

**IV Meeting on Astrophysical Spectroscopy -  
A&M DATA - Atmosphere**

May 30 to June 2, 2022, Fruška Gora, Serbia

**BOOK OF ABSTRACTS AND  
CONTRIBUTED PAPERS**

**Edited by Vladimir A. Srećković, Milan S. Dimitrijević,  
Nikola Veselinović and Nikola Cvetanović**

**A&M DATA**



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Belgrade 2022

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## SCIENTIFIC RATIONALE

Spectroscopy is a powerful tool for the analysis of radiation from different plasmas in astronomy, laboratory, fusion research, atmospheric research and industry. Effective theoretical analysis, synthesis and modelling of stellar spectra as well as the spectra from other plasma sources, depends on atomic data and their sources. In particular, for the modelling of stellar atmospheres and opacity calculations a large amount of atomic data is needed, since we do not know *a priori* the chemical composition of a stellar atmosphere. Consequently, the development of databases with atomic data and astroinformatics is important for stellar spectroscopy.

The Conference is planned as an opportunity to consider above mentioned aspects of spectroscopic research on plenary sessions and then to work on the special mini-projects, which will result in common papers to be published in international astronomical journals after the Conference.

### Venue

Fruška Gora (Ceptor, Andrevlje), Serbia



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## **Data analysis on Serbian participation in COST Actions: Celebrating 50 years of research networks**

**Bratislav P. Marinković<sup>a</sup>, Stefan Ivanović<sup>b</sup> and  
Zoran Mijić<sup>c</sup>**

*Institute of Physics Belgrade, Pregrevica 118, 11080 Belgrade, Serbia*

*<sup>a</sup>E-mail: bratislav.marinkovic@ipb.ac.rs Member of COST Committee of Senior  
Officials (CSO)*

*<sup>b</sup>E-mail: stefan.ivanovic992@gmail.com; data analyst*

*<sup>c</sup>E-mail: zoran.mijic@ipb.ac.rs; COST National Coordinator (CNC)*

### **Abstract**

Last year COST celebrated 50 years of the existence and successful networking activities. Although it does not finance the research itself, it already has become an inevitable part of each European country's community of researchers and innovators since it is devoted to both excellence and widening priorities of European Research Area. Here, we have briefly analyzed data of Serbian participation in COST Actions by tackling the issues of the rate and extent of involvement, presenting its interdisciplinary, organization of info-days and some success stories such as chairing the Actions.

### **Introduction**

The European Cooperation in Science and Technology (COST) is the oldest intergovernmental funding organization in Europe created in the year 1971 with the aim to establish the research networks among scientists and innovators across Europe. Among 19 founding countries at that time there was Yugoslavia, whose researchers took active role in projects called *Actions*. In 2001, June 7<sup>th</sup>, Serbia (Federal Republic of Yugoslavia) rejoins COST and nowadays is one of 40 member countries together with one cooperating country that all form COST Association. Average number of countries participating in one Action was between 8 and 12 in the period of the first 20 years of COST establishment. Since then, this number is growing every year hitting the value of 31 and it is assumed to grow further in the forthcoming years (COST Brochure 2021).

COST organization experienced several transformations during its long history. It was established prior the start of Framework programs (FP), the first FP covering three years from 1984 to 1987. European Science Foundation, ESF, was an implementing agency via which EU financed COST organization from 2003



“COST: Past, Present and Future”. On 25<sup>th</sup> March 2015, an info-day was organized with guests from COST, Dr. Ángeles Rodríguez-Peña, COST President and Ms Katalin Alföldi, Policy officer for excellence and inclusiveness of COST programme. The Serbian representation in 245 COST Actions within 9 Domains was summarized by Prof. Dr. Goran Đorđević, while the participant’s experience was shared by Dr. Bratislav Marinković. During the info-day on 23<sup>rd</sup> March 2018 Acad. Sierd Cloetingh, COST President, Prof. Eva Kondorosi, Vice President of ERC and Chair of the Working Group on Widening European Participation, Mr Bart Veys, Policy officer and Mr Christer Halen, Policy administrator gave talks on COST, while Dr. Bratislav Marinković, Prof. Dr. Zorica Srdjević and Prof. Dr. Slobodan Cvejić presented Serbian experience in COST (<https://mpn.gov.rs/vesti/u-rektoratu-univerziteta-u-beogradu-odrzan-cost-info-dan/>).

On 10<sup>th</sup> October 2018 “COST Connect event” on *Sustainable Energy in the Danube Region* was held in Belgrade, organized by COST members Dr Ronald de Bruin, COST Director, Mr Bart Veys, Policy officer and Dr Elwin Reimink, Data and impact analysis officer, while the Serbian delegation was led by Prof. Dr Viktor Nedović, State secretary, Ms Željka Dukić, CSO member and Dr Bratislav Marinković, CNC and CSO member (<https://mpn.gov.rs/vesti/u-beogradu-odrzana-konferencija-cost-connect/>). COST Connect is a thematic event that brings COST Actions, policymakers and stakeholders together to exchange their ideas.

The info-day held on 29<sup>th</sup> March 2019 brought COST delegation (Dr Ronald de Bruin, Dr Elwin Reimink and Mr Christer Halen) in Belgrade. This info-day was combined with the presentations of Marie Skłodowska-Curie Actions, EURAXESS Serbia and EIT-Climate-KIC, European Institute of Innovation & Technology, while Serbian experience in COST was shared by Prof. Dr Bojan Blagojević from Faculty of Agriculture and Chair of COST Action CA18105 and by Dr Tijana Lainović from Medical Faculty, School of Dentistry, University of Novi Sad, MC member of COST Action CA16124. There was a large interest for this info-day at which 146 researchers participated.

## **Chairing COST Actions**

The very first Chair of one COST Action was Prof. Dr Biljana Stojanović from the Institute for Multidisciplinary Research, University of Belgrade. She proposed the consortium and chaired the Action 539 - Electroceramics from Nanopowders Produced by Innovative Methods (ELENA) which main objective was to improve the physical and electronic properties of advanced electroceramics and thick films produced by chemical, physical and mechanical synthesis techniques focusing on the polymeric precursors, sol-gel, spray pyrolysis, microemulsion, ultrasonic and freeze-drying methods (Stojanović 2009). The Action started in 2005 and ended in 2009 with total number of 22 member and 6 non-COST countries involved. During the life of the Action there were organized 7 MC meetings, 11 working group (WG) meetings, 35 Short-term scientific missions (STMS), 7 Workshops and 2

Training Schools. More than 300 publications were published, while at the conferences more than 150 contributions were presented (Stojanović 2009).

During the first open call in 2018 the proposal by Prof. Dr Bojan Blagojević was successful and COST Action CA18105 - Risk-based meat inspection and integrated meat safety assurance (RIBMINS) was approved. The Action started in 2019 with the main aim to combine and strengthen European-wide research efforts on modern meat safety control systems. It will last till 2023, it is organized in 5 WG with researchers from 35 countries. This was the first time when Serbian institution holds a position of a Grant Holder.

The open call in 2019 was very productive, 3 of 45 Actions were approved in which the main proposer was from Serbia. Those Actions are: CA19110 - Plasma applications for smart and sustainable agriculture (PIAgri) with Dr Nevena Puač from the Institute of Physics Belgrade as a Chair; CA19128 Pan-European Network for Climate Adaptive Forest Restoration and Reforestation (PEN-CAFoRR) chaired by Prof Vladan Ivetić, Faculty of Forestry, University of Belgrade; CA19135 Connecting Education and Research Communities for an Innovative Resource Aware Society (CERCIRAS) chaired by Dr Gordana Rakić, Faculty of Sciences, University of Novi Sad. These Actions started in 2020 and will last 4 years.

The open call in 2020 brought one chairing position for Serbian scientist. It is the Action CA20108 FAIR Network of micrometeorological measurements (FAIRNESS) proposed by Dr Branislava Lalić from Faculty of Agriculture, University of Novi Sad. The action intends to improve standardization and integration between databases/sets of micrometeorological measurements that are part of research projects or local/regional observational networks established for special purposes (agrometeorology, urban microclimate monitoring).

### **Success stories highlighted in the booklet on COST 50 years**

One of the COST success stories is the Action TD1308 - Origins and evolution of life on Earth and in the Universe (ORIGINS). Prof. Didier Queloz, a member of this Action received Nobel prize in Physics in 2019 for discovery of ‘an exoplanet orbiting a solar-type star’. Serbian representatives in this Action that lasted from May 2014 till May 2018 were Prof. Dr Zorica Svirčev from University of Novi Sad, Faculty of Sciences and Dr Branislav Vukotić from Astronomical Observatory Belgrade.

In the special edition of COST booklet “*50 years of research networks*” (COST Brochure 2021) an article named “Doors Opening Across Europe Thanks to Tree Talk” highlights the research of Prof. Dr Saša Orlović, at the Faculty of Agriculture and Head of the Institute of Lowland Forestry and Environment at the University of Novi Sad and Dr Dejan Stojanović, also at the Institute of Lowland Forestry and Environment. In the article it has been pointed out how cross border collaboration is helping scientists in Serbia to open the doors of cooperation with their colleagues

around Europe. Prof. Dr Saša Orlović is a very active participant in COST Actions, being either MC member or MC substitute in nine past Actions (E42, E47, E52, FP0903, FP1106, FP1201, FP1204, ES1308, FP1403) and two running Actions (CA18134 and CA18201).

A testimony by Goran Tmušić, PhD student and research assistant at the Faculty of Sciences of the University of Novi Sad has been recorded by mentioning his experience as a participant of the COST Action CA16219 - *Harmonization of UAS techniques for agricultural and natural ecosystems monitoring* (<https://50years.cost.eu/stories/goran-tmusic/> ). Member of MC of the Action CA16219 are Prof. Dr. Jasna Plavšić from the Faculty of Civil Engineering, University of Belgrade and Dr. Jugoslav Joković from the Faculty of Electronic Engineering, University of Niš.

The statement of Dr Ana Milojević from the Faculty of Political Sciences, University of Belgrade was posted at the COST website on the occasion of 50 years celebration: “All COST Actions are about getting people together. I collaborated with many excellent scholars, which I believe is one of the strongest points of COST”. Dr Ana Milojević is MC member of CA17132 and MC substitute of IS1308 Action.

### **Analysis of Serbian participation in COST Actions**

Involvement of Serbian researchers in COST Actions is constantly increasing as well as their share of total COST budget that is covering their activities. In 2020, Serbia participated in 270 Actions out of 291 Actions running at any time of the year (92.8%). In 2020, a total of 243 participants from Serbia were reimbursed by COST for their participation in COST Action networking activities (meetings, STSM, Training Schools) and our share in relation to the total budget of the Actions was 4.8% (in 2018 and 2019 these shares were 3.6%). In 2020, 58 participants from Serbia were involved in STSM, 34 trainees and 5 trainers were involved in Training Schools. There were also 12 Conference Grant participants from Serbia. In 2020, 45% of the participants from Serbia in networking activities holding a PhD were Early Career Investigators (ECI up to 8 years after obtaining PhD), while the average for all COST countries was 25% (COST Statistics 2021). However, the absolute figures for 2020 when compared to 2019 are significantly lower what is the consequence of covid-19 pandemic situation that reflected strongly on network activities.

Currently we are undergoing the statistical analysis of Serbian participation in COST Actions trying to achieve the how many of Serbian researchers and innovators have been participating in COST, how many of them have been in MC or at some other leading positions such as vice-chairs, WG leaders, STSM, grant awarding or science communication coordinators and Grant holder representatives.

The Actions that were approved in 2014 and before were distributed across different domains, each domain was covered by domain committee which could

approve certain number of Actions in proportion of the number of proposals. On the 163<sup>rd</sup> CSO meeting in Reading, UK, in November 2005 a decision of major restructuring of COST was taken. From June 2006 till 2014 there were 9 domains: Biomedicine and Molecular Biosciences (BMBS), Chemistry and Molecular Sciences and Technologies (CMST), Earth System Science and Environmental Management (ESSEM), Food and Agriculture (FA), Forests, their Products and Services (FPS), Information & Communication Technologies (ICT), Individuals, Society, Culture and Health (ISCH), Materials, Physical and Nanosciences (MPNS), Transport and Urban Development (TUD) and one Transdisciplinary Domain (TD). At that time, Serbia country rate participation in COST Actions was 21.9% out of 228 running Actions any time of the year (Annual Report 2006). The participation rates were 30.6% (of 222) (Annual Report 2007), 33.2% (out of 238) (Annual Report 2008), 32.2% (out of 255) in 2007, 2008 and 2009, respectively. In 2010 the percentage was 42% (Annual Report 2010). Participation of Serbian researchers was gradually but thoroughly increasing during the years: 50% of 301 Actions in 2012; 56% of 349 in 2013; 66% of 370 in 2014; 74% of 347 in 2015; 81% of 352 in 2016; 83% of 339 in 2017; 89% of 291 in 2018 and 92% of 292 in 2019 (COST Statistics 2020).

### **Interdisciplinary in COST research**

Analysis of interdisciplinary of COST Actions is carried out in the view of 6 main OECD scientific fields, each field consists of several subfields. It covers the Actions from the period of open calls 2015-1 till the 2020-1. The summary result is given in Fig. 1. On the graph the first columns in blue represent data from the 7 open calls (2015-2018) while the second columns in grey are those from all 9 open calls (2015-2020). The methodology of representing data is the same as presented in (Marinković 2019). In every Memorandum of Understanding (MoU) it is mandatory to state to which scientific field and subfield the Action belongs to. Those data have been aggregated for each open call and results have been presented by the SC and COST data analysts. If the degree of interdisciplinarity of the proposals have been measured based on the key expertise defined in OECD Fields of Science and Technology (OECD DSTI/EAS/STP/NESTI(2006)19/FINAL Document, 2007) selected by the main proposers when submitting the proposal, then the results show that almost half of all proposals are interdisciplinary, covering two, three or more disciplines. This interdisciplinary degree persists in COST open calls.

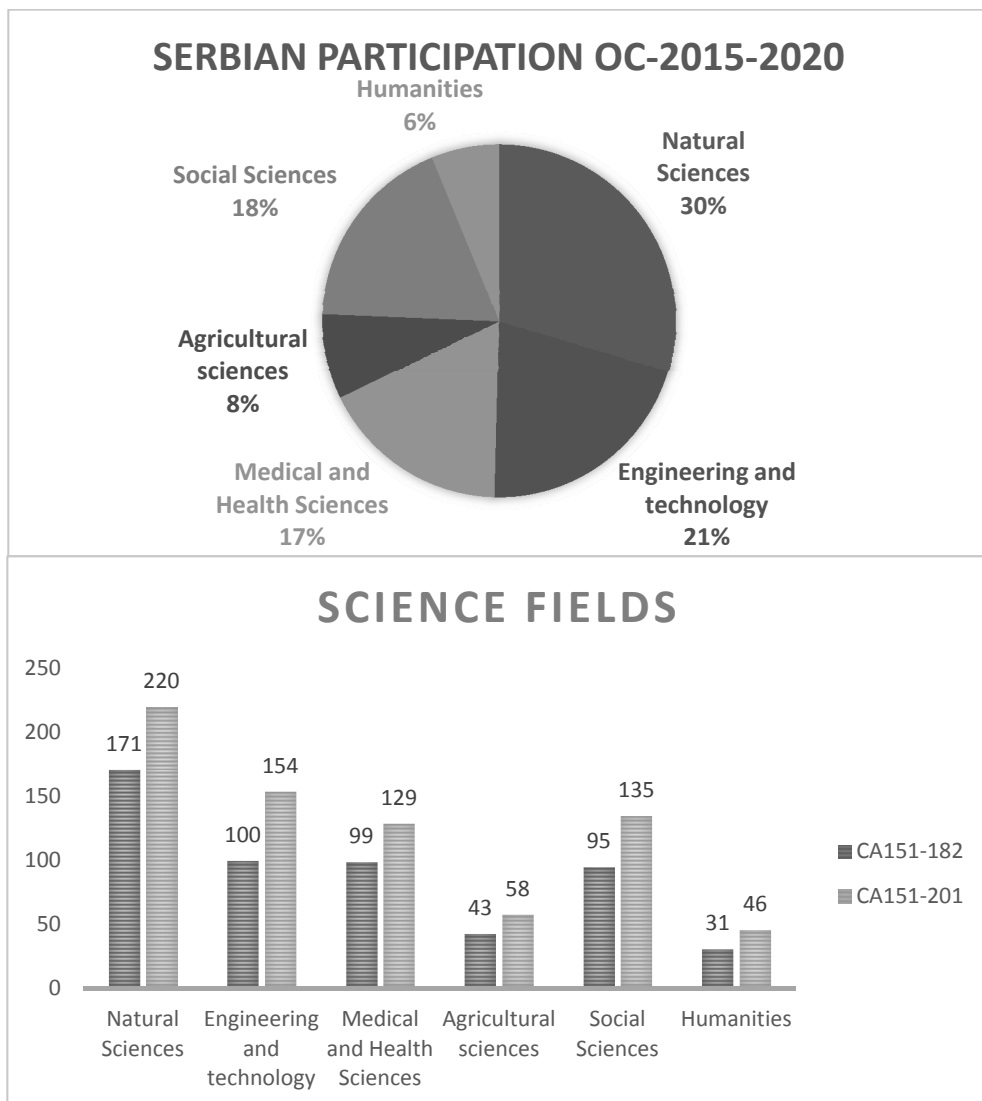


Fig. 1. Distribution of 6 main OECD scientific fields among Serbian research community in period 2015-2020: a) percentages; b) numbers in the first columns (blue) represent data from the 7 open calls (2015-2018), while the second columns (grey) are those from all 9 open calls (2015-2020).

## Conclusions

Serbian participation in COST activities is significantly growing. We are taking part almost in all new Actions, e.g., in 39 out of 40 Actions launched in the latest open call OC-2020-1. That is showing the versatility of Serbian science and also its

incorporation into European Research Area (ERA). But it also shows that there are not enough national programs and calls that support research community. During covid-19 pandemic time (years 2020 and 2021) many traditional ways of research have changed and been transformed to adopt more distant access to facilities and networking. Also COST, on April 2021, launched new Virtual Networking Tools (VTNs) with two novel instruments, the Virtual Networking Support (VNS) Grant in order to stimulate virtual collaboration among the members of a COST Action, and the Virtual Mobility (VM) Grant(s) for strengthening the individual activities. The rules and principles related to the submission, running and monitoring COST Actions have been recently simplified together with the guidelines for COST Action Proposal Submission, Evaluation, Selection and Approval documentation (COST Documents and Guidelines 2022). Accordingly, the national rules for joining and proposing new Actions have changed. All changes have been presented at the national COST webpages (<http://mail.ipb.ac.rs/~ncc-serbia/>). The procedure for applying for the MC position can be finished by direct upload of the required documents via dedicated link (<https://survey.ipb.ac.rs/index.php/666713?lang=sr>). The great challenge is ahead our COST and research and innovation community to make a participation in new 70 Actions that are envisaged to be approved at the end of May 2022, together with the new 70 Actions within newest call OC-2022-1 that will be closed on 22<sup>nd</sup> October 2022. On the same time, it will be a great opportunity for Serbian science to be more extensively integrated in ERA.

## Acknowledgments

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## **Statistics of Management Committee Members from Serbia in COST Actions**

**Zoran R. Mijić<sup>1</sup> and Bratislav P. Marinković<sup>2</sup>**

*Institute of Physics Belgrade, Pregrevica 118, 11080 Belgrade, Serbia*

<sup>1</sup>*E-mail: zoran.mijic@ipb.ac.rs COST National Coordinator (CNC)*

<sup>2</sup>*E-mail: bratislav.marinkovic@ipb.ac.rs Member of COST Committee of Senior  
Officials (CSO)*

### **Abstract**

COST (European Cooperation in Science and Technology) provides researchers and innovators access to the top scientific and technology networks in Europe and beyond. In order to increase Europe's capacity to solve scientific, technical, and social concerns it connects academics and innovators by providing funding for excellence-driven and multidisciplinary pan-European networks (COST Actions). Each Action is managed by a Management Committee composed of COST Member representatives. In this paper the basic analysis of Serbian representatives in active COST Actions is presented.

### **Introduction**

COST Actions are open, bottom-up networks of researchers and innovators that facilitate pan-European collaboration in a range of scientific and technological domains (Marinković, 2019). COST Action proposals are evaluated on the basis of excellence and can be submitted via an open call procedure. Participants at various stages of their careers collaborate in a field of science and technology of mutual interest to at least seven COST Full Members. The number of countries per Action has increased by 27% in the last seven years, mostly as a result of more Inclusiveness Target Countries (ITCs) joining COST Actions.

COST Action is managed by a Management Committee (Action MC) composed of Action MC Members (COST documents guideline, 2021). The COST National Coordinators (CNCs) is the national contact point in the COST Member responsible for the nomination in the Action MC. The selection of maxima two MC members per Action representing the COST Member state is based on national rules and procedures. Following the good practice, the consultation from Action Main Proposer/Chair prior nomination of MC is required to ensure that the profile of the proposed Action MC Member matches the aims and objectives of the COST Action and, where possible, brings diversity and interdisciplinarity in the Action MC.



An Action starts officially on the date of the first Action MC meeting (MC1) that should take place not earlier than 4 months and not later than 9 months after COST Committee of Senior Officials (CSO - main decision body of COST Association) approval.

Before the start of the Action, nominated persons will automatically become Action MC Members, but after the Action MC1 meeting, new Action MC Members must be validated by the Action MC. Validation occurs implicitly, that is, without any action on the part of the Action MC. An Action MC decision, on the other hand, might clearly approve or reject the nomination. The refusal must be supported by a formal reason submitted within four weeks of the nomination. If no express rejection decision is made within four weeks following nomination, the nomination is confirmed (Annotated Rules for COST actions, 2021).

The Action MC Members should actively participate to the work of at least one Working Group (WG) and represent their COST Member community in order to coordinate the input to the Action and disseminate opportunities arising within the Action at national level. The basic information and data related to the Serbian representatives in active Actions are presented below.

### Statistics of MC members from Serbia

The official data obtained by COST Association in May 2022 provide the information on nomination and MC member's statistics for all COST Members (COST statistics, 2022). Fig 1. depicts the average days needed for MC member nomination (for Action secondary proposers) after the official CSO approval. Serbia, with 61 days needed for nomination, is in the middle range with respect to all other countries.

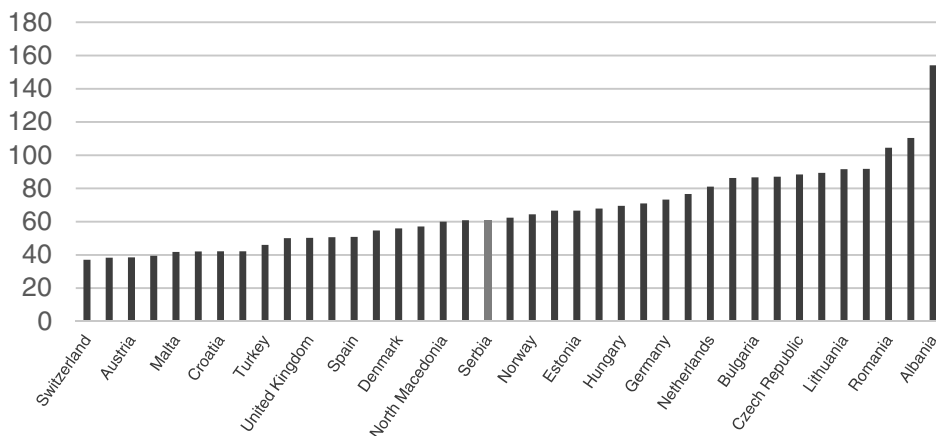


Fig. 1. Days between CSO approval and MC delegate nomination for Actions proposers.

On the other hand 123 days in average is needed for nominations of non-secondary proposers (Fig 2.) indicating the necessity to improve the information sharing on new Actions approval and promotion of benefits for non-secondary proposers to join COST Actions.

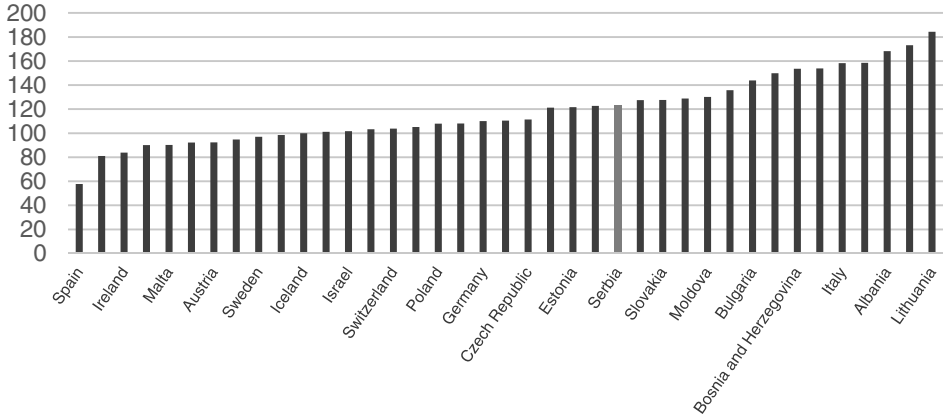


Fig. 2. Days between CSO approval and MC delegate nomination for Actions non-proposers.

The percentage of the nominated MC members at least 1 month before the MC1 meeting is 88.2% for secondary proposers (Fig. 3) and 52.6% for non-proposers (Fig. 4).

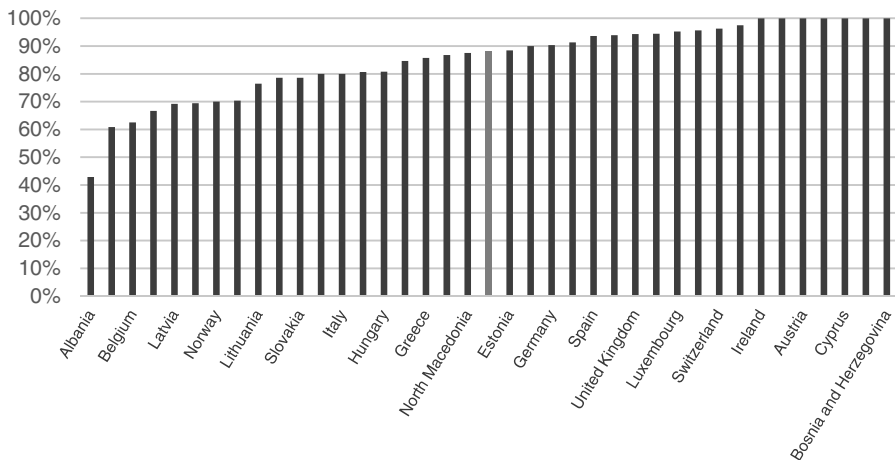


Fig. 3. Percentage of proposers nominated at least 1 month before the first Management Committee meeting.

positions, notably with regard to empowerment of young researchers and innovators (researcher or innovator under the age of 40) is one of the key component of The Openness and Inclusiveness COST Principle (The COST Mission, 2021). Serbia, with 46.5% relative mobilization of younger researchers is the leading country in this domain.

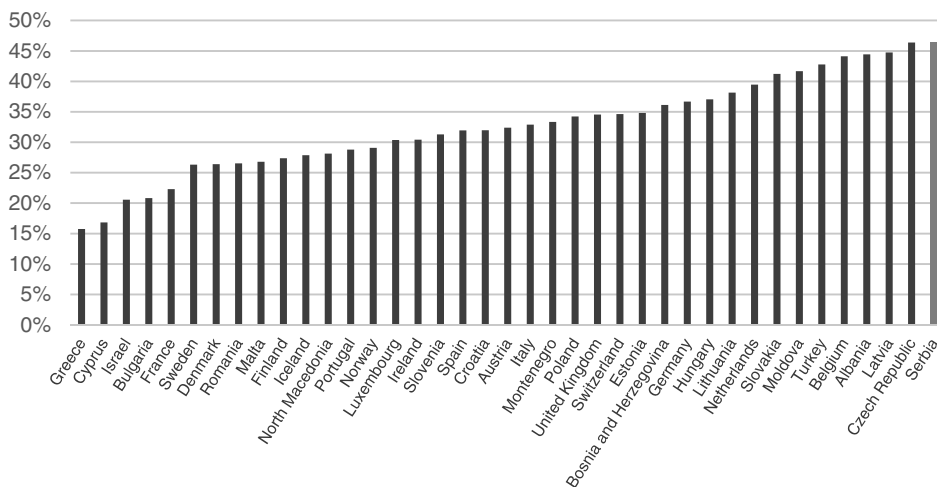


Fig. 6. Relative mobilization of younger researchers.

In addition, gender balance is regarded as an important component of COST's aim to being open and accessible to all categories of researchers. It is consistently emphasized as an essential aspect for COST Actions while organizing their activities. 54.9% of MC members from Serbia are females showing that Serbia reaches pretty fair gender balance (Fig. 7).

COST documents guidelines 2021, available at <https://www.cost.eu/funding/documents-guidelines/>

COST Statistics - Serbia - Participation in COST Activities, Overview 2021 (May 2022).

Marinković, B. P., 2019, “COST Actions as a wide network of researchers and innovators across Europe”, Proc. The Seventh Conference on Information Theory and Complex Systems (TINKOS 2019), Belgrade 15-16 October 2019, Book of Abstracts, Eds. Ilić, V. and Mitrović Dankulov, M., Mathematical Institute of the SASA and Institute of Physics Belgrade, University of Belgrade, Serbia

Serbian COST office, 2022, national website available at <http://mail.ipb.ac.rs/~ncc-serbia/>

The COST Mission, 2021, available at <https://www.cost.eu/about/cost-mission/>

## **SECTIONS (MINI PROJECTS)**

S1 Radiative Processes and Spectra

S2 Spectral line profiles in stellar and laboratory plasmas

S3 A&M DATA and HPC

S4 A&M DATA and standards

S5 Modeling the Atmosphere: data&models

S6 COST

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