



Euro-CASE

THE EUROPEAN COUNCIL OF
ACADEMIES OF APPLIED SCIENCES,
TECHNOLOGIES AND ENGINEERING

ANNUAL REPORT

2019



A hub of collective intelligence



Euro-CASE

Established in 1992, The European Council of Academies of Applied Sciences, Technologies and Engineering (Euro-CASE) is an independent, non-profit organisation of national academies of applied sciences, technologies and engineering from 23 European countries. Euro-CASE exists as a permanent forum for exchange and consultation between European institutions, industry and research.

Through its affiliated academies, Euro-CASE has access to top expertise (more than 6,000 of Europe's most eminent engineers and technologists) and provides impartial, independent and balanced advice on technological issues with a clear European dimension to European institutions, national governments, companies and organisations.



Euro-CASE Executive Committee:



Reinhard Hüttel
acatech [DE]
Chairman



Yves Caristan
NATF [FR]
Secretary General



Ric Parker
RAEng [UK]
Treasurer



Elzbieta Frackowiak
PAN [PL]
Member



Olavi Nevanlinna
TAF [FI]
Member



Petar Petrovic
AESS [RS]
Member



Willy R. GEHRER
SATW [CH]
Member

Prof. Tuula Teeri, President of the Royal Swedish Academy of Engineering Sciences (IVA), was elected as a member of the Executive Committee at the Board meeting on 20 October 2019.

The **Euro-CASE Finance Committee** is chaired by Ric Parker, the Treasurer. Yves Caristan, Secretary General, Rolf Hügli and Fernando Santana are members.

The **Euro-CASE Board** includes Presidents and Honorary Presidents of individual national member academies: Prof. Vladimir Androcec, Croatia (HATZ); Prof. Miklós Bendzsel, Hungary (HAE); Prof. Torbjörn Digernes, Norway (NTVA); Prof. Dr. Reinhard Hüttel, Germany (acatech); Dr. Willy Gehrler, Switzerland (SATW); Prof. Mihai Mihaita, Romania (ATSR); Dr. Mark Plesko, Slovenia (IAS); Mr Bruno Revellin-Falcoz, France (NATF); Prof. Fernando Santana, Portugal (PAE); Prof. Tuula Teeri, Sweden (IVA)

Euro-CASE staff: SAPEA Scientific Policy Officer, Antoine Blonce; Advisor, Wolf Gehrish; Euro-CASE Executive Assistant, Nadia Pipunic.

Euro-CASE in a changing context by Yves Caristan, Euro-CASE Secretary-General

Euro-CASE has been particularly active in 2019, both with respect to its internal platforms and its contacts with academies in China and the US.



Yves Caristan, Secretary General of Euro-CASE

Activities at Euro-CASE ...

In 2018 the Euro-CASE Energy Platform issued a report promoting the need for a systemic approach to the European energy system, in the absence of a coordinated view on energy in Europe. In 2019, this question was taken up by the Scientific Advice Mechanism of the European Commission. I would like to thank the members of the Platform, particularly Prof Eberhard Umbach (acatech) for his efficient chairmanship.

Two other platforms have been making good progress in their reports: The Engineering Education Platform, a very important subject for our societies as we rely more and more on technologies, and the Future of Work Platform. Reports are expected in 2020, thanks to work led by the two Chairs: Prof. Petar Petrovic (AESS) and Prof. Torbjörn Digernes (NTVA).

Technology-driven societal changes such as artificial intelligence (AI) and robotisation will change our lives and impact labour markets. This was the topic of the Euro-CASE Annual Conference on the Future of Work and the Contents of Jobs held in October 2019 in Oslo, Norway. I would like to take the opportunity to thank our friends at the Norwegian Academy of Technological Sciences (NTVA) for the insights raised at this conference which has resulted in the setting up of a new Platform "Future of Work".

... and abroad

The seventh successful EU-US Frontiers of Engineering symposium was held on 18-20 November 2019 in

Stockholm, Sweden, in partnership with the US National Academy of Engineering (NAE) and Euro-CASE, and perfectly organised by the Royal Swedish Academy of Engineering Sciences (IVA). It is essential that we offer talented young engineers and scientists this unique opportunity to participate in such a high level and enriching transatlantic exchange. All my appreciation for this excellent symposium goes to IVA's Chair and staff, as well as to the representatives of the NAE.

Thanks to Petar Petrovic, Euro-CASE also led a delegation of 11 members to the city of Ma'an Shan in China, at the invitation of the Chinese Academy of Engineering (CAE). This exceptional and formal event was a real success and showed how much we can gain in sharing points of view on technology and engineering. Euro-CASE is looking forward to further exchange between the two institutions.

Strengthening Scientific Advice for Policy Makers

Science Advice for Policy by European Academies (SAPEA) is at the heart of Euro-CASE and defines our actions, both internally and externally.

At European level, through the SAPEA consortium (www.sapea.info), Euro-CASE is strongly involved in the European Commission Scientific Advice Mechanism (SAM), together with the Group of Chief Scientific Advisers. Euro-CASE experts, nominated by Euro-CASE member academies, have been closely

involved in SAPEA projects including shaping the content of reports, with the support of Euro-CASE staff. I warmly thank our members, the selected experts and Euro-CASE staff for their high level of competence and their dedication to our common goal.

Together, we will strive to further strengthen the structures of Euro-CASE, to consolidate our role as a partner of national academies of technology and engineering across Europe, and demonstrate our value as a strong partner of the European Commission in providing evidence-based policy advice in the field of technology and engineering.

Modification of the rules of procedure

The Chair, the Executive Committee members and the Secretary General were all elected in 2016. Since then, the Board has adopted a new philosophy, with a portion of positions renewed annually. The Rules of Procedures were approved at the Board meeting in Oslo on 20 October 2019 and will be implemented in 2020.

I am very much looking forward to working with Euro-CASE members to embrace new challenges and opportunities in 2020.



Yves Caristan, Secretary General



Euro-CASE

Euro-CASE Vision

“Euro-CASE will be the voice of European excellence in Engineering, Applied Sciences and Technology for the world”.

Content:

Highlights of publications 20196

- SAPEA: Scientific Advice, evidence reviews and other scientific inputs

Internal Euro-CASE topics: Platforms8

- Engineering Education
- Energy

Partnerships10

- Frontiers of Engineering
- Euro-CASE - Chinese Academy of Engineering (CAE) Forum on Scientific Advice for Policymaking, 15-17 April 2019
- CAETS
- The SAPEA Consortium
- Annual Conference

Member Academies major events and achievements in 201917

Highlights of publications 2019

SAPEA: Scientific Advice, evidence reviews and other scientific inputs

With the support of its member academies, Euro-CASE was involved in three SAPEA Evidence Review Reports (ERRs).

These reports present the best available and most up-to-date scientific and technical evidence, including highlighting of all uncertainties, gaps, and contradictions in scientific knowledge to ensure trust and accuracy. The reports are prepared by fellows and experts from member academies of SAPEA networks and feature robust and contemporary scientific content.

The SAPEA Quality Assurance process ensures the excellency, independency and transparency of the approaches to prepare these reports, and of the scientific advice provided to the Commission.

Microplastics in nature and society

The evidence review report “A scientific perspective on microplastics in nature and society” was officially published on 10 January 2019. One expert from the Engineering Academy of the Czech Republic (EACR) contributed to the report.

The report comprehensively examines the best available evidence from natural sciences and computer model-

ling, as well as social, political and behavioural sciences. Its key conclusions are that the best available evidence suggests that microplastics and nanoplastics do not pose a widespread risk to humans or the environment, except in small pockets. But that evidence is limited, and the situation could change if pollution continues at the current rate.

The SAPEA communication team made great efforts to disseminate the report: it was discussed for instance by the G7 Chief Science Advisors. A roundtable on microplastics pollution on 13 February 2019 was organised in the Canadian embassy in Washington, U.S.A.

The Slovenian Academy of Engineering (IAS) hosted a one-day event for this report. The meeting “A scientific perspective on microplastics in nature and society including plastic recycling and bio polymers in advanced technologies of the future” took place on October 4, 2019 at the University of Ljubljana.

Transforming the future of ageing

Transforming the future of ageing was published on 27 June 2019. One Euro-CASE candidate nominated by the Netherlands Academy of Technology and Innovation (AcTI) was selected for membership in the Working



Group, and one Euro-CASE member nominated by the National Academy of Technology of France (NATF) was selected as peer reviewer.

This SAPEA evidence review report shows that the ageing process needs to be transformed. Europe must tackle the challenges presented by ageing in every generation. We must adjust to an ageing and shrinking workforce and find financially viable ways to deliver high-quality health and social care for all.

Making sense of science for policy

“Making sense of science for policy under conditions of complexity and uncertainty”, was published in July 2019, with evidence review and scientific input provided by the Euro-CASE member academies of Romania (ASTR), France (NATF) and Finland (TAF).

The report highlights the fact that many of the world’s most pressing problems are also incredibly complex - including climate change, environmental pollution, economic crises and the digital transformation of societies. What’s more, the scientific knowledge around these areas can often be uncertain or contested.



Now more than ever, policymakers need good quality science advice to inform their decisions, and the very policy issues for which scientific input is most needed are the ones where the science itself is often complex and uncertain.

A Systemic Approach For the Energy Transition in Europe

The Euro-CASE Energy Platform, under the chairmanship of Prof. Eberhard Umbach from acatech, had prepared a concept paper for a SAPEA project “How to meet the future challenges of the European energy system”? including social aspects, sector coupling, heating requirements and supply, and energy storage.

Following approval by the SAPEA Board and the Advisors to proceed with the scoping of a new SAPEA bottom-up topic, Euro-CASE assembled a dedicated Task Force with experts selected by the SAPEA networks involved in this topic (AE, ALLEA, EASAC and Euro-CASE), to prepare for a scoping workshop to help draft a scoping paper.

Euro-CASE representatives met with the SAM Unit, DG ENER, DG CLIMA, DG RTD, the Secretariat General and the JRC on 8 October 2019 in Brussels to discuss the best approach to meet the agenda and objectives of the European Commission. It was recognised that the topic aligns closely with the top priority of the newly elected Commission, the “European Green Deal”.

The scoping workshop was held in Brussels on 12 December 2019, attended by experts representing SAPEA and the European Commission. It was attended by 30 participants including GCSA, SAPEA, Euro-CASE, DGs representatives (DG ENER, CLIMA, RTD, JRC, MARE, SG and EPRS) and the members of the Task Force.

The purpose of the workshop was to discuss the issue of the energy transition in Europe and to better understand how SAPEA could contribute to addressing this challenge. Part of the workshop was a participatory foresight exercise carried out by the Foresight on Demand team, using the concept paper prepared by the Euro-CASE Energy Platform as a basis for brainstorm discussions.

Following this scoping workshop, Euro-CASE, with the help of a scientific writer, will draft the scoping paper for this new SAPEA bottom-up topic on the Systemic Approach for the Energy Transition in Europe.

Internal Euro-CASE topics: Platforms

Engineering Education



The Euro-CASE Engineering Education Platform was launched in 2016 following approval from the Euro-CASE Board. Management of the platform was entrusted to Petar Petrovic, from the Academy of Engineering Sciences of Serbia (AESS).

Two thematic priorities were defined and recognised as highly relevant for the future of education of engineers in Europe:

- Thematic priority #1: Knowing-Doing Gap in Engineering Education – Understanding and bridging the gap between theory and practice within European engineering education.
- Thematic priority #2: Big Data and Learning Analytics – Technology-enhanced teaching and learning environments, new understanding of learning processes, and decision making in engineering education through educational data mining and learning analytics.

The first in-person meeting took place in London on 19-20 March 2019, hosted by the UCL Faculty of Engineering Sciences and the Royal Academy of Engineering (RAEng). The meeting included two presentations on “Observation of a Civil Engineering Scenario in process” and “Future opportunities in engineering education arising from the PEARL facility”. The meeting focused on contributions to report writing, such as:



University College London (UCL), Faculty of Engineering Sciences, UCL Centre for Engineering Education: ‘Integrated Engineering Programme (IEP)’, delivered by Emanuela Tilley, Director, John Mitchell, Vice Dean Education, March 19, 2019.

- Excellence through interdisciplinarity,
- Integration of Industry 4.0 in engineering education / empowering practical experience and skills,
- Engineering education and the prosperity triangle, including soft skills.

The second in-person meeting took place in Vienna, on 10-11 October 2019, and was hosted by the Austrian Academy of Sciences (ÖAW). It included a presentation by Dr. Walter Mayrhofer, Vienna University of Technology, TU Wien.

Engineering Education Platform Chair: Prof. Petar Petrovich, Academy of Engineering Sciences of Serbia (AESS).

Working Group members: Petar Petrovic, Chair (Serbia), Albert Albers (Germany), Hanna Bogucka



The Royal Academy of Engineering, Prince Philip House: ‘UK engineering education’, delivered by Dr Rhys Morgan, Director of RAEng Engineering and Education, March 20, 2019.



Platform meeting in Vienna, hosted by the Austrian Academy of Sciences - ÖAW, 10-11.10.2019, Vienna, Austria.

(Poland), Gerard Creuzet (France), Jonas Gallenkämper (Germany), Janez Možina (Slovenia), Kurt Richter (Austria), David Timoney (Ireland), Petr Zuna (Czech Republic), Nick Tyler (United Kingdom). Bozica Bojovic, provided technical assistance.

Current topic: the gap between knowing and learning, and the new digital approach to Engineering Education.

Energy Platform



Cooperation in all sectors of energy has become a crucial aspect for supply security and stability for European individual and industrial customers and for decarbonisation of the system.

In 2012, the European Commission issued a document entitled Energy Roadmap 2050, in which a “possible” pathway to “a secure, competitive and decarbonised energy system in 2050” is indicated. This document addresses various principles, including energy efficiency, electrification of the mobility sector, renewable energies including biofuels, energy transmission including heat, legislation, societal questions such as acceptance, and cooperation between countries and regions.

In the following years, several national and multi-national projects on energy cooperation, regional energy transmission grids (North-South, East-West, Baltic region, North Sea, etc.) energy efficiency have been proposed and are being funded under different schemes.

Within Euro-CASE, several academies had raised questions about the European energy system as a whole, its coherence and changes required. It is believed that these questions are part of a truly important topic for Europe. Euro-CASE therefore established an Energy Platform with the support of several member academies.

The Euro-CASE Energy Platform report, Energy transitions in Europe - common goals but different paths,

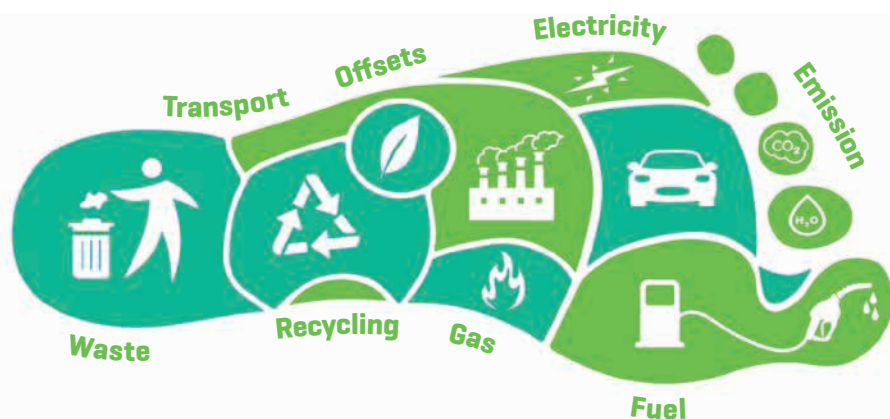
was published in October 2019. The report presented a range of national energy outlooks based on extensive statistics including orders of magnitude for different types of production and energy carriers, and some economic data. It describes the EU policy for reducing CO₂ emissions by 2030 and 2050 and national plans for translating these targets into national policies and action plans.

While the report underlines successes where they have been achieved, it also stresses the difficulties some countries encounter and the underlying reasons for them. The report restrains from formulating recommendations, but it does formulate views on how to look at the task ahead in a holistic way, integrating the national efforts into a systemic approach involving wider regions and the EU as a whole.

The Energy Platform Chair: Prof. Eberhard Umbach, National Academy of Science and Engineering (acatech).

Working Group members: Eberhard Umbach, Chair (Germany), Eloy Alvarez (Spain), Gérard Creuzet (France), Jean-François Minster (France), John Loughhead (UK), Karin Byman (Sweden), Krzysztof Galos (Poland), Miodrag Mesarovic (Serbia), Zoran Marinšek (Slovenia). Katharina Schätzler provided support.

Current topic: Systemic approach to energy production in Europe: experiments and prototypes of cooperation across borders.



Carbon footprint

is currently more than 36,8 Gt of CO₂

Partnerships

Frontiers of Engineering

2019/2020 cycle

Since 2010, Euro-CASE and the US National Academy of Engineering (NAE) have jointly organised meetings under the umbrella of Frontiers of Engineering (FOE).

The objective of FOE Symposia is to bring together the next generation of leaders in engineering and create an early-career network, to facilitate transatlantic engineering/technology collaboration and the transfer of new techniques and methods across four topics of major societal interest. Invited participants comprised of engineers, scientists and technologists below 45 years old including 60 representatives from both Europe and the United States.

On behalf of Euro-CASE, The Royal Swedish Academy of Engineering Sciences (IVA) co-organised the successful FOE 2019 symposium with Pontus Johnson (Royal Institute of Technology and IVA Fellow) as the European General co-chair and Michael Tsapatsis (NAE) as the US General co-chair.

Four topics were tackled: 5G and the Internet of Things, Systems Approaches to a Clean Environment, Manufacturing for Smart Industry and Materials Engineering Enabled by Advances in Imaging.

A detailed programme and presentations from the symposium are available on the NAE Website

The 2020 EU US FOE event has been postponed to 2021 and will be held in the United States in October hosted by Nokia Bell Labs. The General Co-Chairs will be Vahid Tarokh for the USA and Pontus Johnson for Europe.

The selected topics are: Advances in Deep Learning for ICT Problems, Applications and Uses of Graphene, Modernizing the Electrical Grid and Technologies for the Detection and Treatment of Dementia and Alzheimer's Disease.

Euro-CASE - Chinese Academy of Engineering (CAE) Forum on Scientific Advice for Policymaking, 15-17 April 2019

Thanks to Petar Petrovic, Euro-CASE led a delegation of 11 members to China, at the City of Ma'anshan, at the invitation of the Chinese Academy of Engineering (CAE). This formal event was a real success and has shown how valuable such experiences can be for exchanging perspectives on technology and engineering.

The European delegation was composed of: Carlos Abanades (RAI), Eloy Alvarez Pelegry (RAI), Yves Bamberger (NATF), Magnus Breidne (IVA), Yves Caristan, Secretary General of Euro-CASE, Nicola Eckersley-Waites (RAEng), Petar Petrovic (AESS), Mark Plesko (IAS), Kurt Richter (ÖAW), David Thomlinson (RAEng) and Bertrand Van Ee (AcTI).

In their opening remarks, He Huawu, Vice President of the CAE, and Yves Caristan highlighted the shared challenges faced by both China and the EU today, including the need to decrease pollution and tackle climate change, and integrate innovation and new services into the economy.



Academic Forum opening ceremony, Haiwaihai Crown Hotel, Hosted by Anhui University of Technology [AHUT], April 15 2019, Ma'anshan, Anhui Province, China.

They also noted the importance of the forum topic, scientific advice for policymaking, to both host institutions: the CAE offers consultation and advice for policymaking at senior levels in China and wants China to become an increasingly innovation-driven country, while Euro-

CASE is becoming increasingly involved in policymaking in Europe through SAPEA. It was therefore agreed that such meetings represent valuable opportunities for sharing examples and good practice between the CAE and Euro-CASE for the benefit of engineering and innovation and evidence-based policymaking in both regions.

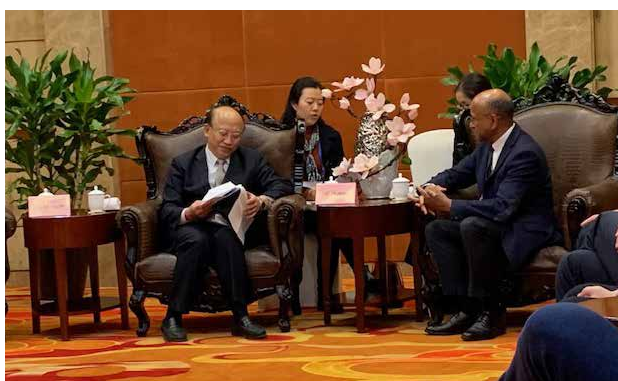
Session One: Scientific advice for policymaking - The group explored routes and mechanisms for scientific and engineering advice to policymakers in the EU and China.

Some differences between the EU and China were noted. Differences in political systems mean that decision making, and therefore the appropriation of the scientific advice for policymaking, looks different between the regions. China can rapidly mobilise the whole country to address challenges, enabling rapid action, whereas the EU often requires a more bottom-up approach to decision making, which can have the advantage of allowing small innovative companies to emerge and influence decision making.

It was agreed that many of the political challenges faced by governments, particularly energy and environmental challenges, are global in nature. There should therefore be significant value in collaboration on developing a scientific evidence base on these topics.

Session 2: Smart manufacturing - The discussion picked up several common themes from the presentations, including the sociotechnical nature of smart manufacturing and the related need to consider social as well and technical implications in both the EU and China. Particularly, this includes the need to develop new education routes, both for engineers and broader industry.

Session 3: Energy policy - The discussion reiterated several key points raised in the presentations, particularly the importance of a systemic and outcomes-focused



Yves Caristan, Euro-CASE Secretary General and HE Huawu, Vice President of Chinese Academy of Engineering - friendly conversations about engineering at VIP conference dinner event.

approach to energy policy. The sociotechnical nature of the system was also highlighted, with increasing need for effective public information and dialogue. This was particularly noted in relation to controversial technologies such as nuclear power, but will also become increasingly important with decentralisation of the energy system. The potential role for academies in providing accessible, accurate, and unbiased public information was discussed.

It was agreed that energy policy is an area where there is significant potential for China and the EU to collaborate further, given the shared and global nature of the challenges to be addressed.

It was concluded that there are a number of similarities in the approach and in the key success factors for an effective scientific advice for policymaking in both China and the EU, and therefore useful opportunities to share good practice. This is especially the case in relation to shared global challenges, such as climate change and innovation, and it may be useful to delve deeper into more specific topics in these areas for knowledge exchange between the two regions.

欧洲应用科学技术与工程院理事会—中国工程院循证科技政策咨询论坛合影
Group Photo of Euro-CASE & CAE Forum on Evidence-based Scientific Policy Advice

2019年4月15日 中国·马鞍山
April 15th, 2019 MA' ANSHAN, CHINA



Keynote Speakers and Panelists: He Huawu, Vice President of Chinese Academy of Engineering Academician of Chinese Academy of Engineering, CAE (Chinese Academy of Engineering); Ding Han, Academician, CAS (Chinese Academy of Sciences); Gan Yong, Academician, CAE (Chinese Academy of Engineering); Guo Wanlin, Academician, CAS (Chinese Academy of Sciences); Kang Yuzhu, Academician, CAE (Chinese Academy of Engineering); Ye Qizhen, Academician, CAE (Chinese Academy of Engineering); Liu Wenqing, Academician, CAE (Chinese Academy of Engineering); Wang Shafei, Academician, CAE (Chinese Academy of Engineering); Jin Donghan, Academician, CAE (Chinese Academy of Engineering); Hao Yucheng, Secretary-General, China Robot Industry Alliance; Zhang Jianwei, German academy of sciences (Hamburg); Tsinghua University; Caristan Yves,

Secretary General of Euro-CASE & Fellow of the National Academy of Technologies of France (NATF), Euro-CASE & NATF; Abanades Carlos, Research Professor, CSIC; Alvarez Pelegry Eloy, Fellow, Real Academia De Ingeniería (RAI); Breidne Magnus, Vice President Projects; Royal Swedish Academy of Engineering Sciences (IVA); Petrovic B. Petar, Fellow, Academy of Engineering Sciences of Serbia (AESS); Plesko Mark, President, Slovenian Academy of Engineering (IAS); Bamberger Yves, Fellow & Chairman of the works committee of the National Academy of Technologies of France, National Academy of Technologies of France (NATF); Thomlinson David; Fellow & International Secretary, The Royal Academy of Engineering; Richter Kurt, Fellow, Austrian Academy of Sciences (ÖAW); Van Ee Bertrand, Fellow, Netherlands Academy of Technology and Innovation (AcTI).

CAETS

The 2019 International Council of Academies of Engineering and Technological Sciences (CAETS) Annual Conference was held in Stockholm on 25-27 June. The conference brought together 400 engineers, scientists, entrepreneurs and policymakers from all over the world, including representatives from 27 CAETS member academies plus those from the academies of Nigeria, New Zealand and Serbia, which were elected as new members of CAETS.

The conference theme “Engineering a Better World – the next 100 years” was chosen to address the global grand challenges and the need for engineering leadership to solve these challenges. The theme was also appropriate for celebrating the 100th anniversary of The Royal Swedish Academy of Engineering Sciences (IVA), which was founded in 1919 as the world’s first

academy of engineering. The most important message from the 2019 conference was the pressing need for inclusive innovation in order to solve global grand challenges that we know will be shaping the fate of mankind long into the future.

Over the past 100 years, engineering has increased the quality of life for many and at the same time reduced poverty. New, powerful technology is considered crucial in solving many of the world’s current challenges, yet is perceived as a threat by many people in today’s society, in particular in relation to turbulent labour markets. Many people worry that automation, robotics, big data, artificial intelligence and other new technologies will cause them to lose their jobs, their privacy or control over their lives.

At the crossroads of grave challenges and great opportunities, one clear message from the conference speakers was that we need to put people at the centre, engaging them in discussions and decisions concerning the effects and implementation of technology. To overcome the threat of technology resistance, we need inclusive innovation, collaboration and prosperity shared by all.

A vision of future society must be developed that can be shared between policymakers and citizens in different regions. The solutions based on such a shared vision must be both environmentally and societally sustainable. The longer we wait to reach a shared vision, the more likely it will be that we reach unforeseen tipping points, which cannot be reversed. The high speed of our scientific and technological development gives us genuine hope but only if our institutions and our communities are capable of change. Many countries and regions



Grand opening of the CAETS Conference ‘Engineering a Better World – the Next 100 Years’, Tuula Teeri, Chair of CAETS and President of IVA, Ruth A. David, Secretary General of the International Council of Engineering Science and Technological Sciences, CAETS, City Conference Centre in Stockholm, June 25th 2019.



Tuula Teeri, Chair of CAETS and President of IVA, addresses the participants of the CAETS 2019 Conference at the reception at the City Hall, hosted by the City of Stockholm, June 25 2019, Stockholm, Sweden.

are still lagging far behind other nations in global knowledge generation and technology development that support prosperity and welfare of their citizens.

Inequalities between regions, countries and citizens were identified as a huge obstacle for reaching our climate goals. This is a complex issue as global earnings tend to surpass global costs for most of today's climate measures, while local costs tend to exceed local profits. The fundamental issue will be to find a balance between environmental and social agendas.

The world is becoming more complex, globalized and very difficult to grasp in its entirety. Due to the complexity and the scale of our challenges, what is needed in the world is perhaps first and foremost cooperation and sharing between science and policy – between scientists from different fields, and between scientists, political decision-makers and the general public. Cross-border research is becoming increasingly important, for example between humanities and science. Diversity in the engineering profession must be embraced in order to maximize the potential in achieving the best results on a broad front.

The CAETS Convocation 2019 concluded that the global engineering profession has a crucial role in meeting the serious challenges humanity faces. However, future development cannot be exclusively technology-driven; it must also be genuinely humanistic, based on the core values of openness, sustainability and inclusion. Cooperation and diversity need to be designed into the solutions. Thus, the consciousness of the global engineering community for a shared vision

should be encouraged. To solve our problems, different fields of research and engineering must come together by forming thematic teams that discuss very complex issues. Our responsibility is global, but the solutions must work on the local level. We need to reach a common understanding of the problems we have and the ways in which they can be solved. Tomorrow's leaders need a clarity of vision and uncompromising focus on equality – at all levels. Tomorrow's leaders also need



CAETS Council meeting, 27 June 2019, IVA Conference Center, Stockholm, Sweden

to learn how to manage complicated collaborations. Engineering leadership is about developing and promoting technology for a better world but it is also about leading with knowledge, skill, insight and courage. The engineering academies and members of CAETS have an important role to play as convenors and facilitators of the complex discussions that will be required to solve today and tomorrow's issues.

Presentations are available on the IVA website.

The SAPEA Consortium

Spanning the disciplines of engineering, humanities, medicine, natural sciences and social sciences, Science Advice for Policy by European Academies (SAPEA) brings together outstanding knowledge and expertise from over 100 academies, young academies, and learned societies in over 40 countries across Europe. SAPEA is part of the Scientific Advice Mechanism (SAM) of the European Commission (EC).

Funded through the EC's Horizon 2020 programme, the SAPEA consortium comprises five European academy networks:

- Academia Europaea (AE),
- All European Academies (ALLEA),
- European Academies' Science Advisory Council (EASAC),
- European Council of Academies of Applied Sciences, Technologies and Engineering (Euro-CASE), and
- Federation of European Academies of Medicine (FEAM).

SAPEA was initially planned to end on 31 October 2020. Following discussions with the European Commission and an amendment on the grant agreement, it was decided in July 2019 to extend the project for 14 months until 31 December 2021.

Summary of SAPEA reports submitted to the European Commission

1. Cybersecurity in the European digital single market: Scientific Opinion delivered by GCSA to the European Commission on 24 March 2017, following a

request by the Commission Vice President Ansip and Commissioner Oettinger.

<https://bit.ly/2M1slTm>

2. Food from the oceans: Request from Commissioner Vella, GCSA opinion and SAPEA Evidence Review Report published November 2017 in the presence of Commissioner Moedas.

<https://bit.ly/3bbQ4ht>

3. Novel carbon capture and utilisation technologies: Request from Commissioner Cañete, GCSA opinion and SAPEA Evidence Review Report published May 2018.

<https://bit.ly/37l2kLp>

4. Authorisation for plant protection products in Europe: Request from Commissioners Andriukaitis and Moedas, GCSA opinion and SAPEA Evidence Review Report published June 2018.

<https://bit.ly/3amPAWH>

5. Microplastics in nature and society: This report has been proposed as a bottom-up topic by the Group of Chief Scientific Advisors and was published in January 2019.

<https://bit.ly/37mmK6R>

6. Transforming the future of ageing: This report has been proposed as a bottom-up topic by SAPEA and in particular FEAM who was the Lead Network for this ERR published in June 2019.

<https://bit.ly/37hM26g>

7. Making sense of science for policy: This report has been proposed as a bottom-up topic by the Group of Chief Scientific Advisors and was published in July 2019.

<https://bit.ly/3sc0LHZ>

SAPEA Board members, Chairmen of Networks



Prof. Sierd Cloetingh
Utrecht [NL]
Chair of the Board of
SAPEA



Prof. Antonio Loprieno
Basel [CH]



Prof. Thierry
Courvoisier
Geneva [CH]



Prof. Reinhard F. Hüttel
Potsdam [DE]



Prof. George Griffin
London [UK]





Euro-CASE ANNUAL CONFERENCES

Since 2008 Euro-CASE member academies have organised a series of Annual Conferences. Through this, a tradition has been established which sees each member academy host an event each year.

2008 London (United Kingdom): "How Can Europe Meet its 2020 Renewables Targets?" [RAEng]

2009 Stockholm (Sweden): "Increasing the interest in Mathematics, Science and Technology" [IVA]

2010 Berlin (Germany): "Innovation - Best Practices" [acatech]

2011 Madrid (Spain): "Water and Food Security in Europe" [RAI]

2012 Paris (France): "Energy Independence for Europe" [NATF]

2013 Lisbon (Portugal): "Boosting Innovation in Europe" [PAE]

2014 Brussels (Belgium): "Evidence-based Policy Advice and Innovation Policy beyond Horizon 2020" [acatech, ARB, IVA]

2015 Delft (Netherlands): "Engineering Smart Cities of the Future" [AcTI]

2016 Lyngby (Denmark): "Big Data - Smarter Products, Better Societies" [ATV]

2017 Poznan (Poland): "Cybersecurity" [PAN]

2018 Zurich (Switzerland): "How will Artificial Intelligence shape our Future" [SATW]

2019 Oslo (Norway): "The Future of Work - The Content of Work" [NTVA]

Annual Conference

Since 2008, Euro-CASE member academies have organised a series of annual conferences, following a tradition of a different academy hosting the event each year.

2019 Annual Conference, 21 October, Oslo (Norway)

The Norwegian Academy of Technological Sciences (NTVA) co-organised the Euro-CASE Annual Conference 2019, focused on the theme of “The Future of Work – The Content of Work”. The event took place in the Ingeniørenes Hus Meeting Center in Oslo (Norway). The conference was divided in three sessions: Cases from the Norwegian private and public sector; Change drivers and opportunities and Knowledge and skills, and it was focused on the employment situation, innovation, human-machine interaction, education and learning methods.

Main speakers included: Xavier Fouger, Senior Director Learning Centers and Programs, Dassault Systemes; Julia Paulsen, Head of Digital Sales and Services, DNB;



Welcome by Marina Tofting, DNV, NTVA President Torbjørn Digernes and Euro-CASE President Reinhard Hüttl

Charles Fadel, Founder and Chairman, Center for Curriculum Redesign; Katja Windt, Member of the Managing Board, SMS Group, Gmb and Walter Qvam, Chairperson, Digital Norway

The conference itinerary also included a meeting of the Euro-CASE Board.



Hendrik Van Brussel, Emeritus Professor, KU Leuven, Innovation, productivity, AI, robots and employment: an impossible deal.



Euro-CASE Board 2019, Annual Conference, Oslo, Norway



2020 Annual Conference, 20 November, Zagreb (Croatia)



The Euro-CASE Annual Conference 2020 is scheduled to take place in Zagreb (Croatia) on 20 November. It will be hosted by the Croatian Academy of Engineering (HATZ) chaired by Prof. Vladimir Androcec, on the theme: “Dealing with Challenges of the European Energy Transition”.

More information on all Euro-CASE conferences can be found on the Euro-CASE website.

Member academies' major events and achievements in 2019

More detailed information for each academy can be found on their respective web sites.



Austria

(www.oeaw.ac.at)

Conferences:

- Feb. 2019: "Vienna Conference on Instrumentation" triennial conference dedicated to the development of specific hard- and software applications for Astro-, Particle and Nuclear-Physics.
- Feb. 2019: The "Masterclass for Teachers" was a three-day workshop of the Institute of High-Energy Physics, aimed at stimulating exchange between school teachers and researchers.

Lectures:

- Mar. 2019: Lecture "Dynamics in Protein Molecules" given by Kurt Wüthrich (Nobel-Prize in Chemistry 2002)
- Mar. 2019: Lecture "Fast Calculations" given by Martin Grötschel (President of the Berlin-Brandenburgische Akademie der Wissenschaften)
- May 2019: Lecture "Using Simulation to Explore and Invent the Future City" given by Michael Batty (The Bartlett Centre for Advanced Spatial Analysis (CASA), London City University)
- May 2019: Lecture "What Will Replace The Transistor?" given by Eli Yablonovitch (University of California, Berkeley)
- June 2019: Lecture "Can Europe catch up in artificial intelligence?" given by Bernhard Schölkopf (Max Planck Institute for Intelligent Systems)

Meetings:

- Oct. 2019: Meeting of the Euro-CASE Engineering Education Working Group at the Austrian Academy of Sciences

High Level Grants

Researchers at the Institutes of the Austrian Academy received eight new ERC-Grants:

- 1 Proof of Concept: Material Sciences
- 3 Starting Grants: Molecular Biology, Cultural Sciences, Biochemistry
- 2 Synergy Grants: Medieval Research, Molecular Biology
- 2 Consolidator Grants: Demography, Molecular Biology



Belgium

ARB (www.academieroyale.be)

- In 2019, the ARB hired several researchers to work on specific projects for a period of 1-3 years, leading a diverse range of projects in line with scientific fields covered by the ARB including Greek archaeology; public investments; restitution of cultural heritage; biology.
- The ARB has established a Québec Chair, in partnership with the Québec Government Office in Brussels. Each year, this chair will henceforth welcome two eminent Quebec personalities from the world of science or culture who will not only be able to give lectures within the Academy but also meet their Belgian colleagues.
- The Collège Belgique, the Academy department responsible for organising scientific conferences for the general public, has installed a new headquarters at the General Delegation of the Wallonia-Brussels Federation, boulevard Saint-Germain, in Paris, where a dedicated cycle to augmented humanity was organised throughout the year.



Belgium

KVAB (www.kvab.be)

- The Royal Flemish Academy of Belgium for Science and the Arts (KVAB) has four classes, including the Class of Technical Sciences KTW which has been a Euro-CASE member since mid-2018, alongside the Belgian sister academy ARB. KVAB is represented on the Euro-CASE Board by its former President, Joos Vandewalle. Brussels and the premises of the Palace of the Academies has offered enormous added value as a central meeting place in Europe.
- In 2019 the Class of Technical Sciences KTW celebrated its tenth anniversary. Over a very active decade, the Class produced many important society related positioning papers, on themes such as mobility for tomorrow, privacy in an age of the internet, social networks and Big Data, Artificial Intelligence, data science and healthcare, learning analytics, corporate digital responsibility and research driven science. The class also set up "thinkers' programmes", engaging international "thinkers" on current societal issues such as societal values in digital innovation, food, democracy and disinformation, the limits of transparency, the doctoral space revisited, water and climate.
- Three permanent reflection groups stimulate the debate on (1) Energy, (2) Art, Science and Technology, (3) Responsible Research and Innovation and Ethics in Science. Some of the most successful symposia were: "Energiezuinigheid bij decreet, waar stopt het bij nieuw- en vernieuwbouw?" (Energy efficiency by decree, where does it stop with new and renovated buildings?), "The Belgian energy system: a bright future?", 'Kunst en Wetenschap in Symbiose' (Art and Science in Symbiosis), 'leve[n]dekunst' (living Art).



Croatia

(www.hatz.hr)

- Publication of the Academy scientific editions: "Annual 2018 of the Croatian Academy of Engineering", HATZ, Zagreb, 2018 and "Engineering Power" – Vols. 14(1) 2019, 14(2) 2019, 14(3) 2019, and 14(4) 2019.
- Participation in the organization of seven scientific conferences, as well as 25 different scientific meetings and public events held under the auspices of the Academy
- Participation in the Euro-CASE Annual Conference and Board meeting in Oslo, Norway, October 2019, and the organisation of the Euro-CASE Annual Conference to be held in Zagreb, Croatia.



Czech Republic

(www.eacr.cz)

- EA CR members actively cooperated on the SAPEA project: IA CR members Prof. Josef Steidl and Prof. Lenka Lhotská participated in the work of working groups "Microplastics" and "Future of Ageing". SAPEA reports were made available by the EA CR to the professional community and the state administration.
- The EA CR launched the EA CR Newsletter in early 2019, sharing current news on EA CR activities. An important item was nuclear engineering which should ensure future self-sufficiency of energy in the Czech Republic. The electronic version of the Newsletter is sent to

EA CR members, partner organisations and the state administration.

- The EA CR award for 2019 was presented to a team from VUTS Liberec for the concept and creation of a unique DIFA jet weaving machine for the fully automated production of special 3D fabrics, so called distance fabrics, i.e. fabrics with large and varying distances.



Denmark (www.atv.dk)

- Technological Summit: the 2019 Summit explored the possibilities of Denmark becoming a laboratory for sustainable green solutions. The Academy launched the report "India - Land of Opportunities" on how Denmark and India can collaborate on India's green transformation and the SDG's.
- New growth of STEM businesses: The Academy identifies well over 1,100 start-ups whose businesses are based on STEM skills (Science, Technology, Engineering and Math) in the report "The new growth of STEM businesses in Denmark". This type of business contributes more than other new companies to Denmark's future growth.
- Applied AI Academy: this activity allowed tech-leaders to explore the business implications of AI. On study trips to Silicon Valley the participants met AI practitioners from leading companies, venture capitalists, experts from world renowned innovation and research institutions, and startups working with new technologies.



Finland (www.academies.fi)

- CoFA hosted EASAC (European Academies' Science Advisory Council) Council and Bureau Meetings in Helsinki, June 2019.
- CoFA nominated national representatives to several international science organisations, such as ISC, IAP, ALLEA, EASAC, Euro-CASE, CAETS and SAPEA, and shared their reports and publications to decision-makers, science organisations and media in Finland.
- CoFA arranged several public discussions and events, where experts discussed current important topics, e.g. based on the reports of international science organisations.



France (www.academie-technologies.fr)

- Besides its Fellows' active participation in Euro-CASE Platforms (Energy, Innovation, Engineering Education) and in the SAPEA project, the National Academy of Technologies of France (NATF) published several reports on the main following topics:
 - Facing the technical challenges of agriculture: the contribution of technologies
 - Nuclear energy and the environment
 - Trajectories for the evolution of the electricity mix 2020/2060
 - The child, the teenager, the family and the screens and apps: call for vigilance
 - Deployment of communicating electricity meters
 - Responsible and reasonable management of radioactive materials and wastes
 - Big data: ethical issues

- The third NATF Annual Convention, devoted to "Terrestrial Mobility of the future" was attended by over 300 people.
- The Annual Seminar was dedicated to "technologies for health: from innovation to its integration in the healthcare system".
- CAETS: NATF participated to the annual meeting in Sweden devoted to "technologies and future challenges" in areas such as energy, antibiotics, water, climate, future health.
- NATF officially announced it will host the CAETS Convocation 2022 in France.



Germany (www.acatech.de)

- In March 2019, acatech launched the Circular Economy Initiative Germany bringing together economic, scientific and societal stakeholders to develop a joint vision on how the transformation towards a Circular Economy in Germany could be fostered. acatech Vice-Presidents Thomas Weber and Reinhard F. Hüttel chair the initiative.
- In June 2019, the Innovation Dialogue with Chancellor Angela Merkel, Minister for Research Anja Karliczek, Minister for Economic Affairs Peter Altmaier, Head of the Chancellery Helge Braun and the Steering Group, chaired by Henning Kagermann, dealt with impulses for the German innovation system through competition with China.
- In July 2019, the National Platform Artificial Intelligence, led by the Minister for Research Anja Karliczek and acatech President Karl-Heinz Streibich, held its annual conference and presented publications on different topics, such as intelligent mobility, machine and deep learning, man-machine interaction, and AI and discrimination.



Greece <https://bit.ly/2lFegDe>



Hungary (www.mernokakademia.hu)

- The General Assembly of the Hungarian Academy of Engineering, held in May, featured an informative and very interesting talk with the title "Innovation, the fuel of the 21st century" given by Dr. Zoltán BIRKNER, President of National Research, Development and Innovation Office.
- In August the academy organised a three-day event on "Innovation and Sustainable Surface Transport 2019" with the purpose of motivating domestic professionals in the field of innovation and strengthening the relationship between domestic stakeholders and the companies involved in development.
- The Academy was represented on Euro-CASE Board and Executive Committee by: Miklós BENDZSEL, President of the Hungarian Academy of Engineering and András SZÖLLÖSI-NAGY, Vice President of the Hungarian Academy of Engineering, responsible for International Relations.



Ireland
(www.iae.ie)

■ **April: Irish Life & Lore Launch**

The Academy, in association with Engineers Ireland and the Association of Consulting Engineers of Ireland, sponsored a series of interviews with senior members of the profession as part of an oral history project. Copies of the recordings were deposited at the National Library of Ireland.

■ **May: AGM & Fellows Lunch**

■ **October: The Origins and Development of Galway's MedTech Cluster - Seminar**

The Irish Academy of Engineering in cooperation with the Whittaker Institute and the CÚRAM Centre for Research in Medical Devices hosted a half-day seminar in NUI Galway on the emergence of the MedTech cluster in and around the West of Ireland city. The seminar presented an opportunity to discuss the factors behind the origins and initial development of the cluster and in particular the emergence of the first group of indigenous companies focusing on the design and production of modern medical devices.

■ **November: Innovating for Growth – Improving Ireland's Innovation Ecosystem - Seminar**

The opportunities and the challenges facing the Irish economy are complex, urgent and require a commitment to developing and implementing long term strategies. This seminar, held in conjunction with the launch of a discussion paper on the same subject, was a first step in establishing a forum where interested parties can discuss and debate long term strategies to create a vibrant sustainable enterprise sector.



Italy
www.fast.mi.it



Netherlands
(www.acti-nl.org)

AcTI Member Meetings

In 2019, five member meetings were organized around five themes:

■ **Theme: "Biobased industry" at Avantium, February 12, 2019, with the following speakers:**

- Heather Leslie, researcher microplastics, Institute for Environmental Affairs,
- Vrije Universiteit Amsterdam
- Nelleke van der Puil, Vice President Materials at LEGO
- David Strik, assistant professor of Environmental Technology, Wageningen University

■ **Theme: "Sustainable Packaging" at Besi in Duiven, April 10, 2019, with the following speakers:**

- Richard Blickman, CEO of Besi, guided tour of Besi, together with colleague Ruud Boomsma, presentation on semiconductor industry
- Kouchi Zhang, Professor of Electronic Components, Technology and Materials (ECTM) at Technische Universiteit Delft
- Arco Berkenbosch, VP Innovation & Development at Smurfit Kappa

- Eline van Beest, Young innovator and founder NightBalance on sleep apnea

■ **Theme: "Mutual reinforcement", House of Representatives in The Hague, 20 June 2019, with the following speakers:**

- Eppo Bruins, member of parliament ChristenUnie and also AcTI member and host
- Thom Palstra, Principal University Twente presents KNAW advice "Mutual reinforcement", committee with, among others, AcTI chairman Margrethe Jonkman and board member Cees Buisman has investigated whether government investments in the field of R&D may slow down private investment in this area.
- Jorrit Kuipers (Director Green Dino and Treasurer AcTI) and Robert Thijssen (Economic Affairs) present the draft advice in which AcTI makes recommendations for increasing the potential of startups and scale ups.
- Presentation Young Innovators Paul Vulto and Marjolein Helder about experiences within SMEs



Norway
(www.ntva.no)

- Publication of the anthology "The new Digital Norway" covering digitalisation of different sectors of the Norwegian society and its consequences. The book has had a broad circulation amongst decision makers in policy, public administration and business. This is the second volume in NTVA's series on digitalisation, with the next volume planned for late 2021.

- NTVA organised the Euro-CASE annual conference on the topic "Future of work – content of jobs". The conference gathered around 110 participants from Euro-CASE member academies, research, education, students and public administration, and covered issues such as life-long learning, AI and its consequences on jobs, and how educational institutions must evolve to meet digitalisation of jobs.

- The academy hosted 36 seminars in six Norwegian cities. The seminars covered various technological areas with a specific focus on sustainability and digitalisation.



Poland
(www.pan.pl)

- In 2019 Polish Academy of Sciences strongly supported research on i.a., climate change and biodiversity protection. The Academy also advocated sustainable management of freshwater resources by coordinating celebrations of World Water Day in Poland, and in partnership with the UN Information Centre in Warsaw, organised a public event on Climate Change in Poland.

- A new method developed at the PAS Institute of Oceanology for identifying the extent of the Arctic ice cover over the last 2000 years will help in understanding the current alarming shrinkage of the ice cover and forecasting future scenarios.

- PAS and INGSA co-organised the workshop African Swine Fever (ASF) – the Role of Science Advice in Warsaw. It focused on science-to-science and science-to-government collaboration on ASF containment.

- Together with Polish Young Academy the academy organised the fourth international conference Polish Scientific Networks – Science and Technology which served as a knowledge transfer platform for researchers working in physics, chemistry and engineering.



Portugal (www.ordemengenhheiros.pt)



Romania (www.astr.ro)

- ZASTR 2019 - Academic Days of Technical Sciences Academy of Romania -International Conference was organised for 16-18 October 2019 in collaboration with the Technical University of Moldova, with the support of the ASTR branch in the Republic of Moldova and the Association of Engineers from Republic of Moldova. The conference theme was-“Creativity in the development of the Knowledge Society” and the papers have been published in Proceedings in Romanian and English languages.
- Journal of Engineering Sciences and Innovation (JESI): quarterly journal 2019-2020 Editor in chief: Valeriu V. Jinescu;
- Scientific electronic journals under the coordination by prof. Ion Boldea: www.jeee.ro and prof. Radu Munteanu: www.jeee.cj, which are periodicals.
- Publications:
 - Series of Pages from the history of the development of the Romanian Industry – vol. 9 coordinator: Valeriu V. Jinescu;
 - Rubber and plastics processing industry - authors: Lucian Motiu, Ion Seres
 - Eight books in the technical, mechanical, electrical and transport engineering fields were published in 2019;
 - Two volumes on “The History of Romanian Technique and Industry” in which certain chapters were written by Mr. Mihai Mihaita, Gheorghe Manolea, Alexandru Morega, Florin Tanasescu, Dumitru Fodor and others, all authors being members of ASTR.
 Prizes were awarded for 13 works with original ideas in the technical field.



Serbia (www.ains.rs)

- The Academy of Engineering Sciences of Serbia (AESS) was elected as a new member of CAETS at the annual convocation in Stockholm, in June 2019. CAETS membership now spans 30 countries distributed across six continents of the world. Dr Sanja Vranes has been appointed by the AESS Steering Committee to be a representative of AESS in CAETS.
- AESS and the Academy of Medical Science - Serbian Medical Society signed a memorandum on bilateral cooperation. This agreement is in line with general commitment of the AESS to enrich its capacity with expertise in non-engineering domains.
- In cooperation with the Technical University of Vienna, the Dresden University of Technology and the Bratislava University of Technology, AESS organized the International Scientific Conference “e-Future of Cities - Between Temptations of Exponential Technology Growth and the Concept of Human City” held in Belgrade in October 2019.



Slovenia (www.ias.si)

- “Promotion of engineering”: In June, IAS hosted a ceremony for new-elected members of IAS, among them the Nobel Prize winner Duncan Haldane and the former NASA astronaut Ronald M. Sega. IAS has also prepared other different activities for promotion of engineering and status of engineers in Slovenia.
- Cooperation with SAPEA on the conference “A Scientific Perspective on Microplastics in Nature and Society”, Including “Plastic Recycling” and “Bio Polymers in Advanced Technologies of the Future”: IAS together with the Faculty of Chemical Engineering of the University of Ljubljana hosted the conference in cooperation with SAPEA. A working group of experts has prepared contributions to review the current evidence on health, environmental and societal impacts of nano- and microplastic pollution.
- “Understanding the Innovation Process and Sustainable Development”: IAS continued a long-term analysis of the educational system in Slovenia, the analysis of Slovenia’s research, development and innovative achievements. It includes recommendations for improvement on these topics.



Spain (www.raing.es)

- The Royal Academy of Engineering of Spain organised several sessions and seminars, and other events during 2019, highlights including:
 - Opening session of the Royal Academies of the Institute of Spain with the lecture “5G in perspective”, under the presidency of HM the King Felipe VI, at the RAI headquarters.
 - Reception ceremony of five new members as Academics.
 - Annual awards “Academiae Dilecta” and “Young Engineers”.
 - “Engineers Laureados” awards.
 - Homage to the Mining and Industrial Engineering School and the Almadén Mines. In collaboration with other academies.
 - A representative of the RAI participated in the Euro-CASE - Energy Platform. The report “Energy Transitions in Europe common goals but different paths”, has been published.
 - Participation of RAI representative in the Euro-CASE & CAE Forum on Evidence-Based Scientific Policy Advice held on 15-17 April 2019 in Ma’anshan, Anhui, China.
 - Volumes VIII and IX of the collection “Technique and Engineering in Spain”, and report of the “Energy Observatory”.



Sweden (www.iva.se)

- In 2019, the Royal Swedish Academy of Engineering and Sciences (IVA), celebrated 100 years. During the year, IVA highlighted challenges and change needed in a number of areas e.g. the climate challenge, circular economy, energy, sustainable water supply, digitisation of society, entrepreneurship and collaboration between the research community and the private sector. The academy did so throughout the year by arranging meetings and seminars, assemble working groups and networks.

- The academy promoted discussion of the role of engineering the next 100 years, most prominently at the CAETS Convocation 2019, hosted by IVA in Stockholm. The conference, hosted by IVA, gathered over 400 researchers and experts from all over the world.
- The 2019 Nobel Laureate in Chemistry, Akira Yoshino, visited IVA in connection with the Nobel festivities in December. Prof. Yoshino, also known as the father of lithium ion batteries, was the keynote speaker at a seminar at IVA, "Future Battery – Technology and Ecosystem".
- "Good science is never dead!" With that statement the 2019 EU-US Frontiers of Engineering symposium, held 18-20 November in Stockholm, was officially opened, with IVA as host. The Frontiers of Engineering is a programme run by the US National Academy of Engineering with the intent to bring together a select group of emerging engineering leaders from industry, academia and government labs, to facilitate collaboration in engineering as well as the transfer of new techniques and approaches across fields.
- At its Annual Meeting in October, over 1000 guests from across the world, IVA celebrated its actual birthday and becoming Sweden's youngest centenarian.



Switzerland (www.satw.ch)

- SATW published the third edition of its biannual "Technology Outlook", an overview of the most promising upcoming technologies for Switzerland, written by various leading experts. For the first time, the publication was also published as an extensive online-version and accompanied by a roadshow with multiple presentations for SME business owners and innovation professionals.
- Under the auspices of the SATW topical platform on artificial intelligence, leading experts in the field published the whitepaper "Recommendations for an AI Strategy in Switzerland". The experts

describe areas with great potential for Switzerland, amongst others the creation of national data platforms. Without such efforts, Switzerland risks being left behind in this forward-looking technology.

- In 2019 SATW successfully completed the first implementation of the public-private partnership programme "Swiss TecLadies", an initiative to foster young female talent in the field of technology. After qualifying by completing an online test, 45 girls aged between 13-16 began a versatile nine-month development programme with the support of a female mentor.



United Kingdom (www.raeng.org.uk)

- RAEng hosted the biennial Global Grand Challenges Summit in September, jointly with the national academies of China and the US. The Summit brought together engineering leaders, researchers, innovators and students to promote the importance of collaborative, inter-disciplinary approaches to global challenges. The next event will be in China in 2021.
- On 6 November RAEng led the first ever This is Engineering Day to promote engineering careers and awareness of what engineers really do. Messaging reached over 14m people and has measurably changed the perceptions of young people and their parents. The next This is Engineering Day is on 4 November 2020, and international partners are welcome to get involved.
- RAEng launched Engineering X in October, a new international collaboration that builds global alliances to engineer a safer, more sustainable world. The programme delivers practical solutions based on real needs, in the areas of Safer Complex Systems, Safer End of Engineered Life, Engineering Skills and Transforming Systems through Partnership.

Acknowledgements: Euro-CASE secretariat is grateful to acatech for an important content contribution of this Annual Report, to the RAEng staff for its proofreading and to AESS for its editing and printing.

Text: Euro-CASE

Design, realisation and printing: AESS, Kliker Dizajn and Dual Mode

Photo credits: Page 3 : © acatech; Page 4 : © internet YC; Page 5: © Envato Elements; Page 9: © ASTR; Page 10: © PAN; Page 11: © KIT IPEK; Page 12: © Envato Elements; Page 13: © TAF & NAE; Page 14: © AESS; Page 15: © Maciej Rutkowski; Pages 16-17 : © Claude Naville, © Envato Elements; Page 19: © Envato Elements

Member Academies and Euro-CASE Board members in 2019 (Representatives and alternates)

Austria

Kurt Richter, Günter Blöschl
Austrian Academy of Sciences - ÖAW
Dr Ignaz Seipel Platz 2
1010 Vienna Austria
Tel: +43 1 51581 3253
www.oew.ac.at

Belgium

Luc Chefneux, Joos Vandewalle
ARB, KVAB
Rue Ducale 1 Hertogstraat
1000 Brussels Belgium
+32 2 550 23 23
www.academieroyale.be/
www.kvab.be

Croatia

Vladimir Androcec, Zdravko Terze
Croatian Academy of Engineering – HATZ
28 Kačić Street, P.O. Box 59
10001 Zagreb, Croatia
Tel : +385 1 49 22 559
www.hatz.hr

Czech Republic

Petr Zuna, Milos Hayer
Engineering Academy of the Czech Republic – EA
CR
Narodni trida 3
110 00 Praha 1 Czech Republic
Tel : +420 221 403 478
www.eacr.cz

Denmark

Nils O. Andersen, Lia Leffland
Danish Academy of Technical Sciences – ATV
C/O BLOXHUB
Faestningens Materialgaard
30 Frederiksholms Kanal
1220 Copenhagen K
Tel.: +45 45 88 13 11
www.atv.dk

Finland

Jari Hämäläinen, Olavi Nevanlinna
The Council of Finnish Academies
Mariankatu 5
00170 Helsinki
Finland
Tel. +358 50 3135112
www.academies.fi

France

Bruno Revellin-Falcoz, Yves Caristan, Gérard
Creuzet
National Academy of Technologies of France - NATF
Grand Palais des Champs Elysees – Porte C
Avenue Franklin D. Roosevelt
75008 Paris France
Tel : +33 1 53 85 44 44
www.academie-technologies.fr

Germany

Reinhard Hüttl, Rudolf Hielscher
National Academy of Science and Engineering
- acatech
Pariser Platz 4a
10117 Berlin
Germany
T: +49 30 20 63 09 611
www.acatech.de

Brussels Office - acatech
Rue d'Egmont 13
B - 1000 Brussels
T +32 2 213 81 81

Greece

Antonia Moroupoulou
Technical Chamber of Greece - TCG
4 Nikis street
10248 Athens Greece
Tel : +30 21 03 29 16 13
https://bit.ly/39ZaATl

Hungary

János Ginsztler, János Takács
Hungarian Academy of Engineering – HAE
H-1111 Budapest Műgyetem rakpart 3.
Hungary
Postal address: H1507. Budapest Pf. 149
Tel : +36 1 353 39 96
www.mernokademia.hu

Ireland

Jim Browne, Gabriel Dennison
Irish Academy of Engineering - IAE
22 Clyde Road
Ballsbridge
Dublin 4 Ireland
Tel : + 353 1 66 51 337
www.iae.ie

Italy

Speranza Falciano, Matteo Pardo
CNR, INFN, ITT and Politecnico di Torino
consortium
C/O Presidenza INFN
Piazza dei Caprettari 70
00186 Roma Italy

Netherlands

Bertrand, van Ee, Lucas Noldus
Netherlands Academy of Technology and
Innovation - AcTI
PO Box 19 121
1000 GC Amsterdam The Netherlands
Tel : +31 20 5510 802
www.acti-nl.org

Norway

Torbjorn Digernes, Gisle Johanson
Norges Tekniske Vitenskapsakademi – NTVA
Norwegian Academy of Technological Sciences
Lerchendal gaard
7491 Trondheim
Tel.: +47 73 59 54 63
www.ntva.no

Poland

Antoni Rogalski, Elzbieta Frackowiak
Polish Academy of Sciences – PAN
Pl. Defilad 1
00-901 Warszawa Poland
Tel: +48 22 182 65 07
www.pan.pl

Portugal

Fernando Santana, João Pereira Bento
Academia de Engenharia - PAE
Portuguese Academy of Engineering
Av. Antonio Augusto de Aguiar 3D
1069-030 Lisboa - Portugal
Tel : +351 21 313 26 09
www.ordemengenheiros.pt

Romania

Mihai Mihaita, Valeriu V. Jinescu
Technical Sciences Academy of Romania - ASTR
Str. Calea Victoriei, nr 118
Sector 1
Bucharesti Romania
Tel: +40 21 319 49 43
www.astr.ro/

Serbia

Petar B. Petrovic, Miodrag Mesarovic
Academy of Engineering Sciences of Serbia - AES
Kraljice Marije 16
11120 Belgrade, Serbia
Tel: +381 11 337 06 52
www.ains.rs

Slovenia

Mark Pleško, Stane Pejovnik
Inženirska akademija Slovenije - IAS
Slovenian Academy of Engineering
Tomšičeva ulica 4
1000 Ljubljana Slovenia
Tel : +386 1 425 4418
www.ias.si

Spain

Pere Brunet
Real Academia de Ingeniería - RAI
The Royal Academy of Engineering - Spain
C. Don Pedro 10
28005 Madrid Spain
Tel: +34 915 28 20 01
www.raing.es

Sweden

Tuula Teeri, Elin Eliot
The Royal Swedish Academy of Engineering
Sciences - IVA
P.O. Box 5073
Grev Turegatan 16, Stockholm
102 42 Stockholm
Tel: +46 8 791 29 00
www.iva.se

Switzerland

Willy Gehrer, Rolf Hügli
Schweizerische Akademie der Technischen
Wissenschaften - SATW
Swiss Academy of Engineering Sciences
St. Annagasse 18
8001 Zürich
Tel: +41 44 226 50 11
www.satw.ch

United Kingdom

Richard Parker, Shane McHugh
The Royal Academy of Engineering - RAEng
3 Carlton House Terrace
London SW1Y 5DG United Kingdom
Tel: +44 20 7766 06 00
www.raeng.org.uk

■ **AUSTRIA** ► The Austrian Academy of Sciences – OeAW ■ **BELGIUM** ► Académie Royale des Sciences, des Lettres et des BeauxArts de Belgique – ARB ■ **BELGIUM** ► Koninklijke Vlaamse Academie van België voor Wetenschappen en Kunsten ■ **CROATIA** ► Croatian Academy of Engineering – HATZ ■ **CZECH REPUBLIC** ► Engineering Academy of the Czech Republic – EA CR ■ **DENMARK** ► Danish Academy of Technical Sciences – ATV ■ **FINLAND** ► Technology Academy Finland – TAF ■ **FRANCE** ► National Academy of Technologies of France – NATF ■ **GERMANY** ► National Academy of Science and Engineering – acatech ■ **GREECE** ► Technical Chamber of Greece – TCG ■ **HUNGARY** ► Hungarian Academy of Engineering – HAE ■ **IRELAND** ► Irish Academy of Engineering – IAE ■ **ITALY** ► CNR, INFN, ITT and Politecnico di Torino consortium ■ **NETHERLANDS** ► Netherlands Academy of Technology and Innovation – AcTI ■ **NORWAY** ► Norwegian Academy of Technological Sciences – NTVA ■ **POLAND** ► Polish Academy of Sciences – PAN ■ **PORTUGAL** ► Portuguese Academy of Engineering – PAE ■ **ROMANIA** ► Academy of Technical Sciences of Romania – ASTR ■ **SERBIA** ► Academy of Engineering Sciences of Serbia – AESS ■ **SLOVENIA** ► Slovenian Academy of Engineering – IAS ■ **SPAIN** ► The Royal Academy of Engineering – RAI ■ **SWEDEN** ► The Royal Swedish Academy of Engineering Sciences – IVA ■ **SWITZERLAND** ► Swiss Academy of Engineering Sciences – SATW ■ **UNITED KINGDOM** ► The Royal Academy of Engineering – RAEng ■



Euro-CASE Office

Grand Palais des Champs Elysées – Porte C
 Avenue F. D. Roosevelt, 75008 Paris – France
 Tel : +33 1 53 59 53 40
 mail@euro-case.org – www.euro-case.org