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In Celebration

## Professor Jean Taine on his 65th birthday



Our colleague and friend Jean Taine, Professor at *École Centrale Paris*, celebrates his 65th birthday this year. It is our great pleasure to take this opportunity to warmly thank him for all his achievements and to express our sincere acknowledgements for his outstanding contributions in the field of radiative transfer and, more generally, in the field of heat and mass transfer.

Professor Taine was born in Roubaix, north of France, on 13 November 1949, and he was raised in Lille, until 1969 when he joined *École Normale Supérieure de Cachan* and University Paris-XI. He prepared there a Master degree in Theoretical physics and learned statistical physics and fluid dynamics from professors R. Castaing and A. Fert. Professors J. Brossel, C. Cohen-Tannoudji and S. Haroche made him discover the physics of radiation. His research was then heavily influenced by these eminent scientists. He obtained his *Doctorat ès Sciences* from Paris XI University, Orsay, in 1980 in the field of molecular physics. His Doctorate work was on CO<sub>2</sub> vibration relaxation through collisions with atoms and molecules, and the measurement of relaxation rates by means of the photoacoustic method.

Professor Taine joined *École Centrale Paris* as Associate Professor in 1976, and then as full professor since 1983. He took in this famous French engineering school (founded by Eugène Péclet and three other scientists in 1829), the chair of heat transfer which was held before him by Prof. Marcel Véron, and then by Prof. Jacques Huetz.

Since 1990, he founded and animated inside EM2C laboratory (Molecular and Macroscopic Energetics, Combustion) a research group focused on the physics of energy transfer. His creative research work led to major contributions in several topics. With a strong background in molecular physics, he moved, as a young professor, from collisional relaxation studies to spectroscopy with major emphasis on infrared radiative properties and radiative transfer in high temperature gases such as H<sub>2</sub>O and CO<sub>2</sub> encountered in combustion. This important field was mostly unexplored and, with the help of theoretical ab-initio approaches and several experimental studies, he succeeded in establishing reliable spectroscopic databases (hot line positions, intensities and shapes), and in using these fundamental data to solve radiation transfer problems with the line-by-line approach. The development of approximate radiation models, based on the rigorous spectral properties, enabled him to study theoretically the effects of molecular radiation combined with turbulent convection and with combustion, and to highlight many aspects of turbulence-radiation interactions. More recently, he tackled the problem of radiative properties and radiative transfer in anisotropic and nonhomogeneous porous media and developed an original statistical formalism for homogenized radiative property characterisation, based on tomographic and Monte Carlo techniques. This led him to propose a generalized (non-Beerian) radiative transfer equation, using the statistical absorption, extinction and scattering properties of the medium. This formalism found several applications such as high temperature solar collectors, catalytic combustion, and the simulation of severe accidents in nuclear reactors. All these research topics found naturally many beneficial cooperations with other academic or industrial partners. Among the French and European industrial partners, he cooperated with most of aeronautic and space, automotive, and huge energy producing or consuming companies.

Professor Taine is also an excellent teacher. He has conceived and took the responsibility of several courses like «statistical physics», «radiation in dense and dilute media», «heat transfer», «turbulent and coupled transfers», ... which, each time, met great enthusiasm from his students. He also introduced innovative learning techniques like the course on «methodology» where the roles of teachers and students are somewhat reversed during design and case studies, and, more recently, the «e-mentor heat transfer learning» which is a fully interactive and progressive course including problems, guides for the students, etc. This learning technique was followed by approximately 250 students of *École Centrale Paris* this year. Moreover, his textbook *Transferts thermiques* who had a fifth edition in 2014 is taken as the reference for most teachers at the national level and was translated into English.

He is the author or coauthor of several other books like «Energy issues», «A first course on heat transfer», . . . He has supervised about 30 PhD students who enjoyed his friendly guidance and intellectual rigor. They all had successful careers in leading academic laboratories or research centers of private companies.

Besides his local duties in teaching, research and academic administration, Professor Taine has been extremely active to contribute to the national and international scientific community. He is an Editor of the *International Journal of Heat and Mass Transfer* and *International communications in Heat and Mass Transfer* and has served as Associate Editor of *EJP Applied Physics*. He was member of International Scientific Committees for heat transfer conferences such as AIHTC and ICHMT, and served as chairman of the international scientific committee of 12th International Heat Transfer Conference (Grenoble, 2002). He participated actively to numerous other international conferences, particularly the seminars and symposia on radiative transfer. He has given many keynotes and invited lectures in major heat transfer conferences. The sixth International Symposium on Radiative Transfer, organized by ICHMT, was dedicated to him along with two other researchers. On the national level, Professor Taine also took many responsibilities at the Ministry of research and universities of France. He was successively in charge of Heat Transfer and Combustion at the *Mission Scientifique et Technique*, then of Heat Transfer, Combustion and Plasmas, and, finally, Deputy Scientific Director at the *Direction de la Recherche*; head of Mechanical, Electrical, Chemical and Civil Engineering and Energy.

Professor Taine's professional activities have significantly contributed to the advancement of radiation and heat transfer community. He is still active and full of ideas about science, learning, and how they may evolve. We congratulate him warmly on his 65th birthday and wish him good health for many more years and happiness in the company of his wife Dominique and his children and grand-children. We look forward to the continuation of his achievements and his interactions on the highest scientific and educational levels.

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