

## A FEW WORDS ABOUT A SUCCESSFUL CAREER TO MIRJANA VUKOVIĆ



This issue of *Sarajevo Journal of Mathematics* is devoted to a special occasion and a special person: we celebrate 70 years of life of our editor-in-chief Mirjana Vuković. Just in time to make it to this article, Mirjana has had something else to celebrate, namely her well-deserved election as a full member of the *Academy of Sciences and Arts of Bosnia and Herzegovina* (ANUBiH). Congratulations, Mirjana. Let us review some of her achievements so far, while wishing her all the best and a happy continuation of her outstanding career.

As a young girl, Mirjana has travelled through many parts of the former Yugoslavia. She was born in Fojnica in BiH, although her family lived in Sarajevo where she spent her early childhood. After Sarajevo, she lived in Varaždin in Croatia and then in Maribor in Slovenia, when she was still a pupil. That was perhaps the first occasion when she had a chance to show that the persistence and hard work can break any barriers. Namely, she had to learn the Slovenian language<sup>1</sup> on the go, while attending all her school classes in that language and with no special allowance for not being a native speaker. After only one semester in the school, she was the best pupil, even in the Slovenian language classes. Mirjana's family finally moved back to Sarajevo to stay and there she continued her education and

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<sup>1</sup>Slovenian, although slavic and one of the languages of the former Yugoslavia, is a very different language from our native Serbo-Croat

successes as a best pupil, in particular in the “*Grammar School III*” (*Treća Gimnazija*) and as a student at the *Department of Mathematics of the Faculty of Natural Sciences and Mathematics* (PMF) of the University of Sarajevo, where she, as one of the best students, got all silver and a gold medal<sup>2</sup>, as well as the prize from the *Foundation “Hasan Brkić” of the University of Sarajevo*. Her excellent work as a student was noticed by her professors, in particular by Academician Mahmut Bajraktorević who elected her in 1972, immediately at the end of her studies, to the highly coveted post of the assistant for his lectures on Complex Analysis, whom Mirjana later succeeded at the chair of Complex Analysis at PMF. She also held lectures and tutorials in numerous other subjects, in the field of algebra, analysis, and geometry. Mirjana obtained her PhD at PMF in 1979, with the topic “*Some Problems on Summability and their Applications to Generalised Fourier Series*” (in Serbo-Croat), after also completing two years of the study of physics and a master’s thesis on “*Hensel fields and Henselisations*” (in Serbo-Croat) in 1975. Mirjana stayed at PMF throughout her career. Between 2002 and 2016 she also worked as a Professor at the *University of East Sarajevo* (UES). At UES she funded and directed the postgraduate studies in mathematics, taught at a high international level.

Although Mirjana’s career was so closely tied to PMF and Sarajevo from the very beginning and through the good and bad times, Mirjana acquired her education at the world’s most prestigious universities such as the “*Lomonosov – Moscow State University*” in Moscow and “*Pierre et Marie Curie*” University in Paris. She first went to Lomonosov as a student receiving scholarship from the Soviet government. As for the “*Pierre et Marie Curie*” University, in a long term collaboration with the celebrated French mathematician Marc Krasner there, Mirjana developed one of the most beautiful and cited strains of her research results, on paragraded structures (groups, rings, modules). In this work they have introduced a theory which is at the same time a generalisation of the classical graded structures as defined by Bourbaki and an extension of the earlier works by Marc Krasner. These structures, called paragraded (groups, rings, modules), in all three cases have the closure property with respect to the direct product and the direct sum, contrary to the category of graded structures. This work appeared for the first time in three joint papers published in the *Proceedings of the Japan Academy* as well as a scientific monograph: *Paragraded Structures (groups, rings, modules)* (in French), published in 1987 in the prestigious monographic series: *Queen’s Papers in Pure and Applied Mathematics, Queen’s University*, in Canada. As a theory in abstract algebra, the theory of paragraded structures will see its full potential of applications only in the years to come, but some applications are already known. Several papers by various authors have developed interesting applications of paragraded

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<sup>2</sup>A silver medal is given to the best student of the University at each of the years one to three of their studies, and a gold one to the best finalist

structures to algebra and number theory, but also to logic, including elementary modules. Since its introduction in the 1980s, this theory is still very vivid and attracts many researchers.

In addition to the two long international collaborations mentioned above, Mirjana was an invited professor at many other world's universities including *Charles' University* in Prague, *University Joseph Fourier* in Grenoble, *The Fields Institute* in Toronto, *Technical University of Vienna* in Vienna, *Tsukuba University* in Tsukuba, and others.

Mirjana collaborates with a large number of mathematicians and universities and her openness and the welcome she enjoys everywhere are witnessed by the facility that she has had to attract a diverse body of editors to our editorial board, even after the difficult times that the scientific collaboration in the region has suffered as a consequence of the political situation at the time of the dissolution of Yugoslavia. This welcome is also witnessed by the participation of many mathematicians at two international conferences: "*Graded Structures in Algebra and their Applications*", dedicated to the memory of Professor Marc Krasner, IUC, Dubrovnik – 2016 and "*Modern Algebra and Analysis and their Applications*" that was held in September 2018 in Sarajevo and where they have gathered to celebrate her birthday and achievements.

Mirjana's rich publication list shows about 50 research papers in peer-refereed international journals, in areas as diverse as her two main topics of algebra and analysis but also in applied mathematics, as well as many conference, survey, review and educational papers and a scientific monograph. She is the author of many textbooks, among which some have become classics, such as the *Group Theory and Representations with Applications in Physics* (in Serbo-Croat). This book is used as a textbook at many universities and in the opinion of its reviewers "*filled the void in the textbook literature in South Slavic languages, especially in the relation to the theory of the representations of groups and continuous groups.*" Some of Mirjana's books are still to appear, such as her upcoming book on Algebra co-authored with the late Academician Veselin Perić.

While giving the reader the flavour of Mirjana's mathematical work, I am purposefully avoiding any temptation to reduce this article to a listing of her theorems, as important as they may be or a diatribe on her number of citations. This type of information may fully describe some mathematicians, those who have spent their career chasing numbers and recognition. But this type of information, available to anybody interested on any one of the many international sites that one can easily consult, is only a part of what Mirjana's career is all about. She stands as somebody who has devoted all her life to scientific brilliance, sharing it and spreading it, without any other motivation but to serve the mathematical community and the moral community of humanity to her best ability. This includes advising more than

100 bachelor's thesis, numerous master's and two doctoral theses, serving through the ranks of PMF from the assistant to the full professor.

Mirjana has been associated with the University of Sarajevo, as professor of mathematics, as Department chair and Vice-Dean for science and teaching of the Faculty of Natural Sciences and Mathematics as well as a Vice-Rector of the University of Sarajevo. She served as a President of the Mathematical Society of Bosnia and Herzegovina and a long – time member of the Editorial Board of the journal “*Sarajevo Journal of Mathematics*”. Since 2014 she is one of two editors in chief of this Journal. In 2012 she was elected as a corresponding member of the ANUBiH and from 2014 she has served as a member of its Presidency.

Being a woman mathematician, a beautiful and feminine woman, in years when it was even more rare than now, was something that just went without saying for Mirjana. Never did that stop her from standing against any injustice she perceived. When Mirjana believes in something, she does it, and she does it well.

In December of 2018 Mirjana's successful scientific work and results got crowned by the full membership in the Academy of Sciences and Arts of BiH. This success evokes many successes and recognitions that Mirjana has earned in her career, such as the “*Sixth of April Award*” of the City of Sarajevo in 1985, the highest Republic scientific prize “*Veselin Masleša*” in 1987, the “*Legion of Work with Silver Crown*” (*Orden Rada sa srebrnim zracima*) from Yugoslav Government in 1987 and many other prizes.

Many thanks Mirjana to all that you have done for the generations of mathematicians, including the author, and we wish you many successes for the years to come.

Mirna Džamonja.