



## In Memory of Vladimir Kresin

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The *Journal of Superconductivity and Novel Magnetism* (JOSC) Editor-in-Chief, Professor Vladimir Kresin, Dr. Sc. (Fig. 1), left us recently. This is sad news for the journal which developed under his leadership for several decades. This is also sad news for all researchers in the fields of superconductivity and condensed matter physics, where his contributions were enormous. A theoretician from the world-renowned Landau school, he worked in Moscow from 1958 until 1979, and in Berkeley since 1980. In the field of superconductivity, he made remarkable contributions to the study



**Fig. 1** Professor Vladimir Kresin, photo reproduced with the permission of Dr. Kresin's family

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of transport and electromagnetic properties, proximity effect, isotope effect, the strong coupling limit of phonon pairing, alternate mechanisms of superconductivity, high- $T_c$  superconductivity, organic superconductivity, and other topics.

Among the large number of Vladimir Kresin's results concerning high- $T_c$  cuprates, we would like to mention the demonstration of lattice and superconducting state stability in the limit of strong electron–phonon coupling. In condensed matter physics, his notable works include structural transitions, optical and magnetic properties, size quantization, and plasmon effects in thin films, as well as mixed-valence manganites. His research in the field of molecular and nanosystems was related to non-adiabaticity in  $\pi$ -electron systems, polyatomic photodissociation, chemical dynamics, and catalysis. His research on pair correlations and their effect on the spectral properties of nanosystems is well known. A series of papers, published through 2022, was devoted to the mechanisms and problems of room- $T_c$  superconductivity in hydrogen-based superconductors. They require very high pressures for metallize them, limiting their immediate applications. In his last work, Vladimir Kresin and his co-authors proposed a strategy for the rational design of high-temperature superconductors at low pressures, by alloying small-radius elements and hydrogen, to form ternary H-based superconductors with alloy backbones. Without any doubt, his scientific potential would allow him to obtain more beautiful and important results.

In addition to his tireless work on keeping JOSC at the forefront of the field, Vladimir Kresin was active in organizing conferences and workshops which were remarkable for the freshness and relevance of their contents. Among them, he was proud of the 1987 Conference on Novel Mechanisms of Superconductivity which was held in the Berkeley Marina on San Francisco Bay and turned out to be the very first major international conference held after the discovery of high- $T_c$  cuprates. The enthusiastic participation of remarkable scientists, the discussions of exciting new physical phenomena, the beautiful natural setting, the smooth organization, and the hospitality of the hosts were all emblematic of Vladimir Kresin's passion for science, beauty, truth, and friendship.

## 1 Some Personal Impressions

### (i) Sergei Ovchinnikov, Co-Editor of JOSOC

I would like to mention several reminiscences of my collaboration with Vladimir Kresin. The first one is related to my PhD thesis defense in 1977. I was a young scientist. We met in Moscow and discussed my results. Then Vladimir flew to Siberia to my research institute in Krasnoyarsk to take part in the thesis presentation. His comments were of great value and importance. My second recollection is related to our meetings at international conferences in the USA and Europe after 2000. Some particularly valuable discussions took place on Ischia.

The third one is related to JOSOC, where Vladimir invited me to serve as a Co-Editor. His advice and regular discussions of all journal-related issues and problems testified that the Journal was truly an important part of his life and activity. Finally, the fourth set of recollections is connected with our joint hard work on the book *Superconducting State: Mechanisms and Materials* (V. Z. Kresin, S. G. Ovchinnikov, and S. A. Wolf, Oxford, 2021). For 2 years, we regularly discussed each page and each figure. Sometimes we had intense debates, especially regarding the mechanisms of superconductivity in cuprates. Conducting such an active collaboration by email was rather difficult. We had many online meetings. With a 15-h time difference between Krasnoyarsk and California, the time band for our online communications was very limited. Finally, Vladimir invited me to his home in Oakland, where we spent some beautiful time with him and his wife, full of physics, music, and walks in nature. During this time I developed a clear impression of the depth and breadth of his vision of the area of superconductivity. I am happy to have had such an experience.

### (ii) Israel Felner, Co-Editor of JOSOC

I met Vladimir at various scientific conferences. Since I am an experimentalist and Vladimir (as stated above) was a theoretical physicist, I usually went to listen to lectures by experimenters, with one exception: Vladimir's lectures. He was skilled to explain the most complicated physical problems using simple models, which anyone could understand.

I felt honored when Vladimir first appointed me as an associate editor and not long after, as a co-editor

of JOSOC. The editorial board used to meet every year at one of the leading conferences (Antalya, Ischia, etc.) where we became good friends. We would travel and spend time together. Many times, as an editor, I encountered problems of various types. Then, I contacted Vladimir who assisted me, and his blessed advice was always wise and helpful.

Several years ago I attended a scientific conference in San Francisco. Vladimir found out about it and "forced" me to visit his home in Oakland. Since I am an orthodox Jew, his wife Lilia and he took care of strictly kosher food, and we were able to spend many hours at their home, discussing various physics topics.

During the pandemic all JOSOC editors would meet virtually several times a year, and Vladimir's presence as editor-in-chief was always prominent and influential.

During the last meeting Vladimir was absent, and we were all certain that he would join us next time. But his illness overwhelmed him, and the journal and the entire scientific community have lost a talented, brilliant, and versatile scientist. I have lost a friend. We shall remember him as a blessed person.

In Hebrew we always depart by saying: "יהי זכרו ברוך" (Yehi zichro baruch).

### (iii) V. P. S Awana, Co-Editor of JOSOC

Besides following some of the best literature authored by Vladimir in field of superconductivity, I was associated with him from over a decade through JOSOC, first as an editorial board member and later as co-editor of the same. He always encouraged persons around him. For me it is much a personal loss; I could always rely on him to promote me to right positions in moving up the scientific ladder. One more thing: I found that his quick responses to the emails came without any delay. Although I never met him in person, the content of his emails had always been so lively that it appeared as if we were talking to each other. I lost a mentor who inspired me. Life and death is the eternal law of the world, in which the law of movement applies to all living beings. We cannot believe that he is no more with us. RIP "Om Shanti."

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