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Croatian Science  
Foundation

# ANNUAL REPORT

FOR 2018



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## ABOUT THE CROATIAN SCIENCE FOUNDATION

The Croatian Science Foundation (hereinafter: the Foundation) was established by a special act<sup>1</sup> of the Croatian Parliament on 21 December 2001 under the name The National Foundation for Science, Higher Education and Technological Development of the Republic of Croatia. The Foundation was established to promote science, higher education and technological development in the Republic of Croatia and to support scientific, high-level education and technological programmes and projects with the ultimate objective to ensure sustainable social and economic development, guided by the social inclusion principles. Since 2009, it operates under the name Croatian Science Foundation.

Since its establishment, the Foundation has been funding competitive scientific, developmental and innovative projects. With legal amendments in 2009 and 2012<sup>2</sup>, a new chapter began for the Foundation, as it took over the funding of national scientific research projects as of 2013, and funding of young researchers' career development as of 2014. In the past decade, the Croatian Science Foundation has ensured all preconditions to fulfill its purpose and launched several programmes with different goals and aimed at different beneficiaries. More than 900 projects approved for funding in the amount of almost HRK 770 million are a good indicator of the Foundation's contribution to the science and higher education system in the past five years. The total amount of allocated funds is continuously on the rise, while in 2016 we reached a milestone of 600 projects funded annually. After that, the number of projects funded by new calls has mainly been stable, as envisaged by the Strategic Plan of the Croatian Science Foundation 2014-2018. It is important to emphasize that the sole criterion for funding is scientific excellence of research and of the principal investigator. Along with the excellence of scientific research, the Foundation's programmes support education of doctoral students and inclusion of young researchers into project activities.

To ensure selection and funding of the best projects, the Foundation has developed a two-stage evaluation procedure. The project evaluation procedure is based on the internationally accepted practice of peer review, performed by international scientists and on evaluation performed by panels, which are composed of Croatian scientists.

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<sup>1</sup> NN 117/2001.

<sup>2</sup> NN 78/2012.



By providing support to quality projects and researchers, the Foundation ensures implementation of outstanding research in Croatian scientific institutions, whereby it enables competition for internationally competitive projects. With regard to young researchers' career development, focus is placed on the inclusion of doctoral students in research with the primary goal of writing a doctoral dissertation, on shortening average duration of doctoral studies and completion of doctoral dissertation in 4 years and systematic monitoring and evaluation of achieved results during doctoral studies and in research. This will enable doctoral students to become competitive with their colleagues abroad and will offer them higher possibility for postdoctoral training in excellent research groups.

During 2018, the Foundation funded and monitored around 600 scientific research projects as well as around 300 doctoral students in the “Young Researchers' Career Development Project – Training New Doctoral Students” programme funded from the state budget and 161 doctoral students funded from the European Social Fund. Research projects are funded through several different programmes: the “Research projects” programme supports internationally or nationally relevant research, the programme “Installation Research Projects” supports establishment of new research groups whose Principal Investigators are excellent young researchers, the programme “Partnership in research” facilitates establishment of cooperation at universities and institutes with the economic sector, while the “Unity through Knowledge Fund” offers possibility for cooperation with eminent Croatian scientists in diaspora. Furthermore, 10 projects are funded in the framework of the “Programme of Supporting Research and Development Activities in the Area of Climate Change”. This Call was launched in cooperation with the Ministry of Environmental Protection and Energy and the Environmental Protection and Energy Efficiency Fund to support research and developmental activities in the field of climate change mitigation and adaptation.

During 2018, the Foundation continued with the programmes “Building Croatian Professional Terminology”, aimed at the creation of a database of field-specific terminology, and “Support to researchers for Applying to ERC Programmes”, supporting cooperation of Croatian researchers with ERC Principal Investigators to enable experience and preparation of their project proposals for the ERC calls.

The “Research Excellence Programme in Science and Higher Education – the Tenure Track Pilot Programme” was also launched and is implemented in cooperation with the Swiss partner *École polytechnique fédérale de Lausanne* (EPFL).

In 2018, the implementation contract for the Collaboration Programme with Croatian Scientists in Diaspora “Scientific Collaboration” was signed, co-funded from the European Social Fund. The total value of the project amounts to HRK 44,842,440.00.

Furthermore, in 2018 the Croatian Science Foundation joined QuantERA – ERA-NET Cofund in Quantum Technologies, the consortium of 32 national/ regional organisations for funding international research projects in the field of quantum technologies. The consortium is co-funded from the Framework Programme of the European Union for 2014-2020. The goal of QuantERA is spreading scientific excellence in the European Research Area (ERA) with special emphasis on the participation of research groups from the new Member States of the European Union. The Croatian Science Foundation participated for the first time in QuantERA Call 2019, open in November 2018, which enabled applications of Croatian scientists. The total funding ensured by the Croatian Science Foundation for the QuantERA Call 2019 amounted to 200,000 EUR.

## VISION

Promoting international standards in research.

Establishing a system for funding young researchers' career development.

Strengthening international cooperation and integration of Croatian scientists into the European Research Area.

## MISSION

Central body responsible for funding scientific research through an independent system of calls, evaluation, selection and funding the best scientific projects and researchers.

## STRATEGIC GOALS

Securing stable financing of internationally competitive research projects

Connecting scientists from public research organisations and universities with researchers from the business sector and social/public sector

Setting up an integral programme for young researchers' career development at the doctoral and postdoctoral level

Establishing a programme for permanent cooperation of Croatian scientists, public research organisations and universities with scientific diaspora

Involving Croatian scientific community into the European Research Area

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## THE FOUNDATION'S VALUES

### WORK CRITERIA

The most important work criteria for the Foundation are research excellence, impartiality during the selection, evaluation, funding and monitoring procedures. In order to ensure funding of the best projects and researchers, the submitted project proposals are referred for peer review to independent international experts. The Foundation applies the principles for the evaluation of scientific excellence (*Statement of Principles for Scientific Merit Review*<sup>3</sup> and *Statement of Principles on Peer/Merit Review 2018*<sup>4</sup>), which embody the highest international standards of expert assessment, transparency, impartiality, confidentiality, ethics and scientific integrity.

Evaluation is carried out through objective scientific and expert assessment based on the internationally accepted practice of peer review, taking into consideration scientific excellence, feasibility and project impact and balanced development of scientific areas and fields. The procedure for identifying conflict of interest and preventing the participation of persons who might be in a conflict of interest in the evaluation was defined.

### TRANSPARENCY AND AVAILABILITY

Grants for scientific research are awarded solely through public calls, and all calls are published according to the Work Plan, which is published on the Foundation's website at the beginning of the year.

During the public call, the full documentation is available on the Foundation's website, including all evaluation forms with the evaluation criteria for project proposals. Experts in the Foundation regularly provide answers to all questions. The questions and answers are published on the website on predetermined dates. All decisions of evaluation panels and the Board are based on clearly defined rules, procedures and evaluation criteria, all published in advance.

<sup>3</sup> [https://www.globalresearchcouncil.org/fileadmin/documents/GRC\\_Publications/gs\\_principles-English.pdf](https://www.globalresearchcouncil.org/fileadmin/documents/GRC_Publications/gs_principles-English.pdf)

<sup>4</sup> [https://www.globalresearchcouncil.org/fileadmin/documents/GRC\\_Publications/Statement\\_of\\_Principles\\_on\\_Peer-Merit\\_Review\\_2018.pdf](https://www.globalresearchcouncil.org/fileadmin/documents/GRC_Publications/Statement_of_Principles_on_Peer-Merit_Review_2018.pdf)

Information about funded projects, names of the principal investigators, mentors and doctoral students can be found on the Foundation's website. Annual Report, Financial Report, Audit Report, the Statute, regulations and other normative acts, Procurement Plan and annual work plans can be found on the Foundation's website.

**EXPERTISE AND CONFIDENTIALITY OF INFORMATION**

Peer reviewers are selected based on predetermined criteria, including knowledge of the proposed research theme and expertise. All persons involved in the evaluation procedure must permanently respect the confidentiality of all information stated in the project proposals revealed to them for the purpose of evaluation. Evaluators are not allowed to discuss project proposals with persons not involved in the evaluation procedure. Communication with applicants about the projects is also not allowed. Each participant in the evaluation procedure is personally responsible for maintaining the confidentiality of information related to the projects in the evaluation process, as well as for the documentation related to the content of the project proposals and must not disclose any information about the projects.

**INTEGRITY AND ETHICAL ISSUES**

Ethics, integrity and professional and scientific responsibility are the highest principles in the entire evaluation process and their protection is the responsibility of all persons involved in the evaluation. Evaluation of project proposals implies independent scientific evaluation, used to determine the scientific quality of proposed research.

**VISIBILITY AND DISSEMINATION**

All news, call announcements, call results, information about grants and doctoral students, all important documents and rules of procedure are regularly published on the Foundation's website. The Electronic Application System (EPP) can also be accessed through the Foundation's website.

1,258,368 views were registered on the Foundation's website during 2018. In 2018, there were 16,264 registered users of the EPP system, while 59,370 users visited the web pages and the EPP system.

Besides posting information on the web pages, the Foundation notifies Principal Investigators, mentors and heads of institutions about all important decisions or amendments via electronic mail.

Furthermore, the Foundation started a series of lectures in cooperation with the Croatian Academy of Science and Arts, in which principal investigators, eminent Croatian scientists, are promoted. Interesting scientific themes and the newest results of Croatian research projects are thereby presented to the wider scientific community and to all interested parties.

In addition, the Foundation regularly publishes the Croatian Science Foundation Gazette in electronic form.



## 2018 IN NUMBERS

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**222** project proposals evaluated

**669** international peer reviewers involved

**147** projects accepted for funding

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**599** projects monitored

**490** periodic reports processed

**523** report evaluators (Croatian scientists)

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**309** doctoral students funded

**35** post-doctoral researchers employed

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**1,052** publications related to the Foundation's projects published

**440** publications published by doctoral students,  
of which **204** as first or only author

**188** doctoral students' trainings

**522** conference presentations held by doctoral students

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**21** UKF projects monitored

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More than HRK **150 million**  
allocated (150,358,816.52 HRK)

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**21** Board meetings held

**59,370** visitors to the Foundation's  
website and the EPP system

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**1,258,368** views of [www.hrzz.hr](http://www.hrzz.hr)

**16,264** registered users of the EPP system

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## ACTIVITIES IN 2018

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In 2018, the Foundation continued improving the system for evaluation and monitoring of projects to ensure funding of excellent scientists and young researchers and excellent, nationally relevant or internationally competitive scientific projects. In its work to date, the Foundation proved its professionalism in implementing evaluation and monitoring of funded projects, which arises from several years of work and harmonising the processes with other international organizations.



## JANUARY

Calls “Research projects” and “Young Researchers’ Career Development Project – Training New Doctoral Students” closed

## MARCH

The results of calls, new programmes and projects presented at the Croatian Academy of Sciences and Arts

Grant award signing ceremony for the Swiss-Croatian Cooperation Programme

## MAY

Call “Partnership in Research” published

Promotion of the open call for the “Tenure Track Pilot Programme“

## JULY

Results of the Call “Research projects” (deadline: January 2018)

## SEPTEMBER

Call “Young Researchers’ Career Development Project – Training New Doctoral Students” closed

## NOVEMBER

Signing of the Grant Agreement on the award of funds to the Croatian Science Foundation for the Collaboration Programme with Croatian Scientists in Diaspora “Scientific Collaboration”

Call for the “Gaining experience” grant in the Framework of the “Connectivity programme” (UKF) published

Call “Quanterra 2019” published

## FEBRUARY

Doctoral students financed by HRZZ announced as this year’s L’Oreal-UNESCO scholarship award winners

## APRIL

“Tenure Track Pilot Programme” Call published

## JUNE

## AUGUST

## OCTOBER

“Croatian-Swiss Research Programme 2017-2023” (CSRP-01-2018) Call results published  
Contract signing ceremony for the “Croatian-Swiss Research Programme 2017-2023” Call

## DECEMBER

“Young Researchers’ Career Development Project – Training New Doctoral Students” Call results published

# ORGANISATIONAL STRUCTURE

Pursuant to the Act on the Amendments to the Croatian Science Foundation Act (Official Gazette 78/2012), the Foundation's Bodies are the Board and Executive Director. Besides the Foundation's bodies, the work of the Foundation in 2018 also involved evaluation panels, peer reviewers and the Foundation's administrative office, which is organised into five departments.

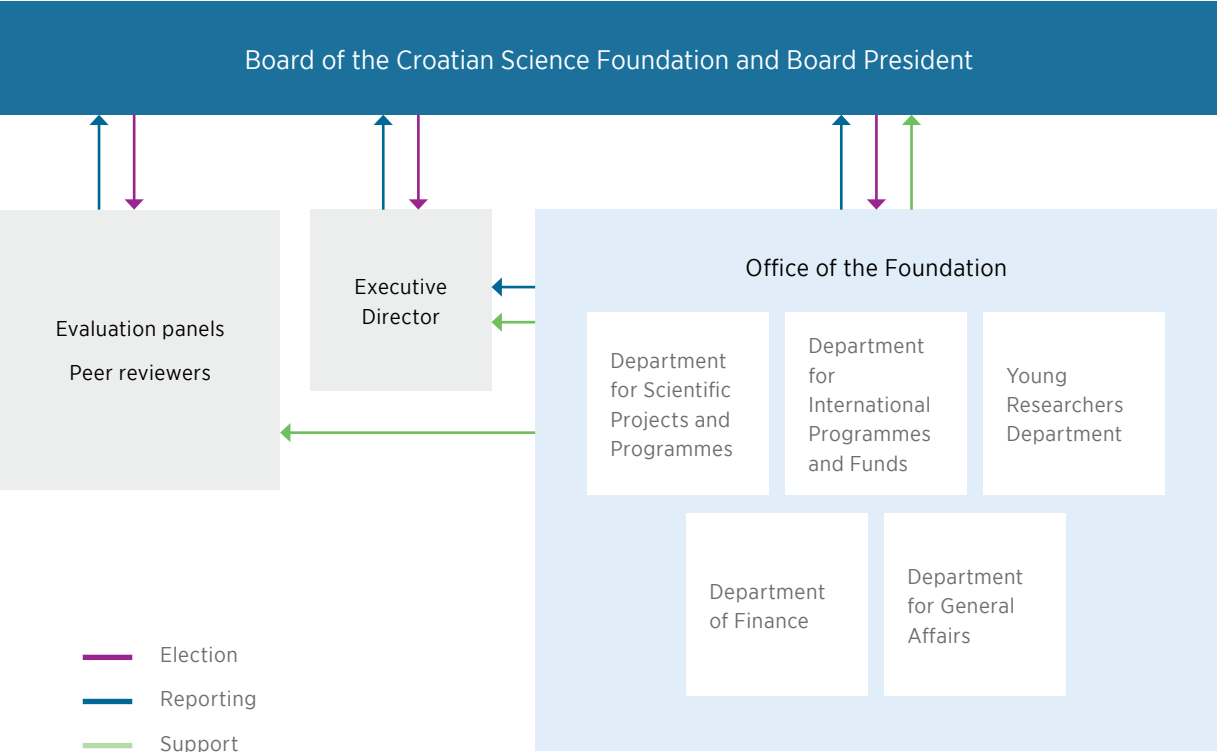


Figure 1. Organisational structure of the Croatian Science Foundation

## THE BOARD

Pursuant to the Act on the Croatian Science Foundation, the Board is the body that adopts the Foundation's legal acts and grant award decisions, manages and monitors the Foundation's activities, proposes the Foundation's strategic plan and conducts other activities pursuant to the Act and the Statute.

Board members are appointed from the pool of excellent Croatian scientists, especially those with results recognized at the international level, taking into account that all scientific areas are represented. They are appointed by the Croatian Parliament, upon nomination by the Government of the Republic of Croatia, while candidates for Board members are nominated by scientific institutes, the Croatian Rectors' Conference, University Senates, the Croatian Academy of Sciences and Arts, the Croatian Chamber of Commerce, employers' associations, the National Council for Science, Higher Education and Technological Development as well as scientists and academia members upon a public call from the Ministry of Science and Education. Board members are elected to a five-year term, renewable once.

The Board held 21 sessions in 2018, 10 of which were sessions in person and 11 were electronic sessions.

## THE FOUNDATION'S BOARD:

Academician **Dario Vretenar**, PhD, President

Professor **Dean Ajduković**, PhD, Deputy President

**Smiljana Goreta Ban**, PhD

Professor **Stipan Jonjić**, PhD

Professor **Ljiljana Marks**, PhD

Professor **Dragan Poljak**, PhD

Academician **Pavao Rudan**, PhD

## EVALUATION PANELS

Evaluation panels for project proposals submitted to the Croatian Science Foundation's calls were established in 2016 following a public call aimed at public scientific institutions. They are divided into scientific areas; hence, evaluation panels are formed for the natural sciences, technical sciences, biotechnical sciences, biomedicine and health sciences, social sciences and humanities. Since interdisciplinary projects are highly encouraged, upon agreement of panel members and if the need arises, interdisciplinary panels may be formed.

The panels' basic tasks include assessing project proposals for referral to the next stages of the evaluation procedure, nominating peer reviewers and ensuring that the evaluation procedure is conducted in accordance with the Project Proposal Evaluation Manual and other general acts of the Foundation. The panels analyse all received reviews and adopt recommendations for funding/rejecting project proposals. Panels are also involved in the evaluation of candidates for mentors of doctoral students, ranking of proposals and giving recommendations to the Board on funding doctoral students. The panels may submit to the Board their proposals for improving the evaluation procedures for future calls.

Evaluation panel members are elected from the pool of eminent scientists with internationally recognisable achievements. 23 evaluation panels have been formed with 146 members in total, appointed to a three-year term, renewable once. The names of panel members are publicly available and published on the Foundation's website. During their term, panel members may submit project proposals to the Foundation's calls, take part in the Foundation's projects in the capacity of associates or apply for mentorship of doctoral students. In that case, the panel member shall not be involved in the evaluation for the call they are applying to.

Panel members are not remunerated for their work.

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## EVALUATION PANEL MEMBERS

on 31 December 2018

### CLINICAL MEDICINE, VETERINARY AND DENTAL MEDICINE

Prof. **Boris Labar**  
Prof. **Ivan Bubić**  
Prof. **Marko Samardžija**  
Asst. Prof. **Alenka Gagro**  
Asst. Prof. **Relja Beck**  
Prof. **Asja Čelebić**  
Prof. **Igor Prpić**  
Prof. **Igor Aurer**  
Prof. **Ines Drenjančević**  
Prof. **Marija Heffer**  
Prof. **Darko Duplančić**

### PUBLIC HEALTH AND HEALTH PROTECTION, PHARMACY

Prof. **Vesna Jureša**  
Prof. **Irena Žuntar**  
Prof. **Ana Marušić**  
Prof. **Vladimir Mićović**

### BASIC MEDICAL SCIENCES

**Marijeta Kralj**, PhD  
Prof. **Hrvoje Banfić**  
Prof. **Tihana Lenac Roviš**  
Prof. **Antonija Jurak Begonja**  
**Tihomir Balog**, PhD  
Prof. **Fran Borovečki**  
Prof. **Davor Želježić**  
Prof. **Olga Gornik**  
Prof. **Željka Krsnik**  
Prof. **Janoš Terzić**

### BIOTECHNOLOGY, FOOD PROCESSING TECHNOLOGY, NUTRITION

Prof. **Jurislav Babić**  
Prof. **Mladen Brnčić**  
**Igor Lukić**, PhD  
Prof. **Dubravka Samaržija**  
Asst. Prof. **Ivan Župan**  
Prof. **Olivera Koprivnjak**  
Prof. **Tea Bilušić**

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AGRICULTURE,  
FORESTRY, WOOD  
TECHNOLOGY

Prof. **Goran Kušec**  
Prof. **Vlatka Rozman**  
**Domagoj Šimić**, PhD  
Asst. Prof. **Vjekoslav Živković**  
Prof. **Edi Maletić**  
Assoc. Prof. **Gabrijel**  
**Ondrašek**  
**Alojz Lalić**, PhD  
Asst. Prof. **Ivan Župan**  
Prof. **Darko Bakšić**  
Prof. **Milan Mesić**

INFORMATION AND  
COMMUNICATION

Assoc. Prof. **Gordana Vilović**  
Prof. **Zrinjka Peruško**  
Assoc. Prof. **Sonja Špiranec**  
Prof. **Neven Vrčec**  
Prof. **Marija Maja Jokić**  
Assoc. Prof. **Nada**  
**Zgrabljić Rotar**  
Assoc. Prof. **Markus Schatten**  
Assoc. Prof. **Patrizia Poščić**

POLITOLOGY, SOCIOLOGY,  
SOCIAL SCIENCES,  
POPULATION, SECURITY  
STUDIES, GENDER STUDIES

EDUCATION, EDUCATION  
AND REHABILITATION  
SCIENCES, SPEECH  
THERAPY, KINESIOLOGY

Prof. **Branislava Baranović**  
Prof. **Zoran Kurelić**  
Prof. **Dinka Čorkalo Biruški**  
Prof. **Zvezdan Penezić**  
Prof. **Kornelija Mrnjaus**  
Prof. **Đurđica Miletić**  
Asst. Prof. **Pavle Mikulić**  
Prof. **Adinda Dulčić**

ECONOMICS, POPULATION

**Jelena Budak**, PhD  
Prof. **Sunčica Oberman Peterka**  
Prof. **Nataša Šarlija**  
Prof. **Goran Vukšić**  
Prof. **Josip Arnerić**

LAW

Prof. **Marko Petrak**  
Assoc. Prof. **Mirela Župan**  
Prof. **Alan Uzelac**  
Prof. **Vesna Crnić-Grotić**  
Prof. **Mira Lulić**  
Prof. **Zvonimir Slakoper**

PHILOLOGY

Prof. **Amir Kapetanović**  
Prof. **Mirjana Polić Bobić**  
Prof. **Davor Dukić**  
Prof. **Sanja Roić**  
Prof. **Neven Jovanović**  
Prof. **Tatjana Jukić Gregurić**

HISTORY, ARCHEOLOGY

Prof. **Aleksandar Durman**  
Prof. **Robert Matijašić**  
Prof. **Mirjana Matijević Sokol**  
Prof. **Stjepan Ćosić**  
Prof. **Irena Benyovsky Latin**

HISTORY OF ART,  
ANTROPOLOGY,  
ETNOLOGY, ART SCIENCE,  
PHILOSOPHY, TEOLOGY

Prof. **Jadranka Grbić**  
**Irena Martinović Klarić**, PhD  
Prof. **Marina Vicelja**  
Prof. **Ante Mateljan**  
Prof. **Nadežda Čačinović**  
Assoc. Prof. **Jasenka Gudelj**  
Assoc. Prof. **Davor Lauc**  
**Tvrtko Zebec**, PhD

BIOLOGY

Assoc. Prof. **Marijana Peričić Salihović**  
Prof. **Kristian Vlahoviček**  
**Brankica Mravinac**, PhD  
Assoc. Prof. **Sven Jelaska**  
Prof. **Felix Wensveen**  
Prof. **Ivana Novak Nakir**

MATHEMATICS

Prof. **Ninoslav Truhar**  
Prof. **Mladen Jurak**  
Prof. **Borka Jadrijević**  
Prof. **Ozren Perše**  
Prof. **Sanja Singer**

PHYSICS

Assoc. Prof. **Krešimir Kumerički**  
Prof. **Leandra Vranješ Markić**  
Prof. **Nenad Pavin**  
**Biljana Lakić**, PhD  
**Osor Slaven Barišić**, PhD  
Prof. **Krešimir Pavlovski**

CHEMISTRY

**Kata Majerski**, PhD  
**Robert Vianello**, PhD  
Prof. **Davor Kovačević**  
Prof. **Dubravka Matković-Čalogović**  
**Ivan Halasz**, PhD  
Prof. **Maja Pavela-Vrančić**  
Prof. **Nives Galić**  
Prof. **Igor Jerković**

GEOPHYSICS, GEOLOGY

Asst. Prof. **Ivana Herceg Bulić**  
**Slobodan Miko**, PhD  
Prof. **Ivan Sondi**  
Prof. **Franjo Šumanovac**  
Prof. **Dražen Balen**

ARCHITECTURE AND URBAN  
PLANNING, GEODESY,  
CIVIL ENGINEERING

Assoc. Prof. **Ivanka Netinger Grubeša**  
Prof. **Tatjana Rukavina**  
Prof. **Miodrag Roić**  
Prof. **Jure Margeta**

GRAPHIC TECHNOLOGY,  
CHEMICAL ENGINEERING,  
TEXTILE TECHNOLOGY,  
MINING, OIL AND  
GEOLOGIC ENGINEERING

Asst. Prof. **Igor Majnarić**  
**Josip Terzić**, PhD  
Prof. **Branka Andričić**  
Assoc. Prof. **Nediljka Vukojević Medvidović**  
Prof. **Zenun Skenderi**  
Prof. **Bruno Zelić**

ELECTRICAL ENGINEERING,  
COMPUTING

Assoc. Prof. **Robert Cupec**  
Assoc. Prof. **Domagoj Jakobović**  
Prof. **Srete Nikolovski**  
Asst. Prof. **Tihana Galinac Grbac**  
Assoc. Prof. **Saša Sladić**  
Assoc. Prof. **Sandra Martinčić-Ipšić**  
Prof. **Maja Matijašević**  
Prof. **Tamara Grujić**  
Prof. **Antonio Šarolić**  
Asst. Prof. **Silvestar Šesnić**

NAVAL ARCHITECTURE,  
METALLURGY, MECHANICAL  
ENGINEERING, TECHNOLOGY  
OF TRAFFIC AND TRANSPORT,  
AERONAUTICS, ROCKET SCIENCE  
AND SPACE TECHNOLOGY

Assoc. Prof. **Marina Franulović**  
Prof. **Nenad Vulić**  
Prof. **Branko Blagojević**  
Prof. **Igor Karšaj**



## EXECUTIVE DIRECTOR

The Executive Director manages the Foundation's administrative work. Pursuant to the provisions of the Act on the Amendments to the Croatian Science Foundation Act (Official Gazette 78/12), the Executive Director is selected through a public call to a five-year term, and is appointed and released from duty by the Board.

At its 12<sup>th</sup> session, held on 27 December 2013, the Board nominated Hrvoje Mataković, PhD for the position of Executive Director, who assumed his office in February 2014 for a five-year mandate. Hrvoje Mataković, PhD left office for a new position and was replaced by Lovorka Barać Lauc, PhD, nominated as Acting Director for the period of 6 months.

## ADMINISTRATION

On 31 December 2018, the Foundation had 34 employees (4 employees are funded from the European Social Fund - ESF, 1 employee is on parental leave and 3 are on maternity leave). The Foundation is divided into five departments: Department for Scientific Projects and Programmes, Young Researchers Department, Department for International Programmes and Funds, Department for Finance and Department for General Affairs.





# ACTS OF THE FOUNDATION

The Board of the Foundation adopted several new acts in 2018, and some existing acts have been adapted in accordance with the legislation.

Regulation on the Procurement Plan, Register of Contracts, Preliminary Consultations and Analysis of the Market during Public Procurement (OG 101/2017) entered in force on 1 January 2018 and it was necessary to make amendments to the Regulation on Simple Procurement of Goods, Services and Works to harmonise it with the legal acts. In addition, the terminology was harmonised and the Regulation was adopted at the 106<sup>th</sup> session, held on 24 January. The consolidated text of the Regulation was adopted at the 108<sup>th</sup> session, held on 21 February 2018.

The Board adopted the Manual for Monitoring Funded Projects at its 65<sup>th</sup> session, held on 23 March 2016. The Manual describes the processes of evaluation and monitoring (processing requests) of funded projects in order to facilitate and promote the work of the coordinators and administration. At its 110<sup>th</sup> session, held on 28 March 2018, the Board adopted amendments to the Manual.

The Board of the Croatian Science Foundation, at its 17<sup>th</sup> session, held on 20 March 2014, adopted the Code of Ethics of the Croatian Science Foundation. The Code of Ethics defines fundamental principles, professional rights and duties, unacceptable behaviour and responsible scientific conduct. Practice shows that, according to its internal procedures, the Foundation cannot prove unethical scientific acts and needs to rely on the opinion of the host institutions' ethics committees. Furthermore, evaluation panels have in certain cases pointed out that they are not competent to assess the ethics committee opinion, nor to establish the necessity thereof. In order to ensure that research is implemented in an adequate way, the matter of scientific integrity needs to be considered so that the Foundation would be able to protect the reputation of researchers, their research, but also the reputation of the Foundation as the source of funding, which is very important for the continuity of research funding. At its 110<sup>th</sup> session, held on 28 March 2018, the Board nominated the working group for the preparation of the Code of Ethics (the members were Prof. Vedran Katavić, Prof. Vlatka Rozman, Prof. Dinko Čorkalo-Biruški, Prof. Klara Buršić Matijašić, Robert Vianello, PhD, Prof. Bruno Zelić and Prof. Dean Ajduković as the President of

the Working Group). Amendments to the Code of Ethics of the Croatian Science Foundation were adopted at the Board's 112<sup>th</sup> session, held on 26 April 2018.

General Data Protection Regulation – GDPR (Regulation EU 2016/679) entered into force on 25 May 2016, which will be implemented in the Republic of Croatia from 25 May 2018. This Regulation protects personal data throughout the European Union and will be directly implemented in the Member States without being transposed into national legislation. Since GDPR will enter into force on 25 May 2018, it is necessary to take measures to ensure basic conditions for the protection of personal data of individuals. For this reason, at its 113<sup>th</sup> session, held on 23 May 2018, the Board adopted additional documentation to harmonise the legal acts with the Regulation. The consent of the project applicants for processing their data was amended. The consent also includes the rights of the individuals prescribed by the Regulation.

At its 119<sup>th</sup> session, held on 14 September 2018, the Board of the Foundation adopted amendments to the Regulation on Office Management. In order to ensure that all information on the subject matter is in one place, the original text from 18 December 2015 was supplemented with the amendments from 14 September 2018 and the consolidated text of the Regulation on Office Management was adopted at the Board's 120<sup>th</sup> session, held on 10 October 2016.



## **PROJECT PROPOSAL EVALUATION PROCEDURE AND PROJECT MONITORING**

The Croatian Science Foundation carries out independent scientific evaluation of project proposals, which enables the assessment of scientific quality and priorities of project proposals. The evaluation procedure is competitive and includes the comparison of submitted project proposals while taking into account the conditions of the call and scientific quality of the proposals as well as a balanced development of scientific areas and fields in the Republic of Croatia.

The evaluation procedure is defined by the Project Proposal Evaluation Manual. The Manual describes the evaluation procedure and participants in the evaluation and defines the procedure from the publication of the call to the decision of the Board on approving funding of the project proposal.

The Manual provides important guidelines to all evaluation panel members, but also to project proposal applicants about the evaluation procedure and the evaluation criteria.

## BASIC EVALUATION PRINCIPLES

The project proposal evaluation procedure is based on the principles of quality, transparency, equality of treatment, confidentiality, impartiality and efficiency and promptness. In 2011, the Foundation, as a member of the Forum of European Science Foundation Member Organizations on Peer Review (ESF MO Forum on Peer review), actively participated in the development of fundamental evaluation principles (Statement of Principles on Merit Review), which were adopted at the Global Summit on Scientific Evaluation, held in Washington in May 2012, and which ensure the standardisation of basic evaluation procedures at the global level.

The evaluation procedure is adjusted to the specific call, particularities of the scientific area and is commensurate to the value of the project proposals.

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## PARTICIPANTS OF THE EVALUATION PROCEDURE

Evaluation panels and reviewers (independent international experts) participate in the evaluation procedure.

### EVALUATION PANELS

Project proposal evaluation procedure is based on the work of the evaluation panel and international reviewers. Panels are established according to scientific areas: natural sciences, technical sciences, biotechnical sciences, biomedicine and health, social sciences and humanities. Depending on the submissions to individual calls, a panel responsible for interdisciplinary projects may be established. The main task of the evaluation panel is assessing project proposals and ensuring that the evaluation procedure is carried out in line with the Project Proposal Evaluation Manual and other general acts of the Foundation.

### REVIEWERS

Reviewers are international experts who assess project proposals in the second round of evaluation (*peer review*) according to predetermined criteria. In specific cases, when the evaluation panel estimates that it is necessary, reviews can be provided by Croatian scientists. The nominated reviewers need to have scientific competence in the research field of the project proposal they are evaluating.

## EVALUATION OF PROJECT PROPOSALS

Pursuant to the Act on the Croatian Science Foundation, grants are awarded solely through public calls, and all calls are published on the Foundation's website. Submission and evaluation are carried through the Electronic Application System (EPP).

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EVALUATION CRITERIA

The Board of the Foundation prescribes criteria for project proposal evaluation for each call. Evaluation criteria are adjusted to each call, according to the Call goals and are available simultaneously with the publication of the call.

General criteria for evaluating project proposals are scientific quality and relevance, feasibility of the proposed research, quality of the applicant and the research team.

Scientific quality and research relevance:

- scientific grounds of the project proposal and quality of the research plan;
- the importance of the proposed topic in relation to the whole research field;
- potential of the project proposal to advance the research field;
- competitiveness of the project proposal in relation to existing research on the same subject;
- suitability and competitiveness of the proposed methodology (in comparison to the most prominent ones in the field).

Feasibility of the project proposal:

- clear and realistic objectives and well-planned activities that lead to the achievement of objectives;
- realistic and attainable research (with regard to the planned time, objectives, planned results and available resources);
- identifying risks and finding appropriate solutions;
- assessment of the planned capacity for the implementation of the project (financial support, number and competencies of team members and institutional support).

Quality of the applicant and research environment:

- scientific competencies of the applicant (estimated on the basis of previous accomplishments);
- the applicant’s project management skills;

- previous research contributions of the applicant and team members in the proposed field;
- institutional support (providing appropriate infrastructure and other conditions necessary for the implementation of the project).

In addition to the general criteria above, the Board may adopt additional criteria for project proposal evaluation for individual calls. All criteria that will apply in the evaluation process must be made available to applicants simultaneously with the publication of the call.

ADMINISTRATIVE CHECK

Administrative check of the submitted project proposals begins after the call closure. The administrative check includes a review of the submitted documentation and completing the relevant administrative check protocol. The administrative check protocols are made available to all applicants simultaneously with the publication of the Call. All project proposals that have been assessed as meeting the administrative requirements are referred to the evaluation procedure and are grouped according to the scientific areas within which they were submitted.

The purpose of the administrative check is that only project proposals with supporting documentation that is complete and in order be referred to further evaluation. If the documentation is not complete, the applicant can supplement the documentation upon being notified by the Foundation.

FIRST ROUND OF EVALUATION

In the first evaluation round, the evaluation panels evaluate project proposals according to pre-defined criteria. Evaluation forms are made available to applicants simultaneously with the publication of the Call. The Panel will adopt a decision on referring project proposals to the second evaluation round or make a recommendation not to send it to the second evaluation round (peer review).

SECOND ROUND OF EVALUATION (PEER REVIEW)

Project proposal evaluation is carried out by international peer reviewers according to pre-defined criteria. For each project proposal that is referred

to peer review, two reviews should be provided. Reviews are sent to the applicants upon completion of the entire evaluation procedure.

**FINAL EVALUATION**

During the final evaluation, the evaluation panel members read all reviews, assess the financial plans of the project proposals, discuss ethical issues, support of the host institution, additional documentation and, if necessary, additional criteria determined by the Board for individual calls. During the evaluation of the project’s financial plan, evaluation panel members must assess whether all items are based on actual costs, necessary and justified in relation to the project needs. Project proposals that obtained positive reviews are ranked based on the abovementioned criteria. The project proposals are ranked according to the scores of the two reviews and the panel’s judgment. If the ranking list differs from the marks given, it needs to be justified in written form.

After each panel has generated its own ranking list, all panel coordinators for the same area meet together to determine the final ranking lists of project proposals recommended for funding, taking into consideration the evaluation results, the availability of financial resources and equal development of fields and disciplines in respective scientific areas. The ranking list of project proposals recommended for funding is then referred to the Board.

**FINANCIAL NEGOTIATIONS**

Based on the evaluation results and the panel recommendations, the Board shall adopt a decision on opening financial negotiations. During the negotiations, applicants are asked to update their financial and work plan according to the recommendations and comments of reviewers and the evaluation panel. The updated financial and work plans are reviewed by the panel members, who then notify the Foundation’s Office whether all recommendations and comments have been taken into account. The goal of the financial negotiations is to determine a sound and accurate project budget.

**MONITORING FUNDED PROJECTS**

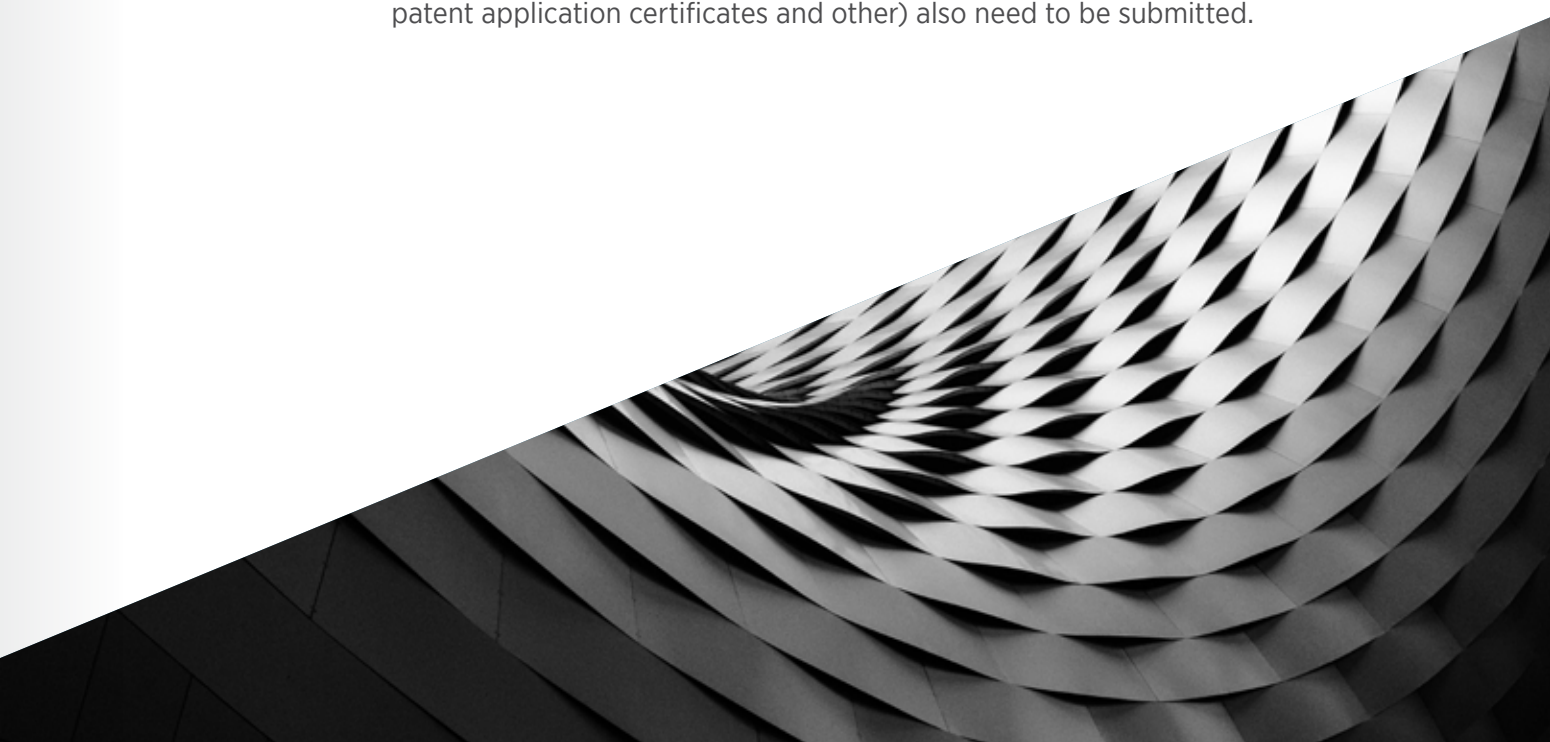
The Foundation carries out continuous monitoring and supervision of projects to ensure implementation of project activities according to the

work plan, responsible management of allocated financial resources, as well as compliance with reporting requirements in line with the Foundation’s acts. Based on the grant award contract, Principal Investigators are obliged to submit regular periodic reports on the completion of the work and financial plan of the project and to submit the final report upon completion of the project. Each report consists of a narrative and a financial part. It is submitted and evaluated through the EPP system.

**NARRATIVE REPORT**

The narrative report consists of two parts: the narrative report form and a table for collecting data on project progress during the reporting period. The narrative report form includes: project results according to the work plan or deviations from the work plan, information about the research team, risks envisaged in the upcoming period and plan for their elimination and other information considered relevant.

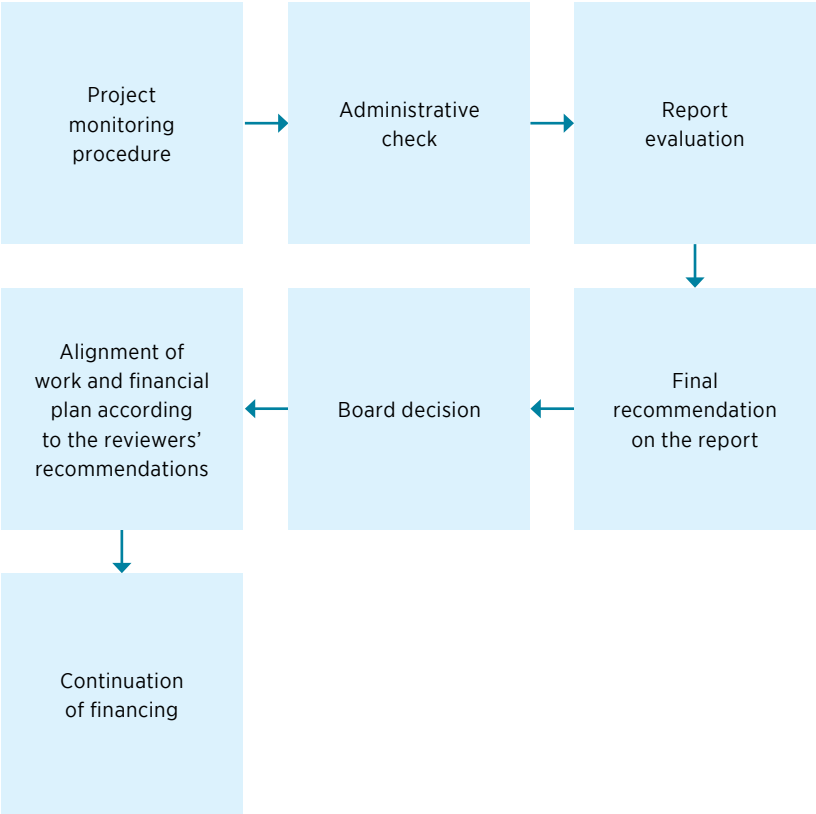
Tables with other important information about project implementation which is not listed in the narrative report (such as trainings, number of doctoral theses and master theses that are a result of the project, publication, dissemination or cooperation) and proof of achieved result (published scientific publication and other documents demonstrating result dissemination, reports on experiments, patent application certificates and other) also need to be submitted.



**FINANCIAL REPORT**

The financial report is submitted to establish efficient and committed spending of public resources. All expenses listed in the financial report need to be in accordance with the approved financial plan for the reporting period, and each expense needs to be substantiated with appropriate receipts. Reviewers and independent experts participate in the evaluation procedure. All persons involved in the evaluation procedure must respect the confidentiality of data and prescribed procedures for monitoring funded projects.

Project monitoring includes the following steps:



**Figure 2.** Project monitoring procedure





# FOUNDATION’S CALLS IN 2018

The Foundation published the following calls in 2018:

- Research Projects (IP-01-2018)
- Young Researchers’ Career Development Project – Training New Doctoral Students (Call 01-2018)
- Croatian-Swiss Research Programme 2017-2023
- Support to Researchers for Applying to ERC Programmes (Call 05-2018)
- Tenure Track Pilot Programme (TTP-07-2018)
- Young Researchers’ Career Development Project – Training New Doctoral Students (Call 09-2018)
- Partnership in Research (Call 07-2018)
- Partnership in Research (Call 12-2018)
- ERA-NET Cofund in Quantum Technologies (QuantERA-2019-02)
- “Gaining experience” grant in the framework of the “Connectivity Programme” of the Unity Though Knowledge Fund

## RESEARCH PROJECTS (IP - 01 - 2018)

The Programme “Research Projects” has been established for funding fundamental research whose goal is creating new and enhancing existing knowledge about a specific area and that is directed at better understanding of the research topic as well as applied research that is conducted with clear technological, economic or social aims in mind.

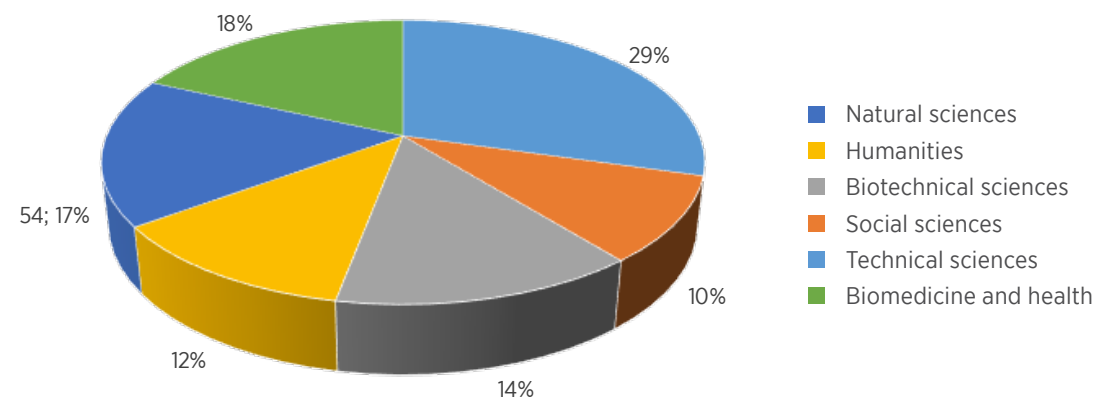
The research topic needs to be internationally recognisable and/or nationally relevant, while the applicant needs to have an excellent scientific track record. Projects that will be funded through this Call need to be based on strong research teams, whose Principal Investigators are scientists recognised on a national and international level and which include integration of scientific organisations, research and equipment, development

of research capacity and plan the development of young researchers. Research consolidation is encouraged to raise the research quality and create internationally competitive and recognisable research teams.



## SUBMITTED PROJECT PROPOSALS

A total of 320 project proposals were submitted. Figures below show the distribution of submitted project proposals by scientific areas (Figure 3) and institutions (Figure 4).

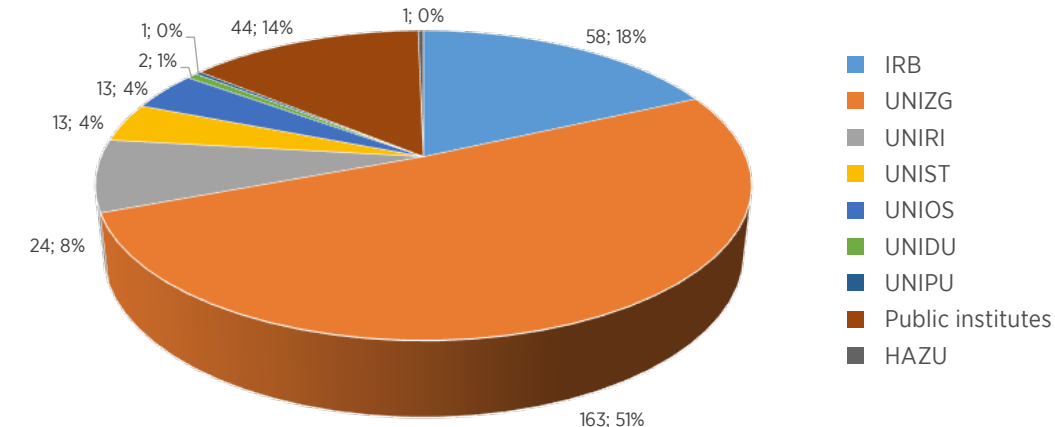


**Figure 3.** Number of submitted project proposals by scientific area

The highest number of project proposals was received from the area of natural sciences, a total of 94 (29%). Biomedicine and health follow with 58 applications (18%), technical sciences with 54 project proposals (17%), biotechnical sciences with 44 applications (14%) and social sciences with 38 (12%) project proposals submitted. The lowest number of applications was submitted in the area of humanities, a total of 31 (10%).

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**Figure 4.** Overview of submitted project proposals by institutions

The highest number of applications arrived from the University of Zagreb (163 or 51%), while the smallest number was submitted from the University of Dubrovnik (2 applications) and University of Pula (1 application).

### Administrative check

Administrative check of all submitted project proposals began after the Call closure. The administrative check included a review of the submitted documentation and completing the relevant administrative check protocol. 319 project proposals passed the administrative check and were referred to the evaluation procedure. One project proposal did not pass the administrative check.

### First round of evaluation

Decision on the referral of project proposals to peer review was taken after the evaluation panels assessed the project proposals according to the criteria from the Evaluation Form.



Second round of evaluation

Reviewers assess project proposals according to the criteria outlined in the Evaluation Form. Each project proposal needs to obtain two reviews, which are delivered to the applicants together with the notification on the evaluation results.

69.28% of submitted applications were referred to peer review. The highest number of project proposals referred to the second evaluation round was in natural sciences (32.13%), and the lowest in humanities (7.69%). The highest pass rate to the second round of evaluation was registered in the technical sciences (79.63%), and the lowest in social sciences (44.74%).

Final evaluation

After the peer review, the evaluation panels carry out final evaluation of the project proposals that receive two positive reviews. Final evaluation involves examination of the received reviews, evaluation of the projects' financial and work plans, and discussion about ethical issues. Finally, the ranking lists of project proposals recommended for funding is created.

Recommendation for funding

Based on the results of the evaluation and evaluation panel recommendations, the Board will adopt the final decision on funding.

Evaluation results

The relation between the number of submitted and funded projects, as presented in Figure 5, is not uniform in all scientific areas. Natural and technical sciences both have a pass rate above 50%: 58.51% and 51.85% respectively. Social sciences have the lowest pass rate of 18.42%.

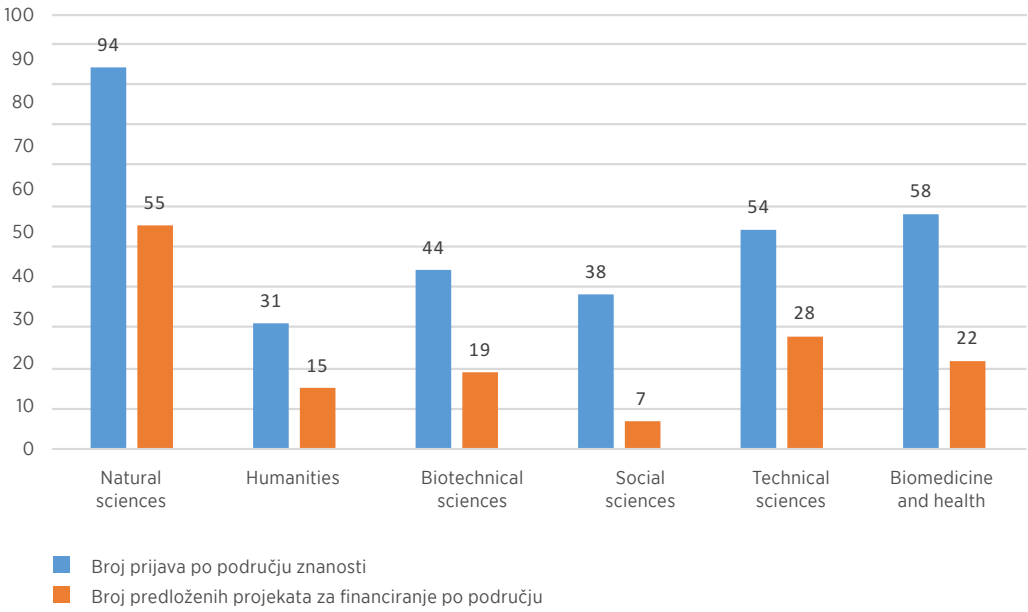


Figure 5. Overview of the evaluation results from the Call IP-01-2018 by scientific area.

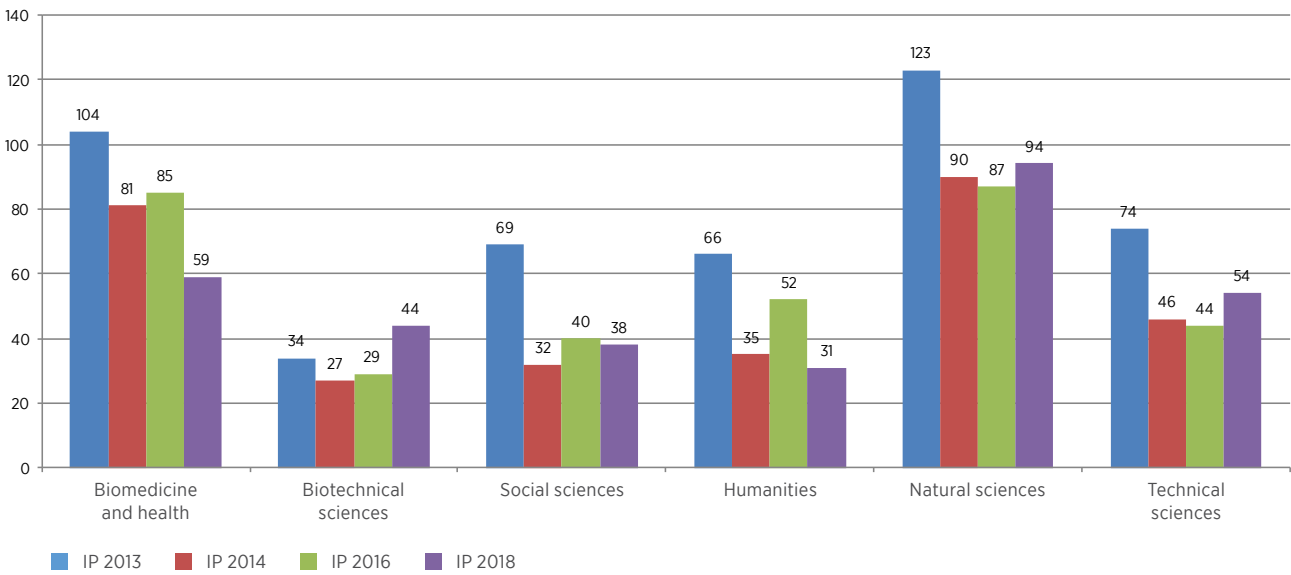
COMPARISON OF THE NUMBER OF SUBMITTED AND FUNDED PROJECTS WITHIN THE CALLS IP-11-2013, IP-09-2014, IP-05-2016 AND IP-01-2018

The number of submitted and funded projects per scientific area is shown in Figures 11 and 12. The highest number of both funded and submitted projects is registered in the area of natural sciences.

The presented data shows that there is an expected difference in the number of submitted proposals and projects proposed for funding between the different calls.

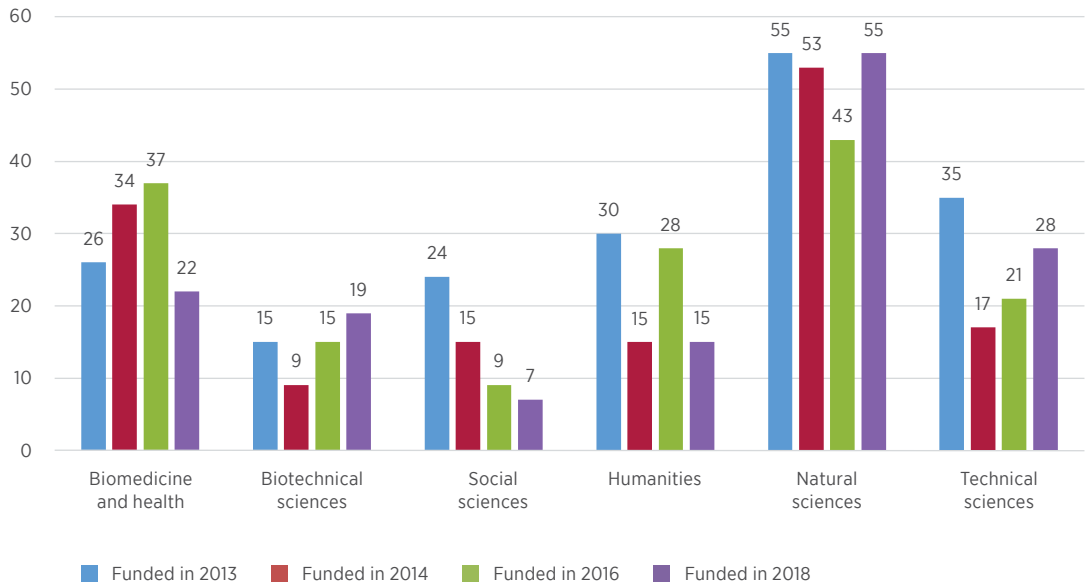
According to the data in Figure 6, the number of submitted projects in biomedicine and health and humanities had fallen almost by 50% between the 2014 and 2018 calls. It is important to emphasize that the number of applications was significantly higher for the 2013 Call, which was the first call ever published by the Foundation. A higher number of applications was received in almost all scientific areas, but variations are significantly minor if this Call is excluded from the analysis. Social sciences experienced a similar fall, as continuous decrease in the number of applications has been

registered during the last four calls as well as a significantly lower pass rate. On the other hand, applications in the natural and technical sciences are on the rise after a decrease in the number of applications in the 2014 and 2016 calls. Humanities are in constant variation: there is an increase in the number of applications for the 2018 Call in comparison to the 2016 Call.



**Figure 6.** Submitted project proposals for calls IP-11-2013, IP-09-2014, IP-05-2016 and IP-01-2018 by scientific area

Natural sciences dominate in terms of the number of submitted and funded projects (Figures 6 and 7), while the number of submitted proposals and pass rate has marked a positive increase in technical and biotechnical sciences, where a growth in the pass rate can be noted. On the other hand, a steep decrease in the number of funded projects in biomedicine and health and a continuous fall in the humanities are negative trends.



**Figure 7.** Funded projects in calls IP-11-2013, IP-09-2014, IP-05-2016 and IP-01-2018





**PARTNERSHIP IN RESEARCH  
(PAR-2018-07 AND PAR-2018-12)**

The Programme supports partnerships in research between public universities or public scientific institutes in Croatia and extra-budgetary sources of funding (not funded from the State budget) from Croatia or from abroad (private companies, local administration units, foreign foundations and agencies for funding research, foreign scientific organisations).

GOALS OF THE  
PROGRAMME

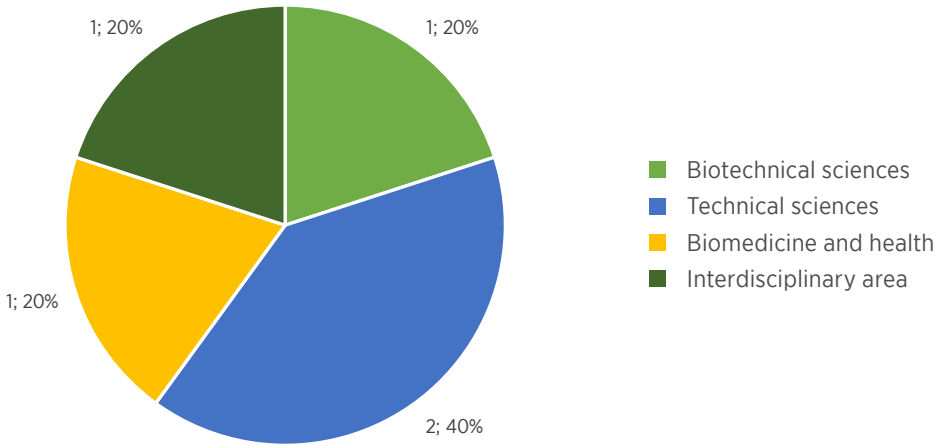
- support relevant scientific research which can speed up the development of new and existing enterprises
- attract representatives of industry and entrepreneurship which can contribute to economic and tehnologic development of the Republic of Croatia

The researchers choose their own research topic. The basic elements that are evaluated are scientific excellence, originality and innovation of the project, proposed research methodology, potential for economic development and previous achievements of the researcher/Principal Investigator and his/her associates.

The Call was published on 27 April 2018 with two Call deadlines. First deadline was 2 July 2018 (PAR-2018-07), and second on 3 December 2018 (PAR-2018-12).

**SUBMITTED PROJECT PROPOSALS**

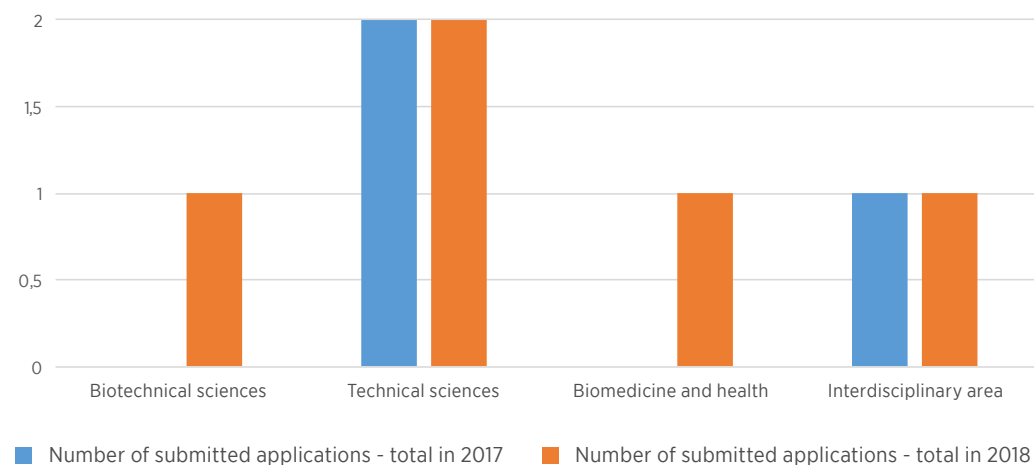
One project proposal in the area of biomedicine and health was submitted under the first Call and was rejected after the second round of evaluation. Five applications were submitted under the second Call, which are shown in Figure 8 as the share in the total number of applications according to the area.



**Figure 8.** Projects submitted under the Call PAR-2018-12 according to scientific area

Based on the comparison of submitted project proposals for the 2017 and 2018 calls, there is an increase in the number of applications for Partnership in Research calls in 2018, as shown in Figure 9.





**Figure 9.** Comparison of the number of applications for the 2017 Call and two calls in 2018

#### Administrative check

Administrative check of all submitted project proposals began after the Call closure. The administrative check included a review of the submitted documentation and filling in the relevant administrative check protocol. All submitted project proposals passed the administrative check.

#### First round of evaluation

Evaluation panel members assessed project proposals according to the criteria from the Evaluation Form. All project proposals submitted to both calls were referred to peer review.

#### Second round of evaluation, peer review

Reviewers assess project proposals according to the criteria outlined in the Evaluation Form. Each project proposal needs to obtain two reviews, which are delivered to the applicants together with the notification on the evaluation results. The sole project proposal submitted for the first Call (PAR-2018-07) did not pass the second round of evaluation. The second round of evaluation for all project proposal submitted to PAR-2018-12 started in the beginning of 2019. The final ranking list is expected in the first half of 2019.

## YOUNG RESEARCHERS' CAREER DEVELOPMENT PROJECT - TRAINING NEW DOCTORAL STUDENTS (CALLS 01-2018 AND 09-2018)

One of the goals of the Strategic Plan of the Croatian Science Foundation 2014-2018 is funding the development of young researchers' careers and active fostering of mobility from the academic sector to the economy. The Strategic Plan anticipates between 200 and 250 new doctoral students being funded every year, depending on the available funds from the State budget, in order to reach the intended number of 1,000 doctoral students under the Foundation's grant system.

To ensure sustainability of such a funding model, the Foundation opened two calls funded from two different sources in 2018. One generation of young researchers will be funded from the European Social Fund (ESF) within the Operational Programme 10.II.3. Improving Conditions for Croatian Researchers and with funds from the State budget of the Republic of Croatia, while the other will be funded from the State budget only.

The goal of the project is the same, regardless of the source of funding, i.e. fostering young researchers in the early phase of their career development (at postgraduate level) in the science and higher education system. Doctoral students' salaries are funded, divided into two periods, each in the duration of two years. The first period includes doctoral studies and registration of the doctoral thesis. Positive evaluation of achieved results is a precondition to continue funding for the next two years, during which the young scientist will finalise their doctoral thesis. The final aim is producing a doctoral dissertation and adopting knowledge regarding basic postulates of scientific work and research.

Funding includes annual doctoral students' gross II salary, including costs of transport to and from work and funds for other expenditures for employed students. The Foundation transfers the funds into the account of the institution at which the mentor is employed and with whom the doctoral student has signed the work contract, while the institution pays monthly salary to the doctoral student.

CALL 01-2018, FINANCED FROM THE EUROPEAN SOCIAL FUND



A total of 202 applications were submitted, 63 in the area of natural sciences, 50 in the area of biomedicine and health sciences, 39 in the area of technical sciences, 23 in the area of biotechnical sciences, 13 in the area of social sciences and 13 in the area of humanities (Figure 10). 201 applications passed the administrative eligibility check. The applications that passed the eligibility check were referred to the evaluation process. One candidate subsequently withdrew their application.

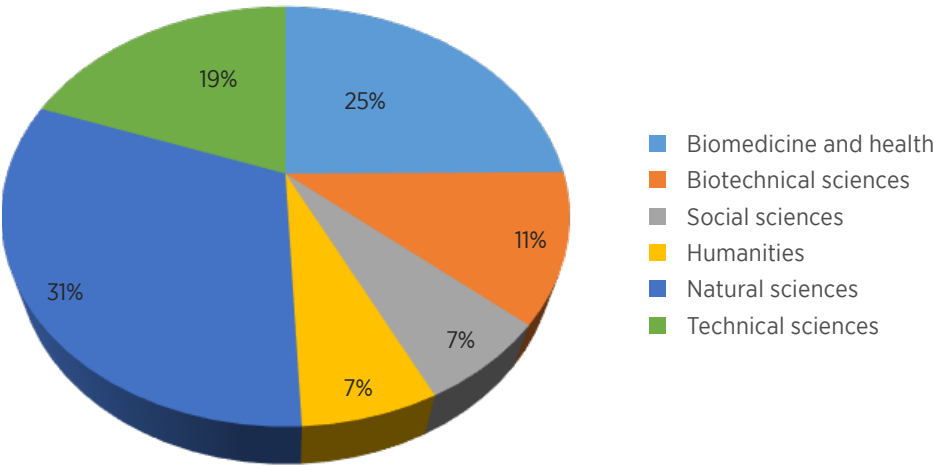


Figure 10. Overview of the total number of applications by scientific area

Based on the evaluation and recommendations of the Evaluation Panel, the Board, at its 110th session, held on 28 March 2018, adopted a decision on funding doctoral students. The final decision on the number of funding doctoral students was adopted in accordance with the funds allocated from the European Social Fund. A total of 173 doctoral students were approved for funding. 161 employment contracts with doctoral students were signed in 2018, while the remaining contracts will be signed in the beginning of 2019.

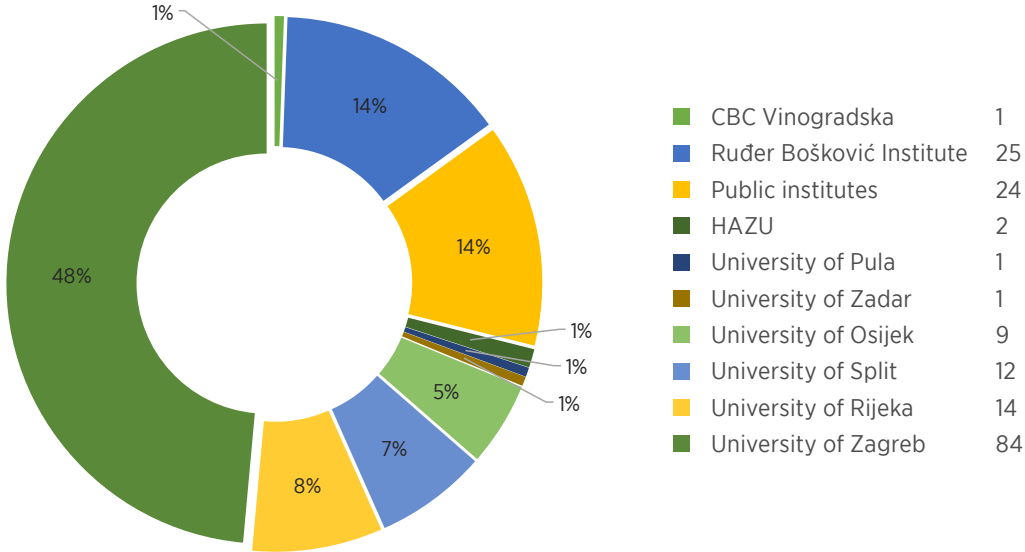
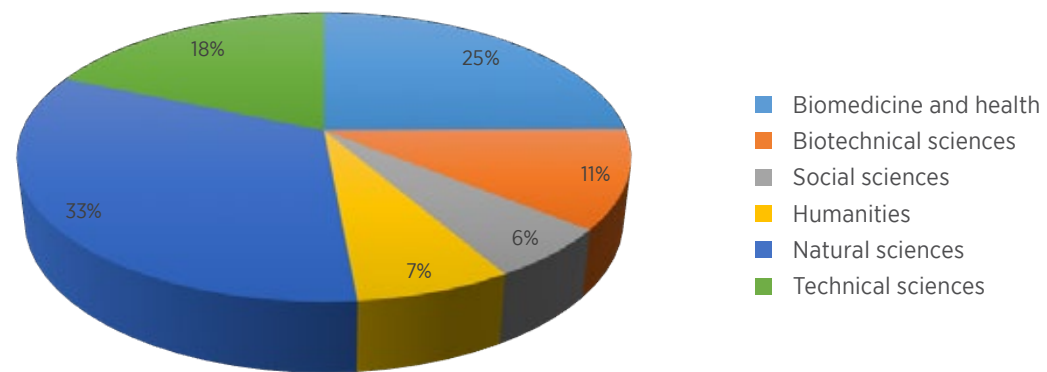


Figure 11. Overview of funded projects by institution

As shown in Figure 11, the highest number of applications was submitted from the University of Zagreb, 84 or 48%, and the fewest applications came from the University of Pula and University of Zadar, 1 application from each institution or 1% of the total share.





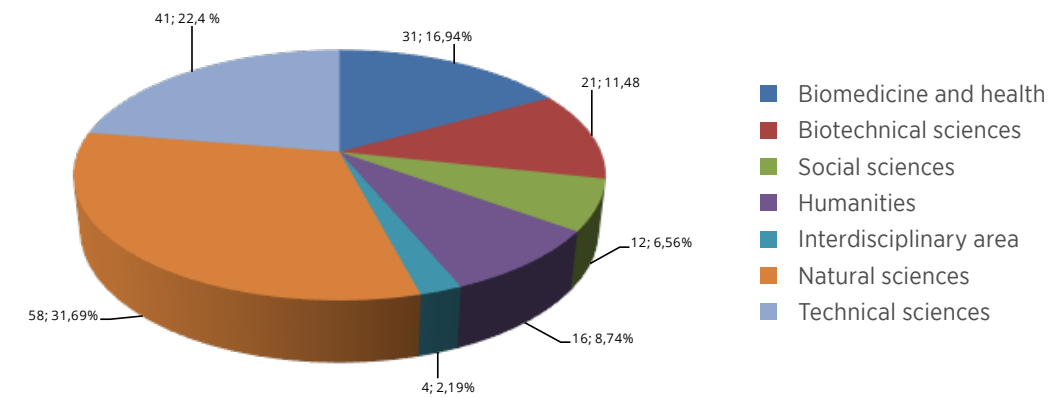
**Figure 12.** Overview of funded doctoral students by scientific area

The percentage of project proposals (i.e. doctoral students) approved for funding by scientific area is presented in Figure 12. Similar to previous years, the highest number of applications came from natural sciences, 57 or 33%, and the lowest from social sciences, 10 or 6% of the total number of applications.

#### CALL 09-2018, FUNDED FROM THE STATE BUDGET

The Call “Young Researchers’ Career Development Project – Training New Doctoral Students” was open in June 2018 with the deadline in September; 183 applications of candidates for mentors were submitted. As with the project proposals in the previous Call, the highest number of applications was received from natural sciences – 58, then 41 from technical sciences, 31 from biomedicine and health, 21 from biotechnical sciences, 16 from humanities and 12 from social sciences. The distribution by scientific area is shown in Figure 13.

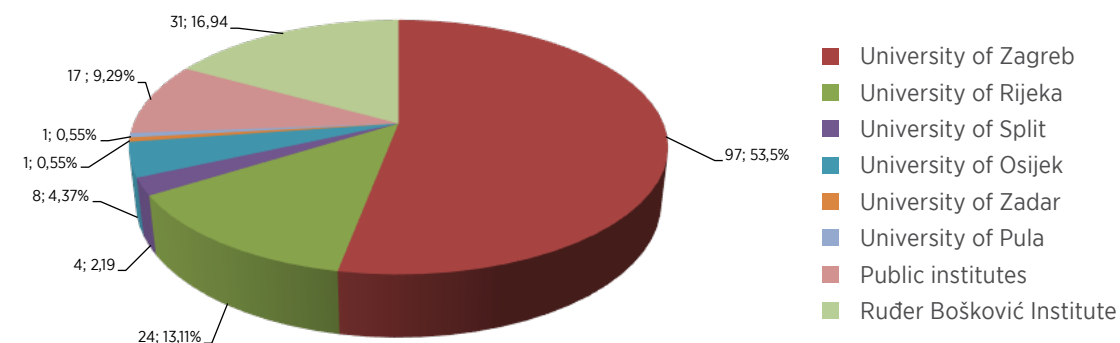
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**Figure 13.** Overview of applications by scientific fields

The division by institutions is presented in Figure 14. Ruđer Bošković Institute is presented separately due to its size and the high number of applications. The highest number of applications came from the University of Zagreb (53.01%), as was the case in previous calls.

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**Figure 14.** Overview of applications by institutions

One application did not meet the administrative criteria, while all other applications were referred to evaluation.

Out of 183 candidates for mentors, 149 applicants are Principal Investigators or associates on projects funded by the Foundation, 36 are involved with international projects and 3 are engaged in centres of excellence.

EVALUATION OF APPLICATIONS

Criteria for the evaluation of candidates for mentors include their scientific activity (publications, patents, international cooperation), mentorship experience, detailed plan for doctoral student’s academic research career, financial plan for the costs of training and doctoral student’s research work and the support of the institution with clearly elaborated elements.

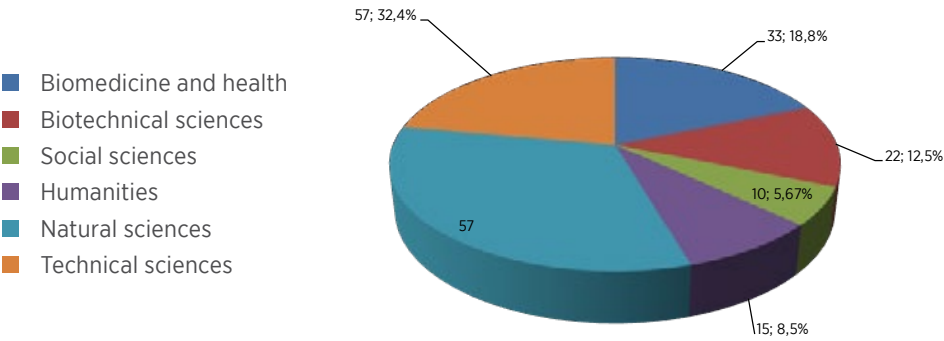


Figure 15. Percentage of funded doctoral students by scientific areas

Figure 15 shows project applications approved for funding by scientific area. As in previous years, the highest number of funded doctoral students are in natural sciences, 57 or almost 33%, and lowest from social sciences, 10 or 5.7% of the total.

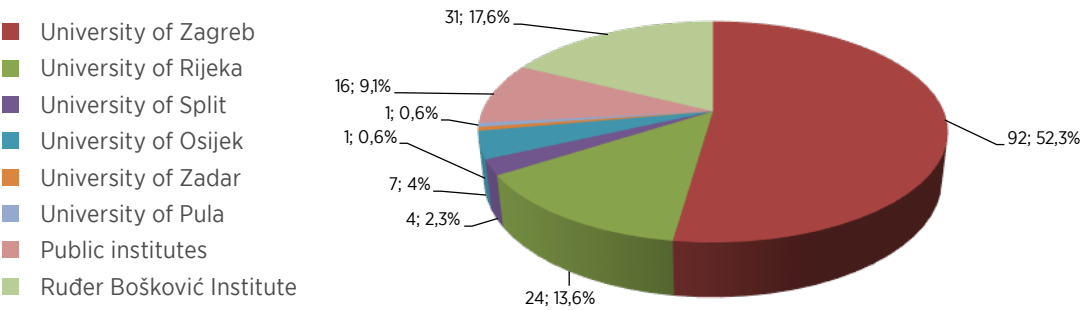


Figure 16. Percentage of funded doctoral students by institutions

The distribution of applications by institutions is presented in Figure 16, with Ruđer Bošković Institute being presented separately. As in the case of previous calls, the highest number of funded doctoral students are located at the University of Zagreb (52.3%).

COOPERATION WITH THE SWISS CONFEDERATION

The Framework Agreement between the Swiss Federal Council and the Government of the Republic of Croatia concerning the implementation of the Swiss-Croatian cooperation programme to reduce economic and social disparities within the enlarged European Union was signed in June 2015. Through this program, a grant in the amount of CHF 45 million was provided for Croatia for projects to be implemented in the period from 2016 to 2024. The framework programme was ratified by the Croatian Parliament in December 2016 and entered in force on 9 January 2017. The Croatian Science Foundation will implement **two programmes** funded from the grant:

1. CROATIAN-SWISS RESEARCH PROGRAMME (CSRP) 2017-2023

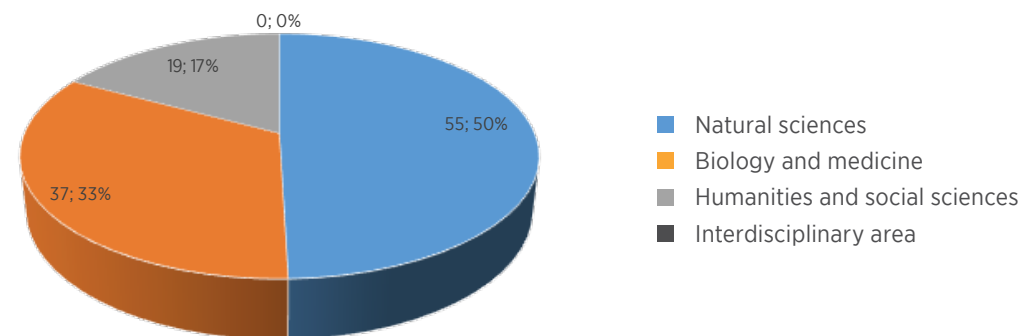
Croatian-Swiss Research Programme 2017-2023 (CSRP) is one of the projects envisaged by the Framework Agreement, implemented by the Croatian Science Foundation in cooperation with the *Swiss National Science Foundation (SNSF)*.

The abovementioned programme will ensure preconditions for successful collaborative research projects between Croatia and Switzerland and the transfer of knowledge, skills and technology. The value of the programme is CHF 4.67 million, with Croatian co-funding in the amount of CHF 0.67 million.

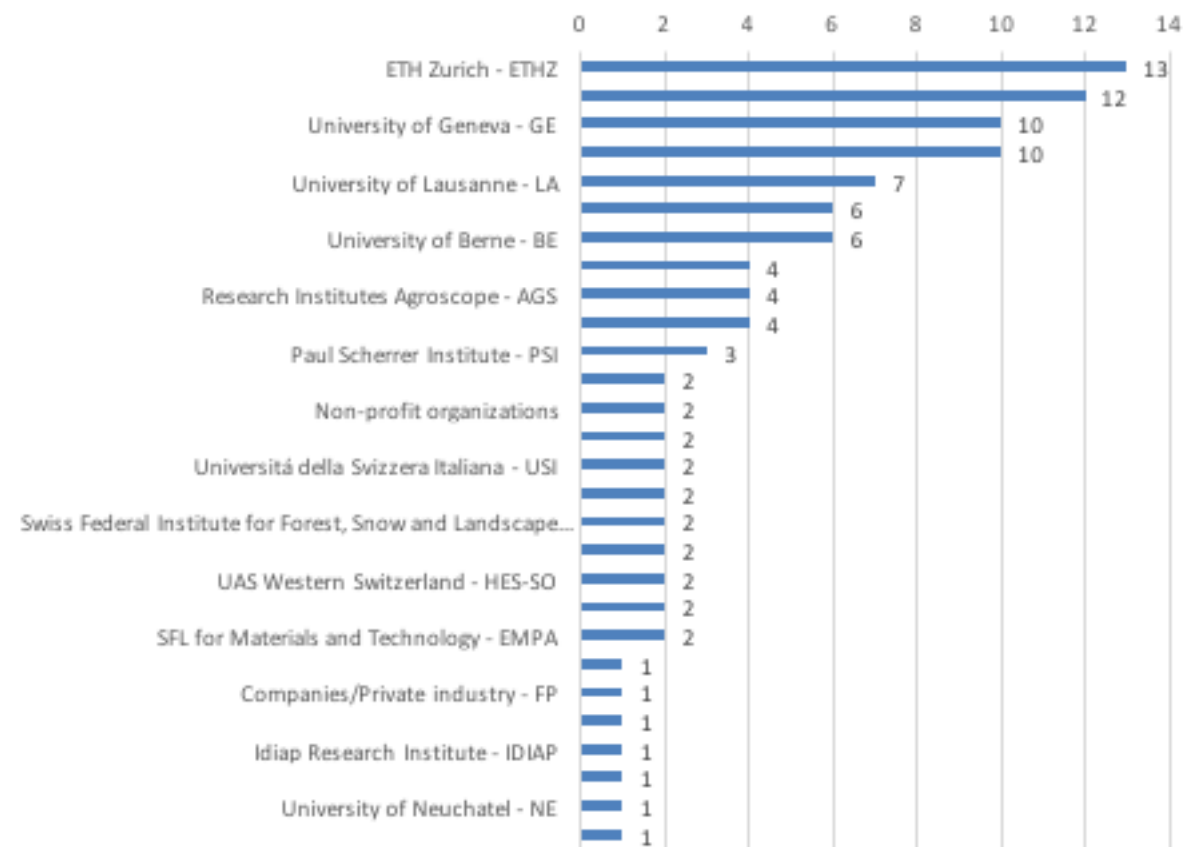
The Call was open for all scientific areas from 9 October 2017 to 19 January 2018. Applications were submitted by Swiss Principal Investigators through the electronic system for application of the *Swiss National Science Foundation, mySNF*.

Submitted project proposals

A total of 111 project proposals were submitted, of which the highest number came from natural sciences (49.55%), as presented in Figure 17. 37 project proposals were submitted from biology and medical sciences (33.33%), 19 project proposals from social sciences and humanities (17.11%), while there were no proposals from the interdisciplinary area (as per SNSF’s classification).

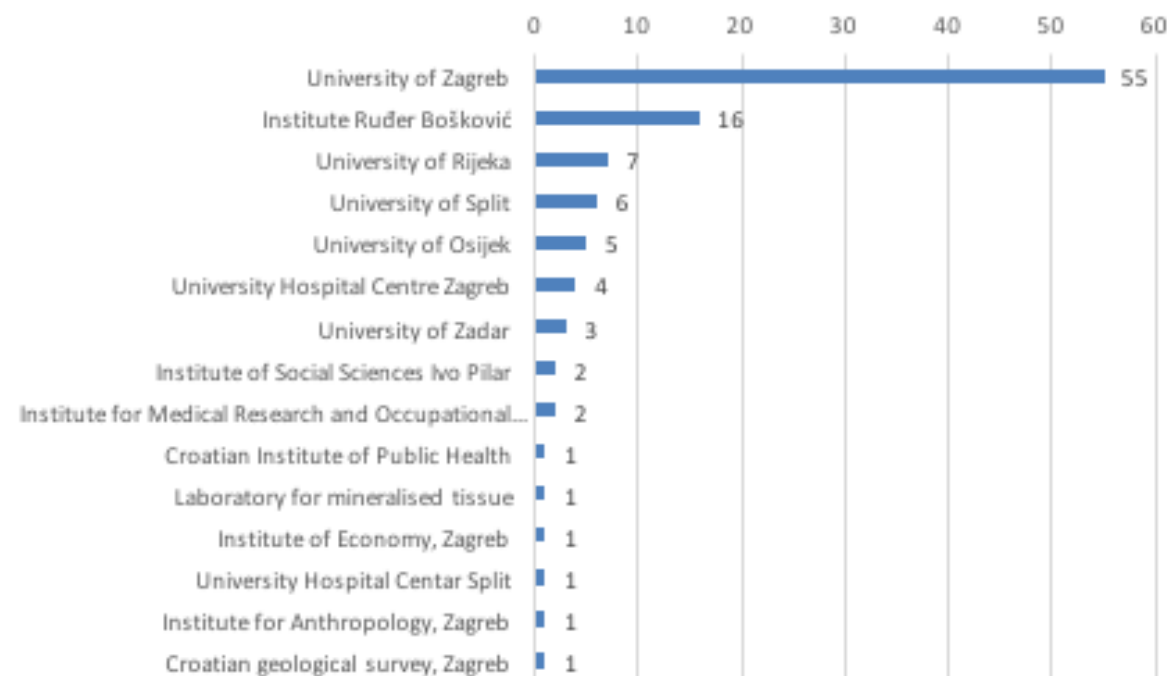


**Figure 17.** Overview of submitted projects by scientific area



**Figure 18.** Number of project proposals by institutions in Switzerland

The highest number of applications that passed the administrative check, categorised by institutions in Switzerland, was received from ETH Zürich (13 applications), University of Zürich (12 applications), University of Geneva and *École polytechnique fédérale de Lausanne* (10 applications each), University of Lausanne (7 applications) and the Universities of Basel and Bern (6 applications each).



**Figure 19.** Number of project proposals by institutions in Croatia

The highest number of applications that passed the administrative check, categorised by institutions from Croatia, was submitted from the University of Zagreb (55 applications), Ruđer Bošković Institute (16 applications), University of Rijeka (7 applications) and University of Split (6 applications).



Evaluation of project proposals, peer review and final review

International peer review was carried out from March until August 2018 and was coordinated by the Swiss National Science Foundation with the support of the Croatian Science Foundation. Based on the peer review, Evaluation Panel members, nominated by the Swiss National Science Foundation and Croatian Science Foundation, conducted the final ranking of proposed projects in Bern from 22 to 23 August 2018 and accepted 11 projects for funding. Eight projects will be implemented at the University of Zagreb, one at the University of Rijeka and two at public institutes.

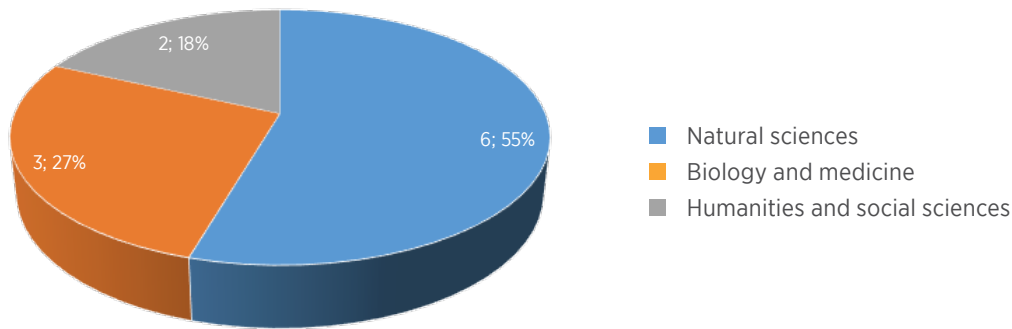


Figure 20. Overview of funded projects by scientific area

The highest number of funded projects (6 or 55%) is from the natural sciences. Biology and medical sciences follow with 3 projects (27%) and humanities and social sciences with 2 projects (18%).

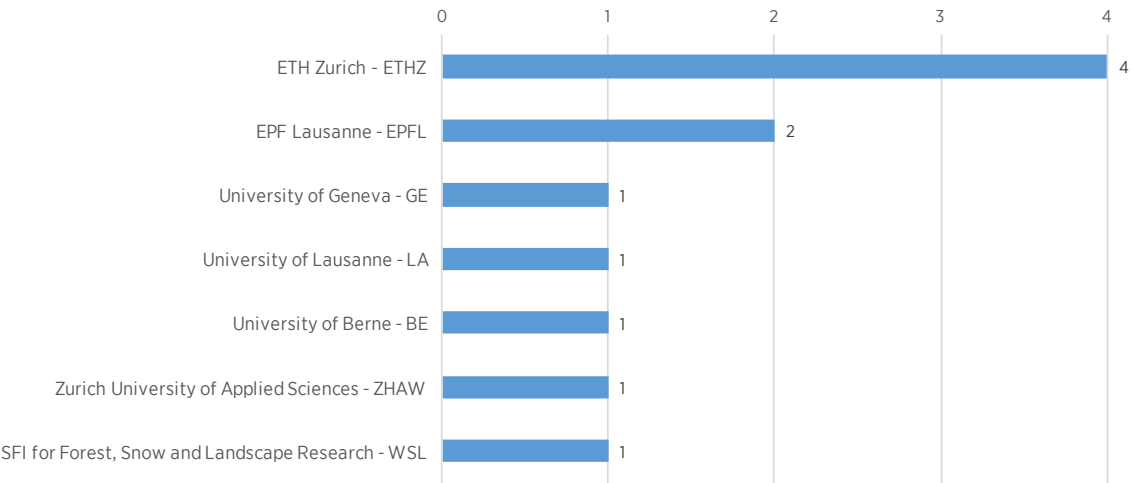


Figure 21. Number of funded projects by institutions in Switzerland

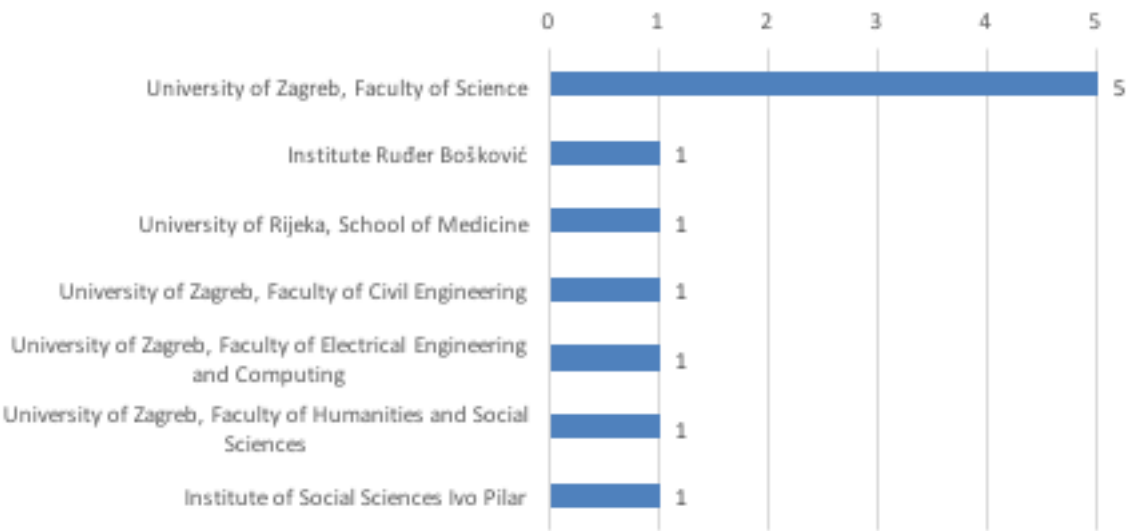


Figure 22. Number of funded projects by institutions in Croatia

The highest number of funded projects by institutions in Switzerland is from ETH Zürich (4 applications), while the Croatian institution with the highest number of funded projects is the University of Zagreb, Faculty of Science (5 applications).

## 2. TENURE TRACK PILOT PROGRAMME (TTPP-2018-07)

Tenure Track Pilot Programme represents joint cooperation of the Croatian Science Foundation, Ministry of Science and Education and *École polytechnique fédérale de Lausanne* (EPFL), for the preparation of the tenure track model for the development of careers of excellent young researchers in Croatia. This programme is funded from the Framework Agreement, in the amount of CHF 4.7 million, with Croatian co-funding in the amount of CHF 0.7 million.

The goal of the programme is to offer young and talented researchers the possibility of long-term career in Croatia. Four research groups will be funded in the framework of the Programme, whereby young researchers will be offered the possibility to conduct visionary research and establish foundations for a new generation of scientists in research areas important for Croatia. The duration of funded projects is 5 years. The Call was open from 3 April to 3 July 2018 for the following areas: biomedicine and health, biotechnical sciences, technical sciences and natural sciences as well as interdisciplinary proposals.

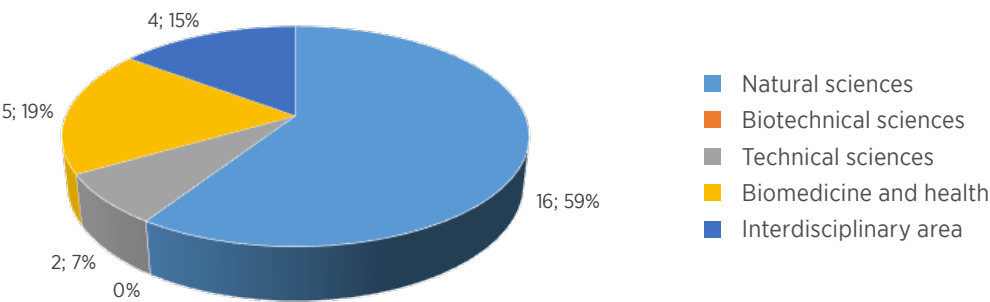
The Call for the Tenure Track Pilot Programme was promoted on Tuesday 15 May 2018 at 9.30 in the Great Hall of the Croatian Academy of Sciences and Arts, Trg N. Š. Zrinskog 11, Zagreb. Academician Velimir Neidhardt, Vice-President of the Croatian Academy of Sciences and Arts, held the introductory statement together with H. E. Stefan Estermann, the Ambassador of the Swiss Confederation in the Republic of Croatia and Prof. Dean Ajduković, Vice-president of the Board of the Croatian Science Foundation. During the programme, presentations about young researchers' career development were held by Prof Antonija Jurak Begonja from the Department of Biotechnology, University of Rijeka and Prof Ivana Novak Nakir, School of Medicine, University of Split. Olivier Küttel, PhD, Head of the Department for International Programmes at EPFL presented the Call for the Tenure Track Pilot Programme.

The Call was published on 3 April 2018. The deadline for obligatory pre-registration was 20 May 2018 and the final deadline was 3 June 2018. Eligible applicants included scientists in early stages of their career of any nationality.

### Submitted project proposals

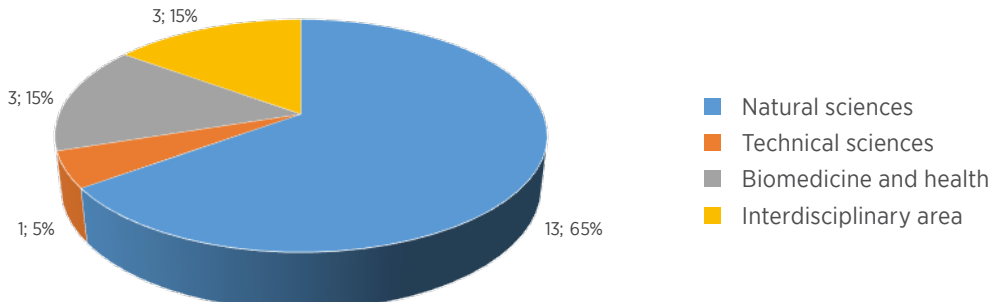
27 project proposals were pre-registered for the Call. Figure 23 shows the number of pre-registered applications by scientific areas.

**Figure 23.** Overview of submitted pre-registrations for the Call within the Tenure Track Pilot Programme by scientific area

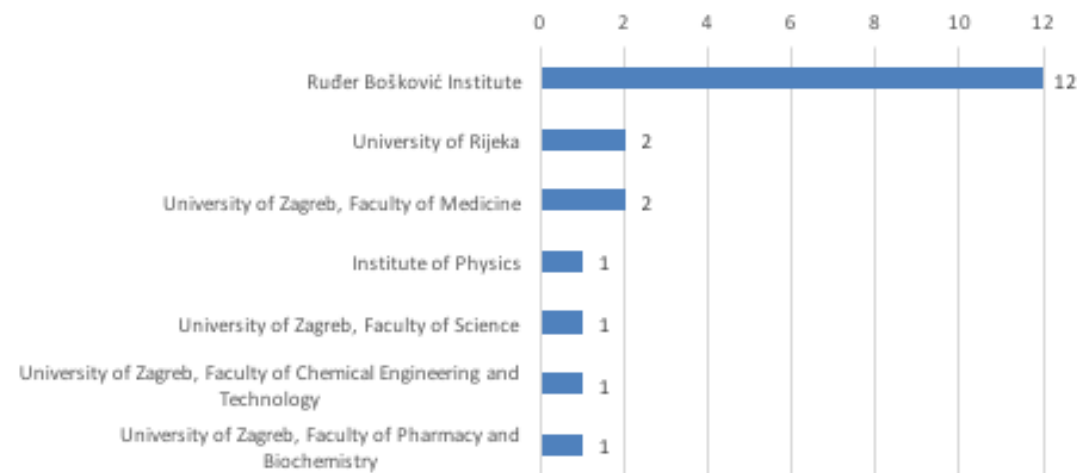


Of the total number of submitted pre-registrations, more than half (i.e. 16) were received from natural sciences, while none were received from biotechnical sciences. 5 pre-registrations were received from biomedicine and health, 2 from technical sciences, and 4 from the interdisciplinary area (Figure 23).

Out of 27 pre-registered applications, 20 project proposals were submitted successfully by the Call deadline. Overview of submitted project proposals by scientific area is presented in Figure 24.



**Figure 24.** Overview of the submitted project proposals by scientific area



**Figure 25.** Number of project proposals by institutions

The highest number of applications by institutions was submitted by Ruđer Bošković Institute (12 applications), University of Rijeka (2 applications – one from the Department of Physics and one from the Department of Biotechnology), 2 applications from the University of Zagreb, the School of Medicine and one application each from the Institute for Physics, University of Zagreb – Faculty of Science, University of Zagreb – Faculty of Chemical Engineering and Technology and University of Zagreb – Faculty of Pharmacy and Biochemistry.

#### Administrative check

After the Call closure, the Foundation carried out administrative check of the submitted project proposals, which included a review of the submitted documentation and completing the administrative check protocol for project proposals.

#### Evaluation

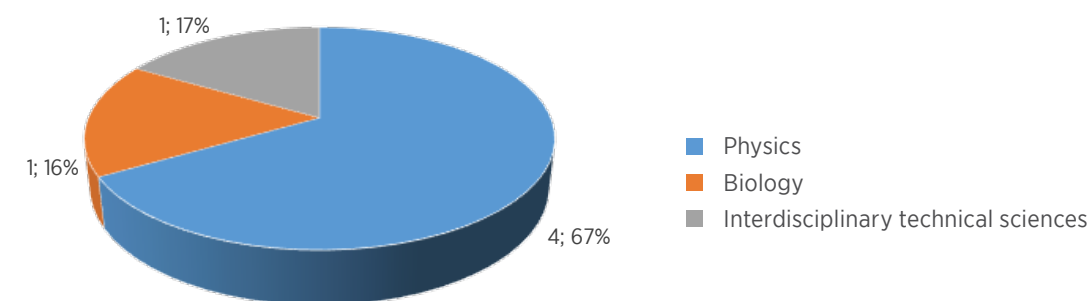
International peer review lasted from July until September 2018. Based on the peer review, the Evaluation Panel members, appointed by *École Polytechnique Fédérale de Lausanne* and the Croatian Science Foundation, performed the final ranking of proposed projects in Zagreb. Out of 20 project proposals, six proposals were recommended for funding. The ranking list for funding was

62

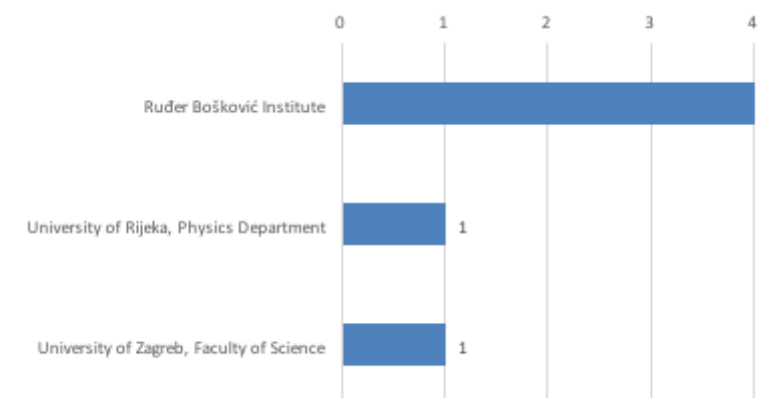
approved by the Steering Committee of the Tenure Track Pilot Programme at its first meeting, held in Zagreb. The Board of the Foundation confirmed the decision of the Steering Committee and decided to open the financial negotiations with four first-ranked projects. The expected finalisation of financial negotiations is March 2019. The projects should start by 1 May 2019 at the latest.

#### Funding

Six projects were recommended for funding, but given the available grant funds, two project proposals were placed on the reserve list. The highest number of projects proposed for funding (5, or 83%) was in natural sciences, i.e. four in physics and one project proposal in biology. 1 interdisciplinary project proposal was proposed for funding.



**Figure 26.** Number of project proposals recommended for funding by scientific area



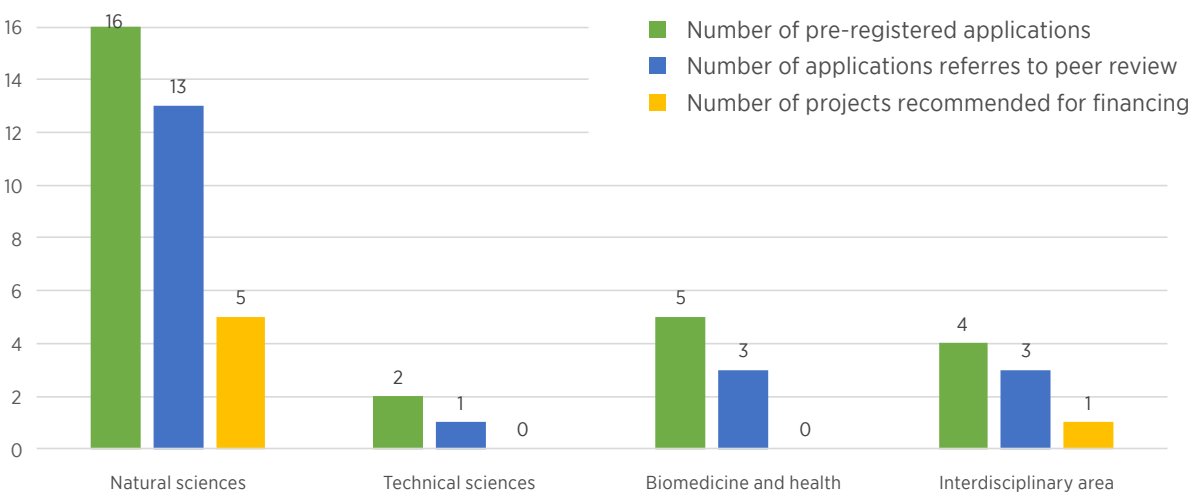
**Figure 27.** The number of project proposals recommended for funding by institutions

63



The highest number of project proposals recommended for funding came from the Ruđer Bošković Institute, 4 proposals, while one came from the University of Rijeka and one from the University of Zagreb, Faculty of Natural Sciences.

Figure 28 provides a comparison of the number of pre-registered applications, submitted project proposals and projects recommended for funding by scientific area, which shows that the total pass rate on the Call is very low. (22.22%).



**Figure 28.** Comparison of submitted projects, projects referred to peer review and projects recommended for funding under the Call TTP-2018-07

**SUPPORT TO RESEARCHERS FOR  
APPLYING TO EUROPEAN RESEARCH  
COUNCIL PROGRAMMES  
(CALL ERC-2018-05)**

The European Research Council (ERC) supports the Croatian Science Foundation in setting up a visiting fellowship programme to fund potential candidates for ERC’s calls to visit teams of projects funded by the ERC that are implemented at the time of the call and visit.

The aim of this Programme is to encourage collaboration between a Croatian researcher (Visiting Researcher) and a current Principal Investigator of an ERC project for the purpose of gaining experience and developing and preparing their own project proposal to be submitted to the first ERC Programme Call (Starting Grant, Consolidator Grant or Advanced Grant) available after the visit. If the application is not accepted for funding, the candidate has to apply to the next available Call.

In March 2018, the Foundation published the third Call “Support to Researchers for Applying to ERC programmes”. One project proposal was received and the grant was awarded to the field of natural sciences.

**“UNITY THROUGH KNOWLEDGE”  
FUND (UKF)**

The Ministry of Science and Education, on behalf of the Government of the Republic of Croatia, started the programme “Unity through Knowledge” Fund (hereinafter UKF) in 2007. The UKF was supported by a loan from the World Bank as part of the Science and Technology Project (STP). The aims of the UKF are supporting internationally competitive research, supporting research that creates new values in the Croatian economy and supporting projects that contribute to the development of research infrastructure in Croatia.

On 22 May 2013, the Republic of Croatia and the International Bank for Reconstruction and Development signed a Loan Contract for the Second Science

and Technology Project (hereinafter STP II), which builds on the previous Science and Technology Project, which was successfully finalised on 31 May 2011.

The aim of STP II is supporting the Republic of Croatia in the absorption of EU funds in the area of research and innovation by strengthening capacities of selected organisations in the public sector and in the development of several research projects from public and private sector, including the development of research groups that can qualify for funding from ESI Funds.

The Croatian Science Foundation assumed the implementation of the UKF Programme on 19 February 2014 by signing the Agreement on the Transfer of the Implementation of the Fund and became the beneficiary of the Loan by an amendment to the Loan Agreement 8258-HR for STP II as of 25 February 2015.

Two Committees have been founded for the purpose of implementation and management of the STP II project. The Board of the Foundation took over the role of the *Approval Committee* responsible for final approval of special programmes and final evaluation of the programmes.

The *Steering Committee*, responsible for communication, initiation of individual UKF programmes, final approval of projects and similar operational tasks, was nominated by the Board of the Foundation (*Approval Committee*) upon recommendation by the Ministry of Science and Education in 2014. The Steering Committee is responsible for the management, coordination and successful implementation of all programmes and activities of the Fund in accordance with the guidelines, plans and agreed procedures. The SC establishes the strategy of the UKF, proposes specific programmes to the Approval Committee, announces programmes, controls quality of the evaluation process and assesses compliance of project applications with the Fund's goals and is in charge of final evaluations and approvals of projects.

The UKF Secretariat is the executive office of the UKF in charge of operational activities such as promotion of the Programme, business and financial planning, proposing UKF working strategy to the SC, selection of peer reviewers, monitoring implementation of approved projects, etc.

Nine projects from the Programme "Across the Border" under the "Cooperability Programme", finalised at the end of 2017 with the total value of HRK 10,702,811 were evaluated at the beginning of 2018.

12 projects have been implemented in 2018 in the fields of technical, natural, biomedicine and health sciences funded from the programme "My first Collaboration" in the framework of the programme "Scientific collaboration", which will enable young scientists at the post-doctoral level to establish collaboration with Croatian scientists living abroad to increase their professional experience and develop a career in science or economy. Projects last for 15 months and mid-term review and independent financial audit was carried out. Two projects were terminated in October and funds were recovered. The total value of these projects is HRK 3,148,556, while HRK 981,817 were disbursed in 2018.

At the end of 2018, the UKF published the Call "Connectivity" within the Programme "Gaining Experience", whose goal is to give opportunity to excellent scientists and experts from Croatia to visit the best research centres abroad to establish cooperation and gain new skills necessary for improving science and technology in the country. The duration of proposed visits can be from 31 days to 6 months. The funds for the "Connectivity Programme" have been made available through redistribution within the third STP II restructuring and amount to HRK 800,000.



# RESULTS OF FUNDED PROJECTS

The relevant project results in 2018 include 1,052 scientific papers published in international peer-reviewed journals, some of which have been published in the most prestigious international scientific journals. It is worth noting that Croatian scientists published a total of 4,718 original scientific papers in 2018, of which almost 25% are connected with the Foundation's projects.

## PROJECT EVALUATION AND MONITORING DATA

68

**490** reports for financed projects received

**523** Croatian evaluation experts took part in the monitoring process of the financed projects

# RESULTS OF THE FOUNDATION'S PROJECTS

**1,052** scientific papers published  
and **115** papers in print

**148** chapters in books

**30** author's books

**352** assessed papers have been written  
in the framework of the projects,  
of which **55** doctoral dissertations

**865** papers in conference proceedings

and **339** papers in peer reviewed collections

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# DOCTORAL STUDENTS' WORK RESULTS

## DOCTORAL STUDENTS FUNDED FROM THE 2014 AND 2015 CALLS

The Foundation published four calls for funding doctoral students in total, the first in May 2014, the second in September 2015, the third in December 2017, and the fourth in June 2018. Three calls are funded from the State budget, while one is funded from the European Social Fund (hereinafter: ESF) in the framework of Operational programme 10.II.3. Improving Conditions for Croatian Researchers. Doctoral students employed through these calls are meeting their obligations in an orderly manner. In 2018, 51 doctoral students from the 2014 generation and three from the 2015 generation obtained their PhD. Their work is presented in the following pages.

## RESULTS OF DOCTORAL STUDENTS' WORK IN 2018

Besides the report on the doctoral student's progress, the mentor and doctoral student need to submit a list of all dissemination activities and publications of the doctoral student from the reporting period. It is clear from the periodic and final reports on the doctoral student's progress that valuable results have been accomplished in 2018. A total of 522 presentations were held at scientific conferences and 440 publications have been produced, with 204 publications where they are listed as the first or only author.



**136** reports on the work of doctoral students of generation 2014 submitted and **142** reports of generation 2015.

**440** publications published

**522** presentations held

**188** doctoral trainings attended

Some of the successfully defended doctoral theses are listed in the following section.

**Mentor:** *Prof. Ivica Kožar, PhD*

**Doctoral student:** **TEA RUKAVINA, PhD**

**Institution:** *University of Rijeka, Faculty of Civil Engineering, and Université de Technologie de Compiègne / Sorbonne Universités, France (dual doctorate)*

**Doctoral studies:** *Postgraduate studies in Civil Engineering*

**Research project the doctoral student is associated with:** *Multi-scale model of concrete with parameter identification, Principal Investigator: Prof. Ivica Kožar, PhD*

The goal of the doctoral dissertation is developing a model for describing conduct during the collapse of fibre-reinforced composite material that is



based on connecting processes at the micro-level of material to a global reply of the whole construction. Damage to the material is closely connected to the durability and integrity of structures, considering the fact that cracks to the material can lead to catastrophic consequences, such as collapse. This is particularly relevant for massive and strategically significant structures, such as bridges, dams, nuclear power plants and wind turbines.

Adding steel fibres to concrete increases material ductility and toughness and improves dynamic features. However, more importantly, the fibres reduce the cracking of concrete as they cross over the micro-cracks and prevent them from merging into macro-cracks. The presented models of individual material components are interconnected through a multi-scale approach, in which equations describing the conduct of concrete and fibre skidding are solved in a sequential manner, resulting in a faster and more robust calculation.

In order to test the proposed methodology, numeric simulations have been conducted for the cases of standard fitting and fibre reinforcement respectively. In addition, in order to get a clearer insight into the conduct of composite material, laboratory tests have been conducted for single fibre ripping and three-point bending.

The scientific contributions of this doctoral dissertation include the development of formulae and computer code for a new ultimate element used for describing the interaction of different cracking mechanisms, including total ripping of fibre from the concrete. In addition, the specific features of the concrete-fibre connection (activation mechanisms, borderline conditions) have been

highlighted and an inverse model has been developed which enables the identification of parameters by minimising errors between the modelled and measured values.

As part of this doctoral dissertation, seven articles have been published in international peer-reviewed journals, while another one is under review. The doctoral student presented her research at four Croatian and seven international conferences.



Adnan Ibrahimbegović, Tea Rukavina and Ivica Kožar



Petra Palić, PhD

**Mentor:** *Maruška Vizek, PhD*

**Doctoral student:** *Petra Palić, PhD*

**Institution:** *The Institute of Economics, Zagreb*

**Doctoral studies:** *Doctoral studies in Economics, specialization: Economics*

**Research project the doctoral student is associated with:**  
*Economic, statistical and political aspects of government bond markets, Principal Investigator: Maruška Vizek, PhD*

The formulation and testing of the volatility and shocks spillover, and financial contagion in property markets such as government bond markets, stock markets and foreign exchange markets and their mutual interaction are the

focus of this research. Namely, the title of the dissertation is “Modeling volatility spillover and contagion across financial markets”. This study incorporates a detailed theoretical framework of financial contagion, which provides an explanation of the causes, basic channels and theoretical outlines of the models with imperfect information and models of international panic transmission. In addition, role of the government bond market, stock markets and foreign exchange markets are thoroughly examined. Furthermore, models used in the empirical literature for the purposes of testing and assessing the effect of spillover of financial shocks from one country to another, and from one financial market to another, such as probit and logit models, the GARCH model, the GVAR model, and the panel models are also defined and analyzed. This study uses a carefully selected methodology, the so-called multivariate GARCH model, which allows for a better understanding of the mechanism, the direction and strength of the volatility spillover and the financial contagion spreading in the financial markets of the European Union. The study also analyzes the asymmetric transfer of volatility on government bond markets, stock markets and foreign exchange markets of the European Union countries, with the aim of achieving the most realistic depiction of the actual financial market interaction and the consequent spillover of the financial contagion. Comprehensive and detailed analysis of the transfer of volatility and shocks throughout the government bond markets, stock markets and foreign exchange markets of the European Union

countries provides new insight into the very phenomenon of financial contagion over time that may be of particular importance to economic policymakers.

**Mentor:** Prof. Silvana Raić-Malić, PhD

**Doctoral student:** **Andrea Bistrović, PhD**

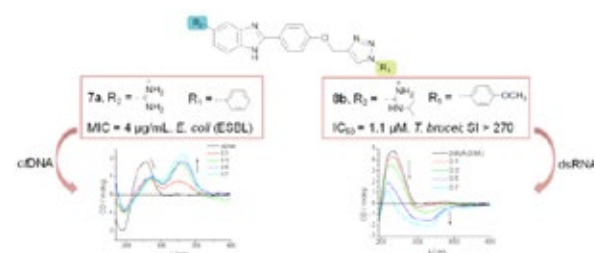
**Institution:** University of Zagreb, Faculty of Chemistry and Technology

**Doctoral studies:** Chemical engineering and applied chemistry

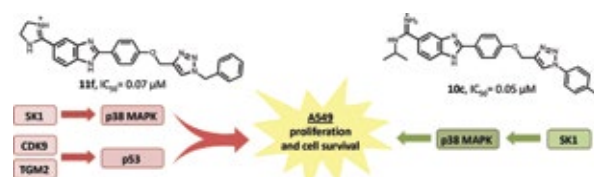
**Research project the doctoral student is associated with:**

*Synthesis and cytostatic evaluations of novel nitrogen heterocycles library, Principal Investigator: Prof. Silvana Raić-Malić, PhD*

In the doctoral thesis entitled “Synthesis of biologically active novel halogenated hybrids of bicyclic heterocycles and 1,2,3-triazoles”, new hybrids of purines and purine isosters were synthesized with substituents at positions 6 and 9 of the purine moiety, and benzimidazole derivatives substituted at positions 2 and 5(6). In the synthesis of target compounds, conventional and modern, more environmentally friendly methods of organic synthesis have been used, such as microwave- and ultrasonic-assisted reactions. *In silico* analyses were used for structural optimization and preparation of compounds with the aim of obtaining leading molecules with improved ADMET properties. The series of amidinobenzimidazole derivatives showed the most potent and selective antiproliferative effect in the nanomolar range on non-small cell lung cancer (A549), which is one of the most common causes of mortality in the world. Additional biological evaluations and molecular docking analysis identified p38 MAP



Correlation of antibacterial activity of new benzimidazoles against resistant *E. coli* bacteria and *T. brucei* parasite with their binding affinity for DNA and RNA..



Mechanism of anti-proliferative action of amidinobenzimidazole on non-small-cell lung cancer (A549)

kinase as a possible target for the action of these compounds. N-Isopropyl-substituted and unsubstituted amidinobenzimidazoles had strong antibacterial activity against clinical strains of *E. coli* resistant to  $\beta$ -lactam antibiotics (ESBL) and methicillin-resistant *S. aureus* (MRSA). The structure-activity relationship has shown that the p-methoxyphenyl-1,2,3-triazole substituent has a significant effect on the inhibitory action against the *T. brucei* parasite. Due to their structural characteristics, possible interactions of the selected compounds

with DNA and RNA polynucleotides, and a correlation of their antimicrobial and antitrypanosomal activity with binding affinity for polynucleotides were investigated.

A. Bistrović has published 6 scientific papers cited in the Current Contents database, and she was awarded the L'OREAL-UNESCO Fellowship for Women in Science in 2018 for her significant scientific contribution as part of her PhD thesis.



Andrea Bistrović (first to the left) at the L'OREAL-UNESCO "For Women in Science" award ceremony

**Mentor:** Prof. Tonči Rezić, PhD

**Doctoral student:** **Martina Andlar**

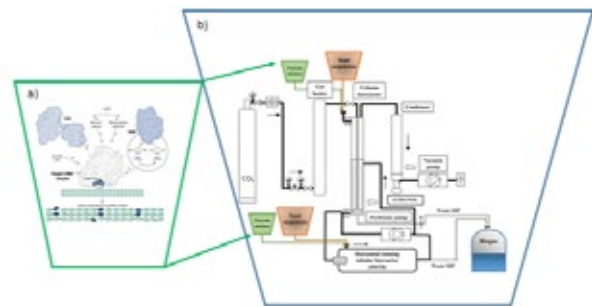
**Institution:** Faculty of Food Technology and Biotechnology, University of Zagreb

**Doctoral studies:** Biotechnology and bioprocess engineering, food technology and nutritionism

**Research project the doctoral student is associated with:** *Sustainable production of bioethanol and biochemicals from agricultural waste lignocellulosic raw materials, Principal Investigator: Prof. Božidar Šantek, PhD*

The title of the doctoral thesis is “Integrated bioprocess system for ethanol production and separation from lignocellulosic raw materials by using different bioreactors”. The objective of this thesis was to develop an integrated bioprocess

system for ethanol production and separation from selected lignocellulosic raw material (sugar beet pulp) by using different bioreactors. For that purpose, a column and horizontal rotating tubular bioreactor (HRTB) were used. The second objective was to develop an efficient enzyme system for cellulose fraction degradation. For the purpose of stimulating the action of fungal hydrolytic enzymes, lytic polysaccharide monooxygenase (LPMO) and various electron donors present in lignocellulose hydrolysates were tested. LPMOs oxidatively degrade insoluble lignocellulose polysaccharides and soluble oligosaccharides. Upon reductive activation, they cleave the substrate and promote biomass degradation by hydrolytic enzymes. Binding studies showed that the reduction of the LPMO's active site increased the affinity and the maximum binding capacity for cellulose. The next step was related to an optimization of enzymatic sugar beet pulp hydrolysis using various commercial enzyme mixtures (Ultrasym AFP-L, Viscozyme L, Pectinase and Cellulase). Ultrasym AFP-L showed the highest efficiency and together with produced extracellular degradation system from fungus *Neurospora crassa*, was used for sugar beet pulp hydrolysis at a large scale. A three-step process comprising the hydrolysatation, fermentation and in-situ gas stripping with a vacuum assisted recovery system, was integrated and optimized. Based on mass and energy balances of the processes environmental sustainability of the integrated processes has been evaluated and used for calculation of environmental impacts. The use of tubular and horizontal rotating tubular bioreactors and the use of LPMO enzymes together with commercially available enzymes and suitable activators contributed to the development of an efficient integrated bioprocess system for the production of ethanol from lignocellulosic raw material.



*Development of integrated bioprocess system for the ethanol production and extraction from lignocellulosic raw materials by using different bioreactors; a) development of bioprocess with enzymes, b) development of bioprocess in bioreactor*



*Luka Brčić, PhD, and mentor Assoc. Prof. Vesna Boraska Perica, PhD*

**Mentor:** *Assoc. Prof. Vesna Boraska Perica, PhD*  
**Doctoral student:** **Luka Brčić, PhD**  
**Institution:** *The Faculty of Medicine, University of Split*  
**Doctoral studies:** *Translational Research in Biomedicine (TRIBE)*  
**Research project the doctoral student is associated with:** *Genome-wide association analysis of Hashimoto thyroiditis, Principal Investigator: Assoc. Prof. Vesna Boraska Perica, PhD.*

Hashimoto thyroiditis (HT) is the most frequent form of automimmune thyroid disease and affects as much as 5-10% of the population. HT is considered one of the most widespread endocrinologic disorders and the most frequent autoimmune disease in general. Even though it is recognised that the genetic factor in combination with different environmental factors contributes to the development of the disease, genetic determinants are not researched well. One of the most

efficient methods for the research of genetic predisposition of complex diseases is the so-called genome-wide association study. By comparing genetic variants spread between the patients and the control group, genetic variants underlying the disease will be identified. This research entailed the first genome-wide association study in the world focused solely on HT. More than 8 million genetic variants in 405 patients and 435 controls from the Split region were tested, while additional 303 HT patients and 302 controls from Split and Osijek regions participated in a replication analysis. Three novel associated genetic variants with HT were found, found in or in close proximity to SDK2, GNA14 i IP6K3 genes. All three genetic markers have been connected with HT for the first time, but it is known that the genomic regions surrounding these markers are included in the regulation of the thyroid function and development of different autoimmune diseases. The results of this research generate new knowledge that will advance our understanding of the genetic base of HT and underlying biological mechanisms of HT, with a view to improve treatment of the disease and develop



new prevention, diagnostic and therapeutic methods. The results of the research are described in detail in the doctoral dissertation with the title “Hashimoto thyroiditis: discovering genetic variants involved in disease development”.

## INTERNATIONAL COLLABORATION

International collaboration is one of the crucial factors that guarantees and improves the quality of scientific institutions. Therefore, one of the Foundation’s goals is to enhance its international collaboration, i.e. the internationalisation of its activities and programmes.

## SCIENCE EUROPE



*Science Europe* is an organization established in 2011, with the headquarters in Brussels, which gathers European institutions that fund scientific research and institutions that implement research. The Organization’s goal is to promote common interests of all member institutions and support the members in their efforts to advance scientific research in Europe, taking into account the interests and opinions of scientists from all European systems. The Organisation is managed by the *General Assembly*, composed of high-level representatives from the member organisations (presidents, general directors and similar).

Members are organisations funding or conducting research, and are elected as members by the General Assembly upon recommendation of the *Membership Committee*. Only politically independent organisations with significant state budget for scientific research, which can influence the development of national scientific system, may be elected as members. Science Europe currently counts 43 member organisations from 27 different countries, while the Croatian Science Foundation has been a member since 2013.

Science Europe holds General Assembly sessions biannually. At the second session of the General Assembly, held in Bruxelles on 22 November 2018, *UK Research and Innovation* (UKRI) has become a member and will substitute what were previously seven research councils of the United Kingdom. The annual work plan and budget for 2019 were approved, along with the proposal for changing the methodology for calculating the membership fee, which will result in the increase of the membership fee from 8 to 10%, which will be implemented through the following 4 years. Results on the Open Access and Research Management plan were presented as well as



the results of the Working Group on the preparation of the *Multilateral Lead Agency Agreement*, in which the Foundation also participates.

The Croatian Science Foundation also participates in the *High Level Policy Network* (HLPN), engaged by the Governing Board of Science Europe to examine all possible strategies and mechanisms for additional support for cross-border cooperation in Europe. The Foundation also follows the performance of the group *cOAlition S*, whose goal is ensuring that all scientific publications with results of the projects funded from public sources are published in Open Access journals or platforms as of January 2020.



## **THE FOUNDATION'S PARTICIPATION IN THE WORKING GROUP OF THE *MULTILATERAL LEAD AGENCY AGREEMENT***

The Governing Board of Science Europe has appointed the *High Level Policy Network* (HLPN) group to examine possible strategies and mechanisms for further support to cross-border cooperation in Europe. The *Multilateral Lead Agency* framework was discussed at the end of 2017, when the support for the creation of the *Multilateral Lead Agency Unique Framework* (further in the text: MLA Framework) was given. MLA Framework was presented and discussed at the General Assembly of Science Europe at the end of 2017 and Science Europe members were invited to submit their expression of interest in the development of the Agreement on the Procedures and Implementation Modalities for MLA (further in the text: MLA Agreement). Further to this, an MLA Working Group was founded with 18 organisations as participants, including the Foundation (*FWF Der Wissenschaftsfonds – FWF, Austria; Fonds Wetenschappelijk Onderzoek – FWO, Belgium; Fund for Scientific Research – FNRS, Belgium; Croatian Science Foundation – HRZZ, Croatia; Grant Agency of the Czech Republic – GAČR, Czech Republic; SUOMEN AKATEMIA – AKA, Finland; Agence nationale de la recherche – ANR, France; Deutsche Forschungsgemeinschaft – DFG, Germany; Science Foundation Ireland – SFI, Ireland; Fonds National de la Recherche – FNR, Luxembourg; The Research Council of Norway – RCN, Norway; Narodowe Centrum Nauki – NCN, Poland; Fundação para a Ciência e a Tecnologia – FCT, Portugal; Javna agencija za raziskovalno dejavnost Republike Slovenije – ARSS, Slovenia; Forskningsrådet för miljö, areella näringar och samhällsbyggande – Formas, Sweden; Swiss National Science Foundation – SNSF, Switzerland; Nederlandse Organisatie voor Wetenschappelijk Onderzoek – NWO, Netherlands; United Kingdom Research and Innovation – UKRI, United Kingdom*).

The goal of the MLA Working Group is the preparation of the MLA Agreement, which will be signed between the organisations referred to above. MLA Agreement signatory parties will accept the evaluation and grant award procedure of the other signatories. In the framework of the MLA Agreement, i.e. Guidelines for Implementation, specific procedures for the submission of project proposals from two or more applicants are being elaborated.

## PROGRAMMES THAT WILL BE FUNDED FROM THE EUROPEAN SOCIAL FUND (ESF)

### “Collaboration Programme with Croatian scientists in diaspora “Scientific Collaboration”

Based on the Grant Agreement on the award of funds to the Croatian Science Foundation for the “Collaboration Programme with Croatian Scientists in Diaspora – Scientific Collaboration” (further in the text: “Scientific Collaboration”), funded from the European Social Fund in the framework Priority Axis 3 – “Education and life-long learning”, specific goal 10.ii.3 “Improving work conditions of Croatian researchers”, Operational programme “Efficient Human Resources” 2014 – 2020”, the Foundation announced the Call in 2018 on its website.

The total value of the Programme “Scientific Collaboration” is HRK 44,842,440.00 and will be implemented in the period from 18 June 2018 to 18 December 2023. The aim of the Programme is transfer of knowledge and attracting investment into the Croatian science system and indirectly into the economy through the cooperation of national researchers and researchers from diaspora. The final goal of the Programme is enhancing employment of researchers in the early phase of career development and networking with researchers in diaspora. Competencies for participation in calls of European and International organisations are also being developed and strengthened.

Publication of the Call for project proposals for funding in the Framework of the Programme “Scientific Collaboration” is scheduled for January 2019. The value of the Call is HRK 42,500,000.00 and the projects are planned to commence in September/October 2019. Twenty projects in the duration of at least three years will be funded and shall end no later than 31 May 2023. Eligible costs are costs related to research, salaries of young researchers (doctoral students and postdoctoral researchers), costs related to the purchase of equipment, mobility and indirect costs.



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## “ERA-NET COFUND IN QUANTUM TECHNOLOGIES CALL 2019” (QUANTERA CALL 2019)

The Croatian Science Foundation has been a member of *QuantERA ERA-NET Cofund in Quantum Technologies* consortium since 2018. The consortium is a network of 32 national/regional organisation for funding research from 26 countries funding international research projects in the field of quantum technology. The Consortium is co-funded from the Horizon 2020 programme. The goal of QuantERA is spreading scientific excellence in the European Research Area with special emphasis on the participation of research groups from new EU member states. At the first QuantERA Call, published in 2017, 26 excellent international projects were funded in the total amount of 32 million EUR, of which 70% include research teams from the new Member States.

The Croatian Science Foundation participated for the first time in the second Call (*Quanterra Call 2019*), published in November 2018, thus enabling participation of Croatian scientists. Envisaged deadline for the participation of short and complete proposals is 18 February 2019 and the projects are expected to start in autumn 2019.

The Call includes the following areas:

1. quantum communication
2. quantum simulation
3. quantum computation
4. quantum information sciences
5. quantum metrology sensing and imaging.

The total funds allocated by the Croatian Science Foundation for the QuantERA Call 2019 amount to 200,000 EUR.

Only project consortiums are eligible to apply, consisting of 3 to 6 partners (research groups) from at least three different countries participating in the Call. Each partner will nominate one *Principal Investigator*, who will communicate with national/regional organisation in their country and who will be the beneficiary of the funds in the case of successful evaluation. The application



will be submitted by the coordinator of the Consortium via the electronic system of the French agency *Agence Nationale de la Recherche*, ANR.

Application, evaluation and selection procedure are transnational.

The proposals will be evaluated against three criteria: excellence, impact and efficiency of implementation.



## EVENTS



### PRESENTATION OF THE CROATIAN SCIENCE FOUNDATION'S PROJECTS

Projects of the Croatian Science Foundation were presented in the library of the Croatian Academy of Sciences and Arts on Monday 12 March 2018. Academician Dario Vretenar, President of the Board of the Croatian Science Foundation, presented results from the calls of the Croatian Science Foundation in 2017 and announced new calls. 165 proposals were submitted for the Call "Installation Research Projects", while 80 projects were selected for funding after international peer-review. These 80 new projects from the "Installation Research Projects" programme include

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those of Asst. Prof. Ivana Herceg Bulić, Asst. Prof. Goran Sedmak, Assoc. Prof. Irena Galić and Asst. Prof. Sunčica Bosak, who presented their projects. Video recordings of these presentations can be found on the [Youtube channel of HRZZ](#).



### SIGNING OF CONTRACTS ON THE IMPLEMENTATION OF PROJECTS IN THE FRAMEWORK OF THE SWISS-CROATIAN COOPERATION PROGRAMME

Contracts on the implementation of projects in the framework of the Swiss-Croatian Cooperation Programme were signed on Tuesday, 27 March 2018, at the Archeological Museum in Zagreb. The Programme entails 10 contracts in the total amount of HRK 335.5 million, of which the Swiss contribution amounts to HRK 282.3 million. The Swiss-Croatian cooperation programme aims to reduce economic and social disparities of Croatia as the youngest Member State of the European Union, as well as to reduce economic and social disparities within Croatia.

President of the Board of the Croatian Science Foundation, Dario Vretenar, the Minister of the Regional Development and EU funds, Gabrijela Žalac and the Minister of Science and Education Blaženka Divjak signed the contract on the implementation of project “Research Excellence Programme in Science and Higher Education – the Tenure Track Pilot Programme” and Agreement on the division of duties and responsibilities for monitoring and funding the implementation of “Croatian-Swiss research programme”. The Ambassador of the Swiss Confederation to the Republic of Croatia, H.E. Stefan Estermann attended the signature ceremony.



Swiss - Croatian Cooperation Programme

#### DOCTORAL STUDENTS OF THE CROATIAN SCIENCE FOUNDATION ARE THIS YEAR’S L’OREAL-UNESCO SCHOLARSHIP WINNERS

Four young female scientists who have contributed to science and society with their engagement were awarded scholarships from the national programme “For Women in Science” in 2018.

The Foundation is extremely proud as the winners are doctoral students funded from the programme “Young Researchers’ Career Development Project – Training New Doctoral Students” – Andrea Bistrović from the Faculty of Chemical Engineering and Technology of the University of Zagreb for her research in the area of medical chemistry, Marija Brbić from the Ruđer Bošković Institute for her work in the area of molecular biology, biomedicine or neuroscience, and Martina Požar from the Faculty of Science of the University of Split for her work in the area of physics. The fourth winner, Antonela Blažeković from the Faculty of Medicine, University of Zagreb, started her research as a doctoral student of HRZZ.

The awards were presented to young researchers by the Parliament Speaker’s envoy MP Vesna Bedeković, Prime Minister’s envoys – Education Minister Blaženka Divjak and Culture Minister Nina Obuljen Koržinek and the President of the National Commission for the

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programme “For Women in Science” and President of the Croatian Academy of Science and Arts, Academician Zvonko Kusić.

L’Oreal-UNESCO scholarship was awarded to more than three thousand young female scientists in 117 countries so far, 46 of which are from Croatia.



#### PROMOTION OF THE OPEN CALL FOR THE TENURE TRACK PILOT PROGRAM

The Call for the Tenure Track Pilot Programme was presented on Tuesday 15 May 2018, in the Great Hall of the Croatian Academy of Sciences and Arts. Tenure Track Pilot Programme is funded from *The Framework Agreement between the Swiss Federal Council and the Government of the Republic of Croatia concerning the implementation of the Swiss-Croatian cooperation programme to reduce economic and social disparities within the enlarged European Union*. The goal of the programme is to support the establishment

of the career of excellent young researchers in setting up an independent research group and acquiring conditions and skills for future employment.

Academician Velimir Neidhardt, Vice-President of the Croatian Academy of Sciences and Arts, held the introductory statement together with H. E. Stefan Estermann, the Ambassador of the Swiss Confederation in the Republic of Croatia and Prof. Dean Ajduković, Vice president of the Board of the Croatian Science Foundation. The presentations on the development of their research career and the results of their “Installation research projects” were held by Asst. Prof. Antonija Jurak Begonja from the Department of Biotechnology, University of Rijeka and Assoc. Prof. Ivana Novak Nakir from the School of Medicine, University of Split. Olivier Küttel, PhD, Head of Department for International Programmes at *École polytechnique fédérale de Lausanne* (EPFL) presented the Call for the Tenure Track Pilot Programme.





## VISIT OF THE DELEGATION OF THE REPUBLIC OF KOREA TO THE CROATIAN SCIENCE FOUNDATION AND THE MINISTRY OF SCIENCE AND EDUCATION

The representatives of the Croatian Science Foundation, the Ministry of Science and Education and the delegation of the Republic of Korea met on 7 September 2018 at the premises of the Ministry of Science and Education. The goal of the visit was the presentation of the Croatian science system and the Foundation's programmes to Korean researchers.

The State Secretary at the Ministry of Science and Education Tome Antičić, PhD, held a presentation about the Croatian science system. The Vice-president of the Board of the Croatian Science Foundation Professor Emeritus Dean Ajduković held a presentation about the programmes of the Croatian Science Foundation for funding research. Scientific advisor and engineer from the Research Institute for Electronics and Telecommunication Jin Byeong Woon held a presentation on the ETRI Q-mark programme. Professor at the Faculty of Electrical Engineering and Computing, Igor Kuzle, PhD presented two projects funded by the Croatian Science Foundation – FENISG and WINDLIPS. Scientific advisor and Head of laboratory at the Ruđer Bošković Institute, Robert Vianello, PhD, held a presentation on his project funded by the Croatian Science Foundation: Computing simulation in modern chemistry and biochemistry.



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## EUROPEAN RESEARCHERS' NIGHT 2018

European Researchers' Night was held on 28 September 2018 simultaneously in four Croatian towns: Zagreb, Rijeka, Split and Pula.

The programme encompassed workshops, quizzes, experiments and other entertaining activities for the popularisation of scientific research among the widest population and with special emphasis on the participation of children and young people.

A total of 19 research organisations led by the Ministry of Science and Education are working jointly on the project



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*Techno-Past Techno-Future: European Researchers' Night*, funded within the EU Framework programme for Research and Innovation 2014-2020 (Horizon 2020).

Besides Croatia, European Researchers' Night was held on the same night in more than 300 cities in the European Union, where this event is held traditionally every year on the last Friday in September.

The Croatian Science Foundation will actively participate in the activities of this project in 2019.



*The project "Techno-Past Techno Future: European Researchers' Night" (TPTF\_ERN) is funded from the EU Framework Programme for Research and Innovation – Horizon 2020*

*Contract No.: 818748*

## SIGNING CEREMONY FOR GRANT AGREEMENTS WITH THE CROATIAN SCIENCE FOUNDATION FOR SELECTED PROJECTS WITHIN THE "CROATIAN-SWISS RESEARCH PROGRAMME 2017-2023"

On October 24, 2018, the ceremony of signing Grant Agreements with the Croatian Science Foundation for 11 projects which were accepted for funding under the "Croatian-Swiss Research Programme 2017-2023" (CSRP) was held at the Ministry of Science and Education. CSRP is one of the projects within the framework of the Swiss-Croatian Cooperation Programme to reduce economic and social disparities within the enlarged European Union and this project is jointly implemented by Croatian Science Foundation and Swiss National Science Foundation.

The ceremony was opened by the Ambassador of the Swiss Confederation in the Republic of Croatia, H.E. Ms. Emilija Georgieva, who emphasized the commitment of the Swiss Confederation to the advancement of the science system in the Republic of Croatia. After this, the attendees were addressed by the State Secretary at the Ministry of Science and Education, Tome Antičić, PhD, who explained the role of the Ministry of Science and Education in the implementation of the "Croatian-Swiss Research Programme 2017-2023" and its importance for promoting excellence in the Croatian science system. The president of the Croatian Science Foundation Board, Academician Dario Vretenar,

briefly presented the “Croatian-Swiss Research Programme 2017-2023” and emphasized the importance of international cooperation of the Croatian Science Foundation and Croatian scientists with their Swiss partners. Furthermore, Academician Vretenar thanked all participants in the project selection process and congratulated the selected researchers and their organizations. Prof. Mirjana Čižmešija from the Faculty of Economics in Zagreb, the Co-chair of the Evaluation Panel, presented the evaluation procedure, based on which 11 projects were selected for funding out of 111 project proposals received.

The ceremony was attended by the PIs and Heads of their organizations, as well as Croatian members of the Evaluation Panel, representatives of the Embassy of the Swiss Confederation in the Republic of Croatia, the Ministry of the Regional Development and EU Funds, the Ministry of Science and Education and Croatian Science Foundation.



**SIGNING OF THE GRANT AGREEMENT ON THE AWARD OF FUNDS TO THE CROATIAN SCIENCE FOUNDATION FOR THE COLLABORATION PROGRAMME WITH CROATIAN SCIENTISTS IN DIASPORA “SCIENTIFIC COLLABORATION”**

On 6 November 2018 at the premises of the Ministry of Science and Education, a signing ceremony was held for the Grant Agreement for direct award of funds to the Croatian Science Foundation for the Collaboration Programme with



Croatian Scientists in Diaspora “Scientific Collaboration”. The contract was signed by the Minister of Science and Education Prof Blaženka Divjak, Acting Director of the Foundation Lovorka Barać Lauc, PhD and Head of the Agency for Vocational Education and Training and Adult Education, Mile Živčić.

The total amount for the Programme “Scientific Collaboration” is HRK 44,842,440.00, 85% of which are grants from the Operational

programme ‘Efficient Human Resources 2014-2020’ from the European Social Fund, while 15% is funded from the State budget.

At least 19 research projects are planned to be funded with at least 38 young researchers – doctoral students and postdoctoral students employed. It is expected that the Call will be published in January 2019.

Minister Blaženka Divjak emphasised that during the last year allocations for science were absorbed ten times faster. She also added that there are more than 300 doctoral students employed on the projects of the Croatian Science Foundation.

The President of the Board of the Croatian Science Foundation, Academician Dario Vretenar, emphasised that this programme funds projects in all scientific areas. He stated that this programme would enable the transfer of knowledge into Croatia and foster new investments into Croatia.

Head of the Agency for Vocational Education and Training and Adult Education, Mile Živčić emphasised that the Agency is already cooperating with the Croatian Science Foundation on the “Young Researchers’ Career Development Project – Training New Doctoral Students”, also funded from the European Social Fund.

Young researcher from the Faculty of Economics, University of Zagreb, Marina Matošec presented her positive experiences from working on the project of the Croatian Science Foundation in the framework of the “Young Researchers’ Career Development Project – Training New Doctoral Students”. She emphasised very successful cooperation with the research team on the project, which resulted with more than 30 scientific



papers in internationally renowned journals. She also emphasised that she would have left Croatia if there had not been the opportunity to be employed through the project of the Croatian Science Foundation.



**INFORMATION WORKSHOPS FOR THE CALL “YOUNG RESEARCHERS’ CAREER DEVELOPMENT PROJECT – TRAINING NEW DOCTORAL STUDENTS”**

At the implementation workshop held on 6 November 2018 at the Faculty of Civil Engineering in Rijeka, ESF grant coordinators, Mile Kvesić and Ivan Jerbić held the presentation on the implementation of the project “Young Researchers’ Career Development Project – Training New Doctoral Students”.

At the implementation workshop held on 9 November 2018 at the Faculty of Electrical Engineering, Mechanical Engineering and Naval Architecture in Split, ESF grant coordinators from the Department for Young Researchers Mile Kvesić and Ivan Jerbić held the presentation on the implementation of the project “Young Researchers’ Career Development Project – Training New Doctoral Students”.



At the implementation workshop held on 13 November 2018 at the Rectorate of the University J. J. Strossmayer in Osijek, ESF grant coordinators from the Department for Young Researchers Mile Kvesić and Ivan Jerbić held the presentation on the implementation of the project “Young Researchers’ Career Development Project – Training New Doctoral Students”.



At the implementation workshop held on 15 November 2018 at the University of Zagreb, ESF grant coordinators from the Department for Young Researchers Mile Kvesić and Ivan Jerbić held the presentation on the implementation of the project “Young Researchers’ Career Development Project – Training New Doctoral Students”.



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## COLLOQUIA OF THE CROATIAN ACADEMY OF SCIENCES AND ARTS AND THE CROATIAN SCIENCE FOUNDATION

In order to make interesting scientific topics more approachable and present the latest results of research projects in Croatia, the Croatian Academy of Sciences and Arts and the Croatian Science Foundation started a series of lectures where Croatian scientists introduce themselves and their work. Video recordings of every colloquium held are available at the Foundation’s website.

The following colloquia were held in 2018:

- Prof. Bojan Vršnak, PhD, Hvar Observatory of the Faculty of Geodesy, University of Zagreb, lecture title: “Utjecaj Sunčeve aktivnosti na Zemlju” (Influence of the Sun’s activity on Earth)
- Jelena Budak, PhD, Institute of Economics, Zagreb, lecture title: “Utjecaj zabrinutosti za privatnost na odluke i ponašanje korisnika interneta” (Influence of anxiety about privacy on decisions and conduct of internet users)
- Prof. Zoran Herceg, PhD, Faculty of Food Technology and Biotechnology, Laboratory for Process and Food Engineering, lecture title “Nove netermičke metode obrade hrane” (New non-thermic methods of food processing)
- Academician Davor Miličić, Faculty of Medicine, University of Zagreb, lecture title: “Istraživanja reaktivnosti trombocita u različitim srčanožilnim bolestima” (Research on reactivity of platelets in different cardiovascular diseases)
- Assoc. Prof. Hrvoje Pandžić, PhD, Faculty of Electrical Engineering and Computing, University of Zagreb, lecture title: “Integracija spremnika energije u moderni elektroenergetski sustav” (Integration of energy storage into modern power system)
- Prof. Klara Buršić-Matijašić, PhD, Faculty of Humanities and Social Sciences of Juraj Dobrila University in Pula, lecture title “Arheološko nalazište Monte Ricco kraj Vrsara” (Archeological site Monte Ricco next to Vrsar)
- Prof. Mirjana Sanader, PhD, Faculty of Humanities and Social Sciences, University of Zagreb, lecture title: “Između Dunava i Mediterana – Uloga rimske vojske u mobilnosti ljudi i roba na tlu Hrvatske u antici” (Between the Danube and Mediterranean – The role of Roman military in the mobility of people and goods on the territory of the Republic of Croatia)

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## PROJECTS OF THE FOUNDATION

In order to bring the research work closer to the scientific and general public and to ensure the presentation of the most interesting and successful projects of the Foundation, a special sub-page “HRZZ Projects” has been designed on the Foundation’s web pages. The Department for Scientific Projects and Programs selected the projects to be presented on the website. The projects will be presented in a popular manner and tailored to a wider audience. In addition to the research story of the Foundation’s projects, the Principal Investigator will be presented and photographs on the research topic will be posted.

In addition to presenting projects on the Foundation’s website, the Scientific Photograph Database was launched. Photographs taken during the research, in the laboratories, in the field research or related to the topic of the research in any other way are rotated on the cover of the Foundation’s web pages, with the name of the researcher and the institution where they were created.

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Below we present some of the successful projects:

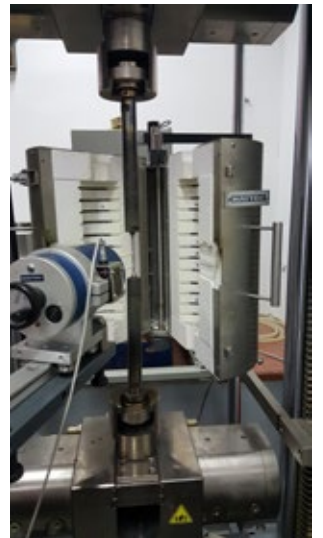
**Project:** Influence of creep strain on the load capacity of steel and aluminium columns exposed to fire

**PI:** Asst. Prof. Neno Torić, PhD

**Institution:** University of Split, Faculty of Civil Engineering, Architecture and Geodesy

**Call:** Installation Research Project, Call September 2014

The effects of fire on load-bearing metal structures have been the topic of intense research from mid-20th century onwards. The main problem in predicting the risk of structure collapse is precisely determining the period in which the structure is able to retain minimum levels of load-bearing capacity and predicting the scenarios for structure collapse. This research would affect the society in such a way that specific conclusions would be provided for defining factors influencing the time when structures are expected to collapse during fire.



*Device with thermal chamber for testing steel and aluminium specimen tubes*



*Laboratory unit for testing load-bearing elements in high-temperature conditions*

The needs of modern society answered by civil engineering are manifested in the construction of tall objects made from steel and light aluminium structures. Both cases entail the need for knowing the risk from collapse of the objects referred to above in cases of fire.

One of the outcomes of the project is the development of a laboratory unit for examining load-bearing capacity in high-temperature conditions. The developed unit is innovative in terms of how elements are heated during tests. Induction is used as it enables a more uniform heating process of the tested samples when compared to



the traditionally used heating systems. The developed laboratory unit is intended for future scientific and potentially commercial application.

A substantial degree of collaboration has been established with the research group located at the University of Sheffield, one of the very first institutions to research the effects of fire on steel constructions. Two doctoral students and one post-doctoral researcher participated in the project, who were actively involved in the development of the laboratory for testing the effects of high temperatures on structures and in the development of new types of material models for steel and aluminium during high-temperature conditions and development of numerical models of the conduct of structures during fire.

**Project:** Archeology of Adriatic Navigation and Shipbuilding

**PI:** Asst. Prof. Irena Radić Rossi, PhD

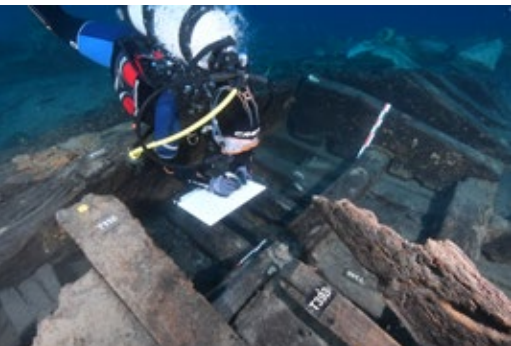
**Institution:** University of Zadar

**Call:** Research projects, Call September 2014

Project AdriaS encourages systematic interdisciplinary research of technological development of Adriatic navigation and shipbuilding from prehistoric times to the present day. Project activities include historical research, archaeological excavations, the application of new technologies in the documentation of underwater

archeological sites, numerical modeling and experimentation in the field of virtual reality, and the promotion of achieved results in the professional and general public.

A dynamic network of experts and young researchers established within the project ensures the sustainability of project achievements through the



Shipwreck off the island of Gnalić, 1583, documenting the ship's structure



Shipwreck off the island of Žirje, 4th c. BC



A curious observer

creation of an international platform for interdisciplinary collaboration of the humanities, natural and technical sciences in the research and interpretation of the complete historic-geographical and economic-political context of navigation and shipbuilding in the past.

Through the implementation of project activities, the project raises awareness of the rich Adriatic maritime past and encourages the active involvement of a professional and wider public in the protection, preservation and presentation of a valuable maritime heritage defining the Croatian maritime identity.

**Project:** Exploring the impact of wastewaters from pharmaceutical industries on the composition and antibiotic resistance profile of exposed microbial communities in freshwater sediments

**PI:** Nikolina Udiković Kolić, PhD

**Institution:** Ruđer Bošković Institute

**Call:** Installation Research Projects, Call November 2014

The aim of this project was to address the effects of wastewaters from local pharmaceutical industries on the development and spread of antibiotic resistance among environmental bacteria. This is of particular importance because antibiotic resistance is one of the biggest public health threat in today's society, and recent studies showed that environmental pollution with antibiotics could contribute to this problem.

Within this project, we analyzed samples of wastewaters from two Croatian pharmaceutical industries and samples of receiving water bodies collected upstream and downstream from the wastewater discharge sites. Our results showed that wastewaters from both industries were polluted with antibiotics and bacteria resistant to those antibiotics, with much higher levels of pollution observed in wastewaters from production of macrolide antibiotic azithromycin than in wastewaters from veterinary drug formulations. The results of



Sava river downstream from discharge of pharmaceutical wastewaters (brown colour)

subsequent analyses of surface water and sediment of the Sava River and the Kalinovica stream have for the first time indicated contamination with antibiotics, antibiotic resistant bacteria and resistance genes they carry, with the highest values measured downstream of discharge sites, highlighting the significant contribution of pharmaceutical wastewaters. Moreover, we showed an increased spread of antibiotic resistance via plasmid transfer among bacteria residing in such polluted environment which is of particular concern as this spread may represent a potential risk for human health. We believe that our results will contribute to the establishment of regulations on maximum permissible concentrations of antibiotics and antibiotic resistant bacteria in pharmaceutical wastewaters and the receiving environment, thus providing the prerequisites for the protection of human and environmental health and the sustainable management of waterways.

Within the project, collaboration with reputable foreign scientists has been established, enabling young researchers to spend some time in their labs. In addition, the results of the project have been published in top international journals, including some of the most influential journals in the field of environmental science such as Water Research and Environment International.

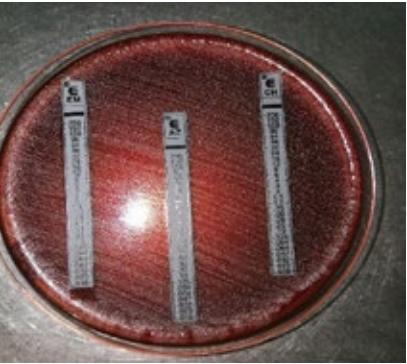
**Project: Converting waste agricultural biomass and dedicated crops into energy and added value products – bio-oil and biochar production**

**Principal Investigator:** Prof. Tajana Krička, PhD

**Institution:** University of Zagreb, Faculty of Agronomy

**Call:** Research projects, November 2013

The research carried out as part of the project identified the physical-chemical, energy and structural properties of crop, fruit and food residues and energy crops, before and after pyrolysis (decomposition of the substance under the influence of heat), as well as the quality and quantity of produced biochar and biofuels.

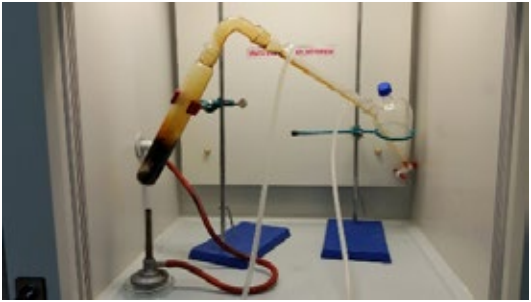


Bacteria from the *Streptococcus* genus

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Collecting raw material



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recovered as waste. The overall results of the project have a positive impact on the economy of the Republic of Croatia, but also of the EU, with particular emphasis on the industry (oil), pellets, biogas plants, and family farms.

The research involved collaboration of a large number of researchers from various institutions, and one such collaboration resulted in submission of a Cohesion project “Design of Advanced Biocomposites from Energy Sustainable Sources”, which was approved for funding. The project involved young scientist Mateja Grubor, who is in the process of writing her doctoral theses.

The specific aim of the proposed project was to determine the pyrolysis potential from different biomass feedstock collected in two climatically different areas – Mediterranean and Continental Croatia. Accordingly, the project was implemented in three main phases; a collection of raw materials and characterization of biomass, pyrolysis of biomass and generation of end products.

The research results respond to the need of modern society for the use of renewable energy sources, in this case agricultural biomass, and open up opportunities for the development of a range of higher value-added products, e.g. biofuels as liquid fuel and biochar as solid fuel and soil improver. The pyrolytic process of biomass (crop, fruit and food residues and energy crops) produced biofuels and biochar as a fuel of high energy value, while at the same time biomass was







Gathering samples

**Project:** **The Sulphur and Carbon Dynamics in the Sea- and Fresh-Water Environment**

**Principal Investigator:** Irena Ciglencečki-Jušić, PhD

**Institution:** Ruđer Bošković Institute

**Call:** Research projects, Call November 2013

Sulphur (S) and carbon (C) cycles are important factors in climate regulation, which can be modified by human impact on the aquatic environment. Within the SPHERE project, S and C dynamics between the atmosphere, water and sediment in different aquatic systems was investigated in order to understand and predict the vulnerability of aquatic environments due to anthropogenic and global impacts.

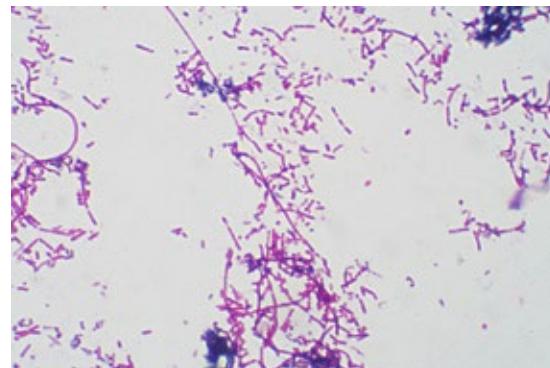
Particular attention was paid to the development of electroanalytical techniques used in combination with

chromatographic and HTCO measurements. These were used to characterize and monitor the distribution of sulphur and carbon species in model solutions as well as in environmental samples of atmospheric particles, sea surface micro-layer, Rogoznica Lake, northern Adriatic, river Krka, Visovac and Brljan lakes, and the drainage water of hydromeliorated soil in Lonjsko Polje.

During the project, cooperation was established with the Faculty of Agriculture, Faculty of Mining, Geology and Petroleum Engineering in Zagreb, University of Ancona (Italy) and National University of Ireland (Galway, Ireland), as well as the Chemical Institute in Ljubljana (Slovenia). In these institutions, additional research relevant to the achieved results was conducted (characterization of natural samples with respect to S and C cycles). Active participation in the implementation of COST actions (TD1105, ES1205, ES1302, CA16109) was related to research on marine aerosols, S speciation, and microbiological processes related to S and C cycles in Rogoznica Lake.

These activities resulted in three doctoral dissertations, participation in 30 international conferences and 28 publications, which was a base for a new HRZZ MARRES project.

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*Desulfovibrio sp. Sulphur bacteria from Rogoznica Lake*



Project team members

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**Project:** **The role of economic sentiment in explaining macroeconomic trends: methodological improvements and new areas of application**

**Principal Investigator:** Prof. Mirjana Čižmešija, PhD

**Institution:** University of Zagreb, The Faculty of Economics

**Call:** Research Projects, deadline November 2013

The research performed within the project applies a holistic and interdisciplinary approach to the analysis of macroeconomic tendencies, with a special emphasis on including psychological factors in econometric modelling. This research is based on the results of the Business and Consumer Survey (BCS). Namely, the recent global financial crisis has opened a variety of novel research areas that might contribute from the utilization of economic sentiment and similar BCS indicators.

Several methodological innovations in quantifying latent concepts, such as the perceptions and expectations of economic agents, are introduced within the realization of this project. Using these innovations, the authors were able to make a significant breakthrough in utilizing these underrecognized survey results in nowcasting and forecasting macroeconomic aggregates both on the EU and national levels of individual Member States. Using nonlinear optimization, the EU Economic Sentiment Indicator was methodologically improved by alternating its ponderation structure. A stock market optimism indicator was

Young researchers have undergone several trainings at partner foreign institutions, thus acquiring basic knowledge for investigation and assessment of environmental quality. One PhD student received the L'Oreal Award for Young Female Scientists in 2016, and another received the RBI Director's award for the best published paper in 2017.

The SPHERE project has made an important contribution to the initiation of marine aerosol research in the Republic of Croatia, and we have succeeded in accrediting the expertise in organic C determination (HTCO technique) in natural waters including seawater and sediment.





*Professor Mirjana Čižmešija  
and her young collaborators*

extracted based on the content analysis of media reports. Additionally, the nature of its relationship with stock market returns was established.

The authors also explored how the stock market reacts to shocks in economic sentiment. New insights were gained on the nonrationality of consumers' inflation expectations and their inability to anticipate aggregate price changes. This research established consumer sentiment as a psychological indicator of real estate prices. Managers' perceptions on firms' liquidity were used to construct a liquidity indicator for the Croatian economy. The authors strongly confirmed the usefulness of consumers' attitudes on their households' financial position, as well as their interconnectedness with standard poverty measures in the EU.

This project has resulted in 29 research papers in international journals, and one scientific monography. Two young researchers have finished and defended their PhD theses in the area of behavioral macroeconomy by analyzing the role of consumer confidence (and economic sentiment in general) in modelling inflation and measuring economic uncertainty.



The basis of quality work of any organization are quality and educated employees. The Foundation continuously develops work instructions for all participants involved in the evaluation process to ensure uniform quality of work across individual panels as well as within its own staff. Strengthening the role of the Foundation and taking over national funding for scientific research and young researchers means that organizational capacity will continue to be developed in 2019.

In addition to continuous work on quality control and improving every single step of the evaluation process, in 2019 the electronic monitoring system will need to be migrated to a new platform in order to gain space for further growth of the system. The aim is also to achieve a higher level of flexibility in project monitoring, which would facilitate the work of Principal Investigators, while still responsibly monitoring the use of public funds.

ACTIVITIES PLANNED IN 2019

In 2019, the Foundation is planning to open the following calls:

- Research Projects
- Installation Research Projects
- Partnership in Research
- Young Researchers’ Career Development Project  
– Training New Doctoral Students
- Support to Researchers for Applying to European Research Council Programmes.

The Foundation will also publish the Call for “Programme for the Development of Postdoctoral Researchers’ Careers”, which will be funded from European Social Fund (ESF).

INTERNATIONAL COOPERATION

The short-term goal of the Foundation during 2019 is to sign bilateral co-operation agreements with organizations that fund research projects in the countries with whose scientists Croatian scientists cooperate the most (e.g.

Slovenia, Czech Republic). This would allow (co-)funding research projects through the Lead Agency procedure, which implies that the project proposal assessment process is carried out by one of the organizations. If the project proposal is positively evaluated and proposed for funding by the Lead Agency, the partner organization undertakes to assume its part of the co-funding of the project without additional peer review process due to mutual recognition of the evaluation procedures. Negotiations on bilateral cooperation are already underway with Slovenian partners from the Slovenian Research Agency (ARRS).

Furthermore, we certainly want to be included in the Multilateral Lead Agency (MLA) framework as full members. Discussion on the MLA Framework proposal began at the end of 2017. The Foundation participates in the work of the MLA Working Group that needs to define the MLA Agreement, expected to be signed in 2020 and implemented in 2021. The MLA Agreement signatory organizations shall adopt the evaluation procedures and the decision-making process for funding of other signatory organizations. Within the framework of the MLA Agreement, i. e. the Guidelines, the specific procedures for receiving project proposals by two or more applicants are being elaborated.

Bilateral and multilateral agreements will enable Croatian researchers to better connect and expand joint research and contribute to the **long-term goal** of the Foundation – to foster a wide range of research and development activities, programs and scientific organizational structures that would better integrate Croatian scientists into the European Research Area (ERA). Joining ERA enables scientists to enhance inter-institutional, cross-sectoral and international mobility, coordinate funding of research in European countries and regions and stronger connection between the scientific and economic area not bounded by national borders. The Foundation, through its programs and activities, will endeavor to encourage the affiliation and integration of Croatian science into the European Research Area

Furthermore, the Foundation’s goal is to encourage Croatian scientific institutions, companies in the business field and researchers to harness the potential of the Croatian scientific diaspora and to encourage researchers of Croatian descent abroad to connect with Croatian researchers in the country. Of particular importance is the potential contribution of the diaspora in the career development of young Croatian researchers (doctoral studies and/or postdoctoral specializations abroad),



in the transfer and application of new knowledge and technologies in Croatia, and in helping to establish future centers of excellence.

**DISSEMINATION**

The Foundation will present the objectives of the calls and the application procedure at universities and public institutes. Public presentation of the Foundation will intensify in the months preceding the call for project proposals. In addition to public presentations, the Foundation will publish all information related to new programs, as well as the results of ongoing calls, on its website and in the Foundation’s Gazette in electronic form.

