



## Obituary Ladislav Kubin

**Ladislav Kubin**

26 November 1943 – 18 October 2022



The materials research community has lost one of its most brilliant minds, and it is with deep sorrow that we pay tribute to our dear friend and outstanding materials scientist Ladislav Kubin, who passed away on 18 October 2022.

Ladislav Peter Kubin was born in 1943 in Peterborough, England to a family of refugees from Czechoslovakia. Ladislav was rather reticent about his family history. All we know is that during the Second World War his father served in the Free French Forces of General De Gaulle in England. Shortly after the war, after a sojourn in Prague, the family fled Czechoslovakia and settled in France, first in the Landes and later in Orléans where Ladislav went to school. As an adult, Ladislav was proud to be related to the renowned painter and writer Alfred Kubin.

Ladislav is remembered as a gifted student. He graduated from the prestigious École Centrale Paris and did his doctoral coursework (DEA) in Solid State Physics at the Faculty of Science of the Paris-Sud University in Orsay (1969) created by the great Jacques Friedel, which has been home of solid state physics and physical metallurgy in France for five decades. There he completed his PhD studies under the supervision of Bernard Jouffrey. Kubin's PhD thesis, defended in 1971, dealt with the deformation mechanisms in niobium. The interest in strength and plasticity of body-centred cubic metals stayed with him throughout his scientific career. Ladislav started off as an experimentalist when he followed his PhD supervisor who became director of the newly created centre for high-voltage transmission electron microscopy in Toulouse. This was the pioneer times when the first *in situ* observations of moving dislocations were made, and Ladislav contributed a lot to the

understanding and interpretation of the elementary dislocation reactions that determine their mobility in metals. The videos he and his colleagues shot in Toulouse became the classics, and we still remember those 16 mm film reels capturing these dislocation reactions. They were used as teaching aids by the lucky ones who possessed a rare copy.

In 1980, Ladislav moved to Poitiers, where he continued his electron microscopy work at the Physical Metallurgy Laboratory. In this period, his research interests were shifting more and more towards theoretical studies. They embraced a broad field, ranging from the individual dislocation kinetics to the collective, macroscopic dislocation phenomena. The central themes of this research included instabilities of plastic flow and non-uniformities of plastic deformation, including thermo-mechanical instabilities, dynamic strain ageing and unstable fatigue behaviour. This seminal work laid the foundations for broadly accepted theories of these phenomena and resulted in models describing plastic instabilities in terms of the dislocation density evolution. The significance of this work was noted by Friedel, who wrote a preface to the proceedings of a summer school on the subject organised by Ladislav together with George Martin in Aussois in 1987. Ladislav intimated to one of us half-jokingly that he was proud of not having done anything practical in his research, but the truth is that this work does have important practical implications. As a proof of the maxim that nothing is more practical than a good theory, the models Ladislav developed provide the practical engineer with a tool for predicting (and thus avoiding) the deformation regimes under which detrimental instabilities of plastic deformation occur in alloys. A further line of research for which Ladislav Kubin obtained great fame is dislocation dynamics simulations. This approach to modelling dislocation interactions, self-organisation, and the attendant plasticity of crystals has now become an integral part of the arsenal of modern modelling techniques. At the time when, together with Gilles Canova, Ladislav initiated this research, it required vision and courage to embark on the tremendous task of using dislocation dynamics simulations to build a physics-based theory of plasticity. Ladislav was able to inspire many researchers and establish an international network working on what is commonly dubbed Discrete Dislocation Dynamics (DDD). It took the adepts of DDD around Ladislav in Poitiers and later at ONERA, which he joined in 1988, decades of painstaking numerical simulations (and a lot of computing resources) to move to the realms of plastic strain where macroscopically relevant phenomena of dislocation structure formation could be explored computationally. The now mature area of DDD simulations will forever be associated with the name of Ladislav Kubin and his disciples.

Ladislav Kubin was a prolific writer. He published scores of research papers in reputable journals, including *Acta Metallurgica* and *Scripta Metallurgica* (later to become *Acta Materialia* and *Scripta Materialia*) and

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also served on the editorial boards of several major journals, including *Scripta Materialia* and *Journal of Modelling and Simulation in Materials Science and Engineering*, and co-edited, with John Hirth, a monograph series 'Dislocation in Solids' (North Holland Publishing Company). His *magnum opus* 'Dislocations, Mesoscale Simulations and Plastic Flow' published in 2013 by Oxford University Press has become an influential treatise on dislocation theory-based plasticity. Ladislav was a very hard-working and productive person. Asked what he was planning to do after his retirement, he said once that he would stop doing research and dedicate himself to other endeavours, such as travel. But being a scientist through and through, he never abandoned research and worked scientifically until his illness made it impossible for him to continue. His last article on non-crystallographic slip in body-centred cubic crystals was published in *Scripta Materialia* in 2019.

Ladislav Kubin received numerous recognitions of his research accomplishments, a CNRS Silver Medal and the Alexander von Humboldt Award among them. But more important than such formal recognitions

of his life's work are the high esteem in which he was held by his colleagues and students and his impeccable reputation in the French and international materials science fraternity.

We have worked with Ladislav over many years. We have spent with him many an hour listening to music, dining, mushroom-hunting, and hiking in the mountains and forests. His friendship enriched our lives, and we shall always be thankful to him for that. The sharp mind, subtle humour, profound intelligence, and aristocratism of the spirit Ladislav possessed is what made interactions with him an utterly delightful experience. We are sure that the many friends, former students, and collaborators of Ladislav Kubin whose paths in science were guided and illuminated by him will join us in commemorating this great researcher and a wonderful human being. The results of the work done by Ladislav have become part of the treasure chest of materials science and will undoubtedly promote further discovery in our discipline.

Vale, Ladislav Kubin!

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