feature

David J. C. MacKay (1967–2016)

Physicist; climate and energy innovator.

Ken Wright

here are many quotes from David MacKay's publications that could be used to illustrate his approach to tackling a challenge, but the following perhaps best encapsulates his blend of mathematical and practical understanding, combined with his intense passion to do something now: "We need to choose a plan that adds up. It is possible ... but it's not going to be easy ... We need to stop the Punch and Judy show and get building." The quote comes from the closing section of his celebrated, scientifically rigorous yet userfriendly 2009 book — Sustainable Energy: Without the Hot Air.

Born in Stoke-on-Trent, David studied Natural Sciences at Trinity College, Cambridge and, after graduating in 1988, obtained his PhD in Bayesian methods for adaptive models at the California Institute of Technology, which he attended as a Fulbright Scholar. He then returned to Cambridge, continuing his crossdisciplinary research at the Cavendish Laboratory — earning the distinction of Professor of Natural Philosophy in 2003 at just 36 years old.

Before turning his attention to climate and energy policy, David gained international respect in the field of machine learning and neural networks. He demonstrated in 1995 that previously inconceivably large datasets could be reliably compressed through noisy communication links using error-correcting codes that are now universally employed in our present-day digital landscape, such as satellite communications and digital broadcasting.

In 1999, David's interest in interfaces between humans and machines led to his invention of Dasher, a software application that has transformed the lives of thousands of people with impaired mobility by employing a predictive language model to enable people who could not use a keyboard to input information through eye movements, head movements or breathing.

In a 2009 interview, shortly after publication of *Sustainable Energy: Without*

the Hot Air, he explained why he wanted to turn his analytical attention to energy and climate: "Most of physics is about energy, and physicists understand inefficiencies. I wanted to write a book about our energy options in a neutral, human-accessible form." His motives are neatly summarized in the preface: "I didn't write this book to make money. I wrote it because sustainable energy is important."

Having received a groundswell of acclaim for this accessible and unflinching treatise, David gained the attention of political decision-makers and was appointed Chief Scientific Adviser of the newly formed UK Department of Energy and Climate Change (DECC) in 2009.

At DECC he increased the size and reach of the technical and analytical teams, ensuring decisions were informed by the best available evidence and that, first and foremost, the numbers added up. His achievements in government are too numerous to capture in so brief a summary, but include development of the UK 2050 energy and emissions calculator, which numerically underpinned the 2011 UK Carbon Plan and has since evolved into a Global Calculator that has been adapted and adopted by government ministries in over 20 countries, arguably making it the UK's single most influential intervention in international climate change diplomacy.

David was unafraid of challenging consensus, though his criticism was always constructive and aimed at unpicking complex issues. For example, his work showing that biomass-generated electricity can be high-carbon — as well as low — in lifecycle terms demonstrated the importance of emissions from changes in land carbon stock.

His approach won him respect from across the political spectrum, as was evident when advocates of opposing positions on climate change co-hosted his last lecture in the Houses of Parliament, on "Why making good energy policy is difficult." In recognition of his work he was elected a fellow of the Royal Society in 2009 and appointed a Knight Bachelor in the 2016 New Year Honours "for services to Scientific Advice in Government and Science Outreach".

In 2015, not long after completing his tenure at DECC, David was diagnosed with terminal stomach cancer and documented his treatment with wry wit and stoicism in his blog: Everything is Connected.

Unfailingly principled and devoted to analytical rigour regardless of political palatability, one of David's last publications — a commentary piece in *Nature*, published before the Paris Climate Change Conference — proposed an alternative, carbon-price based approach to the current international framework for tackling climate change that he believed would be more likely to ultimately succeed; he referred to this as "the most important piece of writing I have ever been involved in".

Yet, despite his conviction, David loved being told of new data that challenged his previous position on an issue. Indeed, it is supremely ironic that a person who cared so much about a rational future pathway will not be able to share it and look back to assess whether his prediction of the suitability of the current system was correct.

On a personal level, those who worked with David on various initiatives during his five years at DECC have nothing but fond memories of his wit, intellect, insight and charm, as well as his patient, unpatronizing manner. He will be sorely missed by those who were fortunate enough to cross paths with him.

David passed away on 14 April 2016. He is survived by his wife, Ramesh (née Ghiassi), and their children, Torrin and Eriska; and by his mother and siblings.

Ken Wright is a Science Adviser in DECC, and writes on behalf of DECC Science and Innovation Directorate. e-mail: ken.wright@decc.gsi.gov.uk