



Royal Academy of Engineering (RAI)

Closing of Academic Year 2019-2020

Report of the Secretary-General

20 October 2020



Closing Session of Academic Year 2019-2020

Report of the Secretary-General

The Hon. Mr President, distinguished academicians, ladies and gentlemen, dear friends.

We conclude the 2019-2020 academic year by reviewing, as usual, the institutional activities developed by the Royal Academy of Engineering in compliance with its foundational purposes of promoting quality and competence in Spanish Engineering.

The 14 October 2019 marked the start of the academic year of the Institute of Spain's Royal Academies, which was presided over by His Majesty King Felipe VI, in the presence of Mr Pedro Duque, Minister of Science, Innovation and Universities.

His Majesty the King opened the session, and academician Mr Elias Fereres, President of the RAI, gave the welcome speech. After the Secretary-General's reading of the Report of Activities of the Institute of Spain's Royal Academy, the RAI academician Mr Miguel Ángel Lagunas gave his inaugural speech of the academic course entitled: *5G in perspective*.



This academic year has been peculiar, since a state of alarm was declared on 18 March which was to last until mid-June. In addition, the impacts of the pandemic have continued to be felt throughout the rest of the academic year with



limitations and restrictions affecting the Academy's life. Nevertheless, the Academy has carried out its duties by carrying out a large part of its activities by telematic means.

Since the beginning of the academic year, the Academy has held six plenary meetings. On 19 November 2019, academician Mr Antonio Colino Martínez was elected president by majority on the first vote from among the candidates presented. In the plenary session held on 10 December, at the proposal of the elected president, the Governing Board was voted on, and the following academicians were elected on the first ballot for the following positions:

Vice Presidents: Ms María Vallet, Mr Luis Lada and Mr José Manuel Sanjurjo

Secretary-General: Mr Eloy Álvarez Pelegry

Treasurer: Mr José Manuel Sanjurjo

Comptroller: Mr Antonio Huerta

Librarian: Mr Luis García Esteban

Members: Mr Iñigo Losada, Mr Antonio Luque and Mr Ignacio Romagosa.

In the January and February plenary sessions, the composition and duties of the Government, Finance, Foreign Relations, Candidacies, Awards, Library, Publications and Communication Committees were approved, as was the creation of the Studies and Opinions section. They have been meeting throughout the academic course to discuss issues within their competence.

The Governing Board also held eight planned meetings during the academic year.

Academic sessions

In the academic year 2019-2020, the following academicians have taken up their positions.

Academician Mr Antonio Huerta Cerezuela took possession of his position on 10 December 2019. Civil Engineer and PhD from Northwestern University. Professor at the Barcelona Higher Technical School of Road, Canal and Port Engineering, his fields of action are modelling, numerical methods and computer engineering.

In his opening speech, entitled: *Computational Engineering: Perspectives on an essential and emerging speciality*, he highlighted that this is a concept that includes modelling, simulation, and application to specific problems that are usually directly linked to engineering but are increasingly extending to a number of scientific disciplines.

The response was carried out by academician Mr Eduardo Alonso Pérez de Ágreda.



The elected academician Mr Daniel Ramón Vidal took possession of his position on 21 January 2020. Degree in Biological Sciences and Extraordinary Doctorate Award. Professor of Food Technology at the University of Valencia and Vice President of R&D in Nutrition and ADM Health, his areas of specialisation being systems biology and microbial genomics.



In his opening speech: *Reflecting on bacteria, food and health*, the new academician showed his vision of how the microbial world influences the production and nutritional assimilation of food and its remarkable variation in the



last decade, thanks to the advent of so-called mass genome sequencing techniques.

The response was given by the academic Mr Enrique Cerdá Olmedo.

The elected academician Mr Luis García Esteban took possession of his position on 18 February 2020.

PhD in Forestry Engineering, Professor at the Higher Technical School of Forest, Forestry and Natural Environment Engineering of the Polytechnic University of Madrid (UPM), where he was assistant director. He has been vice chancellor of students at that university. His lines of research include, among others, anatomy and identification of wood, physical-mechanical characterisation of wood, wood products and application of artificial neural networks to the optimisation of processes in the wood industry.

In his speech, *Journey to the heart of wood*, he referred, among other aspects, to the use of artificial intelligence through image recognition, which is the new stage that is being addressed so that the authorities in charge of controlling the wood market have a sufficiently reliable tool to establish early warnings.

His speech was responded by academician Mr Luis Alfonso Gil Sánchez.



On 27 February 2020, the medal and title as Academician was awarded to Mr Javier Jiménez Espriú in a solemn ceremony. The *laudatio* of the new academician was given by academician Mr Aníbal R. Figueiras Vidal.



In his lecture, *The miscegenation of our engineering and the ethical clash of the 21st century*, the new corresponding academicien expressed that the distinction received allows to strengthen bonds between Spanish and Mexican engineering, and he went on to make a brief tour of Mexican engineering throughout its wide and long tradition and its encounter with that which arrived from the Iberian Peninsula in different times in history.



On 22 October 2019, the session *In Memoriam dedicated to the Hon. Mr Manuel Márquez Balín*, who died on 19 May 2019, was held. Mr Manuel Márquez was one of the thirty-six constituent academicians of the RAI, and from the onset, his role and attitude were essential in the development and activities of the Academy.

He was the vice-president of the Academy, member of the Board of Trustees of the Pro Rebus Academiae Foundation and a figure of singular relevance in the Academy's projection at an international level, actively participating in different CAETS and Euro-CASE committees.



During the academic year we also mourned the death of academicians Mr Adriano García-Loygorri y Ruiz, on 24 March 2020, who was the 29th medallist; and that of academician Mr José Luis Díaz Fernández, on 24 September, who was the 4th medallist.

Constituent academicians since 1994, they were both mining engineers, and had a relevant role in the activities of the Academy, being well recognised in the professional and academic fields as clear references in their fields of action. Their deaths are a considerable loss to the Academy.





Awards and distinctions

As far as awards and distinctions are concerned, on 19 November 2019, the awards ceremony for young researchers *Agustín de Betancourt y Molina* and *Juan López de Peñalver* took place at the RAI headquarters.

The session began with the intervention of academician Mr Elías Muñoz, a member of the Awards Committee, who made a brief presentation of the award-winners, and of the candidates who were recognised with the RAI medal due to the quality of their work

The *Agustín de Betancourt y Molina Award* was granted to Dr. Jesús Alonso-Zárate, a telecommunications engineer and currently Division Manager at the Communications Technology Centre of Catalonia (CTTC) and Associate Professor at the Pompeu Fabra University.

The *Juan López de Peñalver Award* was granted to the Offshore Engineering and Marine Energy Group of the Environmental Hydraulics Institute of the University of Cantabria, represented by Dr. Raúl Guanche, Roads, Canals and Ports Engineer.

Given the outstanding level of the candidates presented, the Awards Committee decided to award RAI medals to candidates who, not having achieved the former awards, deserved special recognition for their contributions to Engineering. Given the scope of this report, their names are listed on the RAI website and in the annual report.



In the same session on 19 November, the company MTorres Diseños Industriales was also awarded the 2019 Academiae Dilecta award.



The RAI Awards Committee particularly valued the group's capacity for innovation, its commitment to creativity being an essential asset, and the creation of technological employment and internationalisation, which has enabled it to take on technological challenges over the years, taking advantage of its continuous R&D work in different sectors.

In the academic year 2019-2020, the Royal Academy of Engineering has awarded the recognition of Engineer Laureates to the extraordinary career of Messrs. Mr Fernando Sáenz Ridruejo and Mr Leonardo Fernández Troyano.

On 4 November 2019, the professional career of these engineers was recognised by the Royal Academy of Engineering.

Academician Josefina Gómez Mendoza introduced Mr Fernando Sáenz Ridruejo, who, after receiving the recognition sculpture, gave a master lecture on *The contribution of civil engineers to the dissemination of knowledge*, and Mr Leonardo Fernández Troyano, whose presentation was made by academician Mr José Antonio Martín Pereda, gave a master lecture on *The Bridge, a work of engineers*, in which he showed his work, detailed the difficulties encountered and showed the solutions used for its construction.

Ms Teresa Estevan Bolea was also awarded as Laureate Engineer, the award ceremony of this recognition being pending.



Distinctions to academicians

As far as distinctions to academicians of the RAI are concerned, on 14 November 2019, academician Joan Margarit was awarded the 2019 Miguel de Cervantes



Award for Spanish Language Literature, granted by the Ministry of Culture and Sport, and the same month he received the Twenty-eighth edition Reina Sofía Ibero-American Poetry award, granted by Patrimonio Nacional (national heritage) and the University of Salamanca.

Academician Maria Vallet was honoured at the First edition of the *International Zenda Awards*, in a ceremony that was held on 27 November.

On 21 January, academician Aníbal Figueiras was sworn in as *corresponding academician of the Royal Galician Academy of Sciences*, and in February Pilar Carbonero received a *tribute from the Higher Technical School of Agronomic and Biosystems Engineering*.

Academician Avelino Corma has been awarded the *Medal of Chemical Engineering 2020* by the Institute for Chemistry and Bioengineering of the Swiss Federal Institute of Technology in Zurich and the *2020 Heinz Heinemann Award* by the International Association of Catalyst Societies (IACS).

Academician Íñigo Losada was elected as member of the Division of Earth and Environmental Sciences of the *European Academy of Sciences* and was appointed as member of the *Academia Europaea*.



Academicians Elías Fereres and Daniel Ramón Vidal were elected, in February 2020, members of the *Scientific Advisory Committee* of the National Institute of Agricultural and Food Research and Technology (INIA).

In July 2020, academician Francisco Herrera was appointed as member of the *Advisory Council on Artificial Intelligence of the Government of Spain*.



On 1 September 2020, academican Antonio Colino, President of the Royal Academy of Engineering, was appointed by the Council of Ministers as *member of the Board of Trustees of the Instituto Cervantes* (Cervantes institute) in representation of the University and the Royal Academies.

Academician Nuria Oliver was awarded the *Concepción Aleixandre* Award to the Valencian woman scientist in February in the category of honour. In March she was appointed *Commissioner* for the Presidency of the Valencia Regional Government (Generalitat Valenciana) on *Artificial Intelligence and Data Sciences in the Fight against COVID-19*. On 14 October she was awarded the *Mujeres a seguir* award (women to watch) in the Technology section.

Relations with other Academies

As regards activities with other Royal Academies and with the Institute of Spain, the Royal Academies of Pharmacy, Exact, Physical and Natural Sciences, Medicine and Engineering held a joint scientific session on *Climate Change* on 26 November 2019 at the auditorium of the Institute of Spain. Academician Eloy Álvarez Pelegry spoke on *Energy and Climate Change* on behalf of the RAI.



The joint session of the RAI together with the Royal National Academy of Pharmacy, Economic and Financial Sciences and the Spanish Youth Academy on *Artificial Intelligence: the value of data* took place on 19 February 2020.

Academician Mr Antonio Colino, president of the RAI, has participated in the ordinary meetings of the Governing Board of the Institute of Spain.



It is due to the RAI's cooperation with the Royal Spanish Academy and the FECYT that the presentation of the "Science Enclave" platform took place on 28 May, where several scientific dictionaries were gathered, including the Spanish Dictionary of Engineering, drafted by the RAI.

On 7 October 2020, the Academic Year of the Royal Academies of the Institute of Spain was solemnly inaugurated, presided over by His Majesty the King Felipe VI. The opening ceremony was attended by the RAI's president, vice-presidents and secretary-general.



Euro-CASE and CAETS

As for Euro-CASE, in the context of the promotion of external relations promoted by the corresponding committee, several academicians have joined different working groups. Academician Mr José Manuel Sanjurjo joined the group *The future of work*, Academician Mr Luis Castañer joined *Engaging early career engineers*, and academician Mr Ignacio Pérez Arriaga joined *Towards on evolution of the needs and means for Scientific Communication and Dissemination in a climate conditions PostCOVID word*.

The Board meeting was attended in June. All meetings took place online.

Academician Mr Jaime Domínguez Abascal represented the Academy at the annual CAETS meeting, which took place in different working groups between 12-15 October, representing our Academy on the Board.



The conference was titled *Engineering a Better World-Smart Society* and was held in four sessions on *Smart Energy Network*, *Hyper-connected Life*, *Education for Smart Society*, and *Climate Change Issues & Challenges in Urban Environment*.

A report on the development of a specific strategy and on the activities of the various committees, which are open to participation, was discussed at the CAETS Board meeting.

On the occasion of the presentation of the medal and the corresponding academic title by the Hon. Mr Javier Jiménez Espriú, on 27 February 2020, a meeting was held with Spanish companies with interests in Mexico and our Academy and the National Academy of Engineering of Mexico signed a declaration in which they agreed to join their efforts to promote rapprochement between both groups, with the purpose of linking the engineering communities and companies.

Conferences and sessions

As a result of the cooperation between the Royal Academy of Engineering and Fundación La Caixa (La Caixa Foundation), a series of conferences is being held under the title *Futurists. Engineering and its new challenges*.

The conference *Will we run out of water?* was given by academician Mr Elías Fereres, on 5 March 2020 in Madrid, and the conference entitled *Artificial Intelligence. Fiction and reality*, was given by academician Nuria Oliver on 24 September 2020.

Between April 2019 and January 2020, the Community of Madrid held *Welcome to Palace! programme*. The Royal Academy of Engineering has cooperated with Patrimonio Cultural of the Community of Madrid in this programme.

On 6 November 2019, the conference *Don Pedro de Toledo, los Villafranca y las artes entre Nápoles y Madrid* was held at the Palace of the Marquis of Villafranca, which are the headquarters of this Academy. On 6 October 2020, the conference *Los viejos palacios madrileños en Galdós (The old palaces of Madrid in Galdós)* was held at the RAI on the occasion of the centenary of the death of Benito Pérez Galdós.



On 16 January 2020, the RAI hosted the presentation of the ETHIA Foundation and was attended by: academican Mr Antonio Colino, President of the RAI, Mr Miguel Udaondo, President of the ACS and Mr José Luis Flórez, President of the ETHIA Foundation.

On 30 September 2020, Mr Ricardo Hausmann, corresponding academic of the RAI and Professor with a Chair in International Economic Policy Rafik Hariri Growth Lab. Harvard University, gave an online master lecture on *"The Global Political Economy before the COVID-19. Rebound or collapse"*.

On 1-2 October 2020, the RAI hosted in its headquarters the authors of the chapters of the book that is planned to be published about *Twelve Engineers who changed Spain*. Renowned historians and engineers participate in this book and will include the figure of outstanding engineers from the second half of the 19th century and the beginning of the 20th century.



Memoria Anual 2019-2020

Jornadas y sesiones



During the 2019-2020 academic year, academician Mr Manuel Silva, and editor of the Technical and Engineering in Spain collection, made different presentations thereof in several Spanish cities such as Valladolid, Gijón and Barcelona and Portuguese cities such as Évora and Lisbon. Mr Silva also presented the collection and handed it over to the Director of the Public Library of the State of Jalisco "Juan José Arreola" (Mexico).

Memoria Anual 2019-2020

Jornadas y sesiones





Other activities

The conference "*Demand management*", organised in the context of the Energy and Innovation Observatory, which is supported by Endesa, took place on 26 November 2019, at the RAI headquarters, and was attended by the Secretary of State for Energy, academician Mr José Domínguez Abascal, who presented the Spanish Government's vision of demand management. The conference was divided into two sessions, the first dealing with demand management, *an opportunity for consumers*, and the second with *regulatory barriers to the development of demand management*.



In the context of the *Observatory. Digitalisation in the Media sector*, on 30 October 2019, an informative session of the Second Call of *Impulsa Visión RTVE Research Grants for Official Master's Studies* took place at RAI and on 12 November 2019, the Conference on *5G in the audio-visual sector*. The conference was attended by academician Mr Miguel Ángel Lagunas.



The E2-I2 Forum: ingenuity at school focused during this academic year on the "Internet of things" through a training course for teachers of secondary education and vocational training with the aim of helping their training in educational tools and kits. It was carried out through an agreement with the Ministry of Education of the Community of Madrid. The course began on 3 March, and was interrupted due to the pandemic, and resumed online in the month of June.



Women and Engineering project



The activities of the Women and Engineering project have materialised through the following actions: Fourth edition of the Mentoring programme, Lidera-Adif programme, Women and Engineering Breakfasts, IngPulso programme and outreach activities.

The Fourth edition of the Mentoring programme was presented on 29 December 2019 and was carried out throughout 2020 with several training sessions and workshops with the 65 mentoring pairs. The closing of this edition took place on 15 October 2020.

The Lidera-ADIF programme is a mentoring programme where Adif professionals participate as mentors for young female engineers who have recently joined the company. The presentation of the programme took place on 17 December 2019 and included several joint training sessions and an online workshop. The closure of this first edition took place on 19 October 2020.

During the academic year, the Women and Engineering Breakfasts were aimed at raising awareness of best practices in managing gender diversity in corporations. On 4 December 2019 a first breakfast was held with the participation of Red Eléctrica de España. On 24 July 2020, another one with Oracle.

The IngPulso programme (an initiative that cooperates with Eje&Con) seeks to promote the greater presence and visibility of female engineers in the professional field. Online training meetings based on personal experiences were organised. In the past academic year, two meetings were held with female students and professionals.

Among other outreach activities, *Mujer e Ingeniería* (Women and Engineering) was presented on 12 December at the plenary meeting of the automotive committee of the Spanish Association for Quality and on 16 January it participated in the annual *Oracle 4 girls* event with the aim of bringing engineering closer to young people between 14 and 16 years old.



Cooperation agreements

These activities would not be possible without the support of the Ministry of Science and Technology and the institutions and companies that support us. During the 2019-2020 academic year, progress was made in signing cooperation agreements with the following institutions and companies:

ADIPROPE, BSQ Solar, COIT, EDP Renovaveis, Ferrovial, Fundación La Caixa, Suez Group, Instituto de la Ingeniería de España, Plataforma de Empresas para la movilidad sostenible (platform of companies for sustainable mobility), RTVE, Salesforce, Siemens Gamesa, Telefónica and the University of Granada

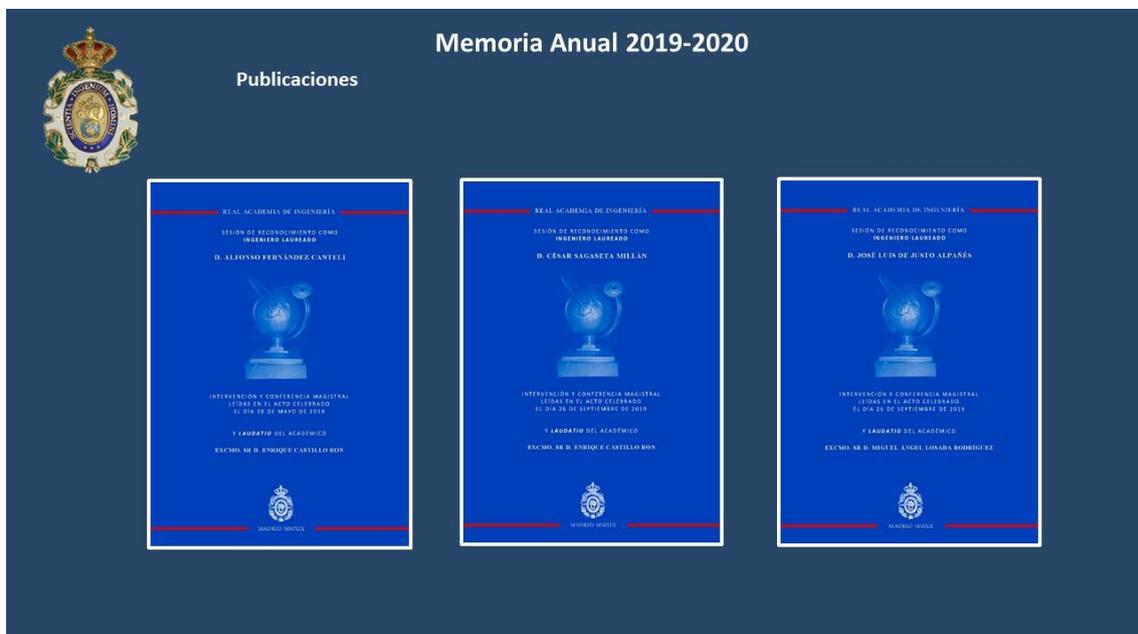
Palabra de ingeniero (Engineer's word)

RAI's participation in the Radio5 programme "Palabra de Ingeniero" has continued with a large representation of academicians who explain different words and terms to the audience. The academic year saw the participation of the following academicians: Eloy Álvarez Pelegry, Javier Aracil, Pere Brunet, Luis Castañer, Antonio Colino, Manuel Doblaré, Elías Fereres, Aníbal Figueiras, Luis Gil, Francisco Herrera, Miguel Ángel Losada, José Antonio Martín Pereda, José Alberto Pardos, José Manuel Sanjurjo, Mateo Valero and María Vallet.



Publications

The academic year has seen the publication of the speeches of the new academicians, of the *In-Memorial* session and of the awards to Laureate Engineers.



The document "Approaches and contributions of Engineering to COVID19. A contribution to the debate and the proposal of possible solutions" in which academicians Enrique Castillo, César Dopazo, Javier Jiménez, Nuria Oliver and Daniel Ramón participate.



The study "Emisiones de gases efecto invernadero en el sistema agroalimentario y huella de carbono de la alimentación en España" (Greenhouse gas emissions in the agri-food system and the carbon footprint of food in Spain) has also been published.

Finally, the study "Engineering as enabler of Sustainable Development Goals: Artificial Intelligence and Disruptive Digital Technologies" directed by academician Francisco Herrera and sponsored by Ferrovial. It is planned to be published in the next year.



Acknowledgements

The development of the activities listed here has been possible thanks to the support of the Ministry of Science and Innovation. Our president has held meetings in July and October, with Minister Pedro Duque, and with the Undersecretary of Science and Innovation, in which the projects and needs of our academy were raised. The annual grant having been received; specific requests are under consideration by this ministry.

We must also thank the generosity of our co-operators and institutions, the Fundación Pro Rebus Academiae and the companies that support us, and also all academicians for their contribution to the activities, works, studies and committees, and all the RAI staff and its management team.

Given the nature of this intervention, I invite you to consult the Royal Academy of Engineering's website, where you can find further details of academic life, about the activities, and the cooperating companies which, given the large amount of them, cannot be listed here.



Since the declaration of the state of alarm, the country's activity in general has slowed down and changed substantially in some respects. During this time, we understand that the Academy has maintained a notorious activity and has initiated a process to adapt to the new situation, which will surely allow it to continue to fulfil its goals.

Thank you.

