



CAMPUS
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INTERNACIONAL

APERTURA DEL CURSO 2011-2012

UNIVERSIDAD POLITÉCNICA
DE MADRID

Brief CV of Juan Carlos Lasheras

Stanford S. and Beverly Penner Distinguished Chair Professor of Engineering and Applied Sciences. Departments of Mechanical and Aerospace Engineering and Bioengineering. University of California, San Diego. La Jolla, California.

Education

Ph.D. in Mechanical and Aerospace Engineering. Princeton University. (1981).
M.S.E. in Mechanical and Aerospace Engineering. Princeton University. (1979).
Ingeniero Superior Aeronautico. E.T.S. Ingenieros Aeronauticos. Universidad Politecnica de Madrid. Madrid, SPAIN. (1975).

Specific technical and professional engineering accomplishments and contributions

Lasheras has made outstanding original contributions to the broad field of applied mechanics and in particular to combustion science, fluid mechanics, and biomechanics. In addition to his extensive basic research, he has been exceptionally successful in transferring some of his findings to the industrial sector with especially significant impacts first to the energy field and more recently to the Medical Devices and Instrumentation area. Lasheras' basic research has led to 41 US patents. Some of these patents have resulted in innovative medical instruments that are currently widely used as standard of care in neurosurgery, trauma and cardiac arrest in many medical centers throughout the US and abroad.

In the broad field of applied mechanics, the contributions of Lasheras range widely over fluid flows both with and without heat and mass transfer and heat release, vascular mechanics, and more recently cellular mechanics. In combustion, he has elucidated the mechanisms of explosive (disruptive) burning of droplets. In fluid mechanics, his research clarified the structure and stability of turbulent mixing layers and jets, including both passive and active control of mixing rates. He has contributed to understanding of various multiphase flows, notably mixing and dispersion of solid particles in a turbulent gas, turbulent dispersion and atomization of droplets in a gas, and bubbles in liquid flows. He has also identified and explained regimes of liquid atomization. Most recently, Lasheras'

research has led to advances in biomechanics both at the macroscopic and cellular levels. Lasheras has evaluated the effects of unsteady blood flows in the risk of rupture of aortic and intracranial arterial aneurysms, and has clarified some of the biochemical pathways for the spatial-temporal distribution of traction forces exerted by amoeboid cells during migration.

Lasheras currently serves as the Penner Professor of Engineering and Applied Sciences and the founding Director of the Center for Medical Devices and Instrumentation at UCSD. He has contributed to engineering education while serving as both a professor and Chair of the Department of Mechanical and Aerospace Engineering at UCSD. His activities in professional societies include elections as Secretary/Treasurer, Vice-Chair and current Chair of the Division of Fluid Dynamics of the American Physical Society.

Impacts of work

Lasheras' extensive work in applied mechanics has contributed to important technical advances in several fields. These include major contributions to the efficient use of vortex methods for improved jet control in propulsion systems. In addition, his contributions to understanding of atomization and mixing in engines and other chemical reactor designs are widely employed in industrial systems, and his insights relating to disruptive burning of multicomponent fuel droplets have resulted in efficient designs of cleaner combustion systems.

In the last twelve years, Lasheras has expanded his interest and provided vital links between fundamental issues in mechanics and biomedical device inventions. In 1998, Lasheras co-founded Innercool Therapies, a medical device company based in San Diego, California. This company grew by utilizing Lasheras' invention of a novel intra-vascular cooling technology and led to the development of the first medical instrument to induce mild hypothermia approved by the Food and Drug Administration (FDA). Lasheras' technology is based on controlled turbulence-enhanced cooling of either the arterial or venous blood streams by using a flexible metallic catheter. The instrument allows physicians to actively induce, maintain, and/or reverse hypothermia (mild cooling) in neurosurgical patients during surgery and recovery/intensive care, as well as in cardiac arrest, stroke and severe neurological trauma patients. Lasheras was responsible not only for developing the technology, but also for helping raise over \$50 million in venture capital investments. The company, which employed as many as 120 engineers and technical personnel in the San Diego area, was acquired by the Dutch electronics conglomerate Philips, (NYSE, PHG) in July 2009. In addition to the endovascular cooling technique, another of Lasheras' patents on Hypothermic Radical Robotic Assisted Prostatectomy is currently undergoing clinical trials. Lasheras' approach consists of a balloon catheter, designed to be placed within the rectal cavity adjacent to the prostate during surgery, allowing for localized, controlled cooling of the gland to minimize inflammatory and other side effects of radical prostatectomy.

At UCSD, which has an especially distinguished Bioengineering Department dating back to the early sixties, Lasheras' group provides vital links relating basic understanding of mechanics to cell migration, vascular mechanics, and medical device applications and inventions.

Professional work experience

2009 – Present Director of the Center for Medical Devices and Instrumentation.
UCSD

2008 – Present Distinguished Professor of Bioengineering (Affiliate). UCSD

2007 – Present Stanford S. and Beverly Penner Distinguished Chair Professor of Engineering and Applied Sciences. UCSD.

2007-present Distinguished Professor of Engineering. UCSD.

1999 – 2004 Chairman of the Department of Mechanical and Aerospace Engineering. UCSD

1991-1998 Professor and Vice-Chair of the Division of Mech. and Aerospace Eng. Department of Applied Mechanics and Engineering Sciences (AMES). UCSD.

1997- 2007 Co-Founder and Scientific Adviser, INNERCOOL Therapies. San Diego. California.

1991, 1995 Professeur Associe. Institut de Mechanique de Grenoble. Universite J. Fourier. Grenoble I, France

1988 – 1991 Associate Professor. Department of Mechanical Engineering University of Southern California. Los Angeles, CA 90089-1453

1983 - 1988. Assistant Professor. Department of Mechanical Engineering University of Southern California. Los Angeles, CA 90089-1453

1982 – 1983 Senior Research Scientist. Koninklijke/Shell Laboratorium Amsterdam (Royal-Dutch/Shell - Laboratory - Amsterdam) Shell International Research B.V. Amsterdam, The Netherlands.

1976-1977 Profesor Adjunto Interino (Lecturer). E.T.S. Ingenieros Aeronauticos Universidad Politecnica de Madrid. Madrid, Spain.

1975-1976 2nd Lieutenant. Airforce of Spain.

1970-1975 Director. Academia Lasheras. Murcia, Spain.

Principal Technical Society membership and activities and other pertinent accomplishment in engineering and public service (boards, consultantships, important offices held and contributions to professional societies)

Member, American Institute for Aeronautics and Astronautics (AIAA). 1983-present

Member American Society of Mechanical Engineers (ASME). 1977-present

Member, The Combustion Institute. 1977-present

Miembro de la Real Academia de Ingenieria de Espana. 1999-present

American Biophysics Society 1999-present

Director of the Center for Medical Devices and Instrumentation, UCSD 2009-present.

Chair-Elect of the American Physical Society/Division of Fluid Dynamics. 2008

Chairman of the American Physical Society/Division of Fluid Dynamics. 2009

Consultant for Shell Oil Company, United Technologies Corporation, UTRC, Medtronic, Microvention, IV3, Cryogen, Cryocore, Innercool Therapies, Lithera, Pfizer.

Professional Recognition (honors, awards, prizes)

1977-78, 1978-79. Guggenheim Fellowship

1980-1981. George Van Ness-Lothrop Fellowship.

1990. F.N. Frenkiel Award for Fluid Dynamics. American Physical Society.

1991, 1995. Professeur Associe. Institut de Mechanique. Universite J. Fourier. Grenoble I, France

1994. School of Engineering Annual Teaching Award. Engineering Honor Society. UCSD.

1995, 1996, 1998, 2000. UCSD School of Engineering. Annual Teaching Award in Mechanical and Aerospace Engineering.

1997-2000 Elected Secretary/Treasurer of the American Physical Society/ Division of Fluid Dynamics

1997-2000 Elected member of the council of the American Physical Society/ Division of Fluid Dynamics

1999. Elected Member of the Real Academia de Ingenieria de Espana (Royal Academy of Engineering of Spain)

2000. Elected Fellow of the American Physical Society (APS)

2003. Breakthrough Innovation in Medical Sciences Award. Given by BIOCOM and BIOSECTOR of Southern California.

2003. High Tech Award in Medical Devices and Instrumentation given by the American Electronics Association (AEA).