

University of Rijeka Faculty of Medicine
REACCREDITATION OF THE POSTGRADUATE UNIVERSITY STUDY PROGRAMME
Health and Environmental Engineering

Date: 30 October 2016



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I. General information and delivery requirements

Study programme: Postgraduate University (Doctoral) Study of Health and Environmental Engineering

Study programme offered by: University of Rijeka Faculty of Medicine

Study programme delivered by: University of Rijeka Faculty of Medicine

Area: Biomedicine and Health

Field: Public Health

Study programme delivered at: Rijeka, Braće Branchetta 20

Number of doctoral candidates: 31

Number of teachers in doctoral study: 74

Number of mentors in doctoral study: 24

Prescribed delivery requirements

Minimum legal requirements:	YES/NO notes
<p>1. The higher education institution (HEI) is entered in the Register of Scientific Organizations in the scientific field of doctoral studies and has a positive outcome of re-accreditation for scientific activity and higher education.</p>	
<p>YES YES University of Rijeka Faculty of Medicine was entered in the Register of Scientific Organizations pursuant to the decision of the Ministry of 15 February 1996 and has continuously maintained this status to date. Appendix 1: Register of Scientific Organizations. The Faculty of Medicine has a positive outcome of the previous reaccreditation, with the letter of expectations of 25 December 2015 and a deadline for rectifying the shortcomings of three years. Our institution had fulfilled all three conditions set forth in the letter of expectations by July 2016 and consequently submitted the evidence of fulfilment thereof to the Agency for Science and Higher Education (ASHE) and the Ministry of Science, Education and Sports (MSES) on 16 July 2016. On 20 September 2016, we received the ASHE's recommendation for accreditation inviting the MSES to issue to the Faculty of Medicine the certificates, respectively, of fulfilment of conditions for higher education activities for all study programmes and of fulfilment of conditions for scientific activities in the scientific area of Biomedicine and Health , as well as to monitor further activities aimed at the adoption of an action plan for improving the quality and inform the Agency annually on the implementation of the action plan. Appendix 2: ASHE recommendation.</p>	
<p>2. The HEI has a vertical link between its study programs (delivering undergraduate and graduate university study programmes) leading to doctoral studies in the same area and field or fields (in the case of interdisciplinary studies), as well as the required number of teachers as defined in Article 6 of the Ordinance on the Content of Licence and Conditions for Issuing Licence for Performing Higher Education Activity, carrying out a Study Programme and Re-accreditation of Higher Education Institutions (OG 24/10).</p>	
<p>YES The Faculty of Medicine in Rijeka has a vertical link between its study programs, given that it delivers the following study programs: Integrated undergraduate and graduate university study of Medicine, Integrated undergraduate and graduate university study of Dental Medicine, Undergraduate university study of Sanitary Engineering and Graduate university study Sanitary Engineering, which are in the same scientific area of Biomedicine and Health as the Doctoral study of Health and Environmental Engineering and in the same scientific field. Article 6 of the Ordinance on the Content of a Licence and Conditions for Issuing a Licence for Performing Higher Education Activity, Carrying out a Study Programme and Re-Accreditation of Higher Education Institutions (OG 24/2010) stipulates the minimum number of five full-time employees in the research and teaching and/or artistic and teaching title for the postgraduate study program, provided that the relevant graduate or integrated undergraduate and graduate studies in the scientific and artistic areas for which the licence is being requested have already been accredited.. The Faculty of Medicine in Rijeka meets this criterion because it has a total of 96 full-time employees and 118 part-time ones working in the research and teaching</p>	



positions, of which 51 are engaged in the doctoral study of Health and Environmental Engineering.	
3. The HEI The HEI has the required number of scientists as defined in Article 7 of the Ordinance on Conditions for Issuing Licence for Scientific Activity, Conditions for Re-accreditation of Scientific Organisations and Content of Licence (OG 83/2010).	
YES Article 7 of the Ordinance on Conditions for Issuing a Licence for Performing Scientific Activity, Re-Accreditation of Higher Education Institutions and the Content of the Licence (OG 83/2010) stipulates that public research organizations must have a minimum of 15 scientists employed full-time, of whom at least 5 in the scientific area in which it carries out scientific activities. The Faculty of Medicine in Rijeka satisfies this criterion because it has a total of 123 scientists in full-time and 118 scientists in part-time employment, of whom 51 scientists working in the area of Biomedicine and Health participate in teaching the doctoral students of Health and Environmental Engineering.	
4. The HEI delivers more than 50% of its content by its own teachers (teachers employed full-time and elected to research-teaching titles).	YES 69%
5. The overall teacher-students ratio in the HEI should be lower than 1:30.	YES In the last five years, the average teacher-student ratio has been 1: 6, being 1: 4 in the previous year (2015).
6. The HEI has ensured the publicity of theses.	
YES The defence of the doctoral thesis topic and of the doctoral thesis itself are public and available to all interested parties. Notifications on a defence of the doctoral thesis topic and of the doctoral thesis itself are published on the Faculty website (http://www.medri.uniri.hr/hr/?start=10).	
7. The HEI has put in place the procedure for revocation of the academic degree (PhD) through the provisions of the statute or another general act if the degree is determined to have been acquired in contravention of the conditions prescribed for its acquisition, by gross violation of the rules of study or on the basis of a thesis which is a plagiarism or falsification.	
YES The Faculty of Medicine in Rijeka has put in place the procedure for revocation of the academic degree (PhD) through the provisions of the Statute of the University of Rijeka, the Statute of the Faculty of Medicine in Rijeka and Regulations on Studies University of Rijeka if the degree is determined to have been acquired in contravention of the conditions prescribed for its acquisition, by gross violation of the rules of study or on the basis of a thesis which is a plagiarism or falsification. Article 132 of the Statute of the University of Rijeka regulates the conditions for revocation of the doctoral degree as follows: (1) The doctoral degree shall be revoked if it is established that the thesis is a result of appropriated scientific work or a falsification; (2) The revocation of a doctoral degree shall be carried out by the Senate at the request of an authorized professional council, through the procedure defined in detail in the Regulations on Studies; (3) The revocation of the doctoral degree shall entail the loss of titles obtained on the basis of the doctoral degree. Article 80 of the Statute of the Faculty of Medicine regulates the conditions for revocation of the doctoral degree as follows: (1) The doctoral degree shall be revoked if it is established that the thesis is a result of appropriated scientific work or a falsification; (2) The revocation of a doctoral degree shall be carried out by the University Senate at the request of the Council, through the procedure defined in detail in the Regulations on Studies; (3) The revocation of the doctoral degree shall entail the loss of titles obtained on the basis of the doctoral degree. Articles 75, 76 and 77 of the Regulations on Studies of the University of Rijeka regulate the conditions for revocation of the doctoral degree as follows: Article 75 - Revocation of the doctoral degree; (1) The doctoral degree shall be revoked if it is established to have been acquired in contravention of the prescribed conditions the prescribed conditions for its acquisition, by gross violation of the rules of study, on the basis of a thesis which is a plagiarism or falsification or through commission of a criminal offence on the part of the student. (2) The revocation of the doctoral degree shall entail the loss of titles obtained on the basis of the doctoral degree. Article 76 - The procedure for revocation of the doctoral degree; (1) The procedure for revocation of the doctoral degree shall be implemented by the Senate. (2) The procedure shall be initiated at the request of the professional committee of the relevant faculty. (3) The Senate shall appoint a commission of five members which will evaluate and consider the proposal for the revocation of the doctoral degree. The commission members shall be	



<p>recognized experts in the area of which the thesis topic, one of whom shall be from another university or research institution. The mentor cannot be a member of the commission. (4) The commission's report must contain a conclusion which explicitly states that the thesis is an appropriated scientific work or falsification, or that it has been compiled through commission of a criminal offence on the part of the student. (5) The Senate shall adopt a decision on the basis of the commission's report.</p> <p>Article 77. Revocation of a diploma of the doctoral degree; (1) If the Senate adopts the decision on the revocation of the doctoral degree, the rector shall rescind the diploma of the doctoral degree. (2) The person whose doctoral degree has been revoked shall be obliged to restore to the University their diploma of the doctoral degree. (3) The diploma of the doctoral degree shall be rescinded by placing it on the revocation clause. (4) The decision on revocation of the doctoral degree shall be registered in the University's Book of Doctorates.</p>
<p>Additional requirements of the Accreditation Council for issuing a positive opinion YES/NO, notes</p>
<p>1. This HEI (or several ones) has a minimum of five teachers elected to research-teaching titles in the field or fields relevant for the delivery of the doctoral study.</p>
<p>YES The Faculty of Medicine in Rijeka has 49 of the total of 74 teachers who have been elected in the research and teaching positions in the field relevant for the delivery of the study programmes of the doctoral study.</p>
<p>2. In the last reaccreditation procedure, the HEI had its standard of Scientific and Professional Activity rated at least "partially implemented".</p>
<p>YES Appendix 2: ASHE recommendation of 20 September 2016.</p>
<p>3. The doctoral study program of the HEI is aligned with the strategic program of scientific research.</p>
<p>YES/NO – partly aligned The doctoral study program is partly aligned with the ASHE Strategy adopted in July 2016 and is yet to be implemented. One of the strategic objectives is the reform of doctoral studies which, among other things, includes implementation of a system of continuous evaluation of mentors with clearly defined criteria, improvement of the system of institutional evaluation of framework topics of research, and selection of doctoral candidates according to the topics/mentors, designing doctoral studies for the training of clinical and translational researchers through harmonization with similar doctoral studies abroad, and improving the system of monitoring the progress of doctoral students during their studies. Appendix 3 – Strategy for the Development of Science of the Faculty of Medicine in Rijeka</p>
<p>4. The mentor-doctoral student ratio at the HEI is not higher than 1: 3.</p>
<p>YES The mentor-doctoral student ratio, calculated on the basis of Table 2: Mentors and doctoral students, is lower than 1:3, namely, it is 1:1.3 (the total number of, respectively, mentors and doctoral students being 24 and 31).</p>
<p>5. The mentors (all) at the HEI meet all the following conditions:</p> <p>a) are employed in the scientific or research-teaching position or associate position (post.doc.) with at least two years of post.doc. research experience;</p> <p>b) are active scientists in the scientific field of the doctoral study (having published scientific papers, participated in international conferences and/or participated in projects in the last five years (T. 2);</p> <p>c) confirm the feasibility of the framework research plan at doctoral student's enrolment (or at registration of the topic);</p> <p>d) provide the necessary conditions (including financial support) for the implementation of scientific research of doctoral students (according to the framework plan of doctoral student's research) either as leaders, co-leaders or associates of the research project or in some other manner;</p> <p>e) have completed some kind of training (comentoring, workshops or other);</p> <p>f) have obtained a positive opinion of their mentoring by the HEI.</p>
<p>Mostly YES a) YES - all mentors of doctoral studies at the Faculty of Medicine in Rijeka have been elected to the research and teaching position. One of the conditions for the election is a minimum of five years in the position of a senior assistant/doctoral candidate by regular election, or a minimum of 3 years experience after the defence of the doctoral thesis for those elected according to the excellence criteria (additional criteria). b) YES - all mentors are active scientists, which they must also prove during the procedure of their reappointment. Information about them is given in Table 2. c) YES - The mentor's statement of agreement is incorporated in form DrS1, which is used to register a doctoral thesis. Under item 2 therein, the mentor or mentors are registered, and in the field "Mentor's agreement with the proposed topic" at the end of the form, the proposed mentors confirm with their signature the statement: "I hereby declare that I agree with the topic being proposed". In addition, the doctoral students certify with their</p>



<p>signature that they have not proposed the same topic at any other university. Before the introduction of the form DrS1 (in September 2015), potential mentors attached a special document in which they confirmed in the same ways their agreement with the proposed topic.</p> <p>d) YES - The form DrS1, the doctoral student must enter the data on the sources of financing of the proposed doctoral thesis, indicating whether they are national, international or independent, as well as the type and the leader of the project from which the research will be financed. Moreover, doctoral students are required to submit a certificate signed by the head of the clinic/department that will allow them carry out research work (use of space, equipment, etc.).</p> <p>e) YES/NO - part of the mentors have attended appropriate workshops, some in the context of education within the project tasks at their institutes/departments. No systematic training of all mentors has yet been carried out at the institutional level.</p> <p>f) NO/YES - Mentors do not receive a formal positive opinion of the institution, but their work is evaluated and described in the report of the department/institute where they are employed, which is the responsibility of the head. Vice-deans for scientific research and postgraduate studies and life-long learning report on the work of mentors, based on reports by heads of department, at the meeting of the Dean's Advisory Board, mentioning potential problems in the mentor - doctoral student relationship.</p>
<p>6. Teachers meet all the following conditions:</p> <p>a) are employed in a scientific or a research-teaching position;</p> <p>b) are active scientists, recognized in the field of their subject matter (T. 1).</p>
<p>YES</p> <p>a) YES -teachers in the doctoral study must have been elected to a research and teaching title and be appointed to the appropriate position.</p> <p>b) YES - teachers are active scientists, recognised in the field of their subject matter, as can be seen in Table 1.</p>
<p>7. As a rule, the mentor does not participate in the commission for the assessment of the topic, the content and the defence of a doctoral thesis.</p>
<p>NO - The mentor does not participate in the procedure of assessment of the topic or the content of the doctoral thesis.</p> <p>YES - The mentor participates in the defence of a doctoral thesis as an associate member of the commission that evaluated the topic and the content of the doctoral thesis. In the reformed doctoral study, we no longer plan to have mentors participate in the work of the Commission for Doctoral Thesis Defence.</p>
<p>8. The doctoral study programme provides at least three years of individual/independent research (concurrently, individually, inside or outside classes), where the independent research involves writing the thesis, writing papers, participating at international conferences, field work, teaching for research purposes and other.</p>
<p>YES</p> <p>The full-time doctoral study lasts 3 years (with the right to study up to 6 years) and the doctoral student immediately begins with research work concurrent with the classes, which in the first year include also lectures. The part-time study lasts 5 years and the doctoral students are granted up to 10 years for the preparation and defence of their doctoral thesis (double the duration of the study). Actually, the three years of individual research are thus distributed over five or more years.</p>
<p>9. In the case of cooperative or joint studies and doctoral schools (at university level), the HEI supports cooperation through relevant agreements; its programme is delivered by accredited HEI (for cooperative and joint doctoral studies), or - at the doctoral school - in a way that meets all the prescribed requirements and ensure effective coordination and support to doctoral students; the coverage of teaching by own teachers (of all institutions) is at least 80 %.</p>
<p>NO</p> <p>At present, we do not have a doctoral school or joint studies. The establishment of the doctoral school at the level of Rijeka University was proposed at the session of the Senate. At the time of writing this self-evaluation, the proposal is under discussion within the academic community. However, although the Faculty of Medicine actively supports a university doctoral school, we are still intent on establishing our own doctoral school within the reform of our doctoral studies.</p>

II. SELF-EVALUATION ACCORDING TO THE CRITERIA FOR QUALITY ASSESSMENT

1. TEACHING, MENTORING AND RESEARCH RESOURCES AND INFRASTRUCTURE

1.1. The HEI is a recognized institution by its research/artistic achievements in the scientific/artistic field in which it offers the doctoral study.

In the observed period, the number of scientific papers cited in Current Contents (which is now a valid criterion of election to a higher research-teaching position) has not significantly increased annually, ranging between 136 and 203. However, the ranking of the journals in which the papers were published has continuously increased. For example, the Q1-ranked journals (according to JCR) published 31 (15.3%) papers in 2011, 32 (19.9%) in 2012, 42 (25.6%) in 2013, 41 (30.1%) in 2014, and 54 (34.8%) in 2015. A significant imbalance between the highly successful and less successful research groups has been noted, as well as a lack of cooperation between preclinical and clinical researchers or groups. The following is a summary list of scientific activities of research groups at the University of Rijeka Faculty of Medicine.

The Department of Histology and Embryology and the Centre for Proteomics has laboratories with high quality research conditions, including laboratories for cell culture, molecular biology, histopathology, a laboratory for the production and purification of proteins, and a laboratory for mass production of monoclonal antibodies. These departments are also equipped with modern equipment, such as confocal microscopy, two flow cytometers and a system for storage of cells and tissues (refrigerators at -80°C and liquid nitrogen). Within these departments there are two experimental premises for laboratory mice that are equipped with IVC systems. One of the main missions of the Centre for Proteomics is developing new tools for research in immunology and virology. The Centre is also involved in the projects of development of new immunotherapeutic approaches for the prevention and treatment of diseases. The Centre has produced several recombinant antibodies and fusion proteins that are licensed as part of cooperation with foreign partners. Based on his cutting-edge scientific achievements, Prof. Stipan Jonjić, PhD, has been entrusted with the leadership of the national centre of excellence for the study of viral immunology and vaccine development (Appendix 4).

Scientists at the Department of Histology and Embryology and the Centre for Proteomics have been successfully working on viral immunology for over 20 years now, and during that period have made significant scientific discoveries and obtained international recognition, reflected in the more than a hundred scientific papers published in the most prestigious journals in the field of immunology and virology, numerous international scientific projects (such as the NIH R01 project and the ERC Advanced project) and international scientific cooperation established with over 20 research laboratories worldwide. The group led by Professors Stipan Jonjić and Astrid Krmpotić is among the most recognizable ones in Croatia, especially by their contribution to the understanding of viral immunosubversive genes and the pathogenesis of cytomegalovirus infection, and generally to the understanding of viral immune control. To date, they have discovered and characterized four MCMV genes responsible for the down-regulation of NKG2D. Using deletion mutants of the virus, in which any of the four viral genes regulating NKG2D ligand has been removed, they showed an attenuated phenotype in vivo (attenuated replication) that could be eliminated by depletion of NK cells or blocking the NKG2D receptor. In addition to ligands for NKG2D receptor ligands, the MCMV also regulates ligands for numerous other activation and inhibitory receptors, such as TIGIT, DNAM1 and Ly49s (Jonjic et al., Curr Opin Immunol, 2008, Lenac Rovis et al., Journal of Experimental Medicine, 2016. 213 (9): 1835-50). Based on the excellent results in basic research, the group has recently focused on translational research in the field of immunology and vaccinology. They were the first to demonstrate that recombinant herpesvirus expressing cell ligands for the NKG2D cell receptor has excellent properties for a vaccine or a vaccine vector (Slavuljica et al., J Clin Invest, 2010; Trsan et al., Proc Natl Acad Sci USA, 2013), and these findings have resulted in a patent application to the US Patent Office and Trademark Office. At the same time, this group of scientists has been working intensively on the development of various research tools and approaches that have enabled their additional connections with the international scientific community (bank of hybridoma cell lines, systems for the production and purification of proteins, recombinant DNA technology, etc.).

The research carried out by the group led by Professor Bojan Polić of the Department of Histology and Embryology can be divided into two main segments: a) research into the biological roles of NKG2D receptors in the development, homeostasis and effector functions of lymphocytes; b) research into the mechanism of systemic chronic inflammation and metabolic syndrome in obesity. In the first segment, the group investigates the biological roles of NKG2D receptors in the immune system. NKG2D is a potent activating receptor present on NK cells, NKT, activated ab and gd lymphocytes T. In their work, they use their own mice with conventional and

conditional NKG2D mutations, which enables specific studies of the role of NKG2D in individual cells. They have thus found that a lack of NKG2D causes hyperactivity of NK cells and that this phenomenon is related to their development (Zafirova et al., *Immunity* 2009; Zafirova et al. *CMLS* 2011). Furthermore, they investigated the role of NKG2D activation of CD8+ T lymphocytes and the formation of memory lymphocytes. They also showed that NKG2D is extremely important in the early stages of formation of memory CD8+ T cells because it affects the survival of their precursors via the PI3K-Akt-Mcl1 signal shaft (Wensveen et al. *J. Immunol.*, 2013). In cooperation with A. Hayday's group (Cancer Research UK, King's College, London), they discovered the connection between the NKG2D-dependent mechanism of control of epidermal stress and the system-specific IgE responses to antigens coincidentally associated with stress. This mechanism is mediated through gd T lymphocytes and IL-13 (*Science*, 2011). In recent years, the group has been intensively engaged in the research of the role of the immune system in the development of low intensity chronic systemic inflammation in obesity, which is one of the main factors in the development of insulin resistance, type 2 diabetes and numerous complications, which constitutes the second segment of their research. Their significant contribution to this area is the recent discovery of the role of NK cells in the initiation and development of inflammation in visceral fat as the main source of infection in obesity (Wensveen et al., *Nature Immunology*, 2015). This research continues in the direction of investigation of the mechanisms of pathogen effects, particularly viral infections, on the development of insulin resistance in obesity. In addition to visceral fat inflammation, the group investigates the mechanisms of inflammation in the liver that contribute to the development of nonalcoholic steatohepatitis (NASH), which is a common side complication of type 2 diabetes in obesity. An important activity of the scientists who work at these two departments is also training of young researchers and networking with other outstanding institutions in the European research area and the exploitation of the results of these studies. To date, over 20 doctoral and/or master 's candidates have been trained in these two departments. Given that these two groups boast the highest number of prestigious international projects in our institution, Appendix 4 gives a list of the most important international projects and their short description. The same Appendix also lists the partners with whom very fruitful international collaboration has been established and patents obtained, as well as a systematic list of awards and recognitions, and international conferences organized by the Department of Histology and Embryology and the Centre for Proteomics. It is worth noting that in 2012 Professor Stipan Jonjić became a member of the Leopoldine, the German National Academy of Sciences.

The main area of scientific research of the group led by Professor Siniša Volarević is the study of mechanisms by which errors in the synthesis of ribosomes, protein-producing machines in the cell, cause diseases in mammals. Prof. Volarević has discovered a control mechanism that detects errors in the synthesis of ribosomes and stops cell division. This discovery was published in the journal *Science* (Volarević et al., 2000), which declared it one of the most important discoveries in the field of biomedicine in that year. By using the most modern technology to manipulate genes in experimental mice and many other methods of molecular and cell biology, his research team discovered the first known component of this new signalling pathway and determined its key role in the development of T-lymphocytes and mouse embryos (Šulić et al., *Genes Dev* 2005; Panić et al., *Mol Cell Biol.* 2006; Barkić et al., 2009). Furthermore, in 2012, they discovered another two key components of this signalling pathway, ribosomal proteins L5 and L11, and clarified the mechanisms by which they transmit signals in the cell (Bursać et al., *PNAS*, 2012). The latest research of this research group has also demonstrated the role of L5/L11/p53-dependent control mechanism in protecting cells from a malignant transformation. In addition to original research papers, they have also published several important review papers in this area of research (Panić et al., *Cell Cycle*, 2007; Golomb et al., *FEBS Lett*, 2014; Bursać et al., *Biochim Biophys Acta*, 2014, Oršolić et al., *Seminars in Cancer Biology*, 2016, etc.). For the purposes of their research, they have developed a large number of new technologies and reagents for research. A special place is occupied by the production of monoclonal and polyclonal antibodies against the 60 ribosomal proteins, and the methods for determining the expression of all gRNA for ribosomal proteins. Given that these reagents can no longer be found on the market, their possession enabled the increase in the volume and level of quality of this group's research and the establishment of new cooperations. Over the past 15 years, Professor Volarević's group research has been funded by several national and international scientific foundations and from other funding sources, including the SNSF, EU FP7, UKF, the Croatian Science Foundation, HIT, etc.. The exceptional relevance and appropriateness of the above-mentioned research is also corroborated by the fact that the results and concepts developed in Prof. Volarević's laboratory recently made it possible to demonstrate the importance of L5/L11/p53-dependent control mechanism in the pathogenesis of several diseases in humans (Treacher Collins syndrome, hyperpigmentation, myelodysplastic syndrome, anaemia, Diamond-Blackfan and many types of malignant tumours). This opens the possibility of manipulation of components L5/L11/p53-dependent control mechanism that is activated by errors in the synthesis of ribosomes for the purpose of treating human diseases. Over the past ten years, they have intensively collaborated with many leading researchers in the fields of research synthesis of ribosomes and malignant diseases, including Moshe Oren

(Weizmann Institute of Science), Jiri Bartek (Danish Cancer Society), Carol Prives (Columbia University), Massimo Derenzini (University of Bologna), Vassilis Gorgoulis (University of Athens), Aristides Eliopoulos (University of Crete) and others, within which they have published papers in some of the most prestigious scientific journals (Nat Cell Biol, Mol Cell, J Cell Biol, Oncogene, Hum Mol Genet, etc.). Due to the above, this research group has a huge impact on the development of this important, complex and competitive research area. Prof. Volarević was the winner of the annual Award of the Croatian Academy of Sciences and Arts for scientific achievement in 2006 and of the National Award for Science in 2010, and in 2008 he became a member of one of the most prestigious scientific organizations in the world, the European Molecular Biology Organization (EMBO). PhD students in Prof. Volarević's laboratory participate in competitive scientific research, publish papers in the world's top scientific journals and collaborate with leading scientists in the US and in Europe, and have received several prestigious awards for their achievements. Research assistant Slađana Bursać has received the Željko Trgovčević Award for the best young researcher in the field of molecular biology in 2012, the For Women in Science national scholarship in 2013, and the Best Young Scientist in Basic Medical Sciences Award of the Faculty of Medicine in Rijeka in 2013. This last award was also awarded to Sandi Tamarut in 2006 and Maja Cokarić Brdovčak in 2014. As of 2014, Prof. Volarević's research group has been included in the Scientific Centre of Excellence for Reproductive and Regenerative Medicine, which is an additional proof of its scientific recognition in Croatia. By organizing visits of more than 100 prominent scientists in the world and numerous international scientific workshops, they have participated in creating a stimulating scientific atmosphere at the University in Rijeka.

The research group for cell physiology, led by Professor Pero Lučin, works at the Department of Physiology, Immunology and Pathophysiology. The group consists of three experienced researchers (Hana Mahmutefendić, Gordana Blagojević Zagorac and Kristina Grabušić) and five doctoral candidates. Cellular physiology is one of the profiling directions of the Department as a basis for the development of systematic research and translational medicine. The group of cell physiology establishes and develops models for monitoring intracellular traffic and sorting of proteins, the formation of membrane organelles and compartments of endosomal paths. In the last ten years, the group has worked intensively on the endosomal sorting of MHC-I molecules, particularly of non-conformed MHC-I molecules in late endosomes, and recycling of MHC-I molecules in the endosomal system. Understanding the mechanisms of sorting MHC-I molecules in the endosomal system contributes to the understanding of the general mechanisms of protein sorting in the endosomal system, especially sorting of non-conformed proteins, the mechanisms of endocytosis and the formation of membrane domains in endosomes and mechanisms of antigen presentation. In addition to establishing a model for fundamental research of endosomal traffic, the group studies the mechanisms by which viruses adapt the endosomal system for the needs of their morphogenesis. In the model of murine cytomegalovirus infection (MCMV), the group investigates rearrangement of the endosomal system in the early stages of infection, which leads to the formation of a section for virion assembly (assembly compartment, AC) and release of infectious particles from the infected cells. In addition, the group explores the structure of AC which is formed in the late stage of infection, the mechanisms of release of infectious particles (virions) after the assembly in the AC, and the content and the physiological role of membrane particles which, in addition to virions, are released from infected cells (exosomes and microvesicles).

The scientific interest of the group led by Professor Biserka Mulac-Jeričević of the Department of Physiology, Immunology and Pathophysiology of the Faculty of Medicine is the role of transcription factors that are receptors for the steroid hormones progesterone and estrogen in normal physiology, with particular emphasis on the role of research selective progesterone receptors A and B in pregnancy and their role outside the reproductive organs. The research carried out by Prof. Mulac-Jeričević has shown that progesterone can perform its biological function via two progesterone receptors whose individual transcriptional activity depends on the tissue in which they are biologically active (Mulac-Jeričević et al., Science 2000, Mulac-Jeričević et al., PNAS 2003, cited more than 1000 times). The results of these studies have contributed significantly to the understanding of the role of steroid hormones and their receptors in reproductive and non-reproductive organs. Prof. Mulac-Jeričević's group cooperates with Jan J. Brosens's (University of Warwick) and Orle M. Conneely's (Baylor College of Medicine) groups. Over the past five years, Prof. Mulac-Jeričević's scientific research has been financed from domestic and foreign sources (MSES, FP7). Intensive cooperation has been established with the Clinic for Orthopedics in Lovran (Prof. G. Gulani and Assis. Prof. Z. Jotanović) and the Clinic of Obstetrics and Gynecology, Clinical Hospital Centre Rijeka (Prof. N. Severinski). As of 2014, Prof. Mulac-Jeričević's research group has been included in the Scientific Centre of Excellence for Reproductive and Regenerative Medicine.

The research group of Professor Biserka Radošević-Stašić studies cytoprotective and immunoregulatory properties of glycoproteins 96 and metallothionein. The group examines the role of heat shock protein (HSP) and metallothionein (MT) in various types of cell and tissue damage in order to determine the patterns of response to

noxae and explain the compensatory mechanisms that contribute to the re-establishment of morphological and immunological homeostasis. In this study analyzed the expression of gp96 and its receptors, MT and metals in several experimental models: a) in the process of liver regeneration, the implantation of the fetus and embryogenesis, b) in demyelinating diseases caused by autoimmune process, c) in demyelinating diseases caused by iron overload and cuprizone administration, d) in inflammation (cholecystitis in humans), and e) in neoplastic processes (cervical lesions and cancer in women). The particularly active members of the research group include Marin Tota, Nada Starčević Čizmarević, Hrvoje Jakovac, Zlatko Trobonjača, Ines Mrakovčić-Šutić, Damir Grebić, Vesna Barac-Latas and Tanja Grubić Kezele.

The research group of Academician Daniel Rukavina studies immune-endocrine mechanisms, in particular cytokines and cytolytic mechanisms at the mother-fetus interface during early pregnancy. They examined the role of granulysin at the mother-fetus interface during early pregnancy, the effect of mucin 1 on the function of decidual CD14+ cells of antigen presenting cells in early pregnancy, the impact of protein heat shock 70 and glycoproteins 96 to maturation of decidual CD1a + dendritic cells in the first trimester of pregnancy, the expression and function granulysin and perforin in decidua in the first trimester of pregnancy, with active participation of collaborators: Danijela Veljković Vujaklija, Suzana Sršen Medančić, Tamara Gulić and Marin Dominović. Academician Daniel Rukavina has been elected an honorary member of the European Society of Reproductive Immunology and awarded the City of Rijeka Award for Lifetime Achievement. With the help of his collaborators, he has organized 27 scientific conferences hosting over 200 scientists lecturers, of whom 64 scientists from abroad. In the reporting period, four doctoral theses were defended.

Research activities at the Institute for Pharmacology are carried out in the field of basic and clinical pharmacology. Basic research, which is the basis of research activities of the Institute since its establishment, is directed towards experimental neuroscience and neuropharmacology. Initially, the focus of interest were the damaging mechanisms and treatment of spinal cord lesions and Alzheimer's disease, which was later extended to a variety of models of experimental seizures, epilepsy, hypoxia and ischemia of the brain. In recent years, basic research has focused primarily on traumatic brain injury. The main area of recent scientific interest of Professor Gordana Župan's research group includes the distribution, extent and timing of biochemical, molecular and cellular mechanisms involved in the brain damage caused by experimental trauma, the potential neuroprotective effects of different classes of drugs that inhibit the mechanisms of damage and the subsequent death of neurons. In recent years, they have published papers in this area in some prestigious journals (Pilipović K et al., *Prog Neuropsychopharmacol Biol Psychiatry*, 2015, Pilipović K et al., *Prog Neuropsychopharmacol Biol Psychiatry*, 2015; Župan Ž et al., *Prog Neuropsychopharmacol Biol Psychiatry*, 2011, Dolenc P et al., *J Neuropathol Exp Neurol*, 2015). For research in the field of experimental brain trauma, Prof. Župan received the Neurotrauma Young Investigator Award at the 13th Congress of the European Federation of Neurological Societies in Florence, Italy, in 2009. Assis. Prof. Pilipović was awarded the Postdoctoral Research Fellowship, of the Central European Initiative Research Fellowship Programme (CERES), and stayed at the International School of Advanced Study in Trieste, Italy, from October 2011 to October 2012 working in the group of Professor Andrea Nistru. Recently, research on the model of repetitive brain trauma has been initiated and collaboration established with the research group of Professor Jasna Križ of the Department of Psychiatry and Neuroscience, Faculty of Medicine, Université Laval, Quebec, Canada. Prof. Župan has organized and led international symposia under the 6th, 7th and 8th Croatian Congress of Pharmacology with international participation (Opatija, 2010, Zagreb, 2013, Split, 2016), organized and led the international conference on "Traumatic brain injury and neurological diseases: from bench to bedside", University of Rijeka Faculty of Medicine, 2012, and was the invited speaker at the international conference of the EU FP7 project GlowBrain Final Conference, 2015. Research activities in the field of clinical pharmacology at the Institute have intensified in recent years, and are predominantly directed towards pharmaco-epidemiology and antimicrobial treatment, the basic research interests of Professor Vera Vlahović Palčevski, and to pharmaco-economics and outcomes of treatments, the recent focus of interest Professor Dinko Vitezić. In his capacity as President of the Organizing Committee, Prof. Vitezić has organized five international congresses dedicated pharmaco-economics in the last five years. From 2007 to 2013, four research projects founded by the MSES were conducted at the Institute (project leaders Prof. Župan, Prof. Mršić Pelčić, Prof. Vlahović Palčevski, Prof. Vitezić), and since 2014 nother three have been subsidised by the University of Rijeka (project leaders Prof. Župan, Prof. Vlahović Palčevski and Prof. Vitezić).

Researchers from the Institute for Microbiology have longtime experience in the field of pathogenesis of bacterial infections. Several research teams are active at the Institute, researching into the development course of infectious diseases caused by bacteria that pose a significant public health problem (e.g., *Listeria*, *Campylobacter*, *Legionella*, atypical mycobacteria, *Pseudomonas*, *Enterobacteriaceae*). The subject of the research group led by Professor

Maja Abram, which includes four experienced researchers (Darinka Vučković, Brigita Tićac, Marina Bubonja Šonje and Ivana Gobin) and three doctoral students, are factors of bacterial virulence, response to the environmental stress, the mechanisms of resistance to antibiotics, the immune response of the host to infection, as well as cellular and molecular mechanisms in the relationship between the host and the prokaryote. Adaptation to the environment is a feature of bacteria transmitted by food because it allows them to survive in foods during processing and adapt to the conditions in the host organism. We have shown that exposure to atmospheric oxygen favors the survival of *Campylobacter* in the culture of enterocytes, while starvation leads to significant morphological changes and reduces the pathogenic potential of these bacteria. We have identified molecular mechanisms of carbapenem resistance in clinical isolates of *Pseudomonas*. Most strains, which are grouped into five clones, showed decreased expression of porins OprD and overexpression of MexAB-OprM, MexCD-OprJ and MexEF-OprN efflux pumps. Due to resistance to antimicrobials, we investigate the biological properties of pure phenolic compounds, natural, and waste, plant material. One of the plants that has potential for use in the prevention and assistance in the treatment of urinary tract infections is *Arbutus unedo* L, a type of strawberry (strawberry-tree berries), which we are currently investigating within the framework of a bilateral Croatian-Serbian project. In 2015, we participated in the organization of the Central European Congress on Antimicrobial Resistance, and in 2016 in the organization of the National Congress of Clinical Microbiology and Infectious Diseases (CroCMID).

The research carried out by the group led by Professor Marina Šantić of the Institute of Microbiology is related to cell and molecular biology of *Legionella pneumophila* and *Francisella tularensis* bacteria. They have shown that iglD protein *Francisella* genome plays a key role in the pathogenesis of the disease because it sends signals to the cytoplasm of human macrophages thus modelling them for their further propagation (*Cell Microbiol.* 9 (10): 2391-403, 2007), and that *F. tularensis* may replicate in cells of arthropods, which is why tularemia is classified as a disease spread by vectors such as mosquitoes and ticks (*Environ Microbiol* 11 (6): 1473-81, 2009). They have also demonstrated that proteosomal decomposition of cell Lys48 - polyubiquitin protease leads to the formation of amino acids necessary for the reproduction of *L. pneumophila*. A defect of ankB mutants for breeding in amoeba cells and human cells can be substituted by adding a mixture of amino acid or cysteine, serine, pyruvate or citrate, which is similar to genetic complementation (*J Exp Med.* 207(8):1713-26, 2010; *Science.* 334: 1553-1557, 2011). They have found that the life cycle of *Francisella* is completely different in amoeba in relation to its life cycle in human cells (*Environ Microbiol* 11 (6): 1473 to 81.2009; *Front Microbiol* 2: 78, 2011, *PLoS Pathogen.* 3; 11 (12), 2015). For her research work Prof. Šantić has received many awards, including the National Award for Science in 2009. Over the past years she has worked with a number of leading research groups in this area (University of Louisville, USA; Institut National de la Santé et de la Recherche Médicale, France; Faculty of Military Health Sciences, University of Defence, Czech Republic, Clinical Bacteriology, Umeå University, Sweden; Bundeswehr Institute of Microbiology, Germany, Health Protection Agency, UK). Thanks to the international recognition of the research group of the Institute for Microbiology, they organized in Opatija the 8th World Congress of Tularemia in September 2015.

Institute for Pathology, led by Professor Nives Jonjić, an organizational unit of the Faculty of Medicine, conducts diagnostic and scientific research primarily focused on the biology of the tumour, with the aim to better identify new prognostic and predictive factors that characterize malignancy. Their modern laboratories ensure quality histological, histochemical, immunohistochemical, immunofluorescent, ultrastructural and molecular analysis. Research is being conducted on tumours of different cancer sites, such as kidney, breast, larynx, lung, oral cavity, and colon cancers, as well as melanoma and multiple myeloma. More specifically, they study the role of angiogenic factors VEGF-A and C, and HIF-alpha and other biomarkers that promote tumour growth, such as EGFR, OPN, cyclin D1 and NF-kB, and the effect of extracellular proteases (MMP) on the spread of neoplastic process. Previous studies have found an association of increased expression of HIF-1alpha, EGFR and OPN, and the poor prognosis of patients with renal, oral cavity, breast and lung carcinoma and melanoma (*J Exp Clin Cancer Res* 2009;28:40; *J Biomed Sci* 2012;19:40, *J Oral Pathol Med* 2013;42:620; *Appl Immunohistochem Mol Morphol* 2014;22:464, *Acta Histochemica* 2014;116:222, *Melanoma Res* 2014;24:584). In contrast, in breast cancers, the expression of cyclin D1 correlated with longer survival in premenopausal patients (*Mod Pathol* 2010; 23: 392) and the expression of NF-kappaB in breast luminal A subtype (*Appl Immunohistochem Mol Morphol* 2014; 22: 464). The role of certain signalling molecules for the expression of particular biomarkers has also been established, such as the association of gene expression of EGFR with expression of OPN and NF-kB signalling pathway (*Clin Transl Oncol* 2013; 15: 65), as well as a significant link between protein and gene expression of VEGF-A and activated NF-kB (*CMJ* 2008; 49: 608). The severity of mucosal lesions of the larynx is associated with the protein expression of EGFR, and EGFR gene amplification with carcinogenesis itself (*CMJ* 2009; 50: 370; *Appl Immunohistochem Mol Morphol* 2014; 22: 674). The morphology of myeloma cells can also have a prognostic significance (*Cytopathol Diagn* 2013; 41: 947)

as well as angiogenesis and fibrosis in the bone marrow microenvironment in patients with multiple myeloma (Am J Clin Pathol 2012; 137: 870). Furthermore, the value of angiogenic factors VEGF, OPN-a and MCP-1 in the plasma also have a clinical significance (Biomed Res Int. 2014; 2014: 513170 Biomed Res Int. 2016; 2016: 7870590). Previous research has contributed to a better understanding of the complexity of the role of VEGF and OPN in the process of angiogenesis in the bone marrow of patients with MGUS and MM (Pathol Res Pract. 2016; 212:509). These angiogenic factors could play a key role in activating the angiogenic switch. Such knowledge could contribute to finding new treatments and prevention of progression of malignancy. The aim of future research is the identification of new biomarkers that can help in the early diagnosis and early detection of the malignant potential of tumour cells, as well as identification of potential targets for effective therapeutic strategies in terms of application of personalized medicine. In 2011, the Institute set up a Biobank, as part of the TransMedRi EU project, with the aim of systematically collecting biological material with basic clinical data thus creating the preconditions for future translational research based on human material.

The research team of the Department of Medical Informatics, led by Professor Mladen Petrovečki, has been investigating for 15 years already the incidence and characteristics of unauthorized downloading of copyright ownership (plagiarism) in the field of biomedicine, due to which they have become recognized in the national and international scientific communities. The team consisted of three experienced researchers (Prof. Mladen Petrovečki, Assoc. Prof. Lidija Bilić-Zulle and Assoc. Prof. Gordana Brumini) and four doctoral students, of whom three obtained their PhD degree on the subject of unauthorized downloading of copyright ownership in the last five years. In the previous period, investigation of scientific integrity included studying the phenomenon of academic integrity in the student environment and in the broader scientific community, which resulted in determining the personality traits that indicate a higher predisposition for plagiarism. They also found occurrences of plagiarism in the Croatian Medical Journal (CMJ), Biochemia Medica (BM) and Acta Stomatologica Croatica (ASCRO). The features of scientific plagiarism in the entire international scientific community were established through a systematic review and meta-analysis of published scientific studies that measure the incidence of plagiarism via questionnaires or computer programs to detect plagiarism, and their original methodology of systematic review with meta-analysis has been internationally recognized. In the last five years, Assis. Prof. Ksenija Baždarić has become editor-in-chief of the journal of the European Association of Scientific Editors (EASE) European Science Editing, and editor for scientific integrity in Croatian Medical Journal (CC, 2015 IF = 1.483). Vesna Šupak Smolčić, MS. mag. biochem., has been appointed editor for scientific integrity in Biochemia Medica (CC, IF = 3.015), and Martin Mavrinac, PhD, the statistical editor in Croatian Medical Journal and Medicina Fluminensis.

Researchers of the Institute for Biology and Medical Genetics of the University of Rijeka Faculty of Medicine have been engaged in the past five years in scientific research in various areas of medical genetics. This group, led by Professor Bojana Brajenović-Milić, investigated global DNA methylation and the Down syndrome. Professor Smiljana Ristić led a group that specializes in genetic analysis of multiple sclerosis, and Professor Saša Ostojić and his associates investigated genetic factors in the etiology of frequent miscarriages. Professor Andjelka Radojčić Badinovac has been working on research into the quality of human gametes, while Professor Alena Buretić-Tomljanović examined the genetics of phospholipid metabolism in schizophrenia. In the area of clinical trials, Assist. Prof. Nada Starčević Čizmarević analyzed the role of iron in the ethiopathogenesis of multiple sclerosis. Prof. Miljenko Kapović has worked on genetic research of the indigenous population of the island of Cres. The diversity of research conducted in the field of medical genetics has attracted the interest of many colleagues from the hospital and medical practice in general, so they also collaborated in these projects. This work resulted in publication of dozens of joint scientific papers, and created additional forms of cooperation with clinicians in the field of diagnostics in the field of genetics.

The research group led by Professor Dragica Bobinac of Institute for Anatomy has been exploring the mechanisms of ischemia/reperfusion injury of tissues and the possible therapeutic or protective approaches. The group consists of a postdoctoral researcher, Tanja Čelić, PhD, and two doctoral students. Successful cooperation has been established with the Clinic for Urology and the Clinic for Anesthesiology and Intensive Care. The group has established and developed models for studying mechanisms of ischemia/reperfusion injury of the kidneys and the spinal cord, and the potential use of anti-oxidative and anti-fibrotic therapeutic approaches, such as the application of recombinant human bone morphogenetic protein (BMP7). In addition, this research group is engaged in the pathophysiological mechanisms of vascular calcification in vitro models.

The general focus of the research conducted by the group led by Professor Jadranka Varljen of the Department of Chemistry and Biochemistry and consisting of Dijana Detel, Lara Batičić Pučar and Sunčica Buljević with

numerous associates was the role and importance of dipeptidyl peptidase IV/CD26 and its structural homologues dipeptidyl peptidase 8 and 9 in the regulation processes important for the development of chronic inflammatory diseases. In order to clarify the mechanisms by which the family of DPP IV/CD26 proteins achieves modulation of immune response, the expression of factors that promote chemotaxis of monocytes, TGF- β and signalling molecule NF- κ B is investigated. Furthermore, in order to understand the role of DPP IV/CD26 in the mechanisms of tissue regeneration, signal and the transcription factors of angiogenesis are tested. The research is divided into two parts: investigation of patients with chronic diseases (inflammatory bowel disease, rheumatoid disease) and studies in experimental models (ulcerative colitis and Crohn's disease, diabetes mellitus type II and wound healing). In 2012, the University of Rijeka Foundation awarded Diana Detel the annual award in the category of the most successful junior researcher/assistant in biomedical and biotechnological sciences. In 2012, Prof. Jadranka Varljen organized the International Congress FEBS 3+ in Opatija. The research group of the Institute of Chemistry and Biochemistry, led by Professor Robert Domitrović, investigates the impact of pharmacologically active phytochemicals in the pathology of acute toxic liver and kidney damage in a mouse model. Also, the group is researching the interaction of phytochemicals and cytostatics and their effect on the effectiveness of anti-tumour therapy in vitro, in order to verify the in vitro results on the human xenograft model in mice. The group currently includes doctoral student Iva Potočnjak, MS sanit. ing., as well as a large number of scientists from different departments of the Faculty of Medicine. The aim of the research group is to determine the mechanisms of antioxidant, anti-inflammatory, and antiapoptotic antifibrotic effects of phytochemicals in models of liver damage by hepatotoxicants carbon tetrachloride and kidney damage by chemotherapeutic cisplatin. Understanding the mechanisms of action of phytochemicals in these models contributes to a better understanding of the impact of diet on the prevention of damage to the liver and kidneys, the main organs in metabolizing and eliminating xenobiotics. In addition, this research creates conditions for the development of new hepatoprotective and nephroprotective drugs. The group uses the tumour cell model to study the mechanisms of modulation of cytotoxicity of anticancer drugs phytochemicals through MAPK, PI3K, NF- κ B and other signalling pathways that control the processes of inflammation, apoptosis and autophagy and cell cycle. Understanding these mechanisms contributes to a better understanding of the effect of phytochemicals on the outcome of anti-tumour therapy, which can be used as the basis for the establishment of mechanisms to combat resistance to anticancer drugs to patients and the development of effective therapies. In addition to original scientific papers, the group members published several significant review articles in prestigious journals in the field of toxicology, pharmacology and nutrition (Archives of toxicology 90 (2016); 39-79; Molecular Nutrition and Food Research 60 (2016); 530-541; Toxicology 324 (2014) 98-107; Toxicology 310 (2013) 115-123; Pharmacological Research 65 (2012); 451-464; Current Medicinal Chemistry 18 (2011); 4454-4469; Toxicology and Applied Pharmacology 241 (2009); 311-321).

The group of researchers of the Institute of Medical Physics and Biophysics study the acoustic flow in liquids caused by ultrasound and analyzes different methods of measurement of ultrasonic beams used in medical diagnosis and treatment in order to ensure safe use of ultrasound for medical purposes. Active cooperation has been established with the Centre for Medical Physics and Radiation Protection of the Clinical Hospital Centre Rijeka on research related to the use of ionizing radiation in medicine. Currently, the focus of research interest is on investigating the limits of computer algorithms for calculating the distribution of the absorbed doses that are embedded in commercial systems for planning radiotherapy, which is intended to be done using Monte Carlo problem simulation. In this, limitations of the methodology for the experimental verification of calculation of the absorbed doses within non-homogeneity will be investigated and means of its improvement proposed. It is planned to study the gold standard in dosimetry of high energy ionizing radiation beams used for intensity-modulated radiation therapy (IMRT). The cooperation between the Institute and the Centre on research related to diagnostic radiology has been very productive. Currently, intensive work is being carried out on optimizing the procedures of computer tomography in the framework of technical cooperation with the International Atomic Energy Agency (IAEA) CRO6015 Upgrading Dose Management and Optimization and Computerized Tomography, but also on the introduction of a quality assurance system in ultrasound diagnostics. The Institute of Medical Physics and Biophysics also has a laboratory for measurement of light stable isotopes (Silab), in which small changes in the isotopic composition of O, H and C which show the evolution of the systems in geophysics, geochemistry, hydrology, climatology, paleoclimatology, meteorology are studied.

The Department of Social Medicine and Epidemiology has a research group led by Professor Tomislav Rukavina, consisting of four researchers: Vanja Vasiljev Marchesi, Lovorka Bilajac, Darko Roviš and Gordana Šimunković. In their research they focus on two important public-health phenomena: the exploration of factors that affect the quality of life of the elderly in order to develop strategic directions for its improvement, and social and genetic factors in drug addiction, aimed at developing programs for successful social reintegration of drug addicts. Both

studies were initiated in the framework of two international collaborative projects in which the Department is the leader member of the Faculty of Medicine as a partner institution.

Scientific research at the Clinic/Department of Internal Medicine covers the main areas of internal medicine. Over the last five years, scientific research at the Institute for Gastroenterology was carried out mainly in the field of pancreatology and hepatology. The group of Professor Davor Štimac completed the research project "Enteral nutrition in patients with acute pancreatitis." Another two randomized clinical trials have been initiated: the use of ceftazidime in the prevention of post-ERCP acute pancreatitis led by Assoc. Prof. Goran Hauser, and prophylactic use of antibiotics in the treatment of acute pancreatitis. In the area of hepatology, research was done into the nonalcoholic fatty liver disease, led by Ivana Mikolašević, PhD, and the correlation between genotype and phenotype of patients with elevated serum iron, led by Professor Sandra Milić. In collaboration with the Cochrane hepatobiliary group of Copenhagen, diseases of the upper digestive tract and the pancreas were investigated, with special engagement of Vanja Giljača, PhD, and Goran Poropat, PhD. Among other awards, it should be noted that Ivana Mikolašević, PhD, received the Borislav Nakić Award of the Croatian Academy of Medical Sciences, awarding Croatian authors younger than 35 years for the best scientific paper published in 2015. Researchers at the Institute of Hematology and Rheumatology with Clinical Immunology continue their years-long research of the biology, and morphology of non-Hodgkin's lymphoma (especially aggressive B-cell lymphoma) and multiple myeloma, as well as the study of clinical aspects of systemic sclerosis, systemic lupus erythematosus and rheumatoid arthritis in which are included Professor Antica Načinović-Duletić, Professor Toni Valković and Professor Srdjan Novak. The Ward of Rheumatology and Clinical Immunology was engaged in international scientific/professional FP7 project "Determining the optimal methods of waste systemic sclerosis", with Ulf Müller as the principal researcher. The Department is an active centre of the EUSTAR group, which conducts research on patients with systemic sclerosis. International cooperation has been established with the Max Planck Institute for Metabolism Research of Cologne, Germany, and the Lautenberg Centre for General and Tumor Immunology, The Hebrew University Hadassah Medical School of Jerusalem, Israel. Over the past five years, Professor Luka Zaputović of Cardiology led a team that conducted four international randomized clinical studies in the field of ischemic heart disease, acute coronary syndrome, pulmonary hypertension and interventional cardiology. Areas of continuous scientific research in Nephrology in the last five years included peritoneal dialysis, hemodialysis, kidney transplantation and cardiovascular risk factors in patients with chronic kidney disease. Scientific cooperation has been established with the Clinical Centre of Sarajevo in research into the volume status of patients on hemodialysis. The areas and topics of scientific research in Pulmonology were genetic investigations of susceptibility to developing tuberculosis, lung cancer genetic research, genetic research of Toll-like (TLC) receptors, and investigation of epidemiology of nontuberculous mycobacteriosis. International cooperation has been established with the research group of Professor Zlatko Dembić, (Oslo, Norway), research groups from Iceland (Institute deCODE genetics/Amgen Inc., Reykjavik, Iceland, Faculty of Medicine and School of Health Sciences, University of Iceland, Reykjavik, Iceland) and the one led by Professor Alexander N.R. Weber, head of the Immunology Department of the University of Tübingen, Germany. This international cooperation resulted in the publication in the past five years of two papers in journals with high impact factor (Nat Genet. 2016 and J Biol Chem. 2012).

Department of Surgery, led by Assoc. Prof. Tedi Cicvarić, organised training of the teaching staff of the Medical Faculty and Rijeka University "Teaching Clinicians to Teach" and "Teaching Professionals to Teach". Assist. Prof. Marko Zelić traditionally organises the Congress of the Croatian Society of Digestive Surgery with international participation and international advanced course "Laparoscopic surgery of the colon," intended for the education of specialists in the field of digestive surgery.

The Department of Orthopedics and Physical Medicine, led by Professor Branko Šestan, has several active research groups. The research group led by Professor Anton Tudor deals with polymorphisms Actn 3/R577X, ADRB 2, ADRB 3 and ACE in top athletes in team sports, the connection between genetic polymorphisms with indicators of muscle fatigue after a concentric-eccentric muscle contractions, and developmental disorder in infant hips with the new L value in the evaluation together with Assoc. Prof. Ivan Rakovac. Research carried out by Tomislav Mađarević, PhD, is directed at the ultrasound-guided operative technique in the treatment of Haglund disease. Assist. Prof. Zdravko Jotanović participated in the project of Professor Zlatko Dembić, investigating the genetic risk by linking polymorphisms of proinflammatory/regulatory cytokine with osteoarthritis of the temporomandibular joint, and also on the project of Professor Biserka Mulac-Jeričević, who studies the effects of progesterone in reproductive and non-reproductive tissues. The interest of Professor Gordan Gulani is directed to the study of pathophysiological mechanisms of destruction of joints in rheumatoid arthritis and osteoarthritis, which is realized through two research projects. He also participates in the study of anthropological parameters of the hip

and the knee with a view to creating software support that would allow creation of customized artificial joints, and is also the organizer of several international scientific conferences in the field of arthroscopic and minimally invasive surgery.

Research group "Animal models of kidney transplantation", led by Assis. Prof. Josip Španjol (Department of Urology) and Professor Dragica Bobinac (Department of Anatomy) operates at the Departments of Anatomy and Urology of the Faculty of Medicine. The group examines ischemic/reperfusion damage of transplanted kidney in a rat kidney transplantation model. Their findings have been published in prestigious scientific journals and have been submitted for patenting new preservation solution (procedure underway) which reduces ischemic damage in a stored organ.

The Department of Psychiatry and Psychological Medicine, led by Professor Tanja Frančišković, carries out scientific research in two directions. One is performed in collaboration with the Department of Biology and refers to the determination of candidate genes associated with schizophrenia and depression, in the context of which a doctoral student is preparing the doctoral thesis. Another area of research is psycho-trauma, which includes investigating the effects of post-traumatic stress disorder on the dynamics of the family and children, and finding the mechanisms for transgenerational transmission of trauma, exploring the role of psychological trauma in the incidence of schizophrenia and association of PTSD and sexual disorders in veterans.

The group led by Professor Damir Miletić of the Department of Radiology has been exploring MR biomarkers in diagnosing, monitoring and predicting the course of Crohn's disease, as well as conducting additional research in the area of cardiac MRI, multimodal diagnosis of breast cancer, new sequences at MRI brain searches and optimization of CT procedures.

The research group in clinical otolaryngology has been active since 2013 under the leadership of Professor Tamara Braut on the project Molecular markers in precancerous lesions and invasive cancer of the larynx. The development of molecular and cell biology has enabled better understanding of a complex stepwise process of carcinogenesis. The state-of-the-art immunohistochemical (IHC) analyses, FISH and microarray technology enable a more detailed analysis of molecular markers. Our goal is to confirm the correlation of EGFR expression of proteins and genes, and acquire further knowledge of their significance in laryngeal carcinogenesis. The project operates in cooperation with the Department of Pathology. The research team consists of Prof. Tamara Braut, Assis. Prof. Milodar Kujundžić, Prof. Radan Starčević, Assis. Prof. Marko Velepčič, and three doctoral students. Collaborators of the Institute of Pathology are: Prof. Mira Krstulja and Andrea Dekanić, PhD.

Scientific work the Department of Oncology and Radiotherapy consists of tests of the immune system in patients suffering from cancer of the urological and digestive systems. Lately, we have been monitoring the levels of certain blood parameters indicating a possible prognosis of patients with renal carcinoma. We monitor and analyze various parameters in patients who are in the terminal stage of malignancies.

The research group in Immunodermatology, led by Professor Marija Kaštelan, operates at the Department of Dermatology and consists of three experienced researchers (Ines Brajac, Larisa Prpić Massari, Sandra Peternel) and one doctoral student. The group works on research in the field of immunogenetics and immunopathogenesis of papulosquamous diseases, especially psoriasis and lichen planus as models of chronic inflammatory immune-mediated diseases (IMID). Research is underway investigating the role of various cytolytic mechanisms in the development of psoriasis and lichen planus, especially those mediated by perforin molecules and Fas/FasL system, and in recent years also the role of TRAIL/ TRAIL-R1 (DR4) i TRAIL-R2 (DR5) molecule systems. In addition, the group intensively investigates the role of HVEM molecules (Herpes virus entry mediator), one of the LIGHT cytokine receptors known also as TNFRSF14 or CD270, as well as new cytolytic molecules granulysin and perforin-2 in psoriasis and lichen planus. In the last ten years, they have defined the HLA haplotype as psoriasis susceptibility gene in Croatian patients, stressed the key role of immune factors, particularly various cytolytic mechanisms, in the pathogenesis of psoriasis.

The area of research interest of the Department of Oral Medicine and Periodontology and the Department of Endodontics and Restorative Dentistry is related to tissue response to materials used in dental medicine, which is also in the focus of numerous clinical and experimental investigations. Professor Sonja Pezelj-Ribarić has led projects of epidemiological studies of oral health and pathological changes in the soft and hard tissues of the oral cavity in Rijeka population, including the effects of pulsed and continuous biostimulation laser on fibroblast culture. The areas of research interest of the Department of Orthodontics are oral corrosion of dental materials,

behavioral dental medicine and the public health aspect of malocclusion, led by Assoc. Prof. Stjepan Špralja. For the purposes of translational medical research, the Department has initiated the establishment of the Bank of Dental, Oral and Perioral Biosamples, which is in function as part of the TransMedRi Biobank.

The research group of the Department of Prosthodontics is working on the etiopathogenesis of orofacial pain under the leadership of Professor Ivona Uhač. The research team is composed of experienced researchers (Zoran Kovač, Robert Antonić, Sunčana Simonić-Kocijan, KeWei Wang) and doctoral candidates. International cooperation has been established with Peking University Health Centre, Beijing, PR China. They created an animal model of chronic stress and occlusal interference on which they tested the soreness of the masseter muscle and the connection between the pain and systemic and local values of IL-6. In the last three years, they have developed an animal model of causing bilateral soreness of the masseter muscle after unilateral inflammation to explore the connection between the pain and the changes in the expression of TRPV1, P2X and P2Y receptors at the level of neurons of the trigeminal ganglion, hippocampus and thalamus. Another group of researchers from the same Department study the quality of life in patients with functional disorders of the stomatognathic system under the leadership of Prof. Renata Gržić. The research group of the Department of Pediatric Dentistry deals with the problem of chewing effectiveness in children under the guidance of Assoc. Prof. Danko Bakarčić.

Appendix 5 – List of active projects of the Faculty of Medicine in Rijeka in the period 2011-2015

1.2. The number and workload of teachers engaged in doctoral studies ensure quality doctoral education.

The courses of the doctoral study in Health and Environmental Engineering are delivered by 74 teachers, of whom 51 have been elected in research-teaching titles at our Faculty, which is 69%. The doctoral studies are delivered by the teachers of the Faculty of Medicine, but also from other faculties of the University of Rijeka (Faculty of Engineering, Faculty of Civil Engineering, Faculty of Tourism and Hospitality Management Opatija, Faculty of Law) and of the University in Zagreb (Faculty of Medicine, Faculty of Chemical Engineering and Technology Faculty of Pharmacy and Biochemistry, Faculty of Food Technology and Biotechnology, Faculty of Science), as well as by guest lecturers of the Ruđer Bošković Institute. The total workload of most involved teachers is in accordance with the needs of the study. We believe that the number and workload of teachers who participate in the execution of the study provide quality doctoral education.

1.3. The teachers are highly qualified scientists for the courses that they deliver and to which they are committed and thus provide quality doctoral study.

Teachers at the doctoral study in Health and Environmental Engineering are recognized scientists, qualified for their courses and the topics in which they are intensively engaged, which ensures quality doctoral study. Their research papers are entered in Table 1 with links to the CROSBİ database in which scientific works of the teachers are presented in detail.

1.4. The number and qualifications of mentors ensure the quality of a doctoral thesis.

The mentor:doctoral student ratio at the doctoral study in Health and Environmental Engineering is 1:1.3. Publications are numerically listed in Table 2 and visible via the link to the CROSBİ database. International and national scientific research projects and the role of mentors in them in the observed period are listed in Appendix 5. The study completion rate is given by the year of study under point 3.2. and can generally be considered as unsatisfactory. The rate of study completion per individual mentors is uneven, which can be explained by the fact that students enrolled in the doctoral program according to a fixed quota rather than a topic or a mentor. For this reason, the reform of the doctoral program will largely affect primarily mentoring. It should be noted that the total time allowed for the defence of the doctoral thesis is 6-10 years, so that the current study completion rate does not represent the final result, namely, does not fully reflect the real situation.

1.5. The HEI has developed a method of checking the qualifications of teachers and mentors.

Qualifications of mentors and teachers are periodically reviewed on the occasion of their re-election, according to the Regulations on Conditions and Procedure of Election into Titles and Corresponding Positions of the Faculty of Medicine in Rijeka - <http://www.MedRi.uniri.hr/hr/dokumenti/znanstvenoistrzivacki-rad-izbori-u-research-and-teaching-zvanje.html>) which include more rigorous criteria than those required by the Parent Commission at the national level. The draft programme of the doctoral school (Appendix 6) includes an elaborated grading system of potential mentors aimed at calculating the actual mentoring capacity of every teacher who wants to compete with a topic of doctoral research. This proposal was adopted by the Faculty Council in its decision of 18 September 2012 (Appendix 7) but has not been completely implemented yet due to disagreements between the University

and the Faculty regarding the establishment of the doctoral school. Given that these disagreements are expected to be finally resolved soon, the process of establishment of the doctoral school at the School of Medicine, which includes a fundamental reform of doctoral studies, including Health and Environmental Engineering, is likely to continue as well. The decision of the University of Rijeka on the requirements for mentors, which will come into force in 2018 because of the time required for adjustment, clearly defines the criteria to be met by any potential mentor in order to apply for doctoral studies with a research proposal.

1.6. The HEI has quality research resources in accordance with the requirements of the scientific/artistic field in which it delivers the doctoral program.

Theoretical and practical training of doctoral students is mostly carried out on the premises of the Faculty of Medicine (B. Branchetta 20), where clinical institutes/departments and common areas for teaching (classrooms) and most other scientific infrastructure are located. Part of the classes are held also at the Teaching Institute for Public Health of Primorje-Gorski Kotar County. In addition to the main building, in Faculty premises include the Institute of Molecular Medicine and Biotechnology, the Centre for Proteomics (CAPRI) and the Mice Breeding and Engineering Centre (LAMRI). The above mentioned components of the Faculty of Medicine have modern laboratories such as: laboratories for molecular biology, laboratories for cell cultures, histological laboratories, biochemical laboratories, a laboratory for confocal microscopy, a laboratory for the production and purification of proteins, a laboratory for mass production of monoclonal antibodies, a laboratory for electronic microscopy (Institute for Pathological Anatomy – within the CHC Rijeka), a laboratory for microinjection and engineering of transgenic mice, laboratories for flow cytometry and cell sorting, a laboratory for gas chromatography, and various other specific laboratories. All the laboratories are at the disposal of doctoral students and practical classes are occasionally organised in them. The level of equipment of laboratories is at a high level and new sophisticated equipment is continuously supplied. The Centre for Laboratory Mice Breeding and Engineering also has two modern SPF (specific pathogen free) vivariums for mice breeding with a collection of over 80 various conventional and transgenic strains, which are also available to our experimental researches and doctoral students for their research. The Centre for Proteomics has started mass production of monoclonal antibodies for various viral and other antigens, which is also a source of reagents for research in protein biochemistry, immunology, and other disciplines. The theoretical part of instruction is delivered in the Faculty's Council Chamber, which is primarily reserved for the needs of the doctoral study and is appropriately equipped with modern teaching aids.

Clinical research is carried out in the teaching bases of the Faculty of Medicine in Rijeka, such as: Clinical Hospital Centre Rijeka, Special Orthopaedic Hospital in Lovran, Thalassotherapy in Opatija, and the Teaching Institute for Public Health in Rijeka. All school constituents in which doctoral students have practical classes and carry out experiments are well equipped with computer equipment. Every institute has computer equipment that is constantly at the doctoral students' disposal during their work. In addition, the school has joint computer equipment in its IT room and in the Faculty library, which is open daily (Monday – Friday) from 8 a.m. to 8 p.m. Computer equipment is constantly renewed and its maintenance is entrusted to the Faculty's IT service. About 10 general biomedical journals can be obtained through the Faculty library (Nature, Science, Cell, New England Journal of Medicine, Lancet, Cancer Cell, Molecular Cell, Genes and Development, etc.), as well as about 60 online databases through the Ministry of Science, Education and Sports (ScienceDirect, Elsevir, etc.). In addition to scientific literature available in the Faculty library, several scientists also have personal subscriptions to some journals of their interest, so doctoral students may partly rely on that source as well.

Appendix 8 gives a table listing educational and scientific material resources of the Faculty.

2. INTERNAL STUDY QUALITY ASSURANCE SYSTEM

2.1. The HEI has defined and adopted effective procedures through which it proposes, approves and implements doctoral education. These procedures include an explanation of scientific/artistic, cultural, social and economic needs.

The proposed study program of the doctoral study in Health and Environmental Engineering (Appendix 9) has passed the whole accreditation process, which included the adoption of the study program by the Faculty Council of the Faculty of Medicine in Rijeka, the formation of studies pursuant to the decisions of the Senate of the University of Rijeka following international evaluation, the ASHE's positive opinion, and registration of the study in the MSES's register.

Respecting the principle of lifelong learning and an individual's right to permanent education, with its nearly fifty years of experience in postgraduate education, the University of Rijeka Faculty of Medicine launched in the 2009-2010 academic year a new doctoral program in Health and Environmental Engineering (HEE), so far the only of the kind in Croatia. The Master's programme of Sanitary Engineering was introduced in order to increase the

interdisciplinary and collaborative work in the field of health and health care, and allow additional professional training of sanitary engineers in other scientific institutions. The primary purpose of the doctoral study is to provide quality scientific education of university researchers. Upon completion of their studies, the researchers are qualified to plan, implement and present their own research, evaluate the existing and create new knowledge in the field of research, and assume responsibility for successful implementation of research projects. In addition, the doctoral program is the source of recruitment of high-quality and modern university teachers, who will be prepared to respond to the needs of ever-higher standards of education. Furthermore, this study trains scientists who can work in biotechnological institutes, modern pharmaceutical companies and pharmaceutical laboratories, both in the public and private sectors, able to independently conduct research projects and become the core of new research groups.

The report in which we explained the reasons for launching our second doctoral study, namely, the doctoral study in Health and Environmental Engineering at the Faculty, notes that awareness about environmental protection as a precondition for the preservation of human health started to emerge and rise in the middle of the last century. The World Health Organization has accepted the task and determined that it will "promote and, along with other specialized agencies, wherever necessary, strive to improve the nutrition of the population, housing, sanitation, recreation, economic and working conditions, and other forms of environmental hygiene", stipulated in Article 2 of the WHO Statute. As part of a general movement for the preservation of environmental health as a prerequisite for preserving the health of man and in order to enable the realization of this task, it initiated, together with UNICEF, the creation of an appropriate profile of professionals who would be able to deal with these increasingly more difficult problems faced by the mankind.

The Expert Committee for Education of Engineers in Environmental Health (ECEEEH, 1967) stressed the need for education of sanitary engineers and sanitary personnel in ministries of health that would effectively deal with the problems of water supply, waste management, hygiene, nutrition, disease vector control, improving housing conditions and dr.

The University of Rijeka Faculty of Medicine accepted the challenge of educating personnel whose main task is to plan, conduct and present research in the field of preserving and improving the health of individuals, families and society, and disease prevention. These studies are aimed at the introduction and application of new methods and technologies in the process of detecting, defining and rehabilitation of environmental factors that can cause harm to human health, which ultimately leads to improved application of measures to maintain hygienic, sanitary and epidemiological levels in the overall men's working and living environment.

The doctoral study is equivalent and analogous to the corresponding studies in most Western European countries and is based on vast experience based on tradition, seeing that the University of Rijeka Faculty of Medicine has been offering postgraduate (doctoral) education for nearly 50 years.

2.2. Starting the doctoral studies is in line with the scientific mission and vision of the HEI, namely, its strategic program of scientific/artistic research.

The doctoral study program complies with the general development strategy of the Faculty of Medicine in Rijeka, including its mission and vision, but requires alignment with the Faculty's Strategy for the Development of Science, adopted by the Faculty Council in July 2016. The existing program of the doctoral study has not changed substantially for over seven years. Recent changes made in 2015 were aimed at updating courses, and the courses that had not been delivered for several years were excluded from the program. It is for this reason that in the coming period we want to implement the strategic objectives adopted in the Strategy for Development of Science (Appendix 3) according to the timetable specified in it. A complete reform of the doctoral study is intended to be complete in 2017. The areas of research which are currently at a high international level include immunology, virology, regulation of cell growth and tumour biology, and infectious diseases. To this can be added certain fields of gastroenterology, immunometabolism, human genetics, neuroscience, toxicology and cell biology. The main strategic objectives are: (1) encourage and reward scientific excellence and innovative research; (2) encourage clinical and preclinical groups that have research potential, but it has not been fully realized; (3) improve the doctoral study. The program of the current doctoral study is not entirely directed towards scientific potentials of the Faculty of Medicine, which the reform of the doctoral study needs to rectify.

2.3. The HEI systematically monitors the success of the program through periodic evaluation of the doctoral study and works on its improvement.

In the process of reaccreditation of all study programs of the Faculty of Medicine in Rijeka carried out in 2015, on the basis of the ASHE's letter expectations due to insufficient number of full-time teachers elected to research-teaching positions, we updated the program and reduced the share of external associates. What still needs to be done are further amendments and establishment of a systematic periodic international evaluation of the programs,

as stipulated in the Faculty's Strategy for the Development of Science. (Appendix 3).

In view of a better visibility and the possibility of analysing and monitoring the scientific production of mentors, teachers and associates at the Faculty of Medicine in Rijeka, we have implemented a systematic presentation of research papers using the Web of Science (WoS) Core Collection database for each calendar year as of 2009, as well as enabled tables to be seen on the SharePoint portal of the Faculty so that they are accessible to teachers, postdoctoral students and doctoral candidates. The tables are made in Excel and enable search by the principal investigator, the impact factor, the ranking of a journal in their respective group, the title of the work, and the like. A systematic presentation of scientific works will allow us to monitor and analyse the scientific production of mentors and doctoral candidates. The Quality Assurance Manual (Appendix 10), on its page 29, defines the procedures for ensuring the quality of scientific and research activities.

Feedback is obtained through a survey given to doctoral candidates systematically on an annual basis (Appendix 11). The Commission for Postgraduate Studies and Continuing Education performs the role of a council for doctoral studies that oversees the progress of doctoral students during their studies.

On the basis of these procedures, changes have been implemented in the new proposal for the doctoral school (Appendix 6) that we intend to further amend and implement by the end of 2017.

2.4. The HEI systematically monitors the success of the mentors, has mechanisms for evaluating or changing them, as well as for solving the possible problems between a mentor and a doctoral student.

The scientific success of doctoral students is given in Appendix 12, which lists all the doctoral students and the doctoral theses they defended since the establishment of doctoral study, and in section 3.2., which lists the average study completion rate by the academic year of enrolment. If a doctoral student requests the change of their mentor, they must give the reasons for the change and submit a signed consent of both the former and the new mentor. If the change is requested by the mentor, the request must be accompanied by a detailed explanation of the reasons for the abandonment of mentoring. The possible change of the mentor is examined by the Commission for Postgraduate Studies and Continuing Education, which submits its proposal to the Faculty Council, which in turn decides on the possible changes.

2.5. The HEI provides academic integrity and freedom of scientific research.

For several years already, the Faculty of Medicine in Rijeka has been working on a systematic improvement of academic integrity. Fabrication, falsification and plagiarism, and any other form of improper appropriation of the results of someone else's work and, generally, misconduct, are stressed in teaching to raise the students' awareness of them (the mandatory course "Introduction to Research" and elective course "Academic Writing" offered at undergraduate/graduate levels, and the mandatory course in "Scientific Research Methodology" in the doctoral studies). In addition, although the University of Rijeka has its Code of Ethics, The Faculty of Medicine has prepared and adopted its own documents - the Code of Ethics of Teachers, Associates and Researchers (2010) and the Code of Ethics of Students (2012), and is preparing its Code of Ethics of Professional Services, which will make it unique at the state level. Permanent Ethics Committee for Protection of Academic Integrity, Safeguarding the Dignity and Promoting the Reputation of the Faculty (founded in 2011), appointed by the Dean, has five members and meets as required, on the basis of complaints filed (on average twice a year). The procedure of reporting is prescribed by the Rules of Procedure of the Ethics Committee (2012), on the basis of which the Committee's opinion is submitted to the Dean, who decides on further measures (with the possibility of initiating disciplinary procedures prescribed by special regulations, written warnings, etc.). It should be noted that this Committee differs by its composition and scope from the Ethics Committee for Biomedical Research, which issues certificates of compliance of research protocols with positive acts (more members, higher interdisciplinarity, and members are appointed by the Faculty Council).

For the purpose of conducting scientific and academic integrity, in particular to reduce the prevalence and proportion of plagiarism in theses and other papers during doctoral studies, the Faculty of Medicine uses Turnitin, the internet-based plagiarism-prevention service. A license issued by the University of Rijeka provides each teacher of the Faculty of Medicine with unlimited access to Turnitin, which allows them to check the compatibility of a text with sources on the internet and electronic databases of papers and theses at the university and beyond. This network service allows analysis of texts, access to matching sources, assessment and review of submitted texts, and enables electronic communication between students and teachers for the purpose of joint work on a thesis. Prior to acceptance of the final thesis version, the mentor is required to make a final analysis of the text and confirm the authenticity of the work in accordance with the functions of a computer program. The report on verification of the authenticity of student work is submitted on the prescribed form of the University, which is an integral part of the basic documentation for thesis defence. It is at the mentor's discretion to accept the proportion of parts taken from other sources if they consider it appropriate and do not find it to be plagiarism, but a general

recommendation of the Faculty of Medicine is that the proportion of text directly adopted from other sources does not exceed 10% (excluding the bibliography, direct quotes in quotation marks and the stipulated parts of the thesis, such as the titles and the like.), which is in accordance with the criteria of other reputable universities in the world. Support to students and teachers in using Turnitin is provided by extensive instructions available on the Faculty website and by the Faculty's Turnitin program coordinator Prof. Lidija Bilić-Zulle.

2.6. The procedure of writing and defence of the doctoral thesis is clear and objective, and includes public presentation of the topic of doctoral research.

The procedure of writing and defence of the doctoral thesis is clear and objective, and includes public presentation of the topic of doctoral research. The procedure is defined in the **REGULATIONS ON STUDIES OF THE UNIVERSITY OF RIJEKA** of 1 July 2008 (Articles 64 and 65: Registration of Thesis Topic, and Thesis Proposal Defence). These two Articles stipulate the content of the registration of a thesis topic, the obligation to attach the proposed mentor's agreement and the approval of the Ethics Committee of the institution delivering the study.

In accordance with the above Regulations and the **REGULATIONS ON WRITING A DOCTORAL THESIS OF THE UNIVERSITY OF RIJEKA** of 16 May 2013 and the **Statutes of the University of Rijeka** (of 15 February 2015) and of the **Faculty of Medicine** (of 28 September 2010), two commissions of the University of Rijeka Faculty of Medicine (for Scientific Research, and for Postgraduate Studies and Continuing Education) compiled the **Instructions for registration of the doctoral thesis topic and writing the doctoral thesis** attached hereto (practical instructions for doctoral students, provide detailed information on registration, public defence and assessment of the doctoral thesis topic, as well as the submission of a doctoral thesis for assessment and the procedure of assessment and defence of the doctoral thesis. The Instructions are posted on the website of the Faculty's Commission for Scientific Research (under Scientific Research). Information, in addition to the website, can be obtained from officials of the Service for Scientific Research.

Application for registration of a thesis topic is submitted on DrS1 form of the University of Rijeka (Appendix 13), which is available on the website of the University of Rijeka (Forms) and on the website MedRi (Scientific activities, Commission for Scientific Research). **DrS forms of the University of Rijeka have been used for the doctoral studies of the Faculty of Medicine in Rijeka since September 2015.** The instructions guide doctoral students through the form and explain where they should enter general data, the title of the proposed topic, and the names of proposed mentors. They also explain the purpose of justification of the topic and its content (a review of previous studies, the objectives and hypotheses, materials and methods, ethical aspects, statistical analysis of results, the expected scientific contributions, and literature citations) and the manner in which the abstract should be compiled. The abstract with respective keywords should be presented in both Croatian and English. Before the introduction of the application form, applications for topic registration did not comprise an abstract but only key words in Croatian and English. DrS1 form contains a field for stating the source of funding that will cover the costs of preparing the thesis. The form must be signed by the mentor(s) (confirming their agreement with the proposed topic) and by the doctoral candidate, indicating the date of signature. By signing it, the doctoral candidate confirms that no identical proposal of the thesis is being simultaneously submitted to another university. The form should be accompanied with the candidates CV on the structured form available on the University and MedRi websites. Before the introduction of DrS1 for, application for registration of the thesis topic also contained all these elements, but not in a single document.

Following the review of the proposed doctoral thesis topic and adjustments made in accordance with the recommendations of the Commission for Scientific Research, the Faculty Council appoints an Expert Commission for Assessment of Doctoral Thesis and Doctoral Thesis Defence. The Commission consists of an odd number of members (at least three), of whom **at least one is the research and teaching position or a relevant scientific position in another scientific institution of the University of Rijeka or another university.** Members of the Commission are elected from among experts in the scientific field or a branch of the thesis. Furthermore, the decision of the Faculty Council of 15 May 2001, stipulates that at least one member is to be elected from among experts of another scientific field (Basic or Clinical Medical Sciences). None of the proposed mentors can be elected members of the Commission.

PUBLIC DEFENCE AND ASSESSMENT OF THE DOCTORAL THESIS TOPIC

Public defence of the thesis topic is regulated by the **REGULATIONS ON STUDIES of the University of Rijeka** of 1 July 2008 (Article 65: Thesis Proposal Defence). The Instructions (attached) contain a detailed description of the procedure of public defence and assessment of the topic. The time and place of the public defence of the doctoral



thesis are advertised on the MEDRI website at least seven days in advance and the information is also sent to all the MEDRI Departments by e-mail. The Instructions inform the doctoral student that the Commission may request that some amendments be made to the application for registration, and also explain the procedure to follow until the application is in accordance with the request of the Commission. Furthermore, the Instructions inform the doctoral student about deadline for the public defence, namely, when they can expect to receive the Commission's report once all the obligations related to the application and public defence of the thesis topic have been fulfilled.

Public defence of the doctoral thesis is held according to the planned **protocol** (Appendix 13). The protocol of public topic defence is described in the MedRi Instructions (p. 7) and is publicly available. After reading the general personal details of the doctoral candidate and the introduction of the members of the Commission, the candidate has at their disposal between 20 and 30 minutes to present their topic. The presentation includes a review of issues, recent findings, the hypotheses and objectives, materials (subjects) and methods, and the expected scientific contribution. After the presentation, the candidate is asked questions first by the members of the Committee, and then by those present in the audience, namely, a discussion follows. The course of the public defence is recorded in the minutes, which state the time of commencement, the duration of the candidate's presentation, the questions asked after it, as well as the comments, remarks and suggestions of the Commission members. The minutes are signed by the Commission members, who also state whether the doctoral thesis topic has been accepted, accepted with modifications, or rejected. Before reaching their final decision, the Commission members convene in the absence of the doctoral candidate (who leaves the room).

The Expert Commission submits its written report on DrS2 form of the University of Rijeka (Appendix 13, available on the Faculty website, like the former DrS1 form). In addition to general information about the doctoral candidate, the study, the mentors and members of the Expert Commission, and the previous scientific activities of the doctoral candidate, DrS2 form also contains the report on the public defence (specifying the place and time of the public defence, the duration of the candidate's presentation, questions by members of the Expert Commission and the audience, etc.) and the assessment of the proposed topic. In its assessment of the topic, the Expert Commission states what the doctoral candidate intends to explore and in which way, and evaluates whether the materials (subjects) and the proposed methods are appropriate for achieving the objectives of the research. Furthermore, the Commission evaluates whether the expected scientific contribution of the proposed research is achievable. Also, the Commission's report, i.e. assessment, on the proposed topic states what modifications and/or additions were requested and confirms that the doctoral candidate has accepted and made them in the text of their application. Following a positive report, i.e. assessment of the doctoral thesis, the doctoral candidate is obliged to submit to the Service for Scientific Research the last, modified version of their application.

Form DrS2 allows for a dissenting opinion in the event of divergence of some members of the Expert Commission and impossibility of their reaching a joint assessment. The report is signed by all members of the Expert Commission, after which the report is considered by the Faculty Council. Reports are available at electronic sessions of the Faculty Council. When adopting a positive report on topic assessment, the Faculty Council also formally appoints the mentor(s).

Appendix 13 Application for registration of the doctoral thesis topic

- 1) Instructions for writing the doctoral thesis (UniRi, February 2013)
- 2) Instructions for registration of the doctoral thesis topic and writing the doctoral thesis at MedRi, September 2015
- 3) DrS1 form: Registration of the doctoral thesis topic (UniRi)
- 4) DrS2 form: Assessment of the doctoral thesis topic (UniRi)
- 5) Forms for the protocol and minutes of the public defence of the doctoral thesis topic
- 6) Selected samples of application for registration of the doctoral thesis topic, assessments of doctoral thesis topic (reports), minutes of public defences of the doctoral thesis topic at the doctoral study in Health and Environmental Engineering

Appendix 14 Samples of application for registration of the doctoral thesis topic with signed topic assessment forms.

2.7. The assessment of a doctoral thesis is the result of scientific evaluation of an independent commission.

ASSESSMENT OF A DOCTORAL THESIS

The procedures of writing, assessment and defence are stipulated in the relevant documents. The doctoral degree can be earned in different ways. Detailed instructions for writing a doctoral thesis at the University of Rijeka and its Faculty of Medicine are publicly available, as well as the forms for the assessment of doctoral theses and the protocols of public defence of doctoral theses.

After completing doctoral research and thesis preparation in writing, doctoral candidate which has previously accepted topic and appointed mentor (s) shall apply to the assessment of the dissertation. Conditions to be allocated pushing meet are prescribed by the **REGULATIONS ON STUDIES of the University of Rijeka** of 1 July 2008 (Articles 66, 67-69: Request for doctoral thesis assessment, Doctoral thesis assessment; Doctoral thesis defence, Defence procedure). The technical instructions for the preparation of the manuscript of the thesis are provided by the **UNIVERSITY OF RIJEKA REGULATIONS ON WRITING A DOCTORAL THESIS** of 16 May 2013. The University of Rijeka also issued the Instructions for writing a doctoral thesis at the University in Rijeka (February 2013) (Appendix 15), in accordance with which Instructions for registration of the doctoral thesis topic and writing the doctoral thesis were also issued (practical guidance for doctoral students, hereinafter: Instructions). The Instructions are supplemented by useful information for doctoral students, and were last revised on 10 September 2015. They inform the doctoral students in detail about the way a doctoral thesis should be written. They also inform them about the possibility of earning the doctoral degree by writing a monograph or according to the Scandinavian model. Therefore, **a thesis can be submitted for assessment in the form of monograph or according to the Scandinavian model, and can be written in the Croatian or English language.** If the doctoral student wants to earn their doctoral degree according to the Scandinavian model, Article 63 of the **REGULATIONS ON STUDIES OF THE UNIVERSITY OF RIJEKA** of 1 July 2008 and Article 2 of the **UNIVERSITY OF RIJEKA REGULATIONS ON WRITING A DOCTORAL THESIS UNIVERSITY OF RIJEKA** of 16 May 2013 apply. The doctoral student who applies for assessment of their doctoral thesis according to the Scandinavian model must enclose by evidence of at least four scientific papers published in indexed journals and meet the other conditions prescribed in Article 5 of the said Regulations. In the last five years, no applications for a doctoral thesis according to the Scandinavian model have been submitted.

Encouraging the publication of papers in journals with international review before the defence of the doctoral thesis: MEDRI Instructions inform doctoral students that they can submit their thesis for assessment after they have fulfilled all their obligations prescribed in the curriculum of the doctoral study, which is verified by the Confirmation of fulfilled obligations issued by the Commission for Postgraduate Studies and Continuing Education. In addition, the doctoral student's application for assessment of the doctoral thesis must be accompanied by their Declaration of Published Work (Works) in accordance with the decisions of the Faculty Council pursuant to Article 29 of the Statute of the University of Rijeka Faculty of Medicine of 28 September 2010. The Declaration is submitted on forms available on the MEDRI website (Scientific activities, Commission for Scientific Research) and contains the information about the author, the title, the journal, the year of publication and the impact factor of the journal, as well as a description of the work with a short presentation of the results to make it easier to connect the content of the paper with the topic of the thesis. The Declaration is signed by the doctoral student and the mentor (s) (Appendix 15). The rules of publication of scientific papers have been modified several times in the past five years for doctoral students enrolled in 2012-2013 and 2014-15 academic years. The criteria were tightened in the sense that they now impose a higher impact factor of the journal in which the results of the doctoral thesis are published, a bigger number of first-author papers or publication in the first or second quartile of journals listed in the JCR.

Publication of papers in journals with international review is encouraged by the following provisions:

1) Students enrolled in the postgraduate university (doctoral) study before the 2012-2013 academic year should have one first-author or two co-author papers related to the thesis topic published in a CC-indexed journal.

2) Students enrolled in the postgraduate university (doctoral) study in the 2012-2013 or 2014-2015 academic year should publish, prior to the submission of their doctoral thesis for assessment, a minimum of two *in extenso* original scientific papers related to the topic of the doctoral thesis in journals cited in the Science Citation Index Expanded / Journal Citation Report (SCIE/JCR) with an impact factor higher than 1, one of which must be first-author. Alternatively, at least one first-author *in extenso* original scientific paper related to the topic of the doctoral thesis must be published in a journal with an impact factor higher than 5 and indexed in SCIE/JCR

databases (according to Art. 29 of the MedRi Statute, the decision of the Faculty Council of 26 February 2013).

3) Students enrolled in the postgraduate university (doctoral) study in the 2015-2016 academic year or later should publish, prior to the submission of their doctoral thesis for assessment, a minimum of two original scientific papers related to the topic of the doctoral thesis in journals cited in the Web of Science Core Collection (WoS Core Collection) with an impact factor higher than 1, one of which must be first-author, have two of their papers published in the first or second quartile (Q1/Q2) of the JCR. Alternatively, at least one first-author original scientific paper related to the topic of the doctoral thesis must be published in a journal with an impact factor higher than 5 and indexed in the WoS Core Collection.

It follows from the above that doctoral students cannot submit their thesis for assessment unless they have published at least part of their doctoral research according to the above provisions.

The mentor must submit a written statement of agreement with the manuscript of the doctoral thesis submitted for assessment, and also check the authenticity of the thesis through the Tunitin system, about which they attach a report on a special form available on the Faculty website (Regulations and documents, Ethics) (Appendix 15). The Commission for Scientific Research controls the technical preparation of the manuscript, evaluates its scientific contribution and makes suggestions to the doctoral student for improving or amending their application where it deems it necessary. When the Commission for Scientific Research is satisfied with the application, it recommends it to the Faculty Council, which in turn appoints at least three members of the Expert Commission for Assessment of Doctoral Thesis. At least one member of the Expert Commission is a scientist from another university or another scientific institution, which is standard practice. The scientific activities of the members of the Expert Commission cover the area of research of the doctoral thesis. The initially granted doctoral thesis topic registration is submitted to the Commission in addition to the manuscript of the doctoral thesis itself to facilitate checking whether the doctoral thesis corresponds to the previously set goals of research.

Encouraging the participation of external members of commissions: an external member is appointed in each expert commission, without exception. This has been the case with each commission for the assessment of a doctoral thesis topic or of a doctoral thesis not only in the past five years, but it has long been common practice at the Faculty. External members are previously contacted by the Commission for Scientific Research and are presented the title of the proposed topic without giving the names of the doctoral student or their mentors. If the external member agrees to participate in the evaluation of the proposed topic and the doctoral thesis, their name is forwarded to the Faculty Council, which confirms the election of all members of the Expert Commission. External members are elected from another university in Croatia (Zagreb, Split, Osijek) or another faculty of the University of Rijeka (Department of Biotechnology, Faculty of Humanities and Social Sciences), but can also be elected from among the international scientific community, which has not been the case in the last five years.

The Expert Commission for Assessment of Doctoral Thesis submits a report within a specified period of time on DrS9 form of the University of Rijeka (Doctoral thesis assessment report) (Appendix 15). This form is also available on the Faculty website (Scientific activities, Commission for Scientific Research). DrS9 form contains general information about the doctoral student, the study, the scientific area, field and branch, the mentors, the Expert Commission for Assessment of Doctoral Thesis and the assessment itself. The assessment includes a brief overview of the content and the main results, the conclusion of the Commission which expressly states the original scientific contribution of the thesis, and the opinion and recommendation to the Faculty Council to accept or reject the doctoral thesis. Also, the field Notes lists the changes that the Expert Commission requested the doctoral student to make and the confirmation that the doctoral student has accepted them and made them in the final version of the manuscript. The signed report is submitted to the Service for Scientific Research, which considers it and then refers it to the Faculty Council for their consideration. The reports on the assessment of a doctoral thesis are available at the electronic sessions of the Faculty Council.

PUBLIC DEFENCE OF THE DOCTORAL THESIS – PROTOCOL

After accepting the positive report of the Expert Commission for Assessment of Doctoral Thesis, the Faculty Council appoints the Commission for Assessment of Doctoral Thesis. In the event of a negative report, the doctoral thesis is rejected and the procedure discontinued. In the event that the report of the Expert Commission does not constitute a sound basis for the acceptance of the thesis, the Faculty Council appoints new members to the Expert Commission and asks them to assess the thesis.

The defence of the doctoral thesis is public and takes place according to a predetermined **protocol** (Appendix 15).

The protocol of public topic defence is described in the Instructions of the Faculty (p. 13) and publicly available. After reading the general details of the doctoral student and presentation of members of the Expert Commission, the doctoral student has 30 minutes to present their doctoral thesis. The presentation includes a review of issues, recent findings, the hypotheses and objectives, the materials (subjects) and methods, the main results, and the scientific contribution of their work. After the presentation, the candidate is asked questions first by the members of the Committee, and then by those present in the audience. The course of the public defence is recorded in the **minutes** (Appendix 15), which state the time of commencement, the duration of the candidate's presentation, the questions asked after it and the proposed changes. The Commission for Assessment of Doctoral Thesis also includes the mentor(s).

Appendix 15 Thesis assessment

- a) Regulations on writing a doctoral thesis at UniRi
- b) Form DrS9 Doctoral thesis assessment report (UniRi)
- c) Statement of published papers (MedRi)
- d) Statement of verification of authenticity of student work (UniRi)
- e) Form: Protocol of public defence of doctoral thesis (MedRi)
- f) Form: Minutes of the public defence of doctoral thesis (MedRi)
- g) A sample of a doctoral thesis assessment (report), mentor's agreement, minutes of the public defence of a doctoral thesis in the period 2011-2015 at the doctoral study in Health and Environmental Engineering

Appendix 16 A sample of a doctoral thesis assessment and minutes of a defence

2.8. The HEI publishes all the necessary information about the study, admission requirements, classes, and the conditions for promotion and completion of the study in easily accessible places and media.

The Faculty of Medicine in Rijeka publishes all necessary information for students on the website of the doctoral program in Health and Environmental Engineering: <http://www.medri.uniri.hr/hr/studenti/poslijediplomski-sveucilisni-doktorski-studiji/zdravstveno-i-ekolosko-inzenjerstvo.html>. In addition to the Faculty website, all important information is sent separately to students of doctoral studies by e-mail. It includes the schedule of lectures, the time of conferences, trainings, schools, scientific forums, reminders of tuition fees due, and the like. Students can obtain further information also in the Office of Postgraduate Studies from Monday to Friday 8.00 - 16.00 hours.

2.9. The funding raised for the purpose of doctoral education are allocated clearly and in a way that ensures the maintenance and improvement of doctoral education (ensures and supports doctoral students' research in order to help them to successfully complete the program).

The doctoral students of the Faculty of Medicine in Rijeka enjoy full and comprehensive institutional support to their training, which consists primarily of the excellent conditions in the form of spatial and material resources that enable advanced research in the field of biomedicine and health and environmental engineering. Excellent material, technical, scientific and methodological conditions are best described by the modern, state-of-the-art equipment that is available to doctoral students in their work on the doctoral thesis. In this regard, it is worth noting the extremely expensive, but modern devices purchased mainly from the funds of scientific and technical projects conducted or being conducted by the teachers of the Faculty of Medicine in Rijeka and the general funds of the Faculty. It should also be noted that several hundred thousand kunas are spent yearly on contracts for regular servicing of these devices or their revisions alone. The quality of research is also supported by the purchase and maintenance of the required small laboratory equipment and reagents. In addition to these core facilities, the doctoral students also have at their disposal the most modern and one of the largest facilities for laboratory animals breeding in southeast Europe, the Mice Breeding and Engineering Centre (LAMRI). Besides this one, there are also the cutting edge breeding and experimental facilities at the Institute for Physiology and Immunology and the Institute for Pharmacology. Needless to say, these expensive installations, which are maintained and developed from project and the general Faculty funds, open a wide space to advanced in vivo biomedical research and the development of competitive doctoral work at the international level. Other core capacities that the Faculty of Medicine in Rijeka offers to its researchers, and thus doctoral student as well, are the installations for the use of liquid nitrogen freezing. The Faculty of Medicine in Rijeka maintains its IT infrastructure and monitors the development of IT equipment, which it procures and puts to the disposal of its doctoral students for their work on scientific projects. Furthermore doctoral students have also at their disposal the scientific literature in the form of books or scientific journals, available in paper or on-line form, which are bought from the project or general funds of the Faculty. The Faculty enables its doctoral students to study and exchange of scientific achievements at conferences, symposia, scientific schools and other scientific meetings by covering the cost of travel, stay, daily



allowances and fees from its general or project funds. Finally, we should mention that, in addition to subsidising research, the funds raised from tuition fees of doctoral students are partly spent also for covering the overheads and maintenance of the spatial and material infrastructure.

The expenses by accounting items are as follows:

ACCOUNT	ACCOUNT NAME	DOCTORAL STUDY
31	EMPLOYEE EXPENSES	3,811,325.58
32	MATERIAL EXPENSES	1,441,497.94
3211	BUSINESS TRIPS	52,257.78
3212	COMPENSATION FOR TRANSPORT TO AND FROM WORK AND FIELD WORK	260,610.05
3213	EMPLOYEE PROFESSIONAL TRAINING	9,023.31
3221	STATIONERY AND OTHER MATERIAL EXPENSES	73,211.20
3223	ENERGY	517,887.01
3224	MATERIAL AND PARTS FOR CURRENT AND INVESTMENT MAINTENANCE	10,430.84
3225	SMALL INVENTORY	9,531.98
3227	OFFICIAL AND WORKING CLOTHES	4,174.91
3231	PHONE AND MAIL SERVICES	91,241.28
3232	CURRENT AND INVESTMENT MAINTENANCE SERVICES	53,854.25
3233	PROMOTION AND INFORMATION SERVICES	11,763.83
3234	UTILITIES	162,352.46
3235	LEASES AND RENTS	59,083.27
3236	HEALTH AND VETERINARY SERVICES	9,963.51
3237	INTELLECTUAL AND PERSONAL SERVICES	22,417.43
3238	COMPUTER SERVICES	37,817.05
3239	OTHER SERVICES	13,863.78
3293	BUSINESS ENTERTAINMENT	7,468.08
3294	MEMBERSHIP FEES	1,566.86
3295	FEES AND CHARGES	32,979.05
34	FINANCIAL EXPENSES	1,177.68
42	EQUIPMENT	26,030.74
	TOTAL	5,280,031.93
	NUMBER OF STUDENTS	352.00
	PER STUDENT	15,000.09

2.10. The tuition fee is determined on the basis of clear criteria (the actual costs of the study).

The tuition fee for the doctoral study is determined on the basis of the calculation of costs incurred by the Faculty of Medicine in Rijeka for undergraduate, postgraduate, specialist and doctoral studies.

CALCULATION OF TUITION FEE FOR DOCTORAL STUDENTS

1	GROSS BALANCE OF COSTS CLASS 3 SOURCE 01 (REGULAR OPERATIONS)	HRK	67,177,521.45
2	GROSS BALANCE OF COSTS CLASS 4 SOURCE 01 (REGULAR OPERATIONS)	HRK	107,237.11
3	COMPENSATION FOR TUITION COSTS OF FACULTY OF HEALTH STUDIES (FHS)	HRK	873,675.00
4	REDUCTION OF INCOME (WORK OF TEACHING STAFF IN SCIENCE, WORK AND INCOME IN OWN ACTIVITIES, BUSINESS TRIPS, ETC.)	HRK	36,740,535.40
	TOTAL EXPENSES	HRK	31,417,898.16



NUMBER OF STUDENTS	
5 FULL-TIME UNDERGRADUATE STUDIES (ALL STUDIES)	1091
6 SPECIALIST AND DOCTORAL STUDIES	535
7 PARTICIPATION OF FHS STUDENTS WITH 70%	454

TOTAL	2080
FEE PER STUDENT 15,104.75	
(The calculation of the cost per student is obtained by dividing the overall costs of the institution with the number of students)	

3. SUPPORT TO DOCTORAL STUDENTS AND THEIR PROGRESS DURING THE STUDY

3.1. The HEI determines the enrolment quotas on the basis of teaching and mentoring resources.

The enrolment quotas for the doctoral study of Health and Environmental Engineering are approved by the University of Rijeka upon the proposal of the Faculty of Medicine. The quota is determined in line with the general quantitative capacity of available mentors, but in practice the mentors' workload is not optimally balanced, as can be seen from Table 2 in the Appendix. However, most mentors do not exceed the set ratio of 1:3 (24 of them, or 100% of available mentors). To date, we have not applied any evaluation mechanisms for mentoring competencies of each potential mentor. Nevertheless, the criteria to be met by a potential mentor were adopted at the level of the University of Rijeka for different scientific fields. The timeframe set for their alignment is five years, so the deadline for their implementation is the academic year 2018-2019.

The Study Agreement regulates mutual rights and obligations between the Faculty and a doctoral student. The student is obliged to acquire the prescribed number of ECTS points of the individual credit group for the current year of study established by by-laws of the University of Rijeka and the study program (Appendix 17).

3.2. The HEI determines the enrolment quotas based on scientific/artistic, cultural, social, economic and other needs.

Economic operators have so far expressed only modest interest for doctors of science in the field of Biomedicine and Health. However, the increase in entrepreneurship in the biomedical field in the wider region, as envisaged in the Development Strategy of the University of Rijeka, the forthcoming development of the Centre for Translational Medical Research – TransMedRi - and biotechnology companies having recourse to the University (Science Park StepRi and Biotechnological Park), the existing pharmaceutical companies (e.g. Jadran Galenski Laboratorij) and health tourism (e.g. Thalasotherapia Opatija, the Istarske Toplice spa, etc.) are likely to result in increased demands for scientific research and scientific-teaching staff.

Average completion rate by the academic year of enrolment in the doctoral study:

Academic year 2009-2010 1/10 10%

Academic year 2010-2011 0/17 0%

Academic year 2011-2012 0/6 0%

We have not analysed the completion rate for the academic year 2013-2014 because the time period is too short for completion of the study given its duration.

3.3. The HEI determines the enrolment quotas depending on the available funding for doctoral students, and on the basis of the absorption potential of research projects or other sources of funding.

A minor part of research carried out by doctoral students is directly financed from projects' funds. However, the Faculty of Medicine fully covers the costs of the study of its employees. The Clinical Hospital Centre in Rijeka participates in the tuition fee of its employees covering a third of the cost, and if these doctoral candidates also participate in the teaching process at the Faculty of Medicine, the Faculty covers another third of the cost. Doctoral students who conduct clinical research use the resources of relevant clinics for their work. The following is a list of all directly funded projects:

List of doctoral students employed in projects:

First and last name	Institute	Project(s)
Robert Doričić	Department of Social Sciences and Humanities	Croatian Science Foundation - European bioethics at work (7853)

3.4. When selecting the candidates and determining their number, the HEI makes sure that each candidate enrolled has a study counsellor (potential mentor). Upon their enrolment, it continues to monitor whether the candidates have a sustainable plan of research and complete their doctoral thesis.

Upon announcement of the competition, the Commission for Postgraduate Studies and Continuing Education appoints

The Commission for Applicant Scoring, which calculates the applicants' score according to the submitted documents. The Commission comprises the Vice Dean for Scientific Research, the Vice Dean for Postgraduate Studies and Continuing Education, the coordinator of the Doctoral Program, the chairman of the Commission for Scientific Research and the chairman of the Commission for Postgraduate Studies and Continuing Education. After the formation of the rank list and selection of candidates according to the approved quota, each doctoral candidate is appointed a temporary mentor (study advisor). The potential mentor's statement of agreement/recommendation for scientific research is a mandatory part of the documentation submitted in the competition process. If the candidate opts for another research during their study, registration of the new doctoral thesis topic is contingent on prior agreement of the new mentor who will lead the doctoral student through the work on and defence of the doctoral thesis. Therefore, each doctoral student has a mentor for the whole duration of the study, until the defence of their doctoral thesis or expiration of the study.

3.5. The HEI ensures recruiting of interested, talented and highly motivated doctoral students from the country and abroad.

The Faculty of Medicine in Rijeka provides timely information of potential applicants about the application for the doctoral study. During an academic year, contacts of interested candidates are collected and they are timely notified via e-mail about the announcement of the competition for admission to doctoral studies. The competition is published in the press (Novi List) and on the website of the Faculty of Medicine in Rijeka. The Faculty encourages enrolment of the best students of undergraduate and graduate students with research preferences. For example, the best students of the Faculty of Medicine in Rijeka with holding the Dean's Award are exempted from paying the tuition for the doctoral study. At present, the competition is not announced at the international level, but despite that there are interested participants from the neighbouring countries: Bosnia and Herzegovina, Kosovo, Slovenia, etc.

3.6. The selection procedure of doctoral candidates is transparent and aimed at the selection of the best ones.

Enrolment of the best candidates is enabled through scoring according to predefined criteria and available to candidates. Most points are earned from the grades achieved in previous education, and from the mentor's recommendation, published works, awards, active participation in conferences and stay outside the institution. After the formation of the rank list, priority in enrolment is given to the better-ranked candidates. Interviews with candidates are not mandatory in the current enrolment procedure, but we plan to introduce them in the reformed study.

The criteria and procedures for the selection of candidates are the following:

1. Average grade in undergraduate study:

Each 0.1 above the average grade higher than 3.4 earns 2 points (maximum 30):

Average grade	No. of points
3.4	0
3.5	2
3.6	4
3.7	6
3.8	8



3.9	10
4.0	12
4.1	14
4.2	16
4.3	18
4.4	20
4.5	22
4.6	24
4.7	26
4.8	28
4.9	30
5.0	30

2. Recommendation:

Recommendation announcing that the candidate will be included in scientific research - 5 points

The candidate has been involved in student scientific research - 5 points

3. CC-indexed papers:

- First author – 10 points

- Co-author – 7 points

- Third or further-line co-author – 5 points

4. Papers not indexed in CC:

- First author – 5 points

- Co-author – 4 points

- Third or further-line co-author – 3 points

5. Popularisation papers:

- 2 points

6. Conference reports at national and international conferences:

- Oral presentation – 2 points

- Poster presentation – 1 point

7. Awards and grants:

- Rector's award – 5 points

- Dean's award – 3 points

- Grants (Top Grant, University Foundation, City, etc.) – 3 points

8. Courses, scientific schools

- International scientific schools and courses - 3 points

- National scientific schools and courses – 2 points

9. Stay at a foreign scientific institution longer than 1 month

- 3 points

3.7. The HEI ensures transparency of both the selection procedure of candidates in accordance with the published criteria and the objection procedure.

The Faculty of Medicine in Rijeka ensures transparency of the selection procedure of candidates in line with the scoring criteria for admission defined in the study programme and published in full on the website of the Faculty of Medicine in Rijeka

(http://www.medri.uniri.hr/files/STUDIJI/Poslijediplomski_studiji/ZDRAVSTVENO_I_EKOLOSKO_INZENJERSTVO/2016_Knjiga_ZEL.pdf)

After reviewing the documentation of applicants, the appointed Commission forms a ranking list, the list of selected applicants is public and published on the Faculty's website. The competition documentation is duly filed in the Office of Postgraduate Studies. The deadline for filing complaints and responding to them is given. Rejected candidates are entitled to have an insight in the weakness and strengths found in their respective application, and



are given recommendations for improving their future research plans as appropriate.

3.8. There is a possibility of recognition of past achievements of doctoral students and candidates for the study.

Recognition of previous achievements relevant to the doctoral program are elaborated and regulated by a number of decisions of the Faculty Council and the Commission for Postgraduate Studies and Continuing Education (Appendix 18).

Based on their prior achievements, the applicants who enrol in the doctoral study of Health and Environmental Engineering are entitled to **end the study without attending the study program**. The provisions of the Regulations on Studies of the University of Rijeka stipulate that the following shall be recognised for these candidates: i) publication of at least three first-author original *in extenso* scientific papers in the last five years indexed to WoS Core Collection; they must be published in journals ranked among the top 25% of journals in the field of research (Q1 according to JCR); the papers that are not accepted include case reports and *in extenso* abstracts; ii) stay of at least one semester in a domestic or foreign university or scientific institution, and active participation in at least two international meetings, of which at least one with an oral presentation.

Doctoral students can earn points from **scientific achievements made before or during the doctoral study within compulsory or elective activities as part of the doctoral program**. For scientific papers published in SCIE/JCR-cited journals, the first author and the corresponding author are scored with 15 ECTS, and the co-author with 7.5 ECTS. Participation at an international congress (conference report) with oral presentation earns 5 ECTS, poster presentation as the first author 2 ECTS and as a co-author 0.5 ECTS. Participation at a national congress (conference report) with oral presentation earn 2 ECTS, and poster presentation as the first author 1 ECTS and as a co-author 0.25 ECTS. Participation in national or international seminars, courses, round tables, conferences, summer schools, etc. is assigned from 0.2 to 2 ECTS depending on the complexity and duration of the event, which is determined by the Commission for Postgraduate Studies and Continuing Education.

Students who transfer to the doctoral studies of the Faculty of Medicine in Rijeka from equivalent studies of other faculties have their previous achievements recognised, namely, the completed compulsory and elective courses and the respective exams passed, scientific papers published in CC- or SCIE- indexed journals, participation in domestic or international scientific meetings (conferences, courses, scientific schools and the like.), the research work carried out in another institution outside of the Faculty of Medicine in Rijeka, and mentor reports from the original institution. ECTS evaluation of research activities is carried out according to the criteria of the program of doctoral studies (cf. previous paragraph).

Doctoral students in Health and Environmental Engineering have the **previously completed Masters study program recognized**, namely, the completed mandatory courses and the respective exams passed of the completed postgraduate scientific (Master) study including provided that their scope and content correspond to the relevant courses in the doctoral study, while the compulsory courses that do not satisfy this condition and all elective courses taken and passed are recognised as elective courses in the doctoral study. This evaluation, scoring and recognition of courses is conducted by the Commission for Postgraduate Studies and Continuing Education with appropriate agreement of the coordinator of the course being recognized.

Doctoral students have **also the program content previously realized in postgraduate specialist studies recognized**. A maximum of 10 ECTS points is recognised for elective courses in completed postgraduate specialist studies, so students who have completed more than one postgraduate specialist study cannot earn more than 10 ECTS points for these.

Finally, doctoral students have their **scientific papers that are not quoted in journals listed in the SCI/JCR databases** recognized as electoral activities according to the following criteria: first-author paper is scored with 4 ECTS and a co-author one with 2 ECTS credits.

3.9. The rights and obligations of doctoral students are regulated by the HEI's relevant regulations and the Study Agreement, which ensures a high level of institutional and mentoring support to doctoral students.

The quality of the doctoral program is ensured by continuous monitoring of the standard of acquisition of skills, the quality and performance of the teaching process and the study outcomes, all under the supervision of the Quality Assurance and Improvement Committee of the Faculty of Medicine in Rijeka. All exams are written, and only if necessary also oral. Students' performance is monitored through analysis of mentors' reports and determining the conditions of entry in the following year. The novelty that we intend to introduce are institutional mechanisms and the annual report by Vice-Dean for Postgraduate Studies and Continuing Education, which will contain important elements of self-evaluation, such as the number of all students enrolled vs. the number of students enrolled in the following year, the most successful students/mentors, average grades by course, students' evaluation of lectures (topicality, structure, workload and work invested, the adequacy of tests, etc.).

The role of the module coordinator (a group of akin courses delivered jointly) is to foster the quality of teaching

and examinations, as well as develop and modernise the teaching methodology of each module. Coordinators also have the task to develop joint knowledge assessment and acquisition of skills in a particular module. On admission to the study, doctoral students are informed about all their rights and obligations.

When enrolling in the study program of Health and Environmental Engineering, doctoral students receive a booklet in which details of all their all obligations are given. Each student has the right to independently create their own program of study (their individual study path) by selecting a mentor, and thus also their research area, the appropriate elective courses and elective activities. All information regarding the study can be found on the website of the Faculty of Medicine in Rijeka (<http://www.MedRi.uniri.hr/hr/>). The Office of Postgraduate Studies is available to graduate students for resolving any specific issues or problems that may occur during the study, and informs the doctoral students about all details regarding their study and the schedule of compulsory and elective courses and elective activities by e-mail. The Faculty of Medicine in Rijeka has its Study Agreement, which is concludes with every student of postgraduate university studies.

3.10. Institutional support for a successful progression of doctoral students through the doctoral study is ensured.

The Faculty of Medicine in Rijeka does not yet have elaborated rules regulating institutional support, and neither is it specifically stated in the program of doctoral studies. However, institutional support is provided through a number of informal forms of assistance for the doctoral candidates' research and advancement, for instance by participating in or covering the whole cost of the study for the Faculty's employees, or subsidising the maintenance of the facilities for small animals. The Faculty of Medicine also awards prize money annually to the best young researchers. We are currently establishing a fund for institutional support to researchers, planned to be in function no later than in 2017, as provided for in the Strategy for Development of Science (Appendix 3). In the last five years, institutional support has been given to the publication of 24 doctoral students' papers (research projects, support for the University of Rijeka), and to six doctoral students for their participation in international conferences. (Appendix 19)

4. PROGRAMME AND OUTCOMES OF THE DOCTORAL STUDY

4.1. The content and quality of the doctoral programme is in accordance with internationally accepted standards.

The doctoral study in Health and Environmental Engineering educates professionals trained to propose programs and projects important in controlling environmental factors harmful to human health, as well as to supervise and assess the effectiveness of the measures implemented and independently create new knowledge within the scientific education of university researchers. These are professionals trained to deal with new hazards for the man's environment and health caused by various agents present in the air, water, soil and food, as well as by potentially harmful physical agents. They are also trained to work within the health care system, with a particular focus on protecting the population from the negative effects of the environment, protect the environment from the potentially negative effects of human activities and improve the quality of the environment. A comprehensive approach to the curriculum also includes economic and legal knowledge, at the level of principles, norms and laws indispensable for the implementation of profession. In addition to their professional level, the competencies of former doctoral students include the capability to independently conduct research projects, and their knowledge allows them to better understand and implement new technologies, advance in their research-teaching career, and become leaders of research groups at the university and beyond. The doctoral study is interdisciplinary by its contents, program and selected teachers and in lines with other relevant health studies at the international level. We point out that in the appointment of teachers for the study, we are guided by the criteria of internationally recognized excellence and have thus managed to assemble a respectable group of top experts, mostly from our institution, but some also from outside it.

The basis of the curriculum, including knowledge in the field of physiology, chemistry, biochemistry, microbiology, toxicology, is closely associated with scientific research. It provides students with a doctoral degree program directly involved in solving the set goals in a specific research project, and thus enables them to develop skills for independent and creative work in research and development at the university and other research institutions with which we collaborate and in the laboratories of which our students can also work.

The enrolment quota of the doctoral study is 30 students, who can study full time or part time. Full-time students attend the doctoral study three years and earn 180 ECTS (3 x 60 ECTS). It is important to emphasize that the equivalent three-year study program (180 ECTS) is offered to part-time students in five years, in which they earn 36 ECTS per year, which enables students employed elsewhere to work on research projects as student researchers in collaboration with the project leaders.

The International Federation for environmental health is an umbrella organization that brings together

professionals and experts in the field of environmental health, including sanitary engineers. This organization, based in the UK, prescribes standardized terms and conditions of standardization of the profession. Compared with similar studies at the international level, the studies for training sanitary engineers offered at the University of Rijeka Faculty of Medicine are highly compliant, both in content and in the estimated duration of the study. Although there are differences in terminology and in the internal organization of the study, the content itself, and consequently also its competencies, are at a high level, which was confirmed by IFEH after inspection of our programme of study. Therefore, the competencies of professionals who complete their studies at the University of Rijeka Faculty of Medicine correspond with those acquired at the international level, including those in the US, the UK, Germany and so on.

This study program is unique in Croatia, and is comparable to the doctoral programs in Environmental Health in Europe (the UK, Germany, Ireland, Sweden, etc.) and the US (Yale University, Boston University, Columbia University, etc.) by its structure and the total duration of the study, the number of acquired ECTS credits, the content and learning outcomes. In comparison to programs of other foreign universities, our doctoral study comprises more theoretical classes in relation to experimental work.

4.2. The learning outcomes listed at the level of the study programme and its segments are in accordance with level 8.2. of the Croatian Qualifications Framework (CROQF). They clearly describe the competencies that doctoral students will develop during the doctoral study and the ethical requirements of scientific research/artistic work.

The learning outcomes of the doctoral study in Health and Environmental Engineering are in accordance with level 8.2. of the CROQF

Knowledge and understanding:

- creation and evaluation of a wide range of knowledge and understanding of the research areas and advanced and specialized knowledge in a particular area
- evaluation of methods and principles of research methodology

Competencies and skills:

- implementation of independent and critical analysis and synthesis, and the skills of reviewing and searching for new and complex phenomena, problems and situations
- creating the ability of setting and differentiating between problems with a critical, creative and independent approach, and planning, using and evaluating appropriate methods in research and other tasks with clearly defines deadlines
- creating contribution in the research area of the thesis

Autonomy:

- presentation of and discussion on research results at national and international conferences in academic and other environment and the ability to write scientific papers
- expression of interest for further insights, knowledge and research

Responsibility:

- assuming ethical and social responsibility for contribution to social development and successful training of others through research
- assuming intellectual autonomy and attitude and ability of ethical considerations in research
- assuming ethical and social responsibility through self-analysis and critical thinking in research, the role in society and the responsibility for using research results.

The learning outcomes are incorporated into the study program as a whole, but have not been elaborated within each course, which we recognised to be a shortcoming that should be corrected with the planned reform of the doctoral study.

4.3. The learning outcomes of the doctoral program are logically and clearly related to the learning outcomes of individual course contents, and the mentoring and research work.

The learning outcomes of most courses of the doctoral study are logically and clearly linked to the learning outcomes of the whole study, which result from the learning outcomes of individual course contents, mentoring and research.

4.4. The program of the doctoral study leads to learning outcomes and competence in accordance with level 8.2. of the CROQF.

In order to enable assessment of the quality and level of learning outcomes achieved, we enclose bound copies of the thesis defended and abstracts in English by the academic year of graduation for the 2011-2015 period (in the

alphabetical order, influential works arising from doctoral research, a selection of published scientific papers on topics of defended doctoral theses (Appendix 20), samples of seminar papers and samples of presentations at conferences (Appendix 21).

4.5. The teaching methods (and the distribution of ECTS, if defined) in the various activities of doctoral students are appropriate to level 8.2. of the CROQF and ensure the achievement of clearly defined learning outcomes.

The doctoral study is organized as a three-year study (Figure 1) for doctoral students who work on their research full time (e.g., research assistants) or a five-year one (Figure 2) for doctoral students who participate in their research part time. The total workload of students per year is 60 ECTS for full-time doctoral students (36 ECTS for part-time ones), which amounts to 180 ECTS for the whole study programme for all doctoral students. The study consists of theoretical classes, compulsory and optional activities and work on the doctoral thesis. The theoretical part is divided into compulsory and elective classes. It is organized in the form of modules, organizational links which include related courses (usually 3-5 courses) and make a logical whole. The study program offers 2 mandatory and 15 optional modules, and comprises a total of 70 courses. In the first semester, the students take compulsory modules (total 30 ECTS Only this semester is firmly set in the implementation curriculum, while all other study activities for the acquisition of ECTS are flexible and chosen in cooperation with the mentor (Figure 3). Thus, the doctoral student is required to choose elective modules worth 30 ECTS, do the mandatory and optional activities worth 30 ECTS and work on writing the thesis worth 90 ECTS (30 ECTS for compulsory stay in laboratories of other institutions + 30 ECTS for laboratory work in the home institution + 30 credits for writing and defending the thesis).

Figure 1. Obligations of full-time doctoral students

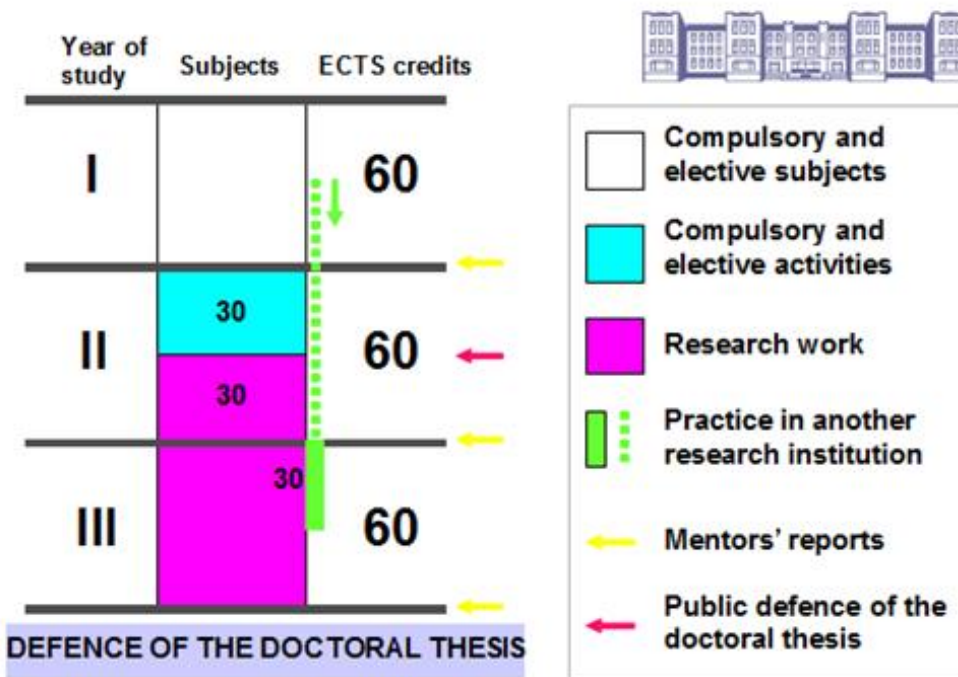


Figure 2. Obligations of part-time doctoral students

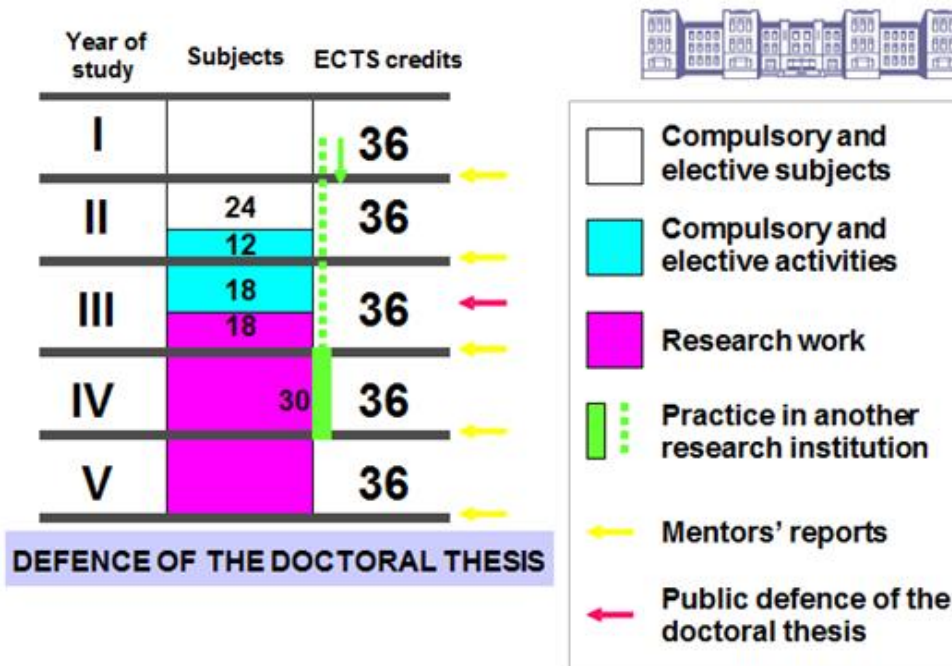
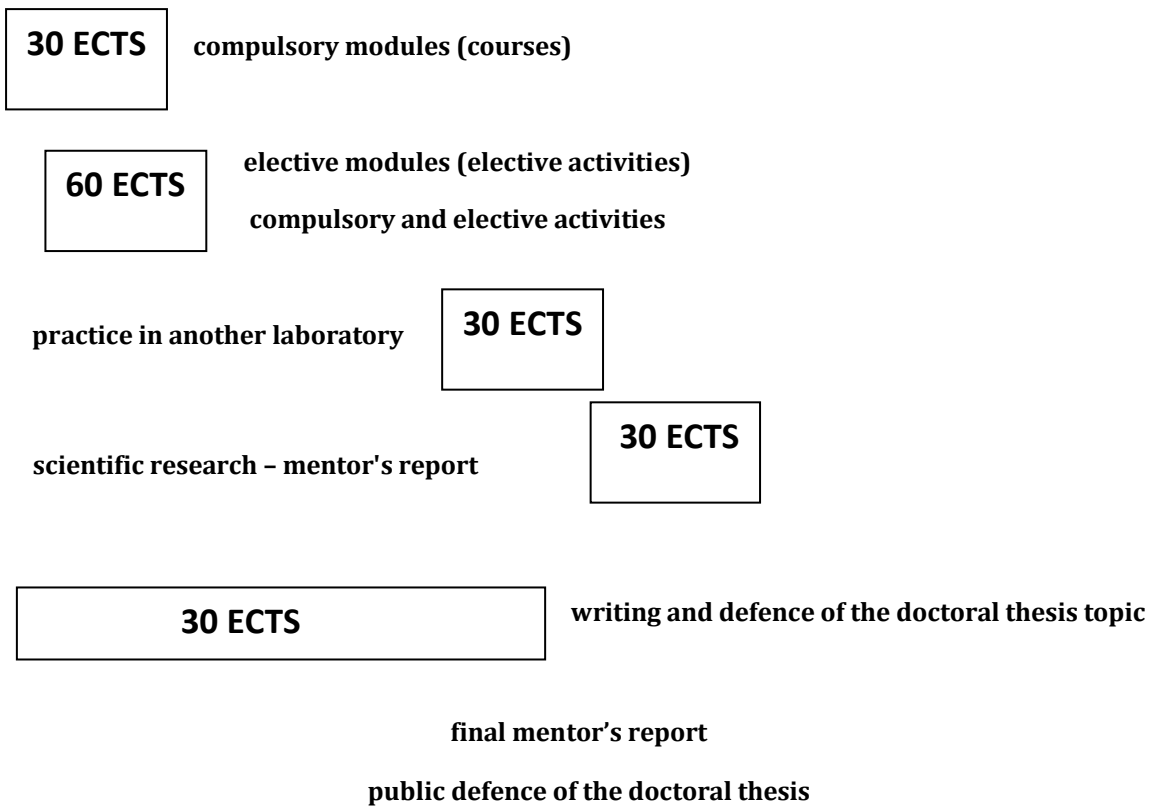


Figure 3. The study structure by compulsory and elective modules and activities



The compulsory courses of the study program enable students to acquire the theoretical basis for the initiation of scientific research. Students adopt scientific methods through work in the institution's laboratory and in courses delivered as seminars or exercises. Moreover, the elective courses comprise modules which largely present experimental and laboratory methods. The percentage of hours of experimental, laboratory and seminar teaching methods is over 80%. In agreement with their mentors, the candidates form their own individual curriculum in accordance with the objectives of the doctoral research. Classes are organized for a group of students who enrolled in a particular course, but in the event when the course is chosen by one or just a few students, individual approach is possible, namely, the course coordinator and the candidate can agree on substitute forms (e.g. seminar papers, presentations, etc.), which is in accordance with the University's Regulations on Studies.

Pursuant to the program of the doctoral study (and the Regulations on Studies of the University of Rijeka), students are required to spend at least three months at another institution, for which they receive 30 ECTS. There are several groups active at the Faculty that can compete with groups in more developed western university by their level of work and publications. International cooperation of the Faculty of Medicine is relatively well developed (Horizon 2020, NIH, Marie Curie). Most scientific research groups have a well-developed cooperation with groups in various European, American and other universities through bilateral or multilateral international projects that enable the mobility of doctoral students and their stay in partners' laboratories. In addition to the formal cooperation, training and stay of doctoral students in foreign institutions is provided through a series of informal individual cooperations.

As part of the elective extracurricular scientific activities in which students acquire the minimum required 5 ECTS points, workshops, courses, round tables, seminars and the like are organised, about which the students are informed in due time through:

http://www.medri.uniri.hr/files//STUDIJI/Poslijediplomski_studiji/ZDRAVSTVENO_I_EKOLOSKO_INZENJERSTVO/Aktivnosti_koje_se_boduju_na_doktorskim_studijima21092016.pdf.

Students have a choice of workshops or trainings relevant for their own doctoral research, since methodological workshops are organized on a monthly basis.

4.6. The program provides for the acquisition of generic (transferable) skills.

Doctoral students have the opportunity to acquire generic skills by attending workshops for development of business and management skills, writing and managing projects, seeking funding, etc. which are regularly organized by the Faculty of Medicine and the University of Rijeka. The list of workshops organized at the Faculty of Medicine and the University to date and is given in Appendix 22 and via the following link: http://www.medri.uniri.hr/files//STUDIJI/Poslijediplomski_studiji/ZDRAVSTVENO_I_EKOLOSKO_INZENJERSTVO/Radionice_i_projekti_za_razvoj_poslovnih_i_upravljackih_vjestina.pdf

Doctoral students are regularly informed about the workshops, courses, symposia, etc. through the Faculty's and the University of Rijeka's websites or by e-mail.

We have divided the learning competencies acquired by doctoral students in the doctoral program in Health and Environmental Engineering into two groups: generic (general) and research competencies.

General competencies that should be acquired in this type of research-based education are:

- a) the ability to cope with the unknown
- b) synthesis of knowledge
- c) ability to innovate in achieving solutions
- d) solving complex problems
- e) development of strategies
- f) ability to establish cooperation - create networks
- g) communicative competence
- h) time management
- i) ability to cope with failure
- j) academic competence referring to the rights and responsibilities in the field of ethics of scientific research and academic communication

The research and presentation skills acquired by students include the skills and knowledge of:

- a) preparing research strategies, and technical and manual research skills
- b) issues related to the research (e.g. the technical possibilities of research, the skills important in research in public health and epidemiology, etc.)
- c) presentation of research work
- d) rights and responsibilities
- e) research management

- f) work with a mentor
- g) search and organisation of literature
- h) databanks - bibliography
- i) preparation of proposals of scientific research
- j) preparation of theses

Therefore, upon completion of their doctoral studies, doctors of science will be able to plan, implement and present scientific research in the form of oral presentations and scientific publications, work on a research project, search and organize literature, formulate scientific issues and present them to other researchers through mentoring. Owing to the acquired competences after graduation, they can be employed in research and teaching professions at university, or work in a research laboratory and in a postdoctoral position, which is especially recommended.

4.7. The teaching content is a function of current and future research and doctoral training (individual plan of attending classes, generic skills, etc.).

The program delivered in the form of classes is flexible and tailored to individual academic needs and research plans of a doctoral student.
We enclose detailed individual work plans of doctoral students (Appendix 23).

4.8. The program ensures quality international connections and mobility of teachers and doctoral students.

Doctoral students, mentors and teachers of the doctoral study involved in international projects are required to internationalise their research and spend a certain period of time in a foreign research centre. The Faculty systematically provides information on the possibilities of doctoral students' mobility.

Researchers of the Faculty of Medicine, and especially its management and the competent authorities, are well acquainted with the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers of 2005. In accordance with these documents, the Faculty of Medicine enables its employees the freedom of scientific research, in line with high ethical principles (regulated by university codes, as well as the acts of a higher order). In addition, it stimulates the professional responsibility and professionalism and respect of contractual and legal obligations associated with scientific research. The investigations follow good practice and appropriate protective measures, and researchers are regularly engaged (on the Days of the Faculty, and sometimes more often) in public life through popular lectures and other activities in which they present their results to the general public. In its capacity as the employer, the Faculty of Medicine ensures recognition of the profession of researcher and their non-discrimination, seeking to continuously improve the research environment and working conditions, valuing mobility, and protecting intellectual property rights. The procedure of employment of researchers is public (public competition) and their selection transparent. All qualifications are recognized in accordance with the applicable state and university regulations.

The mandatory part of the study activities at doctoral study comprises the obligation for the student to acquire 30 ECTS credits by a three-month residence in another research institution (laboratory). This can be substituted by performing appropriate study activities which encourage internationalization of research, namely, cooperation with foreign research groups. Therefore, international cooperation and stays in research centres outside the home institution is not only encouraged but also required. The possibility of such training of doctoral students is primarily the result of scientific research cooperation with foreign partners and international collaborative projects. This matter is regulated by decisions of the Faculty Council: Class: 003-06/14-02/21 1; Ref. no.: 2170-24-01-14-1, of 17 June 2014, and Class: 003-06/14-02/266; Ref. no.: 2170-24-01-14-1 of 29 July 2014.

The Faculty of Medicine in Rijeka, through its Office for Postgraduate Studies and Continuing Education, regularly informs all doctoral students by e-mail about the national and international conferences and other scientific meetings. The Commission for Postgraduate Studies and Continuing Education a priori credits some of the local meetings for which there is increasing interest with a number of ECTS credits, while international and some domestic conferences are evaluated on the basis of evidence of a student's attendance at them and presentation of their work in one form or another. The travel expenses of doctoral students are mainly covered from project funds of the Faculty of Medicine in Rijeka.

The thesis may be substituted by publication of works in certain internationally respected publications. The Instructions for Writing a Doctoral Thesis at the University in Rijeka, which are an integral part of the Regulations on Writing a Doctoral Thesis of the University of Rijeka, Class: 602-04 / 13-01 / 02, Ref. no. 2170-57-01-13-187 of 15 May 2013, stipulate that a doctoral thesis can be presented in the form of a set of scientific papers with an introductory part, a short elaboration of work, conclusions and references (the Scandinavian model). This type of work is possible only within research work carried out in doctoral studies, and scientific papers have to be

published after admission to the doctoral study. The same Instructions also defines specific elements that the doctoral thesis according to the so-called Scandinavian model typically includes:

- the text on the cover is printed in bold (University of Rijeka, Study offered by, Author's first and last name, Title of the doctoral thesis, Doctoral thesis, Rijeka, Year); the text on the cover spine is printed in bold (Author's first and last name, Year and Title of the doctoral thesis; if the title is too long, the shortened version is written, not longer than 80 characters); the first sheet after the cover is empty; the first page of the second sheet has the same text as the one on the cover (the same content and language, including the mentor's signature); if the work is not written in English, the first page of the third sheet has the same text as the first page of the second sheet but this time in English; the first page of the fourth sheet gives information about the mentor/co-mentor (title, first and last name), data on the time and place of the thesis defence, and details of the members of the commission before which the doctoral thesis was defended (title, name); acknowledgements' (optional);
- thesis abstract written in the language of the thesis and in English;
- extended abstract in the Croatian language, only if the thesis is not written in Croatian;
- key words in the language of the thesis, and in Croatian and English;
- contents, introduction;
- elaboration of the doctoral thesis by the so-called Scandinavian model presents a critical review of the results of doctoral research in the context of existing scientific knowledge, but cannot be shorter than 30 pages;
- conclusions, literature;
- illustrations, i.e., list of tables, graphs, figures, photographs, drawings, diagrams, histograms, charts, ...;
- attachments - published scientific papers that complement the research work. A minimum of four papers published in indexed journals is required, of which at least two published in journals listed in the Web of Science or ERIH databases, of which at least one in a journal with the impact factor greater than the median impact of international journals in the field of doctoral research. Each work can be presented by only one doctoral student. Exceptionally, the implementing institution may accept the work submitted by two doctoral students with special justification. Doctoral student must be the main author of at least three of the above-cited papers. The collected works must provide new scientific contribution in respect of individual works.

International cooperation is one of the fundamental characteristics of the activity of the University of Rijeka Faculty of Medicine. It is conducted on teaching, professional and scientific levels, and the importance of cooperation is based on the Strategy of the University of Rijeka Faculty of Medicine. During their doctoral training, doctoral students are obligated to spend part of the study time in another research organization. In addition, it is important to emphasize that the University of Rijeka Faculty of Medicine has a multiyear experience of organising international professional and scientific workshops and summer schools, conferences, congresses and seminars, which has made it an important partner in the field of biomedical sciences in the region. The objective of international cooperation and mobility is to increase the number of outgoing and incoming students and teachers, and to increase the number of days spent in the exchange. Active mobility of doctorate students is regulated by the Regulations on Doctoral Studies. Doctoral students are encouraged by their mentors to participate in international exchange with institutions with which the Faculty has established cooperation.



III. TABLES

Table 1: Teachers

Teacher (first and last name /institution*) and link to CROSB1**	Scientific (or teaching and research) title and area/field of choice	A	B	C	Course (and type of classes) at doctoral studies and total teaching workload	Workload in teaching hours (TH)***
Maja Abram https://bib.irb.hr/lista-radova?autor=133610	Full Prof. PhD tenured Biomedicine and Health / Clinical Medical Sciences	13	87 (192)	10	Bacterial Virulence Factors (lectures)	15
					Bacterial Virulence Factors (seminar)	12
					Teaching workload at 1st and 2nd level	300
					Teaching workload at other HEI	244
					Total teaching workload	544
Ana Alebić- Juretić https://bib.irb.hr/lista-radova?autor=122402	Full Prof. PhD Biomedicine and Health / Public Health and Health Care	7	24 (118)	12	Persistent Pollutants (lectures)	12
					Persistent Pollutants (seminar)	9
					Teaching workload at 1st and 2nd level	165.5
					Teaching workload at other HEI	105
Total teaching workload	270.5					
Roko Andričević / Faculty of Civil Engineering, Architecture and Geodesy, University of Split https://bib.irb.hr/lista-radova?autor=223606	Full Prof. PhD Technical Sciences/ Civil Engineering	5	13 (196)	16	Environmental Risk Assessment (lectures)	42
					Environmental Risk Assessment (seminar)	9
					Teaching workload at 1st and 2nd level	51
					Teaching workload at other HEI	250
					Total teaching workload	301
Ivanka Avelini-Holjevac/ University of Rijeka, Faculty of Tourism and Hospitality Management https://bib.irb.hr/lista-radova?autor=1071	Prof. Emeritus Social Sciences / Economy	1	0 (27)	2	Quality Management (lectures)	18
					Teaching workload at 1st and 2nd level	18
					Teaching workload at other HEI	0
					Total teaching workload	18
Delko Barišić, Ruđer Bošković Institute, Division for Marine and Environmental Research, Laboratory for Radioecology, https://bib.irb.hr/lista-radova?autor=129652	PhD Scientific Advisor at RBI, Natural Sciences / Earth Sciences	13	91 (218)	12	Hazardous and Radioactive Waste (lectures)	30
					Teaching workload at 1st and 2nd level	30
					Teaching workload at other HEI	35
					Total teaching workload	65
Branka Blagović https://bib.irb.hr/lista-radova?autor=142202	Assoc. Prof. PhD Biotechnological Sciences / Biotechnology	4	6 (53)	6	Chromatographic Methods in the Study of Biological Membranes(lectures)	6
					Teaching workload at 1st and 2nd level	215
					Teaching workload at other HEI	0
					Total teaching workload	215
Dalibor Broznić	Assis. Prof. PhD	7	23	4	Mathematical and Computer	30



https://bib.irb.hr/lista-radova?autor=270072	Biomedicine and Health / Basic Medical Sciences		(30)		Modeling in Ecological Systems(lectures)	
					Mathematical and Computer Modeling in Ecological Systems(seminar)	7.5
					Mathematical and Computer Modeling in Ecological Systems(exercises)	5
					Sampling and Sample Preparation for Chemical Analysis(lectures)	12
					Sampling and Sample Preparation for Chemical Analysis(seminar)	4.5
					Sampling and Sample Preparation for Chemical Analysis(exercises)	2
					Use of Liquid Chromatography in Pesticide Analysis (lectures)	9
					Use of Liquid Chromatography in Pesticide Analysis (exercises)	5
					Teaching workload at 1st and 2nd level	300
					Teaching workload at other HEI	26
					Total teaching workload	326
Marina Bubonja-Šonje https://bib.irb.hr/lista-radova?autor=247541	Assoc. Prof. PhD Biomedicine and Health / Clinical Medical Sciences	7	63 (63)	4	Biofilm (lectures)	2
					Teaching workload at 1st and 2nd level	150
					Teaching workload at other HEI	0
					Total teaching workload	150
Aleksandar Bulog https://bib.irb.hr/lista-radova?autor=270215	Assis. Prof. PhD Biomedicine and Health / Public Health and Health Care	4	8 (37)	4	Environment and Health (seminars)	3
					Ecotoxicology (lectures)	60
					Ecotoxicology (seminar)	15
					Techniques of Pesticide Application of Pest Control(lectures)	15
					Techniques of Pesticide Application of Pest Control(seminar)	4.5
					Techniques of Pesticide Application of Pest Control(exercises)	2
					Teaching workload at 1st and 2nd level	150
					Teaching workload at other HEI	0
					Total teaching workload	150
Krunoslav Capak https://bib.irb.hr/lista-radova?autor=185033	Full Prof. PhD Biomedicine and Health / Public Health and Health Care	/	/	/	Environment and Health (seminar)	3
					Teaching workload at 1st and 2nd level	3
					Teaching workload at other HEI	0
					Total teaching workload	3
Đurđica Cekinović https://bib.irb.hr/lista-radova?autor=270230	PhD Biomedicine and Health / Clinical Medical Sciences	6	26	5	Environmental Factors in the Development of Congenital Malformations(seminar)	1.5
					Environmental Factors in the Development of Congenital Malformations(lectures)	3
					Teaching workload at 1st and 2nd level	150
					Teaching workload at other HEI	0
					Total teaching workload	150



Gordana Čanadi Jurešić https://bib.irb.hr/lista-radova?autor=226411	Assis. Prof. PhD Biomedicine and Health / Basic Medical Sciences	6	14 (27)	4	Electrophoretic Techniques in the Study of Proteins(lectures)	18
					Electrophoretic Techniques in the Study of Proteins(seminar)	3
					Electrophoretic Techniques in the Study of Proteins(exercises)	2
					Chromatographic Methods in the Study of Biological Membranes(lectures)	0
					Chromatographic Methods in the Study of Biological Membranes(exercises)	6
					Teaching workload at 1st and 2nd level	311
					Teaching workload at other HEI	140
					Total teaching workload	451
Mladen Črnjar https://bib.irb.hr/lista-radova?autor=226545	Full Prof. PhD Social Sciences/ Economy	/	/	/	Ecology and Economy (lectures)	15
					Ecology and Economy (seminar)	15
					Teaching workload at 1st and 2nd level	30
					Teaching workload at other HEI	0
					Total teaching workload	30
Robert Domitrović https://bib.irb.hr/lista-radova?autor=201523	Full Prof. PhD Biomedicine and Health / Pharmaceutics	16	316 (440)	14	Mechanisms of the Hepatoprotective Effect of Phytochemicals (lectures)	12
					Mechanisms of the Hepatoprotective Effect of Phytochemicals (seminar)	9
					Teaching workload at 1st and 2nd level	258
					Teaching workload at other HEI	0
					Total teaching workload	258
Hrvoje Fulgosi / Ruđer Bošković Institute https://bib.irb.hr/lista-radova?autor=186771	Full Prof. PhD Natural Sciences/ Biology	9	47 (231)	12	GMO in Food Production (lectures)	30
					Teaching workload at 1st and 2nd level	30
					Teaching workload at other HEI	0
					Total teaching workload	30
Jasminka Giacometti / Department of Biotechnology University of Rijeka https://bib.irb.hr/lista-radova?autor=177203	Full Prof. PhD Biomedicine and Health / Basic Medical Sciences	14	83 (166)	11	Lipid Analysis - Laboratory Work (lectures)	12
					Lipid Analysis - Laboratory Work (exercises)	12
					Teaching workload at 1st and 2nd level	24
					Teaching workload at other HEI	313.50
					Total teaching workload	321.50
Ivana Gobin https://bib.irb.hr/lista-radova?autor=247495	Assis. Prof. PhD Biomedicine and Health / Basic Medical Sciences	3	0 (25)	4	Microbial Resistance in the Environment (lectures)	45
					Microbial Resistance in the Environment (seminar)	7.5
					Bacterial Virulence Factors (seminar)	1.5
					Microbial Response to Stress (seminar)	1,5
					Biofilm (lectures)	2
					Teaching workload at 1st and 2nd level	300
					Teaching workload at other HEI	215.5
					Total teaching workload	515.5
Nada Gosić https://bib.irb.hr/lista-radova?autor=247495	Full Prof. PhD Social Sciences/	2	1 (3)	1	Bioethics in Scientific Research (lectures)	24



ta-radova?autor=207046	Philosophy				Teaching workload at 1st and 2nd level	150
					Teaching workload at other HEI	6
					Total teaching workload	156
Jasna Hrenović / University of Zagreb, Faculty of Science, Department of Biology, Division of Microbiology https://bib.irb.hr/lista-radova?autor=219292	Assoc. Prof. PhD Natural Sciences/ Biology	20	121 (346)	13	Bioremediation of Land or Microbial Degradation and Bioconversion of Organic Matter (lectures)	21
					Bioremediation of Land or Microbial Degradation and Bioconversion of Organic Matter (seminar)	12
					Teaching workload at 1st and 2nd level	33
					Teaching workload at other HEI	270
					Total teaching workload	303
Željko Jeričević https://bib.irb.hr/lista-radova?autor=18623	Full Prof. PhD Biomedicine and Health / Basic Medical Sciences	0	0 (38)	7	Basics of Scientific Computing (lectures)	48
					Basics of Scientific Computing (seminar)	6
					Basics of Scientific Computing (exercises)	5
					Biological and Chemical DatabaseS (lectures)	60
					Teaching workload at 1st and 2nd level	150
					Teaching workload at other HEI	0
					Total teaching workload	150
Stipan Jonjić https://bib.irb.hr/lista-radova?autor=95983	Full Prof. PhD - tenured Biomedicine and Health / Basic Medical Sciences	55	729 (2046)	40	Animal Models of Human Diseases (lectures)	3
					Cell Culture (lectures)	3
					Cell Culture (seminar)	1,5
					Teaching workload at 1st and 2nd level	300
					Teaching workload at other HEI	0
					Total teaching workload	300
Barbara Karleuša / Faculty of Civil Engineering, University of Rijeka https://bib.irb.hr/lista-radova?autor=220524	Assoc. Prof. PhD Technical Sciences / Civil Engineering	7	10 (14)	2	Treatment and Discharge of Waste Water in the Coastal Region (lectures)	36
					Treatment and Discharge of Waste Water in the Coastal Region (seminar)	4,5
					Teaching workload at 1st and 2nd level	40,5
					Teaching workload at other HEI	265
					Total teaching workload	305,5
Goran Kniewald / Ruđer Bošković Institute, Zagreb https://bib.irb.hr/lista-radova?autor=85574	Full Prof. PhD Natural Sciences/ Biology	/	/	/	Environmental and Health Aspects of Waste Management (lectures)	18
					Teaching workload at 1st and 2nd level	18
					Teaching workload at other HEI	0
					Total teaching workload	18
Branko Kolarić https://bib.irb.hr/lista-radova?autor=257325	Assoc. Prof. PhD Biomedicine and Health / Public Health and Health Care	33	122 (172)	8	Antiepidemic Interventions (lectures)	30
					Antiepidemic Interventions (exercises)	10
					Interventions in Emergency Situations (lectures)	30
					Interventions in Emergency Situations (seminar)	15



					Teaching workload at 1st and 2nd level	150
					Teaching workload at other HEI	0
					Total teaching workload	150
Olivera Koprivnjak https://bib.irb.hr/lista-radova?autor=186850	Full Prof. PhD Biotechnical Sciences / Food Processing Technology	8	36 (127)	10	Food Safety (lectures)	45
					Food Safety (seminar)	22.5
					Teaching workload at 1st and 2nd level	333
					Teaching workload at other HEI	0
					Total teaching workload	333
Astrid Krmpotić https://bib.irb.hr/lista-radova?autor=237334	Full Prof. PhD Biomedicine and Health / Basic Medical Sciences	14	253 (889)	23	Cell Culture (lectures)	6
					Cell Culture (exercises)	6
					Animal Models of Human Diseases (lectures)	3
					Animal Models of Human Diseases (exercises)	3
					Teaching workload at 1st and 2nd level	300
					Teaching workload at other HEI	0
Total teaching workload	300					
Natalija Kučić https://bib.irb.hr/lista-radova?autor=239812	Full Prof. PhD Biomedicine and Health / Basic Medical Sciences	6	46 (86)	7	Basics of Applicable Immunology (lectures)	20
					Teaching workload at 1st and 2nd level	300
					Teaching workload at other HEI	0
					Total teaching workload	300
Želimir Kurtanjek https://bib.irb.hr/lista-radova?autor=24881	Full Prof. PhD Biotechnical Sciences / Food Processing Technology	/	/	/	Mathematical and Computer Modeling in Ecological Systems(lectures)	15
					Teaching workload at 1st and 2nd level	15
					Teaching workload at other HEI	0
					Total teaching workload	15
Danijela Lakošeljac https://bib.irb.hr/lista-radova?autor=254074	PhD Biomedicine and Health / Public Health and Health Care	2	0 (4)	2	Epidemiological Research (seminars)	6
					Teaching workload at 1st and 2nd level	150
					Teaching workload at other HEI	0
					Total teaching workload	150
Hrvoje Lalić https://bib.irb.hr/lista-radova?autor=216836	Full Prof. PhD Biomedicine and Health / Public Health and Health Care	1	4 (27)	5	Noise and Vibrations (lectures)	24
					Teaching workload at 1st and 2nd level	150
					Teaching workload at other HEI	0
					Total teaching workload	150
Sandra Laleta University of Rijeka Faculty of Law https://bib.irb.hr/lista-radova?autor=170802	Assis. Prof. PhD Social Sciences / Law	0	0	0	Health Care. Health Insurance. Legislation on Sanitary Engineering (lectures)	27
					Health Care. Health Insurance. Legislation on Sanitary Engineering (seminar)	9
					Health Care. Health Insurance. Legislation on Sanitary Engineering (exercises)	3
					Security Legislation. Security and Welfare. Environmental Protection Security (lectures)	27
					Security Legislation. Security and Welfare. Environmental Protection Security (seminar)	9
					Security Legislation. Security and Welfare. Environmental Protection Security (exercises)	3
					Sanitary Protection. Sanitary and	27



					Hygienic Conditions. Sanitary Control. Sanitary Inspection (lectures)	
					Sanitary Protection. Sanitary and Hygienic Conditions. Sanitary Control. Sanitary Inspection (seminar)	9
					Sanitary Protection. Sanitary and Hygienic Conditions. Sanitary Control. Sanitary Inspection (exercises)	3
					Teaching workload at 1st and 2nd level	117
					Teaching workload at other HEI	397
					Total teaching workload	514
Gordana Laškarin https://bib.irb.hr/lista-radova?autor=239823	Full Prof. PhD Biomedicine and Health / Basic Medical Sciences	25	73 (368)	17	Basics of of Immunology (lectures)	30
					Basics of of Immunology (seminar)	6
					Teaching workload at 1st and 2nd level	75
					Teaching workload at other HEI	0
					Total teaching workload	75
Tarzan Legović / Ruđer Bošković Institute https://bib.irb.hr/lista-radova?autor=25590	Full Prof. PhD Natural Sciences/ Biology	11	21 (269)	18	Ecological Models in Environmental Protection (lectures)	90
					Teaching workload at 1st and 2nd level	30
					Teaching workload at other HEI	154
					Total teaching workload	184
Dražen Lušić https://bib.irb.hr/lista-radova?autor=270046	Assis. Prof. PhD Biotechnical Sciences / Food Processing Technology	6	10 (28)	3	Food Risk Analysis (lectures)	60
					Food Risk Analysis (seminar)	15
					Introduction to Bee Products and Their Importance for Health (lectures)	30
					Introduction to Bee Products and Their Importance for Health (seminar)	30
					Teaching workload at 1st and 2nd level	300
					Teaching workload at other HEI	0
					Total teaching workload	300
Vladimir Mićović https://bib.irb.hr/lista-radova?autor=225825	Full Prof. PhD Biomedicine and Health / Public Health and Health Care	14	51 (220)	10	Environment and Health (lectures)	12
					Epidemiologic Research (lectures)	12
					Environmental Factors in the Development of Congenital Malformations(lectures)	2
					Environmental Factors in the Development of Congenital Malformations(seminar)	3
					Teaching workload at 1st and 2nd level	150
					Teaching workload at other HEI	0
					Total teaching workload	150
Brankica Mijandrušić- Sinčić https://bib.irb.hr/lista-radova?autor=243173	Assoc. Prof. PhD Biomedicine and Health / Clinical Medical Sciences	12	29 (100)	6	Food - Source of Diseases (lectures)	6
					Food - Source of Diseases (seminar)	6
					Teaching workload at 1st and 2nd level	150
					Teaching workload at other HEI	0



					Total teaching workload	150
Ines Mrakovčić-Šutić https://bib.irb.hr/lista-radova?autor=146280	Full Prof. PhD Biomedicine and Health / Basic Medical Sciences	12	28 (68)	7	Environmental Factors and Immune Disorders (lectures)	24
					Environmental Factors and Immune Disorders (seminar)	3
					Teaching workload at 1st and 2nd level	262.44
					Teaching workload at other HEI	325
					Total teaching workload	587.44
Jasenska Mršić- Pelčić https://bib.irb.hr/lista-radova?autor=142272	Full Prof. PhD tenured Biomedicine and Health / Basic Medical Sciences	6	12 (49)	7	Drug Toxicology (lectures)	9
					Toksikologija lijekova(seminar)	6
					Teaching workload at 1st and 2nd level	300
					Teaching workload at other HEI	0
					Total teaching workload	300
Biserka Mulac-Jeričević https://bib.irb.hr/lista-radova?autor=32705	Full Prof. PhD Biomedicine and Health / Basic Medical Sciences	8	118 (831)	24	Immunodiagnosics and Molecular Diagnostics from Theory to Practice (lectures)	30
					Immunodiagnosics and Molecular Diagnostics from Theory to Practice (exercises)	4
					Teaching workload at 1st and 2nd level	300
					Teaching workload at other HEI	0
					Total teaching workload	300
Amir Muzur https://bib.irb.hr/lista-radova?autor=259840	Full Prof. PhD Biomedicine and Health / Basic Medical Sciences	18	7 (215)	8	Scientific Research Methodology (lectures)	24
					Scientific Research Methodology (seminar)	12
					Teaching workload at 1st and 2nd level	150
					Teaching workload at other HEI	6
					Total teaching workload	156
Nevenka Ožanić University of Rijeka https://bib.irb.hr/lista-radova?autor=213993	Full Prof. PhD Technical Sciences /Civil Engineering / Hydraulic Engineering	11	23 (35)	4	Selected Topics in Hydrology (lectures)	42
					Selected Topics in Hydrology (seminar)	9
					Water Resources in Karst Areas and Their Protection (lectures)	42
					Water Resources in Karst Areas and Their Protection (seminar)	0
					Teaching workload at 1st and 2nd level	220
					Teaching workload at other HEI	0
					Total teaching workload	220
Sandra Pavičić Žeželj https://bib.irb.hr/lista-radova?autor=292881	Assis. Prof. PhD Biomedicine and Health / Public Health and Health Care	2	7 (29)	4	Sampling and Sample Preparation for Chemical Analysis(seminars)	2.25
					Teaching workload at 1st and 2nd level	150
					Teaching workload at other HEI	65
					Total teaching workload	215
Jadranka Pečar Ilić / Faculty of Electrical Engineering and Computing, University of Zagreb https://bib.irb.hr/lista-radova?autor=189932	Assoc. Prof. PhD associate position Technical Sciences / Electrical Engineering	1	6 (16)	4	Information Systems on the Environment (lectures)	20
					Information Systems on the Environment (exercises)	5
					Teaching workload at 1st and 2nd level	25
					Teaching workload at other HEI	0
					Total teaching workload	25
Olga Cvijanović https://bib.irb.hr/lista-radova?autor=189932	Assis. Prof. PhD Biomedicine and Health / Basic	24	162 (164)	10	Epidemiological Research (seminar)	3
					Teaching workload at 1st and 2nd level	300



rada?autor=269863	Medical Sciences				level	
					Teaching workload at other HEI	0
					Total teaching workload	300
Ester Pernjak-Pugel	Assoc. Prof. PhD Biomedicine and Health / Basic Medical Sciences	12	118 (221)	10	Environmental Factors in the Development of Congenital Malformations(lectures)	5
					Environmental Factors in the Development of Congenital Malformations(seminar)	3
					Teaching workload at 1st and 2nd level	300
					Teaching workload at other HEI	0
					Total teaching workload	300
Bojan Polić	Full Prof. PhD tenured Biomedicine and Health / Basic Medical Sciences	17	300 (765)	21	Animal Models of Human Diseases (lectures)	6
					Animal Models of Human Diseases (seminar)	3
					Teaching workload at 1st and 2nd level	300
					Teaching workload at other HEI	45
					Total teaching workload	345
Tomislav Rukavina	Full Prof. PhD Biomedicine and Health / Clinical Medical Sciences	6	6 (48)	6	Molecular Diagnostic Methods in Eenvironmental Microbiology (lectures)	15
					Molecular Diagnostic Methods in Eenvironmental Microbiology (seminar)	7.5
					Molecular Diagnostic Methods in Eenvironmental Microbiology (exercises)	5
					Teaching workload at 1st and 2nd level	262,50
					Teaching workload at other HEI	0
					Total teaching workload	262.5
Ivica Ružić	Full Prof. PhD Natural Sciences / Chemistry	/	/	/	Information Systems on the Environment (lectures)	10
					Information Systems on the Environment (exercises)	5
					Teaching workload at 1st and 2nd level	5
					Teaching workload at other HEI	0
					Total teaching workload	5
Ante Simonić	Prof. Emertius Biomedicine and Health / Basic Medical Sciences	0	0 (115)	11	The Science of Sciences (lectures)	12
					The Science of Sciences (seminar)	9
					Teaching workload at 1st and 2nd level	21
					Teaching workload at other HEI	0
					Total teaching workload	21
Dora Smolčić-Jurdana/ Faculty of Tourism and Hospitality Management	Full Prof. PhD Social Sciences/ Economy	3	4 (5)	2	Managing Health Tourism Development (lectures)	18
					Managing Health Tourism Development (seminar)	9
					Teaching workload at 1st and 2nd level	27
					Teaching workload at other HEI	367.50
					Total teaching workload	394.50
Ana Stavljenić-Rukavina	Prof. Emeritus	/	/	/	Harmonization of Education (lectures)	6
					Harmonization of Education (seminar)	6



radova?autor=44681					Harmonization of Education (exercises)	4
					Globalization and Health (lectures)	15
					Globalization and Health (seminar)	22.5
					Teaching workload at 1st and 2nd level	53.5
					Teaching workload at other HEI	0
					Total teaching workload	53.5
Ivana Sušanj/ University of Rijeka Faculty of Civil Engineering Department of Hydraulic Engineering and Geotechnics https://bib.irb.hr/lista-radova?autor=327821	Mag. ing. aedif. Technical Sciences / Civil Engineering / Hydraulic Engineering	0	0	0	Water Resources in Karst Areas and Their Protection (seminars)	9
					Teaching workload at 1st and 2nd level	9
					Teaching workload at other HEI	180
					Total teaching workload	189
Marina Šantić https://bib.irb.hr/lista-radova?autor=242464	Full Prof. PhD Biomedicine and Health / Clinical Medical Sciences	5	90 (645)	20	Selected Zoonoses (lectures)	18
					Selected Zoonoses (seminar)	9
					Mycotoxicoses (lectures)	30
					Mycotoxicoses (seminar)	3
					Mycotoxicoses (exercises)	8
					Teaching workload at 1st and 2nd level	300
					Teaching workload at other HEI	181
Total teaching workload	481					
Jasenka Škrlin-Šubić https://bib.irb.hr/lista-radova?autor=182210	Assoc. Prof. PhD associate position Biomedicine and Health / Clinical Medical Sciences	5	13 (69)	8	Bacterial Virulence Factors (seminars)	1.5
					Biofilm (lectures)	4
					Teaching workload at 1st and 2nd level	33
					Teaching workload at other HEI	6
					Total teaching workload	39
Vanja Tešić https://bib.irb.hr/lista-radova?autor=336446	Assis. Prof. PhD Biomedicine and Health / Public Health and Health Care	6	10 (69)	5	Bioerrorism(lectures)	30
					Bioerrorism(seminar)	15
					Teaching workload at 1st and 2nd level	150
					Teaching workload at other HEI	100
					Total teaching workload	250
Brigita Tićac https://bib.irb.hr/lista-radova?autor=163253	Assoc. Prof. PhD Biomedicine and Health / Clinical Medical Sciences	4	18 (45)	5	Biofilm (lectures)	3
					Biofilm (seminar)	7.5
					Teaching workload at 1st and 2nd level	150
					Teaching workload at other HEI	223,5
					Total teaching workload	373.5
Jelena Tomac https://bib.irb.hr/lista-radova?autor=133676	Assoc. Prof. PhD Biomedicine and Health / Basic Medical Sciences	3	12 (147)	8	Environmental Factors in the Development of Congenital Malformations(lectures)	2
					Environmental Factors in the Development of Congenital Malformations(seminar)	1.5
					Teaching workload at 1st and 2nd level	300
					Teaching workload at other HEI	0
					Total teaching workload	300
Dijana Tomić Linšak https://bib.irb.hr/lista-radova?autor=133676	Assis. Prof. PhD associate position Biomedicine and	7	11 (10)	2	Rodents and Human Health (lectures)	18
					Rodents and Human Health	10.5



rada?autor=336922	Health / Public Health and Health Care				(seminar)	
					Rodents and Human Health (exercises)	7
					Teaching workload at 1st and 2nd level	25.5
					Teaching workload at other HEI	0
					Total teaching workload	25.5
Siniša Tomić https://bib.irb.hr/lista-radova?autor=243125	Assoc. Prof. PhD associate position Biomedicine and Health / Basic Medical Sciences	10	30 (126)	6	Health Legislation: Drugs and Medical Products (lectures)	45
					Teaching workload at 1st and 2nd level	45
					Teaching workload at other HEI	0
					Total teaching workload	45
Marin Tota https://bib.irb.hr/lista-radova?autor=243035	Assoc. Prof. PhD Biomedicine and Health / Basic Medical Sciences	9	20 (40)	5	Use of Liquid Chromatography in Pesticide Analysis (lectures)	12
					Teaching workload at 1st and 2nd level	300
					Teaching workload at other HEI	0
					Total teaching workload	300
Luka Traven https://bib.irb.hr/lista-radova?autor=270083	Assis. Prof. PhD Biomedicine and Health / Public Health and Health Care	8	57 (96)	6	Environment and Health (seminars)	3
					Air Pollution and Health Risks (lectures)	21
					Air Pollution and Health Risks (seminar)	12
					Teaching workload at 1st and 2nd level	150
					Teaching workload at other HEI	125
					Total teaching workload	275
Zlatko Trobonjača https://bib.irb.hr/lista-radova?autor=173625	Full Prof. PhD tenured Biomedicine and Health / Basic Medical Sciences	6	6 (105)	10	Basics of Applicable Immunology (lectures)	4
					Teaching workload at 1st and 2nd level	300
					Teaching workload at other HEI	177
					Total teaching workload	477
Srećko Valić https://bib.irb.hr/lista-radova?autor=135761	Full Prof. PhD Natural Sciences/ Chemistry	10	29 (93)	9	Multidimensional NMR Techniques (lectures)	30
					Synthesis and Characterization of Polymers (lectures)	30
					The Use of Polymers in Food Packaging (lectures)	15
					The Use of Polymers in Food Packaging (seminar)	7.5
					The Use of Polymers in Medicine (lectures)	15
					The Use of Polymers in Medicine (seminar)	7.5
					Teaching workload at 1st and 2nd level	180
					Teaching workload at other HEI	0
					Total teaching workload	180
Jadranka Varljen https://bib.irb.hr/lista-radova?autor=85515	Full Prof. PhD tenured Biomedicine and Health / Basic Medical Sciences	8	31 (130)	11	Food - Source of Diseases (lectures)	6
					Food - Source of Diseases (seminar)	6
					Teaching workload at 1st and 2nd level	300
					Teaching workload at other HEI	0
					Total teaching workload	300
Dražen Vikić Topić https://bib.irb.hr/lista-radova?autor=7118	Full Prof. PhD Natural Sciences/ Chemistry	5	80 (500)	18	Analytical Determination and Monitoring of Hazardous Wwaste Components (lectures)	30
					Teaching workload at 1st and	30



3					2nd level	
					Teaching workload at other HEI	0
					Total teaching workload	30
Ksenija Vitale / Ruđer Bošković Institute, Zagreb https://bib.irb.hr/lista-radova?autor=183255	Full Prof. PhD Biomedicine and Health / Public Health and Health Care	19	26 (99)	6	Environmental and Health Aspects of Waste Management (lectures)	18
					Teaching workload at 1st and 2nd level	30
					Teaching workload at other HEI	350
					Total teaching workload	380
Dinko Vitezić https://bib.irb.hr/lista-radova?autor=194590	Full Prof. PhD tenured Biomedicine and Health / Basic Medical Sciences	7	8 (117)	9	Drug Toxicology (lectures)	3
					Drug Toxicology (seminar)	3
					Teaching workload at 1st and 2nd level	300
					Teaching workload at other HEI	32
					Total teaching workload	332
Jasmina Vraneš / Dr. Andrija Štampar Institute of Public Health https://bib.irb.hr/lista-radova?autor=186056	Full Prof. PhD tenured Biomedicine and Health / Clinical Medical Sciences	9	35 (82)	8	Biofilm (lectures)	4
					Teaching workload at 1st and 2nd level	4
					Teaching workload at other HEI	300
					Total teaching workload	304
Ana-Marija Vrtdušić-Hrgović /University of Rijeka, Faculty of Tourism and Hospitality Management https://bib.irb.hr/lista-radova?autor=217874	Assis. Prof. PhD Social Sciences/ Economy	1	0 (0)	0	Quality Management (seminars)	9
					Teaching workload at 1st and 2nd level	9
					Teaching workload at other HEI	292.5
					Total teaching workload	301.5
Darinka Vučković https://bib.irb.hr/lista-radova?autor=133680	Full Prof. PhD Biomedicine and Health / Clinical Medical Sciences	9	17 (69)	7	Microbial Response to Stress (lectures)	9
					Microbial Response to Stress (seminar)	10.5
					Teaching workload at 1st and 2nd level	300
					Teaching workload at other HEI	204
					Total teaching workload	504
Vidoje Vujić / Faculty of Tourism and Hospitality Management https://bib.irb.hr/lista-radova?autor=6100	Full Prof. PhD Social Sciences	1	0 (0)	0	Quality and Personnel Management Systems (lectures)	18
					Quality and Personnel Management Systems (seminar)	9
					Teaching workload at 1st and 2nd level	27
					Teaching workload at other HEI	20
					Total teaching workload	47
Darija Vukić-Lušić https://bib.irb.hr/lista-radova?autor=317550	Assis. Prof. PhD Biomedicine and Health / Public Health and Health Care	8	13 (17)	3	Detoxification of Drinking Water (lectures)	21
					Detoxification of Drinking Water (seminar)	12
					Water Pollution (lectures)	21
					Water Pollution (seminar)	12
					Sampling and Sample Preparation for Chemical Analysis(seminar)	2.25
					Teaching workload at 1st and 2nd level	150
					Teaching workload at other HEI	0



					Total teaching workload	150
Felix Wensveen https://bib.irb.hr/lista-radova?autor=333895	Assis. Prof. PhD Biomedicine and Health / Basic Medical Sciences	17	292 (355)	12	Animal Models of Human Diseases (exercises)	3
					Teaching workload at 1st and 2nd level	300
					Teaching workload at other HEI	0
					Total teaching workload	300
Gordana Žauhar https://bib.irb.hr/lista-radova?autor=142294	Assoc. Prof. PhD Natural Sciences/ Physics	8	15 (111)	9	Biostatistics (lectures)	30
					Teaching workload at 1st and 2nd level	150
					Teaching workload at other HEI	0
					Total teaching workload	150

* Indicate only if they come from outside HEI.

** Or another link showing accurate details of the works and the results of other scientific work.

*** The work load expressed in norm hours for all three levels of higher education as well as the workload on other universities.

A = number of scientific publications (books, articles, etc.) relevant to this area/field, according to the Regulations on the Election to Scientific Titles in the last five years (CROSB update for a complete overview of the works).

B = number of citations, if applicable, and specification of the source (e.g. WoS, Scopus, Google Scholar).

The first number in column B refers to the number of citations listed in column A between 2011 and 2015. The number in parentheses refers to the number of citations of all works of a given teacher in the period 2011 - 2015.

C = h-index (if applicable, and specify the source).



Table 2: Mentors and doctoral students

Teacher (first and last name /institution*) and link to CROSB1**	Scientific (or teaching and research) title and area/field of choice	Work load in teaching hours (TH)** *	A	B	C	D	E	Doctoral student (initials) and topic title	F	G	No. of candid. who obtained their PhD within the stipulated time / no. of those who didn't but should have (in the past 5 years)
Alan Bosnar https://bib.irb.hr/lista-radova?autor=171724	Full Prof. PhD tenured Biomedicine and Health / Clinical Medical Sciences	300	14	41 (98)	7	0	0	M.Č.	0	0	0/0
Aleksandar Bulog https://bib.irb.hr/lista-radova?autor=270215	Assis. Prof. PhD Biomedicine and Health / Public Health and Health Care	150	4	8 (37)	4	0	2	N.S. M.V.	2 2	0 0	0/0
Robert Domitrović https://bib.irb.hr/lista-radova?autor=201523	Full Prof. PhD Biomedicine and Health / Pharmacy	279	16	316 (440)	14	0	3	I.P.	3	22	0/0
Antica Duletić Načinović https://bib.irb.hr/lista-radova?autor=242576	Assoc. Prof. PhD Biomedicine and Health / Clinical Medical Sciences	75 (100)	17	36 (107)	7	0	2	D.K. A.J.	0 0	0 0	0/0
Renata Gržić https://bib.irb.hr/lista-radova?autor=210920	Full Prof. PhD Biomedicine and Health / Dental Medicine	150	9	15 (66)	6	0	2	N.V.	0	0	0/0
Gordan Gulan https://bib.irb.hr/lista-radova?autor=214744	Full Prof. PhD tenured Biomedicine and Health / Clinical Medical Sciences	150	26	31 (119)	8	0	2	A.Z.	0	0	0/0



Branko Kolarić https://bib.irb.hr/lista-radova?autor=257325	Assoc. Prof. PhD Biomedicine and Health / Public Health and Health Care	150	33	122 (172)	8	1	0	B.C. Determination of styrene released from plastic consumer products by spectral fluorescence fingerprint and health risk assessment	2	7	0/0
Romina Kraus/ Ruđer Bošković Institute, Centre for Marine Research, Rovinj https://bib.irb.hr/lista-radova?autor=242363	Research associate Natural Sciences /Earth Sciences/ Oceanography (Assist. Prof. associate position Natural Sciences / Interdisciplinary Natural Sciences / Marine Science	(120)	6	53 (153)	10	2	1	V.B.	0	0	0/0
Dražen Lušić https://bib.irb.hr/lista-radova?autor=270046	Assis. Prof. PhD Biotechnical Sciences/ Food Processing Technology	300	7	11 (28)	3	2	1	M.V. Safety assessment of food supplements based on bee products in the Croatian market	2	20	0/0
Đulijano Ljubičić https://bib.irb.hr/lista-radova?autor=142325	Full Prof. PhD Biomedicine and Health / Clinical Medical Sciences	300	0	0 (57)	6	0	0	L.D. J.M.	0 0	0 0	0/0
Ivana Marić https://bib.irb.hr/lista-radova?autor=212345	Full Prof. PhD Biomedicine and Health / Basic Medical Sciences	300	8	45 (233)	10	0	3	I.D.Č. S.Š.P.	0 0	0 0	0/0
Vladimir Mićović https://bib.irb.hr/lista-radova?autor=225825	Full Prof. PhD Biomedicine and Health / Public Health and Health Care	150	14	51 (220)	10	1	1	V.J.P.	0	0	0/0
Ines Mrakovčić Šutić https://bib.irb.hr/lista-radova?autor=146280	Full Prof. PhD Biomedicine and Health / Basic Medical Sciences	262,44	12	28 (68)	7	1	1	I.K. G.S.M.	0 0	0 0	0/0
Amir Muzur https://bib.irb.hr/lista-radova?autor=259840	Full Prof. PhD Biomedicine and Health / Basic Medical Sciences	150 (86)	18	7 (215)	8	0	1	R.D.	0	0	0/0



Sanjin Rački https://bib.irb.hr/lista-radova?autor=255641	Assoc. Prof. PhD Biomedicine and Health / Clinical Medical Sciences	150	72	147 (195)	9	0	2	I.T.	0	0	0/0
Gordana Rubeša https://bib.irb.hr/lista-radova?autor=194610	Full Prof. PhD Biomedicine and Health / Clinical Medical Sciences	300 (160)	5	12 (73)	11	0	1	A.P.R.	0	0	0/0
Tomislav Rukavina https://bib.irb.hr/lista-radova?autor=163264	Full Prof. PhD Biomedicine and Health / Clinical Medical Sciences	262,5	6	6 (48)	6	2	1	L.B. The association between social and economic characteristics and health care use in the Republic of Croatia	1	1	1/0
Alen Ružić https://bib.irb.hr/lista-radova?autor=303372	Assoc. Prof. PhD Biomedicine and Health / Clinical Medical Sciences	150 (12)	15	27 (103)	7	0	1	A.Š.S. D.A.	0	0	0/0
Luka Traven https://bib.irb.hr/lista-radova?autor=270083	Assis. Prof. PhD Biomedicine and Health / Public Health and Health Care	150 (125)	8	57 (96)	6	0	1	G.C. G.K.	0	0	0/0
Zlatko Trobonjača https://bib.irb.hr/lista-radova?autor=173625	Full Prof. PhD tenured Biomedicine and Health / Basic Medical Sciences	300 (177)	6	6 (105)	10	0	2	M.Š.	1	0	0/0
Vanja Vasiljev Marchesi https://bib.irb.hr/lista-radova?autor=255663	Assis. Prof. PhD Biomedicine and Health / Clinical Medical Sciences	75,5 (195)	7	102 (80)	4	2	4	S.O.	0	0	0/0
Ksenija Vitale/ Ruđer Bošković Institute, Zagreb https://bib.irb.hr/lista-radova?autor=183255	Full Prof. PhD Biomedicine and Health / Public Health and Health Care	30 (350)	19	26 (99)	6	2	2	P.Š. The impact of socio-economic factors and health behaviors on satisfaction with the quality of life of women in the Republic of Croatia	0	0	0/0
Vera Vlahović-Palčevski https://bib.irb.hr/lista-radova?autor=194575	Full Prof. PhD Biomedicine and Health / Basic Medical Sciences	75 (360)	23	240 (371)	16	1	1	M.S.B.	0	0	0/0



Darija Vukić Lušić https://bib.irb.hr/lista-radova?autor=317550	Assis. Prof. PhD Biomedicine and Health / Public Health and Health Care	150	8	13 (17)	3	0	2	V.B.	0	0	
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* Indicate if they come from outside HEI.

** Or another link showing accurate details of the works and the results of other scientific work.

*** The total current workload expressed in norm hours for all three levels of higher education (+ the workload on other HEI in parentheses).

A = number of scientific publications (books, articles, etc.) relevant to this area/field in the last five years, according to the Regulations on the Election to Scientific Titles (CROSB I update for a complete overview of the works).

B = number of citations of these works, if applicable, and specification of the source (e.g. WoS, Scopus, Google Scholar).

The first number in column B refers to the number of citations listed in column A between 2011 and 2015. The number in parentheses refers to the number of citations of all works of a given teacher in the period 2011- 2015.

C = h-index (if applicable, specifying the source).