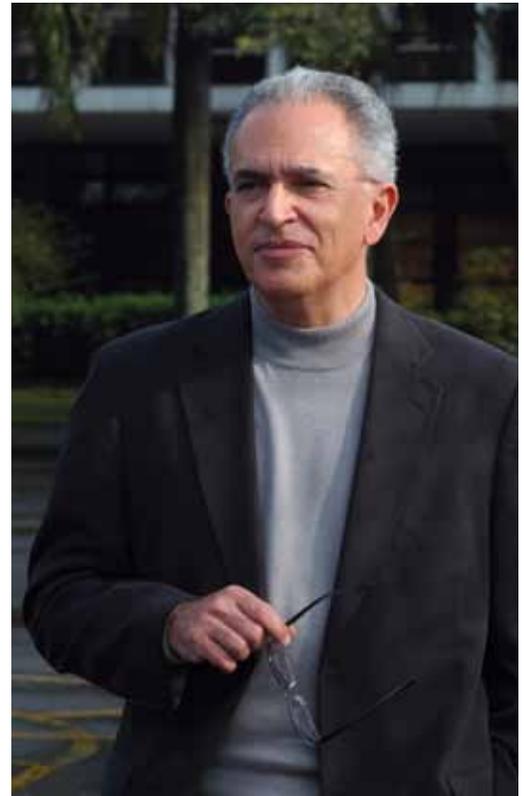


# Mission: Thinking about the future of science

Anthropologist who coordinates a project financed by FAPESP is appointed to a council that advises the U.S. government

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Emilio Moran,  
an expert on  
human settlements  
in Amazonia

Anthropologist Emilio Moran, holder of a FAPESP São Paulo Excellence Chair at the University of Campinas (Unicamp) and coordinator of a project regarding the impact of the construction of the Belo Monte hydroelectric power plant, has been chosen by former U.S. President Barack Obama to serve on the National Science Board (NSB). The Board establishes strategies for the National Science Foundation (NSF), the leading basic research funding agency in the United States. It examines the entire range of policies defined by the country's executive and legislative branches and decides which major research projects should be funded. Composed of 25 members, including prominent scientists and representatives of a number of industries that focus on innovation, the NSB meets five times a year and advises the U.S. government and Congress on matters related to science, technology, and education.

Moran will serve a six-year term at the NSB. "The Board tries to ensure that funds invested in science and technol-

ogy by the National Science Foundation are spent on high-quality research that meets the needs of the United States. Helping to make those decisions is a heavy responsibility," says Moran. The researcher is a professor at Michigan State University (MSU) and a pioneer in studies that combine natural and social sciences in an effort to understand the interactions between man and the environment. Rachel Croson, director of the MSU's College of Social Science, notes that Moran has a uniquely multidisciplinary background that promises to be very useful to the board. "We are proud to see him appointed," she says.

In addition to Moran, three others were appointed members of the NSB by President Obama. One of them is University of Florida president, W. Kent Fuchs, who has many years of experience in university management: from 2002 to 2008, he was dean of the Cornell University College of Engineering and, from 2009 to 2014, he was Cornell University provost. He coordinated the establishment of a new Cornell campus

devoted to technology and situated in New York City. Victor McCrary, another appointee and vice president of Morgan State University in Baltimore, Maryland, was an executive at the Johns Hopkins University Applied Physics Laboratory, where he managed investments of over US\$60 million in security and defense projects. The third appointee, Julia Phillips, is an executive emerita of Sandia National Laboratories where, as a vice president, she was responsible for developing the institution's intellectual property protection policy. Three members of the board were reappointed for additional six-year terms. Physicist Arthur Bienenstock, professor emeritus at Stanford University, coordinated the board's initiatives to reduce the administrative costs that weigh heavily on NSF-financed researchers. W. Carl Linenberger, a chemistry professor at the University of Colorado, and Anneila Sargent, an astronomy professor at the California Institute of Technology, are both known for their skills in supervising foundation programs.



1 had no government connections, in order to prevent politics from influencing the board's decisions.

Although Bush's treatise had been commissioned by the White House, then-president Harry Truman had different plans for the future agency. He wanted the agency to be overseen by a White House-appointed director, rather than being administered by a board. Vannevar Bush teamed up with U.S. Senator Warren Magnuson, who introduced a bill proposing the establishment of a basic research agency controlled by a nine-member board. The law passed in 1947, but Truman vetoed it. Supported by sectors of the scientific community, Bush continued to defend his idea. A solution to the impasse came in 1950 with the passing of the law that gave the president the power to appoint the agency's director, as Truman had wanted. It also had, however, something Bush wanted: a governing body of 25 members, which would be mandatorily composed of scientists, engineers, and educators - though all of them would be appointed by the White House. Members of the NSB were given the authority to select its chairperson—currently Maria Zuber, vice president for research at the Massachusetts Institute of Technology.

On occasion, the Board has had to speak up. They did so, for example, when President John F. Kennedy proposed to decrease the number of board members from 25 to 12—he ultimately changed his mind—or when President Richard Nixon froze the NSF budget and, in 1971, changed the conditions for the appointment of a new director based on an agreement by the nominee to support Nixon's antiballistic missile program. Chemist Franklin Long, of Cornell University, declined the offer. In the 1980s, the Board played an important role in reformulating the NSF peer review system after evidence surfaced that recommendations by reviewers about an education project had been ignored by foundation staff, thus causing political embarrassment. Beginning in the 1990s, the NSB was also decisive in strengthening NSF investments in research on the environment, science education and mathematics. More recently, it has been focusing on nanoscience.

It is in this environment that Moran, a naturalized U.S. citizen born in Cuba, will be working. Brazil, especially Amazonia, is one of his fields of interest (see inter-

### LONG-TERM RECOMMENDATIONS

The National Science Board has become a forum for discussion of NSF directives and its future prospects. It makes long-term recommendations to both the U.S. government and Congress. Although the board participates in decisions made by the foundation, it does not directly intervene in its day-to-day operations. That task is performed by the NSF director, a post currently held by astrophysicist France Cordova, who also has a seat on the NSB. Some of the contributions by the NSB are published in reports, such as those presented every two years about the status of science and engineering in the United States, or those that address specific subjects. The most recent report has discussed the challenges involved in improving the training of professionals who work in science, technology, the various fields of engineering, and mathematics.

The Board's tendency to think of science as a state policy rather than a government policy has taken shape over time. Its members are appointed by the president, but their six-year terms are completely independent of the U.S. political calendar. The idea of creating a body composed of people associated with science to support the NSF dates back to the second half of the 1940s, when it was accepted somewhat reluctantly. One of the people who are responsible for that format was engineer Vannevar Bush, who at the time headed the U.S.



2 Meeting of the National Science Board in 2015, with National Science Foundation Director France Cordova, at front. Medal representing the Vannevar Bush prize, awarded by the Board to leaders in science in the United States

Office of Scientific Research and Development. In 1945, Bush produced an historic document entitled *Science, the Endless Frontier*, in which he defended the importance of basic science for the future of the United States and the need for the government to fund the work of university researchers and the education of future scientists. Under his proposal, this function would be performed by an agency directed by a board composed of nine members, who would be selected from the scientific community and who



A street in Altamira, frequented by workers from the Belo Monte hydroelectric dam: evaluation of the social impact of major undertakings

view in *Pesquisa FAPESP* Issue No. 125). At the Center for Environmental Studies and Research at Unicamp (NEPAM), Moran coordinates a team of researchers from different fields and various institutions who are studying the social and environmental impacts caused by the construction of the Belo Monte hydroelectric plant in the Xingu River basin, near the municipality of Altamira, in the State of Pará. The project is funded by FAPESP and is connected to the São Paulo Excellence Chair (SPEC). This is a grant mechanism created by the Foundation to forge collaborations among institutions in the state of São Paulo and leading researchers in other countries. Moran visits Brazil several times a year. He lectures and advises doctoral candidates on environment and society at Unicamp and does field work in Altamira.

With a degree in Spanish literature from Spring Hill College in Mobile, Alabama, Moran earned his master's degree in Latin American history and his doctorate in social anthropology at the University of Florida. He spent most of his career at the University of Indiana, until retiring in 2012. There, he collaborated for many years with political scientist Elinor Ostrom (1933-2012). Winner of the 2009 Nobel Prize in Economic Sciences, Ostrom challenged the concept of the "tragedy of the commons," according to which individual interests take precedence over community objectives, thus

resulting in destruction of public assets and natural resources. Ostrom argued that in practice, the isolated interests pursued by certain groups can be more beneficial to the economy and the environment than an intervention by the State or by the market itself.

#### TRANS-AMAZONIAN HIGHWAY

In the 1970s, Moran observed the beginnings of human settlements along the Trans-Amazonian highway. This was the subject of his doctoral dissertation. According to sociologist Lucia da Costa Ferreira, a professor at Unicamp and NEPAM researcher, what is innovative about Moran's approach is that it uses a broad set of data obtained from interviews, remote sensing, and demographic studies in an effort to understand the roles of various figures in the settlement of forest areas. "His work considers the settlement process as a complicated system that involves alliances and interactions between multiple actors. He rejects the traditional dichotomy that sets the figure of the unscrupulous entrepreneur, responsible for the destruction of the rain forest, against a community of the excluded," says Ferreira, a member of the Belo Monte project team. In earlier studies, she explains, Moran showed that there are micro-sociological processes that intervene in the structural change of the forest. "He found, for example, that family farming also played a role in the deforestation of

the rainforest. Based on demographic and remote sensing data, he demonstrated that family composition was one of the variables in this phenomenon. Farmers who had more male children benefitted from that labor force and ended up causing more deforestation than farmers who had daughters," she noted.

In his research at Altamira, Moran and his team are studying the impact of the construction of the hydroelectric plant on several population groups. They developed a questionnaire and began the work of interviewing the former residents of the city. "Almost all the data collection for the project has been done. All there is left to do is the evaluation of a rural settlement, because it hasn't been built yet," Moran explains. The project seeks to better understand the consequences of undertakings such as Belo Monte, including the rapid population growth, which consequently increases the prevalence of infectious diseases and affects sanitation and the food supply. Large projects also bring about changes in the labor supply. The plan is to develop policies to address those challenges. ■

#### Project

Social and environmental processes that accompany the construction of Belo Monte hydroelectric dam, Altamira, PA (2012/51465-0); **Grant Mechanism:** São Paulo Excellence Chairs Program (SPEC); **Principal Investigator:** Emilio Federico Moran (Michigan State University and the Center for Environmental Studies and Research-Unicamp); **Investment:** R\$772,919.97.