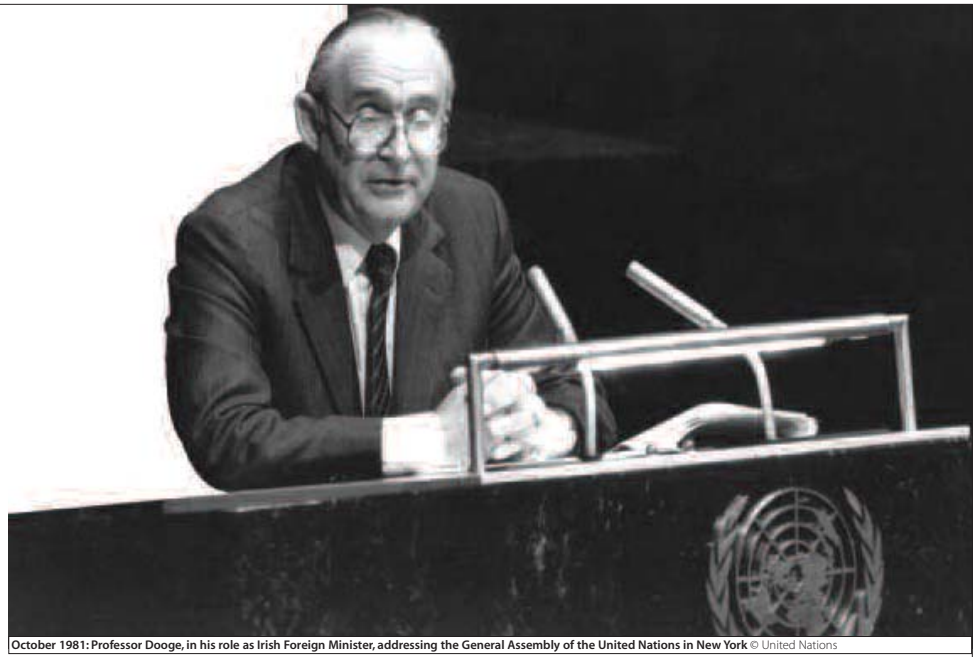
Engineer, academic, politician, international envoy – Professor James Dooge has been all of these, and much more over 60 years. The latest recipient of The Royal Academy of Engineering's Prince Philip Medal talks to Michael Kenward about his life juggling these roles, and his views on what engineers can bring to politics, climate change and other environmental issues.

JAMES DOOGE FREng



October 1981: Professor Dooge, in his role as Irish Foreign Minister, addressing the General Assembly of the United Nations in New York © United Nations

It is hard to label Professor James Dooge. Engineer, academic, politician? He would probably place engineer first and foremost. That is certainly the reason why the Duke of Edinburgh recently presented him with the Prince Philip Medal, which is awarded by The Royal Academy of Engineering to 'an engineer of any nationality who has made an exceptional contribution to engineering as a whole through practice, management or education'. While his award refers to his position as 'an outstanding figure in the field of hydrology,' his achievements have been in practice, management and education.

Now 83, Professor Dooge restricts himself to engineering. He continues to work with his colleagues in the Centre for Water Resources Research at the University College Dublin. He is currently researching "reverse routing in flood control" in an attempt to devise a control strategy for a reservoir that prevents downstream flooding. This seemingly straightforward project – albeit one that challenges various conceived wisdoms – illustrates several aspects of Jim's long career. He has spent more than 60 years doing things with water, in particular pioneering a theoretical approach to this area of research.

After graduating, Professor Dooge's first job as what he describes as a "wet civil engineer" was on a sewage treatment plant at a tuberculosis sanatorium in County Dublin. "You don't really need to mention that," says Jim, helpfully trying to keep his life history down to reasonable length. But then he continues with one of his many anecdotes: "The biological treatment plant wouldn't work because of all the disinfectant they were using in the sanatorium," he explains. "It killed off the microorganisms needed to treat the sewage." As a result of this, 'fresh' sewage had to be imported in order to start up the process!

This first job as a clerk of works began a long career in hydrology, a subject choice that was the first of many "chance events" in Jim's long career. Had the employment situation been different, Jim might have spent his time in a very different area of civil engineering. "My ambition was to build bridges," he explains, but there just weren't that many jobs in that area after he graduated from University College Dublin.

FAMILY HISTORY

It was always going to be an engineering career of some sort for Jim. He was surrounded by a family of engineers. His father was a ship's engineer and his mother's youngest brother was a civil engineer, as were his father's two brothers. "I was interested in engineering from my early teens," he explains, so much so that he persuaded his school to find someone to teach him applied mathematics.

Mathematics is a common thread running throughout Jim's career. One of his major research achievements was, as he puts it, "bringing an engineering mentality into a branch of the earth sciences". He did this by applying mathematical systems theory to hydrological phenomena. Prior to this, hydrologists had taken a purely descriptive approach to work on floods, droughts, river flows and so on.

This involvement with wet civil engineering continued in 1946 when he joined the Irish Electricity Supply Board. There he worked on the hydraulic design of hydroelectric schemes as well as the design of cooling water systems for steam power plants.

A FLUID TRANSITION

The first of several major career shifts came in the 1950s. After more than a decade as a practising engineer, Jim moved to University College Cork to become Professor of Civil Engineering. The catalyst for this move was two years spent in the mid-1950s doing postgraduate research in the USA at the University of Iowa, then known as a leading centre for research in fluid mechanics and hydraulics.

The American trip itself wasn't easy to set up. At the time Jim wanted to go, the Irish Electricity Board regulations didn't allow leave of absence for academic time out. Not for the last time, Jim had to get the rules changed so that he could be the first to try something new.

"I got a taste for the academic world while I was in Iowa," he says, and a couple of years later, when a former professor suggested that Jim apply for the chair at Cork, he took the bait. "I have always been

September 1981: Foreign Ministers chatting between formal sessions of the European Community.
From left, Peter Carrington (UK), Claude Cheysson (France) and James Dooge (Ireland)

ACHIEVEMENTS

Born **1922**. Graduated in Civil Engineering from University College Dublin **1942**. Design engineer in river improvement **1943–46** and hydro-electric development **1946–1958**. Professor of Civil Engineering at Cork **1958–1970** and at Dublin **1970–1984**. Research in Systems Hydrology. President of Institution of Engineers Ireland **1968–69**. President of Royal Irish Academy **1987–1990**. President of International Council for Science **1990–93**. Foreign member of Academies of Science of Poland **1985**, Russia **1994**, and Spain **1998** and of The Royal Academy of Engineering **2000**. Winner of the**1999** International Prize for Meteorology of the World Meteorological Organization. Numerous awards including eight honorary doctorates. Member of the Irish Senate **1961–1987**. Irish Minister for Foreign Affairs **1981–82**.

a believer that you should change direction every 12 years or so," he adds.

Thus began a long career in research. Jim may have started later than those who went straight into a university life after graduating, but his list of publications now fills 14 pages, and is still growing. He made a leading contribution towards international cooperation in hydrological research, notably with central and eastern Europe in the 1960s and with China following the end of the Cultural Revolution.

AN HISTORICAL PERSPECTIVE

When Jim first moved to Cork he had to work with his colleagues to beef up the university's research activities and recruit research students. He also set out to broaden the scope of the university's degree course, adding economics and some history to the curriculum. The addition of economics may seem obvious – after all, civil engineers do have to operate in the real world where someone has to pay for their projects – but why history? "I don't believe that anyone can be a master of their subject unless they have understood its history," he explains. Of course, this is coloured by his own view that history is "absolutely fascinating".

Another element that he brought to his academic career was 16 years of practical engineering experience. "You don't get that now," he says. Too few academics have such 'real world' experience: "It is a bit of a weakness in our present system. We may have gone too far towards research rather than practice."

Professor Dooge's progression from business to academia, taking in politics on the way, might appear to be well planned. Far from it. "My whole career has been a matter of chance events causing turns," he says. The first throw of the dice took him into hydrology. Another roll pointed him to the university career. Even going into politics was by no means deliberate.

A PASSION FOR POLITICS

To begin with Jim had little interest in politics. He hadn't even campaigned for his grandfather, who was involved in local politics. But Jim began to change his mind after a dinner party given by a friend of his mother. During the usual after dinner chatter, someone of an older generation chipped in with a response to what Jim admits may have been "smart remarks" on his part. "You young people are all the same," was the jibe. "You criticise politicians but you refuse to do anything about it."

After he had thought this through, politics began to play a more important part in his life. In 1948, Jim was elected a member of Dublin County Council, the first step on a career in Irish politics that took him up to ministerial level. He jokingly suggests that he won his first election because "people thought that they were voting for my grandfather. I slipped in."

When the chance came up to go to Iowa, Jim faced a straight choice between engineering and politics. Engineering won and he retired from politics. Indeed, this happened twice more over the next 40 years, only on those occasions his resignations were from the Irish Senate. Even Jim's election to this upper house had an engineering factor: he was nominated for the position by the Institution of Engineers of Ireland.

ON THE HUSTINGS

How is it that engineers have a hand in picking politicians? "If you can understand the Irish Senate electoral system, you deserve to get elected," jokes Jim. He explains that nominations for the 60 seats come from a variety of organisations, including professions and universities, as well as the Prime Minister. Then the result of the election comes down to canvassing some 900 local councillors in their homes.

Whatever the system, it worked for Jim. First elected in 1961, he was re-elected in 1965, 1969 and 1973. He held the position of Deputy Chairman for two terms, becoming chairman in 1973, and a member of the small group that stood in for the President when called upon to do so.

During much of this time, Jim also held down a professorial role. It didn't help that unlike some academics, he believes that it is important for "the Prof" to be visible, and not just someone whom undergraduates glimpse at the end of a corridor. "I made a practice of teaching to every year of a four-year course," he explains. And such was his desire not to be seen to be short- changing his academic position as head of a department because of his political activities, he took on more than his fair share of the teaching: "I had to give myself a heavier teaching load than my colleagues because I was in politics."

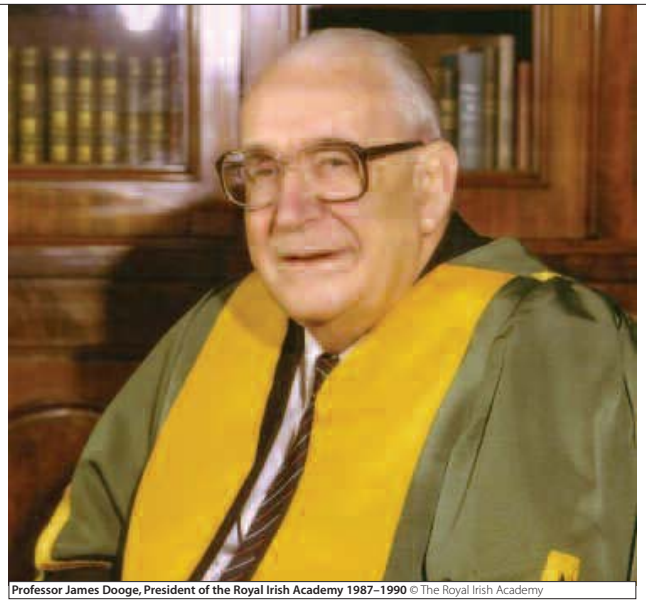
"Don't ask me how I did it," says Jim. "The only reason I survived was by keeping the two things in separate compartments."

But this isn't quite true. Ask if an engineer's experience brings anything to politics and Jim quickly responds in the affirmative. An engineering training, he says, means that you can bring "a degree of objectivity" to politics. It will be up to his political opponents to judge if, as Jim claims, he really did deal more objectively and "analytically" with bills and motions. But anyone who listens to most politicians will accept more easily his assertion that an engineer would prepare more thoroughly for an important debate. "You didn't just talk off the top of your head," as he puts it.

STANDING ON A WORLD STAGE

You certainly can't talk off the top of your head when thinking about global problems on an international scale, such as climate change or the global biosphere. This is where Jim's next unplanned change of direction, and his second retirement from politics, took him. In 1977, he chose to "devote more time to academic concerns and international cooperation in science and engineering".

An important part of this phase was Jim's work with the International Council for Science. ICSU, as it is known, is the catalyst behind many major international initiatives over the years. During this time, Jim was involved in the International Geosphere-Biosphere Programme: A Study of Global Change, the IGBP. The key factor here, says Jim, is that such massive ventures depend



Professor James Dooge, President of the Royal Irish Academy 1987–1990 © The Royal Irish Academy

on cooperation across disciplines and national boundaries, two kinds of collaboration which are difficult on their own, and even harder together. Interdisciplinarity is essential when dealing with such profound global issues, he adds, even though it can lead to communication problems between experts. People may say that science has a common language, "but there are lots of dialects inside it", and different disciplines often use the same words to express entirely different ideas.

INITIATING CLIMATE DEBATE

The IGBP was a forerunner to the World Climate Research Programme (WCRP). It was in 1978, says Jim, that people started to talk about this issue at a meeting of the World Meteorological Organization in Geneva. We had two questions before us, explains Jim. Is there such a thing as a climate problem? And, if there is, is it serious enough to call a world conference of scientists to discuss it? Yes, was the answer on both counts, and the rest is history.

The first major scientific meeting took place in 1979, with only scientists at the party. By 1990, says Jim, it had become a two-week event, with a week of science followed by a week when politics (and politicians) joined the fun. That was when Jim escaped from the fray, partly because the whole thing had become a political issue. There is still some research to do, he agrees, but essentially what we need now is action. "It is now climate policy. That is the big problem," he adds.

Jim may have ducked out of the climate debate because politics had soared up the scientific agenda, but by then he had already been lured back into Irish politics. In 1981, the Taoiseach nominated him to the Senate and appointed him as Minister for Foreign Affairs. Sadly, this is where Jim draws a veil over his life in politics.

There are too many sensitivities surrounding his time in the Senate for Jim to say much for public consumption. But he can't resist the temptation to share a good yarn, and he recounts an anecdote or two about his dealings in the 1980s with Margaret Thatcher and Peter Carrington (then Britain's Foreign Secretary) on Irish affairs. Alas, these fascinating insights must remain "off the record".

FOR THE RECORD

Perhaps we will all be able to read about such things if he manages to succeed in yet another of the tasks he has set himself: to put his voluminous archive of papers in order and write his memoirs. That really could be a challenge to Jim's desire to keep politics and engineering in separate compartments.

BIOGRAPHY – Michael Kenward OBE

Michael Kenward has written about technology for 35 years. A freelance writer for the past 15 years and currently a member of the *Ingenia* Editorial Board, before that he worked on *New Scientist* for 20 years and edited the magazine in the 1980s.

Editorial Information

Ingenia welcomes proposals and suggestions for articles that aim to inform and stimulate readers from both within and outside the engineering community. The writing style should be clear, authoritative and easy for non-specialists to digest. Prospective authors should submit a one page outline to the Managing Editor, the Editor-in-Chief or to any member of the Editorial Board. Names and contact details are provided on the Contents pages. Articles themselves should be about 2000 words in length, preferably with three or four colour illustrations. *Ingenia* also welcomes letters to the Editor. Additional copies of *Ingenia* can be requested from the Managing Editor at a cost of £10 each, with cheques made payable to 'The Royal Academy of Engineering'.