



**Champalimaud
Foundation**

Jeremy Nathans & King-Wai Yau win 2008 António Champalimaud Vision Award



Jeremy Nathans (far right) and King-Wai Yau (second right) receive the 2008 trophies from the President of the Portuguese Republic, Prof. Aníbal Cavaco Silva

2008 António Champalimaud Vision Award goes to researchers from Johns Hopkins University

The Champalimaud Foundation has announced the recipients of its 2008 Vision Award. The €1 million (\$1.4 million) António Champalimaud Vision Award is the largest monetary prize in the field of vision and one of the largest scientific prizes in the world.

The recipients of the 2008 Vision Award are **Dr. Jeremy Nathans and Dr. King-Wai Yau**, both faculty members at Johns Hopkins University in Baltimore, USA. The €1 million

prize will be divided between Drs. Nathans and Yau, and may be utilised by each scientist in an unrestricted way to contribute to their research. Drs. Nathans and Yau are the first American recipients of the Vision Award.

The 2008 António Champalimaud Vision Award recognises Dr. Nathans' and Yau's fundamental discoveries related to the first step in seeing: the conversion of light into electrical signals that the brain uses to create vision. Jeremy Nathans determined the genetic code of the human visual pigments, helping to understand how they function and discovering how mutations in their sequence can lead to some retinal diseases. King-Wai

Yau showed how the absorption of light by these pigments generates the electrical signals that initiate vision and regulate our natural rhythms. These discoveries are basic to the current understanding of vision.

“Taken individually or together, Drs Nathans and Yau’s pioneering research represents breakthroughs of historical proportions,” said Champalimaud Foundation President, Leonor Beleza. “Their discoveries of the fundamental understanding of the mechanisms of vision open important avenues for research that, when put to clinical application, will contribute significantly to the global quest to eradicate blindness. 45 million people worldwide suffer from the intolerable burden of blindness. This is a scar on humanity which the António Champalimaud Vision Award was designed to confront.”



From left: King-Wai Yau, Prof. Aníbal Cavaco Silva, Leonor Beleza, President of the CF, and Jeremy Nathans.

Dr Nathans’ research may have eventual clinical applications in the fight against blindness caused by retinal damage or disease. Contributing to the search for treatments of potentially blinding diseases such as diabetic retinopathy and age-related molecular degeneration are just two examples of ways this award winning research may contribute to the goal of eradicating blindness. Dr. Yau’s work may provide a significant step towards uncovering fundamental molecular mechanisms of vision.

The 2008 Award winners were honoured at a presentation ceremony held in Jerónimos Monastery, Lisbon. The ceremony took place in the presence of the President of the Portuguese Republic, Aníbal Cavaco Silva, and the Prime Minister of Portugal, José Sócrates. The ceremony was closed by a musical piece that underlined the link between science and art. Dr. Laura Garwin,

former Physical Sciences Editor of Nature, was in attendance to give a rendition of Benjamin Britten’s Fanfare for St Edmundsbury on the trumpet. Dr. Garwin left her career in science in 2006 to pursue a role as a professional musician in London.

About the Antonio Champalimaud Vision Award

The Antonio Champalimaud Vision Award was launched in 2006 in Brussels with the support of the President of the European Commission, José Manuel Barroso. In October of the same year, the inaugural edition was launched in India at a ceremony presided over by Dr. A.P.J. Kalam, the former President of India. In order to provide maximum support for the fight against blindness, the Award concentrates both on work in the field and on scientific research. In odd numbered years, starting in 2007, the Award is given for contributions to the fight against blindness on the ground, particularly in developing countries. In even numbered years, beginning in 2008, the Award recognises outstanding scientific research. In 2007, the Award was presented to India’s Aravind Eye Care System.



José Sócrates (second left), Prime Minister of Portugal, with Jeremy Nathans (far left), José António Pinto Ribeiro (middle), Portuguese Minister of Culture, Daniel Proença de Carvalho (second right), President of the CF General Council, and King-Wai Yau (right)

The Jury for this prestigious award is comprised of leading international scientists and renowned public figures. They are: **Alfred Sommer, Paul Sieving, Jacques Delors, Amartya Sen, Carla Shatz, Joshua Sanes, Mark Bear, Gullapalli Rao, José Cunha-Vaz, António Guterres and Susumu Tonegawa.** The entry period for the 2009 Award will open on October 1st and entries will be accepted until December 31st 2008.

Foundation's Scientific Committee convenes in Lisbon

On May 21st 2008 the Champalimaud Foundation welcomed some of the World's leading figures in science and medicine at the first meeting of the Scientific Committee. The meeting was led by the Nobel laureate and "father" of DNA, **James Watson**, in his capacity as Head of the Committee and he was joined by Leonor Beleza and João Botelho from the Foundation's Board of Administration. Also present from the Committee were **Dr. Paul Marks**, former President of the Memorial Sloan-Kettering Cancer Centre in New York, **Prof. Sir Keith Peters**, President of the Academy of Medical Sciences, and **Dr. Ronald Blasberg**, a specialist in medical imaging from the USA. In addition, the Foundation welcomed **Prof. Ricardo Brentani**, **Dr. Zachary Mainen** and **Prof. António Coutinho** to the meeting.

During a highly productive afternoon the participants discussed all of the Champalimaud Foundation's scientific aims and objectives. In particular, the Committee discussed the Champalimaud Centre for the Unknown, due to open in 2010, the CF Neuroscience Programme, and the Foundation's future activities in the field of cancer research.



In addition to those present on May 21st, the Committee is privileged to count on the support of its other distinguished members who were unable to attend the inaugural session. They are: **Prof. Alan Ashworth**, from the Breakthrough Breast Cancer Research Centre in the U.K.; **Prof. Mark Bear**, Director of the Picower Center for Learning and Memory at M.I.T.; **Dr. Maria Blasco**, Vice-Director of the Spanish National Cancer Research Centre; **Dr. Barry Dickson**, Scientific Director at the Austrian Institute of Molecular Pathology; **Prof. Martin Raff**, from University College London; **Prof. Susumu Tonegawa**, Nobel Laureate and Director of

the RIKEN-MIT Neuroscience Research Center.

The Scientific Committee will continue to meet annually to advise and guide the Foundation on all scientific and medical matters.

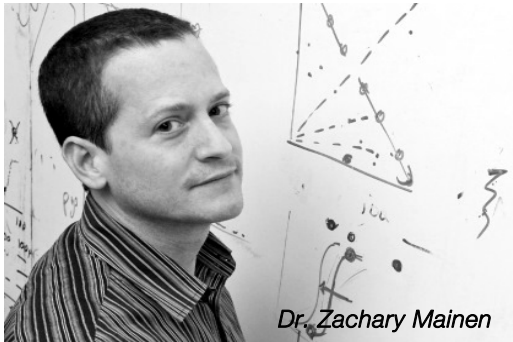
CF Researcher shows that even rats calculate confidence in decisions

The confidence that we have in taking a decision is considered to be one of our principal characteristics as humans: which way we choose when we arrive at a crossroad depends on the confidence that we have in each alternative. A new study carried out by Zachary Mainen, Coordinator of the Champalimaud Neuroscience Programme, questions this human exclusivity by showing that rats can also show varying levels of confidence in making decisions.

These surprising results, obtained at the Cold Spring Harbor Laboratory, USA, were recently published in *Nature* (Kepecs, Uchida, Zariwala and Mainen (2008), *Neural correlates, computation and behavioural impact of decision making*, *Nature* advance online publication 10 August 2008). Mainen and colleagues trained laboratory rats to engage in decisions of different difficulty. Because rats excel at olfaction, this was achieved by repeatedly presenting them with odours composed of mixtures of two chemicals and asking them to determine which component was stronger in order to receive a small reward. According to Mainen, "by precisely varying the exact mixture of components, it was possible to manipulate the difficulty of the decision and therefore the animals' predicted level of uncertainty. This task is akin to asking a human whether a particular blend of blue and green colours is more blue or more green. Confidence is typically highest when the blend is mostly green or mostly blue. Uncertainty is highest when the blend contains nearly equal amounts of each colour."

The team recorded signals from individual neurons localised in the orbitofrontal cortex, an area of the brain common to both rats and humans. While the rodents were put to the test of distinguishing smells, the team found a correlation between velocity of

“firing” of the cells and the level of indecision experienced by the rats in choosing the smells. “These neurons seem to have been registering, after the rat made its decision, how uncertain the animal was that it was about to receive its desired reward,” Dr. Mainen explained. “We tested several alternative explanations but the best explanation for the neural activity we observed was that these neurons were signaling the confidence of the animal about its decisions.”



The team also went on to show that in uncertain situations the rats prefer to abstain from making a decision for a few moments and then perform the test again, rather than making an incorrect decision. Mainen stated that “our results suggest that confidence estimation is not a complex function specific to humans but a core component of the process of decision-making probably found throughout the animal kingdom. Future studies of this kind may illuminate the question of how we form an intuitive sense of the solidity of a belief, how we distinguish fact from fiction itself.”

The Champalimaud Neuroscience Programme is dedicated to the study of the cellular and molecular bases of behaviour. The Programme, based in the Gulbenkian Institute of Science (IGC), was launched in 2007 and comprises five research teams working at the cutting-edge of neuroscience research.