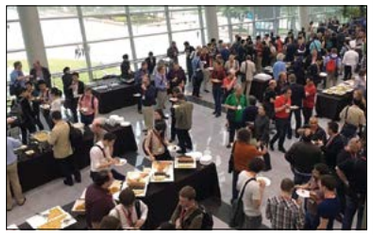
with recent studies of beta functions opening the door for light sources to replace the traditional and lengthy orbit response techniques with fast turn-by-turn-based optics corrections.

At the high beam-power front, the Spallation Neutron Source in the US has reached 1.4 MW and launched a study to double the power at 1.3 GeV. Meanwhile, the European Spallation Source in Sweden, which is based on an unprecedented 5 MW linear accelerator that will reach an energy of 2 GeV using superconducting RF cavities, is well into construction and progressing towards first beam in June 2019. Accelerating superconducting cavities based on Nb_3Sn (the same material being explored for the HL-LHC and FCC magnets) have now been shown for the first time to outperform Nb cavities, defining the next generation of superconducting RF technology.

Other highlights from the Korea event included developments at J-PARC in Japan, where the rapid-cycling synchrotron is approaching routine 1 MW operation and the main 50 GeV ring is delivering a 400 kW beam for long-baseline neutrino experiments. There was also a session devoted to engagement with industry, which is crucial for the high-luminosity LHC, and a report from PACMAN – a Marie-Curie network based at CERN that is pushing the limits of technology in component alignment, in addition to training qualified engineers and creating synergies between institutes.

The Xi Jalin Prize for outstanding work in the accelerator field was awarded to Derek Lowenstein from Brookhaven National Laboratory in the US, while the Nishikawa Tetsuji Prize was awarded to Gwo-Huei Luo at the NSRRC in Taiwan. Sam Posen of Fermilab in the US received the Hogil Kim Prize, and the Mark Oliphant Prize was awarded to Spencer Jake Gessner of SLAC for his PhD thesis work on hollow-channel plasma wakefield accelerators.

The eighth IPAC will take place in Copenhagen, Denmark, on 14–19 May 2017.
● www.ipac16.org.



IPAC16 was hosted by Pohang Accelerator Laboratory in Korea.

Visits

Sophia Bennett

Austria's minister for labour, social affairs and consumer protection, **Alois Stöger**, visited CERN on Wednesday 8 June, during which he toured the ATLAS cavern with experiment spokesperson **Dave Charlton** (right).

Sophia Bennett

The **Rt Hon Hugo Swire MP**, minister of state, Foreign and Commonwealth Office, UK, in the LHC superconducting magnet test hall with head of the beams department **Paul Collier** (right) on 9 June.

Maximilien Brice

On 14 June, the Japanese minister for education, culture, sports, science and technology, **Hiroshi Hase**, signed the guestbook with the director for research and computing, **Eckhard Elsen**, and the director for international relations, **Charlotte Warakaulle**, during a visit that took in the ATLAS visitor centre and the LHC magnet test hall.

Sarah Charley

Under secretary for science and energy at the US Department of Energy, **Franklin (Lynn) M Orr**, pictured at CMS on 16 June with CMS scientist **Isobel Ojalvo** from the University of Wisconsin-Madison.

Obituaries

Péter Hasenfratz 1946–2016

Péter Hasenfratz was born in Budapest, Hungary on 22 September 1946. He studied physics at Eötvös University, finishing his PhD in 1973, and in 1975 he took up a postdoc position under Gerard 't Hooft in Utrecht. He then returned to Budapest, before moving to the CERN Theory Division in 1979.

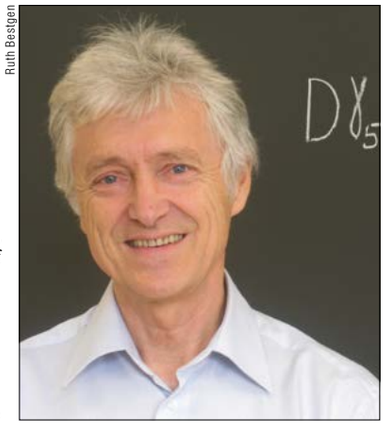
Péter then began to work on field theory regularized on a space–time lattice. In 1980, together with his younger sister Anna, he presented the first correct computation of the scale parameter of QCD on the lattice. In 1982 he organized the first international workshop on lattice field theory at CERN, sending handwritten invitations to each of the participants. He had planted the seed for a new scientific community, and today several hundred people meet annually at the lattice conferences.

In 1984 he went to the University of Bern, and from 1999–2001 he was the director of the Institute for Theoretical Physics there. His lectures, not only in Bern but also at numerous international schools, have been described as a revelation by participants.

Péter was extremely creative and made many original contributions to quantum field theory. He often calculated things analytically that had seemed incalculable before, such as the exact value of the dynamically generated mass gap in several 2D asymptotically free quantum field theories. In addition, he significantly contributed to our understanding of chiral symmetry on the lattice. While cleaning up his office in 1997, he discovered an old preprint by Paul Ginsparg and Kenneth Wilson from 1982 that contained the now famous Ginsparg–Wilson relation, which turned out to hold the key to understanding chiral symmetry. By constructing a novel solution for this relation, Péter breathed new life into this old paper and today, with more than 950 citations, it has become one of the most cited papers in lattice field theory.

He had always wished that he could witness the discovery of the Higgs boson, since he had a special interest in electroweak symmetry-breaking, and his wish was granted in 2012 – one year after his retirement. Tragically, after this most remarkable scientific career, rapidly advancing Alzheimer's disease probably prevented him from fully appreciating the scientific significance of this discovery.

Péter was an extraordinary scientist and an extremely friendly, kind person. He passed away peacefully at home on 9 April, leaving behind his wife Etelka, their four children, six grandchildren, and his sister Anna.
● *His colleagues.*



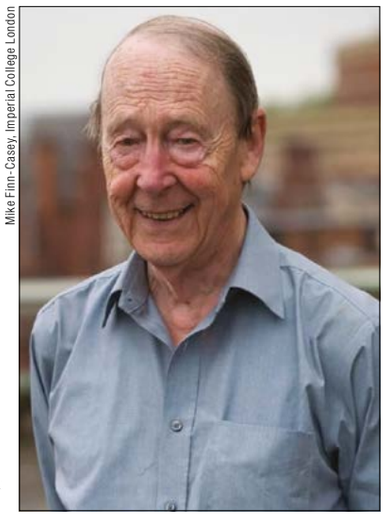
Ruth Bestgen

Péter Hasenfratz was a member of the CERN Theory Division from 1979–1984.

Tom Kibble 1932–2016

Tom Kibble, an internationally renowned theoretical physicist whose contributions range from the theory of elementary particles to modern early-universe cosmology, died on 3 June in London, aged 83.

One of Kibble's most important pieces of work in this area was his study of spontaneous symmetry-breaking, whereby vector particles can acquire a mass accompanied by the appearance of a massive scalar boson. This mechanism – which was put forward independently in 1964 by Brout and Englert, by Higgs and by Kibble, Guralnik and Hagen – lies at the heart of the Standard Model and all modern unified theories of fundamental particles. It was finally confirmed in 2012 by the discovery of the Higgs boson at CERN (the associated massive W and Z vector bosons having already been discovered at CERN in the early 1980s), winning Higgs and Englert the 2013 Nobel Prize in Physics.



Mike Finn-Casey, Imperial College London

Tom Kibble, co-inventor of spontaneous symmetry-breaking.

The vindication of spontaneous symmetry-breaking presented a much-debated dilemma for the Nobel Committee, notwithstanding Brout's demise in 2011, because prizes can be awarded to at most three individuals. However, Kibble was also sole author of a 1967 paper that focused on the non-abelian generalization of the mechanism. When the Standard Model came along shortly afterwards, Kibble's paper was seen to explain not only why the W and Z acquire a mass but, equally crucial, why the photon does not. At a celebration of Kibble's 80th birthday at Imperial College in March 2013, Steven Weinberg ended a public lecture by stating "Tom Kibble showed us why light is massless". Indeed, Higgs said that Kibble should have shared the prize awarded to Englert and himself "because of what he ▷

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wrote in 1967". Kibble himself maintained a dignified modesty throughout, in keeping with the honesty and integrity for which he was justly famous.

Spontaneous symmetry-breaking also predicted the existence of soliton-like solutions of the field equations of unified field theories. In 1976, Kibble realised that these structures could condense as the universe cooled from the hot conditions prevailing in the Big Bang, and might therefore have striking effects on the development of large-scale structures in the universe called cosmic strings. Kibble's vision has thereby provided an extraordinary link between the macroscopic and microscopic features of our universe – an effect that has been confirmed experimentally in the context of vortex formation in superfluid helium 3.

Kibble was born in Chennai, India, to missionaries Walter and Janet (nee Bannerman) and he attended Edinburgh University in the UK from 1951–58. After spending a year at Caltech in the US he joined the theoretical physics department at Imperial College London, which had recently been founded by Abdus Salam. In 1970 Kibble became professor of theoretical physics at Imperial, and was head of the department of physics there from 1983–1991.

He was an outstanding teacher and his textbook on classical mechanics has become a classic. In 2005 he was awarded the 2005 NESTA/Nature Mentoring lifetime achievement award. Kibble was elected Fellow of the Royal Society in 1980 and served as its vice-president in 1988–89. He was awarded the 1981 Hughes Medal of the Royal Society, jointly with Peter Higgs, "for their international contributions about the spontaneous breaking of fundamental symmetries in elementary-particle theory". Other awards include the 1984 Rutherford Medal and Prize, the 1993 Guthrie Medal and Prize, the 2009 Dirac Medal, the 2010 Sakurai Prize for Theoretical Physics, Honorary Fellowship of the IOP in 1998 and the 2012 Einstein Medal. He received a CBE in 1998 and a knighthood in 2012.

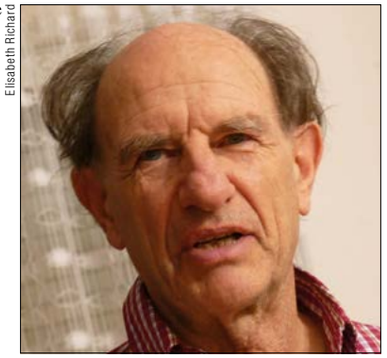
Kibble was also concerned about the nuclear arms race and took leading roles in several organizations promoting the social responsibility of science. These included the British Society for Social Responsibility in Science, Scientists against Nuclear Arms, Scientists for Global Responsibility and the Martin Ryle Trust. Tom Kibble was the personification of stature, dignity and integrity, and will remain so in our memories. His wife, Anne (nee Allan), whom he married in 1957, died in 2005. He is survived by their son, Robert, and two daughters, Helen and Alison.

● *Mike Duff, Imperial College London.*

Gérard Mennessier 1943–2016

Gérard Mennessier, a theorist at Laboratoire Charles Coulomb in Montpellier, France, passed away on 8 April. He was much admired by his many colleagues and collaborators, both for his physics achievements and for his human qualities, especially his modesty and cordiality even in adverse circumstances.

After studying at the Ecole Normale Supérieure, Mennessier began his research in Paris before moving to Montpellier. His research in particle physics ranged from phenomenology, experiments and theory to mathematical physics and tended to involve rigorous numerical computations. In phenomenology, he made significant contributions to dispersion relations for photo-production and C-violation in photo-production of pions in proton Compton scattering. He also helped determine total cross-sections for hyperon



Elisabeth Richard

Some of Gérard Mennessier's most important contributions concerned pion–pion scattering.

nucleon scattering, three-meson resonances and meson pair production in two-photon processes, and constructed a practical theory of the multi-layered transition radiation detector.

Mennessier's most enduring contributions are in the field of pion–pion scattering from a rigorous S-matrix framework based on axiomatic field theory, for which he helped improve the bounds by a factor of 40. Another achievement was his role in proving that there are several and even continuous solutions when you try to extract the KM matrix from the moduli of the matrix if there are more than three generations of quarks, contrary to what was believed at the time. More recently, Mennessier's interests moved to the life sciences, in particular genomics.

We send our deep condolences to his daughter Elisabeth and to his many friends and admirers.

● *His friends and colleagues.*

György Vesztergombi 1943–2016

György Vesztergomb, a prominent figure in Hungarian high-energy physics, died on 2 May after a long illness. He was emeritus professor of the Wigner Research Centre for Physics at Eötvös University in Budapest, and a member of several CERN committees as Hungarian delegate or representative. During his career he founded and led several research groups in experimental particle and nuclear physics, including the Hungarian components of the CERN experiments L3, NA49, CMS, ALICE and NA61.

Gyuri, as he was known to his friends, was born in Mohács and studied physics at the Eötvös University. His diploma work concerned neutron-induced reactions at KFKI Research Institute for Particle and Nuclear Physics (RMKI), after which he analyzed bubble-chamber data. He joined the related experiment at the Serpukhov accelerator, where he developed methods and software to enable electronic data to be transferred to magnetic tapes, rather than photographic films. In 1974 Vesztergombi moved to CERN and joined Pierre Darriulat's group at the ISR, where he started to work on phenomena associated with large transverse momentum. From 1976 onwards he contributed to the study of the quark structure of the proton at the SPS experiment NA4 in the group of Carlo Rubbia, and he later worked on the detailed study of W and Z bosons as a member of the L3 Collaboration at LEP.

During the 1980s, while at the Max Planck Institute in Munich, Gyuri joined CERN's NA35 streamer chamber experiment – which was among the first attempts to create the quark–gluon plasma. On returning to Hungary he defended his doctoral thesis titled "Interaction of quarks and gauge bosons" in 1992, and in the same year he played a crucial role in Hungary's accession to CERN. His NA49 group contributed to the assembly, operation and analysis of a grid-geometry time-of-flight wall and, encouraged by the successes at RHIC, he proposed a detailed study of large transverse momentum particles. Vesztergombi was co-spokesman of the successor experiment NA61 and chairman of the collaboration board for several years.

Hungarian Academy of Sciences

György Vesztergombi played an active role in many CERN experiments.

Simultaneously, he started preparatory work for the planned LHC experiments. Under his guidance, KFKI-RMKI built the hadronic forward calorimeter for CMS and his group was partly responsible for the alignment of the CMS tracker. Vesztergombi foresaw that the expected volumes of LHC data could not be handled with classical computing methods, and got involved in highly parallel and associative computer programming and field-programmable gate arrays. He played a pioneering role in the development of new ideas – among them a proposal to use the waters of Lake Geneva as a gigantic detector for a neutrino beam fired from CERN. In Hungary, he was also the first to recognize the potential of plasma-wakefield acceleration, and hoped that it would one day take us into the PeV energy regime to reveal the internal structure of quarks.

In recognition of his work, Vesztergombi received the Academy Award of the Hungarian Academy of Sciences in 1992 and the Officer's Cross of the Order of Merit of the Hungarian Republic in 2009. He taught experimental particle physics at Eötvös University for more than two decades, and was dedicated to educating young researchers. In Gyuri we have lost an energetic, highly versatile and imaginative scientist. But his activities and enthusiasm have launched the careers of a new generation of physicists.

● *Ferenc Siklér, Wigner Research Centre for Physics, Budapest, and colleagues.*

Irene Vichou 1964–2016

Our ATLAS colleague Irene Vichou passed away in April, after a long career working on CERN experiments, including many years as a member of the ATLAS collaboration.

Irene started to work at CERN's West Area Omega experiment while a PhD student at the University of Athens. From 1993, she worked with the ATLAS liquid-argon calorimeter group from LAL Orsay, during which time she participated in calorimeter-prototype beam tests and carried out the first full simulation of photon and electron identification for the ATLAS calorimeters. In 1996 Irene joined the ATLAS Tile Calorimeter community, initially working with the IFAE Barcelona team, and was involved in the first prototypes of the caesium radioactive source calibration system.

One of the important results of Irene's work was the identification of the long-term degradation of the photomultiplier performance, which led the manufacturer to modify the design.

In 2000, Irene joined the ATLAS team at Athens University and brought into operation an important test bench to qualify the 10 000 photomultiplier blocks assembled for the ATLAS Tile Calorimeter.

Ilias Efthymiopoulos

Irene Vichou led the ATLAS Tile Calorimeter group.

Then, in 2004, she joined the University of Illinois at Urbana-Champaign, where she helped prepare the calorimeter for sub-detector operation within ATLAS. She was responsible for many crucial activities including the implementation of services, the commissioning and refurbishment of electronics, data preparation and detector performance, and at a broader level coordinated several activities within the Jet/EtMiss group. Irene was also the supervisor of several PhD students and was a highly regarded mentor.

Irene was appointed project leader of the ATLAS Tile Calorimeter system in 2014. Under her leadership, the project saw a major consolidation and repair campaign for the front-end electronics during the long shutdown after the LHC Run 1, enabling the collaboration to start Run 2 with a fully working detector that was more robust against failures. R&D for the Tile Calorimeter upgrade for the high-luminosity LHC also took a large step forward under her supervision.

Irene was a calm and thoughtful colleague and a good friend to many of us in ATLAS. She always looked carefully and deeply into every topic, earning her the appreciation and respect of all. We came to rely on her calmness, quiet wisdom and authority in all Tile Calorimeter matters and beyond.

Our thoughts are with Irene's husband Ilias, and their daughters Paulina and Natalia.

● *Her friends and colleagues in ATLAS.*

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