OBITUARY

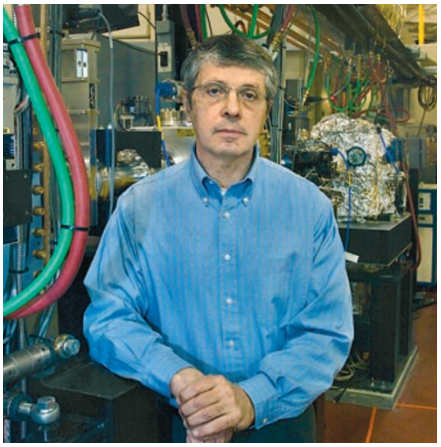
Daniel Chemla (1940–2008)

Physicist, karate master, and pioneer in optical properties of nanostructures

Daniel Chemla, a pioneer of nanophysics, and nonlinear optics, passed away on 20 March 2008 in his home, near Berkeley, aged 67. He is survived by his wife Berit, and their two children. Over the past four years, while leading his research group at Lawrence Berkeley National Laboratories (LBNL), Chemla had been battling the aftermath of a stroke. As a professor of physics at Berkeley, he taught light–matter interactions and the theory of condensed-matter physics. Before his deteriorating health, Chemla was Director of the Advanced Light Source (ALS) at LNBL. Between 1998 and 2005, without any prior experience in 'big science' facilities, he upgraded the ALS to the premier US Department of Energy (DOE) facility towards the production and utilization of soft X-rays. He was elected to the US National Academy of Science in 1995.

Daniel Simon Chemla was born on 21 July 1940 in Tunis, shortly before the then French protectorate was to be occupied by Nazi Germany. His fate, as kin to a Jewish family, might have been sealed, were it not for the liberating advance of allied forces in 1943. A survivor from dramatic times, exposed to hardship at an unduly early age, Daniel was nevertheless as cheerful, positive and forward looking a person as can be, open to many cultural influences. This was by no means contradictory to his frequent references to his Mediterranean roots, such as a self-mocking colourful 'pied-noir' colloquial language and accent that he would, at times, rejoice his friends with. He had nurtured special ties with France, where he spent his formative years from 1958 to 1981, through a dual education at the Ecole Nationale Supérieure des Télécommunications and Pierre and Marie Curie University in Paris. Following his doctorate, he started on an increasingly successful research career at the Centre National d'Etudes des Télécommunications in Bagneux, from 1972 to 1981, which then was a joint France Telecom and CNRS research laboratory.

Daniel graduated from an elite engineering school in Paris, but did not follow the semi-administrative overprotected track that the French system tends to value sometimes on top of research-driven careers. Hence his decision to move to the US, which he considered better suited to



deploy his potential. Indeed, his career gained further momentum when he moved to the US, from AT&T Bell Laboratories in Holmdel (1981–1990) to Berkeley and LBNL (1991–2008), where the many facets of his creativity fully flourished.

Since his early days as a researcher, Daniel's interest in light–matter interactions and materials science pervaded to diverse materials from semiconductors and organics all the way to biological systems, at time- and length-scales down to the femtosecond and nanometre. Amongst his early contributions to science, one may single out deep insights into the engineering of nonlinear optical molecular materials at a time when this field was largely considered exotic. His original use of group theory later inspired general molecular design rules that had been overlooked. In 1987 he co-authored a large portion of the two-volume treatise *Nonlinear Optical Properties of Organic Molecules and Crystals*, which remains a milestone in the field. This naturally led him to enthusiastically support the modern study of biological systems by single-molecule spectroscopy, where he always stressed simple predictive models as opposed to blind screening.

On his arrival at Bell Labs, in 1981, the time was ripe for one of the most enduring revolutions in solid-state physics, as enabled by the control, on an atomic scale, of the deposition of semiconductor thin-films. This period at Bell Labs in the early eighties certainly can be considered as the golden age of semiconductor physics, of which Daniel is one of the heroes. Indeed, it was during that period that Daniel and his colleagues discovered and formulated theoretically the 'quantum confined stark effect' as well as the self-electro-optic-effect device (SEED) at the more applied end. His studies of ultrafast carrier dynamics and many-body effects in quantum wells and heterostructures ultimately led to full control of exciton physics in confined structures. At the occasion of his 65th birthday in 2005, a *Chemical Physics* special issue on molecular nanosciences paid tribute to these seminal contributions.

Building on his managerial skills as head of the Quantum Physics and Electronics Research Department at Bell Labs, his leadership fully blossomed during his time at LBNL, where he trained several generations of young scientists in nanosciences. His creation of the Molecular Foundry at LBNL, one of five national DOE Nanoscale Science Research Centers, was the ultimate focus point of his career. It showed him at his best, uniquely combining the creativity of an exceptionally gifted scientist, the scientific vision of an inspiring director and the implementing skills of an efficient manager.

Regarding his private interests, karate was another focal point of his life, and he subsequently rose to the rank of godan, the top rank in Shotokan karate. Daniel was a true citizen of the world, and had many attachments, amongst them Norway, birthplace of his wife, Japan through his karate career and Israel, where he counted many friends and students from physics to karate.

One may conclude here along the lines of Churchill: in few cases were so many indebted to so few, namely here to a single individual, be it in our scientific lives, our careers and maybe more importantly, in our personal approaches to team work, life and purpose.

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