

## Jean Paul Frédéric SERRA

Jean Serra, along with G. Matheron, formulated the *Theory of Mathematical Morphology* in 1965. The two together founded the *Centre de Morphologie Mathématique (CMM)* at "Ecole des Mines de Paris" in 1967 - a centre that was directed by J. Serra himself for more than two decades, from 1979 to 2002. Under his able stewardship the Centre emerged as the world's foremost laboratory for research in Mathematical Morphology. Not only did J. Serra work at the Centre on further developing his own theory, but also created a setting and environment that attracted brilliant researchers from around the globe. Every scientist who visited the centre generated new ideas, worked on solutions to existing problems and developed new software and new devices - all of which helped in advancing the frontiers of the discipline. In extending the frontiers of Mathematical Morphology, which seeks to understand the physical world, Jean Serra has developed his theory along three paths: First, he proposes a set of operators expressing some characteristics of the medium of the image under study; second, he elaborates a comprehensive range of random models, and third he develops a synthesis between texture and physical or biological properties. The field, through original ideas developed over four decades, has played a significant role in laying the foundation and in understanding the morphological bases of various physically varied geometrical operations and has found applications in several areas - fluid mechanics, sintering processes, optical and electron microscopy, material sciences, physics, mathematics and in all areas handling numerical morphology (remote sensing). It has also found applications in new fields such as Geo-computations, GIS, multi-media applications, medical imagery, robot vision, and video image processing, to mention a few. When one retrospectively considers the state of the art of Mathematical Morphology, the contributions of Jean Serra stand out. The phenomenal impact of Jean Serra's work could be gauged from the fact that his book *Image Analysis and Mathematical Morphology* - the first book of its kind and published by Academic Press in 1982 - has been cited more than 3000 times till date in peer-reviewed ISI recognised journals alone. If one were to include other journals, the number of citations would be much higher.

Jean Serra earned his Ph. D. in Mathematical Geology in 1967 from the University of Nancy, and, subsequently, Doctorat d'Etat in Mathematics from Pierre et Marie Curie University, Paris in 1968. He has authored seven books, over one hundred research papers, more than one hundred scientific communications, and has to his credit several patents for image processing devices; the CMM - the centre founded and led by him - has to its credit nearly one hundred books and several thousand papers. Under Serra's able supervision, over fifty students - many of whom are now recognized internationally as experts - have defended their doctoral theses. He has inspired many and his influence has been considerable. The numerous notions that Jean Serra propounded have become theoretical tools for mathematical geoscientists. Practically all standard mathematical libraries in the world propose citations, openings, morphological filters, connections, watersheds, etc. Similarly, most of the devices in telecom, digital radiology and quantitative microscopy that incorporate image processing make use of some morphological operators that he invented.

Jean Serra has also been instrumental in setting up research laboratories around the world - MGU (Moscow, 1971-1972), University of Michigan Ann Arbor (1981 - 1984), CSIRO (Sydney, 1975, 1987, 1996), UPC (Barcelona, 1991), USP (Sao Paulo, 1996) - to mention a few - to advance the frontiers of mathematical morphology. His contributions to the industry have been no less significant. During his career, a series of image processors and/or software packages - were designed by him or under his directions, and commercialised under license by several manufacturers - the Lutz-TAB (Germany 1974 - 1984), the Visionist of Allen Bradley (USA, 1984-1988), the Quantimet 575 of Cambridge Instruments UK (1989-1993), the MACROMORPH Package of Transvalor (France, 1996) - the ANALOGH Package of Actel (France, 1995 - 2001). In 1982, Jean Serra created a company called "Morpho Systems" for fingerprints recognition; the company was acquired by the SAGEM group in 1993 and currently accounts for more than half of the world market in the area.

Jean Serra has been associated with a number of international bodies of interest to Earth Science communities around the world: 1979, International Society for Mathematical Morphology which was founded by Jean Serra, elected his second president. In the same year, he was elected as a member of the Dr. Honoris Causa of one of the most prestigious universities of Spain, the Autonomous University of Madrid. He has lectured extensively in different countries of the world and has been invited to deliver the highly prestigious and the prestigious JAMG-Georges Matheron Lecture Series during the 1980s. In 1980, he was elected as a member of the French Academy of Sciences. He has also acted as Editor/Reviewer/Consultant for several journals. In 1987, the *Journal of Mathematical Morphology* (JMM) published a special issue in his honour. In 1988, he was elected as a member of the prestigious "Chevalier de la Légion d'Honneur" and in 1990, he was elected as a member of the "Académie des Sciences de l'Université de Uppsala, Sweden".

Jean Serra is a member of the International Union of Pure and Applied Mathematics (IUPAC) and is the father of his two children. He is married to a French mathematician, and they have three children. In his spare time, he is a constant soccer player and a keen golfer. He has been a member of the "Comité de l'Environnement" from 2001 to 2003.

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Jean Serra, elected him as its first president. In the same year, he received the title of Dr honoris causa of one of the most prestigious universities of Spain, the Autònoma de Barcelona. He has lectured extensively in different countries of the world and was invited to deliver the inaugural lecture in the prestigious *IAMG-Georges Matheron Lecture Series* during September 2006 in Belgium. His services to professional periodicals as Editor/Reviewer/Consultant have been substantial. The *Journal of Mathematical Imaging and Vision* (JMIV) published a special issue (v. 22 (2-3), p.103-353) on the occasion of Serra's 65<sup>th</sup> Birthday. He is also a recipient of the prestigious "Chevalier of the National Order of Merit" in 1989. He is a member of the Royal Academy of Sciences of Uppsala, Sweden.

Even as the world recognizes Jean Serra's extraordinary accomplishments in the field of Mathematical Morphology, one cannot miss his human qualities. A loving husband to his doctor-wife and a caring father of his two children, Serra is a man of principles and a person with an excellent sense of humour. To his friends, he is a constant source of inspiration and encouragement. Interestingly, Serra served as Deputy Mayor of Fountainbleau from 2001 to 2005, and is the organist in a church in the city.

Jean Serra is currently professor emeritus at the ESIEE Institute of Paris-Est University and an active member of an international network of scientists working on *Modelling Environmental Risks*.

Jean Serra has turned 70 and it is a pleasure and a privilege to dedicate this workshop – featuring invited talks by eminent scientists on mathematical morphology /computational and digital geometry – to this outstanding scientist.

**Systems Science and Informatics Unit, Indian Statistical Institute-Bangalore Center, India  
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