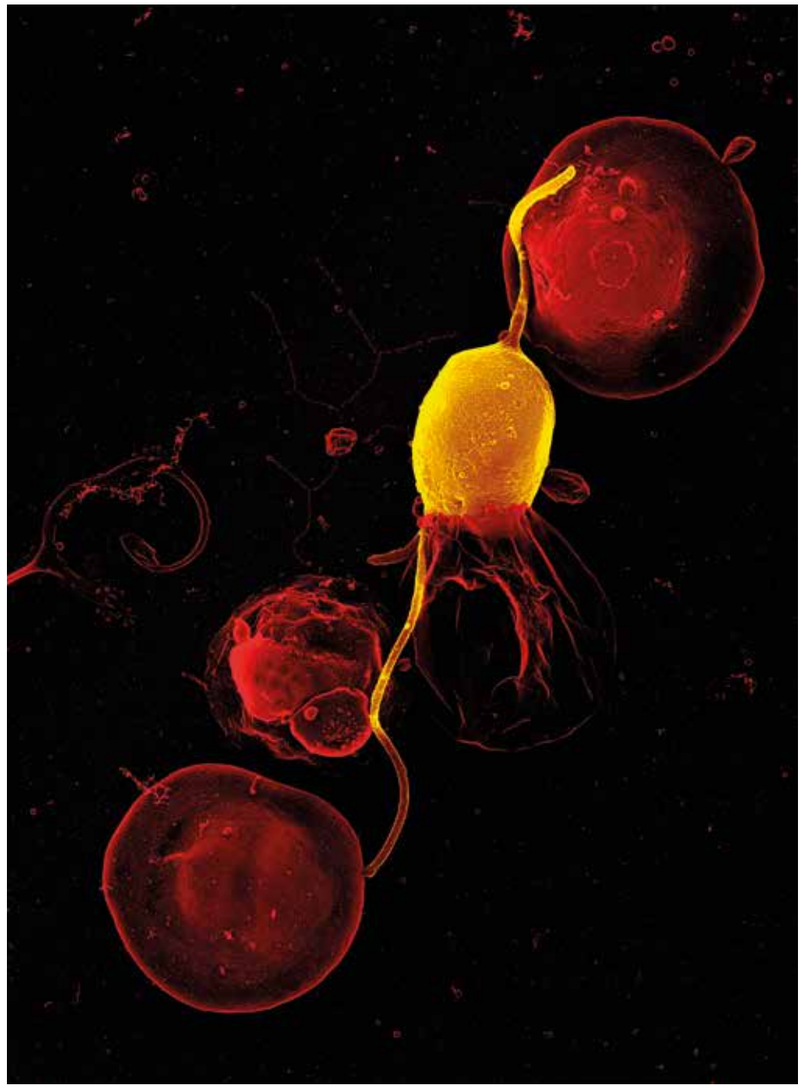
Distinctions in scientific photography are specifically for scientific photographers who are concerned with producing images for science. Scientific photography is very different from other types of photography where the photographer’s personal statement or viewpoint can be subjective. In scientific photography, pictorial documentation of the subject needs to be as objective as possible and the scientific image must meet the needs of the scientist who commissions it, unless the scientist produces the image for him/herself. It must be emphasised that there are also scientific images, and we have seen many, which are aesthetically pleasing and yet contain scientific data. Creativity is



NEURONS ABOVE

Heiti Paves
Department of Gene Technology, Tallinn University of Technology, Tallinn, Estonia

Sensory nerve cells from a rat embryo grown in culture. These cells (neurons) were stained with chemicals that bind with specific proteins then fluoresce in characteristic colours under ultraviolet radiation. Here, the blues show microfilaments, the smallest component of the cell's cytoskeleton structure, while the reds show the larger neurofilaments. This image was captured using an Olympus fluorescence microscope.



PLASMODIUM BERGHEI ABOVE

Volker Brinkmann
Max Planck Institute for Infection Biology, Berlin, Germany

A malarial parasite (yellow) leaves a red blood cell. The parasite (Plasmodium berghei) is carried by mosquitoes and infects the blood of some mammals. As it isn't a threat to humans or domesticated animals, P. berghei is used extensively in the study of malaria control. An original monochrome image was made with a scanning electron microscope, then digitally colourised to emphasise the biological structures.

not the sole monopoly of artists; scientists can also produce images that are creative.

Distinctions can be achieved by the submission of images (prints, transparencies or digital images) as per the Society's Distinctions regulations. Through this route, it is possible to apply for a Distinction in medical, biological, forensic or archaeological photography, or other related scientific disciplines.

The images submitted can be taken with optical or non-optical devices using the visible or invisible range of the electromagnetic spectrum, such as medical images, photomicrographs, electron micrographs, IR and UV, schlieren, time-lapse, high-speed or astrophotography. They can also include other disciplines that support scientific research documentation and the publication of scientific research data.

Application for a Distinction by the submission of images has to be made in accordance with the Society's regulations. Although the same regulations apply to scientific imaging, it has the additional requirement that the applicant must provide a statement explaining the materials and methods used and the purpose of the work.

Although manipulation is allowed, any image manipulation or image processing must not alter the authenticity of what is being presented. Submissions will be assessed against criteria appropriate to the particular nature of the material submitted. In particular, images will be assessed against the statement of intent and must be of the highest technical quality. Applicants must show a range of skills, even if in a narrow discipline. At Fellowship level there must be a demonstration of distinguished ability in the chosen subject area.

Included in this article are some excellent examples of scientific images submitted for the International Images for Science Exhibitions (IISE).

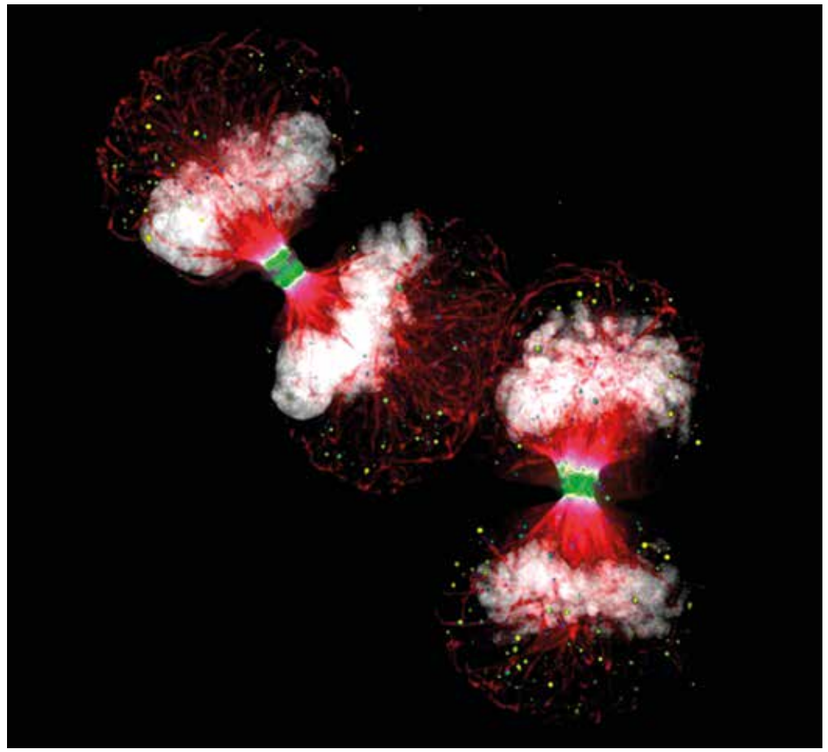
'Any image processing or manipulation must not alter the authenticity of what is being presented'

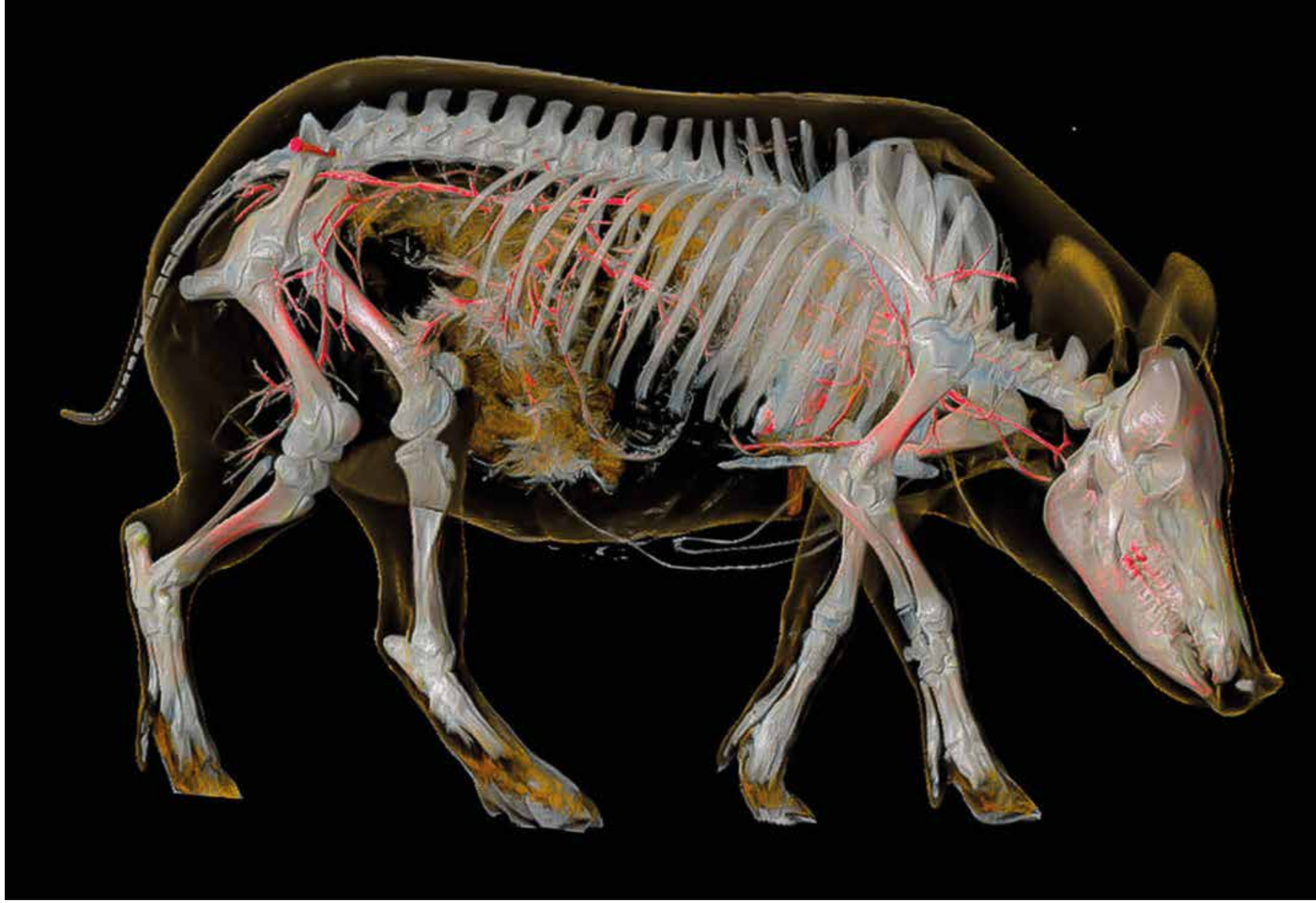
IMAGING SCIENTIST QUALIFICATIONS

To enhance career prospects and recognise achievements in imaging science and scientific imaging, the Society offers professional Imaging Scientist Qualifications (ISQ) at four levels: Qualified Imaging Scientist (QIS LRPS), Graduate (GIS ARPS), Accredited (AIS ARPS) and Accredited Senior (ASIS FRPS). These qualifications are for imaging scientists, scientific photographers and scientists who use imaging as a tool.

Applicants for Imaging Scientist Qualifications apply through the submission of documentary evidence. Those involved in relevant academic disciplines – such as computer science, physics, chemistry, imaging

TWO IN TELOPHASE BELOW
Paul Andrews
University of Dundee, Scotland
Two HeLa human cervical cancer cells in telophase, a stage in cell division, fluorescing under ultraviolet radiation. In each cell there are two bundles of DNA wrapped up as chromosomes (white) that will form the nuclei of the daughter cells. These are connected with microtubules (red). At the centre of each cell is a protein, Aurora B (green), that may be a target for new chemotherapy drugs. This image was created by restoration-deconvolution microscopy. By knowing the characteristics of the lens system it is possible to reconstruct even out-of-focus spots of light to how they should look in focus, then stack them to reconstruct the 3D structure.





• science, scientific imaging, engineering etc – can also apply for these qualifications provided they can demonstrate substantial work experience. For example, qualifications may be attained by Society members working within relatively narrow specialisations but where their achievement requires a range of widely applicable professional skills. It is also important that candidates demonstrate their ability to collate the required documentary evidence that will form the bases from which to assess their applications.

Applicants who are successful in acquiring an imaging scientist qualification at any level would also be awarded a Distinction. ISQ can also be attained without formal degree qualifications through a process based on an individual's experience. Applicants are therefore required to demonstrate a wide range of applicable professional skills, including the ability to undertake a programme of work, write reports and papers and, of course, produce results.

DOCUMENTARY EVIDENCE REQUIREMENTS

Evidence in support of applications for qualifications is in four parts:

'The ISQ board is continually looking for ways to improve the assessment process and make it more accessible'

- Documentary evidence of prior academic qualifications. In certain cases, this requirement may be replaced by a longer period of relevant experience
- A statement of experience as a professional imaging scientist
- A full curriculum vitae
- Statements from referees that will demonstrate the extent, level, scope and experience of the candidate in imaging science and confirm the veracity of the statements provided.

EXEMPTIONS ROUTE

Graduate and postgraduate qualifications in scientific photography, biological or medical photography or any other scientific discipline of photography, with appropriate work experience, could qualify for an exemption at an appropriate level. An exemptions route is available for members of the Society who are also members of other professional or learned bodies and hold equivalent qualifications, provided that they have a sufficient period of appropriate imaging science work experience. Every case will be assessed on its own merits.

Members of The Royal Photographic Society who are also members of other professional or learned bodies and hold equivalent qualifications may apply for AIS (eg MRSC, or MInstP) or for ASIS (eg FRSC, or FInstP) provided that they have a sufficient period of appropriate imaging science work experience. In these cases, only evidence of the exempting qualification, a statement of relevant experience, a curriculum vitae and an independent referee's report are required. Through this route the applicants are required to substantiate all claims with supporting documents.

IMAGING SCIENTIST QUALIFICATIONS BOARD

The membership of the ISQ board is determined by the Society's board of trustees on recommendations from the ISQ board chairman and the Distinctions manager, and consists of members who hold ASIS qualifications at level 4 and are senior members of the Society with many years' experience. The qualifications board is responsible for the recognition of academic courses. In cases of an applicant not being recommended the board gives clear reasons to the candidate and, where appropriate, guidance and advice. The ISQ board is continually looking for strategies that improve the assessment process, make it more accessible to the public and make it easier to apply.

The Imaging Scientist Qualifications regulations can be downloaded from the Society's website (rps.org), or obtained by contacting the author (medical@rps.org) or the Distinctions manager (andy@rps.org)

COMPUTED TOMOGRAPHY ANGIOGRAPHY OF DEAD WILD BOAR ABOVE
Anders Persson
Center for Medical Image Science and Visualisation, Linköping University, Linköping, Sweden
This 3D-reconstructed image shows the skeleton and blood vessels of a dead boar. An iodine contrast agent is injected into the arteries and the boar placed in a dual-energy computer tomography scanner, which takes virtual 'slice' scans at two different X-ray energies. The slices are combined to form a virtual 3D image and computer processing can apply colour and transparency to the types of tissue. This technique is being developed for virtual autopsies on human bodies post mortem.