Ceremony of the Francqui Prize by His Majesty The King Albert II at the "Palais des Académies" on June 9, 2009

Curriculum Vitae - Scientific activities - Report of the Jury

(photos of the Ceremony)

Eric Lambin

Curriculum Vitae

Eric Lambin is born in Belgium on September 23rd, 1962. He obtained in 1985 a Master in geography and a baccalaureate in philosophy at Université catholique de Louvain in Louvain-la-Neuve. In 1988, he defended a PhD in the same university, based on his research on the application of Earth observation satellites to better understand interactions between farming systems and desertification in the African Sahel.

After a postodoc at the Joint Research Centre of the European Commission, in Ispra (Italy), he was hired as Assistant Professor at Boston University. He joined a research team that is very active in NASA programmes on Earth observation by remote sensing for global environmental monitoring. He then returned to the Joint Research Centre of the European Commission in Ispra to analyse new time series of satellite data that had just become available.

In 1995, he was hired as Professor at the Geography department of Université catholique de Louvain (UCL), in Louvain-la-Neuve, and was promoted as Full Professor in 2005. He leads a research team that is involved in several

international scientific projects on human-environment interactions in different parts of the world. These projects combine remote sensing, socio-economic data, and spatial models to better understand and predict terrestrial ecosystem dynamics and their impacts.

In 2002-2003, Eric Lambin was invited as fellow at the *Centre for Advanced Study* of Stanford University in California. Starting the 2009-2010 academic year, he will share his time between UCL, where he remains Professor, and Stanford University, were he will occupy the Inaugural George and Setsuko Ishiyama Provostial Professorship at the Department of Environmental Earth System Science, School of Earth Sciences, and Woods Institute for the Environment.

Eric Lambin published more than 100 scientific papers in international journals specialised in environmental sciences. He also published two books for a broad audience: “The Middle Path” University of Chicago Press (translated from “La Terre sur un fil” Editions Le Pommier) and “An Ecology of Happiness” (to be translated from “Une écologie du bonheur”, Editions Le Pommier). Invited to give talks in many universities worldwide, he also spends several weeks per year doing fieldwork in drylands and tropical forests of Africa, Asia and Latin America. So far, he has been supervisor of 22 PhD theses defended or in progress, and has supervised about 30 research assistants who are employed today in various scientific institutions worldwide.

From 1999 to 2005, Eric Lambin has been Chair of the international scientific project *Land Use and Land Cover Change (LUCC)* of the *International Geosphere-Biosphere Programme* (IGBP) and *International Human Dimensions Programme on Global Environmental Change* (IHDP). He also contributed to the United Nations programme *Millennium Ecosystem Assessment*. He is often consulted by international organisations on issues related to tropical deforestation, desertification, environmental impacts of biofuels, and the potential role of tropical forests in mitigating climate change.

Eric Lambin is member of the “Académie royale des Sciences, des Lettres et des Beaux-Arts de Belgique” and is associated member of the “Académie Royale des Sciences d’Outre-Mer de Belgique”. In 2005, he occupied the “Chaire Francqui au titre belge” at KULeuven. In 2009, he was elected as Foreign associate at the U.S. National Academy of Sciences, one of the five Belgians only to receive this honour so far.

He is married with Régine Geets, who works as an executive in the pharmaceutical industry. They have two daughters, Tatiana (1991) and Julie (1993). Eric and Régine Lambin share a long-dating passion for horse riding. Eric Lambin has also passions for modern jazz, literature and mountain climbing.

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Scientific activities

Eric Lambin’s research has contributed to a better understanding of human-environment interactions in terrestrial ecosystems, thanks to new methodological approaches.

At the start of the 1990s, he developed a method to detect changes in vegetation cover and terrestrial ecosystem dynamics at regional scales based on time series of wide-field-of-view Earth observation satellites. The application of this method highlighted a range of interannual variations in vegetation that were often ignored in previous environmental studies. This work contributed, for example, to a better understanding of the geographic distribution of biodiversity and the dynamics of forest and savannah fires in Africa.

In parallel, Eric Lambin developed, and then applied to several case studies worldwide, an integrated approach to study human-environment interactions. It links remote sensing and socio-economic data at a fine level of disaggregation. This approach, at the interface between natural and social sciences, allowed for a better modelling of causes and impacts of tropical deforestation, desertification, and conflicts between wildlife and agriculture around large African national parks. These studies concerned mostly Africa, but also China, Thailand, the Amazon, Indonesia…

Since the 2000s, the research team of Eric Lambin broadened its interest to responses by rural communities to environmental changes. Attention is being paid to non-linear transformations of terrestrial ecosystems, and on critical thresholds and feedbacks that slow down or accelerate these changes. For example, a research project analyses the transition from net deforestation to net reforestation that is taking place since a few years in some developing countries, including Vietnam, China, Bhutan and Costa Rica. These projects also concern strategies adopted by rural communities to adapt to and anticipate climate change in semi-arid regions of the African Sahel and Mediterranean Europe.

More recently, the research team of Eric Lambin started to study the impact of land change on emerging or re-emerging diseases that are transmitted by vectors (ticks, mosquitoes, flies) and/or that have an animal origin (zoonoses). An integrated analysis at the landscape scale allows a better understanding of interactions between changes in ecosystems and climate, the ecology of vectors and animal hosts of infectious agents, human behaviour and land use, and agricultural practices. These interactions often contribute to disease emergence. These latter research projects in spatial epidemiology are highly interdisciplinary.

The research work of Eric Lambin helped to identify the conditions under which a society adopts more sustainable practices when using the natural environment. It also contributed to the emergence of a theory of human-environment interactions. This research also highlighted a limited suite of pathways associated with deforestation, desertification or ecological restoration of ecosystems. Identifying these generic pathways improved predictions of human transformations of terrestrial ecosystems, despite the great complexity of human-environment interactions.

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Report of the Jury (May 5, 2009)

Eric Lambin has developed a method for quantitative analysis of land modifications based on remote sensing and has pioneered the integration of biophysical and socio-economic data to analyze the role of human activity and

climatic factors in land-cover change. In particular, his development of change-vector analysis has opened up the quantitative assessment of land use and land cover changes brought about by a variety of human and climatic factors, both local to and remote from the areas affected by those changes. He has been able to integrate a variety of disciplines, from anthropology to space systems' physics to describe and explain how land use and land cover have changed up to the present. By using multi-agent simulation methods, Eric Lambin has been able to interpret the changes that he has quantified in terms of human actions, specifically those contributing to desertification, agricultural developments and deforestation and reforestation. To some extent, the same methods are also able to predict alternative developmental pathways into the future, given past and present trajectories of land-use change. He is thus able to warn when projected changes indicate a decrease in the ability of the natural environment to sustain human activities into our uncertain future.

Starting with pictures of the earth from space, Eric Lambin has shown us, using change-vector analysis, what the human species is doing to planet earth. He is able to interpret, and most importantly quantify, the changes that have been recorded by these satellites and has shown how local changes in land cover and land use are often brought about by global forces driven by political, social and economic factors beyond the control of the local inhabitants. His studies have covered local, regional and global perspectives. Eric Lambin has been able to show us that there is no First World and no Third World. There is only One World; we are all part of it and we should look after it carefully.

Jury members :

Professor S. R. Srinivasa Varadhan
(Frank J. Gould Professor in Science, Courant Institute of Mathematical Sciences, ***New York University- USA****).* Srinivasa Varadhan was educated in India, receiving his Bachelor's degree in 1959 from Madras University and Ph.D in 1963 from Indian Statistical Institute. He move to USA in 1963 and has stayed at Courant Institute, New York University ever since. He has published extensively on different aspects of probability theory. He has received many awards for his work including the Abel Prize, in 2007. He has been elected to National Academies of USA, India and UK.

Chairman

and

Professor Louis E. Brus
(Samuel Latham Mitchill Professor, Chemistry Dept., ***Columbia University - USA****)* Louis Brus was educated in Chemical Physics at Rice University and Columbia University. In 1973 he joined the chemistry and materials research area of Bell Laboratories in Murray Hill, NJ. He returned to Columbia in 1996, where he is now S. L. Mitchill Professor of Chemistry. He is a member of the US National Academy of Sciences, and in 1998 was the Chairman of the Board of Trustees of the Gordon Conferences. He has won the APS Langmuir Prize, the ACS Chemistry of Materials Prize, the OSA Wood Prize, and in 2008 the inaugural Kavli Prize in Nanoscience.

Professor Stephen Y. Chou
(Joseph C. Elgin Professor, Dept. of Electrical Engineering, ***Princeton University – USA****).*
Stephen Y. Chou, head of the NanoStructure Laboratory at Princeton University, received his PhD from MIT (1986). Dr. Chou's pioneering research and inventions have shaped new paths in the fields of nanofabrication, nanoscale electronics, optoelectronics, magnetics, biotechnology and materials, and have brought significant impacts to both academia and industry. As an entrepreneur, he founded Nanonex and NanoOpto, and is a co-Founder of BioNanoMatrix. Among other awards and

honors, Dr. Chou is a member of National Academy of Engineering, a recipient of IEEE Brunetti Award, IEEE Fellow, Packard Fellow, and an Inductee of New Jersey High Technology Hall of Fame. Dr. Chou's graduate work used X-ray lithography to scale MOSFETs to the 60 nm range (1982-86). Since 1985 he has demonstrated various ultra-small MOSFETs, quantum devices, and single electron transistors. In early 1990's, he began pioneering work in exploring sub-wavelength optical elements (SOEs) –a new class of optical devices suited for miniaturization and wafer-scale integration, as well as in bringing nanofabrication into magnetic data storage media, which led to his invention of quantized magnetic disks (now termed bit-patterned media) – a new paradigm in magnetic data storage. In 1994, he invented one of his best-known works, nanoimprint lithography (NIL), a revolutionary nanoscale patterning method that allows sub-10 nm patterning over large areas with high throughput and low cost. He and his group are the first to apply NIL to a broad range of fields such as electronics, optics, display, data storage, biotechnologies and materials. Since 2000, Dr. Chou and his group have been pioneering various innovative DNA sensors (i.e., nanochannels and nanogap detectors) by combining the cutting edge nanofabrication, nanoelectronics, and nanophotonics with biology. Dr. Chou is also the primary inventor of lithographically induced self-assembly (LISA), laser-assisted direct imprint (LADI), and self-perfection by liquefaction (SPEL).

Professor Arthur Jaffe

(Landon T. Clay Professor, Dept. of Physics, ***Harvard University – USA****).* Arthur Jaffe is the Landon T. Clay Professor of Mathematics and Theoretical Science at Harvard University. He is a member of the U.S. National Academy of Sciences, of the American Academy of Arts and Sciences, and is an Honorary Member of the Royal Irish Academy. He was a founder and then the first President of the Clay Mathematics Institute, which established the Millennium Problems in Mathematics. He received the Dannie Heinemann Prize of the American Institute of Physics and the Prize in the Physical Science of the New York Academy of Science, for his research that demonstrates the mathematical compatibility of special relativity with quantum theory, in space-time of less than four dimension.

Professor Thomas Kailath

(Hitachi America Professor of Engineering, ***Stanford University – USA****).* Thomas Kailath (Sc.D.,MIT,1961) has been at Stanford University since 1963, where he is now Hitachi America Professor of Engineering, Emeritus. His research has ranged over several fields, including information theory, linear systems, estimation and control, signal processing, semiconductor manufacturing, probability and statistics, and matrix and operator theory. Major honors include the IEEE Medal of Honor, Guggenheim and Churchill Fellowships, several honorary degrees, election to the Silicon Valley Engineering Hall of Fame and to the US National Academy of Engineering, the US National Academy of Sciences and the American Academy of Arts and Sciences. He is also a foreign member of several academies, most recently of the Royal Society. In 2009, he received a Padma Bhushan national award from the President of India.

Professor Sir Peter Knight, FRS

(Senior Principal of the Faculty of Natural Science, ***Imperial College London - UK****).* Professor Sir Peter Knight is Senior Principal at Imperial College London and Professor of Quantum Optics. He was knighted in the Queen's Birthday Honours List in 2005 for his work in optical physics. Peter Knight is a Past-President of the Optical Society of America. He is a Thomson-ISI "Highly Cited Author." His research centres on theoretical quantum optics, strong field physics and especially on quantum information science. He has won a number of prizes and awards including the Thomas Young Medal of the Institute of Physics and the Ives Medal of the OSA. He has been a Visiting Professor at the University of Louvain-la-Neuve.

Professor Hans Mooij

(Kavli Institute of Nanoscience, ***Delft University of Technology - The Netherlands****).* Hans Mooij is professor of nanoscience and university professor at Delft University of Technology in The Netherlands. He was a visiting professor at Stanford and MIT and was Loeb lecturer at Harvard University. Mooij is the founding director of the Kavli Institute of Nanoscience in Delft. His research is directed towards superconducting nanosystems for quantum information processing. He is a member of the Royal Netherlands Academy of Sciences and fellow of the American Physical Society. Among others he received the Europhysics Condensed Matter Prize and an honorary doctorate of Trondheim University.

Professor Jerry A. Nolen Jr.

(Argonne Distinguished Fellow, ***Argonne National Laboratory, Physics Division – USA****).* Jerry Nolen, Physics Division, Argonne National Laboratory. Dr. Nolen is currently an Argonne Distinguished Fellow with a research program in the fields of accelerator physics, beam optics, and development of new methods for the production of and research with intense beams of radioactive isotopes. He was a Woodrow Wilson Graduate Fellow in Physics at Princeton University, a Professor of Physics and Associate Director of the National Superconducting Cyclotron Laboratory at Michigan State University. He has served on many national and international advisory and executive committees such as the U.S. NSF/DOE Nuclear Science Advisory Committee and the GSI (Germany), GANIL (France), and RIKEN (Japan) Technical Advisory Committees.

Professor David J. Rogers
(Professor of Ecology, Dept. of Zoology, TALA Research Group, ***Oxford University – UK****).* David J. Rogers, MA, D.Phil. (Oxon) - Curator of the Hope Entomological Collections -Founding Fellow, Green College. First (Zoology) and second (Entomology) degrees at Oxford UK followed by 2 years in Uganda studying tsetse flies, then a lecturer-ship and later professor-ship at Oxford University. David Rogers is interested in insect population ecology in general and in the ecology and epidemiology of vector-borne diseases in particular, especially the African trypanosomiases, dengue, yellow fever, West Nile virus and bluetongue. He uses remotely sensed satellite data in much of this work and is intrigued by the potential power of Earth Observation data in both statistical and biological models of the distribution and intensity of organisms and diseases.

Professor Henry I. Smith
(Joseph F. and Nancy P. Keithley Professor of Electrical Engineering,Codirector, NanoStructures Laboratory, ***Massachusetts Institute of Technology – USA****).* Henry I. Smith Is Professor of Electrical Engineering and Co-Director of the NanoStructures Lab at MIT. From 1990 to 2005 he held the Keithley Chair in Electrical Engineering. He is a member of the National Academy of Engineering, a fellow of the American Academy of Arts and Sciences, a Fellow of the Optical Society of America, and a member of the APS, AVS, MRS and Sigma Xi. He is a recipient of the Cledo Brunetti Award of the IEEE and the Baccus Award of SPIE. He holds over 30 US patents and has published over 400 technical articles.

Professor David N. Reinhoudt
(Faculteit Technische Natuurwetenschappen, ***University of Twente, Enschede – The Netherlands****).* Professor David.N. Reinhoudt was born in 1942 in The Netherlands, graduated in chemistry in 1969 from Delft. During 1970-1975 he worked at Shell. In 1975 he was appointed as a part-time professor at the University of Twente and in 1978 as a full professor. Since 2002 he is chairman of the board of the Dutch Network for Nanotechnology. He is a member of the Royal Dutch Academy of Sciences. He is the author of more than 900 scientific publications.

Members

Professor Patrick De Wilde
(Director, Institute for Advanced Study, ***Technische Universität Munchen - Germany****).* Patrick Dewilde received the degree of Electrical Engineering from the University of Leuven in 1966, the License in Mathematics from the Belgian Central Examination Commission in 1968 and the Ph.D. degree in Electrical Engineering from Stanford University in 1970. He has held research and teaching positions at the University of California in Berkeley, the University of Lagos in Nigeria and the University of Leuven. In 1977 he became full professor of Electrical Engineering at the Technical University of Delft (the Netherlands). In 1981 he was named Fellow of the IEEE for his work on Scattering Theory. From 1993 to 2001, he was the Scientific Director of the Delft Institute of Microelectronics and Submicron Technology DIMES, and 2002 to 2007 Scientific Director of the 'ICT Delft Research Centre' at Delft University of Technology. Presently he is Director of the Institute for Advanced Study of the Technische Universität München. He was elected a regular member of the Dutch Royal Academy of Science in 1993. From 1996 to 2005 he was chairman of the Technology Foundation STW. In 2000 he received an IEEE Circuits and System Society Golden Jubilee Medal, and in 2003 a Humboldt Research Prize. He is the author of a large number of scientific publications and two books. In 2005 he was elevated to the Knighthood of the Dutch Lion by Queen Beatrix of the Netherlands.

Consultant

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