EURO 2019

UCD, DUBLIN, IRELAND

CONFERENCE FINAL REPORT

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1   Planning and Organisation

The Thirtieth European Conference on Operational Research (EURO XXX or EURO 2019) was held at University College Dublin (UCD) from 23-26 June 2019. In this section, we outline the roles played by the people who made EURO 2019 happen, including the Programme Committee (PC), the Organising Committee (OC) and support staff from Abbey Events PCO and from UCD.

The conference was organised through the Analytics Society of Ireland (ASI), working together with EURO and UCD, with the UCD Centre for Business Analytics acting as the link between UCD and the other partners. The Programme Committee, responsible for scientific content, was led by Luís Gouveia of the Faculty of Sciences, University of Lisbon. The Organising Committee, which organised the conference "on the ground", was led by Seán McGarraghy of University College Dublin.

The planning began in late 2015, when the initial bid and costing was put together by Seán McGarraghy and Cathal MacSwiney Brugha, President of the ASI, for submission to the January 2016 meeting of the EURO Executive Committee; thus, the planning and organisation extended over a period of more than three and a half years.

EURO 2019 was a collaborative effort and could not have succeeded without the goodwill and intensive efforts of many dedicated people. The OC and PC Chairs would like to thank these people wholeheartedly, and note the camaraderie and helpfulness of EURO itself, particularly from the responsible EURO Executive Committee (EC) members, and the EURO IT Manager Bernard Fortz and EURO Conference Advisor Willi Weber.

We would especially like to thank Sarah Fores, EURO Manager (right), who played a key role in the organisation of EURO 2019 from the very beginning, including multiple visits to Ireland to interview PCOs, detailed work at OC meetings, meetings with the Abbey PCO, and working throughout the duration of the conference in late June 2019, on too many things to mention!

1.1   Programme Committee

EURO conferences gather together the finest researchers in the Operational Research (OR) / Management Science (MS) and cognate areas. The Programme Committee was composed of highly devoted individuals who are expert in these areas. To aid in knowledge transfer and ensure an "institutional memory" of how a EURO conference is run, the EURO 2019 PC included Greet Vanden Berghe (PC Chair of the Valencia EURO 2018 conference), Albert Wagelmans (EURO VP1, responsible for conferences), Bernard Fortz (EURO IT Manager) and Willi Weber (EURO conference advisor).

Luis Gouveia
Portugal

Christina Buesing
Germany

Stéphane Dauzère-Pérès
France

Cristinca Fulga
Romania

Ana Camanho
Portugal

Matthias Ehrgott
England

Patrizia Daniele
Italy

Bernard Fortz
Belgium

Milos Kopa
The Czech Republic

Markus Leitner
Austria

Marta Szachniuk
Poland

Inmaculada Rodríguez Martín
Spain

Joris Van Den Klundert
The Netherlands

Gerhard-Wilhelm Weber
Poland

Seán McGarraghy
Ireland

Greet Vanden Berghe
Belgium

1.2   Organising Committee

Organising a major event such as EURO 2019 takes a lot of effort and dedication. Here, we list the OC colleagues involved, spanning several universities, schools and departments. As with the PC, the OC received invaluable help from previous organisers and people from EURO with experience of running EURO-k conferences. We would particularly like to thank Rubén Ruiz and Ramón Álvarez-Valdés (OC co-chairs, EURO 2018, Valencia), Joanna Józefowska (OC Chair, EURO 2016, Poznan), and Val Belton and Tim Bedford (OC co-chairs, EURO 2015, Glasgow).

Again, the OC benefitted from EURO's "institutional memory", in the form of members Albert Wagelmans (EURO VP1) and Sarah Fores (EURO Manager), whose contribution cannot be overstated.

Seán McGarraghy
Chair

Cathal MacSwiney Brugha

Tony Brabazon

Paula Carroll

Sarah Fores

Brian Fynes

Vicent Hargaden

Patrick Healy

Peter Keenan

Michael MacDonnell

James McDermott

Miguel Nicolau

Stephan Onggo

Michael O'Neill

Albert Wagelmans

Luís Gouveia

1.3   Collaborating Organisations

1.3.1   Analytics Society of Ireland (ASI)

In the Irish language, "The Analytics Society of Ireland" is "An Cumann Éireannach d'Anailísí".

The society was founded by David Kennedy in 1964 as the Operations Research Society of Ireland. David had studied Operations Research in the United States, and introduced it into Aer Lingus, which he later was to lead as CEO.

In 1972 the ORSI hosted one of the first IFORS conferences to be held in Europe, with Dr. Fred Ridgeway as Chair of the Local Organising Committee. At this conference the decision was taken to set up EURO, the Association of European Operational Research Societies. The ORSI was one of the founder members of EURO.

Over the years the Society has broadened its remit to become attractive to a wider group. In 1985 Management Science was included, and later Systems Science and Decision Science, to become the Management Science Society of Ireland. In 2010 the Society re-cast itself as the Analytics Society of Ireland (ASI).

Over the years the Society has run annual conferences, seminars, student conferences and newsletters. While demand for these has reduced, the practice of operations research has increased, by people in engineering, finance, software, ICT, where the Irish export-orientated economy, with strong links to U.S. industry, has grown over the years.

Now the ASI acts as a node in a network that links Ireland to international activities in Analytics, Management Science, Operational Research, Systems Science and Decision Science.

The ASI is pleased to have hosted EURO 2019, as a member society of EURO: EURO has come home.

1.3.2   EURO

EURO is the Association of European Operational Research Societies. It is a non-profit organisation, founded in 1975 and domiciled in Switzerland. Its objective is to promote Operational Research throughout Europe. EURO is a regional grouping within the International Federation of Operational Research Societies (IFORS), and full membership is restricted to national societies that are members of IFORS.

EURO is regulated by a Council consisting of representatives/alternates of all its members and an Executive Committee, which constitutes its board of directors. In addition, the Executive Committee and Council select an IFORS Vice-President to liaise with IFORS. EURO is supported by additional officers who have specific responsibilities and administrative roles.

The aims of EURO are the advancement of knowledge, interest and education in operational research by the exchange of information, the holding of meetings and conferences, the publication of books, papers, and journals, the awarding of prizes, and the promotion of early stage talents. Full details of EURO activities can be found at: https://www.euro-online.org

1.3.3   University College Dublin

Since its foundation over 160 years ago, University College Dublin (UCD) has made a unique contribution to the creation of modern Ireland. UCD is one of Europe's leading research-intensive universities, carrying out undergraduate education, masters and PhD training, research, innovation and community engagement.

The international standing of UCD has grown in recent years; it is currently ranked within the top 1% of higher education institutions world-wide. UCD is also Ireland's most globally engaged university with over 30,000 students drawn from 136 countries, including almost 4,000 students based at locations outside of Ireland. The University's main Dublin campus occupies an extensive parkland estate of 133 hectares and offers world-leading facilities including the UCD O'Brien Centre for Science, UCD Sutherland School of Law, UCD Lochlann Quinn School of Business, and the UCD Student Centre.

In 2018/19 UCD researchers secured €153 million in research grants from national and international funding agencies, companies and foundations. Since 2009/10 UCD researchers have secured over €1 billion in such grants. Their research underpins national research and technology institutes and centres. UCD faculty also engage in international research collaborations, sharing and contributing to a global bank of knowledge. Over the last decade UCD researchers have authored more than 31,000 papers in total. 54% of the papers were co-authored with researchers from more than 130 countries. These papers are cited by other researchers at a rate that is 71% above the world average.

UCD is globally recognised for its excellence in teaching and learning. This quality of teaching is complemented by a high standard of support. Every incoming first year is assigned a peer mentor and there are student advisers for every programme. UCD is Ireland's University of first choice, leading in first-preference applications in Ireland year after year. The first-year retention rate is 94%. For the last three years UCD has ranked number one in Ireland for Graduate Employability (QS Graduate Employability Rankings 2018, 2019, 2020).

UCD is also Ireland's leader in graduate education with over 9,500 graduate students; almost 20% of whom are graduate research students. 1,611 PhD students benefit from a structured PhD programme as well as the research-led education culture at UCD.

UCD's world extends beyond its campus, city and borders. UCD students and worldwide network of 279,000 alumni benefit from a UCD education that enables them to thrive and contribute in an increasingly global community. As the number one 'university of destination' for international students coming to Ireland, UCD's 8,428 international students make up 29% of the student body, while international academics make up 30% of UCD's faculty.

Operational Research in UCD is mostly located in the College of Business, but also in the Colleges of Engineering and Science. Researchers in OR collaborate through the UCD Centre for Business Analytics (CBA). The UCD Centre for Business Analytics incorporates a cross-section of disciplines associated with Business Analytics, Operational Research, Management Science, Systems Science and Decision

Support Systems. It facilitates the development of, and provides ongoing support for, an internationally recognised, UCD-based community of researchers whose work focuses on Decision-Making, Modelling, and Practice. The UCD Centre for Business Analytics aims to lead research in business analytics, management science, decision science, decision support systems and systems science in Ireland. The emphasis is on the practical application of technical approaches to solving problems in business.

The UCD Centre for Business Analytics was the formal link between the Analytics Society of Ireland and UCD, for the purposes of hosting EURO 2019.

1.3.4   Abbey

Founded in 1988, Abbey Conference & Events are award winning Professional Conference & Event Organisers. They are part of the Abbey Group, who are Ireland's largest inbound tour operator. Their quality and experience are best demonstrated by their portfolio of International and National Conferences & Events. Specialising in association conferences, Abbey have worked with organisations from a wide range of disciplines over the years including scientific, medical, financial, academic, industry and pharmaceutical as well as a number of Government Departments.

There are currently 20 full-time experienced multi-lingual employees within Abbey Conference & Events whilst the Abbey Group has over 170 employees with fluency in 13 languages.

1.4   Conference Sponsors

EURO 2019 exceeded its sponsorship target of €30,000, gaining €36,600 sponsorship from scientific and publishing sponsors, as well as €36,311 funding from the Irish National Tourism Authority, Fáilte Ireland, for a total of €72,911.

We are very grateful to all of our sponsors, especially Fáilte Ireland and Platinum Sponsor Gurobi.

Irish National Tourism Authority

Platinum Sponsor:

Silver, Bronze and Stand sponsors:

1.5   Committees and meeting agendas

Each of the Programme and Organising Committees had a number of meetings. In-person meetings were limited; both committees had much more contact through web conferencing, email and other virtual means. The OC and PC chairs had weekly Skype calls for the 8 months leading up to the conference.

At the end of the EURO 2018 Valencia conference, the "Washup meeting", a working lunch on the final day of EURO 2018, proved very fruitful in transferring knowledge and ideas as to what worked well and what worked less well. It was attended by the PC and OC chairs of both EURO 2018 and EURO 2019, together with Albert Wagelmans (EURO VP1) and Anja Fischer and Gráinne McQuaid of Abbey Events PCO.

The Programme Committee had two formal meetings. The first one was during the EURO 29 conference in Valencia, 9-11am on 10 of July 2018. During this meeting, most of the members of the Programme Committee were present.

The second meeting of the Programme Committee was hosted by the conference organisers and was held during 26-27th February 2019 at UCD, after the 15th February extended abstract submission deadline, which allowed a good view of the numbers and kinds of abstracts submitted. During this visit, the PC had long meeting sessions and a tour of the university venues and main conference rooms.

The PC also had time to continue working and relax during lunches and dinners, which was key in strengthening the collaboration between the members of the Programme Committee.

As most of the members of the Organising Committee were based in Dublin, there were frequent meetings at UCD during 2017-2019, in particular during late 2018 and the first half of 2019. Many of these were ad-hoc or attended by a smaller group working on a particular topic (e.g., finding travel times among rooms to locate related talks geographically closer); all were attended by the OC chair. Major meetings included those on 26 September 2018, 6 December 2018, 22 February 2019 and 12 March 2019. These were also attended by the PCO, Abbey Events, and in some instances UCD Building Management, to discuss room requirements. Also, some OC members attended the 26-27 February PC meeting, to introduce the two committees.

1.6 Conference App

Previous EURO and IFORS conferences had used third party mobile applications (apps) which generally worked well but came at a cost. EURO 2019 used a bespoke app developed by EURO IT Manager Bernard Fortz: this was a mobile version of the conference program (a progressive web app).

It was chosen for the following reasons:

- designed to be closely integrated with the EURO abstract system and database

- easy to include graphics or other content such as social program, building maps, google maps (with link that open directly in the smartphone app if using a smartphone), or an integrated map, needing only the html code and the graphics file. Any content that fits on a webpage fits in the app

- road-tested at OR2018 in Brussels (organised by Bernard), which used the EURO abstract submission system, and generated very positive feedback

- in-house EURO solution with no integration issues, and with no cost

- on a smartphone, the page can be added to the home screen, so it becomes a full app with offline access as well

The app front page is shown to the right:
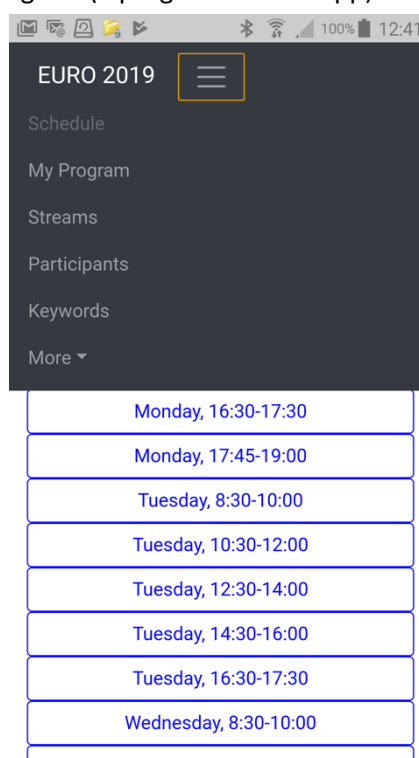
1.7 Event promotion

Because of the block booking of UCD buildings campus-wide during the months of July and August, for language classes to non-English-speaking students, EURO 2019 could not be run in early July – the usual time for EURO conferences. This led to some issues affecting potential attendance, which were understood by the organisers early on:

a.   the earlier than usual timing of EURO 2019 in late June instead of the normal early July;

b.   the overlap of the EURO2019 conference with other cognate conferences; and

c.   many universities in southern Europe have exams running in late June.

Given this understanding that the OC and PC had of potential difficulties in attracting delegates, extra efforts had to be made to attract speakers and delegates to the conference. These efforts included:

- Fliers were handed out at numerous conferences

- Gerhard-Wilhelm Weber and other PC and OC members made a great effort in marketing the EURO 2019 conference at various conferences;

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- EURO 2019 shared a stand at IFORS, Quebec City, July 2017 with the team from EURO 2018 Valencia. The stand was manned by the Valencia team, and they kindly distributed EURO 2019 "Save the Date" bookmarks and shamrock pins. In addition, the OC Chair Seán McGarraghy gave a presentation on EURO 2019 during the IFORS 2017 closing session.

- EURO 2019 had a dedicated stand at the EURO 2018 conference in Valencia, and handed out fliers, bookmarks and shamrock pins. The OC Chair Seán McGarraghy also presented on EURO 2019 during the EURO 2018 closing session.

- Mailing lists and personal contacts were used to announce the conference, themes, invited speakers, etc.; Gerhard-Wilhelm Weber particularly contributed to this. The conference was announced very widely, and also to developing countries.

1.8   Social and environmental responsibility

EURO 2019 took seriously its effect on the environment and society. To reduce its negative impacts, and to leverage available technology, a number of approaches were taken. These approaches included the following:

- the badge was made of durable paper, with no plastic surround. Badges were printed as needed, meaning no badges were printed for "no-shows";

- the conference bag was made from sustainably produced cotton rather than plastic, and was designed to be convenient for reuse, functioning either as a rucksack or overarm bag;

- the wide use of mobile devices and the campus-wide availability of eduroam, together with the conference app, easy access to the conference website and the dynamic conference programme, meant there was no need for a bulky programme which could be out of date as soon as printed. Rather than print a full conference schedule, the A5 conference handbook was designed to be compact but still have the main information about the conference. In addition, a foldout A4 cardboard Conference Overview gave an "at-a-glance" view of the conference areas, streams and sessions, together with the campus and building maps. The maps were provided in hard copy because (a) few devices are A4 in size, and a larger map is easier to use; (b) hard copies do not run out of battery when you need them most.

2 Scientific Programme

2.1 Areas and call for papers

The first Announcement and Call for Papers was sent on October 22nd, 2018, giving general information about the important dates, registration fees, and abstract submission, and referring to the web page, already set and working. The second Announcement and Call for Papers was sent on January 5th, 2018, this time also including detailed information about the Plenary and Tutorial (Keynote) speakers, and the special sessions. Two more calls for papers were sent later on, one at the end of January and the last one on February 4th. In addition, several members of the Programme Committee and other EURO members had already made additional calls for papers of their respective areas, working groups and national societies. If one was an OR researcher or practitioner, the conference would be hard to miss.

2.2 Submission process

There were 25 areas for which an author could submit an abstract. Each area was further divided into several streams, and each stream comprised a number of 90-minute sessions, each session being up to four talks. The PC members managed the abstracts submitted to their area. This was overseen by the PC Chair, Luís Gouveia. The original deadline for abstract submission was February 8th but, following the tradition of previous EURO conferences it was extended, but only by one week, until February 15th. However, following the advice of area coordinators, a few abstracts were accepted after the deadline. As can be seen from the figures below, a large number of the abstracts (over 700) were submitted very close to the deadline, following the general tendency from previous EURO conferences. The second figure also indicates that we received nearly 2200 by the first deadline, and this number finally increased to 2562 abstracts. The length of the abstracts was maintained at 1500 characters. The review process was carefully done by the area coordinators, resulting in a very small number of rejections (23). Authors were informed of the abstract acceptance by the planned date, March 21st. Before organising the final programme, 84 abstracts were withdrawn (cancelled) by the authors and 435 removed because the authors did not register for the conference. Overall, slightly more than 2000 presentations were presented at EURO 2019 during the days 23–26 June 2019.

Submissions by country are shown in the table below:

Country	Number	Country	Number	Country	Number
Algeria	1	India	31	Portugal	64
Argentina	3	Ireland	37	Qatar	1
Australia	26	Israel	33	Romania	10
Austria	64	Italy	155	Russian Federation	18
Belgium	74	Japan	32	Saudi Arabia	5
Brazil	46	Korea, Republic of	25	Serbia	3
Canada	46	Latvia	2	Singapore	4
Chile	43	Lebanon	1	Slovakia	6
China	32	Lithuania	6	Slovenia	5
Colombia	4	Luxembourg	2	South Africa	10
Croatia	7	Malta	1	Spain	130
Cyprus	1	Mexico	9	Sweden	19

Czech Republic	34	Nepal	1	Switzerland	21
Denmark	32	Netherlands	71	Taiwan	17
Ecuador	4	New Zealand	8	Tanzania	1
Finland	21	Nigeria	3	Tunisia	2
France	111	Norway	30	Turkey	72
Germany	247	Oman	1	Ukraine	2
Greece	35	Pakistan	2	United Arab Emirates	2
Hong Kong	11	Peru	3	United Kingdom	176
Hungary	11	Philippines	2	United States	126
Iceland	2	Poland	37		

2.3   Main conference Schedule

The schedule for the normal sessions is shown in the next figure.

Sunday June 23	Monday-Wednesday		Monday June 24	Tuesday June 25	Wednesday June 26
	Morning A		MA 8:30 - 10:00 **Parallel Sessions**	TA 8:30 - 10:00 **Parallel Sessions**	WA 8:30 - 10:00 **Parallel Sessions**
	Coffee break		10:00 - 10:30	10:00 - 10:30	10:00 - 10:30
	Morning B		MB 10:30 - 12:00 **Parallel Sessions**	TB 10:30 - 12:00 **Parallel Sessions**	WB 10:30 - 12:00 **Parallel Sessions**
			12:00-12:30	12:00-12:30	12:00-12:30
Lunch 12:00 - 14:30		**Midday C**	MC 12:30 - 14:00 **Parallel Sessions**	TC 12:30 - 14:00 **Parallel Sessions**	WC 12:30 - 14:00 **Parallel Sessions**
			14:00 - 14:30	14:00 - 14:30	14:00 - 14:30
	Afternoon D		MD 14:30 - 16:00 **Parallel Sessions**	TD 14:30 - 16:00 **Parallel Sessions**	WD 14:30 - 16:00 **Parallel Sessions**
	Coffee break		16:00 - 16:30	16:00 - 16:30	16:00 - 16:30
	Afternoon E		16:30 - 17:30 **Plenary**	16:30 - 17:30 **Plenary**	16:30 - 17:30 **Plenary**
17:30 - 19:00 **Opening session**			17:45 - 19:00 **Women in OR**		17:45 - 19:00 **Closing session**
19:00 **Welcome party**				20:00 **Gala dinner**	19:00 **Closing Party**

As in previous EURO conferences, the integer programme developed by Thomas Stidsen was key in scheduling of the conference sessions and talks. For EURO 2019, Thomas added new features to the IP allowing for association of related sessions in geographically close locations. Adjustments were made afterwards to further compress and reorganise sessions. This resulted in a maximum of 55 parallel sessions at any one time.

The full programme was and is available at https://www.euro-online.org/conf/euro30/myprogram

2.4   Opening and Closing Sessions

2.4.1   Opening Session

At the Opening Session (17:30-19:00) Sunday 23 June, the PC Chair, Luís Gouveia, opened the conference and the President of EURO, Immanuel Bomze, welcomed the delegates to the conference. The Irish Government Minister for Higher Education, Mary Mitchell O'Connor, spoke of the history and relevance of OR and Science in Ireland, with particular reference to the role of women, while the

UCD Dean of Business, Professor Tony Brabazon, on behalf of the UCD President, introduced the delegates to the UCD campus.

Roman Słowiński, as chair of the 2019 EURO Distinguished Service Medal (EDSM) Jury presented the EDSM 2019 to Paulo Toth, and described his many and varied contributions to OR, both academically and in other ways.

M. Grazia Speranza, chair of the 2019 EURO Gold Medal (EGM) Jury, gave some background about the medal, and introduced the 2019 winner, Martine Labbé, the first female recipient of the EGM. Martine then gave a presentation on her work.

Following Martine's presentation, the EURO 2019 PC Chair, Luís Gouveia, gave an overview of the conference programme, including the plenary and tutorial talks, special sessions and special issues of journals (all of which are described in further detail in later subsections).

The EURO 2019 OC Chair, Seán McGarraghy, outlined the running of the conference and the efforts made to run it sustainably. He described the UCD campus, including locations of conference buildings, coffee/snack and lunch points and exhibition stands, and showed the building maps relevant to EURO 2019. The Opening Ceremony concluded with an exhibition of Irish music and dancing by a talented group including current and former UCD students.

EURO Distinguished Service Medal winner, Paulo Toth (centre), receives his medal from EDSM Jury chair, Roman Słowiński (left) and EURO President, Immanuel Bomze (right)

EURO Gold Medal winner, Martine Labbé, receives her medal and certificate from EURO President, Immanuel Bomze, and EGM Jury chair, M. Grazia Speranza (left); and gives a presentation (right)

Opening Ceremony (L-R): PC Chair, Luís Gouveia, EDSM Jury Chair Roman Słowiński, UCD Dean of Commerce Tony Brabazon, Minister Mary Mitchell O'Connor, EURO President Immanuel Bomze, ASI President Cathal MacSwiney Brugha and OC Chair Seán McGarraghy

Catherine Brugha, PC Chair Luís Gouveia, Minister Mary Mitchell O'Connor and OC Chair Seán McGarraghy

The Opening Session concluded with an exhibition of Irish music and dancing by a group including current and former UCD students

2.4.2   Closing Session

The Closing Session was opened by Seán McGarraghy, OC Chair. During the conference a number of awards had been decided upon, namely: the EURO Award for the Best EJOR Paper (EABEP 2019); the

EURO Doctoral Dissertation Award (EDDA 2019); the EURO Excellence in Practice Award (EEPA 2019); and the ROADEF/EURO Challenge Awards. The awards were presented during the closing ceremony. For further details of these, see the next section.

Bumsoo Kim, member of the local organising committee for IFORS 2020, spoke on the upcoming IFORS 2020 conference in Seoul, South Korea. Following his presentation, Nikos Tsotsolas described the succeeding EURO 2021 conference to be held in Athens, hosted by HELORS, the Hellenic Operational Research Society.

Luís Gouveia, PC Chair, made some final remarks, thanking all the people who helped make EURO 2019 a success. He was followed by Albert Wagelmans, EURO VP1 with responsibility for conferences, who spoke of the very good weather he had on his visits to Ireland, and the welcome sign that missed out some relevant languages – the reader is invited to find which…

Albert then announced that the EURO 2022 conference would be held by the Finnish OR Society, at Aalto Campus, Espoo, Finland from 4-7 July 2022.

Seán McGarraghy wrapped up the conference with an overview of the three and a half days, thanking all who had contributed; then the delegates went out in the sun to enjoy the Closing Party.

PC Chair Luís Gouveia thanks all those who made the EURO 2019 Conference a success

EURO VP Albert Wagelmans presented mementos to Cathal MacSwiney Brugha, President of the ASI, Seán McGarraghy, OC Chair and Luís Gouveia, PC Chair

2.5 Plenary and Tutorial speakers

Three plenary and twelve tutorial (keynote) speakers were invited for this conference. All plenary and tutorial talks were given in the O'Reilly Hall auditorium. After each talk, the session chair presented the speaker with a personalised Irish crystal paperweight containing the EURO 2019 green shamrock logo, as a memento of EURO 2019.

The schedule for the plenary and tutorial talks is given below:

Sunday June 23	Monday-Wednesday		Monday June 24	Tuesday June 25	Wednesday June 26
	Morning A		MA 8:30 - 10:00 **Sally Brailsford**	TA 8:30 - 10:00 **Anna Nagurney**	WA 8:30 - 10:00 **Sheetal Silal**
	Coffee break		10:00 - 10:30	10:00 - 10:30	10:00 - 10:30
	Morning B		MB 10:30 - 12:00 **Leon Petrosjan**	TB 10:30 - 12:00 **Hólger Hoos**	WB 10:30 - 12:00 **Roberto Cominetti**
			12:00-12:30	12:00-12:30	12:00-12:30
Lunch 12:00 - 14:30	**Midday C**		MC 12:30 - 14:00 **Nicole Adler**	TC 12:30 - 14:00 **Claudia D'Ambrosio**	WC 12:30 - 14:00 **Ivana Ljubic**
			14:00 - 14:30	14:00 - 14:30	14:00 - 14:30
	Afternoon D		MD 14:30 - 16:00 **Nico Vandaele**	TD 14:30 - 16:00 **Bernd Bischl**	WD 14:30 - 16:00 **Piotr Faliszewski**
	Coffee break		16:00 - 16:30	16:00 - 16:30	16:00 - 16:30
	Afternoon E		16:30 - 17:30 **Ulrike Reisach**	16:30 - 17:30 **William Cook**	16:30 - 17:30 **Dick Den Hertog**
17:30 - 19:00 **Opening session**			17:45 - 19:00 **Women in OR**		17:45 - 19:00 **Closing session**
19:00 **Welcome party**				**20:00** **Gala dinner**	19:00 **Closing Party**

Affiliations and titles of talks of plenary and tutorial speakers are described below.

2.5.1 Plenary Speakers:

There were three plenary talks, each of which had no other session in parallel. The affiliations and titles of talks of the plenary speakers are given below.

Ulrike Reisach, *Neu-Ulm University of Applied Sciences, Germany*
Title: "Artificial Intelligence – How Ethics and Governance could contain the Manipulation of Societies"

William Cook (IFORS Distinguished Lecturer), *Johns Hopkins University, United States of America*
Title: "The Traveling Salesman Problem: postcards from the edge of impossibility"

Dick den Hertog, *Tilburg University, The Netherlands*
Title: "What every OR practitioner should know about Robust Optimization"

Ulrike Reisach gives her plenary presentation on Ethics in OR

Bill Cook receives the IFORS Distinguished Lecturer plaque from IFORS President M. Grazia Speranza (left); and gives his presentation on the TSP (right)

Dick den Hertog gives his plenary presentation on Robust Optimisation

2.5.2   Tutorial Speakers:

There were twelve tutorial (keynote) talks, on hot topics in OR. The affiliations and titles of the talks of the tutorial speakers are given below.

Sally Brailsford, *University of Southampton, UK*
Title: "Introduction to hybrid simulation"

Leon Petrosyan, *St. Petersburg University, Russia*
Title: "Time-Consistency Problem in Control Theory and Dynamic Games"

Nicole Adler, *Hebrew University, Israel*
Title: "Applying game theory to analyze air transport markets"

Nico Vandaele, *KU Leuven, Belgium*
Title: "Humanitarian Operations Modeling at the Interplay of Relief and Development"

Anna Nagurney, *Isenberg School of Management, USA*
Title: "Game Theory and Variational Inequalities:
From Transportation and Supply Chains to Financial Networks and the Internet"

Holger Hoos, *Universiteit Leiden, The Netherlands*
Title: "Programming by Optimisation: Automated algorithm configuration, selection and beyond"

Claudia D'Ambrosio, *CNRS, LIX, Ecole Polytechnique, France*
Title: "Challenging Optimization Problems in Energy Production and Transportation"

Bernd Bischl, *LMU Munich, Germany*
Title: "Bayesian Optimization and Automatic Machine Learning"

Sheetal Silal, *University of Cape Town, South Africa*
Title: "Evidence-based tools to support decision making for malaria elimination"

Roberto Cominetti, *Universidad Adolfo Ibáñez, Chile*
Title: "Routing games in congested networks: convergence for large games and the Price-of-Anarchy"

Ivana Ljubic, *ESSEC Business School of Paris, France*
Title: "From Game Theory to Graph Theory: A Bilevel Journey"

Piotr Faliszewski, *AGH University of Science and Technology Krakow, Poland*
Title: "Committee Elections: Applications, Axioms, and Algorithms"

Sally Brailsford

Anna Nagurney

Sheetal Silal

Leon Petrosyan

Holger Hoos

Roberto Cominetti

Nicole Adler

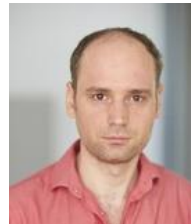**Claudia D'Ambrosio**

Ivana Ljubic

Nico Vandaele

Bernd Bischl

Piotr Faliszewski

2.6 Special Sessions, Awards, Prizes and Challenges

As in previous EURO conferences, there were a number of special sessions as summarised in the figure below.

Sunday June 23	Monday-Wednesday	Monday June 24	Tuesday June 25	Wednesday June 26
	Morning A	MA 8:30 - 10:00 European Research Council	TA 8:30 - 10:00 EEPA 1	WA 8:30 - 10:00 **How can better governance save the world with the help of OR?**
	Coffee break	10:00 - 10:30	10:00 - 10:30	10:00 - 10:30
	Morning B	MB 10:30 - 12:00	TB 10:30 - 12:00 EEPA 2	WB 10:30 - 12:00 EthOR Award
		12:00-12:30	12:00-12:30	12:00-12:30
Lunch 12:00 - 14:30	**Midday C**	MC 12:30 - 14:00 **Session in Honour of B. Roy ROADEF**	TC 12:30 - 14:00 EDDA	WC 12:30 - 14:00 **Governance Analytics 1**
		14:00 - 14:30	14:00 - 14:30	14:00 - 14:30
	Afternoon D	MD 14:30 - 16:00 **EJOR: policy, facts and highlights**	TD 14:30 - 16:00 **Women in OR - Workshop**	WD 14:30 - 16:00 **Governance Analytics 2**
	Coffee break	16:00 - 16:30	16:00 - 16:30	16:00 - 16:30
	Afternoon E			
17:30 - 19:00 **Opening session EGM 2019/EDSM 2019**		17:45 - 19:00 Women in OR		17:45 - 19:00 **Closing session EDDA 2019/EEPA 2019/EABEP 2019**
19:00 **Welcome party**			20:00 **Gala dinner**	19:00 **Closing Party**

More information on Women in OR and Making an Impact is given in later sections of this document.

In this section we give the winners of the EURO Award for the Best EJOR Paper (EABEP 2019); the EURO Doctoral Dissertation Award (EDDA 2019); the EURO Excellence in Practice Award (EEPA 2019); and the ROADEF/EURO Challenge Awards, as mentioned earlier in the section on Closing Ceremony.

2.6.1 EURO Award for the Best EJOR Paper (EABEP 2019)

Ana Barbosa-Póvoa was chair of the jury. There were three main paper categories:

   a. Innovative Applications of OR,

20

b. Review,

c. Theory and Methodology

The winner in Innovative Applications of OR was:

Jasper Schuijbroek, Robert Hampshire, and Willem van Hoeve, with a paper entitled *Inventory rebalancing and vehicle routing in bike sharing systems.*

The winner in the Review category was:

Mika Marttunen, Judit Lienert, and Valerie Belton, with a paper entitled *Structuring problems for Multi-Criteria Decision Analysis in practice: A literature review of method combinations.*

The winner in Theory and Methodology was:

Adiel Almeida, Jonatas Araujo De Almeida, Ana Paula Costa, and Adiel de Almeida-Filho, with a paper entitled *A new method for elicitation of criteria weights in additive models: Flexible and interactive tradeoff.*

2.6.2 Outstanding PhD thesis in Operational Research

Bernardo Almada-Lobo was chair of the jury. There were 3 finalists among 17 submissions. The winner was:

Martina Fischetti (supervisor: David Pisinger), with a thesis entitled *Mathematical Programming Models and Algorithms for Offshore Wind Park Design.*

2.6.3 EURO Excellence in Practice Award (EEPA 2019)

This prize is "Awarded in recognition of outstanding accomplishments in the practice of Operational Research". Erik Demeulemeester was chair of the jury. There were 18 applications and 6 finalists made presentations.

The winners were:

Yves Lucet and Warren Hare, with a contribution entitled *Towards Optimal Alignment Design for Road Construction – Using Optimization to Design Safe Roads at Minimal Cost.*

2.6.4 ROADEF/EURO Challenge [4 Awards]

This comprised four Awards. Eric Bourreau was chair of the jury. The award categories were

a. Scientific Award

b. Open Source Award

c. Best Junior Award and

d. Best Overall Team Award

The winners in category a) were Ramón Álvarez-Valdés, María Teresa Alonso, Francisco Parreño.

The winners in categories b), c), d) were Luc Libralesso and Florian Fontan.

EDDA: Martina Fischetti receives the award for best PhD thesis in OR

Immanuel Bomze presents the EEPA to Yve Lucet and Warren Hare

Marc Sevaux, EURO President-Elect, members of the EURO/ROADEF challenge Jury and Immanuel Bomze, EURO President present awards to Rúben Ruiz, on behalf of Ramón Álvarez-Valdés, María Teresa Alonso and Francisco Parreño (left); Luc Libralesso and Florian Fontan (right)

2.7 Women in OR

This is a follow up of a very successful initiative started at EURO 2018 in Valencia which recognised the historical contribution of many brilliant women. At EURO 2019, a constructive dialogue on how we (the OR community) can contribute to recognising the contribution of current women actors within the OR discipline was conducted.

Several panellists were invited to discuss a limited number of topics and action proposals.

Panellists:

1. Prof. Sally Brailsford, Southampton Business School, University of Southampton, UK;
2. Prof. Martine Labbé, Computer Science Department, Université Libre de Bruxelles, Belgium;
3. Prof. Anna Nagurney, Isenberg School of Management, University of Massachusetts, Amherst, US;
4. Prof. Ulrike Reisach, Neu-Ulm University of Applied Sciences, Bavaria, Germany;
5. Prof. Daniele Vigo, Department of Electrical, Electronic, and Information Engineering, University of Bologna, Italy.

Panel Chair: Dr. Paula Carroll, School of Business, University College Dublin, Ireland.

Panel Facilitators: Dr. Sarah Fores (EURO), Dr. Frances O'Brien, Warwick Business School, University of Warwick, UK and Dr, Christina Phillips, Leeds University Business School, University of Leeds.

Panel Session Schedule:

17.45 Introductions
17.55 Panel discussion
18.30 Participant - open forum
18.55 Close

The Women in OR panel discussing the points arising; from left to right: Daniele Vigo, Ulrike Reisach, Anna Nagurney, Martine Labbé, Sally Brailsford, Paula Carroll.

The Women in OR main session was followed on the next day by an OR workshop where participants discussed issues raised and ways forward.

2.8   Making an impact

"Making an impact" is a special stream, created in the EURO 27 Conference held in Glasgow, designed for people who rather than to develop the OR discipline, theory or quality of research, have the main aim to make the organisations they work for more effective. Its purpose was to allow participants to

- Explore the challenges every practitioner faces, and share solutions
- Try out new techniques – are they any good for you?
- See case studies showcasing important applications
- Exchange ideas and expertise with people in similar fields
- Meet leading academics and discover what they can do for you – and what you can do for them
- Build your network amongst likeminded professionals

This stream was organised in previous EURO conferences, starting with EURO 2015 in Glasgow, and this year it was chaired by Joaquim Gromicho. This event was held in a dedicated breakout room where participants sat around tables and could discuss the points raised by the speakers.

This stream was organised in previous EURO conferences, starting with EURO 2015 in Glasgow, and this year it was chaired by Joaquim Gromicho (shown to the right).

This event was held in a dedicated breakout room where participants sat around tables and could discuss the points raised by the speakers.

This event proved extremely popular and for certain talks, it was standing room only. The somewhat unexpected level of demand for this stream may mean that future EURO conferences should consider allocating more space and/or more streams.

The schedule and sessions of this stream are summarised in the figure below (for reasons of space, the full title of the MA session, "Speed Networking and EURO working group on practice of OR", has been abbreviated):

Monday-Wednesday		Monday June 24	Tuesday June 25	Wednesday June 26
Morning A		MA 8:30 - 10:00 Speed Networking and …	TA 8:30 - 10:00 OR Impact across Industries	WA 8:30 - 10:00 How can better governance save the world with the help of OR?
Coffee break		10:00 - 10:30	10:00 - 10:30	10:00 - 10:30
Morning B		MB 10:30 - 12:00 Fast and Furious	TB 10:30 - 12:00 OR Impact on Societal Problems	WB 10:30 - 12:00 Optimizing with Python
Lunch 12:00 - 14:30		12:00-12:30	12:00-12:30	12:00-12:30
	Midday C	MC 12:30 - 14:00 Operations Research meets Machine Learning	TC 12:30 - 14:00 Roundtable 1	WC 12:30 - 14:00 Let the Data Do the Talking
		14:00 - 14:30	14:00 - 14:30	14:00 - 14:30
Afternoon D		MD 14:30 - 16:00 From Data to Decisions	TD 14:30 - 16:00 Roundtable 2	WD 14:30 - 16:00 Governance Analytics 2
Coffee break		16:00 - 16:30	16:00 - 16:30	16:00 - 16:30
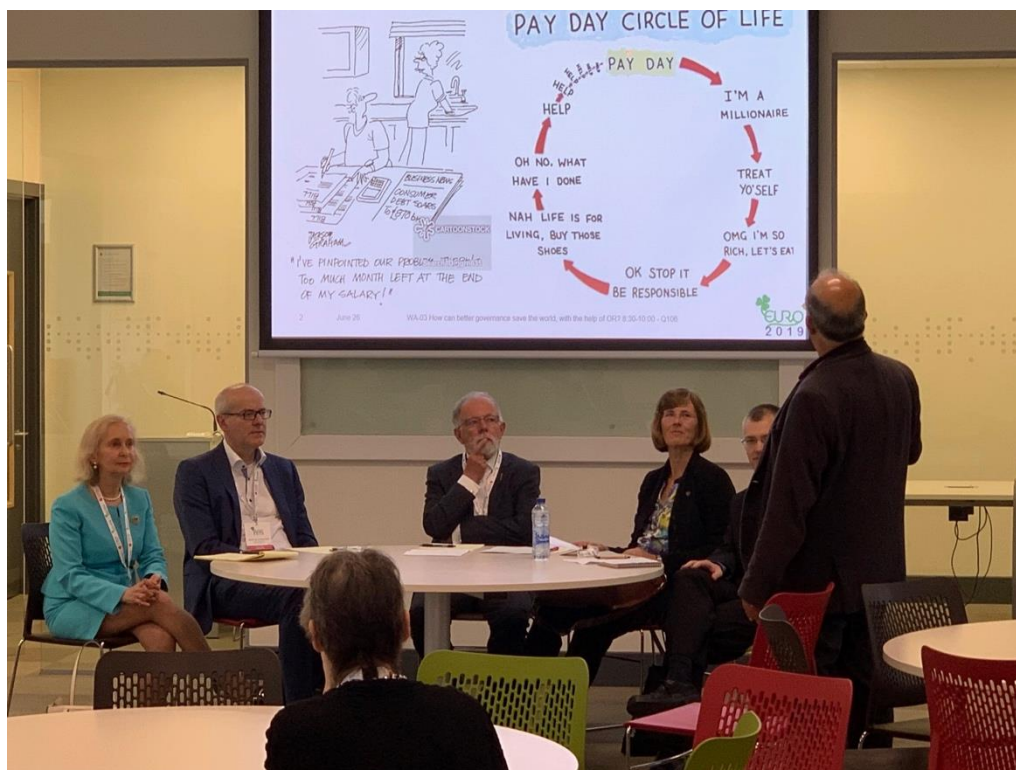
Panellists discuss Making an Impact topics during one of the breakout sessions.

2.9 Special Issues

As with past EURO conferences, EURO2019 also promoted the publication of special issues associated to the event:

Journal: European Journal of Operational Research
Title: Special Issue: EURO 2019 Conference
**Editors**: Luís Gouveia, Seán McGarraghy and Cathal MacSwiney Brugha

Journal: European Journal of Computational Optimization
Title: Computational Discrete Optimization
Editors: Arie Koster and Clemens Thielen

Journal: European Journal of Transportation and Logistics
Title: Public transportation planning in the face of uncertainty
Editors: Marie Schmidt, Konstantinos Gkiotsalitis and Immaculada Rodríguez-Martín

Journal: Networks
Title: Network Analytics and Optimization
Editors: Christina Büsing and Markus Leitner
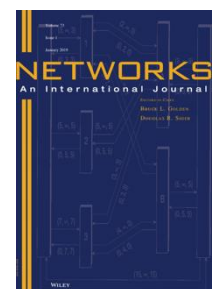
Journal: Journal of Dynamics and Games
Title: EURO 2019: Games in economics, finance and biology
Editors: Cristinca Fulga, Bruno de Oliveira and Gerhard-Wilhelm Weber

Journal: IEEE Transactions on Fuzzy Systems
Title: Smart fuzzy optimization in operational research and renewable energy: modelling, simulation, and application
Editors: Gerhard-Wilhelm Weber, Pandian Vasant and Gilberto Perez Lechuga

2.10 Satellite Events

Several EURO working groups prepared satellite events that started either just before or just after the EURO 2019 conference in cities close to Dublin. A summary of these events is given below:

2.10.1 EUROPT 2019

The 17th Workshop on Advances in Continuous Optimization (EUROPT 2019) was held on 28-29 June 2019 at the University of Strathclyde, Glasgow, UK.

This workshop is the annual event of the EUROPT continuous optimization working group of EURO (The Association of European Operational Research Societies) and it usually takes place just after the EURO Conference.

2.10.2 EWG Ethics & OR

The EthOR award ceremony took place during the Dublin EURO 2019 conference 23rd-26th June 2019. The EWG Ethics & OR annual meeting was also held during the conference.

2.10.3 EWG-ORD Workshop 2019

The EURO Working Group on Operational Research for Development was established in 2006, to promote and facilitate communication links among European and other researchers working in areas of OR for development. EWG-ORD organises yearly workshops to promote the importance of OR in improving the lives of people in developing and developed countries. The EWG-ORD 2019 Workshop www.ewgordworkshop2019.com continued the 2018 forum for debate and exchange of knowledge and experiences towards the achievement of the United Nation's Sustainable Development Goals through the application of OR. In 2019 the focus was on renewable energy, health, and well-being, but all topics on sustainability were welcome. The workshop took place a few days before the EURO Conference, and was facilitated by Professor Patrick Paul Walsh, Professor of International Development Studies, of the Geary Institute for Public Policy, University College Dublin.

2.10.4 INOC 2019

INOC is the conference of the European Network Optimization Group (ENOG), a working group of EURO. The aim of this conference, held every two years, is to provide researchers from different areas of Operations Research, with the opportunity to present and discuss their results and research on the field of Network Optimization, in an inspiring and bridge building environment where fruitful ideas may flow freely. INOC 2019 is the 9th edition of this event and took place at the University of Avignon, France, on 12-14 June two weeks before the EURO Conference.

2.10.5 ELAVIO 2019

The 23th edition of ELAVIO (Summer school of the Latin American Association of OR) took place in Lleida (Spain) from 1-5 July 2019, soon after the EURO Conference. The Summer School promotes education in operational research among young researchers and graduate students. The EWG OR in Agriculture and Forest Management (ORAFM) was involved in the organisation.
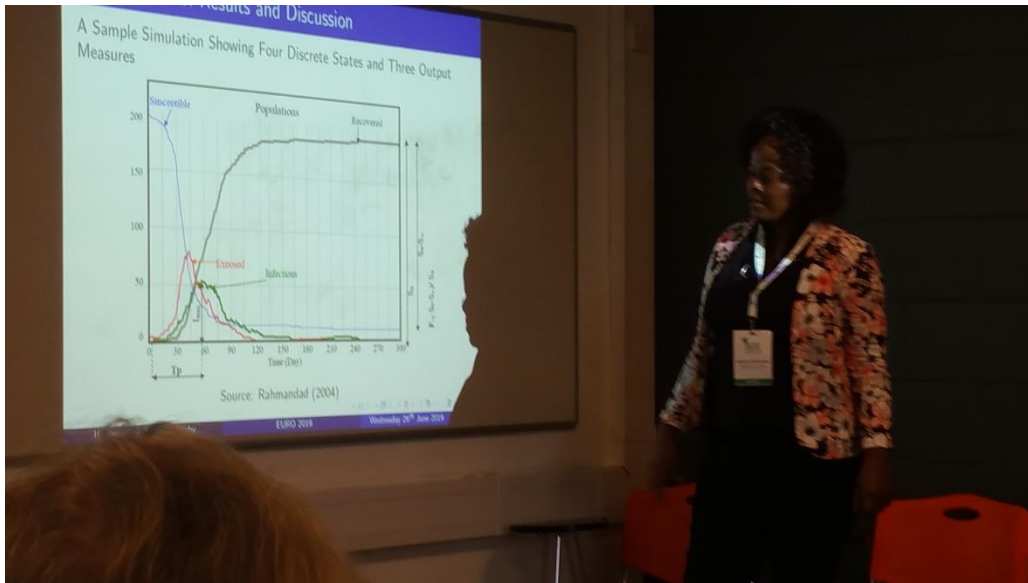
Herieth Rwezaura of the University of Dar es Salaam, Tanzania, describes work on Social Contact Network models of infectious disease (measles) transmission and effects of targeted interventions

3 Social Programme

While the focus of a major conference like EURO 2019 is on scientific content and new advances in OR, a very important aspect is the social side – meeting friends and colleagues whether to work together on some problem or just to enjoy each other's company. Here, we mention the ways in which EURO 2019 helped this to happen.

3.1 Welcome Party

The Welcome party took place on Sunday 23rd June 2019 in University College Dublin (UCD) at the O'Reilly Hall and O'Brien Centre for Science after the Opening Ceremony. The musicians that played with the Irish dancers during the opening ceremony continued to play in the conservatory of O'Reilly Hall during the Welcome Party. These musicians and dancers were students of UCD, and proved very popular with the delegates. Canapés, Beef and Guinness stew, and drinks were served to delegates from 19.00 to 21.00. Roughly 1800 delegates attended the reception. Attendance was complimentary.

3.2 Plenary and Gala Dinner

The Gala Dinner was held at the Aviva Stadium (Ireland's national Rugby and Football stadium) on Tuesday 25th June 2019. Tickets were available for purchase prior to the conference on the registration system at €80 per ticket. A complimentary bus transfer at 19.00 to Aviva Stadium was available to delegates from outside four locations; UCD campus, the Talbot hotel, Radisson St Helens hotel and on Nassau St in the City Centre. Guests were piped into the venue by an Irish uilleann pipes player. A drinks reception took place between 19.00 and 20.00 in the Atrium area overlooking the Aviva Stadium pitch.

The gala dinner had 758 delegates in attendance and ran very smoothly. Guests were called to dinner at 20.00. A three-course dinner with wine was served. A ceilidh band performed during the courses and after dinner – the same musicians who performed at the Opening Ceremony. As with the opening ceremony entertainment, the gala dinner entertainment was received very well by the delegates.

A complimentary bus transfer returned guests to UCD campus, the Talbot hotel, Radisson St Helens Hotel and Nassau St in the City Centre at 11pm.

3.3 Casual Closing party

The Closing party took place on Wednesday 26th June 2019 after the closing session, in the O' Reilly Hall conservatory and on the green space between the O' Reilly Hall and the lake. Fish and Chips and mini burgers were served with drinks to delegates from 18.00 to 20.00. Attendance was complimentary, included in the registration fee. After a cloudy/rainy Sunday, Monday and Tuesday, the sun came out on Wednesday, so delegates could enjoy the closing party by the lake, many wearing sunglasses!

The following pages give a sample of the social side of EURO 2019.

Current and previous organisers

An uilleann piper welcomes delegates to the gala dinner

The "best beard" competition gets under way

Cathal and Catherine Brugha in conversation

A happy minister for OR

The Irish national stadium welcomes EURO

Willi Weber and friends

Local UCD people at the Closing Reception

Conversation at the Exhibition Stands

Cathal MacSwiney Brugha at the gala dinner

A well-attended gala dinner

Pre-gala-dinner drinks and conversation

M. Grazia Speranza at the pre-dinner drinks

The Aviva Stadium, site of the gala dinner

Joanna Jozefowska, Willi Weber and friends

Paolo Toth and friends at the gala dinner

Roman Slowinski and friends

Bill Cook relaxes after a very special presentation

Members of the Portuguese OR Society and Willi Weber

Martine Labbé finds she likes Guinness!

Past EURO President Richard Eglese chats with his wife and friends

Traditional Irish musicians at the gala dinner

Enjoying EURO 2019…

Everyone's a photographer

The sun comes out at UCD …

4   Registration and UCD Belfield conference venue

This section describes the registration process for EURO 2019, and the venue at UCD Belfield.

4.1   Registration

Delegates were invited to submit abstracts for the conference on the 22nd October 2018 through the EURO abstract system. The original submission deadline was 8th February 2019, which was extended by a week to 15th February 2019. The author registration deadline was 29th March 2019. The PCO were given admin logins to the back end of the system to check payments and authors registered. The conference inbox was extremely busy in the weeks leading up the author registration deadline. The number of emails per day during this time averaged 250 new emails each day.

There were some delays in opening of the registration system, due to difficulties in syncing the EURO abstract system to the Events air registration system (complicated by the fact that Events air work from Australia, with a 12-hour time difference). It is recommended where possible to use the same registration system from year to year to avoid these complications every year. Athens in 2021 will also be using Events air so we expect it will be a much smoother process for all companies with the Events air registration system going forward.

There was also a delay in receiving a VAT registration number. The application for a VAT registration number was submitted a couple of weeks before the registration system opened. As academic conference registration fees are exempt from VAT in Ireland, we did not anticipate the need for an approved VAT number before registration opened. However, many universities requested the VAT number in order to set Abbey Conference and Events up as a supplier on their systems so they could pay their delegate invoices. Therefore, there was some delay for these universities submitting payment for their delegate registrations. This should be noted by future EURO conferences.

4.1.1   Registration Deadlines

The deadlines for the most important activities relating to the Conference were as follows.

• 22nd October 2018, web page open for abstract submissions

• 8th February 2019, original abstract deadline

• 15th February 2019, extended abstract deadline

• 15th March 2019, early bird registration deadline

• 29th March 2019, author registration deadline

• 23-26 June 2019, conference in Dublin

Registration opened on a manual basis in December 2018, to allow delegates to use 2018 funding towards EURO 2019 if they had some left, and electronic registration opened on 12th February 2019. The original deadline for abstract submission was 8th February 2019 but, following the tradition of EURO conferences, it was extended until 15th February 2019 (note that because of the large number of papers submitted before the original deadline, the extension was only for one week, instead of the two weeks given at previous EURO conferences). This meant that the PC had a good overview of all submitted papers for the joint PC-OC meeting on 26-27 February 2019.

4.2   Hosting EURO 2019

University College Dublin is located in south Dublin, just 4km from the city centre and is accessible by car, bus and aircoach (direct coach from Dublin Airport). UCD has a number of campuses: the main one, Belfield, was used for EURO 2019. Six campus buildings were booked for the duration of the conference, and the University Club was used for special EURO and IFORS catered meetings. To ensure hosting capacity for EURO 2019, and to avail of a fixed lower price, the required rooms in these buildings (100 rooms initially) were booked in late 2015.

EURO and IFORS additional meeting requirements and dinners were all hosted in one venue, the University Club. There was therefore a level of continuity for those who attended these meetings as

many of the meetings involved the same people. Meeting time was not wasted by attendees trying to find the meeting. This building was brand new and the food was of a high standard.

As there were six buildings in use across the campus it was useful that we had an information desk and two PCO staff members in every building, as well as a team of student volunteers. The PCO staff and student volunteers were dressed in distinctive green T-shirts with the EURO 2019 shamrock logo, and helped delegates find their way around campus and to the talks they wanted to attend.

In addition, there were free-standing signs that detailed the rooms in use in that building and a map of each level of the building with the rooms in use coloured in to identify them. This meant that each building ran like a mini conference of its own. An example is shown in §4.5. These maps were also included in the A4 fold-out conference overview provided to delegates.

There was also the facility to order taxis for delegates at the information desk in the Science Centre.

There were some issues in one building with building works taking place during the conference which caused some disruption, but this was managed onsite and closely monitored throughout. Unfortunately, this is sometimes a consequence of running a conference in a university: the summer months on a university campus are the time when all upgrades or building works tend to be done.

Abbey PCO staff celebrate a job well done

4.3   Lunches and Coffee breaks

Experience from other conferences showed that having lunch catering in only one building could result in queues at peak times for delegates. Conference catering was split across multiple buildings (the

O'Reilly Hall, the O'Brien Centre for Science and the Lochlann Quinn School of Business), which resulted in minimal queues.

Although the quality of conference catering was excellent and food never ran out completely, it was found that catering sometimes ran out in certain buildings sooner than it should have (e.g., Quinn School on Monday 24th June). This could be attributed to delegates bringing families/partners in for lunch, serving staff not strictly checking delegate badges before serving lunch and many delegates availing of more than one lunch. Lunch tickets per day are recommended for future EURO conferences.

Coffee, soft drinks, water, juice and snacks were available in all buildings during the breaks between sessions.

4.4   Signage

The signage was designed by the PCO's graphic designer and printed by a local supplier, O'Brien Expo Services Ltd. The signage included external directional signage, internal directional signage including individual building maps, a large campus map, stage banners, tabletop graphics and lectern branding for O' Reilly Hall.

External directional signage was designed to be very clear, and each sign had a campus map to orientate the delegates, with other signs indicated by shamrocks.

4.5   Conference venue maps

A colour coded system was used to make it easier to find the geographical location of streams, sessions and talks – in the Conference Overview provided to delegates, the stream was highlighted in a colour corresponding to the building it was held in. The geographical locations had earlier been decided on the basis of placing "similar" streams in geographically close positions, to minimise the difficulties should a delegate wish to "session-hop", for example, move from the second talk in a session on Tuesday B (10:30-12:00) to the third talk in another Tuesday B session. The OC physically measured the travel distances/times between buildings; these locations and distances then fed into Thomas Stidsen's IP formulation for scheduling of the conference sessions and talks.

Each floor of each building used had its own map highlighting the rooms used by EURO 2019, for example, in the O'Brien Centre for Science:

4.6 Delegate Materials

4.6.1 Delegate Badge

The delegate badges were printed onsite using kiosks. Delegates scanned a QR code that had been emailed to them in their final confirmation; or they typed their name into the kiosk machine to print the badge. Five kiosks were available and support staff were present at all kiosks.

Badges were double sided and included the conference logo, the delegate's name and ticket type, and whether they had a gala dinner ticket or travel leap card. If the badge showed that delegates had pre-purchased a gala dinner ticket or travel leap card, then these were handed to the delegate by a staff member at the kiosk.

As mentioned in Section 1, to improve EURO 2019's contribution to sustainability, the badge was made of durable paper, with no plastic surround. The badge had one hole in the centre for the lanyard. The lanyards were sponsored by Platinum Sponsors, Gurobi Optimization.

The onsite registration process was very quick and smooth. There was minimal queuing for delegates at peak times. We attributed this to the onsite badge printing and the fact that we separated the registration process and delegate bag collection into two different areas.

4.6.2 Delegate Programme and Conference Overview Schedule

The delegate programme was A5 in size. It included welcome messages, committee information, information on the programme and speakers, information on the EURO awards, a stream overview, maps, special issues, sponsors and exhibitors for each day, information on the venue, social events, networking with the professor, speakers, committee, sponsors and exhibitors, some useful information for delegates and information on the social programme.

The delegates also received an A4 fold out conference overview schedule which was colour coded per building and detailed the rooms each stream was taking place in during the 3 days of the conference. On the reverse side there was a campus map and maps of the individual buildings also colour coded

to match the overview. This took quite some time to collate but it was very useful to orientate and guide delegates around the campus.

The full abstract book was not printed but was made available as a pdf online for download.

Travel cards were made available to pre purchase during registration for €19.50. We purchased 40-50 extra passes to sell onsite. This turned out not to be enough, and we could have sold 100 – 150 more travel passes to delegates requesting them.

4.6.3   Delegate bags

Delegate bags were available in multiple colours, and each delegate could choose his/her colour, subject to availability. As well as the A5 conference booklet/programme and A4 fold out conference overview, each bag contained the most recent IFORS newsletter, publicity material from certain sponsors, and a memento/present of a box of Guinness fudge.

Delegate bags in multiple colours, before the big rush began

4.7   Exhibition Area

The exhibition area with stands, including those of sponsors, IFORS and EURO itself, was in the O'Brien Centre for Science, between the registration area and the bag pickup area. It was also surrounded by breakout areas and coffee/snack points, making it an attractive area for delegates to meet and circulate in, and so meeting the exhibitors' needs of good access to delegates.

4.8 Accommodation

Rooms were available to book on campus in UCD and across 5 hotels, through Abbey PCO; however, many delegates chose to organise their own accommodation. The speaker / EC-member hotel was the Radisson Blu St Helens Hotel, within walking distance across the main road from UCD Belfield.

	18 Jun	19 Jun	20 Jun	21 Jun	22 Jun	23 Jun	24 Jun	25 Jun	26 Jun	27 Jun	28 Jun	29 Jun
UCD on Campus	1	4	4	7	100	343	355	348	182	11	1	1
Radisson Blu	0	0	1	15	19	28	29	29	17	0	0	1
Talbot Hotel	0	0	0	0	7	33	35	34	17	0	0	0
Ballsbridge Hotel	0	0	0	0	4	9	9	9	7	0	0	0
Dawson Hotel	0	0	0	0	4	11	11	10	5	0	0	0
Camden Court	0	0	0	0	0	14	14	14	10	0	0	0
TOTAL	**1**	**4**	**5**	**22**	**134**	**438**	**453**	**444**	**238**	**11**	**1**	**1**

5 Conference Finance

This section provides a summary of the final EURO 2019 conference income and expenditure.

5.1 Registration Fees

The fee structure was as follows (all fees in euro):

Regular early	375
Regular late	500
Student/retired early	180
Student/retired late	240
Accompanying person	90
Exhibitor passes	150

A number of delegates from low income countries were given reduced fees (remaining fee covered by EURO).

5.2 Final attendance numbers

Regular early registrations	1389
Regular late registrations	184
Regular low income	4
Student early	602
Student late	62
Student low income	6
Accompanying persons	58
Exhibitor registrations	6
Complimentary registrations	60
Total	**2371**

There was a total of 60 complimentary registrations, mostly comprising invited speakers and members of the Organising and Programme Committees:

Accompanying Person Complimentary	2
Delegate Pass as part of sponsorship package	10
Exhibition Only Pass	4
Keynote Speaker	3
Tutorial Speaker	12
Complimentary Registrations (OC, PC)	29

5.3 Final Balance

The following table shows the conference Income and Expenditure.

Income

Registration fees	Unit cost	Number	Amount
Regular early	375	1389	520,875.00
Regular late	500	184	92,000.00
Student/retired early	180	602	108,360.00
Student/retired late	240	62	14,880.00
Reduced fee		10	1227.50
Accompanying person	90	58	5220.00
Exhibitor passes	150	6	900.00
Cancellation charges			15,502.50
Total Registration income			**758,965.00**
Conference dinner			**46,589.43**
Sponsorship and exhibitors			
Sponsors and exhibitors			36,600.00
EURO lower income countries funding			10,000.00
Failte Ireland Funding (overseas visitors)			36,311.00
Total			**82,911.00**
Total Income			*888,465.43*

Expenditure

	Amount
PCO fees and expenses	156,304.00
Bank fees	28,005.81
UCD Venue costs	54,704.25
Catering (lunches, tea/coffee, snacks)	203,851.75
Audio-visual	44,489.10
Welcome reception (food, drink, entertainment)	44,913.03
Gala dinner	79,364.19
Delegate badges	28,782.00
Delegate bags and contents (handbooks, etc)	45,003.24
Marketing and promotion	10,268.96
Exhibition and bag station	6,457.50
Invited speaker costs	21,989.19
Signage	28,788.15
Misc (website, insurance, photography, etc)	30,509.46
EURO fees	38,190.00
Reimbursed fees	8,772.50
Total Expenditure	*830,393.12*
Profit	*58,072.31*