

## A tribute to M.M. (Micky) Zdravkovich

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Another of the greats of FSI/FIV has passed away. There is hardly an issue of JFS that is published without one or several citations of Micky's work. It is therefore with great sadness that we dedicate a few pages of the journal to reminiscences and appreciations of Micky's work, as well as to a wonderful biography composed by his wife Jelena (Helena).



Micky Zdravkovich

(He loved Nature and, all of his photographs  
were taken outdoors)

## A brief biography

Micky (Momchilo) Zdravkovich, who suddenly died aged 71, was born in Belgrade on 21 August 1935. His father was an eminent surgeon, killed in the Second World War in 1943. His mother had an extremely hard time bringing up two boys.

Micky was always an outstanding pupil and student. After finishing Grammar School he went on to read Aeronautical Engineering (5-year course) at Belgrade University. He graduated with distinction in 1959. In 1962, he was awarded an M.Sc. in Applied Mechanics and in 1966, a Ph.D. in Applied Mechanics from the University of Belgrade.

From 1959 he was appointed a Lecturer at the University of Belgrade. At the same time, he was working as a Consultant Engineer at Energoprojekt (Nuclear Power Group), as an adviser in the Institute of Nuclear Sciences, Vincha (Thermodynamics Lab.) and he was a Member of the Mathematical Institute (Serbian Academy of Sciences).

A very special moment in his life happened when in 1966 he came to spend his sabbatical leave in Cambridge, UK. He discovered the joy of freedom to research, to follow his ideas and scientific instinct. He was lucky to find an exceptional friend in Peter Sutton who was always there to help him find his way in this completely new world. His happiness was complete when his first daughter, Anna, was born in Cambridge in 1967. Micky was married in the Serbian Orthodox Church, Belgrade in 1958.

On his return to Belgrade, he found it very hard to accept the conditions of research at his University and when in 1968 he received an invitation from Professor J.L. Livesey to come to Salford University, Micky was happy to accept it, but at the same time he left his country, relatives and friends with a feeling of deep sadness.

Micky was a very enthusiastic teacher, who tried to help students in many ways and was very much appreciated by them. A few of his colleagues and at the same time wonderful friends—Bill Green, Paul Wilcox and the late Toby Ferman made him forget and not pay any attention to the fact that he was openly underrated by certain colleagues at Salford. And yet, he did not accept several offers of professorships, because he did not want to move from Manchester and disturb the life and education of his beloved daughters Anna and Alexandra.

Micky spent his second sabbatical leave (1976–1977) at Imperial College in London, and came back with new ideas and happy memories of his research there, his colleagues and in particular Professor Peter Bearman.

During the Salford period (1969–1999), Micky was able to carry on with his research, write articles, present papers at different Congresses, Conferences, Seminars and International Colloquiums and to write two books: *Flow around a Circular Cylinder*, Vol. 1: *Fundamentals* and *Flow around Circular Cylinders*, Vol. 2: *Applications*. Unfortunately, his work on his third book stopped at the 31st chapter when his heart stopped.

In 1997, Micky was invited as Visiting Professor to Kanazawa University in Japan. He truly loved Japan and Japanese people. He enjoyed working there and he came back with precious and wonderful memories, which he treasured till the end. He often talked about his friends—Professor Honji, Professor Okajima and many others.

Even Parkinson's disease, from which he had been suffering for the last 10 years of his life, did not stop him from writing, following what was happening in the scientific world and being in touch with some of his friends and colleagues all over the world—Professor Paidoussis, Professor Sarpkaya, Professor Graham, Professor Honji, Professor Okajima, Professor Matsumoto, etc., to name just a few.

Micky was a very modest man. He never talked about his achievements or took any credit for them. He dedicated his entire life completely to teaching and research on flow around circular cylinders, which took 1260 pages to be described in two volumes. In 2005, for his Vol. 2: *Applications*, Micky was awarded the JAWE prize in Japan, which is given for outstanding publications. One of his colleagues, Professor Paidoussis wrote to him, saying that the book was “a monumental legacy”. In Vol. 3 of the trilogy, which is unfinished and not as yet published, Micky concentrated on unsteady flow, waves and flow-induced vibrations.

Micky wrote in the preface of his books that his trilogy could be “compared to a strange and incomplete jig-saw puzzle of a peculiar kind. It is composed like a jig-saw of hundreds and hundreds of pieces, which vary in size and do not fit nicely together. This reflects the complexity of Fluid Mechanics, where more research is always needed to fit together the remaining pieces”.

Unfortunately, this wonderful, modest and great man was deprived by Fate from adding more pieces to fit in the puzzle, but he would be extremely happy if the pieces he had already put together would help others to complete the picture.

## Tributes

I first became acquainted with Micky Zdravkovich when we exchanged papers through the mail in the late 1970s. When I first visited UK in 1979, I met Micky when he drove from Salford to meet me somewhere near Stonehenge one evening where we discussed some Fluid Mechanics and just got acquainted. In the early 1980s, Micky came by Houston

while on a visit to the US. The ASME-WAM was being held in New Orleans that year and I was planning to fly myself to the meeting (New Orleans is about 300 air miles east of Houston) and Micky agreed to fly with me. He had never flown in a small plane before and he was quite excited about the new experience. However, the exuberance became undone because, on the day of departure, the plane's radio was not working and we had to fly commercially.

I next saw Micky in about 1986 when I made another trip to UK and Micky insisted that I come to Salford for a seminar and I wound up spending two nights in his home where I met Helen and Alexandra. We again had some interesting discussions about Fluid Mechanics during this time.

We corresponded via regular mail since Micky was not an email person. Like Sarp, I even learned how to read his handwriting after a number of letters.

I returned to UK again in 1999 when I had what the State of Texas refers to as a sabbatical (do not ask). Micky arranged with Brian Launder for me to give a seminar at Manchester and, again, I spent the night at his home in Salford.

We had not crossed paths since that visit in October 1999. I have kept in contact with Micky, again by letters, and am constantly aware of him because of his first two volumes of "Flow Around a Circular Cylinder" which has proven to be an invaluable reference for me and, I'm sure for the many of us who are interested in flow past cylinders. I am certain that everyone is very interested in seeing Vol. 3 finished, however that happens.

Micky is missed. He was a polite, friendly and gentlemanly person. The world could use many more like him.

Charles Dalton  
*University of Houston, Houston, TX, USA*

My memories of Micky include quite a number of times when I was exposed to his very considerable charm and enthusiasm, not least for the English Lake District where he had a holiday apartment.

His knowledge of the fluid dynamics of circular cylinders and also the history of the subject was of course well known and encyclopaedic. What I really appreciated about Micky was his understanding of the underlying physical phenomena and his interest in discussing his insights with others.

Altogether the fluid mechanics community in addition to his family and friends has lost a unique person whose contribution will take some time to be fully assessed.

Mike Graham  
*Aeronautics Department, Imperial College, London, UK*

It was with the profoundest grief that I learned of the death of Dr. M.M. Zdravkovich. I have always admired and respected Micky. Micky established his name as an outstanding and world-famous fluid-dynamics scientist, especially on flow around circular cylinders.

In July, August and September 1997, I invited Micky to my Laboratory, in Kanazawa University in Japan, under the British Council/Japanese Educational Office Sponsored Scheme for Inviting British Academics, because Micky was one of the world authorities on fluid-dynamic problems of circular cylinders. Fluid-dynamics and flow-induced vibration problems were the most serious ones since the accident of the leakage of the liquid sodium coolant occurred at the Fast-Breeding Nuclear Reactor "MON-JU" in Japan on December 8, 1995. His suggestions for this problem were very useful and helpful for further understanding of the cause of the "MON-JU" accident, and his activity in Japan was marvellous. It has remained in my mind that he helped us to carry out a program in Japan on the problems of fluid-dynamics and flow-induced vibration as a world-leading researcher in this field. His academic books "Flow around Circular Cylinders," vols. 1 and 2, published by Oxford University Press have sold well in Japan as well, and his reputation was well recognised by the academic community around the world.

Then, the Japan Association for Wind Engineering awarded Micky the JAWA Prize 2005 for his books. Micky was very respected and liked by many professors and researchers. All of us who knew him will long cherish his memory.

Atsushi Okajima  
*Emeritus Professor, Kanazawa University  
Professor, Kanazawa Gakuin College*

Micky Zdravkovich was a dedicated and enduring contributor to our community. His research on bluff body wakes, particularly the complex interactions of wakes of multiple, closely spaced cylinders, is well known around the globe. Moreover, he took great pride in his voluminous collection of contributions to the topic of flow past bluff bodies, which, of course, benefited all of us working in this area of flow-structure interaction. As a persistent archivist who strongly felt that our community had the responsibility to properly acknowledge the wide range of investigations on a given subtopic, his

presence served as a continuous reminder that scholarship involves not only scientific advances, but also proper citation of the contributions of those who have gone before. Indeed, we who serve as referees for manuscripts submitted to various journals sometimes yearn for more rigorous documentation of previous related investigations and, in doing so, then perhaps we subconsciously wish for Micky's watchful eye and his encyclopedic recitations!

Donald Rockwell  
*Lehigh University, Bethlehem, PA, USA*

I was sorry to hear of the passing of Dr Momcilo Zdravkovich, Micky to his friends. Dr Zdravkovich's scholarly legacy is well established by his publications and monumental books and will be covered by others contributing to this memorial. I would like to share a few fond memories of Micky Zdravkovich, the ever cheerful and delightfully eccentric friend, who I was fortunate enough to have spent some great times with over the past 35 years.

Micky had a warm, friendly and outgoing personality, which was clearly seen in his conference presentations. He demonstrated an infectious enthusiasm for his work and a creative way of presenting it so that it was both insightful and entertaining. Nobody who was there could forget the Karlsruhe paper at which Micky shuffled the huge podium flowerpots about, to help illustrate flow around cylindrical bodies.

Micky was also very resourceful and unpretentious. At an ASME meeting in San Francisco in the late 1970s, he amazed us all when he proudly announced that he had acquired a room at a major hotel for a small fraction of what the rest of us were paying. Apparently, he had used his considerable charm to obtain a very modest room with a folding cot. At the same conference, Micky was seen on the television news participating in a parade with his usual big smile and engaging energy. He seemed not to be aware that it was a gay pride parade, but that did not matter to him. He was having fun and enjoying the ambiance.

Some years later, at a conference in Washington, Micky asked if he could share our hotel room, again sleeping on a folding cot charmed from the hotel staff. This was after Micky had had by-pass surgery and was following a daily exercise program. He promised to be a minimum of nuisance and to do his exercises quietly. He was fond of identifying with great precision his degree of recovery, 88% at that time as I recall. His routine included jogging, which was executed (not so quietly) in our room and then up and down the hallway. This was Micky. We were glad to see him in good health and to have the opportunity to share his company.

Micky was also a gracious host. Any visit to Salford was accompanied by a visit to his home to meet Helena and their daughters and to share a meal. He was clearly a loving husband and a proud father.

Micky was a unique character who could provide insights into complex phenomena while brightening your day. I will always remember him for his kindness, his enthusiasm, and his love of life. He is greatly missed.

David S. Weaver  
*McMaster University, Hamilton, Ont., Canada*

The circular cylinder is the iconic bluff body and it is now impossible to think of cylinders without remembering Micky Zdravkovich. Almost the whole time I knew him, which was more than 30 years, Micky was gathering information for his highly successful books on circular cylinder flow. I cannot recall when I first met him but I assume it must have been at a conference and he would have been making an enlightening and entertaining presentation on some aspect or other of circular cylinders. A favourite trick of his then was to place large old British pennies on an overhead projector and all he needed was two pennies to illustrate a talk on side-by-side, tandem or staggered arrangements of cylinders. In the mid-1970s I was contacted by Micky with a request to spend a sabbatical at Imperial College. At first I was a little surprised because I am used to people going far away for their sabbatical, not simply catching a train from Manchester to London. But I quickly realised what a great opportunity and delight it was to be able to have Micky at Imperial. He carried out some very nice research on flow around a circular cylinder near a plane boundary, which was later published in the *Journal of Fluid Mechanics* and still receives plenty of citations. However, there were times when Micky used to disappear for quite long periods and it was then that I discovered his other reason for choosing to come to Imperial College, it was to spend hours in the Science Museum Library reviewing material for what would later turn out to be his books on circular cylinder flow. One day he came back particularly excited because he had been to the museum at the nearby Royal College of Music and seen an Aeolian harp. They even allowed him to take it to an open window so he could listen to vortex shedding from a circular cylinder.

Micky enjoyed travel and was a great conference goer. We would meet sometimes in London and Manchester but most often in some faraway place. He particularly liked Japan and I recall meeting him in Kanazawa University where he was staying as a guest of his friend Atsushi Okajima. We all went to a restaurant for lunch and Micky was in great form that day and bubbling over with enthusiasm. It was at a time when he had had a few health scares but it seemed nothing could or would slow Micky down.

For many Micky will be best remembered for his books, but it should not be forgotten that he was also a talented researcher and through his own work he contributed much to our understanding of circular cylinder flow. I remember him as an enthusiastic, warm and friendly person with a passion for life (and circular cylinders).

Peter Bearman  
*Imperial College, London, UK*

I cannot remember when I first met Micky Zdravkovich, but it must have been in the 1960s in some conference or other. I remember him, however, for as long as I can remember, as the very intelligent, perceptive and dedicated researcher that everyone agrees he was.

I was struck by how knowledgeable he was. At conferences, he would discuss an esoteric point in the question period, something like this: “Let us recall that X did such and such in 1935, but also that Y corrected X in such and such way in 1948. Also, let us not forget the recent work by Z in 1976, and also by ZZ in 1982 in a paper published in ....” How could he remember all that? I was truly awe-struck. No one could match him.

However, my first indelible memory of Micky was his General Lecture at the IAHR/IUTAM 1979 Karlsruhe Conference (organised by Profs E. Naudascher and D. Rockwell) in which he spoke about flow-induced vibration of groups of cylinders, including cylinder arrays. As is common in Europe, the stage, specifically in front of the podium, was decorated with a number of large and magnificent flowerpots. Micky decided to illustrate fluidelastic instability in cylinder arrays by coming in front of the podium and moving one of the pots as if it were a cylinder, and then back to the podium to discuss the effect; back and forth, till the explanation was complete. Unfortunately, the pots were rather large and heavy, and with the back and forth, a lot of effort and time was expended, and some of the other things Micky wanted to say remained unsaid. But what a vivid, colourful illustration of fluidelastic instability! One that anyone witnessing it would be unlikely to forget!

Another vivid memory is related to a paper Micky delivered about some experiments he had conducted on bistable flows around groups of cylinders. He said that things appeared to be quite random, until he noticed that the switching from state A to state B, and back, was related to someone opening the door to the lab. Even so, he said, the correlation was not complete, and he started to suspect that the switching was also related to the ringing of the telephone! Was this a Micky joke? We shall never know. If he did not want to say, he could be as enigmatic as the Sphinx, with that half-smile of his.

He came to McGill once, in the 1980s, I think, to visit Professor Stuart Price and me and, as usual, he asked us to find him a cheap room, as a matter of principle! During dinner at a Greek restaurant, we tried to discover whether he was a Serb or a Croat, without success. He clearly thought of himself as a Yugoslav, and I only learned now that he was Serb. How painful it must have been for him to see his native country dismembered piece by piece in recent years.

Speaking of his penchant for “cheap” hotel rooms, I remember also that in one of the Karlsruhe conferences he stayed in a loft in a farmhouse, nearly one hour away by train. Not only was the rent a pittance, but he enjoyed fresh-baked bread, eggs and cheese made right there, for breakfast. He was clearly a very wise traveller!

His legacy to the FSI community remains, and will remain, extremely important: a number of very clever and important papers, constantly cited, and more so the two volumes of his trilogy on “Flow around Cylinders” published by OUP. (It was initially planned to be a tetralogy, but when he was struck by Parkinson’s he very sadly pared it down.) He was very pleased when I referred to his two books as “a monumental piece of work” and he wrote to me about it, but it was definitely that and more! We shall eagerly await Vol. 3.

We shall always remember Micky as the researcher pursuing a relentless quest for knowledge and understanding in his chosen field: flow around cylinders. But also as a very dedicated and, yes, brave, warm and friendly colleague with a fine, mischievous sense of humour.

Michael P. Païdoussis  
*McGill University, Montreal, Qué., Canada*