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## Experiences and good practices in the implementation of EU infrastructure project RISK at the University of Rijeka, Faculty of Civil Engineering (UNIRIFCE)

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Dissemination and exploitation - Development of project website and  
promotional materials/ Rijeka / 20th December 2021.

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University of Nis



[www.swarm.ni.ac.rs](http://www.swarm.ni.ac.rs)

**Strengthening of master curricula in water resources  
management for the Western Balkans HEIs and stakeholders**

Project number: 597888-EPP-1-2018-1-RS-EPPKA2-CBHE-JP



## **CONTENT:**

1. INTRODUCTORY ABOUT THE EU INFRASTRUCTURE RISK PROJECT
2. MONITORING OF PROJECT RISK INDICATORS
3. EXPERIENCES AND GOOD PRACTICES IN THE IMPLEMENTATION OF EU INFRASTRUCTURE PROJECT RISK AT THE UNIVERSITY OF RIJEKA, FACULTY OF CIVIL ENGINEERING

# 1. INTRODUCTORY ABOUT THE RESEARCH INFRASTRUCTURE FOR CAMPUS-BASED LABORATORIES AT THE UNIVERSITY OF RIJEKA (RISK) PROJECT

- Funded from EU funds 2007-2013 – 23 mill EUR - EU Regional Development Fund 85%, CRO contribution 15%.
- Contract signed 18.4.2014.
- Project duration: 20 months



# UNITS OF UNIVERSITY OF RIJEKA



## 12 Faculties:

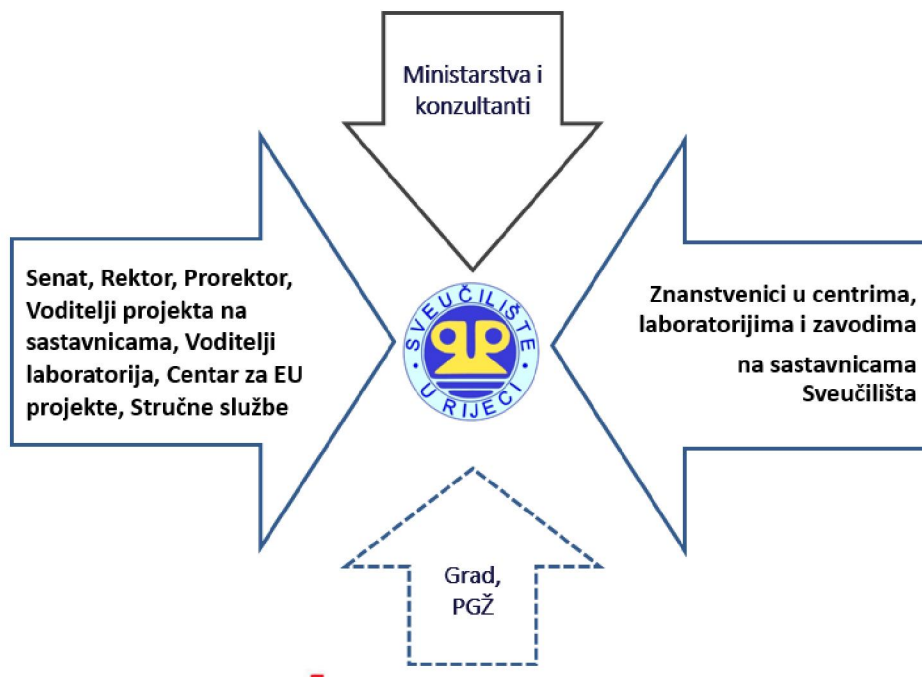
- Academy of Applied Arts
- Faculty of Economics
- Faculty of Humanities and Social Sciences
- Faculty of Civil Engineering
- Faculty of Medicine
- Faculty of Maritime Studies
- Faculty of Law
- Faculty of Engineering
- Faculty of Teacher Education
- Faculty of Health Care Sciences
- Faculty of Dental Medicine
- Faculty of Tourism and Hospitality Management

## 4 University Departments

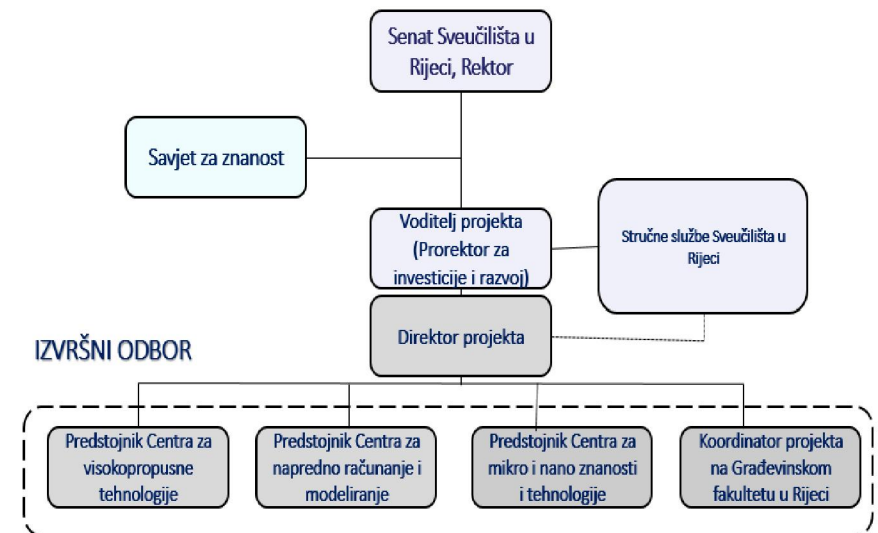
- University Department of Biotechnology
- University Department of Physics
- University Department of Informatics
- University Department of Mathematics

# PROJECT TEAM

Coordination of information between participants at all levels,  
over 150 involved participants



## ORGANIZACIJSKA STRUKTURA PROVEDBE PROJEKTA





## THE PROJECT'S OBJECTIVES:

- To increase the competitiveness of the Croatian economy through the implementation of research for the promotion of interdisciplinary research, the creation of interdisciplinary study programs, the transfer of knowledge through technological innovations and the advancement of social practices;
- To develop the knowledge and skills in an area that has been identified as a globally priority at the EU level and on the national level;
- To increase the collaboration of the academic and industrial sectors;
- To develop of new products and services to the Croatian economy;
- To increase the collaboration with the government institutions;
- To increase the level of scientific output in this area;
- To increase the number of University students;
- To enhance synergic effects with other research institutions, especially abroad;
- To develop a new graduate and post-graduate educational curricula;
- To introduce of new scientific instrumentation and methods to the Croatian S&T sectors.

## RISK - THE VALUE OF EQUIPMENT PER CENTER OF EXCELLENCE

CENTRE	Value of the equipment	VAT	Total value (KN)
Centre for high throughput technology	37.725.618	9.431.404	<b>47.157.022</b>
Centre for micro and nano sciences and technologies	24.371.009	6.092.751	<b>30.463.760</b>
Centre for advanced computing and modelling	38.404.466	9.601.116	<b>48.005.582</b>
FCER	43.559.547	10.889.888	<b>54.449.435</b>
<i>Total value of the equipment and adaptation of space:</i>			<i>180.075.799</i>
<b>External audit of the project</b>			<b>106.249,91</b>
<b>Total value of the project:</b>			<b>180.182.048,91</b>



# RESULTS OF THE PROJECT

- Increase the level of research activities at the University, creating the environment for increasing both research and learning outcomes with an emphasis on collaboration and development of multidisciplinary scientific fields.
- Timely preparation is crucial to develop an institution and solve its most pressing needs.

## EFFECTS AND BENEFIT FOR VARIOUS GROUPS PROJECT STAKEHOLDERS

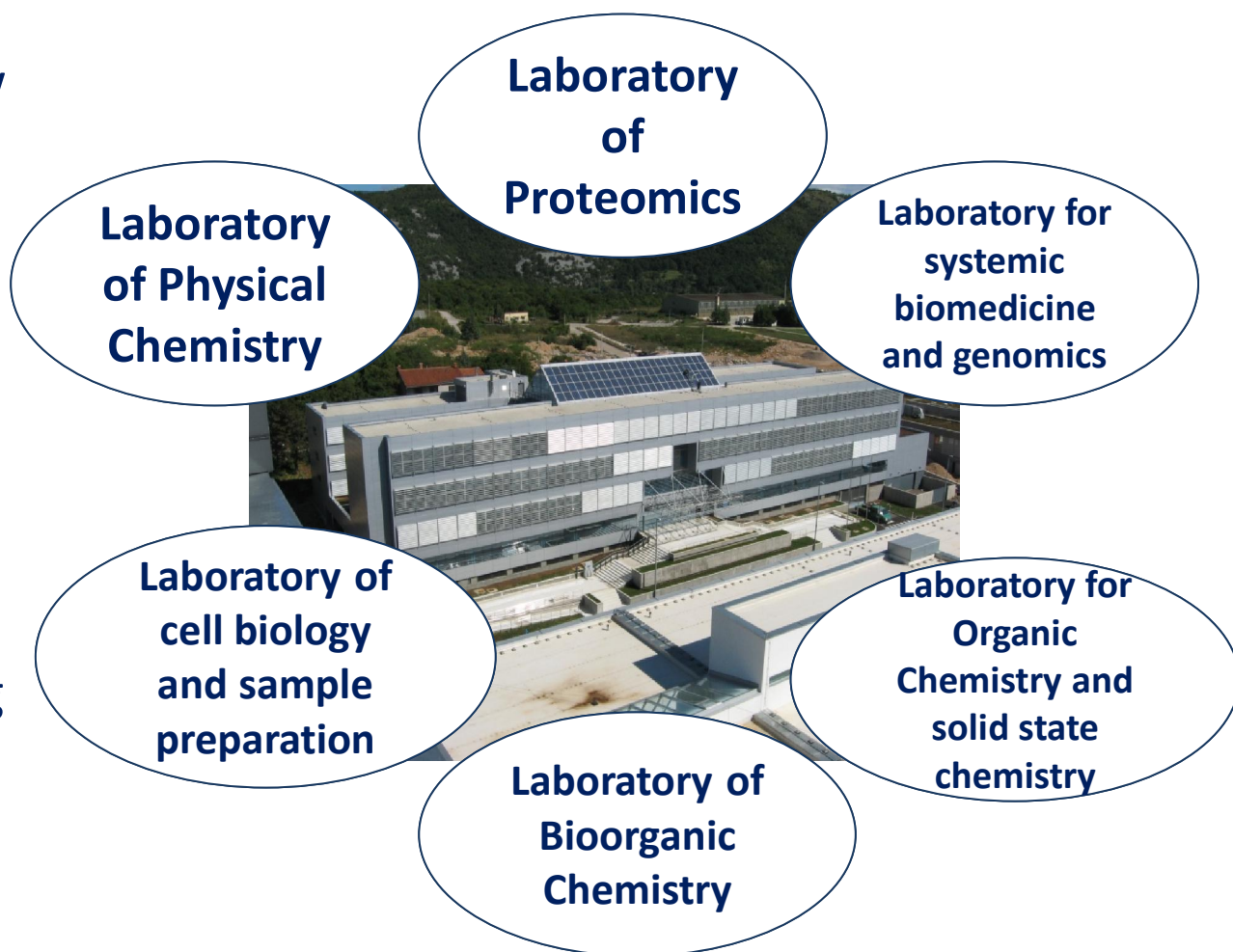
- University of Rijeka in general
- University centers and FCER
- Scientists - researchers
- Students
- Centers of excellence
- Economic partners
- Local community



## THE EQUIPMENT FOR THE CENTRE FOR HIGH THROUGHPUT TECHNOLOGY – 6.3 mEUR

High-throughput analysis allow researchers to conduct millions of biochemical, genetic and pharmacological tests in a short time, applicable to:

- preventive medicine -
- development of new sensor drugs; research and development of drugs; training of professional staff in the pharmaceutical industry and public health institutions



**Laboratory  
of Physical  
Chemistry**

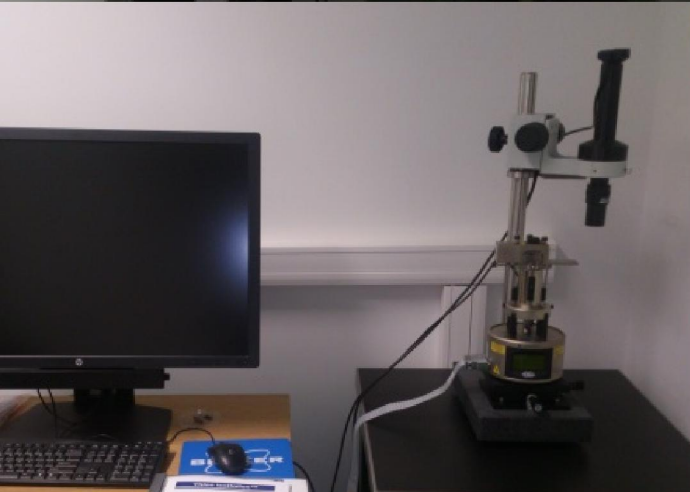
**Laboratory  
of  
Proteomics**

**Laboratory for  
systemic  
biomedicine  
and genomics**

**Laboratory of  
cell biology  
and sample  
preparation**

**Laboratory of  
Bioorganic  
Chemistry**

**Laboratory for  
Organic  
Chemistry and  
solid state  
chemistry**



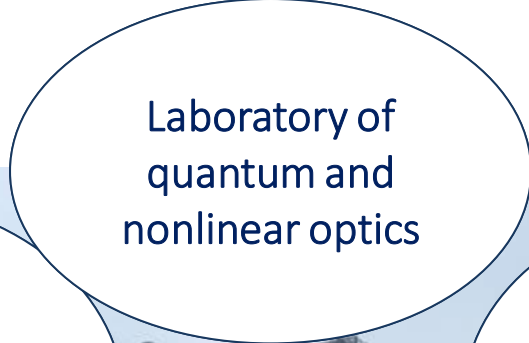
## THE EQUIPMENT FOR THE CENTRE FOR MICRO AND NANO SCIENCES AND TECHNOLOGIES – 4 mEUR

Materials Research in all its forms and specialized services in the areas of:

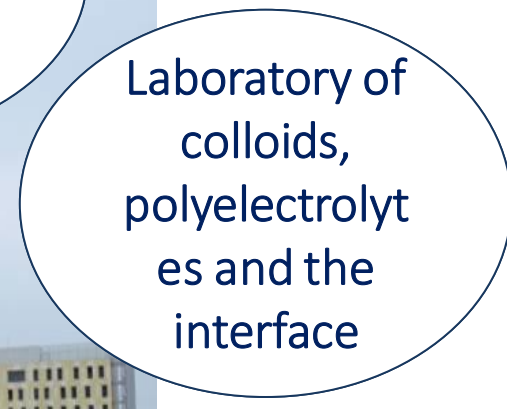
- food production and packaging materials, optics, production of waste water treatment equipment, oil and gas, car industry, construction, household appliances, information and communication technologies, energy production and distribution,...

A circular callout bubble containing the text "Laboratory for precision engineering and technology of micro and nano systems". The bubble is positioned over a background image of a modern, multi-story building with a grid of windows.

Laboratory for  
precision  
engineering and  
technology of  
micro and nano  
systems

A circular callout bubble containing the text "Laboratory of quantum and nonlinear optics". The bubble is positioned over a background image of a modern, multi-story building with a grid of windows.

Laboratory of  
quantum and  
nonlinear optics

A circular callout bubble containing the text "Laboratory of colloids, polyelectrolytes and the interface". The bubble is positioned over a background image of a modern, multi-story building with a grid of windows.

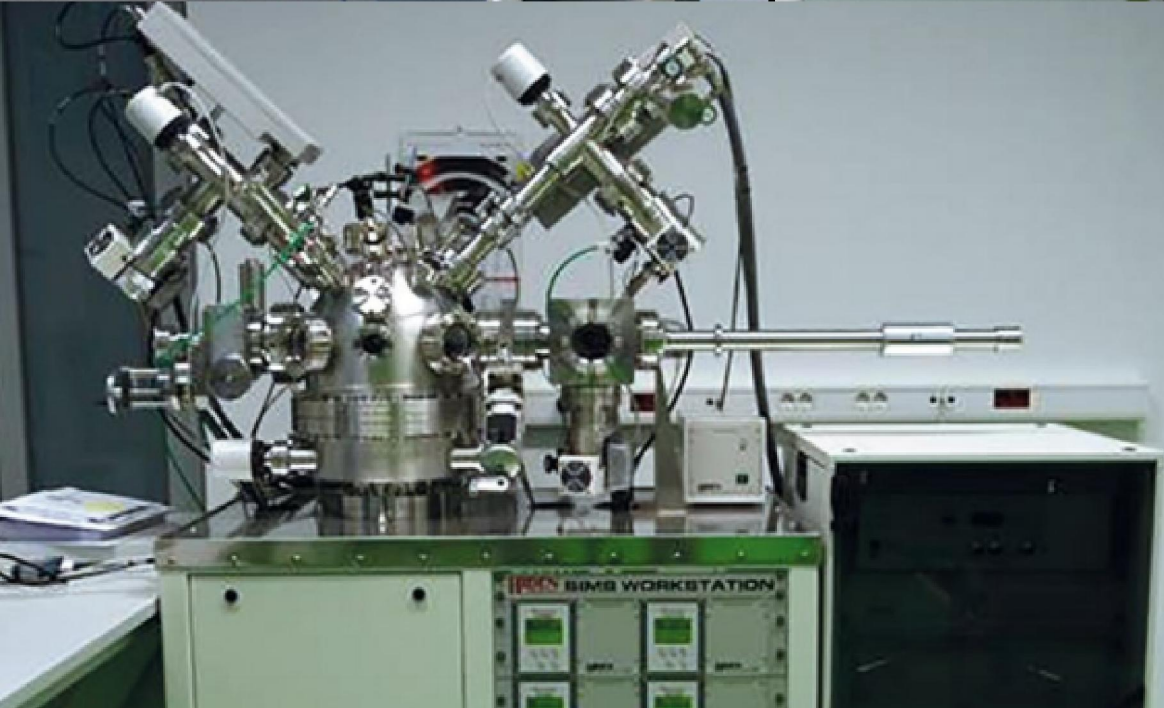
Laboratory of  
colloids,  
polyelectrolytes  
and the  
interface

A circular callout bubble containing the text "Laboratory for Surface and Materials". The bubble is positioned over a background image of a modern, multi-story building with a grid of windows.

Laboratory for  
Surface and  
Materials

A circular callout bubble containing the text "Laboratory of Macromolecular Research". The bubble is positioned over a background image of a modern, multi-story building with a grid of windows.

Laboratory of  
Macromolecular  
Research




Era:  
of th


eme

# THE EQUIPMENT FOR CENTRE FOR ADVANCED COMPUTING AND MODELLING – 6.4 mEUR

- Opportunities for implementing new methodologies and techniques in multidisciplinary fields of science and research;
- Research in the fields of high performance computing, mechanical engineering and construction;
- A platform to open new high-tech spin-off companies in the medium and high-tech products,

A white oval containing the text "Laboratory of Computer and Network Technology". The oval is positioned over a photograph of a modern, multi-story building with a grey facade and many windows. The building is partially obscured by the oval and other text elements.

Laboratory of  
Computer and  
Network  
Technology

A white oval containing the text "Laboratory for e-Science, e-learning and e-business". The oval is positioned over the same photograph of the modern building.

Laboratory for  
e-Science, e-  
learning and  
e-business

A white oval containing the text "Laboratory for Signal Processing and Communication Technology". The oval is positioned over the same photograph of the modern building.

Laboratory for  
Signal Processing  
and  
Communication  
Technology

A white oval containing the text "Laboratory for AI technology and modeling". The oval is positioned over the same photograph of the modern building.

Laboratory  
for AI  
technology  
and modeling



# THE EQUIPMENT FOR THE FACULTY OF CIVIL ENGINEERING - 7.3 mEUR

**Large spin off potential and contribution to the construction sector, the services will include:**

- Services specific to the field of civil engineering and basic technical sciences especially in karst areas, the sea area (geotechnics, hydraulic, construction, roads, materials), research on innovative building materials ...
- Use of complex 3D models for research and construction engineering in collaboration with the Centers of excellence at the UniRi

A white oval containing the text "Hydraulic Laboratory".

**Hydraulic  
Laboratory**

A white oval containing the text "Laboratory of Transportation Engineering".

**Laboratory of  
Transportation  
Engineering**

A white oval containing the text "Geotechnical Laboratory".

**Geotechnical  
Laboratory**

A white oval containing the text "Materials Laboratory".

**Materials  
Laboratory**

A white oval containing the text "Structures Laboratory".

**Structures  
Laboratory**







## RESEARCH INFRASTRUCTURE FOR CAMPUS-BASED LABORATORIES AT THE UNIVERSITY OF RIJEKA

- The University of Rijeka has published a catalog of obtained scientific equipment purchased through the RESEARCH INFRASTRUCTURE FOR CAMPUS-BASED LABORATORIES AT THE UNIVERSITY OF RIJEKA project in Croatian and English at: <https://www.uniri.hr/>
- A more comprehensive catalog of laboratory and field equipment of the Faculty of Civil Engineering in Rijeka is available at: <http://www.gradri.uniri.hr/hr/>

### Razvoj istraživačke infrastrukture na Kampusu



Sveučilište u Rijeci  
University of Rijeka

LABORATORY EQUIPMENT CATALOGUE

### Razvoj istraživačke infrastrukture na Kampusu

SVEUČILIŠTE U RIJECI

KATALOG LABORATORIJSKE  
I TERENSKJE OPREME  
GRAĐEVINSKOG FAKULTETA  
U RIJECI



Sveučilište u Rijeci  
University of Rijeka



SVEUČILIŠTE U RIJECI  
GRAĐEVINSKI FAKULTET

## 2. MONITORING OF PROJECT RISK INDICATORS

Indicator description, name and unit of indicator	Planned quantity/ value	Starting quantity/ value	Actual quantity/ value (cumulative)
Increased number of published scientific articles at the University of Rijeka	1025	609	1874
New workplaces	154	100	199
Higher employability of students due to better learning outcomes	1000	0	5590
National / international experts directly involved in cooperation activities	12	0	164
Increased number of implemented projects	280	228	369
Agreements on cooperation with the business sector signed	20	7	49
Increased number of internationally recognized patents	1	0	2

## MONITORING OF PROJECT RISK INDICATORS FOR FACULTY OF CIVIL ENGINEERING UNIVERSITY OF RIJEKA

Indicator description, name and unit of indicator	Starting quantity/ value	Actual quantity/ value (cumulative)
Increased number of published scientific articles at the University of Rijeka	107	<b>125</b>
New workplaces	32	<b>61</b>
Higher employability of students due to better learning outcomes	0	<b>3089</b>
National / international experts directly involved in cooperation activities	0	<b>3</b>
Increased number of implemented projects	18	<b>32</b>
Agreements on cooperation with the business sector signed	7	<b>44</b>
Increased number of internationally recognized patents	0	0



### **3. EXPERIENCES AND GOOD PRACTICES IN THE IMPLEMENTATION OF EU INFRASTRUCTURE PROJECT RISK AT THE UNIVERSITY OF RIJEKA, FACULTY OF CIVIL ENGINEERING**

- Since 2014. the equipment was used both in Centers of Excellence and at the Faculty of Civil Engineering for scientific research and teaching.
- During the monitoring time the permitted commercial purpose is 20% during a 5-year monitoring (till April 2021).
- Monitoring is over, indicators have been achieved and there are no more restrictions.
- Equipment is getting older - necessary maintenance and renewal - expensive - to enable through commercial projects.
- This year, too, we started few new projects that include technology transfer to the economy.



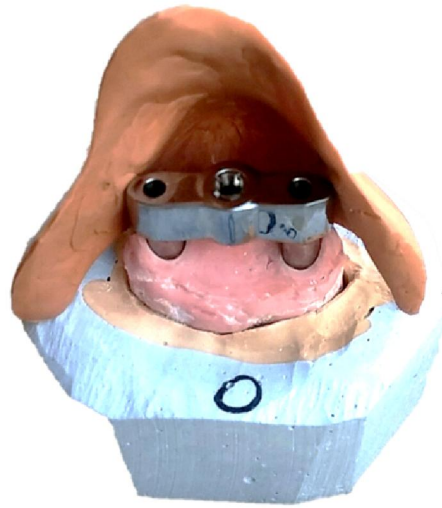
## EXAMPLES OF COOPERATION WITH OTHER UNIVERSITY UNITS AND ECONOMICS

- Cooperation with the Faculty of Medicine in Rijeka - Center for Biomodeling and Innovations in Medicine
- Over twenty case studies related to the application of additive technologies in biomedicine (teaching aids, implants, epithets, visuals and preparatory models for surgical procedures) were conducted in the period 2015-2021. - using a 3D printer.





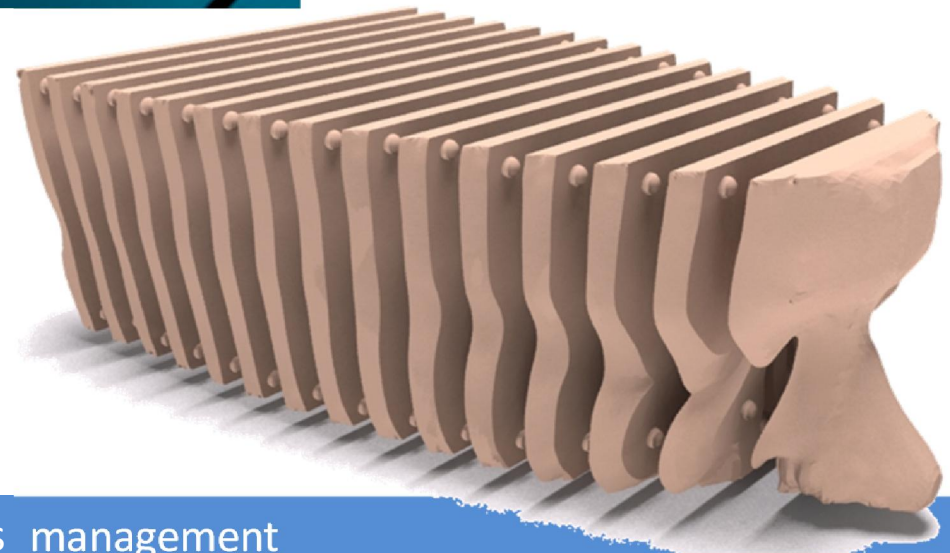
Testing 3D model



Final version of the  
model (anterior i  
posterior)

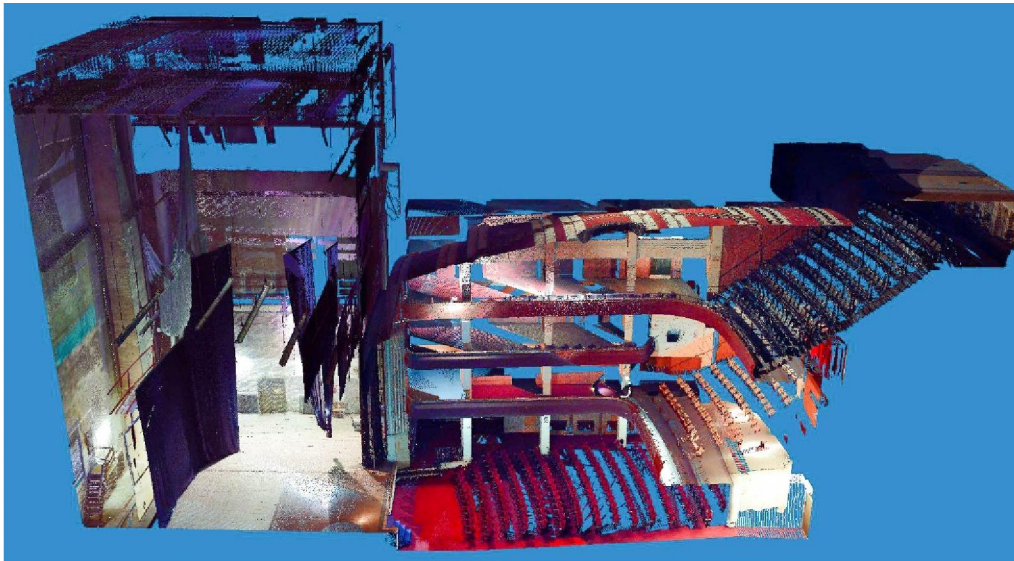


Use of 3D printer for teaching purposes (needs of the Department of Anatomy, Department of Anesthesia, Resuscitation and Intensive Care, etc.)

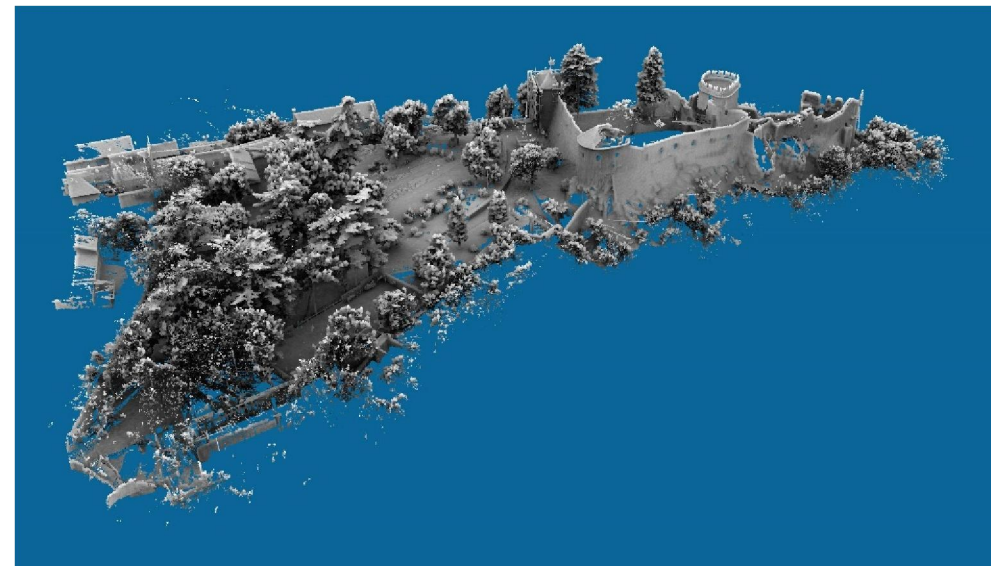




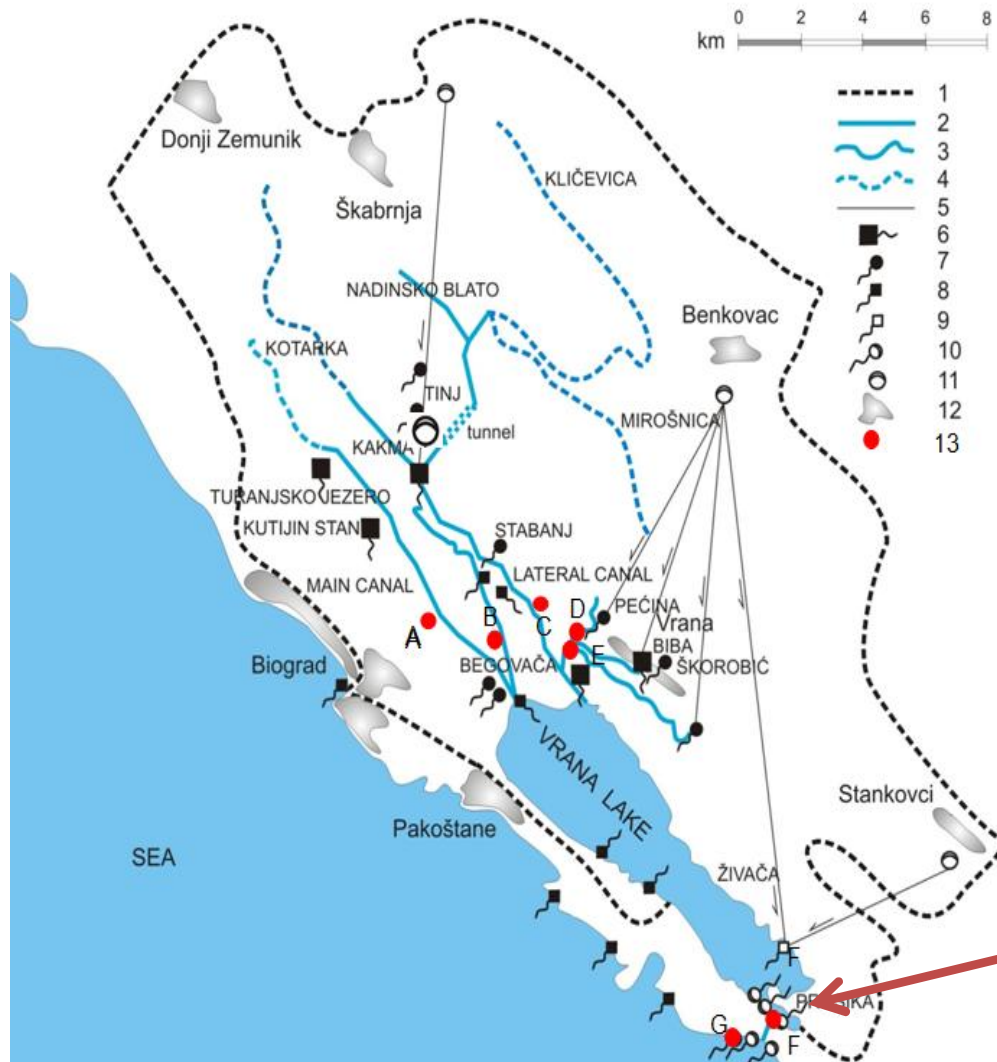
LASER 3D SCANNER - Low weight, high accuracy, data collection speed, easy handling and setup is a revolutionary solution for data collection and creating 3D models using point clouds.



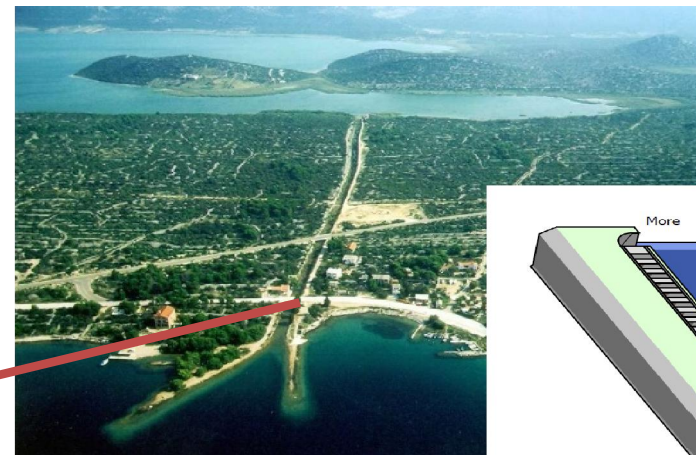
Industrial heritage - torpedo launch pad



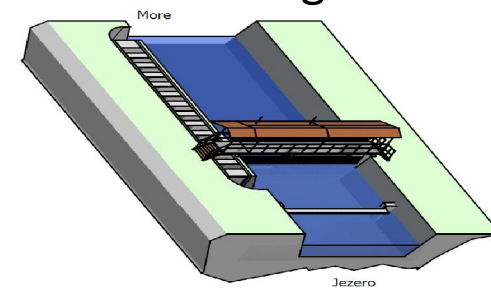
Cultural heritage - Trsat Tower



- Vransko jezero - Nature park from 1999.,
- Cryptodepression - a problem of salinization
- Development of a physical model in a hydraulic laboratory



Planned gate





## ADAPTATION TO CLIMATE CHANGE

- Climate change is a growing threat in the 21st century and a challenge for all of humanity as it affects all aspects of the environment and the economy and threatens the sustainable development of society.
- In several UNIRI-FCE projects equipment was used for monitoring and modelling of projections of possible changes;
- Spatial-planning measures in the function of reducing the risk and harmful consequences of floods in endangered areas;
- Construction and revitalization of water reservoirs for spatial and time water redistribution;
- Use of alternative water sources;
- Control of runoff in urban areas to minimalize existing negative anthropogenic pressures.
- Coastal vulnerability due to rising sea levels....

