



THE  
OPERATIONAL  
RESEARCH  
SOCIETY

# Annual Report and Accounts

for the year ended 31 December 2020

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# Foreword from the President

It is a great pleasure to introduce this report, which describes The Operational Research Society's achievements during 2020 and sets out our plans for the future.

2020 has been a year like no other for the Society, nor indeed for the whole country and the rest of the world. The coronavirus crisis had its origins at the end of 2019 and swiftly progress to a global pandemic early in the 2020. From mid-March, the UK, like much of the rest of the world, has faced a series of restrictive measures aimed at combating the spread of the virus. At the time of writing, these measures are still in place and likely to continue to impact the Society's activities through much of 2021. Since these measures were first introduced, the Society's staff have been working from home and all of its usual face-to-face activities have been unable to take place. The Society's transition to offering virtual alternatives has been swift and very successful.

The crisis has been a challenge for the entire operational research community, but OR thrives in times of change, albeit enforced in this case. I remain hugely proud of the contribution our community has made to the world-wide response, despite much of this effort being behind the scenes and not visible to the general public.

This emphasises a point that I made at this point in the 2019 annual report, that there's huge potential for a step change in the visibility and influence of Operational Research, and for growth in our practice and research communities. Despite the pandemic, the programme of engaging more with government and policy-makers has progressed, with the most visible result to-date being the Blackett Memorial Lecture in November. The Society will continue its key co-ordinating role and hopes to build on the momentum generated by the lecture.

This report describes some of The OR Society's key achievements during 2020 in responding to the opportunities and challenges presented by the 'new normal'. These have included: fast transition to virtual delivery of many of our services, the approval of the level 7 apprenticeship for an Operational Research Specialist; and involvement in a Royal Society inspired alliance to look at the professionalisation of data science.

Edmund Burke  
OR Society President 2020-2022  
May 2021

# Introduction

The Operational Research Society is a charity set up to advance knowledge, interest and education in operational research (OR). Our vision is of a world improved by rigorous analysis and better, evidence-based decision-making: "OR providing world class analysis for world class decisions". In this world OR would be seen as indispensable – not just a 'nice to have' but a 'must have' – and be used and acknowledged widely in all areas of industry, business, government and the third sector.

As a charity, we must work for the public benefit, but we also aim to work for the good of our members, because without active, able and well-supported researchers and practitioners, students and supporters, OR would not exist. We disseminate learning; promote awareness of OR; support OR professionals and standards; and aim to ensure that UK OR has a 'voice at the table', both in the international OR world and in wider UK arenas. This represents a broad programme of activities and services, that has been growing year on year and that we continue to maintain and develop.

With the continuing dramatic changes in the world around us – the global coronavirus pandemic – our activities and services have had to adapt accordingly. These changes present great challenges for the whole world, but offer great opportunities for the OR discipline, OR professionals and The OR Society.

## Review of the Year 2020

2020 was the final year of our 3 to 5-year strategic planning period, during which we adapted our main priorities on top of the 'Business as Usual' services and activities. These are: raising awareness of the importance of OR; supporting OR knowledge development; supporting OR education; growing membership and wider reach; ensuring financial sustainability of the Society; and embedding good diversity practice in OR and the ORS. Whilst we aim to put EDI considerations at the heart of everything we do, we felt its importance deserves highlighting as a separate strategic strand.

### *Highlights of the Year*

This has been another year of highlights which, along with our full range of activities, support our charitable aims to advance knowledge, interest and education in OR.

#### **Advancing knowledge**

The Society's portfolio of academic journals was able to make a substantial contribution to both advancing and sharing knowledge specifically related to COVID-19. All of our relevant content was made free to access and a significant volume of new research material was published in much condensed time-frames.

The Society continues to work with Council for Mathematical Sciences on the next steps of the Big Maths Initiative, a possible outcome of which could be the establishment of a national Mathematical Sciences academy. This could play a key role in the future advancement of knowledge in OR. Other activities to advance knowledge are covered below in the Events, Publications and Research sections.

#### **Advancing interest**

The Society's strategic goal of advancing interest in OR was both hindered and helped by the global pandemic. Its usual programme of face-to-face activities completely ground to a halt, but was soon up and running in a virtual format. While this did mean some limitation to networking opportunities, the global reach achievable through the revised online events was impressive. This year's annual conference reached its biggest ever audience, and one that covered all corners of the globe.

The Society continued to implement the recommendations of its Artificial Intelligence (AI) task and finish group. One such activity was the delivery of an extensive workshop at the BCS AI conference, highlighting how OR can contribute to AI projects. Other activities to advance interest are covered below in the Events, OR in Education and Pro Bono OR sections.

### **Advancing education**

A major highlight of the year was the Institute for Apprenticeships' approval of the standard and assessment plan of the level 7 (Masters) apprenticeship for Operational Research specialist. The Society is now pursuing approval as an End Point Assessment Organisation. It is hoped that the first cohort of apprentices will commence in late 2021. Other activities to advance education are covered below in the Education, Training and OR in Education sections.

### **Other highlights**

Some of our 2020 highlights made contributions to all our charitable aims. These included the expansion of our Women in OR and Analytics Network (WORAN) with a number of virtual events held during the year. This network provides a key focus for addressing issues facing women in our profession.

Finally, the Society is actively involved in an alliance of learned societies (BCS, IMA, and RSS) to implement recommendations in the Royal Society report *Dynamics of data science skills*, including shaping professional standards for data science. This has the potential to be pivotal in improving trust in data analysis across all sectors of the economy.

## ***Achievements during the year***

### **Equality, Equity, Diversity & Inclusion**

Part of the OR Society's vision is to have a vibrant and active membership drawn from diverse areas. In support of this, the Society has been active over the past year in the Equality, Equity, Diversity & Inclusion (EEDI) area. In line with its commitment to the Science Council declaration, the Society has a Board level Diversity Champion and a member of the Society's permanent staff working together to drive the realisation of our EEDI ambitions. Key achievements over the past year include the launch of our first Diversity and Inclusion survey where 65% of respondents felt we were an inclusive Society. A key focus area moving forward, amongst others, will be supporting social mobility within the OR profession. In support of this, the Society is working with In2Science, which is a charity focused on social mobility in STEM and we are exploring how to broaden the reach of our OR in education work. On our ambitions in the BAME area, the Society attended a Parliamentary & Science meeting on Racial Inequality in UK Science, and we are exploring some of the issues raised from an OR perspective. We are also engaging with BB STEM to promote their University Alliance work and to identify ways to work together on education outreach. Finally, in the gender equality area, our Women in OR and Analytics Network had a very active programme of, well attended, on-line events. Moving into the next year, our EEDI work is focused on delivering our strategy and supporting programme to cohere all the wonderful work, spread across the Society, related to EEDI, ensuring we live up to our inclusive value: a vibrant community united by a common passion and purpose.

### **Conferences and Events**

Events and Conferences remain a key focus for both our membership and our target market for future members, this is clear from the feedback from our member surveys and post event communications. Upfront we must recognise that 2020 however, proved to be a year where the global pandemic tipped our planned schedule of events on its head, where many events were unfortunately but understandably cancelled and where we went Virtual with the rest. Zoom became our new Conference venue. Our prior experience of

running online events and seminars was not extensive, but we were able to draw on the knowledge we had and from some new team members who joined during the year. The Events Committee, all the staff at ORHQ, our generous volunteers, all rallied to the cause and with their energy and undaunted commitment “the show went on”. Our thanks to everyone who assisted, spoke and attended our events during the year.

Despite the extraordinary circumstances, with a degree of creativity and stubbornness, we have delivered an extensive and varied programme of high-quality events again in 2020. In some respects, the inability to travel to specific meeting venues, meant that our events became more accessible to all our members and to an increased audience of non-members too. With people locked down, sometimes shielding at home, the opportunity to join an online meeting or event was no longer an inconvenience, but a great outlet to listen, learn, share and meet up with kindred spirits.

Annual Conference, on with the show...

Our Annual Conference was once again the flagship event. The planning started before the Covid-19 restrictions came into force and the Conference Committee were planning for a physical event at Warwick University. Anyone who has ever been involved in this event previously, will understand the hard work required to make it a success. Well, this year was extraordinary. Our thanks must be given to Co-Chairs Frances O'Brien and Juergen Branke for all the hard work they and their committee put in to making it such a success. Initial disappointment of not having an opportunity to meet physically were short lived and it was all hands to the pumps to completely rebuild the conference to an online model. Three excellent keynote plenaries from Internationally acclaimed Professor Dimitris Bertsimas from MIT, professional consultant Dr Ellen Lewis and Cornell University Professor Patrick Reed headlined each day perfectly. The numbers registering, 1375 and attending the event 704, were indeed a record in the history of the conference. Whilst our decision to follow similar conferences in making the event free of charge, would have no doubt contributed to this increased attendance, the content was at our usual high quality with some sessions attended by over 150 people and a peak of 357 for the first plenary. We were able to accommodate the different time zones of our speakers and attendees, with the online model also allowing for recording of sessions so that these could be watched at the convenience of attendees. Despite the constraints, the attendees were able to enjoy a rich programme of parallel streams, across a broad range of topic areas. As part of the pre-Conference activity, we held a very successful Early Careers Research Network launch event. Speakers drawn from Universities (Edinburgh, Loughborough, Bath, Southampton), UKRI EPSRC and ESRC were joined by 70 live attendees and many watching the recording of the event. We further explored online networking and workshop sessions thru The Making an Impact programme, to offer a varied content-rich opportunity for everyone to share in best practices, successful implementation of projects and research. The normally wonderful social calendar, conference dinner, etc however, proved to be more difficult to deliver. We did manage an evening social Pub Quiz, which was well attended and as fiercely competitive as usual. Thanks to all the speakers and contributors for making this most unusual Annual Conference such a rewarding experience for all attendees. We look forward to a similarly great online event, OR63 in September 2021, organised by the team at CORMSIS in Southampton. We plan to resume our physical model at the University of Warwick in September 2022.

Before things went virtual...

Our last physical event was in late February, with the Annual Half Day, Beale Lecture. Held at the Royal Society in London, our speaker, Professor Russell Cheng presented “The Enigma of Choice - When is a good decision possible?” Russell’s work in the development of Simulation and the theoretical contributions to the use of statistics therein were recognised by President Edmund Burke. The event was particularly special this year as we welcomed Martin Beale’s children Rachel, Marcus and Nicholas, to the audience.

Sadly, many of our regularly planned events were cancelled in the wake of Covid-19 restrictions namely, Simulation Workshop 20, Analytics Summit 2020, ISMOR 37 and a number of Regional and Special Interest Group (SIG) events.

The launch of Webinar Wednesdays...

In an effort to continue our commitment to our members and enhance their professional development, the launch of a regular webinar programme proved to be a great initiative. One which was both popular with members and non-members alike. An opportunity to explore new subject areas across both academic research and practical examples in multiple industry sectors. Registrations of between 250 - 350 people, were beyond expectations. Meghan Crawford's talk on using Behavioural Science to improve our response to pandemics was the most popular to date, with just short of 300 people joining live. The lessons learned from these events was extremely useful in the planning and execution of the earlier mentioned Annual Conference.

Other online events have included:

Our Women in OR and Analytics Network (WORAN) continues to grow and develop and have frequently met online during the course of the year. Sophie Carr's Webinar on the subject of Trust: Teams, numbers and data was especially pertinent, given the remote working we all found ourselves doing during the lockdown periods. The Pre-Conference Panel discussion chaired by Sally Brailsford, comprised Julia Bennett from Leeds University Business School, Hiroko Plant from the Land Registry, Leila Seith Hassan, Hd of Data Science and Analytics at Digitas and Noel-Ann Bradshaw from London Metropolitan University. These occasions represent great opportunities to meet such inspirational women, to share and discuss experiences. The final event was in November hosted by Dr Nadia Papamichail, University of Manchester and Dr Nunzia Esposito-Amideo, University College Dublin. With a plenary, entitled "Never a dull moment: My life in Academia, from Professor Julia Buckingham CBE, Vice Chancellor and President of Brunel University and Chair of the Athena SWAN Steering Group. The event welcomed Laura Reid, CEO of SIMUL8 to share her "how to network guide". A perfect Kickstarter to the concluding group networking sessions. This series of meetings continues our celebration of the achievements and impacts of female colleagues, the events are recorded and remain open to all members.

Our Special Interest Groups (SIG) and Regions continue to provide specialist / expert subject matter and local support and networking opportunities to our members. Groups have enjoyed the online zoom platform to meet up during the year. The SIGs in particular actively engaged with the main Conference organising committee in helping coordinate stream activities.

Our AGM, preceded by a thought-provoking talk, was held online on 30 July. It has been noticeable at many events, just how much the OR community have contributed to the understanding and decision making to reduce the impact of the COVID-19 pandemic. This was no exception. Christine Currie, Director of CORMSIS, University of Southampton presented a recent article from the Journal of Simulation. The paper covered the use of OR methods to tackle operational problems, such as distribution of resources and societal issues.

Despite the circumstances and the impact on the economy our Annual Careers Open Day was held in November. We would usually welcome over 300 students and 20 exhibitors to this event presenting a challenge to the organising team, seeking to transform into an online model. The support from employers was superb and the feedback from the students likewise. The one-to-one appointments set up after the event going above and beyond the expectations of all involved.

And finally, virtually...

Our Blakett Memorial Lecture was a rousing session from Rt Hon Chris Skidmore, MP for Kingswood and former U.K. Science, Research and Innovation Minister. Under the umbrella of “Superforecasters and Moon Shots” Chris spoke about the future of R&D and the ambition for the U.K. to be a “global science superpower”. On the question of how to prioritise resources to meet this goal, he “believed” that Operational Research was needed more than ever, to play a central role in planning this vision. The gauntlet has been thrown down, do we have the appetite to step forward to fulfil this role. A very animated Q&A and networking discussion followed.

Nothing from this programme of events would be possible without the dedication and efforts of the ORHQ team, committee members and volunteers. We greatly appreciate the time they give and their ongoing support.

## **Publications**

The OR Society has six academic journals. These are the *Journal of The Operational Research Society (JORS)*, *European Journal of Information Systems (EJIS)*, *Knowledge Management Research & Practice (KMRP)*, *Journal of Simulation (JOS)*, *Health Systems (HS)* and the *Journal of Business Analytics (JBA)*. All of the academic journals experienced an increase in submissions during 2020 compared with 2019. It is encouraging to see this evidence of the popularity of our journals among contributing authors. In 2020, Health Systems grew from three to four issues and in 2021, JORS will have an increased page budget, while maintaining twelve issues per year.

2020 was also an excellent year for our Society’s journals in terms of the number of papers downloaded. In 2020 there were 332k more downloads than in 2019. In total, there were 719,730 downloads from our academic journals. In addition to our academic journals, the Society publishes Impact magazine aimed at practitioners and potential users of OR. It saw a doubling in downloads in 2020 compared to 2019 with the 2020 total reaching over 18k.

JORS and EJIS are now live on the Taylor & Francis EPUB pilot. This means that as well as being able to download articles in HTML and PDF formats, the EPUB format allows papers to be read more easily on a mobile device or e-reader.

Authors are now being encouraged to publicise their research papers using social media. Comparing 2020 to 2019, there is a marked increase in the number of downloads coming directly from Twitter increasing from 603 to 2,554 and the number of downloads coming directly from LinkedIn increasing from 472 to 4,200.

Driven by the restrictions on physical meetings due to the Covid-19 pandemic, 2020 saw a shift from physical to virtual editorial board meetings for the first time and it generally proved very successful. The virtual format allowed for much greater attendance than usual from board members, some of whom may be located thousands of miles apart.

The Society monitors our journals’ services to authors, particularly in terms of turnaround times for dealing with papers. The mean time to a first decision has been reduced by 15% overall for journals when comparing 2020 to 2019, with most journals showing some reduction.

2020 was a year in which the whole world has been impacted by the effects of the Covid-19 pandemic and the efforts to contain it. Papers have been published in our journals and promoted elsewhere that aim to contribute to dealing with the crisis.

We are continuing to monitor developments in Open Access (OA). The Society responded to the consultation launched in 2020 by UKRI, but are still awaiting to hear details of their OA policy.

The Society's newsletter for members, *Inside OR*, is normally published at the beginning of each month. However, the Board decided to make the publication bi-monthly for the last six months of 2020, in response to budget pressures. Its publication has been reinstated to a monthly basis from the beginning of 2021. During 2020, John Crocker, who has been ably editing *Inside OR* for the last ten years, expressed his wish to stand down and the Society is looking to recruit a replacement for him.

Our thanks go to all the editorial teams, the staff in the OR Society office and Taylor & Francis for their work over the past year in supporting and promoting the OR Society publications.

## **Education**

The meetings of the Education Committee (EC) transitioned to an online format during 2020, in line with the rest of the Society. The change has not been detrimental to performance of EC which has achieved a lot.

We would like to start by thanking Eve Hardy, our Education Officer, who has taken forward the continuing work of our OR in Education (ORiE) programme during a very challenging year. Our appreciative thanks go to Matthew Robinson, the ORiE Taskforce chair, and to all volunteers who have participated in online events.

The major achievement in 2020 was the final development and approval of the Level 7 postgraduate Apprenticeship Standard in the occupation of "OR Specialist". Apprenticeships at all levels, not just Level 7, enable employers to leverage their Apprenticeship Levy payments to provide employees with education and training. For the OR Society, an OR Apprenticeship at the postgraduate level is a strategic project to compensate for the drop in the number of UK-based graduates from UK MSc courses, many of which are composed mainly of international students. The MSc route into the OR profession used to account for over 75% of new UK entrants into the UK OR workforce, but nowadays accounts for under 10%.

EC worked closely with the Trailblazer Group of OR employers that was formed in 2019 to develop an "occupational standard" for a postgraduate Level 7 Apprenticeship for an "OR Specialist". The standard was approved in 2020 and the roll out of the apprenticeship is being led by GORS, the Government OR Service, building on the interest shown by several UK universities in becoming providers of teaching for apprentices in partnership with the employers. In addition, the OR Board approved an EC proposal that the Society should become an EPAO, an "End Point Assessment Organisation", to provide assessment services to all apprenticeship employers. A concern in 2020 was that no Russell group universities seemed interested in being a provider, maybe because such universities see no financial or political need to participate. This was fortunately counter-balanced to some extent by some highly respected OR-oriented white-tile / beige-brick / post-92 universities who showed active interest in being providers.

The committee also welcomed Nicola Morrill, the OR Society's diversity champion, to its September meeting. A diversity survey indicated most ORS members have parents with degree-level or equivalent education and suggests people from lower-income backgrounds are under-represented in both the OR Society and wider OR community. Nicola proposed focusing on social mobility to address this. Ensuring that people are aware that there are a variety of routes into OR is critical. This will require reaching students at a pre-university level and working with Alliance universities as well as Russell Group universities. The new Apprenticeship is also a vehicle for social mobility in that it provided postgraduate level education for OR employees who might not be able to afford MSc fees.

The Training Working Group (TWG) is now under the remit of EC. David Halsall, the new TWG chair, participated in the March EC meeting where it was agreed that a closer working relationship between EC and TWG would be beneficial. TWG has successfully run online courses and all the feedback has all been positive.



There is a lot of interest in the 2021 online course calendar. TWG is working with the Marketing department to increase bookings for 2021.

Finally, we would like to thank Alistair Clark for all his work during his spell as the chair of EC and his outstanding contribution to the Society.

## **Research**

The Research committee has continued to drive the Society's engagement with research issues. Its work has been enhanced by recruiting four additional senior academics who have excellent networks with research councils, the Council for Mathematical Sciences, and businesses. The committee has also been strengthened by a representative from the early researcher community.

We have made significant progress in understanding our early career researchers' geographical spread and demographics through a survey undertaken for the 2019/20 academic year. The survey has highlighted areas that we need to investigate further, such as fewer women in OR than men at the ECR stage, and fewer UK nationals in OR than people born overseas at the same stage. These differences become greater at later stages of an ECR career, so there is work to be done.

One of the outputs of the survey was that the committee launched an Early Career Researcher network. This launch took place at our ECR bi-annual event held before the annual conference, OR62. The network is now a lively community of over 80 ECRs.

We also started a new initiative to encourage members to join the EPSRC Peer Review College. It is essential that OR is represented and engages with the Council, particularly given the government's additional £300m funds made available to mathematics. These new funds will be available for research that delivers real impact, and OR is well placed to deliver on this. Some of the new funds were made available at the end of the year via Small and Programme grants opportunities, and we were able to give members advance notice. Committee members have played an active role in developing the new EPSRC Fellowship Scheme and participated in the EPSRC Strategic Advisory Council, REF, and the Big Mathematics Initiative. This means we have been able to update the community on critical developments.

## **Training**

During 2020, the Society delivered 19 courses covering a range of OR topics, attracting a total of 150 delegates. Take up of courses was strong in the first quarter of the year before the onset of the coronavirus pandemic. All face-to-face courses were cancelled for the remainder of the year, but the Society was able to rapidly transition to online versions, running second courses late in the year. These courses were extremely well-received by participants with the average score being over 8.98 out of 10. It is anticipated that all courses will be run virtually during 2021. We thank our pool of excellent tutors for the rapid switch to the virtual delivery.

## **Publicity and Membership**

The Society website and other communications have been updated throughout the Covid pandemic. As well as informing members of the status of events and training, we have made sure that we have shared wider resources and opportunities to a broad audience. This has helped get OR people involved in responding to the crisis and demonstrating purpose in action.

We also developed 'With OR Without' campaign material to help encourage people to see the value in OR for decision-making and the opportunities to come together as community. With changes to website navigation and enhanced membership landing pages, we're trying to make it as easy as possible for people to join the Society and further their engagement with OR as a profession.

Despite the pandemic, our membership levels have stayed fairly flat as we continue to offer valued services and create a sense of community. We have also been sensitive to increased workload for many of our members, combined with the financial difficulties others may have faced. We put on hold our plans to push membership and a revised approach will be developed and implemented in 2021. This will include a focus on making sure we are inclusive and tackle potential barriers to diverse membership and participation.

### **OR in Education**

In the academic year 2019-20 there was a total of 29 individual visits and events nationally. There were seven individual visits to schools, five extracurricular visits (such as New Scientist Live) and 17 university events. Other headline results include running two volunteer training sessions, five teacher CPD events and attending one Enterprise Network meeting. Enterprise Networks consist of businesses that deliver careers services and advice in their community.

Outreach efforts from March - August 2020 were severely impacted by COVID-19 as many events were cancelled or postponed.

Prior to the impact of COVID, volunteer availability remained the main barrier to attending more events.

Teachers and volunteers gave lots of positive feedback from ORiE events.

Volunteer feedback:

- *The stand was very busy. Raised awareness of the OR Society as a lot of students didn't know what you do. Students were keen to take the graduate opportunities booklet and the new trifold. The new trifold was good because it gave scenarios of how OR helps in the real world which students found interesting.*
- *The stand was popular, considering it was competing with more high-tech stands, I think that demonstrates there is an interest in OR.*

Teacher feedback (from Teacher CPD webinars):

- *I thought that the presentation and the support OR in Education have to offer were well thought out and of a high standard. I'll be investigating further into how our maths department could use the resources and/or run a workshop.*
- *You have just made teaching Discrete maths next year much less daunting- thank you!*

Student feedback has been limited this year due to the change from in person to online events.

This period saw ORiE volunteers attend online events for the first time, which brought a unique set of challenges and opportunities. This provided an opportunity to review the materials made available to volunteers, with an updated handbook and a new guide to virtual volunteering.

The first ORiE video resources were also created and have been used at several online science fairs. At one science fair, the ORiE video was the most popular video of the whole event.

### **Pro Bono OR**

Pro Bono OR's fantastic volunteers worked on 24 projects throughout the year, using a variety of OR methods to help organisations tackle food poverty, reduce and solve crimes, safeguard children in Ghana and promote social justice and human rights.

Despite the difficulties caused by coronavirus, Pro Bono OR volunteers completed 12 projects in 2020, helping organisations to create business plans, develop simulation computer models, improve data analysis

and collection, understand their strengths, and implement measurement tools (to name but a few). Feedback from third sector organisations and volunteer analysts has remained positive.

During 2020, COVID forced the majority of the Third Sector to focus less on seeking external aid to improve their processes and to instead focus on simply keeping their doors open and supporting their ever-increasing number of service users. For the PBOR scheme, this manifested in a reduced number of expressions of interest from Third Sector organisations and consequently a reduced number of PBOR projects. The Pro Bono steering group understands that these difficulties are likely to continue well into 2021, and as such are focused on creating new initiatives to both help the struggling Third Sector and engage the scheme's under-utilised volunteer base.

The Pro Bono OR scheme has been managed by Amy Hughes since summer 2018 and the Steering Group is chaired by Ruth Kaufman. In 2020 five new members were invited to join the group, in order to bolster its capacity and improve succession planning. At the end of 2020 the group consisted of: Jane Parkin, Shamim Rahman, Graham Rand, Ian Seath, Mike Boyles, Owen Bowden, Kate Hammond, John Lincoln, Ashleigh Monks and Felicity McLeister.

The steering group began work on a series of white papers for struggling Third Sector organisations, who may not have the internal capacity to commit to a PBOR project but could still use OR techniques to their advantage. These white papers aim to introduce a Third Sector audience to the different ways in which OR can help them. We have so far produced three examples and will now be developing those with the ORS marketing team and some third sector employees, to test their value and adapt before launching if these steps are successful. These white papers will be finalised and published in 2021 and will also be used by the PBOR volunteer base as examples as a reference when creating their own white papers, drawing on their OR experience expertise. The steering group hopes to engage a few volunteers to create these white papers, which will be reviewed, and ultimately published on the PBOR website.

In addition to the white papers, the steering group also began planning a series of webinars to start in March 2021. These webinars will be aimed at those who work in the Third Sector with the aim of helping them to improve their operations, efficiency, and decision making. The first series of webinars will initially be devised and run by members of the steering group and volunteers. It is hoped that the volunteer base will be encouraged to contribute further webinars following this first series, either by showcasing their PBOR project case studies or outlining how their particular OR expertise could be used to aid the Third Sector. PBOR hopes to capitalise on the success The OR Society has had in running and publicising the Webinar Wednesday programme and the Society's current expertise with online events.

As always, PBOR took part in UK Volunteers week, this time working closely with The OR Society's inhouse graphic designer to refine the quality and quantity of posts shared with the social media campaign. The scheme's involvement resulted in two organisations citing the Twitter campaign as the way they heard about the scheme's offering.

Throughout 2020 Pro Bono OR continued to make new contacts and worked well with both new and familiar organisations. Pro Bono OR was once again a part of the OR annual conference, this time collaborating with the University of Warwick's Data Science for Social Good (DSSG) initiative to host a successful workshop focused on providing third sector organisations with knowledge of the scheme itself as well as an opportunity to talk with OR consultants to search for an answer to their organisation's issues. As the event was held online for the first time, attendance was the highest ever recorded for a PBOR involvement with the annual conference and the event was well received by those who attended. On the day, the workshop was joined by 12 charities with eight Pro Bono OR expressions of interest generated following the event. It is hoped that these will turn into projects in 2021.

The aim of raising awareness in the third sector has also been facilitated through attendance at external events. In November, PBOR hosted an online event 'Data, Decisions and Impact' alongside The Royal Statistical Society. The event was aimed at helping the third sector appreciate the need for a better understanding of data, its collection and analysis. Other organisations involved in the event included The National Lottery Fund, Red Cross and Social Investment business group. The session had over 90 attendees from a variety of Third sector organisations and resulted in three expressions of interest.

Organisations registering for the PBOR scheme have also identified discovering Pro Bono OR through publicity in similar organisations' and voluntary services' newsletters, referrals through Small Charities Coalition, via a Google and website search, via Twitter due to our involvement in UK volunteers' week, via recommendations from previous project contacts and through our online presence as an official partner of UK charity week.

### ***Members, Affiliates and Fellows***

At the end of the year, The OR Society had 3,121 members. The Analytics Network boasted 2,105 members, the Society's LinkedIn group had 5,189 members and we had 5,118 Twitter followers. In addition, there were ten corporate partners – CORDA (part of BAe Systems), Natwest Group, Ministry of Justice, Home Office, Dept for Work & Pensions, AWE, Office for National Statistics, Ministry of Defence, NHS Wales and The Smith Institute – representing 567 affiliates.

There were 344 accreditees, comprising 160 Fellows, 74 Associate Fellows, 49 Associates and 61 Candidate Associates. There were 22 members accredited as Chartered Scientists and one as a Registered Scientist.

## Awards

- **Goodeve Medal** (awarded for best paper published in *JORS* in 2019): Awarded to Esra Adiyke, Semra Agrali and Ethem Canakoglu "Risk Averse Investment Strategies for a Private Electricity Generating Company in a Carbon Constrained Environment.", *Journal of The Operational Research Society* (2019) 70, 2056–2068.
- **Stafford Beer Medal** (awarded for best paper published in *EJIS* in 2019): Awarded to Bjorn Ross, Laura Pilz, Benjamin Cabrera, Florian Brachten, German Neubaum and Stefan Stieglitz "Are social bots a real threat? An agent-based model of the spiral of silence to analyse the impact of manipulative actors in social.", *European Journal of Information Systems*, 28 394-412.
- **Cook Medal** (awarded for best paper published in *KMRP* in 2018/2019): Awarded to Eleni-Maria Kalegeraki, Dimitrios Apostolou, Nineta Polemi and Spyridon Papastergiou "Knowledge management methodology for identifying threats in maritime/logistics supply chains.", *Knowledge Management Research & Practice*, 16 508-524.
- **Ranyard Medal** (awarded for best paper published in *Journal of Business Analytics* in 2018/2019): Awarded to Amir Hassan Zadeh and Anand Jeyaraj "Alignment of business and social media strategies: insights from a text mining analysis.", *Journal of Business Analytics*, 1 117-134.
- **Doctoral Award** (awarded for the most distinguished body of research leading to the award of a doctorate in the field of OR in 2019): Awarded jointly to Marton Benedek, University of Southampton, "Computing the nucleolus of cooperative games" and Lucy Morgan, Lancaster University, "Quantifying and Reducing Input Modelling Error in Simulation".
- **President's Medal** (awarded for the best practical application of OR): Awarded to Harminder Mann, Jordan Low, Kim Brett, Lizzie Baggot, Mary McKee, Sara Smith and Sam Rose (Department for Transport) for "Creating new population movement insight to shape the UK Government's response to the Coronavirus pandemic".
- **Beale Medal** (awarded for a sustained contribution to the theory, practice, or philosophy of OR): Awarded to Val Belton.
- **Companionship of OR** (awarded for sustained support and encouragement for the development of operational research or for those in influential positions who are in broad sympathy with the subject area): Awarded to Alec Waterhouse.

### Structure of the Funds

The Society's funds are unrestricted but are organised into:

- the General Fund, through which the ongoing operations of the Society are conducted;
- the Reserve Fund, comprising the Seymour House property together with investments and cash on deposit to cover potential risks of a general nature, the most significant of which would arise if the Society were forced to move quickly to a financial regime in which its publications income was significantly reduced; and
- the Designated Award Fund which represents a bequest received from Mrs May Hicks in 2002 and which is used for purposes consistent with her wishes, by providing awards for the best student OR projects undertaken for a client organisation.

### Review of Operations

The Society's income and expenditure account showed a surplus of £15k during the year, on a turnover of £1.2m. This compares with a deficit of £234k in 2019. Whilst much of that deficit was planned, financial management processes were reviewed and tightened to prevent a repeat of the disappointing performance of 2019, and the 2020 outcome is very pleasing.

The performance is particularly gratifying considering the impact the coronavirus pandemic had on much of the Society's normal operations. Income for the year was down over £300k compared to 2019, with conferences and events taking the biggest hit (£270k). Training income also suffered, but a good start to the year (prior to the first lockdown) and a switch to online delivery later in the year, minimised the impact. The Society implemented a package of cost-saving measures to ensure its financial health.

Nearly all bookings for face-to-face events were either cancelled or rescheduled for 2021. Whilst we were able to replace many of these events in a virtual format, Board decided to waive delegate fees to enable the community to continue to benefit from the opportunities despite the difficulties of the pandemic. We anticipate much of our conferencing activity will remain online in 2021 but delegate fees will be re-introduced.

The publications income was almost £30k above the 2019 level, with our publishing partners, Taylor & Francis, continuing to realise the full potential of our journal portfolio. It is anticipated that in 2021 publications income will improve further under the partnership. The existing contract with Taylor & Francis comes to an end in 2022 and discussions on a contract extension are underway.

In 2019, Board approved a significant budget (£30k) for a membership recruitment and retention project for 2020. A proportion of this funding was used to create the supporting assets, but the balance for paid promotion was not deployed. It was agreed that the coronavirus pandemic would impact it adversely. The campaign will go ahead in 2021. Income from membership subscriptions was almost £11k down on 2019. Almost £6k of this was as a result of a timing issue on payment from one of our larger corporate partners; the rest is due primarily to a loss of 'full' members.

Most operations to support the charitable aims of the Society – such as conferences, special events, regional societies, special interest groups, education, publicity and outreach initiatives, the monthly Inside OR magazine and special charitable projects – result in deficits to the Society. To support them the Society relies primarily on subscriptions and income from its academic journals – particularly the latter which in 2020 contributed over £810k net of all associated costs. This serves as a reminder of the Society's current financial dependence on the academic publication system; see the section on 'Risk' below.

The Society employed 16.8 members of staff during 2020 (averaged over the year, 16.5 full-time-equivalents), compared to 17.8 (16.6 FTE) during 2019.

### **Assets, Reserves and Investments**

The total net assets of the Society decreased slightly to £2.395m over the year, with the small surplus on income and expenditure being counter-balanced by a decrease in investment values and a net £46k capital loss (realised and unrealised) on our investment funds. This relatively small decrease masks an extremely turbulent year for the markets as a result of the coronavirus pandemic. The value of the Society's investments fell by almost £300k in the first quarter of the year, but staged a remarkable recovery over the year to finish just below the 2019 level. Prudent financial management meant the Society did not need to draw down any of its investment funds during the year, allowing the recovery to take place.

It is important that the Society maintains an appropriate level of reserves in relation to perceived financial risks. During the year the Board reviewed the Society's reserves policy. In setting its reserve policy, the Board distinguished between the funds held in the General Fund, which arise from the normal operating activities of the Society, and the Reserve Fund held to ensure that the Society can continue long-term operations in the event of financial risks materialising. The policy review considered the minimum and maximum levels for the amount required in the Reserve Fund. It was agreed that this steadier approach to reserves, based on the costs of the Society rather than the (publications) income, remained valid.

Based on the usual annual costs of running the Society, one year's costs of £900k should be a minimum value for the reserves and the maximum value would then be two years' costs giving a value of £1.8 million. This would cover any growth of the Society over the next few years and release funds to further the Society's aims. Fixed costs in 2020 were £831k, slightly lower than normal as a result of cost-cutting measures in place during the pandemic.

At 31 December 2020, the Society's reserves – its investments and cash held within the Reserve Fund – amounted to £1.74m. The reserves are therefore within their prescribed limits. The Board will bear this in mind when considering opportunities for spending on worthwhile one-off projects that further the Society's objectives, and may be more inclined to do so on securing an extension to its publications contract.

The Society's investments and their performance are kept under review by the Investment Committee in accordance with policies decided by the Board. The Committee is chaired by the Treasurer and, in addition to other members of the Society, includes representatives from the Society's investment managers.

### **Risk**

The Society's dependency on journal income is the most significant material risk. Our contract with Taylor & Francis to a large extent mitigates this risk for the Society, for the five years of the contract (finishing in December 2022), by transferring much of it to the publisher. The risk has not disappeared though, and we could never be wholly insulated from any impact that might result from this risk on our publisher. In addition, beyond the contract period our exposure to the risk is unchanged and the risk may in fact have increased following moves to ensure that EU-funded research is, in future, made available via the open-access business model.

A key strategic risk is that OR could be seen as less relevant in the rapidly changing environment, as big data and increasing computing power drive technical developments and as new discipline descriptions compete for attention and funding. We have been mitigating this through a number of initiatives led by our Analytics Development Group and are also actively promoting the relevance of OR to data science, robotics and artificial intelligence as well as other overlapping fields. More generally, we aim to raise the visibility of OR and support outward-looking practice and membership through outreach to other professional societies and to

organisations and businesses who may benefit from what OR has to bring and through the variety of topics and speakers at our events.

A further key risk is that The OR Society could be seen as less relevant to OR professionals. We have been mitigating this through the whole range of activities addressing our strategic goals and described elsewhere in this report.

The Board regularly reviews the risk register covering a wide range of operational risks, including IT risks, and, where feasible, puts mitigating action in place.

### **Brexit Position**

The impact of the exit from the EU by the UK remains under consideration. Whilst the trustees expect the likely direct impact on the Society to be low, the greatest threat would be that of a UK recession brought on trading difficulties. This could impact all sources of income as might happen during any period of economic downturn. The terms of its current publications contract give it considerable protection from such risks. It faces no threat in terms of the origin of its employees.

The threats to the community could be more widespread, from the number of EU citizens working in the field through to access to funding and collaboration on EU research projects.

### **COVID-19 Position**

The COVID-19 pandemic has had an impact on businesses across the world, and in this respect the Society is no different. During, the Society has had to cancel its face-to-face meetings, networking events, training courses and conferences. Online alternatives continue to fill the void and are expected to be in place through the whole of 2021. The Society updated its IT infrastructure during 2019 and this has enabled its staff to all switch to homeworking without disruption. Budgets and cashflow forecasts for 2021 have been revised to account for the loss of income from events, and surplus budget is still planned. The overall cashflow situation remains healthy. In this case, the Society's publishing contract provides protection from such disruption. The Society does not foresee the need to lay off or furlough any of its staff during 2021.

Our investment portfolio value has all-but recovered from its initial losses as a result of the crisis, and fortunately the Society is able to take a long-term position during which the investments can fully recover their value.

In the longer term, the biggest threat will be the impact of the subsequent worldwide economic difficulties.

In summary, the Society's accounting status as a 'going concern' is not changed.

### **Key Management Personnel**

The Key Management Personnel for the Society comprise the trustees (its Board of Directors) and the Executive Director. No remuneration is payable to trustees for service on the Board.

### **Basis for Remuneration**

The President, Treasurer and President Elect or Immediate Past President review the Executive Director's salary and, when agreed by Finance Committee, a written recommendation is made to Board. The Executive Director leads the process for other staff which is again initially discussed by Finance Committee before the recommendations go to Board for final approval.



## ***Voluntary Contributions***

The Society's work in 2020 benefited from voluntary contributions of time, from members and others, through these principal lines of work: refereeing of journal papers; editing of journals; conference organisation; authorship and delivery of talks to regional societies and special interest groups; organisation of regional societies and special interest groups; the work of the Society's officers; contributions to the administration of the Society, its Awards and its accreditations through service on Board and the Society's committees.

The coronavirus pandemic has meant that some of the usual volunteering opportunities have been unable to take place. The Society is delighted in the way its pool of volunteers has responded to the switch to online activities where this has been possible, especially with our two main outreach projects, OR in Schools and Pro Bono OR. Their work benefits the OR community, the future development of the profession and the wider society and is a fine contribution to The OR Society's charitable objectives.

It is estimated that a total of 4,000 person-days were contributed in 2020. If this time is valued at £500 per day, its value is £2M. The Society is most grateful to all who contributed voluntary effort, without which the Society could not accomplish its goals.

# Objectives for 2021

At the start of 20, Board produced a revised version of its 3-5 year goals and priorities. These build on those in place for the previous strategic planning phase and represent exciting opportunities for the Society and the wider OR community. The revised strategic pillars are to: raise awareness of the **importance of OR**; support **OR knowledge development**; support **OR education**; grow **membership and wider reach**; ensure **financial sustainability** of the Society; and address **diversity and inclusion challenges** in OR and the OR Society.

Work has already started on many of the initiatives that we hope will come to fruition in the next year or so:

- working with Taylor & Francis to capitalise on its strategy to maximise the value of our current publications contract, develop robust publishing models to deal with opportunities and challenges presented by open access publishing and Plan S;
- ensuring that OR is fully involved in the Big Mathematics Initiative (following up the recommendations of the Bond review of knowledge exchange in the mathematical sciences);
- building policy influence with key Government contacts and connect with other key decision makers;
- implementing an engagement plan for the analytics / artificial Intelligence /data science community, and specifically implementing the recommendations of the artificial intelligence task-and-finish group;
- supporting the full establishment and growth of the Women in OR and Early Careers networks;
- maximising benefit from the new website, social media campaigns and other marketing activity to raise the brand profile of OR itself;
- once coronavirus restrictions are lifted, launching its museum-based travelling exhibition to raise public awareness of OR;
- progress its bid to come an End point Assessment Organisation and further support the launch of the level 7 OR apprenticeship scheme for OR Specialist;
- strengthening relationship with key bodies such UKRI, Royal Society, Science Council and other learned societies;
- investigating diversification of income, including exploring new streams (accrediting University courses, fundraising / donations, sponsorship);
- implementing our diversity plan based on recommendations from the diversity champion;
- creating and disseminating thought leadership pieces (with the initial focus on ethics);
- demonstrating the relevance of OR to complex problems and big issues.

These developments will be on top of our existing broad sweep of services: conferences, events, lectures and training; publications; Pro Bono OR and OR in Schools; representing The OR Society on bodies including The Council for Mathematical Sciences, the Science Council, EURO and IFORS; and our more inward-looking activities to improve sustainability, efficiency and effectiveness.

For a relatively small professional body in an uncertain world, there are many challenges to overcome. By undertaking these activities, we aim not just to meet the challenges, but to grow the profession and The OR Society's contribution and make the most of the opportunities awaiting us.

# Information about the Society

- (1) The Operational Research Society is a company limited by guarantee (no. 663819). It is also a charity registered in accordance with the provisions of the Charities Act 2011 (registration no. 313713)
- (2) The objects of the Society are given in its Memorandum and Articles and can be summarised as:
  - (a) the advancement of knowledge by fostering, promoting and furthering interest in operational research; and
  - (b) the advancement of education by providing facilities for and, by subsidising it, endowing, organising or supporting scholarships or educational or training schemes; and conducting examinations or advising on their content.
- (3) The Society is empowered to do all proper things in pursuit of these objectives.
- (4) The affairs of the Society were managed during 2020 by the elected officers and members of the Board listed below. Together they constitute the Board of Directors of the limited company and Trustees of the charity and the members of its management committee. Specific matters are delegated to particular committees of the Society by resolution of the Board and in accordance with the Society's Articles.

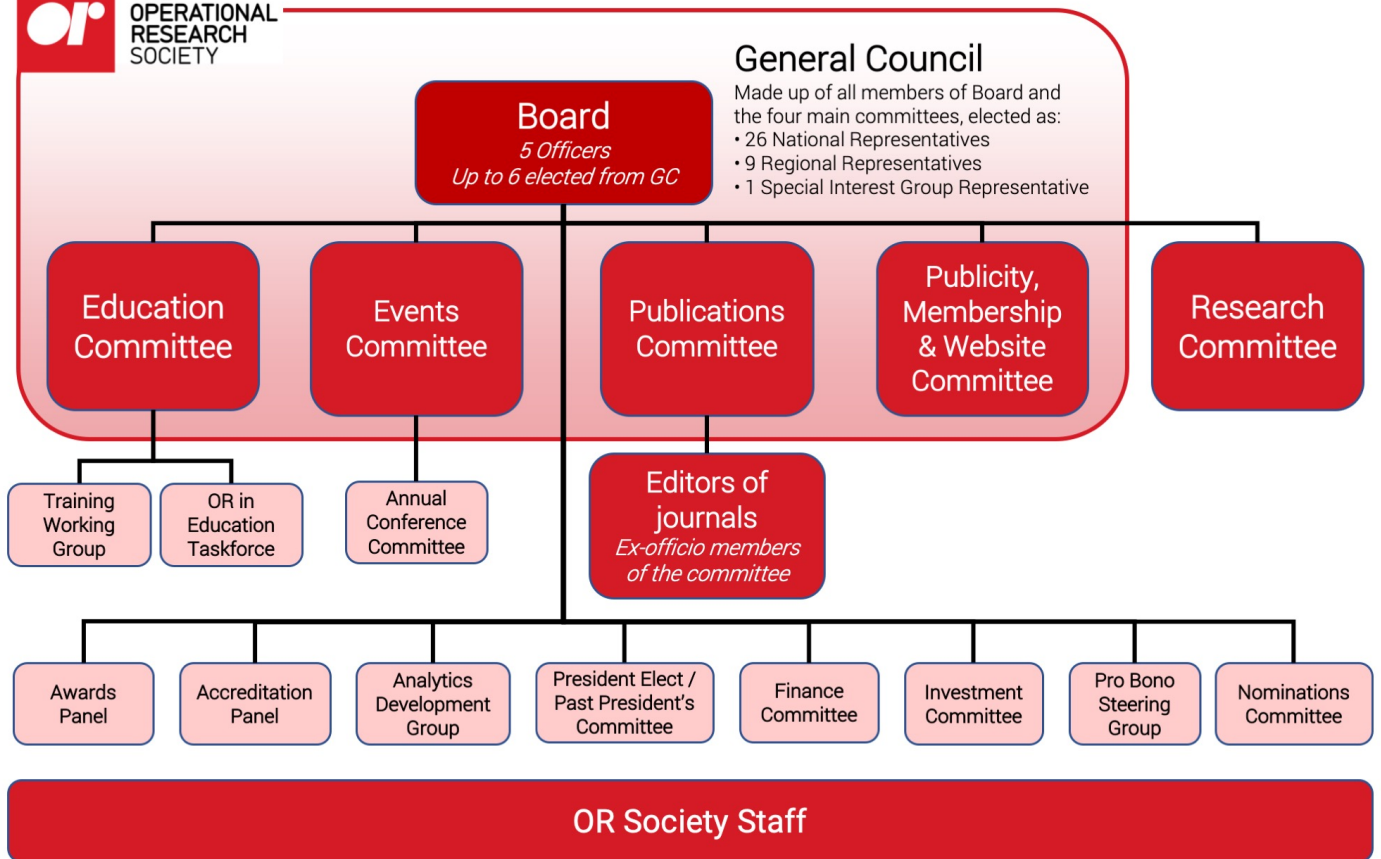
The following served as members of the Board in 2020

E K BURKE President	J BATSON	R A SCOTT
J R HOPES Immediate Past President	A R CLARK	
S HOWICK Vice President	R W EGGLESE	
A P ROBINSON Vice President	J MEDHURST	
J E WILLIAMS Hon. Treasurer	N MORRILL	

Unless otherwise stated, changes in the membership of the Board occur at the end of a calendar year.

The Board is supported by a General Council with a maximum membership of thirty-six. These two bodies assist the Society in its ongoing commitment to involve as many members as possible in its affairs. The Board of Directors is responsible for governance and strategy and the General Council, with its wide representation, provides advice, feedback and challenge and monitors the Board's activity. Members of General Council have also, in all cases, been assigned to one of the Society's four main committees: Publications; Publicity, Membership and Website; Education and Research; and Events and the Chairs of those committees are currently Board members.

The structure is set out in the diagram below.



(5) The committees are established to implement policies of Board & General Council with respect to meeting the Society's objectives and to controlling expenditure. The names of the committees are set out as follows, together with the object ((a) or (b) as above) towards the achievement of which they contribute:

Accreditation Panel	(a)
Analytics Development Group	(a)
Awards Panel	(a)
Education	(b)
Events	(a), (b)
Finance	Management of financial aspects
Investment	Management of investments
Nominations	Volunteer recruitment to governance roles
Past President's/President Elect's	Elections, planning & administrative reviews
Pro Bono Steering Group	(a)
Publications	(a)
Publicity, Membership & Website	(a)
Research	(a)
Training Working Group	(b)

(6) Other Committees are set up from time to time for specific purposes, but they are given no delegated powers. In addition, the Society has a large number of active Special Interest Groups which are listed in the Journal of the Society. They contribute particularly to object (a).

(7) The registered address of the Society is:

Seymour House  
12 Edward Street  
BIRMINGHAM  
B1 2RX

Its Executive Director is:

I G Blackett  
The OR Society  
12 Edward Street  
BIRMINGHAM  
B1 2RX

Its Bankers are:

The Co-operative Bank  
Delf House  
Southway  
SKELMERSDALE  
WN8 6WT

Its Solicitors are:

Sydney Mitchell and Co  
Cavendish House  
Waterloo Street  
BIRMINGHAM  
B2 5PU

Its Auditors are:

Mazars LLP  
45 Church Street  
BIRMINGHAM  
B3 2RT

Its Investment Adviser is:

Tom Quicke  
Investec  
30 Gresham Street  
LONDON  
EC2V 7QN

Its Stockbrokers are:

Investec  
30 Gresham Street  
LONDON  
EC2V 7QN

(8) The Society's investment policy is governed by the legislative provisions relating to charity investments, but the Society is not otherwise restricted in the way in which it can invest. However, it is the Society's policy not to invest in tobacco shares.

(9) These particulars are published in compliance with Accounting and Reporting by Charities: Statement of Recommended Practice applicable to charities preparing their accounts in accordance with the Financial Reporting Standard applicable in the UK and Republic of Ireland (FRS 102) (effective 1 January 2019).

# Public Benefit

The OR Society is a charity and meets the public benefit test as set out in the Charities Act 2011 in various ways:

## **Advancement of education:**

Through the OR in Schools initiative, its many networking, training and conferencing activities in schools, universities and workplaces and extensive on-line resources, The OR Society promotes the understanding of OR and how it can be applied for the wider benefit. The OR Society is a participating society (with voting rights) on the Joint Mathematical Council of the UK.

## **Advancement of science:**

Through its publications, conferences and networking activities; representation on the Council for Mathematical Sciences, Science Council, funding bodies and international federations; and on-line materials and facilities, The OR Society supports, promotes and publicises research; raises standards of research and practice; and promotes the effective application of OR for wider social benefit. Through its accreditation and awards schemes, The OR Society recognises and promotes engagement, effectiveness and development in its members, further raising standards.

## **Advancement of community development:**

The OR Society encourages volunteering and involvement through its Pro Bono OR initiative, involvement of members in outreach to schools and universities and networks of Regional and Special Interest Groups.

The OR Society funds educational, development and research projects that are in line with its charitable aims of advancing knowledge and education through fostering OR

All OR Society events and training are open to all who may be interested. In addition, it minimises barriers to access by:

- (1) ensuring that many of its on-line resources are publicly and freely available;
- (2) keeping membership fees low and offering reduced fees for unwaged groups; and
- (3) supporting Regional and Special Interest Group networks which offer free meetings.

In governing The OR Society, the Trustees have had regard to the Charity Commission's public benefit guidance.

# Statements as to disclosure of information to auditors

In accordance with Company Law, as the charity's trustees, we certify that:

- so far as we are aware, there is no relevant audit information of which the Charity's Auditor is unaware; and
- we have taken all the steps that we ought to have taken in order to make ourselves aware of any relevant audit information and to establish that the Charity's Auditor is aware of that information.

# Statement of responsibilities of the elected officers and members of the Board

Company law requires the elected officers and members of the Board to prepare financial statements for each year which give a true and fair view of the state of affairs of the Society and of the surplus or deficit of the Society for that period. In preparing those financial statements, the elected officers and members of the Board are required to:

- select suitable accounting policies and then apply them consistently;
- make judgements and estimates that are reasonable and prudent;
- state whether applicable accounting standards have been followed, subject to any material departures disclosed and explained in the financial statements;
- prepare the financial statements on the going concern basis unless it is inappropriate to assume that the Society will continue in business.

The elected officers and members of the Board are responsible for keeping proper accounting records which disclose with reasonable accuracy at any time the financial position of the Society and to enable them to ensure that the financial statements comply with the Companies Act 2006. They are also responsible for safeguarding the assets of the Society and hence for taking reasonable steps for the prevention and detection of fraud and other irregularities.

## Appointment of trustees

The officers and other members of the Board are elected by secret ballot of the Society's membership and the members of General Council respectively, to serve for a three-year term (except for the President, who serves one year as President-Elect, two years as President and a further year as Immediate Past-President). A member of the Board, other than the President, whose first term of office has expired may stand for election for one further term. At the end of 2020, two members of the Board completed their terms of office: J BATSON and A R CLARK.

## Induction of new trustees

New trustees receive a comprehensive information pack, setting out details of their role and responsibilities as both trustees and company directors, the nature of a charity, the Society's constitution, its policies on members' interests and expense claims and including the Charity Commission's 'welcome' leaflet.

## Members' interests

In accordance with Article 46 of its constitution, the Society requires that members of Board or committees having an interest in a matter to be debated should declare that interest and leave the room whilst the matter is discussed and decided. Members of the Training Working Group are drawn from organisations which have no interest in bidding for courses and wherever appropriate, recommendations on major charitable projects are made by a special expert committee comprised entirely of disinterested parties.

# Approval of report

We approve this report and the audited accounts for the year 1 January to 31 December 2020 and recommend their adoption by the Society at its Annual General Meeting.

E K BURKE President

J E WILLIAMS Hon Treasurer

R BYDE

R W EGGLESE

J R HOPES

S HOWICK

J MEDHURST

N MORRILL

A P ROBINSON

R A SCOTT

V SENA

Being the elected officers and members of the Board of The Operational Research Society as at 18 May 2021.

I G Blackett

Executive Director

18 May 2021



# Accounts

for the year ended 31 December 2020

## INDEPENDENT AUDITOR'S REPORT TO THE MEMBERS OF OPERATIONAL RESEARCH SOCIETY

### Opinion

We have audited the financial statements of Operational Research Society (the 'charity') for the year ended 31 December 2020 which comprise the Statement of Financial Activities, the Balance Sheet, the Statement of Cash Flows and notes to the financial statements, including a summary of significant accounting policies. The financial reporting framework that has been applied in their preparation is applicable law and United Kingdom Accounting Standards, including FRS 102 "The Financial Reporting Standard applicable in the UK and Republic of Ireland" (United Kingdom Generally Accepted Accounting Practice).

In our opinion, the financial statements:

- give a true and fair view of the state of the charity's affairs as at 31 December 2020 and of its income and expenditure for the year then ended;
- have been properly prepared in accordance with United Kingdom Generally Accepted Accounting Practice; and
- have been prepared in accordance with the requirements of the Companies Act 2006.

### Basis for opinion

We conducted our audit in accordance with International Standards on Auditing (UK) (ISAs (UK)) and applicable law. Our responsibilities under those standards are further described in the Auditor's responsibilities for the audit of the financial statements section of our report. We are independent of the charity in accordance with the ethical requirements that are relevant to our audit of the financial statements in the UK, including the FRC's Ethical Standard and we have fulfilled our other ethical responsibilities in accordance with these requirements. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

### Conclusions relating to going concern

In auditing the financial statements, we have concluded that the trustees' use of the going concern basis of accounting in the preparation of the financial statements is appropriate.

Based on the work we have performed, we have not identified any material uncertainties relating to events or conditions that, individually or collectively, may cast significant doubt on the charity's ability to continue as a going concern for a period of at least twelve months from when the financial statements are authorised for issue.

Our responsibilities and the responsibilities of the trustees with respect to going concern are described in the relevant sections of this report.

### Other information

The other information comprises the information included in the annual report, other than the financial statements and our auditor's report thereon. The trustees are responsible for the other information. Our opinion on the financial statements does not cover the other information and, except to the extent otherwise explicitly stated in our report, we do not express any form of assurance conclusion thereon.

In connection with our audit of the financial statements, our responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the financial

statements or our knowledge obtained in the course of the audit, or otherwise appears to be materially misstated. If we identify such material inconsistencies or apparent material misstatements, we are required to determine whether there is a material misstatement in the financial statements or a material misstatement of the other information. If, based on the work we have performed, we conclude that there is a material misstatement of this other information, we are required to report that fact.

We have nothing to report in this regard.

### **Opinions on other matters prescribed by the Companies Act 2006**

In our opinion, based on the work undertaken in the course of the audit:

- the information given in the Trustees' Report which includes the Directors' Report prepared for the purposes of company law, for the financial year for which the financial statements are prepared is consistent with the financial statements; and
- the Directors' Report included within the Trustees' Report has been prepared in accordance with applicable legal requirements.

### **Matters on which we are required to report by exception**

In light of the knowledge and understanding of the charity and its environment obtained in the course of the audit, we have not identified material misstatements in the Directors' Report included within the Trustees' Report.

We have nothing to report in respect of the following matters in relation to which the Companies Act 2006 requires us to report to you if, in our opinion:

- adequate and proper accounting records have not been kept, or returns adequate for our audit have not been received from branches not visited by us; or
- the financial statements are not in agreement with the accounting records and returns; or
- certain disclosures of trustees' remuneration specified by law are not made; or
- we have not received all the information and explanations we require for our audit; or
- the trustees were not entitled to prepare the financial statements in accordance with the small companies regime and take advantage of the small companies' exemption in preparing the Trustees' Report and from the requirement to prepare a Strategic Report.

### **Responsibilities of Trustees**

As explained more fully in the trustees' responsibilities statement set out on page [X], the trustees (who are also the directors of the charitable company for the purposes of company law) are responsible for the preparation of the financial statements and for being satisfied that they give a true and fair view, and for such internal control as the trustees determine is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, the trustees are responsible for assessing the charity's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless the trustees either intend to liquidate the charity or to cease operations, or have no realistic alternative but to do so.

### **Auditor's responsibilities for the audit of the financial statements**

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance but is not a guarantee that an audit conducted in accordance with ISAs (UK) will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate,

they could reasonably be expected to influence the economic decisions of users taken on the basis of the financial statements.

Irregularities, including fraud, are instances of non-compliance with laws and regulations. We design procedures in line with our responsibilities, outlined above, to detect material misstatements in respect of irregularities, including fraud. Based on our understanding of the charity and its activities, we identified that the principal risks of non-compliance with laws and regulations related to the Charities Act 2011, the Charities Statement of Recommended Practice, employment regulation and fraud, and we considered the extent to which non-compliance might have a material effect on the financial statements. We also considered those laws and regulations that have a direct impact on the preparation of the financial statements, such as the Companies Act 2006.

We evaluated the trustees' and management's incentives and opportunities for fraudulent manipulation of the financial statements (including the risk of override of controls) and determined that the principal risks were related to posting manual journal entries to manipulate financial performance, management bias through judgements and assumptions in significant accounting estimates, in particular in relation to use of restricted funds, and income cut off at year end.

Our audit procedures were designed to respond to those identified risks, including non-compliance with laws and regulations (irregularities) and fraud that are material to the financial statements. Our audit procedures included but were not limited to:

- Discussing with the trustees and management their policies and procedures regarding compliance with laws and regulations;
- Communicating identified laws and regulations throughout our engagement team and remaining alert to any indications of non-compliance throughout our audit; and
- Considering the risk of acts by the charity which were contrary to applicable laws and regulations, including fraud.

Our audit procedures in relation to fraud included but were not limited to:

- Making enquiries of the trustees and management on whether they had knowledge of any actual, suspected or alleged fraud;
- Gaining an understanding of the internal controls established to mitigate risks related to fraud;
- Discussing amongst the engagement team the risks of fraud; and
- Addressing the risks of fraud through management override of controls by performing journal entry testing.

There are inherent limitations in the audit procedures described above and the primary responsibility for the prevention and detection of irregularities including fraud rests with management. As with any audit, there remained a risk of non-detection of irregularities, as these may involve collusion, forgery, intentional omissions, misrepresentations or the override of internal controls.

A further description of our responsibilities for the audit of the financial statements is located on the Financial Reporting Council's website at [www.frc.org.uk/auditorsresponsibilities](http://www.frc.org.uk/auditorsresponsibilities). This description forms part of our auditor's report.

### **Use of the audit report**

This report is made solely to the charity's members as a body in accordance with Chapter 3 of Part 16 of the Companies Act 2006. Our audit work has been undertaken so that we might state to the charity's members those matters we are required to state to them in an auditor's report and for no other purpose. To the fullest extent permitted by law, we do not accept or assume responsibility to anyone other than the charity and the

charity's members as a body for our audit work, for this report, or for the opinions we have formed.

Signed:

Ian Holder  
(Senior Statutory Auditor)  
for and on behalf of Mazars LLP  
Chartered Accountants and Statutory Auditor  
First Floor  
Two Chamberlain Square  
Birmingham  
B3 3AX

# History

In the autumn of 1947, at a dinner discussion convened at the Athenaeum Club in London, it was decided to form the Operational Research Club. The club was inaugurated in April 1948 with an initial membership of 50, under the chairmanship of Sir Charles Goodeve and with Mr J A Jukes as the first secretary. The exclusivity associated with the word “club” was deliberately chosen for the initial period, to ensure clarification of what was meant by operational research and to attempt to develop a wholeness in what was otherwise a somewhat vague field. The club met regularly in the rooms at the Royal Society for technical discussions. By 1953 the initial objectives had been achieved and the pressure to form a normal “learned and professional” society had become strong. Therefore, the club was transformed into The Operational Research Society and its first president was Sir Owen Wansbrough-Jones and the hon secretary Mr B H P Rivett.

## Presidents of the Society

Sir Owen Wansbrough-Jones	1954/55
Sir William K Slater	1956/57
Professor M G Kendall	1958/59
The Earl of Halsbury	1960/61
Professor B H P Rivett	1962/63
Professor G A Barnard	1964/65
Professor R T Eddison	1966/67
Mr E C Williams	1968/69
Mr S Beer	1970/71
Professor K D Tocher	1972/73
Mr R C Tomlinson	1974/75
Mr A M Lee	1976/77
Professor M G Simpson	1978/79
Mr G H Mitchell	1980/81
Professor K B Haley	1982/83
Dr R S Stainton	1984/85
Professor J V Rosenhead	1986/87
Dr J C Ranyard	1988/89
Mr P N Thornton	1990/91
Professor C B Chapman	1992/93
Professor L C Thomas	1994/95
Mr I J Disley	1996/97
Professor R G Dyson	1998/99
Professor M Pidd	2000/01
Mr J Gibb	2002/03
Professor V Belton	2004/05
Professor J D Griffiths	2006/07
Mrs S M Merchant	2008/09
Professor R W Eglese	2010/11
Dr G H Royston	2012/13
Professor S L Robinson	2014/15
Ms R A Kaufman OBE	2016/17
Mr J R Hopes	2018/19
Professor E K Burke	2020/22

# OR Society Awards

## Companion of Operational Research

Sir Hermann Bondi	1983	Professor R G Dyson	2007
Mr D Hicks	1983	Mr E K G James	2007
Professor R V Jones	1983	Professor J Friend	2008
Professor B H P Rivett	1983	Dr G Royston	2008
Mr H R W Watkins	1984	Professor R J Paul	2009
Professor Sir David Cox	1985	Professor A Mercer	2010
Lord Ezra	1985	Mr T O'Connor	2010
Mr P Hughes	1985	Professor V Belton	2011
Lord Zuckerman	1985	Ms R A Kaufman	2011
Sir John Kingman	1986	Professor M Pidd	2011
Sir Dennis Rooke	1986	Professor P H Millard	2012
Sir Charles Carter	1987	Professor D M Ryan	2013
Mr T P Frost	1987	Professor R M Davies	2014
Professor H.Muller-Merbach	1988	Mr C R Humby	2014
Mr D A Quarmby	1989	Mrs S M Merchant	2015
Professor R C Tomlinson	1990	Professor S C Brailsford	2016
Mr R A Showell	1991	Professor J D Griffiths	2016
Mr G H Mitchell	1992	Professor E K Burke	2017
Professor P Whittle	1994	Professor P R Harper	2018
Mr J Plymen	1994	Professor R W Eglese	2019
Professor S Vajda	1995	Mr A Waterhouse	2020
Professor K B Haley	1996		
Professor M F Shutler	1996		
Professor D J White	2001		
Professor K C Bowen	2001		
Dr R A Forder	2005		
Professor F Kelly	2005		
Mr G K Rand	2005		
Dr J C Ranyard	2005		
Professor J V Rosenhead	2005		
Dr J F Miles	2006		

## Beale Medal

J V Rosenhead	1992	J D Griffiths	2009	R Cheng	2018
D J White	1993	K H Haley	2010	A Land	2019
A H Christer	1995	F Kelly	2011	V Belton	2020
G H Mitchell	1998	M D Elder	2012		
H P Williams	1999	K D Glazebrook	2013		
R C Tomlinson	2005	R Fildes	2014		
P Checkland	2006	J Friend	2015		
C Eden	2007	R Ormerod	2016		
L C Thomas	2008	M Jackson	2017		

## Silver Medal

C F Goodeve	1964	A M Lee	1970	S Eilon	1982
P M Morse	1965	R L Ackoff	1971	G Dantzig	1986
K D Tocher	1967	C G Vickers	1975	L V Kantorovich	1986
B H P Rivett	1968	E.K.G.James	1979		
R T Eddison	1969	E M L Beale	1980		

## Bronze Medal

R M Adelson	1965	A R Wild	1967	F K Lyness	1970
J Stringer	1967	D J Chambers	1968	A M Duguid	1972
T A Burgin	1967	M F Cantley	1969	C G Moss	1972

## Goodeve Medal

B H Mahon	1976	J Banasik	2000	S Kapoor	2012
R J M Bailey	1976	J N Crook	2000	A Sheth	2012
N R Tobin	1977	L C Thomas	2000	R True	2012
I Sanderson	1979	R Korporaal	2001	P Kemmer	2013
A J Williams	1980	A Ridder	2001	A Strauss	2013
J G Shepherd	1981	P Kloprogge	2001	T Winter	2013
F K Lyness	1982	R Dekker	2001	J Bengtsson	2014
L P Fatti	1984	S Howick	2002	D Bredstrom	2014
A H Christer	1985	C Eden	2002	P Flisberg	2014
W M Waller	1985	J E Beasley	2003	M Ronnqvist	2014
G Best	1987	H Howells	2003	S Crowe	2015
G Parston	1987	J Sonander	2003	P Bennett	2015
J V Rosenhead	1987	R Hartley	2004	M Daraktchiev	2015
D Rowland	1988	G Lanot	2004	M Utley	2015
I R Turner	1989	S C Brailsford	2005	S C Brailsford	2016
R Bandyopadhyay	1990	V Lattimer	2005	D De Silva	2016
S Datta	1990	P Tarnaras	2005	A Backiel	2017
D Schrady	1992	J Turnbull	2005	B Baesens	2017
D Wadsworth	1992	K Taylor	2006	G Claeskens	2017
A Bouzaher	1993	B Dangerfield	2006	A I Ali	2018
S Offutt	1993	S C Brailsford	2007	G Ince	2018
D W Bunn	1994	D Evenden	2007	A Brice	2019
E R Larsen	1994	V Harinda	2007	R Bye	2019
K Vlahos	1994	P Harper	2007	J Oppen	2019
G M Campbell	1995	A Medina-Borja	2008	J Royset	2019
C F Davis	1995	K S Pasupathy	2008	E Adiyeke	2020
M Carey	1996	K Triantis	2008	S Agrali	2020
D Lockwood	1996	D Ronen	2009	E Canakoglu	2020
C M Yeats	1997	C A Goodhart	2009		
T Rehman	1997	S Kumar	2010		
D-W Tcha	1998	D A Nottestad	2010		
T-J Choi	1998	E E Murphy	2010		
Y-S Myung	1998	L C Thomas	2011		
F Duckworth	1999	F R Johnston	2012		
A J Lewis	1999	E A Shale	2012		

## Stafford Beer Medal

JJ Jahng	2003	P O'Reilly	2011	R Parks	2018
H Jain	2003	P Flanagan	2011	H Xu	2018
K Ramamurthy	2003	R Lederman	2012	C-H Chu	2018
R Lindgren	2004	R Johnston	2012	P Lowry	2018
D Stenmark	2004	H Koch	2013	N Hikmet	2019
J Ljungberg	2004	E Gonzalez	2013	A Connolly	2019
S Sarker	2005	D Leidner	2013	C Davis	2019
S Sahay	2005	D Denyer	2014	A Bhattacharjee	2019
S Madon	2006	M Hall	2014	F Brachten	2020
C Middleton	2007	E Kutsch	2014	B Cabrera	2020
W Cukier	2007	E Lee-Kelley	2014	G Neubaum	2020
S K Sia	2008	P Tallon	2015	L Pilz	2020
C Soh	2008	J Gerow	2016	B Ross	2020
C Ashurst	2009	J Thatcher	2016	S Stieglitz	2020
N Doherty	2009	V Grover	2016		
J Peppard	2009	A Utesheva	2017		
F Thiesse	2010	J Simpson	2017		
J Al-Kassab	2010	D Cecez-	2017		
E Fleisch	2010	Kecmanovic			

## Tocher Medal

K Kotiadis	2009	C-Y Kuo	2015	M Cabrera-Rios	2019
T Pitana	2011	J Xu	2017	D E Arias	2019
E Kobayashii	2011	E Huang	2017	Gonzalez	
C Boer	2013	L Hsieh	2017	E Nino-Perez	2019
Y Saanen	2013	L H Lee	2017	Y M Mendez-	2019
K-H Chang	2015	Q Jia	2017	Vazquez	
A-L Chang	2015	C Chen	2017		

## Cook Medal

P Jackson	2014	M Walsh	2016	D Apostolou	2020
J Klobas	2014	R Murray	2016	E Kalogeraki	2020
D Pentland	2016	L Irvine	2016	S Papastergiou	2020
K Forsyth	2016	F Di Vincenzo	2018	N Polemi	2020
D Maclver	2016	D Mascia	2018		

## Griffiths Medal

H Witteman	2015	G Vanden Berghe	2017	V Caldwell	2019
J Stahl	2015	V Mabin	2019		
M Mihaylow	2017	J Yee	2019		
P Smet	2017	S Babington	2019		
W Van Den Noortgate	2017	R Moore	2019		



## Ranyard Medal

A Jeyaraj	2020
A Zadeh	2020

## Lyn Thomas Impact Medal

S Crowe	2019
C Pagel	2019
M Utley	2019

## Doctoral Award

K Kaparis	2008	T Lidbetter	2013	G Palmer	2018
A Strauss	2009	M Takac	2014	M Bedenek	2019 †
F Liberatore	2010	C Koc	2015	L Morgan	2019 †
R Wood	2011	I Megiddo	2016		
K Rustogi	2012	J F Sze	2017		

† Joint winners

## President's Medal

D R Corkindale	1976	P Loader	2004	M Wauben	2019
M L Chambers	1977	M Bryant	2004	P Macdent	2019
R G Dyson	1977	P Bates	2004	B Marshall	2019
M Sloman	1978	C McGuckin	2004	E Baggot	2020
J V Rosenhead	1979	D Kelly	2004	K Brett	2020
P Doyle	1980	P Loucopoulos	2005	J Low	2020
J Fenwick	1980	KG Zagafos	2005	H Mann	2020
G P Savage	1980	Y Pyrgiotis	2005	M McKee	2020
D B Gilding	1981	D Beis	2005	S Rose	2020
C Lock	1981	A Swain	2006	S Smith	2020
B Fokkens	1982	A Ross	2006		
M Puylaert	1982	A Lewins	2007		
R S Hambleton	1983	M Sykes	2007		
A W Nimmo	1984	A Moon	2007		
C B Chapman	1985	M Allwright	2008		
D F Cooper	1985	J Ball	2008		
A B Cammaert	1985	D Pankhurst	2008		
P Doyle	1987	I Wright	2008		
J Saunders	1987	P Frangos	2010		
M Pidd	1988	S Hughes	2010		
S R Clarke	1989	S Hammond	2011		
A H Christer	1990	K Slater	2011		
K A H Kobbacy	1990	C Marston	2012		
B C Dangerfield	1991	P Rose	2012		
C A Roberts	1991	S Mardle	2013		
M B Wright	1992	L Fildes	2013		
C P Thunhurst	1993	A Lewins	2013		
C J Ritchie	1993	E Husemann	2014		
A Khakee	1994	D Lane	2014		
K Stromberg	1994	E Munro	2014		
J J Glen	1996	G Owusu	2016		
H Tsoukas	1997	S Shakya	2016		
D B Papoulias	1997	R Dorne	2016		
J H Powell	1998	A Mohamed	2016		
G Laporte	1999	A McCormick	2016		
F Semet	1999	A Liret	2016		
V V Dadeshidze	1999	O Buhlinger	2017		
L J Olsson	1999	C Henzel	2017		
F Vasko	2000	M Clocherty	2017		
H Gilles	2000	M Knapton	2017		
D Bright	2000	H Papachristou	2017		
V Kocatulum	2000	C Legge	2017		
E Wolf	2000	R Leese	2018		
J Moffat	2000	J Blaavand	2018		
J J Race	2001	C Centazzo	2018		
D Burnell	2001	A Bejan	2018		
M Neighbour	2002	P Munday	2018		
M Acutt	2003	A Booker	2019		



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