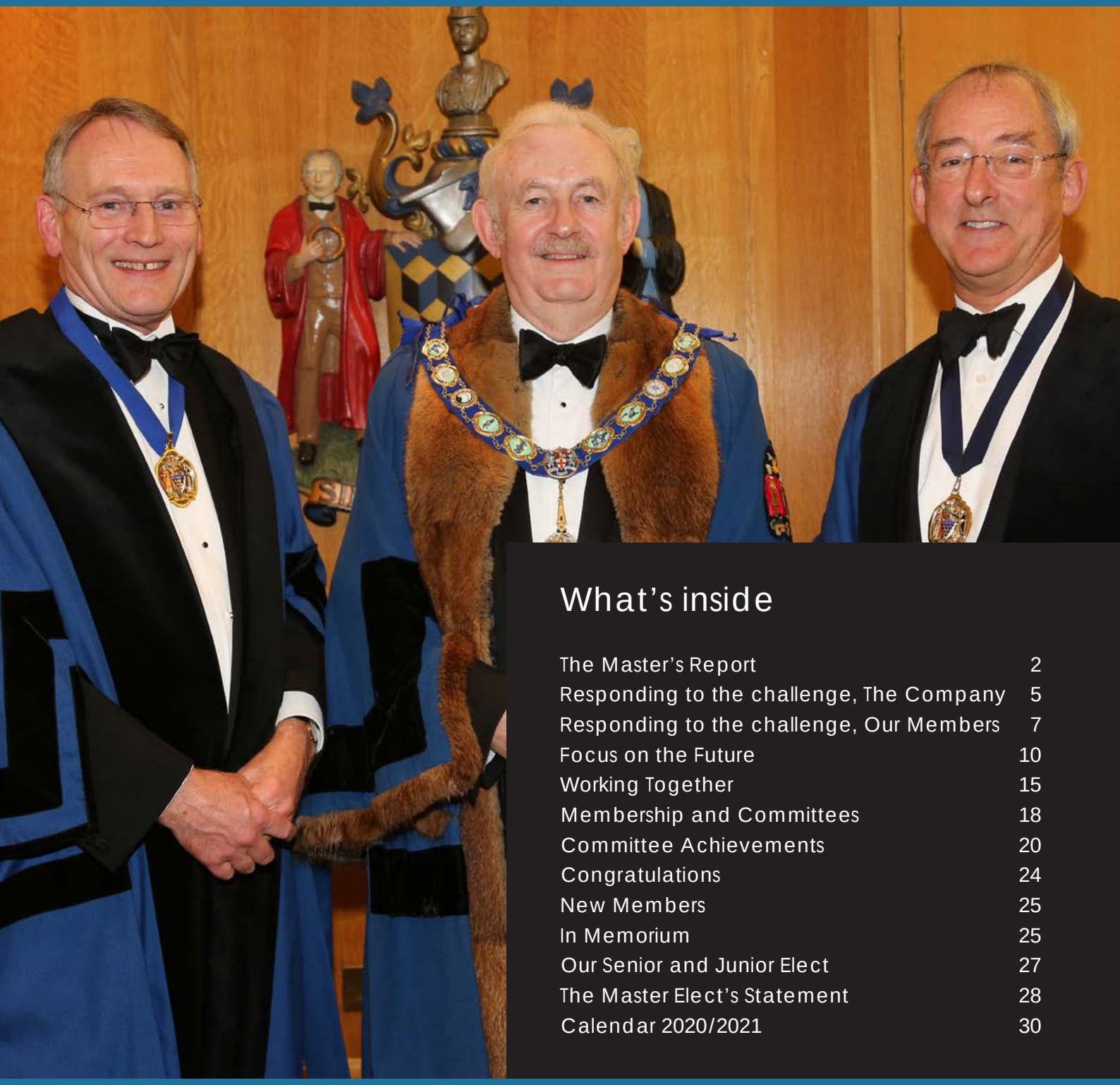
The Worshipful Company of
Scientific Instrument Makers

A review of 2019/2020

Moving forward, giving back



What's inside

The Master's Report

Moving forward - Giving Back

How different everything looked on 24th October 2019. I had just had the pleasure and honour of being installed as Master of the Livery and was walking into a very well attended Admission Court Dinner with my Guest Speaker, Professor Isobel Pollock-Huff. Isobel, a Past Master of the Worshipful Company of Engineers and Past President of the Institution of Mechanical Engineers gave an excellent and well received speech: one of my themes for the year was to make sure that I would invite a group of distinguished female scientists and engineers to speak at my Livery Dinners.

An excellent start to the year and I was very pleased that subsequently Professor Lisa Hall accepted my invitation to be the Guest Speaker at our next Livery Dinner in February in the River Room: Lisa and her husband John Saffell have become Liverymen.

When I look back on what I said at the end of that first evening, looking forward to my year in office and thanking everyone for the confidence they had placed in me, it is a reminder that while you can plan, external events can overtake even the best laid plans of Livery Company Masters.

Of course, so many activities have since fallen victim to the lockdown and the restrictions on our meeting together and the safety of travelling in London. Our annual SIMposium in April was due to showcase what some of the many young people associated with the Livery – the Apprentices, Prize Winners and Freeman – were doing, to inspire us through showing us some of the future directions in scientific instrumentation.

I was particularly sad that we lost the Master's weekend that was due to take us in May, to Northern Ireland: where I grew up and to allow us to see something of the sights of my native Province – amongst them the UNESCO Heritage site, the Giant's Causeway, the word-famous Titanic Centre and have dinner in the Great Hall at Queen's University, where I was a student a long time ago. We had planned the maximum flexibility for travel and accommodation to allow as many as possible to come for all or part of the weekend – and it didn't happen. A highlight of the year was due to be the celebration of the award by Her Majesty The Queen of a Charter of Incorporation to The Worshipful Company of Scientific Instrument Makers where we planned to mark this historic occasion at a glittering Charter Dinner and Annual Banquet in June. That will still happen but at a date likely now in 2022 when we can celebrate as we should.

As you know, none of that has happened. However, I was fortunate that I did have a busy period from my installation to a well-attended annual Carol Service led by our Honorary Chaplain and held a few weeks before Christmas – the traditional way to herald the coming of Christmas and time spent with family and friends, or on holiday. I did enjoy one of the Master's privileges – sampling three different types of Christmas pudding as guest of three different Livery Companies at dinner, lunch and then dinner again, all in just over 24 hours. Looking back at the diary, there were many other interesting events as well that I could attend – the Arkwright Engineering Scholarship Award Ceremony at Savoy Place, representing the Livery at the Garden of Remembrance at St Pauls, being a guest at the Silent Ceremony where the new Lord Mayor was installed and attending the Lord Mayor's Show on a bright sunny November afternoon as well as being the guest at a number of Livery Halls in the City. And that was just some of the things I did before Christmas.

After the break and into the new year, there were Livery Schools events, lectures, interviews for the prizes and awards to students made to students from across our partner Universities…and a number of further dinners as guest of other Livery Companies. Sadly events like the Big Bang Fair in Birmingham in early March, where we have been actively involved for many years (and which has been a source of a number of our future Apprentices) was one of the first events to be cancelled. The last face-to-face event we held was a series of routine Committee Meetings at the Livery Hall on 16th March.

After that, as we know, everything changed…. and we all learned about Zoom, Microsoft Teams, WhatsApp Conference calls and the like. However, we were determined that as much of the life and work of the Livery would go on in spite of the lockdown that was imposed and I am pleased to say that Committee meetings and Court meetings have gone ahead as planned, through Zoom, keeping our finances and other aspects of our organization in order. Indeed, one of the unexpected benefits has been that those members of the Court and our various other Committees who have had difficulty with travel have been able to join us through Zoom and attendances have been at record levels, so it has been very much 'business as usual'.

We have also had several very good admission ceremonies for Freemen and Apprentices via Zoom where we have welcomed new people into the Livery and with the support of Assistant Jim Webster, we have arranged and held a number of Open Evenings, also by Zoom, which have worked extremely well: they have been more personal and a great opportunity to speak to each of the attendees for longer than usual and tell them about the benefits of joining the Livery. I am glad to say that a number of people have accepted our invitation and joined us as Freemen or Apprentices as a result.

So it is clear that the new rules imposed by the Government and the need for ensuring our safety have meant major changes. A big negative of all this has been that I have not had the chance to meet everyone during my Master's year and for us to get together at Livery Dinners, Events and Lectures. I was delighted that we were still able to host the Four Liveries Lecture on 21st September and have a great event on 'Ophthalmology and New Technologies', given by Consultant Ophthalmologists Nigel Davies & Kevin Gallagher. All this was arranged by Zoom and we had an excellent attendance from across the four Livery Companies involved, in part because of the greater access that the virtual format has given us. Our Admission Court Dinner, due for 22nd October, had to be postponed but were able to have a small scale ceremony to welcome the new Master and Wardens that was streamed widely and many were able to play a part, even virtually. Let me wish them well in the year to come, and I am pleased to offer my support in my new role as Deputy Master. We were also delighted also to welcome Nobel Laurate Carlo Rubbia to the Livery as an Honorary Freeman – a world class scientist working with one the world's largest scientific instrument at CERN, reflecting our international links with the leaders of the field.

This year saw the retirement of our Beadle, Tony Parker, who has been a 'presence' for most of the years that I have been involved with the Livery: we will miss his distinctive voice – and humour – at our events and his ability to keep everything running smoothly. We wish him an enjoyable and relaxed retirement. We are pleased to welcome Ted Prior as our new Beadle – Ted has the sort of experience that we value enormously and we look forward to his contribution to the life and work of the Livery in the years to come. We also saw the retirement of Jean Monk who had served the Company as book keeper for almost 20 years. We most certainly wish Jean a long and enjoyable retirement.

Through it all we were blessed in that, to the best of my knowledge, we did not lose any Liverymen or Freemen to Covid-19 and our membership kept safe. We were particularly saddened however by the passing of Past Master Guy Brocklebank at an untimely early age after an accident and many of us were able to attend his funeral service, streamed on-line: a Memorial Service is planned for May 2021 and further details will be made available soon.'

We have tried as far as we can to keep everyone informed and linked to the Livery through the Bulletins and other electronic communication and will do so until things begin to return to greater normality. I hope that the new Master will continue writing the 'Master's Missives' that I have added to several of these Bulletins to let you all know what we have been doing from behind our computer screens. Above all I am encouraged by how relevant the scope and work of the Livery is to our modern world with the diversity of what is 'scientific instrumentation' today: seen in sensors, big data and the associated software

and hardware, the entrepreneurship of many of our members in exploiting these for the benefit of the UK and the diversity of work that we see being done, especially by our young people working in this exciting and highly topical field. The world of work will be difficult for young and old as our economy takes time to recover but I am confident that those skilled in a craft such as ours will find many key, leadership roles.

Let me close by thanking everyone for their support for the Livery in the last, uncertain year. Lesley and I have not had the year that we had expected but it has been enjoyable, albeit 'different' and certainly largely unexpected. It has been our pleasure to serve the Livery during this year and an honour to be your Master and Master's Consort. We look forward to continuing to play our part in a number of different ways and to the day coming when we can safely meet up at the Livery Hall and enjoy the fellowship and friendship that marks out the Worshipful Company of Scientific Instrument Makers as a Livery of which we can be proud.

Kenneth & Lesley Grattan
Master 2019-20

From Left:

The Beadle

The Master and his Consort

The Master and Wardens

Responding to the Challenge – The Company

This last year has been a creative challenge for the Company and Clerk's Office. We had to adapt very quickly to new ways of working with all our members who are aged 17 to 100. The Clerk and Assistant, who already shared documents electronically, relocated what they needed to their homes. They quickly discovered that many of the Companies activities and expenditures remained the same despite COVID. Meetings and events still had to happen; liaison with the City and compliance bodies had to be maintained; membership needed to be recorded and cared for; bill's and charitable payments made. The challenge was how to do this quickly and cost-effectively. Furlough was not an option.

The first big change was to move all our business meetings to Zoom. We looked at a range of platforms but Zoom proved most flexible and cost-effective. It seems our assessment was the correct one given it's widespread adoption. Committee meetings and court meetings took on a different view with members framed on a computer screen surrounded by their domestic paraphernalia from lovely paintings to a collection of whiskies. However, this did not prevent Company business being conducted in a proper and timely manner.

A positive outcome from this new way of working was re-engagement with some Court members who had previously found it difficult to travel into central London to attend meetings. Looking forward, it is highly likely that some element of online activity will remain - even once life returns to normal - to allow more people living at a distance to take part in meetings with a more 'blended approach'.

ZOOM came to the fore again with potential new members. The Recruitment Warden worked with the Clerk's Office to arrange virtual Open Evenings to give potential members an opportunity to meet with the Wardens and the Master. The number of people

on screen were kept to a manageable minimum so that everyone had a chance to speak. This provided the Master and Wardens with an opportunity to really get to know potential members and equally an opportunity for potential members to understand SIM better, all from the comfort of their own homes.

Not content with arranging open evenings, the next step was to conduct Freeman and Apprentice Admission Ceremonies, all online. Again, considerable thought was given to these processes to ensure those involved felt valued as new members of the Company. A social event to welcome the new admittees and introduce them to the Court is planned for the Spring of 2021.

The Clerk's Office initiated a regular bulletin sent via mailchimp (and post to eight members) to share what members were up to and provide contact with the Company, the wider Livery and City of London. We know that over 50% of the membership regularly open the Bulletins so it has proved a useful way to reach the wider membership. Contributions to bulletin and web site continue to be welcome.

The Four Liveries Lecture, was delivered by the Clerk's Office via Zoom Webinar (rather than meetings) to WCSIM, the Clockmakers, Spectaclemakers and Lightmongers. Use of the webinar facility meant the speakers were the focus and numbers were not limited in any way. Over 100 people attended the event. Plans for more webinars are being developed as this goes to print.

All the while the Honorary Almoner, Diane Howse, worked tirelessly to stay in touch with the sick and the elderly. Her reassuring phone calls and reports to the Court and Committees have helped us to keep in touch with members in true Livery fashion. If you are struggling please contact Diane through the Clerk's Office.

Of course, the biggest loss for members has been the lack of dinners and other events where they can eat, drink, meet old friends and make new ones. We appreciate that electronic means cannot replace this, but we ask that you stay in touch and support us in the new year when we can start to operate again.

There is no doubt that these changes in operation will continue to develop as the situation evolves, but it is clear that everyone is looking forward to once again attending face to face social events. So, we would like to reassure you that the Hall management has done everything it can to comply with COVID guidelines from social distancing, one way system, temperature testing and designated event areas.

Responding to the Challenge – Our Members

Just as SIM has adapted methods of working due to the Covid pandemic, so many of our members have responded to the situation by adapting methods of working, diversifying, researching statistics to advise policy makers and producing numerous articles for the government and media. Here are a few examples of how members have responded during the pandemic.

Carl Stephen Patrick Hunter

The beginning of 2020 proved a very turbulent time, posing many obstacles for us, as it may have done for many of you too.

In our case COVID19 forced us to re-design the company strategy in order to overcome these and accelerate rather than hibernate.

One of the things I am proud of as Chairman , is that on 11 March 2020, I circulated a note to the company to guarantee their salaries. We have been blessed not to furlough anyone since.

On that day we lost our global oil and gas sector overnight because of the oil price drop and there was a dramatic decline in global trade given COVID19 which meant we lost 50% of our global shipping primary market sector too. Tankers were fine sailing with that cheap oil, but dry vessels suffered from the Asian COVID as that region needed less commodities. Since Asia comprises 40% of our trade overall, we had to identify a way forward that enabled us to grow in the midst of economic decline. We decided there and then that our exposure to our "primary" markets in marine and offshore had to change, and that somehow we had to become a "multi-sectoral" company across 25 market sectors globally, and develop a new and broader technology to add to our specialised ones. The new company strategy was developed in March 2020 based on "Resilience – Diversification – Growth". We are implementing a new Global Distribution Network across our Top 30 Country Markets, establishing a wide-reaching network of exclusive distributors, covering all 25 market sectors across countries worldwide. Set alongside the ability to be "Better-Faster-Cheaper" than competitors globally. For 20 years we have always been 1-2 of these. Today we are all 3.

To do that we had to find a way to "break out" from our specialised fields and add a new "3rd core technology" which would have a place in industrial l market sectors alongside our specialised ones. To achieve this we reconfigured the R&D Plan, slimming it down to accelerate to production new systems and instruments that we could focus on. I am very proud that we were able to successfully launch our latest instrument that created our "3rd core technology", launching it in July 2020, having accelerated it by 9 months. We created new Heads of Departments and since September have employed 3 new personnel.. The aim of the plan is for us to become the global leader in key specialised fields.

We achieve this by mastering what I describe as the "Science - R&D – Innovation – Manufacturing – Certification - Commercialisation loop", which occurred in England in 1760 in the First Industrial Revolution, when science was applied to manufacturing and when domestic demand was created alongside global demand, and which we are doing in our company today. In production we increased the rate of production so that we could supply quickly on demand and watched suppliers of mine who I have known for nearly 30 years continue and often grow without furlough, whilst some 2nd or 3rd tier suppliers, who did go into furlough, face issues.

In June 2020 we won a British Government COVID19 technology award. We have other new instruments and systems presently in R&D, which we will be launching over the coming months.

The remarkable energy, dynamism and application of the team since 11 March 2020 has been extraordinary, and I am proud how my company unified and is over-coming national and global economic obstacles.

Carl Stephen Patrick Hunter OBE BA Hon DSc (Dunelm) FRINA FIMarEST AFNI MRAeS
Chairman Coltraco Ultrasonics Limited

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Ben Fernando

During the Covid-19 crisis, Ben Fernando, a PhD student at the University of Oxford and Liveryman of the Company, has been co-ordinating the efforts of over 150 volunteers to summarise the latest research for the Shadow Cabinet and Leader of the Opposition's Office on the COVID. The briefings are circulated to over 250 MPs, Peers, local government officials and media personnel.

'Basically, we summarised the content of all published medical papers on COVID and synthesised pertinent policy questions," Benjamin explained. Those briefings were received by around 250 MPs and Peers, as well as local councillors, MSPs and COVID researchers.

The post-grad student also sat on the Faculty Board for Oxford's Science and Engineering departments, helping to draw up the policies to reduce the impact of the pandemic on students, including organising online social events for isolated/vulnerable students and lobbying for extra funding for students in need.'

Ben is also member of the URNU - University Royal Navy Unit.

Liveryman Philip Thomas

Liveryman Philip Thomas is Professor of Risk Management at Bristol University. Throughout the Covid Pandemic he has regularly written articles and papers which have been widely reported in the media. These papers include:

> Thomas, P., 2020, "J-value assessment of how best to combat COVID-19", Nanotechnology Perceptions, Vol.16, pp. 16–40, available at: http://www.colbas.org/ntp/opnAxs/N02TH20A.pdf

> Thomas, P., 2020, "The length and severity of the coronavirus recession estimated from the dynamics of relaxing lockdown", Nanotechnology Perceptions, IN PRESS

> Thomas, P., 2020, "The options for the UK leaving the coronavirus lockdown of 2020", Nanotechnology Perceptions, IN PRESS

In July, Philip provided written evidence to the UK Treasury Committee assessing the economic impact of coronavirus and in August the Mail online published an article exploring how a further lockdown and subsequent recession could be more damaging that the Covid virus itself.

> https://www.dailymail.co.uk/debate/article-8677207/Driving-economy-recession-killing-people-Covid-could.html

Philip's work has been reported widely in the national and international press, and he has been interviewed frequently on TV and radio.

He was the first to warn that the health effects of a severe and long-lasting economic recession could be worse than the disease.

Stephen O'Connor

I am entering the second and final year as President of the Institute of Physics and Engineering in Medicine, IPEM. The Covid-19 pandemic has certainly changed the way that I anticipated leading the Institute.

I was extremely fortunate to have a tremendous CEO start in January 2020, who had no idea that he would be closing down the national office in March, ahead of the lockdown, and planning how the staff could work effectively from home.

All meetings on the business of the Institute, and travel on its behalf, were suspended in March and plans made to carry on virtually, wherever possible. The new magnetic resonance safety expert course and exam were the first to fall. This is a new initiative from IPEM to ensure that safety in MRI areas is controlled by experts in the field.

Governance of the Institute had to continue despite Covid-19. Our quarterly meetings of the Trustees' Board have continued virtually, as have the finance and business planning meetings. Charity Commission rules have allowed annual general meetings to be held virtually over the pandemic and up year end. We therefore held the AGM at the start of our virtual medical physics and engineering congress, MPEC. We took the opportunity to change the articles of association to allow for AGMs to be held virtually should we need to do so in the future when the relaxation from the Charity Commissioners ceases.

Our MPEC was held over 2 weeks with sessions held at various times during the day. The opening talk was inspiring, given by Professor Jim Al-Khalili, British theoretical physicist, author and broadcaster, on science communication. The closing talk, highly amusing, was given by Dr Philip Hammond, Physician, Comedian and broadcaster. In between these presentations, the whole gambit of medical physics and engineering was covered including heroic work during Covid-19. Attendance was very encouraging.

I write an article for IPEM's monthly newsletter to keep members abreast of the topics of interest. One important topic for our members is mental health over the pandemic period. IPEM directed members to the NHS website, mental health charity websites as well as initiatives from the office of the Chief Scientific Officer and the Academy of Healthcare Scientists. We asked members to consider their own mental health as well as to keep an eye out for that of their colleagues.

IPEM succeeded in changing government policy over the summer. We wrote to the Home Secretary in January asking for medical physicists and clinical / biomedical engineers to be included in the NHS rapid access visa scheme, shortage occupations. The letter arrived on the Home Secretary's desk the morning after the knife attack in Streatham. A follow up letter was sent by way of a reminder in May and the response was to include medical physicists, but not the engineers. We continue to hard to make the same provision available for clinical / biomedical engineers.

I have attended the Devices Expert Advisory Committee of MHRA virtually over the pandemic period and business has been as usual. An interesting development, however, is that this committee will now start to make their minutes public for greater transparency.

Focus on the Future

WCSIM actively supports a variety of charitable organisations to promote education and training in the fields of science and technology. These include making donations to schools to enhance the science curriculum. In addition the Charitable Trust also awards a number of scholarships and prizes to students in partner Universities to recognise those advancing the design and construction of scientific instruments.

We have focused on two of our Scholars, Alexander Mason and Jamie Marland, exploring in a little more detail the projects and research they have been developing.

Alexander Mason, Ph.D.

I passed my PhD exams at the end of August, with a thesis on the experimental characterisation of turbocharger turbine exit flow deviation, which is useful for the improvement of 1D engine transient models. My programme featured a close industrial partnership with Caterpillar Inc., who had a desire to improve their knowledge database concerning the physical phenomena governing transient engine response. Transient response is a Critical Customer Requirement for the machines Caterpillar design, as it contributes to driveability as well as accounting for a significant portion of CO2 emissions during a drive cycle.

Fundamental to my research was the use of the Hot Film Anemometry technique to measure rapidly changing velocities and flow angles close behind the rotor blades of the Turbocharger turbine. Exploiting the state-of-the-art Transient Air System Rig at Imperial College, I measured velocity fields under a range of conditions, including pulsating-transient cycles similar to those seen on a real engine. Under these conditions, pressure and temperature are also variable, and a key element in the success of my research was the development of a suite of

algorithms capable of converting instantaneous hot film probe response data into velocity fields. This information is useful to engineers, who frequently have to extrapolate Turbocharger maps well beyond the data provided by the manufacturer - often with considerable uncertainty. My measurements also provide a reference for those seeking to improve the integrity of turbine models and to accommodate the flow physics responsible for turbine torque generation more accurately.

I am currently working on two journal papers documenting the experimental methodology using film probes, and the novel transient exit flow deviation data measured during the programme. Having served as a research assistant in the group for two months, I am now seeking opportunities in technical consulting in the field of renewable energy. In the longer term, I hope to use the invaluable skills and experience gained during my Ph.D to work on energy access and sustainability projects in East Africa. This befits one of my lifetime goals, which is to use scientific exploration and investigation for the empowerment of disadvantaged communities and the improvement of livelihoods.

I was thrilled to receive the WCSIM's annual postgraduate scholarship and become a scholarly member of the Company. As an experimentalist, and with a keen interest in communicating science to the public, I am very excited about the opportunities on offer, as well as to meet other like-minded researchers with a passion for instrumentation. My passion has led me to engage in several charitable opportunities including rainwater harvesting projects in Tanzania, East Africa, voluntary mathematics tutoring for under-privileged and talented GCSE candidates, and extra-curricular workshops in schools, during my internship with Lockheed Martin. I'm keen to continue this activity alongside my research.

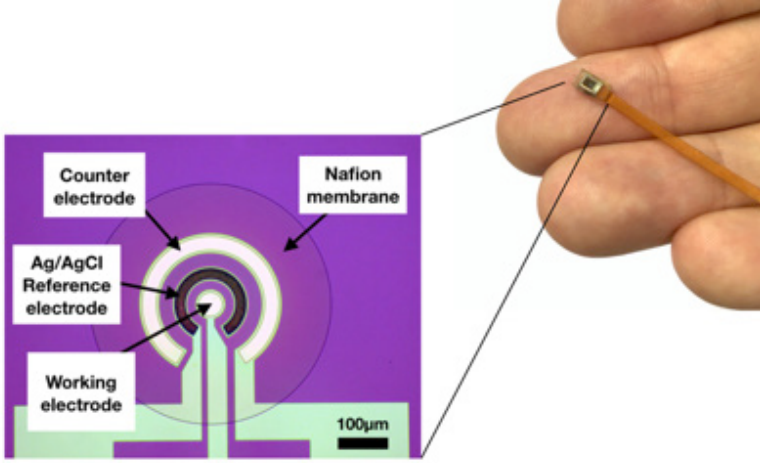
WCSIM Beloe Fellow 2018 – Jamie Marland

I am an academic researcher with a strong interest in using electronic microsystems to solve important medical problems. My PhD (from University of Cambridge) and early postdoctoral research (at University of Edinburgh) was in clinical neuroscience, with a focus on synapse biology. A growing desire to pursue interdisciplinary research, and to focus on topics that have direct and immediate impact, then motivated me to develop expertise in engineering. In 2016 I obtained an MSc in Sensor & Imaging Systems (from University of Glasgow) which provided a solid grounding in electronics and sensor systems. I then joined the University of Edinburgh as a post-doc in the School of Engineering, working on a programme called IMPACT: Implantable Microsystems for Personalised Anti-Cancer Therapy. I was recently appointed as a lecturer at the University of Edinburgh, starting in December 2020.

My research within the IMPACT programme focussed on developing sensor technology to improve radiotherapy. Our aim was to locate treatment-resistant (low oxygen) areas within a tumour, so that they can be targeted with a higher dose. Using the unique capabilities of the Scottish Microelectronics Centre at the University of Edinburgh, I designed and fabricated a miniature implantable oxygen sensor using silicon microfabrication techniques, developed a novel polymer processing method to manufacture protective sensor membranes, and designed miniature test structures to optimise wafer-level fabrication of the sensor reference electrode. In collaboration with veterinary and medical colleagues from Edinburgh and UCL, I also tested sensor performance in vivo using multiple animal models. The result is the world's first fully integrated CMOS-compatible oxygen sensor, fabricated at wafer level, that has also been validated in an implantable application. In recognition of this work I was awarded the WCSIM Beloe Fellowship prize in 2018.

The Beloe Fellowship has helped my professional development by providing support to develop a major funding application in a new area of academic research: bioelectronics. In the coming decades, this area will play an increasingly important role in the development of biomedical sensing and measurement equipment. Combining my expertise in both electronic engineering and biology will position me a niche that has great future potential.

Using the funding from this WCSIM award, I attended the Synthetic Biology UK conference in December 2019. There I made a significant number of new contacts with potential future research collaborators across the UK, and was exposed to the latest research in the field. Crucially, the award then also enabled me to spend a dedicated month outside my normal work, developing an independent academic fellowship proposal. This took place during April 2020. Full salary funding during this month was derived from the Beloe Fellowship and delivered through the University of Edinburgh. The proposal I developed is for the UK Research and Innovation Future Leaders Fellowship (UKRI FLF) scheme, a major national award that provides independent funding for up to 7 years. My focus will be on designing a novel bioelectronic interface for medical diagnostics. It will involve development of biosensors using the tools of synthetic biology, and then engineering an electronic readout chip that is microfabricated on silicon wafers. The target analytes are ribonucleic



acids – short strands of genetic information that are indicative of physiological status and infectious diseases. This platform technology would have a wide range of applications across medicine.

The WCSIM Beloe Fellowship has been essential. Without it I would not have had the time or resources necessary to develop the UKRI FLF application. This prestigious award from WCSIM has marked a high point in my career to date, and I am very grateful to the Company for all the opportunities it has provided.

WCSIM SUPPORT FOR SCHOOLS AND INDIVIDUAL PUPILS

WCSIM supports science education and the development of scientific interest in young people in numerous ways both as an individual Livery Company and as part of a London Livery wide initiative known as Livery Schools Link (LSL). In this Annual Report a spotlight is turned onto the youngest children WCSIM support through a charitable donation of £1,000 per year awarded to the Charles Dickens Primary School, Southwark. Staff at this school also attended a STEM awayday to demonstrate ways of delivering the science curriculum organised by Primary Engineer, which itself is also supported by the WCSIM charity. However, before embarking on how our donation enriches learning it is salient to probe the depth and breadth of support we provide for schoolchildren of all ages and ability.

At Secondary School and Sixth Form levels (ages 11 to 18) WCSIM supports the London Nautical School through a direct annual donation of £1,000; has a stand at the LSL Careers Fair organised for children aged 12 to 14, hopefully to channel scientific interest into appropriate choice of GCSE's to allow progress to careers in science and engineering; and provides direct support for two science-based prizes at the City of London Academy Southwark (£250 each). In addition to school-based support, WCSIM provides funding to the Eng(UK) 'Young Engineer of the Year' award at the Big Bang Fair and provides an opportunity for two student finalists in that competition to participate in an international event held in the USA – all through an annual donation of £14,000; and the Livery provided seed support to the organisers of the British Physics and Astronomy Olympiad – a further example of where prize winners go on to the international stage to compete for individual and team medals. It is not surprising that some of the students involved in these competitions are offered WCSIM Apprenticeships that provide individual mentorship from a Liveryman together with a small bursary to support their continued learning. WCSIM also support four Arkwright Scholars each year (a scheme run by the Smallpeice Trust), each scholar is provided with an Apprenticeship as they move towards their post-18 options.

Returning to the Charles Dickens Primary School, the impact of WCSIM funding can be gauged in numerous ways. New fruit trees and shrubs were planted thereby creating an interesting and varied 'Forest School' site – bearing in mind that the school is located in a densely populated part of London with little access to green space. This has allowed 124 children across the early years to have weekly group sessions developing language and knowledge related to the natural world. The Forest School also provides a safe space in which to make small fires to teach the children about fire safety and al fresco cooking, which many children have never experienced. These activities also allows them to relate better to stories about camping and adventure and gives them the opportunity to hook new information and vocabulary onto the experiences and words they encounter.

Other activities include: den building (which involves knot tying and developing spatial awareness which in turn helps children with mathematical directional concepts.), plant and tree identification (building natural intelligence), transient art (developing awareness of symmetry and pattern), collaborative games (becoming more aware of others and developing empathy) and clay work (allowing sensory deprived children to overcome their fears of getting dirty thereby allowing them to experience all activities on offer in science and design and technology). WCSIM has part-funded the building of a larger greenhouse that can accommodate a group of children for the teaching of seed germination and their eventual transplantation and thus indicate how food is grown for the table. In the Charles Dickens Primary School there is a resounding interest in growing plants, especially those that provide food. Each year pupil 'eco-councillors' report back that children in their class would like the opportunity to plant more produce. The funding this year has enabled that and as a consequence keen gardeners and eco-councillors have also had a great space in which to have meetings and carry out seasonal gardening tasks. Children with additional education needs are especially attracted to the garden, finding the space soothing and calming. This space has allowed them to develop the skills of turn taking, collaboration and empathy more readily than in their class environment.

One measure of response to risks in the environment is how the school coped with lockdown in recent months. It is here, perhaps, that the outstanding ethos of the school is truly demonstrated. During this time each child was provided with a device to access the 'Charles Dickens Virtual School' allowing teaching and learning to continue unabated. A weekly science lesson was included in this home learning experience where all pupils spent half a term learning about plants. A major supermarket donated seedling kits allowing each family to grow their own plant at home. The children sent in photos and videos of this activity as well as their completed learning worksheets. Some classes enhanced this baseline activity by growing plants from avocado stones as can be viewed in the accompanying photograph.?

Should you wish to find out more about this inspirational school and how it integrates itself into the community I encourage you to investigate its website where you will find details of the science curriculum from pre-school children to 10 year olds. The science curriculum can be accessed via a drop-down box from 'Academic Excellence' and is a shining example of the values that the school beholds: academic excellence, creativity, and social intelligence. I think you will agree that our funding is both well received and well used.

Website: charlesdickens@southwark.sch.uk

Ron Summers
Past Master
EdCom School Liaison and LSL lead

With thanks to Nicola Jacobs, Year 6 lead, for help with compilation of this report.

Information about the science curriculum in action photographs

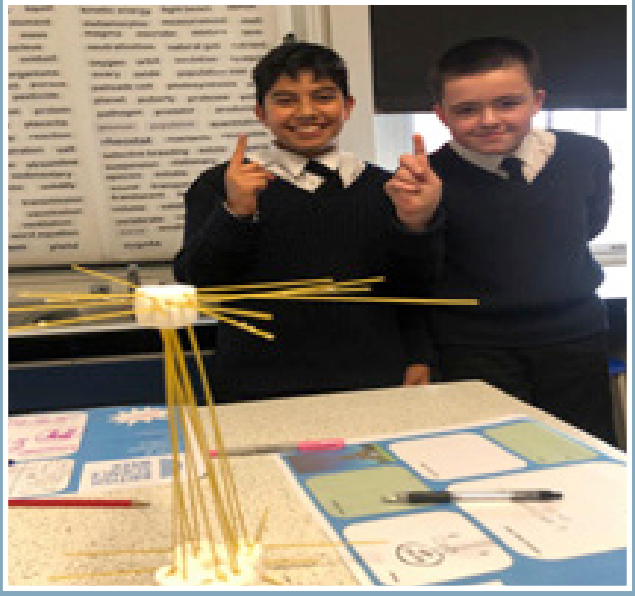
Our curriculum includes a wide range of opportunities for every child to experience experimental work in science, developing an ability to manipulate and operate complex and hazardous equipment and chemicals safely.

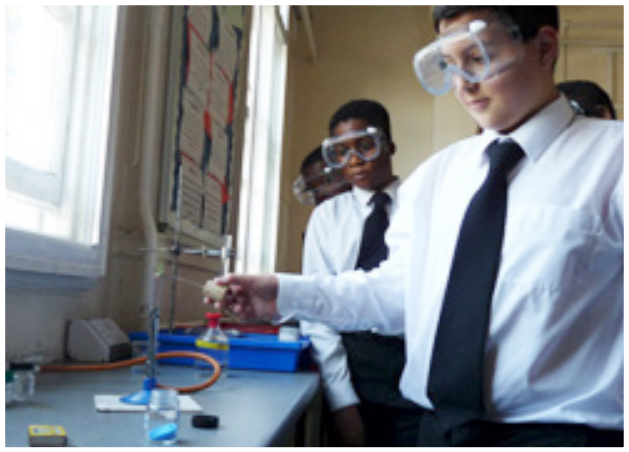
In Flame Tests 1 to 4 you can see Year 8 students exploring the chemical properties of different metals by performing flame tests. This is to confirm that atoms of different elements have different properties through an experiment that stimulates children's curiosity about the world. Also different tests are used to explore gases such as oxygen that relights a splint without the use of a match (oxygen gas test).

Acids and alkalis 1 and 2 photographs are exploring how colourful indicators can be used to show the pH of acids and alkalis to help explain the properties of the everyday chemicals around them.

We want to inspire, enthuse and provide students a passion about the natural world through demonstrations such the combustion of methane gas (Methane combustion demonstration photo) and viewing the smallest of living things under microscopes (Microscopes 1 to 3).

Every year to give the students the opportunity to put their problem -solving skills to the test with different engineering challenges during British Science Week. Here you can see students in Year 9 building marble roller coasters out of paper and Year 8 students showing off their winning spaghetti and marshmallow tower. These activities teach students about both engineering and team work.





Working Together...

The Company has a number of Wardens tasked with various aspects of engaging new and existing members within the Company. We thought it would be good to spotlight these individuals and highlight how they work together.

Introducing

Recruitment Warden – Jim Webster
Induction Warden – Stephen O'Connor
Apprentice Warden – Richard Payne
University Warden – Hugh McCann
Freeman Warden – Brian Stammers

Jim Webster
Recruitment Warden

Following a 40+ year career in technology and instrumentation businesses, I joined our Company in 2013, becoming a Liveryman in 2014 and an Assistant to the Court in 2016.

Having worked with a number of members to increase awareness of the work of the Livery, I was pleased to accept the invitation to assume the newly created role of Recruitment Warden in 2019. In this role my responsibility is to work with my colleagues on the Membership Development and Marketing and Promotion Committees and with all our membership to encourage the introduction of new members and to guide candidates through the application process once they have expressed an interest to join us.

My colleagues have excellent networks with academia, commerce and the professional bodies that are connected to the STEM world generally and to instrumentation in particular, all of which provide a rich pool of talent for us to attract.

Our lunches and dinners at the Hall are a great way to introduce people to our Company and many new application originate at them. In addition, our Open Evenings are an excellent way to engage with prospective new members and my principal task is to follow up with attendees with help and encouragement to join us. This involves following up their attendance via email or 'phone and answering any questions they may have about the application process and the support we can provide once they have joined us.

Since March, it has not been possible to hold these Open Evening events and so we have used the Zoom video facility to conduct virtual meetings called 'Meet Us'. I am pleased to report that whilst not as immediately convivial as face to face meetings, they have proved an effective wat to meet new candidates and to communicate our aims and objectives.

Stephen O'Connor
Induction Warden

In my role as induction warden, I am a member of the Membership Development Committee, MemDevCom. I am a court assistant responsible for welcoming new Liverymen into our Livery. I try to attend the freeman ceremonies of new Liverymen at The Guildhall, join them at our own clothing ceremonies, introduce them at our events to others members of the Livery, hopefully in their area

of interest, if I did my homework well. Prior to the March 2020 lockdown, I also attended the member recruitment evenings.

I have linked up with the Freeman Warden, Brian Stammers, via the North Bedfordshire branch of WCSIM, comprising Brian, Deputy Master Ken Sanders and myself. I have suggested various methods of running a successful mentoring programme for our Freeman. I work too with the recruitment warden to pull new recruits into 'working Liverymen'.

I work with the chair of MemDevCom, Martyn Wheatley. I have made suggestions to him for an 'ethnicity, diversity and inclusivity' policy for the Livery.

Richard Payne
Apprentice Warden

Background

1961-1967 Worked with the Public Analyst for Reading, whilst studying Chemistry part time.
1967-1973 Head of Analytical Section, Brooke Bond Liebig Research Centre.

!973-1979 Technical Manager, LKB Instruments Ltd (UK). 1979-1983 International Sales and Marketing Manager, LKB Produkter AB, Stockholm, Sweden.
1983-1985 Managing Director, LKB Instrument NV/SA, Antwerp, Belgium.

1985-1994 Director of Marketing Europe and Vice President, General Manager Waters Division of Millipore Corporation, Boston, USA, based in Paris.
1994-2006 President International Business Operations, Waters Corporation, Paris.

Joining the WCSIM

My wife is a Liveryman with the Worshipful Company of Educators. At a Livery dinner in 2018 I sat next to Margaret Leighfield who is a good friend of WCSIM Past Master John Caunt. John contacted me and invited me to a WCSIM admissions evening after which I was invited to join the WCSIM.

Apprentice Warden

The primary role of the Apprentice Warden is as a facilitator of communication between the Apprentice, the Apprentice Master and the Livery. The tradition of having Apprentices bound to a Livery Company goes back many hundreds of years and although the relationship between the Apprentice and the Livery has changed over time, the value of the link has not. Within the Livery we have a huge capability and experience and this can be of tremendous value to young people transitioning from school to University and beyond into a career. The key in the Wardens role is to try to ensure that there is good initial contact between Apprentice and Master, that a framework for on-going communication is established, that this is followed during the 4-5 years of the Apprentiship and that at the end of period the Apprentice is encouraged to become "free" and remain linked to the Livery.

Since I started in this role in 2019, I have been trying to stress the importance of the communication element, both to Apprentices and to their Masters. There have been cases where contact needed to be re-established or strengthened and unfortunately some cases where all contact has been lost. Currently we have 27 Apprentices bound to the Livery and we expect to admit 5 more (via a Zoom link) in September.

Goals

I want to try to establish and maintain, for all Apprentices, a minimum level of contact between the Apprentice and their Master, throughout the period of the Apprenticeship. The Apprenticeship concept should be regarded as a two-way process. The Livery can certainly provide support and advice in many forms to the Apprentice, but equally for the Master it can be a rewarding experience to see the evolution of the educational path of the Apprentice, all of whom come to us having already achieved very successful academic results. To this end I would like to see as many Liverymen as possible taking on the role of Apprentice Master.

Professor Hugh McCann
BSc, PhD, FREng, FRSE, FIET, CEng

University Warden

I am a Court Assistant at WCSIM, and I have the role of University Warden. With the help of the Clerk's office, I oversee the Company's awards to students and researchers at our affiliated universities. As well as reporting to the Court (via Education Committee) on the use of the Company's funds, I liaise with our staff contacts in the universities, with their nominees, and with the Postgraduate Scholarship and Beloe Fellowship holders. Key tasks in this portfolio are the interviewing of candidates, and subsequent liaison and project reporting. It is hugely inspiring to hear about the work of our Scholars and Fellows, and to work with them.

In my day job, I am Professor of Tomographic Imaging at The University of Edinburgh, where I was Head of the School of Engineering (2013-2018). Now an Electronic Engineer, I graduated in Physics and did a PhD in High-Energy Particle Physics at the University of Glasgow before doing six years of post-doctoral research in the same field. I used the particle accelerators at CERN (Geneva) and DESY (Hamburg) during that 10-year period. I then spent a further 10 years in R&D at the Royal Dutch/ Shell Group, mostly in developing advanced measurement methods for the study of explosion hazards and product performance in operating automotive engines.

I joined UMIST/ University of Manchester in 1996, as Professor of Industrial Tomography, and was Head of the Department of Electrical & Electronic Engineering there for three years, and oversaw all of the research in the Faculty of Engineering and Physical Sciences for a further three years. I taught measurement and instrumentation at all undergraduate and postgraduate levels.

My research in Agile Tomography is carried out with users in industry (e.g. Shell, Rolls-Royce, etc.) and in medical research, and I was appointed Honorary Professor at Beihang University, Beijing, in 2018.

Dr Brian Stammers
Freeman Warden

I have been a Liveryman since 1994 and have spent the majority of my working life engaged in the Life Sciences sector, running companies of various sizes and engaging heavily in international markets. A particular passion of mine is in helping to establish new and innovative companies, through mentoring and assisting in raising venture finance.

I am proud to have been appointed Freeman Warden of the Livery. With over 75 Freemen, the Livery is well enabled to secure its future, as many of these Freemen will take the next vital step in their Livery 'career' by becoming fully fledged Liverymen.

My task is to provide mentoring and assistance to our Freemen and help them to feel that they are a vital part of our membership and greatly valued. It is also to prepare them for that next step and act as a conduit and primary contact within the livery.

In normal times, it would be part of my role to organise informal meetings of Freemen. However, pro tem, Covid-19 has disrupted that activity: I hope we can resume normal service soon. In the meantime, I plan to engage with Freemen to provide input into the Quarterly Livery bulletins by establishing a 'Freeman Focus' section.

I welcome contact from Freemen whenever they feel it appropriate and am happy to assist them wherever possible.

Dr Brian Stammers, Freeman Warden, WCSIM

Membership of Court and Committees 2019-2020

Court of Assistants

Master	Prof K T V Grattan, OBE
Deputy Master	Mr K J Sanders
Senior Warden	Mr M E Wheatley
Junior Warden	Mr C J Holroyd
Senior Past Master	Dr N K Reay
Past Masters	Dr D Townsley-Hughes
	Captain G P Brocklebank, RN
	Mr H L Tee, CBE
	Mr B D Fishwick
	Mr K F Etherington
	Eur Ing D W Kent
	Prof T Wilson
	Mr C J Sawyer
	Mr J F Caunt
	Prof R Summers
Court Assistants	Mr A Dunford
	Prof P Thomas
	Mr J C Webster
	Mrs J E Fishwick
	Prof H McCann
	Prof S A P O'Connor
Stewards	Prof SH Khan
	- Master's Steward
	Mr I Gilbert
	- Senior Warden's Steward
	Ms L Hogarth
	- Junior Warden's Steward
	Mr J Simons (appt 12 Feb 2019)
Honorary Assistants	Mr D A Wallis*
	Mr W Lyons,*
	Sir Ivor Cohen, CBE, TD, Hon FREng*
	Prof R C Hills*
	Dr R W Hartley*
	Mr B J Lowings*
Clerk	Dr M Hebel
Clerk Emeritus	Mr N J Watson
Hon. Chaplain	Rev'd Prebendary W J H Crossley
Hon. Dir. of Music	Mr R F H Townend
Honorary Solicitor	Mr D R Seaton
Beadle	Mr A W Parker

**all Past Master Emeritus*

FINANCE AND GENERAL PURPOSES - EXECUTIVE COMMITTEE

Chairman (Master)	Prof K T V Grattan, OBE
Senior Warden	Mr M E Wheatley
Junior Warden	Mr C J Holroyd
Deputy Master	Mr K J Sanders
Honorary Treasurer	Mr B D Fishwick
	- Past Master
	Captain G P Brocklebank
	- Past Master
	Dr N K Reay, Senior Past Master
	Mr C J Sawyer, Past Master
	Mr J F Caunt, Past Master
Clerk	Dr M Hebel

CHARITABLE AND EDUCATIONAL TRUST

Chairman (Deputy Master)	Mr K J Sanders
Master	Prof K T V Grattan, OBE
Senior Warden	Mr M E Wheatley
Junior Warden	Mr C J Holroyd
	Mr B D Fishwick
	- Honorary Treasurer
	Captain G P Brocklebank
	- Past Master
	Mr C J Sawyer, Past Master
	Mr A Dunford, Assistant
	Mr D W Lazenby, CBE,
	- Liveryman
	Ms D Howse
	- Honorary Almoner
	Prof R Summers
	- Past Master
Secretary	Dr M Hebel

SIM HALL BOARD

Chairman	Mr C J Sawyer (also GHL)
	Mr K F Etherington (also GHL)
	Mr B D Fishwick,
	- Honorary Treasurer
	(alternate GHL)
	Mr K J Sanders
	Prof K T V Grattan
	Mr M E Wheatley
	Mr C J Holroyd
	Dr K Reay
Secretary	Dr M Hebel

EDUCATION SUB- COMMITTEE

Chairman (Junior Warden)	Mr C J Holroyd
	Prof H McCann
	Mr C Clifton
	Mr I Gilbert
	Mrs J E Fishwick, Court Assistant
	Prof S Hall
	Dr S Pollitt, Scholar/Freeman Warden
	Prof R Summers, LSL/schools Rep
	Prof P Vadgana
	Mr R Payne, Apprentice Warden
	Mr E Szemberg-O'Connor
	Mr H Muhamedsalih
Clerk	Dr M Hebel
	Prof K T V Grattan, Master ex officio

PROMOTION AND MARKETING SUB-COMMITTEE

Chairman	Mr A Dunford
	Mr C J A Holroyd
	Mr M Gucleur
	Ms L Hogarth
	Mr R Payne, Apprentice Warden
Clerk	Dr M Hebel
	Prof K T V Grattan, Master ex officio

MEMBERSHIP DEVELOPMENT AND ACTIVITY SUB-COMMITTEE

Chairman	Mr M E Wheatley,(Senior Warden)
Clerk	Dr M Hebel
Membership Development Panel	Mr C J A Holroyd, Junior Warden
	Mr J Webster, Membership Warden
	Dr S O'Connor, Induction Warden
	Mr P Meades
Technical and Social Activity Panel	Mr C J A Holroyd, Junior Warden
	Mr R Abreu
	Ms L Hogarth

GLAZIERS HALL BOARD

Mr C J Sawyer, alternate Mr B D Fishwick
Mr K F Etherington, alternate Mr B D Fishwick

SENIOR STEWARDS

Dr L B Davies
Mr R Murton
Ms D Howse (Almoner)

STEWARDS

Mr R Abreu
Mr C Clifton
Miss E C Cohen
Mr J F Comer
Mr D R Craven
Mr N W Gammon
Prof S Hall
Mr M N Hunter-Wyatt
Mr K P Lambert
Dr I J Lewis
Ms J A Migdal (Lady White)
Dr G S Philp
Dr S Pollitt
Mr M J Sharrocks
Dr D A Spencer
Mr B R Sowter
Mr S M Walton
Dr M D Windram

APPOINTMENTS

Apprentice Warden	Mr R Payne
Barge Master	Captain G P Brocklebank (Until June 2020)
Honorary Treasurer	Mr B D Fishwick
Honorary Almoner	Ms D Howse
Induction Warden	Dr S O'Connor
IILG Convenor	Prof R Summers
Livery Schools Link	Prof R Summers
Recruitment Warden	Mr J Webster
IT Warden	Mr A Peters (from 2008?)
Freemen Warden	Dr S Pollitt (to Jan 2020)-
Freeman Warden	Mr Brian Stammers (from Jan 2020)
Technical Liaison Group	Mr R Abreu
Web Master	Dr M Hebel
University Warden	Professor Hugh McCann

Committee Achievements

F&GP Report

The Finance and General Purposes Committee looks after a wide range of activities under the heading of 'general purposes' and works closely with the Treasurer on the financial aspects of the Livery, working closely with the Charity Committee.

It is chaired by the Master and meets four or five times per year with a wide agenda that, although has a number of 'standard' items, can vary greatly from meeting to meeting. It is the Committee that plays a major role in supporting the Clerk and Assistant Clerk in the everyday running of the Livery. From meeting to meeting, the Committee considers closely how, for example, we run our range of events, responding to comments and feedback received and how we can communicate in the best way with the membership. As well as receiving a range of reports from the other major Committees via their Chairs, who are all members of the F&GP Committee.

My aim has been to lead the Committee during my Master's year so that it can consider and help to introduce new initiatives to the Livery and its calendar. I am sure that the current Master will follow that through and keep this a lively and dynamic Committee – not one that just contents itself with receiving and noting reports – but responds in the best way. We have been meeting successfully by Zoom over the last six months or so and indeed have as a result had some of the most well attended meetings in recent years. Clearly that situation will continue for some time.

I would like to thank the membership of the Committee for their hard work and the key support provided for the life and work of the Livery, especially in this unusual and challenging year.

Charitable and Educational Trust Annual Report: 2019/2020

The WCSIM Educational Trust, created by Founders of the Livery, has a number of programmes focused on young people studying Science and Engineering, with a leaning towards Scientific Instruments. The Charity also supports the Corporation of the City of London and individual members with specific needs.

The Charity is supported by a fund managed by Adams and Company of £2.9m built up from donations and investment returns. In this pandemic year, with lower than usual investment returns, and an increased contribution to the Livery running costs, out goings have marginally exceeded income, but this is not expected to continue beyond a year or two.

The ongoing programmes include for graduate level students, our Apprentice scheme giving a small bursary to the student and a mentoring process. Each year we judge STEM projects at the Big Bang Fair, and appoint two Young Scientific Instrument Makers of the year, who win an all expenses paid trip to compete in the International Science and Engineering Fair in the USA. We continued with that in 2020 but, due to the Pandemic, projects were judged virtually via short videos. From this process, we appointed 5 new Apprentices.

At the post graduate level, working with a number of Universities, we offer grants of £1000 to students doing research in areas connected with scientific instruments. Alongside this, we have a competitive scheme, and the most prestigious award made by The Livery, The SIM Beloe Fellowship, which is an award to an outstanding post-doctoral researcher, making a considerable contribution to his/her field.

In addition to these programmes the Livery supports a number of local schools with financial support for STEM activities, and a number of military awards, through the Southwark Sea Cadets, and an Annual STEM day aimed at pre-GCSE students from a number of schools.

The fund supports a number of events in the Livery calendar specifically aimed at our younger members, including our Education Trust Supper, with free attendance for the younger members, and our annual SIMPosium, a day of lectures on a key topic, often by our members themselves. Topics recently have been Entrepreneurship, Biomedical and Measurement Systems.

This year we have taken the opportunity to commence a review and update of our Charity Governance Documentation and the Trustee line up, taken from the Livery membership.

Our spend, on these activities for this year was over £80k, and as a testimony to what it achieves in raising awareness of Scientific Instrument making and supporting and encouraging STEM students we can do no better than quote the following.

At the most recent Education Trust Supper, students were asked to tell us what membership of the livery meant to them. Two of the most motivating comments were:

From an Apprentice, Tsemaye Uwejamomore:

> 'A bridge between where I am today and where I want to be.'

From a Freeman, Peter Meades:

> 'WCSIM is the science network you never knew you needed.'

Ken Sanders - Deputy Master
Chairman of the Trust Committee

Education Trust event

Glaziers Hall

Glaziers Hall in keeping with most hospitality businesses has struggled over the last 8 months, we have not been able to operate as normal and hope improved normality returns soon for all of us. However that has not stopped Glaziers' Hall from working hard during lockdown to achieve a number of Awards.

Glaziers Hall takes great pride in maintaining the highest levels in everything we do and during these difficult times particularly in relation to health, hygiene and cleanliness. In light of Covid-19 we have taken several additional measures in relation to the environment we provide for our visitors, to ensure meetings may continue to take place at Glaziers Hall, a "SAFER EVENTS" venue.

What have we been up to while you have been away?

- We have been awarded with a **Gold Standard, Green Tourism award**, for all our work in relation to our sustainability as a business. We have also implemented a "green" conference package, for those of you who wish to make a positive impact on the environment.
- We have achieved our **"safer events" accreditation**; through our implemented procedures, cleaning practices and operational working habits. This has included a deep clean as well as "fogging" of our venue. We have also increased the number of sanitiser units we have throughout the building and introduced temperature checks at entrances as well as new routes throughout the building to ensure and maintain safe distancing.
- We have also achieved our **Visit England "We're good to go"** accolade, in recognition of the work we have carried out through our safer events policy.
- We also WON, **"Best Conference Event Venue 2020 – London"** for our continued dedication to staff training, customer service and our innovation in our products offered.

Clarity around what are you able to hold?

Within our industry a lot of words are used to describe a meeting; some call them conferences, some events and some simply meetings. For us at Glaziers Hall it is quite simple, we are allowed to host meetings for up to 30 people. The latest official government

announcement on Thursday 15th October 2020 stated:

> **"Business meetings and events of up to 30 people indoors are allowed in permitted venues if social distancing can be maintained and the venue can demonstrate it has followed the COVID-19 guidance. The rule of six does not apply to work, education and training activities." The 30 people includes our serving staff.**
>
> **"Exhibition and conference centres are permitted venues, if they have small, separate and directly accessible meeting facilities as part of the site, and the venue can demonstrate it has followed the COVID-19 secure guidance. If permitted venues have multiple, separate meeting facilities, these can be hired out simultaneously for separate meetings/events if social distancing can be maintained, groups can be kept separate, and the venue can demonstrate it has followed the COVID-19 guidance. Business meetings and events of over 30 people should not currently take place in any venue. Banqueting and private dining events should not currently take place in any venue".**

We have divided the hall into 3 self-contained floors, enabling us to host up to 90 people, who may be linked by way of our Hybrid technology, linking sound and vision to all floors in the building.
Some of our rooms have floor to ceiling 6ft square windows providing line of sight from one room to another, which may also be linked by sound.

Nicholas Bills - Managing Director

Education Trust Dinner

2020 Education Committee Annual Report

The Education Committee is responsible for managing the budget for the Company's key education programmes.

This past year has been one of the more memorable years that most of us have experienced. I dip into Daniel Defoe's book "A Journal of the Plague year", the account of one man's experience of the year 1665 in which the Great Plague struck the City of London. The slow response of the Authorities when the outbreak started, and the fears and concerns and behavior of individuals during the Plague, were remarkably similar to what we have seen this year. Ye panicke buying, ye olde refusal to self-isolate, little care about infecting others. Many became unemployed and destitute, and business owners feared losing everything. Londoners appreciated that the contagion was spread by breath and by touch. Those who became ill were forcibly locked down in their homes, with watchmen placed outside to ensure that they didn't leave. But the wretches in many cases did not want to stay locked down, and escaped and wandered about spreading the infection further. Of course, many knew that the principal sources of infection were those walking and trading who were unaware that they were carrying the plague. How little we have changed, albeit we are much lighter on enforcement these days.

Happily, over the intervening 350 years our trade has helped contribute to sophisticated medical instruments for diagnosis and treatment, and today the prospects of surviving the pandemic are much better than in 1665.

My thoughts at the beginning of the Livery year were of busy times at SIM Hall, chairing the Education Committee, contributing to Court meetings, to the Finance and General Purpose Committee, the Charity, and enjoying all those wonderful dinners and occasions that the Company puts on.

There were a number of events that took place before the initial lock-down was imposed. These included the City of London School Careers Fair attended by Liveryman Stephen O'Connor on the 26th November, and the Primary Engineers on the 26th February this year, this latter with the encouragement of Liveryman Jane Fishwick, where 11 schools were represented at the City University

venue. Of the three speakers at the Primary Engineers, one was Freeman Tom Forsey. Three other members of the Livery kindly supported the training day.

Happily we were able to hold the annual Education Trust Supper and networking event. A slightly different format was used this year with discussions in special interest groups allowing individuals to discuss areas of specific interest to them.

Alas many of the usual activities sponsored and managed by the Education Committee had to be cancelled. These included the Big Bang ISEF Fair, the STEM day in Hall, the SIMposium, the Livery Schools Link, planned events for the younger SIM members and more, all of which had volunteers who had kindly been prepared to set aside their time. Past Master Ron Summers was able to maintain SIM links with the three local schools that we support: London Nautical School, City of London Academy Southwark and the Charles Dickens School.

But the Show had to go on...

Education Committee meetings went Zoom. After a shaky start, we all got into the swing of it. Liveryman Simon Hall and Deputy Master Ron Saunders judged presentational videos from the Big Bang ISEF. Interviews were conducted digitally. Apprentice ceremonies and potential Liverymen events went virtual. And glasses of wine began to appear at the end of meetings, as we all got used to the new medium and the events became more relaxed.

We have been thrilled to welcome a number of new apprentices this year. The Apprentice Warden Richard Payne has been diligent in ensuring that all the new apprentices have excellent Apprentice Masters. We now have 35 Apprentices and 51 Scholars, with a further 16 Apprentices who have served their time and are eligible to be Free.

My thanks and appreciation go to all on the Education Committee, to the Clerk and Assistant Clerk for their hard work behind the scene to make events happen, and to the Master, Senior Warden and Court for contributing to and permitting the digital ceremonies of the new Apprentices and Freemen.

Charles Holroyd - Junior Warden

Membership Development Committee

The Membership Development Committee or MemDevCom has evolved considerably over the last twelve months into an effective and pro-active operation.

The consolidation of the Warden structure is now complete with clear roles defined and some redefined to ensure continuous member support from Apprentice through to full Membership.

Our Apprentice Warden, Richard Payne, has created new clearly structured guidance for all Apprentice Masters and their Apprentices. This will improve the support that each Apprentice receives from the Company and ensures consistency across this vital activity. Despite our COVID situation, Richard, with the support of The Clerk, has organised two virtual Apprentice Recruitment Ceremonies, which resulted in five new outstanding Apprentices including our Big Bang Fair winners.

Linking directly to this activity is the new Freeman + Mentoring Warden, Brian Stammers. Brian and Richard now work carefully together to encourage all Apprentices and Scholars to become Freemen. This new role also includes providing assistance to all Freemen as their careers develop plus guidance and the introduction to mentors within the Livery where it is requested.

Supporting these two activities and sustaining close SIM links with important universities is Hugh McCann, our University Warden. These vital networks help not only our young members with opportunities but also the Company by retaining academic contact with the latest scientific programmes and developments. A further benefit is the opportunity to meet and recruit suitable qualified Livery Members.

It has been recognised that, the early engagement and encouragement of newcomers, with SIM's events and activities, is important for their continued involvement plus the long-term retention of members. Our Induction Warden, Stephen O'Connor now works with each new member in turn to receive them into our Company and ensure that they benefit from joining.

Programming open evenings to welcome potential new members, interested in joining SIM, is vital for

the growth of our membership and future prosperity. Jim Webster has been very active this year as our Recruitment Warden creating four 'Meet Us' events, two of which were on-line. The Zoom format worked well and a number of new members have now applied to join.

To improve our communication and interaction, especially with our younger members, the MemDevCom has recruited the new role of Networking Warden. Roger Goldsborough has taken on this new position to improve the visibility of the Livery's wide activities to our young, as well as the rest of our members. Roger will work on increasing Face to Face events as well as setting up Special Interest Groups (SIGs).

The committee's Technical Wardens, Raul Abreu and Peter Meades, created a programme of interesting events for all of our members this year. Sadly however, most of these have had to be curtailed for now. One though, the recreation of Wren and Hooke's programme of scientific experiments which were carried out inside The Monument, is one that we can all look forward to, at the original location, once life returns to normal.

So, a very busy and constructive year for all the MemDevCom members, including myself, Martyn Wheatley. I will shortly be handing the committee on to a safe pair of hands in Charles Holroyd, the Senior Warden, who will continue to improve the SIM membership experience with this key team.

Martyn Wheatley - Senior Warden

Congratulations

Liveryman Jessica Leigh Jones awarded MBE

Liveryman Jessica Leigh Jones awarded MBE in Queen's Birthday Honour List

We are delighted that Jessica has been awarded and MBE in the Birthday Honours announced earlier this month. She received her honour for services to Women in Engineering. Below is a little of what Jessica has been up to:

'I've been awarded the MBE for services to Women in Engineering in Wales. Since 2010 I have been working with Welsh Government and various social enterprises including Chwarae Teg and Full Circle CIC to promote engineering to young women.

In the last three years, I've taken my speaking services international, visiting Portugal, Bulgaria, Russia and Japan, and working with high profile clients including Forbes, HSBC, Barclays, CBI and UK Government.

More recently, I have been operating at Board level, as a Non-Executive Director of the Institute for Apprenticeships and Technical Education, WJEC CBAC and the Engineering Education Scheme Wales. I have been evolving my work to focus on organisational culture to fix the "leaky pipeline" of women entering and progressing in STEM employment.'

Many Congratulations to Jessica from everyone in the Company.

New Members

The following individuals Joined the Company in the last year.

Liveryman

Simon Nicholas BLAND
David John CLARK
Matthew John GANTLEY
Elizabeth Ann Howlett HALL
Derek Morris HODD
John Robert SAFFELL
Lars Ingwald WALLDEN

Freeman

Alison ACKROYD
Raveena R K BHONDI
Lewis Christopher BRAND
Kelvin Tsz CHOI
Nick CHRUMKA
Jamie FARRINGTON
Will FAWCETT
Thomas Edward FORSEY
Jordan Peter GRIFFITH
James PATTERSON
Justin RANDLE
Isabel REES
Daniel James SAUL
Reece William TAYLOR
Philo WADDELL
Henry WARNE

Apprentices

Chelsea CONCEPRIO
James Stuart Jun Chen GOH
Seren Ann HOPKINS
William Jack SHORROCKS
Andrey Evgeniev GIZDOV
Tim PRIOR
Ukender Kumar VADIVEL
Ryan VINCENT
Diana VIRGOVICOVA
Charlotte Elizabeth WEIR

Scholars

Beloe Fellow
Matthias Fabian, City University London

SIM Scholars

Rahul Kumar, City University London
Alexander Mason, Imperial College
Ruslan Murshudov, University of Manchester
Mairi Dorward, University of Edinburgh

SIM Cohen Award Scholars

Miodrag Vidakovic, City University London
Alaric Taylor, UCL

In Memorium

With great regret we record the deaths of the following members:

Liveryman Sir David G John KCMG	- 27 October 2019
Liveryman Terence E Lake	- 4 November 2019
Liveryman George B Marson	- 8 January 2020
Liveryman Jeoff Samson	- 9 January 2020
Liveryman N P Smith	- June 2020
Past Master Captain Guy Brocklebank RN (rtd)	- 29 June 2020
Liveryman Richard Trim	- 29 September 2020

In Memorium

Past Master Captain G P Brocklebank RN
1954 - 2020

Guy Philip Brocklebank was born on 24 August 1954 in Worcestershire. He was related to the Brocklebank shipping family. After education locally at Elmfield School and then at Millfield School in Somerset, he joined the Royal Naval College Dartmouth in 1973. He graduated from City University in 1979 with BSc (Hons) in Systems & Management.

Sea time as a Midshipman was spent in HMS Londonderry in the Far East and he served under the Prince of Wales on HMS Bronington. After graduating he qualified as an Officer of the Watch and joined HMS Rhyl. He then served as a signals officer on board the destroyer HMS Glasgow and was Senior Watch Officer (C) on HMS Beaver as she circumnavigated the world in 1985-86. He held key communications roles to the Flag Officer Sea Training and on the staff of the Chief Naval Signal Officer during the 1st Gulf War. On promotion to the rank of Commander in 1989, he served in Gibraltar and in 1999-2000 he was Commander of the nuclear submarine base at Faslane. Guy was on exchange to the United States Navy at the Pentagon during the attack of September 11, 2001 and subsequent military operations in the Middle East, for which he was awarded a United States Navy Meritorious Service Medal. In October 2003 he returned to the staff of Commander-in-Chief Fleet in the post of Deputy Assistant Chief of Staff as an Acting Captain. Following promotion to Captain in 2005 he moved to the Ministry of Defence. Guy left the Royal Navy in 2009.

Guy became Free of the Livery in 1979 and a Liveryman in 1981. The Royal Navy was sympathetic of Guy's extensive involvement in the Livery. Guy joined the Court in 2001? He was very supportive of the charitable aims of the livery and in particular the Southwark Sea Cadets, the Royal Nautical School and the Richmond Sea Scouts. Guy championed the Livery adopting first one and then later two Thames cutters. These were based in Richmond and have become an important part of the Livery programme. He was actively involved in the Thames Traditional Rowing Association and the London Youth Rowing association.

Guy was Master in 2006-7 during which time he presented the livery with a magnificent silver statuette of Admiral Lord Nelson. For many years he served on the F&GP and the Charity Trustees committee. Guy was an enthusiastic member of the 007's, which was the Past Masters Association formed in his year as Master.

Another area of interest was the Wellington Trust where Guy was Chairman and very involved in the future of HQS Wellington. He was also a Trustee of the Southwark Charities and was chair of their property committee. He had also been a trustee of two charities supporting special educational needs.

His hobbies and interests include reading, walking, rowing and sailing. He was a Fellow of the Royal Society of Arts, Manufacturers and Commerce, a Member of the Chartered Institute of Management, the Communication Managers Association, the Royal United Services Institute, the Seven Seas Club, the United Wards Club, the City Livery Club and The Signals Officers Association.

Guy took a great interest in his extended family and enjoyed a long-standing friendship with Annie Robertson, whom he met whilst they served in the Royal Navy. Guy and Annie were both important members of the Livery family and Annie has accepted an invitation to become an Honorary Freeman so that we can continue to enjoy her company.

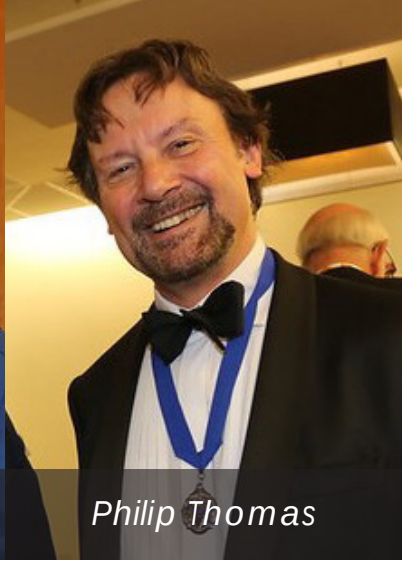
Guy was an enthusiastic member of our Livery and he will be much missed for his knowledge and wisdom and for his bonhomie.

Past Master Captain Guy Brocklebank RN born August 24 1954, died June 29 2020.

Our Senior and Junior Wardens Elect

A brief introduction

Charles Holroyd



Philip Thomas

Charles Holroyd
Senior Warden Elect

Charles became a Scientific Instrument Maker in 1990, following in his father John's footsteps who joined the Livery in 1964. Charles was Steward to Trevor Dixon.

Charles has a BSc in Electrical and Electronic Engineering from the University of Bristol and an MBA from INSEAD. He is a Chartered Engineer and a Fellow of the Institution of Engineering and Technology.

Charles has held senior management positions within a number of publicly quoted companies. He has lived and worked in a number of countries including France, Pakistan, Brazil, Uruguay and Singapore. Most recently Charles worked at Oxford Instruments plc, which he joined in 1999 and where he served on the Board and was responsible for group business development including M&A activities. He retired from Oxford Instruments in 2018.

Charles is currently Chairman of IBEX Innovations, and the Senior Independent Director at Judges Scientific

Professor Philip Thomas
Junior Warden Elect

Philip joined the Livery in 2011 and was invited onto the Court of Assistants five years later.

He holds a B.Sc. in Cybernetics and Instrument Physics from the University of Reading and a D.Sc. from City, University of London. His link with London began with his time at City University, where he held the chair in engineering management for 15 years.

Philip worked previously as an engineer in both the chemical and nuclear industries. His roles with the UK Atomic Energy Authority included managing the green-field decommissioning of the Windscale Advanced Gas Reactor.

He took up his current post as professor of risk management at the University of Bristol in 2015.

The Livery awarded him its Best Paper Prize in 2006 for an article outlining the J-value method of risk management he has developed.

The results of applying the J-value to big nuclear accidents like Chernobyl or Fukushima, were reported extensively in the national and international press. J-value insights on managing the coronavirus pandemic have attracted similar coverage.

He has published journal and conference papers on control, instrumentation, nuclear decommissioning, risk assessment, economics and law. His book, Simulation of Industrial Processes for Control Engineers, was published in 1999.

The Master Elect's Statement

Master Elect - Martyn Wheatley
26 October 2020

I am honoured to have been elected as The Master of the Worshipful Company of Scientific Instrument Makers for 2020-2021. In my role I will do my utmost to honour our motto of 'Moving Forward and Giving Back' as well as delivering the aims and objectives of our Company.

Membership Development is one of my key priorities and I wish to ensure that the co-ordination of Warden activities, which we have recently developed, continues to improve the experience for all our members and their levels of participation at SIM. Another focus for me will be strengthening the structured recruitment programme, which is attracting so many new members from right across the Science, Instrumentation, Engineering and Control sectors.

I have been involved for several years in the updating of committee activities and I will continue to keep track of, and encourage, this process. The new Warden framework is already delivering continuity of support from our Apprentices into Freemen and finally to full Membership. These linked activities provide help, advice, and support for our members throughout their careers and will encourage each person to then join the Company in time and continue this vital work.

With the COVID situation likely to be with us for some time to come, I will be looking to find new ways of creating on-line events for all our membership to become involved. Face to face time and connecting with others, to discuss and talk about topics of mutual interest, is going to become especially important during these times of restriction and isolation.

After the recent great success of our Four Liveries Lecture, given so capably by our two SIM members, Nigel Davies, and Kevin Gallagher, we intend to repeat their presentation format with new Quarterly Webinars about STEM subjects. Speakers will be leading individuals in their own field, and we can assure you of a fascinating programme which is coming up soon.

After we sadly lost our SIMposium to the COVID lock-down this year, I have teamed up with the current Master, Professor Ken Grattan OBE, to jointly organise our 2021 event. One of the key objectives will be encourage and support our younger members, and for the Livery as a whole, to learn of the enormous breadth of work in the field of scientific instrumentation, which they are engaged in. We will also look at how the new ideas and developments of our young members might become fledgling businesses with support from the Company. Our young members are the future of the Livery.

Let us all hope and look forward to life being back to something a bit more normal by the summer of 2021, so that the Livery Weekend in Birmingham can go ahead. Have no doubt about how fascinating the history of this great city is plus its contribution to Science and Engineering. A visit to the Thinktank, or the local name for the Science Museum will be included. In addition, Birmingham boasts one of the finest Art Galleries in Europe which holds the largest collection of Pre-Raphaelite paintings and tapestries in the world. With more canals than Venice, the Jewellery Quarter and some of the best shopping in the UK, we are all going to have a great Brum weekend together in my home town.

During these trying times do please remain fully involved with your livery Company and all its activities. Please do contact me with your ideas and suggestions for new events, on-line or not, which we can roll-out for all the SIM membership to enjoy.

As we come out of restrictions and overcome COVID, as we all will, I wish as Master, with my wife Valerie, to share as many Livery functions as we can, with Ken Grattan and his wife Lesley, during my year in office. Ken and Lesley have lost so many splendid occasions during this year and I look forward to all four of us hosting our Annual Banquet at The Haberdashers Hall next summer.

I look forward to meeting many of you at the range of events which will return to our Hall next year and to working closely with the new Senior Warden, Charles Holroyd and Junior Warden, Philip Thomas, during my year.

Thank you for electing me as your Master and I pledge to support and develop the aims of the Company, and I know I can count on the support of all of our members, in this endeavour.

The Worshipful Company of
Scientific Instrument Makers

Calendar 2020/2021

Company events in bold — **Committees in blue**
City events in italics — Events with other organisations in standard

All events subject to change depending on government guidelines on COVID-19

NOVEMBER 2020				
24-11-20	**Mon**	**1130-1500**	**Committee group 1 – Trustees, SIM Hall Ltd, F&GP exec**	**Zoom**
DECEMBER 2020				
1-12-20	**Tues**	**1800-2000**	**Meet Us event**	**Zoom**
8-12-20	**Tues**	**1915-2030**	**Master's Christmas party**	**Zoom**
JANUARY 2021				
11-1-21	**Mon**	**1500 -2230**	**Court & Livery Dinner**	**Court via Zoom**
FEBRUARY 2021				
8-2-21	**Mon**	**1600 -2130**	**Education Trust Supper**	**Zoom**
25-2-21	**Thurs**	**1900**	**WCSIM Webinar – Ian Gilbert on MH370**	**Zoom**
MARCH 2021				
1-3-21	**Mon**	**1100-1600**	**Committee group 2 – Education; Membership Development and Promotion**	**Glaziers' Hall**
11-3-21	**Mon**	**1130-1500**	**Committee group 1 - Trustees, SIM Hall Ltd Exec F&G P Followed by Minerva Lecture (1800-2100)**	**Glaziers' Hall**
15-3-21	**Mon**	**1800-2000**	**Meet Us event**	**Glaziers' Hall/Zoom**
APRIL 2021				
19-4-21	**Mon**	**0900 -1700**	**SIMposium**	**Glaziers' Hall/Zoom**
29-4-21	**Thu**	**1500 -2230**	**Spring Court & Court Family Dinner**	**Glaziers' Hall**
MAY 2021				
5-21 tbc		1830-2200	Howard Dinner for Master, Wardens & Past Masters only	Not at Hall
10-5-21	**Mon**	**1100 -1600**	**Committee group 2 – Education; Membership Development and Promotion Meet Us event**	**Glaziers' Hall**
21-5-20	*Fri*	*1100 - 1230*	*United Guilds' Service, St Paul's followed by lunch*	
21-5-20	Fri	1400	Memorial Service & reception – PM Guy Brocklebank	Southwark Cathedral & Hall
27-5-21	**Thurs**	**1900**	**WCSIM Webinar – Prof Philip Thomas on modelling COVID**	**Zoom**
17-5-21	**Mon**	**1130 -1500**	**Committee group 1 - Trustees, SIM Hall Ltd Exec F&G P**	**Glaziers' Hall**
JUNE 2021				
3-6-21	Weds	Time tbc	Edwards Lecture	City University, London
8-6-21	**Tues**	**0930-1615**	**Shaping the Future through STEM – schools event with EDT**	**Glaziers' Hall**
17-6-21	**Thurs**	**1830 -2230**	**Annual Banquet**	**Haberdashers Hall**
12-06-21	Sat	10-1600	WCSIM/SIS/RMets event - tbc	Glaziers' Hall
24-6-21	*Thurs*	*1100-1500*	*Election of Sheriffs followed by lunch*	*Lunch venue - tbc*
JULY 2021				
2/4-7-21	**Fri - Sun**		**Livery Weekend**	**Birmingham or Geneva**
19-7-21	**Mon**	**1600 -2230**	**Election Court followed by supper**	**St Margaret Lothbury & Glaziers' Hall**
SEPTEMBER 2021				
7-9-21	**Tues**	**1900 -2130**	**Four Liveries Lecture – hosted by Clockmakers**	**tbc**
2/-9-21	**Thurs**	**1900**	**WCSIM Webinar**	**Zoom**
29-9-21	*Weds*	*1100-1500*	*Election of the Lord Mayor followed by lunch*	*Lunch venue tbc*
26-09-21	*Sun*		*Woolmen – sheep drive*	*London Bridge*
OCTOBER 2021				
21-10-21	**Thu**	**1500-2230**	**Admission Court & Dinner - The Hall**	**Glaziers' Hall**