FLASHES

A MONTHLY MAGAZINE ON KNOWLEDGE AND DEVELOPMENT BY THE MOHAMMED BIN RASHID AL MAKTOUM KNOWLEDGE FOUNDATION

FEBRUARY 2019 • ISSUE 50

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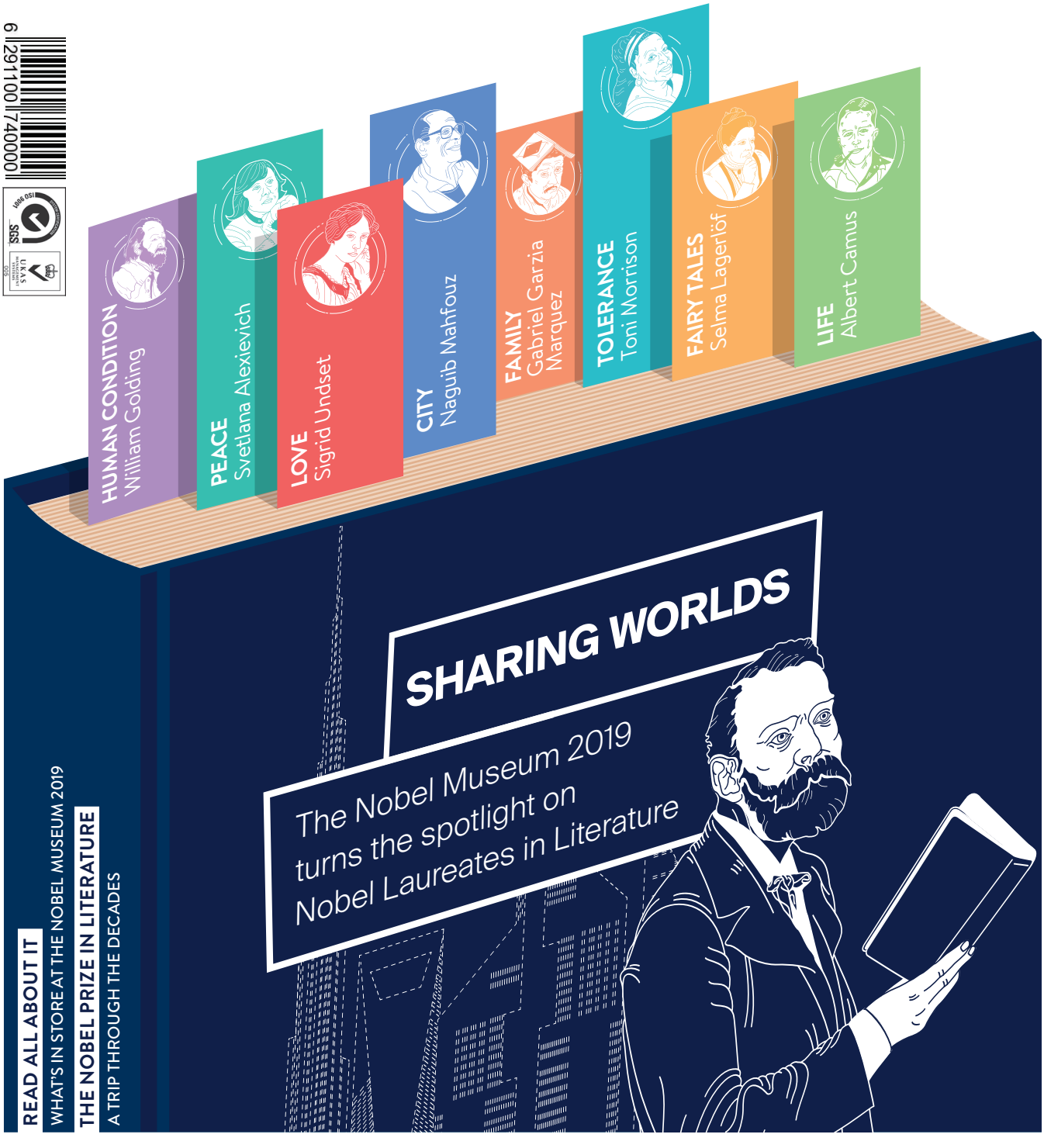

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FOREWORD

Dear readers,

It was English author Edward Bulwer-Lytton who, in 1839, famously said that "the pen is mightier than the sword". By which he meant that the peaceful act of writing can have a bigger impact than an act of violence.

Throughout the ages, the pen has remained extremely powerful. The world of literature allows us to explore the many facets of life through the works of novelists, poets and playwrights. It allows us to join them in journeys of fact or fiction, and it invites us to develop our own understanding of many human complexities.

It is with great delight then that I invite you to the fifth edition of our popular Nobel Museum exhibition, organised in collaboration with the Nobel Foundation, which this year carries the theme 'Sharing Worlds' and celebrates the works of Nobel laureates in Literature.

Held under the patronage of His Highness Sheikh Ahmed bin Mohammed bin Rashid Al Maktoum, Chairman of the Mohammed bin Rashid Al Maktoum Knowledge Foundation, the exhibition explores such topics as peace, love, tolerance, life and the human condition as committed to novels by selected Nobel Prize in Literature winners.

The selected laureates span the history of the prize and all originate from various parts of the world, which shows the power and force of the written word to transcend borders and unite generations.

The exhibition also honours the great Naguib Mahfouz, the first Arab writer to win the Nobel Prize for Literature. The acclaimed Egyptian author enjoyed a 70-year career during which he wrote scores of novels, short stories, films and plays. Arab literature gained the attention of the wider world after he was awarded the Nobel Prize in 1988, and Mahfouz continues to be an inspiration to Arab writers of all ages.

With interactive exhibits and a series of workshops held by literary experts, this year's Nobel Museum – which runs from 3 February to 2 March, at La Mer, Dubai – brings the written word to life in a way designed to spark the imagination of all ages.

I hope you can visit the Nobel Museum and it's my wish that it inspires you to pick up a pen and embark on your own literary journey.

Jamal bin Huwaireb
CEO of Mohammed bin Rashid
Al Maktoum Knowledge Foundation

Winners of 'MBR Medal for Scientific Excellence' Honoured

Ten winners received the highest Emirati scientific honour recently when they were each awarded the Mohammed bin Rashid Medal for Scientific Excellence.

Vice President, Prime Minister of the UAE and Ruler of Dubai, His Highness Sheikh Mohammed bin Rashid Al Maktoum presented the medals to the winners in the presence of Crown Prince of Dubai, His Highness Sheikh Hamdan bin Mohammed bin Rashid Al Maktoum, and Deputy Ruler of Dubai, His Highness Sheikh Maktoum bin Mohammed bin Rashid Al Maktoum.

The winners were selected from a pool of 200 scientists who were nominated for the second edition of the Mohammed bin Rashid Medal for Scientific Excellence, which seeks to recognise outstanding scientists and researchers for their achievements and contributions in various fields.

The award ceremony took place on the sideline of the second annual meeting of the Mohammed bin Rashid Academy of Scientists, which attracted more than 150 scientists and researchers from throughout the world.

Winners included Dr Lihadh Ibrahim Al-Gazali, Senior Consultant in Clinical Genetics and Pediatrics at the United Arab Emirates University, and Dr Ali Almansoori, Professor of Chemical Engineering at Khalifa University, while Omar Yaghi, Founding Director of Berkeley Global Science Institute, received a Lifetime Achievement Award for his scientific works.

The award ceremony was also attended by the Chairman of Dubai Civil Aviation Authority and Chairman of Emirates Group, His Highness Sheikh Ahmed bin Saeed Al Maktoum, Chairman of the Mohammed bin Rashid Al Maktoum Knowledge Foundation, His Highness Sheikh Ahmed bin Mohammed bin Rashid Al Maktoum, and His Highness Sheikh Mansour bin Mohammed bin Rashid Al Maktoum. Minister of Cabinet Affairs and The Future, His Excellency Mohammad bin Abdullah Al Gergawi, and Minister of State for Advanced Sciences Sarah bint Youssef Al Amiri, also attended the event.

The second annual meeting of the Mohammed bin Rashid Academy of Scientists included several workshops that brought together experts in various fields to explore the challenges facing the scientific community, and to proactively propose solutions to overcome them.

Members of the Mohammed bin Rashid Academy of Scientists are experts in a wide range of disciplines, including medicine, electronic engineering, chemical engineering, genomics, mechanical engineering, aviation engineering, physics, artificial intelligence, cyber security, materials science, food security, water technology, biology and genetics, and neurology, among many other scientific fields.

Zayed Sustainability Prize Winners Praised

By identifying work across sectors that are cornerstones of the UN Sustainable Development Goals, the Zayed Sustainability Prize presents "an unparalleled global platform for ideas that have the power to benefit humankind and our planet".

That was the message from His Highness Sheikh Mohamed bin Zayed Al Nahyan, Crown Prince of Abu Dhabi and Deputy Supreme Commander of the UAE Armed Forces, when he presented awards to the 10 winners of the 2019 Zayed Sustainability Prize recently.

In the presence of Vice President and Prime Minister of the UAE and Ruler of Dubai, His Highness Sheikh Mohammed bin Rashid Al Maktoum, Sheikh Mohamed bin Zayed congratulated the winners and praised their efforts and valuable contribution to supporting sustainable development. He encouraged them to keep up the good work to find innovative and sustainable solutions to address current and future global challenges.

He also praised their creative ideas and efforts that have contributed to the economic and social development of their countries and regions.

The awards, presented during Abu Dhabi Sustainability Week, recognised the winners' efforts across the health, food, energy, water and global high schools sectors.

The prize honours leaders whose work and spirit of enterprise has resulted in working solutions across communities around the world. The global high schools category seeks to inspire young minds and encourage entries based on concepts or proposed projects that can be implement with the award's prize money.

Progress Report on Dubai Future Foundation Projects

Vice President and Prime Minister of the UAE and Ruler of Dubai, His Highness Sheikh Mohammed bin Rashid Al Maktoum visited the Dubai Future Foundation recently, where he was briefed on the development of the foundation's various projects.

HH Sheikh Mohammed toured AREA 2071, which is designed as a collaborative innovation hub to bring together individuals and organisations to form a creative community focused on solving important human challenges at scale. AREA 2071 is considered a physical manifestation of the UAE Centennial Plan that aims to make the UAE the world's leading nation by 2071.

HH Sheikh Mohammed was briefed on the progress of other initiatives, including Dubai 10X, Dubai Future Accelerators, Dubai Future Academy and One Million Arab Coders, among others. He also inspected construction progress on the Museum of the Future, which is set to open in 2020.

Accompanying HH Sheikh Mohammed on his tour were HH Sheikh Hamdan bin Mohammed bin Rashid Al Maktoum, Dubai Crown Prince and Chairman of the Executive Council and Chairman of the Board of Trustees of the Dubai Future Foundation, plus a number of other dignitaries.

MAKING HISTORY

As this issue of Flashes went to press, the UAE was preparing for the first major event to fall under the nation's Year of Tolerance.

Reflecting the nation's position as "a global capital for tolerance and humanitarianism", the UAE was preparing for a historical occasion as this issue of *Flashes* went to press – the visit of two of the world's most prominent religious leaders.

His Holiness Pope Francis, the Head of the Catholic Church and Sovereign of the Vatican City, and His Eminence the Grand Imam of al-Azhar Sheikh Ahmed el-Tayeb were due to visit the UAE from 3 – 5 February.

The landmark visit – which comes as the UAE celebrates 2019 as the Year of Tolerance – marks the first time a Pontiff has visited the GCC and is the first time any Papal visit has coincided with a religious figure as significant as the Grand Imam. It comes after His Holiness Pope Francis and His Eminence the Grand Imam accepted the invitation of His Highness Sheikh Mohammed bin Zayed bin Sultan Al Nahyan, the Crown Prince of Abu Dhabi and Deputy Supreme Commander of the UAE Armed Forces.

The visit is "a further milestone in the UAE's commitment to promoting the human fraternity and shared values of tolerance and humanitarianism, and the peaceful coexistence of all people and religions," said state news agency WAM.

"In the 47 years of the UAE's existence, the nation has been proud to promote co-existence among its multinational population and hosting this visit and its commitment to human fraternity is a testament

to the nation's ongoing doctrines of peaceful coexistence, tolerance and human values, driven by open interfaith dialogue," added WAM.

"The joint visit is a highly significant occasion for the UAE in 2019, which has been declared The Year of Tolerance in the UAE, to further strengthen the nation's role of encouraging stability and prosperity in the region."

More than 135,000 people from across the UAE and neighbouring countries were expected to attend a Papal Mass at the Zayed Stadium, in Abu Dhabi, on 5 February – one of the largest single gatherings ever held in the UAE.

His Holiness Pope Francis, and His Eminence the Grand Imam were also scheduled to meet His Highness Sheikh Mohammed bin Zayed bin Sultan Al Nahyan, the Crown Prince of Abu Dhabi and Deputy Supreme Commander of the UAE Armed Forces, for bilateral meetings and discussions. They were expected to visit the Sheikh Zayed Grand Mosque and founding father of the nation Sheikh Zayed's tomb together. The Pontiff was also planning to meet with the Muslim Council of Elders.

"The willingness of us all, Emiratis and foreigners, to engage with people different from ourselves in a spirit of respect and empathy has ensured our success"

HE SHEIKH NAHYAN BIN MUBARAK AL NAHYAN
UAE MINISTER OF TOLERANCE

UAE officials met Pope Francis in the Vatican in 2017 to discuss the importance of promoting tolerance worldwide. The delegation was headed by Her Excellency Sheikha Lubna Al Qasimi, who held the position of UAE Minister of State for Tolerance at the time. During the visit, HE Sheikha Lubna described the UAE's "philosophy of tolerance" and emphasised the need to promote communication and understanding of religions and cultures.

Sheikh Mohammed bin Rashid Al Maktoum, Vice President and Prime Minister of the UAE and Ruler of Dubai, said Pope Francis' visit to the UAE would "strengthen our ties and understanding of each other, enhance interfaith dialogue and help us to work together to maintain and build peace among the nations of the world".

Welcoming Pope Francis' visit, the UAE's current Minister of Tolerance, His Excellency Sheikh Nahyan bin Mubarak Al Nahyan said: "We are proud to welcome him as a friend, as an advocate for global

His Eminence the Grand Imam of al-Azhar Sheikh Ahmed el-Tayeb and His Holiness Pope Francis at the Vatican in 2016

peace and dialogue and as a representative of a great world religion.

"The visit of Pope Francis to the United Arab Emirates will reinforce the peace with which we have been blessed," he added. "We Emiratis have welcomed the world to the United Arab Emirates. Our remarkably diverse population lives and works in peaceful and productive harmony, sheltered safely by a welcoming Arab tent.

"The willingness of us all, Emiratis and foreigners, to engage with people different from ourselves in a spirit of respect and empathy has ensured our success. We talk to one another. We learn from one another. We have come to understand and accept our differences. We have discovered the values that we share."

The UAE has a long and proud history of inter-faith dialogue and freedom of religious expression, and the first Catholic Church in the country was established in Abu Dhabi in 1965. Archeologists have also found

The book is "the first of its kind delivering an important message of tolerance"

remains of a church and monastery on Sir Bani Yas Island dating back to the 7th century.

Inter-faith dialogue and freedom of religious expression in the UAE is also the focus of a new book, authored by Reverend Andrew Thomson. A diverse group of faiths collaborated in producing the book, titled *Celebrating Tolerance: Religious Diversity in the United Arab Emirates*, which serves as a compendium of their experiences of coexisting peacefully in the country.

Representatives of each faith provide a brief overview of its migration to the UAE in the early 1960s and 1970s with an understanding of its rituals. Envisioned by Reverend Thompson from the Anglican Church, in Abu Dhabi, the book is "the first of its kind delivering an important message of tolerance; a testament to the country's highly tolerant views and acceptance of a very diverse group of people who come from all over the world".

Reverend Thompson, who was born in the UK, was awarded an MBE in 2011 for promoting inter-faith dialogue between Christians and Muslims.

"Tolerance is a virtue and an intrinsic part of the Islamic culture," states the UAE government. "It is observed at all levels: individual, organisational and national. With more than 200 nationalities living peacefully and successfully in the UAE, the UAE society has been an undisputed example of being a tolerant and inclusive country."

COUNTRY PROFILE: BELGIUM

GDP US$492.68 BN **POPULATION** 11,429,336 **HDI** 0.916

SECTORIAL INDICES

PRE-UNIVERSITY EDUCATION (PUE)
RANK 1
VALUE 79.8

TECHNICAL VOCATIONAL EDUCATION & TRAINING (TVET)
RANK 6
VALUE 71.2

HIGHER EDUCATION (HE)
RANK 9
VALUE 56

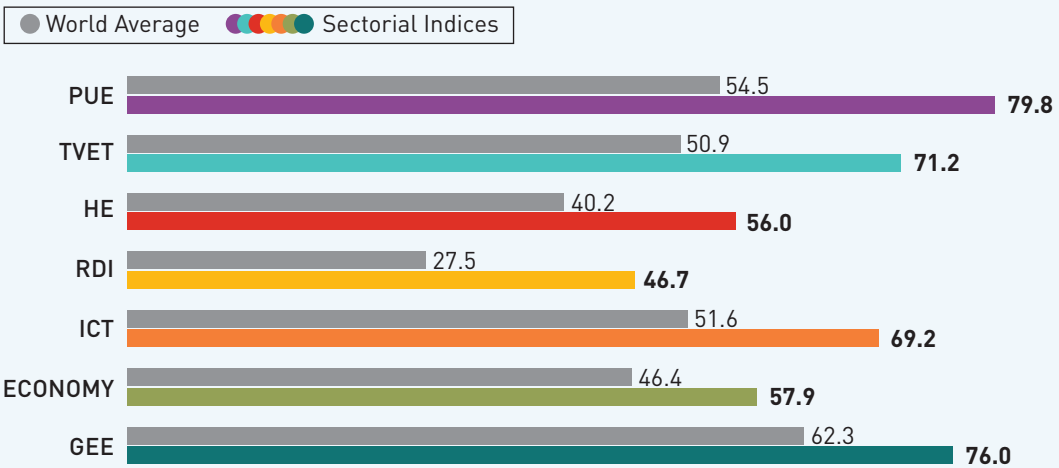
RESEARCH, DEVELOPMENT & INNOVATION (RDI)
RANK 16
VALUE 46.7

INFORMATION AND COMMUNICATIONS TECHNOLOGY (ICT)
RANK 26
VALUE 69.2

ECONOMY
RANK 20
VALUE 57.9

GENERAL ENABLING ENVIRONMENT (GEE)
RANK 25
VALUE 76

SECTORIAL INDICES IN COMPARISON WITH WORLD AVERAGE



WORLD RANK 12/134

Japan	Ireland	Denmark	**Belgium**	Norway	Germany
9	10	11	12	13	14

	RANK	VALUE
GENERAL ENABLING ENVIRONMENT	25	76
POLITICAL AND INSTITUTIONAL	22	80.1
SOCIO-ECONOMIC	40	68
HEALTH AND ENVIRONMENT	33	82.6
PRE-UNIVERSITY EDUCATION	1	79.8
KNOWLEDGE CAPITAL	11	73.5
EDUCATIONAL ENABLING ENVIRONMENT	1	89.2
TECHNICAL VOCATIONAL EDUCATION AND TRAINING	6	71.2
FORMATION AND PROFESSIONAL TRAINING	6	78.3
FEATURES OF THE LABOUR MARKET	27	60.6
HIGHER EDUCATION	9	56
HIGHER EDUCATION INPUTS	24	54.3
HIGHER EDUCATION OUTPUTS AND QUALITY	15	57.2
RESEARCH, DEVELOPMENT AND INNOVATION	16	46.7
RESEARCH AND DEVELOPMENT	15	50
INNOVATION IN PRODUCTION	21	49.4
SOCIAL INNOVATION	54	34.2
INFORMATION AND COMMUNICATIONS TECHNOLOGY	26	69.2
ICT INPUTS	27	75.1
ICT OUTPUTS	24	66.7
ECONOMY	20	57.9
KNOWLEDGE COMPETITIVENESS	23	61.7
ECONOMIC OPENNESS	14	56
FINANCING AND VALUE ADDED	33	52.1

THE REMAINS OF THE DAY and NEVER LET ME GO

Kazuo Ishiguro (Faber and Faber)

British author Kazuo Ishiguro has become one of the most celebrated authors of the modern age. Most notably, he won the Nobel Prize for Literature in 2017, one of the most revered literary prizes in the world. The achievement followed nearly four decades of accolades and prizes for his work, including the Man Booker Prize for Fiction in 1989 for his third novel, *The Remains of the Day*, and being named as one of the greatest writers in the past century by *Time* in 2010, for his work *Never Let Me Go*.

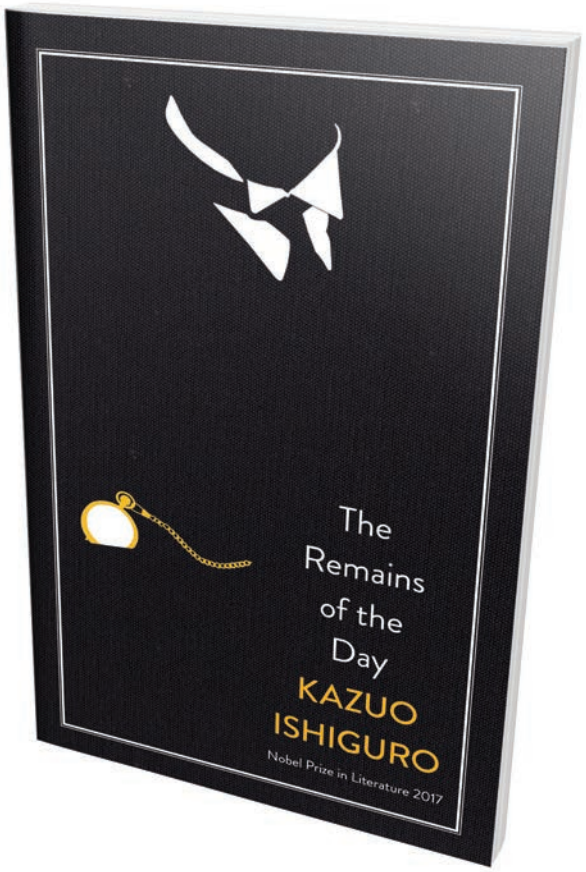
Upon his selection, the Nobel Prize Committee said that Ishiguro had been chosen for the award due to his "great emotional force" as a writer, who has through his work "uncovered the abyss beneath our illusory sense of connection with the world".

Perhaps rather self-deprecatingly, Ishiguro has said that when his agent called him to say that he had won the award, his first thought was that the announcement could be "fake news". Ishiguro then went on to say that he hoped his win would be something which "engenders goodwill and peace" and served as a reminder of "how international the word is".

Indeed, Ishiguro – who was born in Japan and moved to the UK when he was five years old – has previously suggested that his international upbringing gave him a unique perspective of England, where many of his stories are set. "I don't have a deep link with England like, say, Jonathan Coe or Hanif Kureishi might demonstrate. For me, it is like a mythical place," he said. One that perhaps seems even more surreal for Ishiguro after he was made a Knight of the Realm in his adopted country, for his achievements in literature, in June 2018.

Although it was first published in 1989, Ishiguro's Booker Prize-winning novel *The Remains of the Day* arguably still remains a relevant and immediate piece of literature three decades later. The plot addresses the universal themes of love, honour and sacrifice and is told through the first-person diary entries of the lead character, a butler named Stevens.

Set in the summer of 1956, we learn that Stevens has worked as the chief of staff at an English country estate called Darlington Hall for several decades, which has recently come under the ownership of an



American named Mr Farraday. We discover that the estate's previous owner (and Stevens' former employer) Lord Darlington was a Nazi sympathiser, and as a result died in disgrace following the end of World War Two. The plot takes us on a journey over several decades in which we discover the moral choices Stevens has had to make – and live with – while in Lord Darlington's servitude. Indeed, it seems that despite Stevens' best efforts over the years to carry out his work with dignity and pride, it is hard to separate the character from the atrocities connected with his former employer.

As Stevens comes to terms with his relationship with Darlington Hall's former owner, we also learn of the personal sacrifices the butler has made

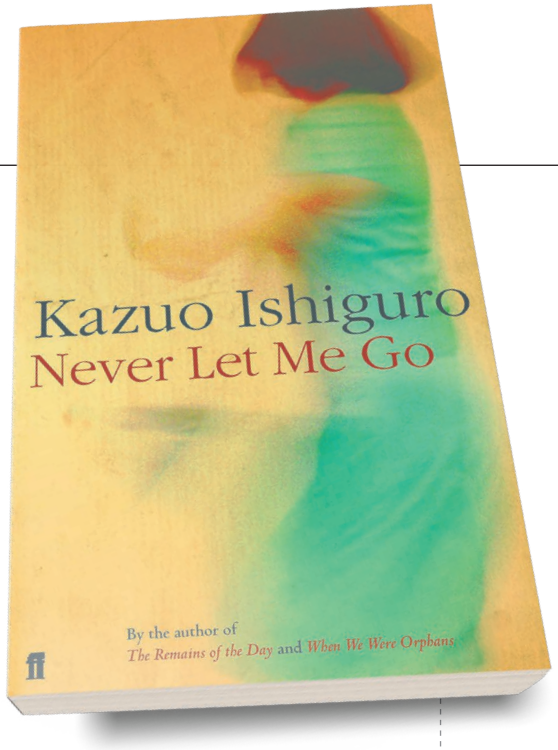
Upon his selection, the Nobel Prize Committee said that Ishiguro had been chosen for the award due to his "great emotional force" as a writer, who has through his work "uncovered the abyss beneath our illusory sense of connection with the world"

during his tenure with the Darlington family, most poignantly his unspoken love for a former colleague, Miss Kenton.

Perhaps the most powerful part of Ishiguro's method of storytelling in *The Remains of the Day* is the immediacy of his first-person narrative. While the reader might question the reliability of the narrator, the subtlety of Ishiguro's storytelling raises the idea that the thought stream of Stevens' diary is as much about the character trying to create self-preserving narratives about his past, as it is about relaying details of his present. Central to the plot is the battle between Stevens' desire to be proud of his work and sacrifice versus his feelings of being imprisoned by irreversible, unredeemable regret.

In a similar light to his earlier novel, in *Never Let Me Go* Ishiago introduces a first-person narrator reflecting on their life. Unlike Stevens however, who is nearing old age at the start of *The Remains of the Day*, Ishiago's 2005 novel is narrated by a character named Kathy, who we are told is 31-years-old. The plot explores the idea of mortality, and specifically what happens to an individual when they realise their time on earth is limited.

Based in England, the plot follows Kathy and her childhood friends, Tommy and Ruth, through their school years at Hailsham School to the present day. We learn that while growing up, the school had a distinct interest in keeping pupils physically healthy, with not much care for their academic development. As the plot develops, we discover that the academy is no ordinary school, and is in fact a home for cloned children, who will be used as organ donors in their twenties and thirties.



The children are brainwashed in to believing they have a "special purpose" and kept separate from mainstream society. In *Never Let Me Go*, the author raises uncomfortable questions about what society as a whole is willing to ignore, especially when it's in its self-interest to do so, along with questions of mortality: what becomes important when a person realises that they will soon die?

The answer from Ishiago, as always, appears as seemingly complex as it is simple: making sure those we love know that we care, and putting right what or who we have wronged.

NOBEL MUSEUM 2019

Under the title **'Sharing Worlds'**, this year's **Nobel Museum** organised by the Mohammed bin Rashid Al Maktoum Knowledge Foundation celebrates the Nobel Prize in Literature. Focusing on the work of selected **Nobel laureates in literature**, and featuring an interactive exhibition suitable for all ages, the Museum runs from **3 February to 2 March, at La Mer**, in Dubai. The Museum is open Sunday to Thursday, 9am – 10pm, and Friday, 2pm – 10pm.

SHARING

This year's Nobel Museum focuses on the Nobel Prize for Literature – a field that is very much part of MBRF's remit – and sets out to encourage future Nobel laureates to take up the wonderful art of storytelling.

The annual Nobel Museum, organised by the Mohammed bin Rashid Al Maktoum Knowledge Foundation (MBRF) in collaboration with the Nobel Foundation, is a highly-anticipated event aimed at disseminating knowledge. The 2019 edition focuses on the Nobel Prize for Literature under the theme 'Sharing Worlds', and runs from 3 February to 2 March, at La Mer, in Dubai.

This will mark the fifth time the Nobel Museum has been held in Dubai under the patronage of His Highness Sheikh Ahmed bin Mohammed bin Rashid Al Maktoum, Chairman of MBRF. The Nobel Prize is the most prestigious of its kind, awarded by Swedish and Norwegian institutions to honour academics and thinkers and recognise their contributions to advancements in physics, chemistry, medicine, literature, economics and peace.

On 27 November 1895, Swedish inventor and industrialist Alfred Nobel signed his last will and testament, giving the largest share of his fortune to a series of prizes, the Nobel Prizes. As described in Nobel's will, one part was dedicated to "the person who shall have

WORLDS

produced in the field of literature the most outstanding work in an ideal direction". The Nobel Prize for Literature has been awarded 110 times to 114 Nobel laureates between 1901 and 2017, but there are seven occasions when it was not awarded due to there being no "outstanding work in an ideal direction", as stipulated in Nobel's will.

MBRF's CEO His Excellency Jamal bin Huwaireb said that the Nobel Museum continues to enhance the Foundation's role in the knowledge sector, shedding light on some of humanity's greatest creations in literature, which facilitates the production and dissemination of knowledge, as well as the establishment of knowledge societies and driving forward the sustainable development process in all of our communities.

"With the Nobel Museum, we are echoing the UAE's strategic objectives to promote innovation and creativity among all segments of society – particularly, the youth and students – empowering them to become productive members of their community," he added. "Organising the Nobel exhibition in the Emirate of Dubai every year reflects the Nobel Foundation's faith in the emirate and in MBRF's ability to host such a large-scale event, and set an agenda that attracts large audiences and lives up to the expectations of knowledge enthusiasts."

The Arab and Islamic world has a rich literary legacy, both in classic and modern literature. It is therefore fitting that one of the eight leureates selected for 'Sharing Worlds' is the Egyptian writer Naguib Mahfouz, who won the 1988 Nobel Prize for Literature. Regarded as one of the first contemporary writers of Arabic literature, Mahfouz published 34 novels, over 350 short stories, dozens of movie scripts and five plays over a 70-year career (see page 50).

The Nobel Academy letter to Mahfouz cited that his "rich and complex work invites us to reconsider the fundamental things in life". Shortly after winning the prize Mahfouz was quoted as saying: "The Nobel Prize has given me, for the first time in my life, the feeling that my literature could be appreciated on an international level. The Arab world also won the Nobel with me."

Dr Olov Amelin, Vice President, Exhibitions, Nobel Prize Museum in Sweden, said: "The Nobel Prize Museum has the ambition to reach out to a young

"If the urge to write should ever leave me, I want that day to be my last."

Naguib Mahfouz

"It's a good thing when you don't dare do something if you don't think it's right. But it's not good when you think something's not right because you don't dare do it."

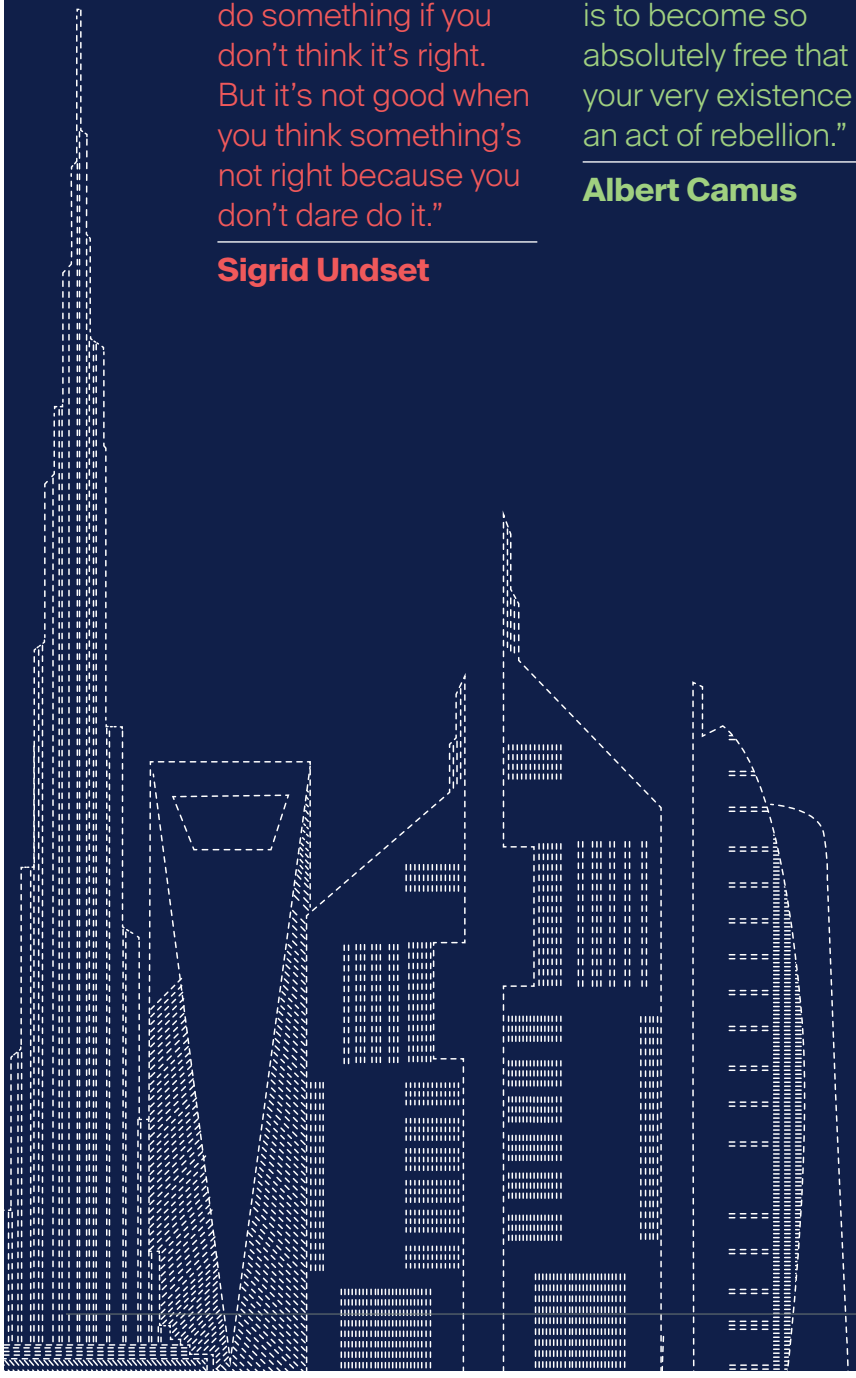
Sigrid Undset

"The only way to deal with an unfree world is to become so absolutely free that your very existence is an act of rebellion."

Albert Camus

"Life and nature are hard. They bring forth courage and joy as a counterweight against their own hardness, or no one could endure them..."

Selma Lagerlöf



audience world wide and inspire people to get engaged in the areas in which you can receive a Nobel Prize. These prizes are handed out in the spirit of Alfred Nobel who claimed that the laureates should have done a fantastic achievement "for the benefit of humankind". Laureates like Mahfouz and others are great role models, and inspire us all through their writing. It's an honour for the museum to be able to present our fifth exhibition in Dubai. We have created a playful entrance to the world of literature, books and everlasting stories."

The 'Sharing Worlds' exhibition focuses on selected Nobel laureates and their works as a gateway that allow us to see the fascinating riches of our world. The eight selected works are presented with films and interactive art pieces. Each of the novels represent a certain theme such as love, peace and family.

Visitors to 'Sharing Worlds' can also try their hand at writing. In the Nobel Museum there are four writing stations, Write Your Story, where budding authors can create their own book with images and text, and publish to the exhibition library. There's also the opportunity to

"The heart's memory eliminates the bad and magnifies the good."

Gabriel Garzia Marquez

"If there is a book that you want to read, but it hasn't been written yet, you must be the one to write it."

Toni Morrison

"Death is the fairest thing in the world. No one's ever gotten out of it. The earth takes everyone – the kind, the cruel, the sinners."

Svetlana Alexievich

"The writer probably knows what he meant when he wrote a book, but he should immediately forget what he meant when he's written it."

William Golding

send a poem by a Nobel laureate to a friend from one of the Poetry Postcard stations.

It is the interactive nature of the Nobel Museum that has made it so popular with visitors, allowing both young and not so young to learn in a stimulating and hands-on environment. The exhibition also includes several weekly workshops, featuring experts and specialists from the Nobel Foundation and international institutions.

THE THEMES

The literature featured in this year's 'Sharing Worlds' Nobel Museum exhibition falls across eight themes:

- HUMAN CONDITION
- PEACE
- LOVE
- CITY
- FAMILY
- TOLERANCE
- FAIRY TALES
- LIFE

MBRF is a strong supporter of the written word with Qindeel – its printing, publishing and distribution arm – focused on the promotion and dissemination of culture and knowledge to stimulate intellectual activity in the Arab region and across the world. It publishes hundreds of new titles every year, covering a wide range of topics and areas such as knowledge, development, business administration, as well as creativity and innovation. These books are published both in paper and electronically.

Other literary initiatives of MBRF include the Dubai Digital Library, an advanced electronic platform that supports a culture of reading by showcasing an extensive collection of Arabic books, including written or translated works covering all areas of life.

Meanwhile, the 2030 Literacy Challenge targets 30 million Arab youth and children. This initiative aims to compensate people for missed opportunities in formal education by helping them to acquire the necessary skills and knowledge to face challenges.

And the Dubai International Programme for Writing aims to empower and encourage young talents who have displayed a flair for writing in various fields of knowledge from science and research to literature, novels and poetry and help them reach the world.

Hopefully, 'Sharing Worlds' will inspire the UAE's potential Nobel laureates to jump-start their literary ambitions.

THE KEY NOBEL LAUREATES

Learn more about the incredible literary works of the following Nobel laureates

WILLIAM GOLDING

From: England
Lived: 1911 – 1993
Featured novel: *Lord of the Flies* (1954)
Theme: Human Condition
Awarded Nobel Prize in: 1983

SVETLANA ALEXIEVICH

From: Belarus
Lived: 1948 – present
Featured novel: *The Unwomanly Face of War* (1985)
Theme: Peace
Awarded Nobel Prize in: 2015

GABRIEL GARZIA MARQUEZ

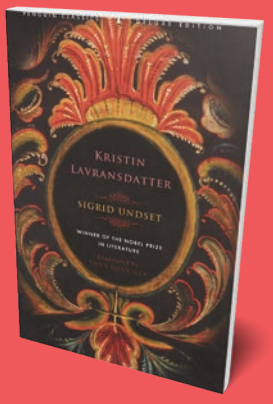
From: Colombia
Lived: 1927 – 2014
Featured novel: *One Hundred Years of Solitude* (1967)
Theme: Family
Awarded Nobel Prize in: 1982

TONI MORRISON

From: USA
Lived: 1931 – present
Featured novel: *The Bluest Eye* (1970)
Theme: Tolerance
Awarded Nobel Prize in: 1993

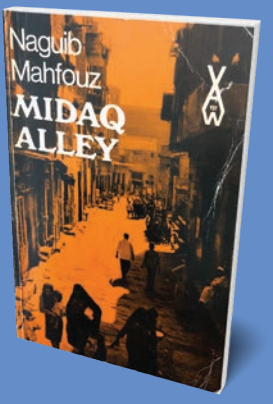
IN LITERATURE

during this year's month-long Nobel Museum exhibition in Dubai.



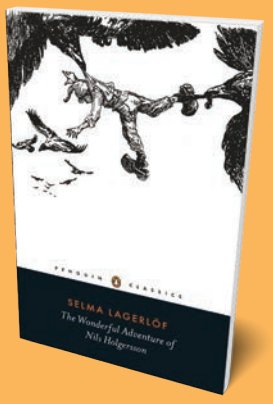
SIGRID UNDSET

From: Denmark
Lived: 1882 – 1949
Featured novel: *Kristin Lavransdatter* (1920)
Theme: Love
Awarded Nobel Prize in: 1928



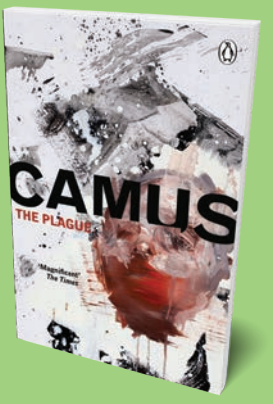
NAGUIB MAHFOUZ

From: Egypt
Lived: 1911 – 2006
Featured novel: *Midaq Alley* (1947)
Theme: City
Awarded Nobel Prize in: 1988



SELMA LAGERLÖF

From: Sweden
Lived: 1858 – 1940
Featured novel: *The Wonderful Adventures of Nils* (1906)
Theme: Fairy tales
Awarded Nobel Prize in: 1909



ALBERT CAMUS

From: Algeria
Lived: 1913 – 1960
Featured novel: *The Plague* (1947)
Theme: Life
Awarded Nobel Prize in: 1957

THE WORKSHOPS

Fascinated by literature? Then you'll enjoy the workshops set up as part of this year's Nobel Museum...

SUNDAY, 3 FEBRUARY AT 11.30AM

The History of the Nobel Prize in Literature

Join cultural historian Dr Gustav Källstrand as he takes us through the history of the Nobel Prize in Literature. Senior Curator of the Nobel Museum, Dr Källstrand has had several books and articles published on the subject, especially on the Nobel Prize in Literature's early history.

SUNDAY, 10 FEBRUARY AT 10.30AM

The Life and Works of Naguib Mahfouz

Guest lecturer Mohammed Selmawi looks back on the life and work of Naguib Mahfouz, the first Arab writer to win the Nobel Prize for Literature. Discover how Mahfouz's love for his native Cairo is woven into his novels.

SUNDAY, 17 FEBRUARY AT 10.30AM

Write Like a Nobel Laureate

Author, literary critic and librarian at the Nobel Library in Stockholm, Kristian Fredén's most recent book is called *Write Like a Nobel Laureate*. He hopes to help aspiring writers find their own literary style via examples of various Nobel laureates in literature. He's previously held a number of lectures on the subject, both in Sweden and further afield.

SUNDAY, 24 FEBRUARY AT 10.30AM

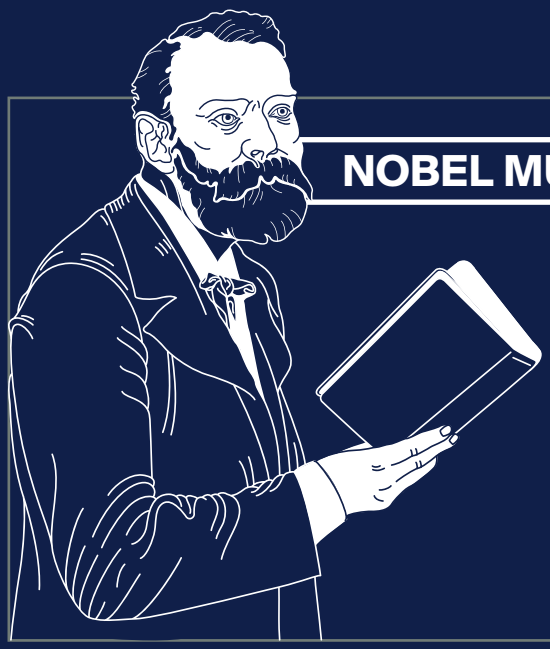
Nobel Books Expressing Humanity

Literature expert at the Nobel Prize Museum, Ebba Holmberg delivers an engaging workshop exploring the different ways books from the exhibition express humanity. Drawing on her passion for literature, Holmberg, who regularly holds literature programmes, lectures and workshops, has written the text for the exhibition.

THE ART OF STORYTELLING

Central to the Nobel Museum exhibition is the way the Nobel laureates' stories are brought to life. Artists from around the world were invited to interpret the titles of the laureates' books, and as a result the exhibition features art works from Zim & Zoe, of France, Saudi Arabian contemporary artist Manal Aldowayan, Kabuki Harada from Japan, and Nix and Gerber, of New York.

Right: Saudi Arabian contemporary artist Manal Aldowayan



NOBEL MUSEUM 2019

Under the title **'Sharing Worlds'**, this year's **Nobel Museum** organised by the Mohammed bin Rashid Al Maktoum Knowledge Foundation celebrates the Nobel Prize in Literature. Focusing on the work of selected **Nobel laureates in literature**, and featuring an interactive exhibition suitable for all ages, the Museum runs from **3 February to 2 March, at La Mer**, in Dubai. The Museum is open Sunday to Thursday, 9am – 10pm, and Friday, 2pm – 10pm.

A NOBEL UNDERTAKING

The annual Nobel Museum has been a resounding success and there is more to come under an exclusive 10-year partnership agreement.

This year marks the fifth time in as many years that the Mohammed bin Rashid Al Maktoum Knowledge Foundation (MBRF) is bringing the Nobel Museum to Dubai in collaboration with the Nobel Foundation. MBRF was the first Arab entity to sign an exclusive 10-year partnership agreement with the Nobel Global Foundation, with the aim of organising the exhibition in several locations at local and regional levels.

The annual event is held under the patronage of His Highness Sheikh Ahmed bin Mohammed bin Rashid Al Maktoum, Chairman of MBRF, and showcases information about the Nobel Prize and Nobel prize winners, as well as information about the founder of the prize, Alfred Nobel.

The Nobel Prize is a set of annual international awards bestowed in several categories by Swedish and Norwegian institutions in recognition of academic, cultural or scientific advances.

The will of the Swedish scientist Alfred Nobel established the five Nobel prizes in 1895. The prizes in Chemistry, Literature, Peace, Physics and Physiology or Medicine were first awarded in 1901. The prizes are widely regarded as the most prestigious awards available in these fields.

The 2019 edition of the Nobel Museum focuses on the Nobel Prize in Literature under the slogan 'Sharing Worlds'. It features interactive displays centred on eight laureates, including Egyptian writer Naguib Mahfouz who won in 1988 (see feature on page 50). There will also be numerous workshops held by individual experts and institutions in the field of literature.

The Nobel Museum first came to Dubai in 2015. Titled 'The Nobel Prize: Ideas Changing the World' it ran for a month at the Burj Khalifa. His Excellency Jamal bin Huwaireb, then Managing Director of MBRF, said the exhibition was organised as part of the Foundation's efforts to empower future generations with sustainable solutions that address the challenges in the knowledge and research domains in the Arab world.

"The Nobel Museum exhibition will provide a unique platform in the Arab world to put the spotlight on innovation and discoveries," HE bin Huwaireb said at the time. "It will draw attention to human

Below: Nobel Museum at Children's City, Dubai Creek Park, in 2018

achievements that have transformed the world and contributed to improving the lives of people. We believe that the Nobel Museum exhibits will motivate our young people to innovate and look around them as creative explorers and divert their energies to find better solutions and ideas."

Among the key attraction were two workshops: one on microfinance addressed by Nobel laureate Muhammed Yunus, and the second on the 'Impact of The Nobel Prizes' by Dr Gustav Källstrand, Senior Curator at the Nobel Museum.

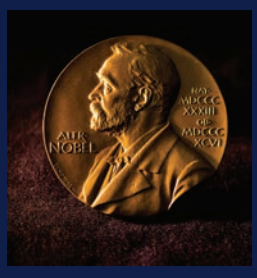
In 2016, the Nobel Museum was held in Dubai under the theme 'Exploring Life: Nobel Prize in Physiology. The exhibition intended to awaken curiosity about the exploration of our bodies and show how the discoveries of Nobel laureates in physiology or medicine have brought about changes in us and our lives.

The exhibition included several sections focused on the major aspects of medicine, such as diseases and their cures, anatomy, the cell, DNA and making the invisible visible. The 'Islamic Medicine' display featured a timeline of events relevant to Islamic medicine and celebrated the achievements of 15 scientists who created major breakthroughs.

The 2017 Nobel Museum was titled 'The Nobel Prize in Physics: Understanding Matter' and was designed to introduce the public to the work and discoveries of Nobel laureates in physics, such as through X-Ray imagery. The eight different sections focused

Below: Youngsters enjoying an interactive challenge during last year's Nobel Museum, which shone the spotlight on laureates in chemistry

FACT FILE



Number of Nobel Prizes in **Literature**

110

Nobel Prizes in Literature have been awarded since 1901

Shared Nobel Prizes in Literature

1904
Frédéric Mistral, José Echegaray

1917
Karl Gjellerup, Henrik Pontoppidan

1966
Shmuel Agnon, Nelly Sachs

1974
Eyvind Johnson, Harry Martinson

Number of Nobel Laureates in Literature

114
individuals have been awarded the Nobel Prize in Literature 1901-2017

Average **age**

The average age of all Literature laureates between 1901 and 2017 is **65 years**

on Rays and Waves, Matter, Stars and Universe, Quantum Physics, Electronics, Cloud Chamber, Laureate Arena, and the VR experience, which enabled visitors to go on a journey through the cosmos using virtual reality gear.

And last year, the Nobel Museum highlighted an important category of the Nobel Prize – chemistry. The 'Nobel Prize in Chemistry – Connecting Elements' focused on the achievements of Arab and Muslim chemists, such as Jabir Ibn Hayyan and Abu Baker Al Razi, who played a key role in establishing the foundations of this science. The five sections within the exhibition showcased the achievements of Nobel laureates in five different areas of chemistry.

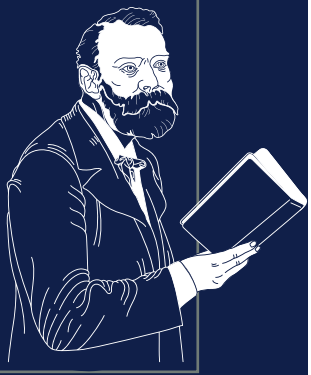
The event also honoured the Egyptian chemist and Nobel laureate Ahmad Zeweil, who was known for being the Father of Femtochemistry (the study of chemical reactions).

"We have highlighted the achievements made by Nobel Prize laureates in chemistry, particularly Egyptian chemist Ahmad Zuwail, underlining the role that these discoveries – as well as other achievements by Nobel Prize winners – play in improving people's lives," HE bin Huwaireb, MBRF's CEO, noted at the time.

Next year the world's eyes will be firmly fixed on Dubai as Expo 2020 takes place. As we look forward to this year's exciting Nobel Museum, we should also prepare ourselves for a special sixth edition next year that will set new standards on all fronts.

NOBEL MUSEUM 2019

Under the title **'Sharing Worlds'**, this year's **Nobel Museum** organised by the Mohammed bin Rashid Al Maktoum Knowledge Foundation celebrates the Nobel Prize in Literature. Focusing on the work of selected **Nobel laureates in literature**, and featuring an interactive exhibition suitable for all ages, the Museum runs from **3 February to 2 March, at La Mer**, in Dubai. The Museum is open Sunday to Thursday, 9am – 10pm, and Friday, 2pm – 10pm.



Youngest Literature Laureate

The youngest Literature laureate is **Rudyard Kipling**, best known for *The Jungle Book*, who was **41 years** old when he was awarded the Literature Prize in **1907**

Oldest Literature Laureate

The oldest Nobel laureate in Literature to date is **Doris Lessing**, who was **88 years** old when she was awarded the Prize in **2007**

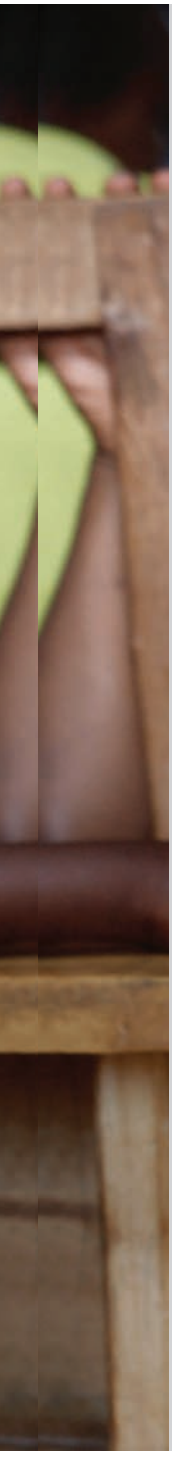
Female Nobel Laureates in Literature

14 women have been awarded the Nobel Prize in Literature

The Nobel Medal for Literature

The Nobel medal for Literature was designed by Swedish sculptor and engraver **Erik Lindberg**

Source: www.nobelprize.org



A VITAL COMPONENT OF LIFE

The World Literacy Foundation is seeking youth ambassadors for its 2019 programme. Flashes speaks to young people who have previously stepped into the role.

"I believe that education and knowledge are a fundamental right for every child in the world," said Doha Khassawneh, a former Jordanian youth ambassador for the World Literacy Foundation. "[Both are] a means to achieve other rights to protection, survival, development and participation."

Khassawneh was among more than 300 young, like-minded individuals from 35 countries who participated in the World Literacy Foundation's (WLF) Youth Ambassador Programme last year, acting as both a voice for literacy and a fundraiser for education.

Such ambassadors are an important component in the global not-for-profit organisation's work, with each ambassador contributing to lasting change around the world as the WLF seeks to lift young people out of poverty through the power of literacy.

According to the WLF, illiteracy not only costs the global economy an estimated $1.19 trillion a year, it leads to unemployment, low income, low self-esteem and reduces access to lifelong learning and professional development. It also impacts social cohesion, civic participation, welfare, crime and gender equality.

Close to 20% of the world's population are unable to read or write. Of those, 102 million are aged between 15 and 24. According to the WLF, 250 million children at primary schools in developing countries are also struggling with reading simple words.

THE **FACTS**

750M ILLITERATE PEOPLE CAN'T READ **A SINGLE WORD**, MORE THAN **2 BILLION** PEOPLE **STRUGGLE** TO READ AND WRITE A SENTENCE.

ILLITERACY COSTS THE GLOBAL ECONOMY **$1.5 TRILLION ANNUALLY**

85% OF **ALL TEENAGERS** WHO ARE INVOLVED IN **CRIMINAL** ACTIVITIES ARE **FUNCTIONALLY ILLITERATE**

21% OF **CHILDREN AROUND THE WORLD** HAVE LESS THAN **5 BOOKS** AT HOME

ABOUT **263M CHILDREN** AND **YOUTH** ARE OUT OF **SCHOOL**

Source: worldliteracyfoundation.org

Above: Doha Khasawneh interacting with children in Bunat Alghad School, in Jordan

These problems are particularly acute in Africa, where more than half of children of primary age are out of school. Only 35% of schools in sub-Saharan Africa have access to electricity, while the majority of countries in that region do not have sufficient access to books for the size of the classes they are being taught in. The average number of primary education-level children in sub-Saharan Africa per reading textbook is two or more. In Uganda it is 2.6.

"Education to me is a fundamental human right, and for me to even imagine not having the opportunities I do today is horrifying," said Avanthika Panchapakesan, a youth ambassador who raised $2,340 through a performance of classical Indian dance last year. "I wish to transform the lives of thousands of children, to give them equal educational opportunities and the chance to improve their livelihoods for themselves. And for me this starts by fundraising and advocating for a cause I believe in."

In the Arab world the average rate of illiteracy stands at 17%, with illiteracy particularly acute in those countries where conflict has combined with poverty. In Iraq, illiteracy is on the rise. According to UNESCO, an estimated five million people in the country are illiterate, including 14% of school age children who have no access to suitable schooling or are obliged to contribute to household income. Almost 30% of the rural population is unable to read or write and 22% of the adult population has never attended school. Women are particularly badly affected, with illiteracy rates reaching higher than 47% among women in some areas.

The World Literacy Foundation's youth ambassadors believe the answer to these problems lie in access to universal education. Anika Christopher, an ambassador from the British Virgin Islands, even quoted Nelson Mandela, who said: "Education is the most powerful weapon which you can use to change the world."

"Education to me is a fundamental human right, and for me to even imagine not having the opportunities I do today is horrifying"

AVANTHIKA PANCHAPAKESAN

"I firmly believe that the value of literacy goes beyond the pages of a book and the value of education cannot be confined by the walls of any classroom," said Christopher. "Literacy and education are, in fact, an indispensable asset for change. However, millions of people worldwide today are illiterate and are therefore unable to acquire an education.

"I became a youth ambassador because I wanted to play my part in improving this situation, giving persons the chance to turn the page, write their lives and change the world.

"When a person is educated, it allows them to unleash their creativity and [their] innovative potential, as it gives them a space in which they can discover and develop all their talents and abilities," she added. "However, before that is possible one must first be literate. This is because literacy is central for the acquisition of knowledge. It is at the heart of all educational pursuits."

The World Literacy Foundation was founded by Andrew Kay in 2003 with the goal of bringing books, tutoring and literacy resources to children without any educational support. It began with the transportation of children's books to Africa and was followed by the creation of low-cost digital e-books in local languages. It now works in partnership with 3,920 groups from 25 different countries, all of whom have one common goal: to eradicate illiteracy in our lifetime.

The organisation's youth ambassador programme was launched in 2016, with the WLF now seeking youth ambassadors for 2019. All ambassadors should be aged between 14 and 24, must be passionate about literacy and education, and will receive a certificate of completion upon closure of the programme. This year's programme will run from 1 July to 15 December, with registration open until 30 June.

As well as advocating for literacy and education in their schools, universities, communities and social groups, all ambassadors will learn about the development and impact of the WLF's Sun Books project in Gulu, Uganda. The project provides low-cost tablet devices that are powered by solar panels to off-the-grid classrooms. All tablets are pre-loaded with a digital library for young learners in both their local language and in English.

Although illiteracy figures may appear frightening, progress is being made. Fifty years ago almost a quarter of youth globally lacked basic literacy skills compared to less than 10% in 2016. The literacy rate in sub-Saharan Africa has also improved in the last 50 years, but is still only at 75%.

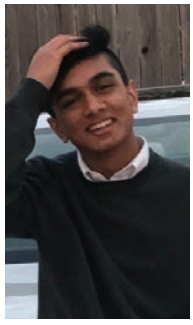
"I want to create a vision for universal literacy," said Simran Cheema, a 2018 youth ambassador. "All humans deserve to be able to read and write in order to fulfil their potential. I believe that literacy is a vital component of life."

MEET THE 2018 **GAME CHANGERS**

The youth ambassadors selected last year have helped to bring lasting change around the world


Doha Khassawneh


Isioma Eneli


Jagrit Sardeshpande


Jibran Gill


Anika Christopher


Aditi Chapanerkar


Levie Mdoka

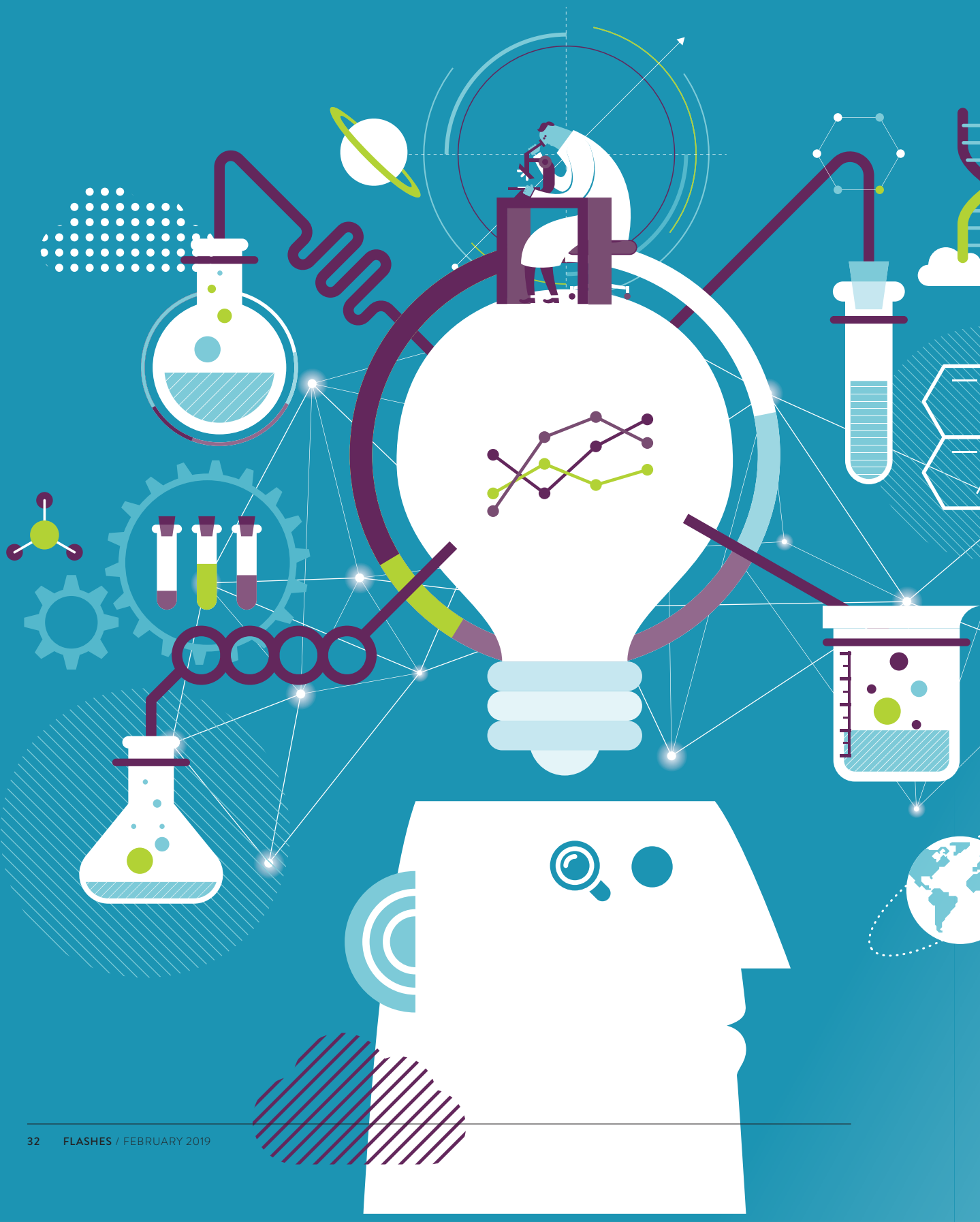

Ryan Brady


Samuel Oppong


Shivam Patel


Simran Cheema

Source: worldliteracyfoundation.org



REWRITING THE RULES OF CHEMISTRY

Machine learning and artificial intelligence are revolutionising the processes of organic chemistry.

For more than 200 years, the synthesis of organic molecules has remained one of the most important tasks in organic chemistry. The work of chemists has scientific and commercial implications that range from the production of aspirin to that of nylon. Unfortunately, it is a complex and time-consuming process to find success.

Synthetic organic chemistry is the science of building desired chemical structures from simpler parts. In order to achieve that aim, organic chemists often work by thinking backwards as much as they do forwards when designing a synthetic route. The concept of retrosynthesis, introduced by E. J. Corey in the 1960s and for which he was awarded the Nobel Prize in Chemistry in 1990, codified the way in which many chemists think.

Generally, the chemists look at a target molecule and try to identify its composition, and question which bonds could have been formed, and which atoms or chemical groups could have been added or transformed? Then, the process starts again, as researchers try to determine the reactions that could have led to the precursor molecule. The aim is to work back to easily available starting compounds, while balancing the factors that make a good synthesis, including the number of steps involved, the probable product yields of those steps, and how easy it is to use the chemistry involved. Organic chemists deal constantly with such questions, especially when making compounds for testing in drug-discovery programmes.

The challenge for organic chemists in fields such as chemistry, materials science, oil and gas, and life sciences is that there are hundreds of thousands of reactions and, while it is manageable to remember a few dozen in a narrow specialist's field, it's impossible to be an expert generalist. Designing materials for a specific demand is a complex task; a random mix-and-match of atomic building blocks could yield any one of an infinite number of possible compounds. Historically, the discovery of materials has involved a combination of chance, intuition and trial and error – but this could all be set to change thanks to artificial intelligence.

Since Corey's work in the 1960s, chemists have believed that a large and well-curated database of chemical transformations could be used as the basis for a programme that not only finds reactions, but also arranges them into plausible synthetic plans.

This dream has been frustrated by two fundamental problems. Firstly, computing hardware simply could not tackle the scale of the challenge. Secondly, the chemical literature is hard to define in terms that a software programme using 1s and 0s can understand:

›

Above: Bartosz Grzybowski, a chemist at the Ulsan National Institute of Science and Technology, in South Korea, and his team spent 15 years inputting more than 50,000 rules of organic chemistry into the system for the programme to draw on

given reactions will work for the type of compound for which they were claimed to work (most of the time), but only under certain conditions. In other words, discerning between terms such as 'may', 'might' or 'will' in scientific papers is as critically important as the temperature or other parameters of the reaction.

This is where machine learning and artificial intelligence enters the picture as it offers the possibility of training computers by using the properties of materials that we already know. Plus, artificial intelligence approaches consider all available data equally and find trends that a human researcher may miss due to bias towards a given interpretation.

A new AI tool developed by Marwin Segler, an organic chemist and artificial-intelligence researcher at the University of Münster, in Germany, and his colleagues, uses deep-learning neural networks to assimilate essentially all known single-step organic-chemistry reactions – about 12.4 million of them. This enables it to predict the chemical reactions that can be used in any single step. The tool repeatedly applies these neural networks in planning a multi-step synthesis, deconstructing the desired molecule until it ends up with the available starting reagents.

Segler and his team tested the pathways that the programme threw up in a double-blind trial, to see whether experienced chemists could tell the AI's synthesis pathways from those devised by humans. They showed 45 organic chemists from two institutes in China and Germany potential synthesis routes for nine molecules: one pathway suggested by the system and another devised by humans. The chemists had no preference for which was best.

Doing retrosynthesis, Grzybowski explains, is like playing chess: there are a number of basic moves. Yet during a game, each move opens up a new branch to a different outcome

Researchers have been trying to use computing power to plan organic chemical synthesis since the 1960s, with only limited success. But Segler's tool is one of several programmes developed in recent years that use AI to flag up potential reaction routes.

Chematica, the most well-known, was acquired by German pharmaceutical company Merck in May 2017. Bartosz Grzybowski, a chemist at the Ulsan National Institute of Science and Technology, in South Korea, and his team spent 15 years inputting more than 50,000 rules of organic chemistry into the system for the programme to draw on.

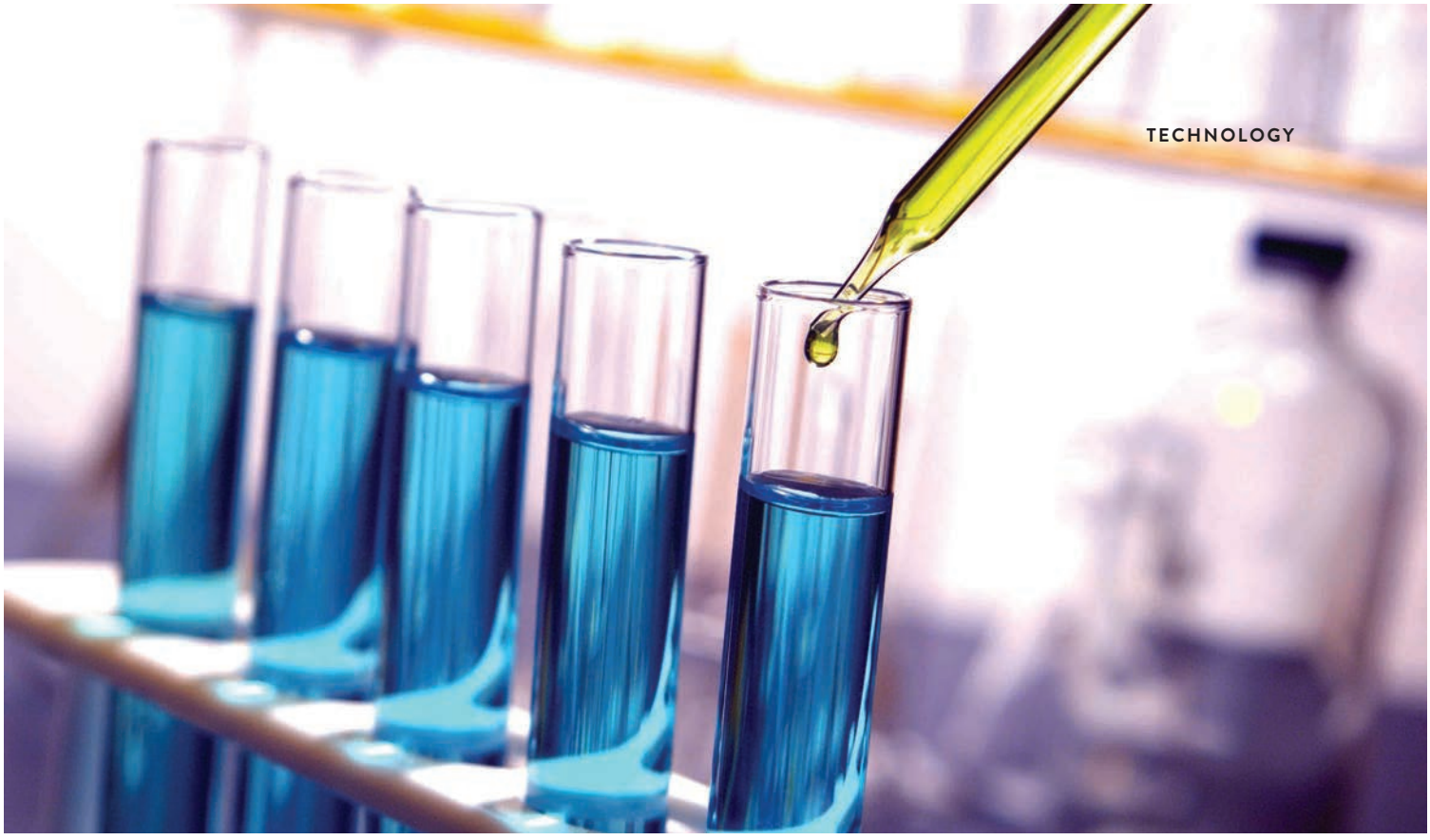
In December, Grzybowski reported that he had tested eight of his algorithm's suggested pathways in the laboratory, and that they all worked. "I'm very glad there is this revival of retrosynthesis, and welcome different approaches," he says.

Doing retrosynthesis, Grzybowski explains, is like playing chess: there are a number of basic moves. Yet during a game, each move opens up a new branch to a different outcome. After both players move, 400 possible chess board set-ups exist. After the second pair of turns, there are 197,742 possible games, and after three moves, 121 million.

However, in organic synthesis "the number of basic moves – basic reaction types – is just ginormous, in the tens of thousands", he says. After each synthetic step around 100 possible next steps become available, meaning the longer a route is the more enormous the number of possibilities becomes.

As Chematica doesn't give precise conditions for each reaction, there is still some trial and error when it comes to optimisation. However, to reflect the time and financial constraints of industry, the team limited itself to five attempts on each reaction and a maximum of 70 hours to complete each route.

The implications of using of machine learning and artificial intelligence in synthetic organic



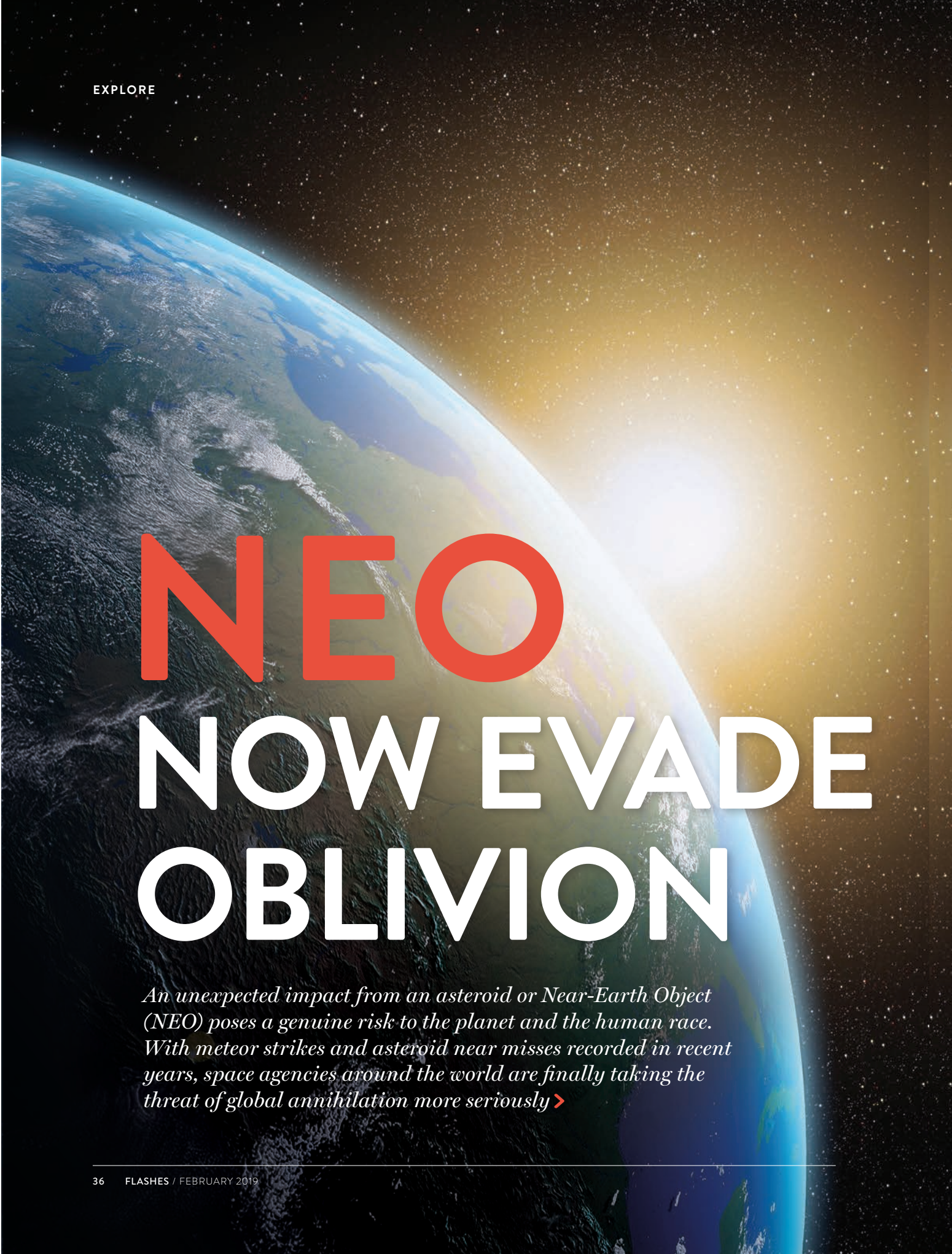
chemistry are staggering. Currently, pharmaceutical companies spend around $2.6 billion on developing a treatment, and nine out of ten candidate therapies fail somewhere between phase one trials and regulatory approval.

Yet change is happening fast. Pfizer is using IBM Watson, a system that uses machine learning, to power its search for immuno-oncology drugs. Sanofi has signed a deal to use UK start-up Exscientia's artificial intelligence platform to hunt for metabolic disease therapies, and Roche subsidiary Genentech is using an AI system from GNS Healthcare in Cambridge, Massachusetts, to help drive the multinational company's search for cancer treatments.

This does not necessarily mean that all machine-suggested routes will work in the laboratory – but, as organic chemists know to their sorrow, many routes designed by humans fail there, too.

Above: In organic synthesis the number of basic moves – basic reaction types – is in the tens of thousands

Left: The concept of retrosynthesis was introduced by E. J. Corey in the 1960s. He was awarded the Nobel Prize in Chemistry in 1990



NEO NOW EVADE OBLIVION

An unexpected impact from an asteroid or Near-Earth Object (NEO) poses a genuine risk to the planet and the human race. With meteor strikes and asteroid near misses recorded in recent years, space agencies around the world are finally taking the threat of global annihilation more seriously ›

If the human race doesn't cause its own extinction through insufficient action on climate change, or via disastrous warfare decisions made by impetuous world leaders, or from creating self-replicating nanobots hell bent on destroying their masters, there's still a remote yet plausible chance that an asteroid collision will be the end of us. Think uncontrollable firestorms, giant tsunamis and, because the sun would be obscured by debris and rock dust, a prolonged and devastating impact winter.

In Stephen Hawking's final book *Brief Answers to the Big Questions*, he wrote that an asteroid collision was likely the biggest threat to the planet and our survival on it. But when it comes to notions of Armageddon, asteroids have been somewhat overlooked. The likelihood of a cataclysmic impact seems so slim that no substantial pre-emptive or emergency response programme exists yet.

In a 1996 report for the US Air Force entitled *Planetary Defence: Catastrophic Health Insurance for Planet Earth*, the authors stated: "Most of the world's population does not know or care about the prospect of cosmic collisions, although this hazard from space is a subject of deadly concern to humanity."

It seems there is plenty to worry about on Earth already, without adding potential obliteration thanks to an asteroid heading directly for it, so most people pay this possibility no heed. The authors of the report go on to say: "When we learned that our team had been assigned the topic of 'Planetary Defence' we admittedly did what most people do when they first consider the subject: we laughed. However, once we immersed ourselves in the data and began to work directly with several of the growing number of astronomers and scientists actively working this problem, our laughs were quickly replaced with concern.

"Our concern was based not only on the prospects of the Earth being confronted with the crisis of an impending impact of a large asteroid or comet but the fact that such impacts occur far more frequently than most people realise, and that the global community, although becoming increasingly serious about this threat, currently lacks the capability to adequately detect or mitigate these extra-terrestrial objects. More importantly, however, is the fact that the impact of a relatively small asteroid would, in all likelihood, cause catastrophic damage and loss of life – even the possible extinction of the human race!"

The evidence of major asteroid impacts is visible around the world. The Vredefort Crater in Free State, South Africa, which in 2005 was awarded UNESCO World Heritage Site status, is the world's largest known asteroid impact structure, with a radius of 190 kilometres. Scientists estimate the impact date to be

In a 1996 report for the US Air Force entitled Planetary Defence: Catastrophic Health Insurance for Planet Earth, the authors stated: "Most of the world's population does not know or care about the prospect of cosmic collisions, although this hazard from space is a subject of deadly concern to humanity"

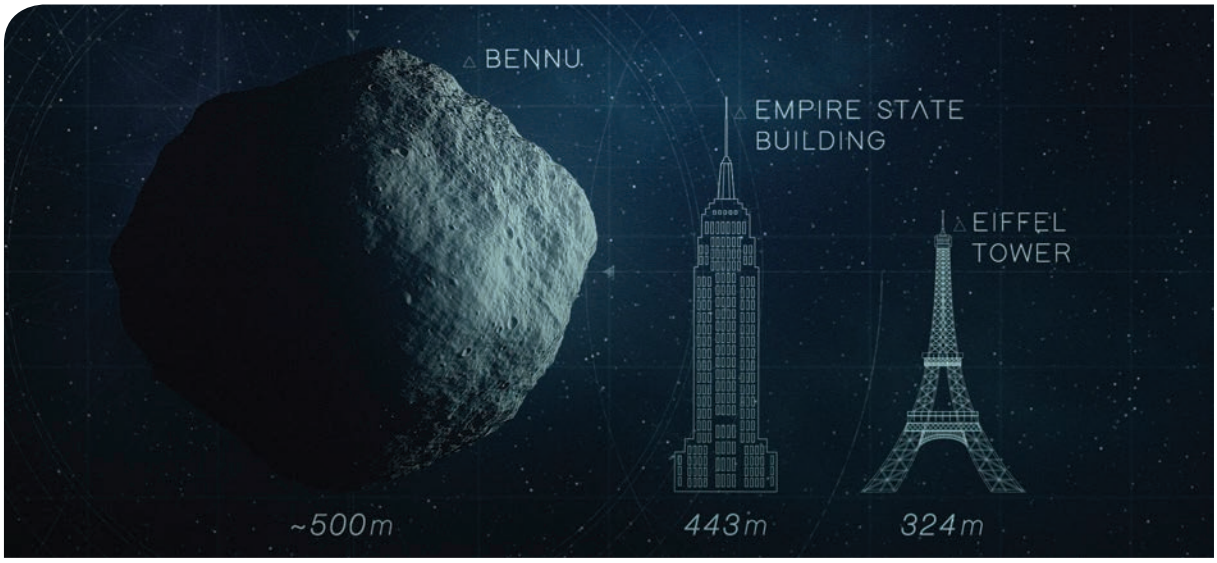
two billion years ago. In Ontario, Canada, there is the Sudbury Basin, created around 1.8 billion years ago, which has a diameter of 130 kilometres.

In more recent terms, it was 66 million years since a 10-kilometre-wide asteroid collided with Earth and caused the Cretaceous–Paleogene event, otherwise known as the main cause for the extinction of the dinosaurs.

Despite the inconceivable amount of time passed, it doesn't mean a similar event won't happen again. It could also mean that another strike is overdue. According to the B612 Foundation, a private nonprofit foundation based in California and dedicated to planetary defence against asteroids: "It's 100 per cent certain we'll be hit [by a devastating asteroid], but we're not 100 per cent sure when."

Certainly collisions of Near-Earth Objects (NEOs) and meteors, which are not solid lumps of leftover materials from the solar system's formation like asteroids, but smaller collections of rocks and space particles, have occurred in more recent times. In 2013, the Chelyabinsk meteor burst brightly over the skies of central Russia, and subsequently on screens worldwide, as it entered the Earth's atmosphere and crashed into the city. Amazingly there were no fatalities, but approximately 1,500 people were injured, mainly from broken glass as the explosion's shock wave damaged 7,200 buildings in six cities across the region.

Below: The Vredefort Crater in Free State, South Africa is the world's largest known asteroid impact structure



Above: As well as alarm bells set ringing from TC4, NASA has also been monitoring an asteroid called Bennu, which can be seen every six years from Earth, and which is expected to pass between our planet and the Moon in 2135

Weighing around 13,000 metric tonnes (more than the Eiffel Tower), and measuring about 20 metres in diameter, it is the largest known natural object to have entered the atmosphere since 1908, when a meteor fireball exploded over a remote forested area in Siberia near the Stony Tunguska River. Known as the Tunguska Event, it is estimated that this explosion would have wiped out an entire metropolitan area, but as it landed in an unpopulated area of forest, no deaths were recorded. The explosion was estimated at 15-megaton, which represents energy of about 1,000 times greater than that of the atomic bomb dropped on Hiroshima, Japan. It destroyed around 80 million trees over an area of 2,150 km2 and it triggered serious talks about asteroid impact avoidance.

The discussions have evolved over the last 111 years, especially since the National Aeronautics and Space Administration (NASA) has listed 73 asteroids that have a one in 1,600 chance of hitting the Earth, yet no actionable and reliable Planetary Defence System (PDS) exists yet.

In the same year as the Chelyabinsk meteor, experts testified to the United States Congress that NASA would require at least five years of preparation before a mission to intercept an asteroid could be launched. On October 12, 2017, an asteroid named 2012 TC4, measuring 15 – 30 metres in diameter and travelling through space at around 25,000 kph, came within 43,000 kilometres of Antarctica. While that may sound far enough away to not cause concern, in planetary terms it is more like a close shave.

As well as alarm bells set ringing from TC4, NASA has also been monitoring an asteroid called Bennu, which can be seen every six years from Earth, and which is expected to pass between our planet and the Moon in 2135.

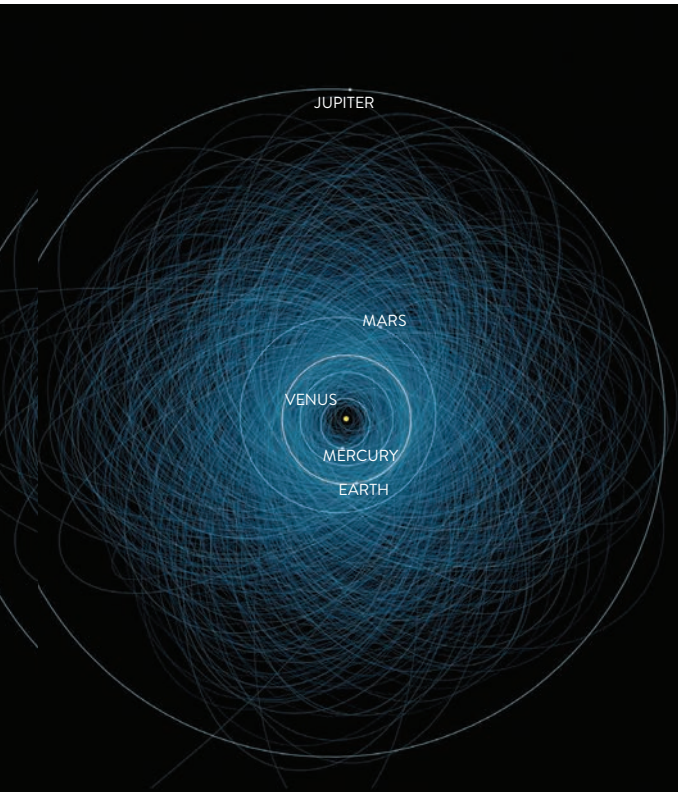
In a substantive step towards more adequate preparation for asteroid and NEO events, the space agency is developing project HAMMER in a joint venture with the US National Security Administration and a weapons lab from the US Energy Department.

HAMMER stands for Hypervelocity Asteroid Mitigation Mission for Emergency Response, and is effectively a nearly nine-tonne spaceship that would fly directly into a threatening asteroid to deflect its course away from Earth. A secondary and more conclusive option is to load the ship with a nuclear bomb to detonate the asteroid in space – an option that is also being explored by Russian scientists.

In a paper published in the Journal of Experimental and Theoretical Physics, the Russian team of

"If the asteroid is small enough, and we detect it early enough, we can do it with the impactor. The impactor is not as flexible as the nuclear option though, when we really want to change the speed of the body in a hurry"

DAVID DEARBORN, ASTROPHYSICIST

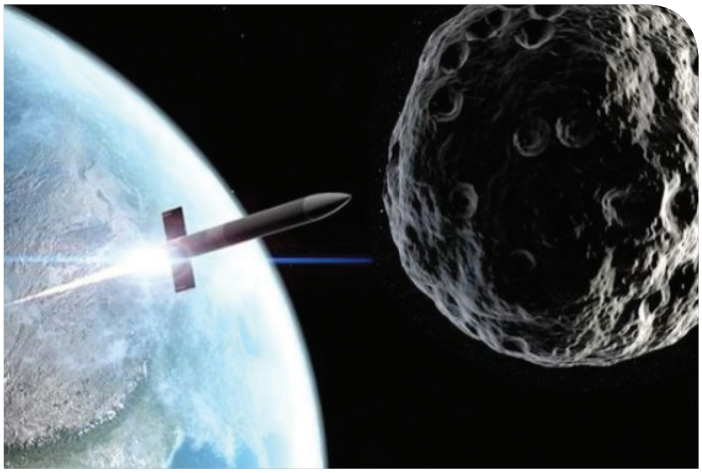


scientists described how they replicated the destruction of an asteroid on a tiny scale by firing a laser beam at a model asteroid measuring just 4mm long and requiring 200 joules of energy to destroy it. Comprised of researchers from the Moscow Institute of Physics and Technology, the Russian Federal Nuclear Centre and the nuclear energy company Rosatom, the team estimated that a 3-megaton nuclear weapon would be required to destroy a 200-metre wide asteroid.

Whilst the nuclear method sounds much more drastic than the "kinetic impactor" method, where the asteroid is struck by a spaceship years in advance of the predicted strike to alter its trajectory and clear Earth, it has wide support from all the space agencies involved in this field.

Astrophysicist David Dearborn, a global authority on the subject of Earth-threatening asteroids and a researcher in the USA at Lawrence Livermore National Laboratory (LLNL) since 1983, said: "If the asteroid is small enough, and we detect it early enough, we can do it with the impactor. The impactor is not as flexible as the nuclear option though, when we really want to change the speed of the body in a hurry."

Dearborn's work involves the design and testing of both nuclear and conventional explosives and he leads a team that is modelling the impact of a nuclear explosion on an object's trajectory in space. "Should an emergency arise, we should know that it's available, and we should have some idea of how to properly use it," he added. He stands by nuclear deflection as the optimal solution, saying: "It is the only method that works for large bodies (1,000 metres), or if the discovery time is late enough that a small speed change is not enough."



Well over a century since the Tunguska Event, it is now globally accepted that a Planetary Defence System or PDS is of paramount importance to prevent catastrophic destruction and loss of life and even save the human race from extinction.

The *Planetary Defence: Catastrophic Health Insurance for Planet Earth* report concluded: "The issue is not if, but when an asteroid or comet will suddenly be detected as a threat, causing global chaos and panic and ultimately placing all of humanity at risk. The obvious question, then, is: Do today's leaders possess the same conviction towards preserving the human race, and, are they willing to invest in the PDS as a 'catastrophic health insurance policy' for planet Earth?

We are not there yet. In June 2018, the US National Science and Technology Council warned that America is still unprepared for an asteroid impact event, and developed and released the National Near-Earth Object Preparedness Strategy Action Plan to better prepare.

The plan is a comprehensive road map for a collaborative approach to developing effective technologies, policies, practices and procedures for decreasing American and global vulnerability to NEO impacts. The plan concludes that, when implemented it "will improve detection, research, mission planning, emergency preparedness and response, and domestic and international engagement. Implementing the NEO Action Plan will increase the United States' ability and readiness, together with domestic and international partners, to mitigate the impact hazard posed by NEOs".

Above: HAMMER stands for Hypervelocity Asteroid Mitigation Mission for Emergency Response, and is effectively a nearly nine-tonne spaceship that would fly directly into a threatening asteroid to deflect its course away from Earth

Above left: "Potentially Hazardous Asteroids" circuits inside the orbit of Jupiter

THE PROBLEM WITH PALM OIL

It's fast becoming the food world's most controversial ingredient, but just how damaging is our over-reliance on palm oil – and what can be done to wean us off it? Flashes investigates...

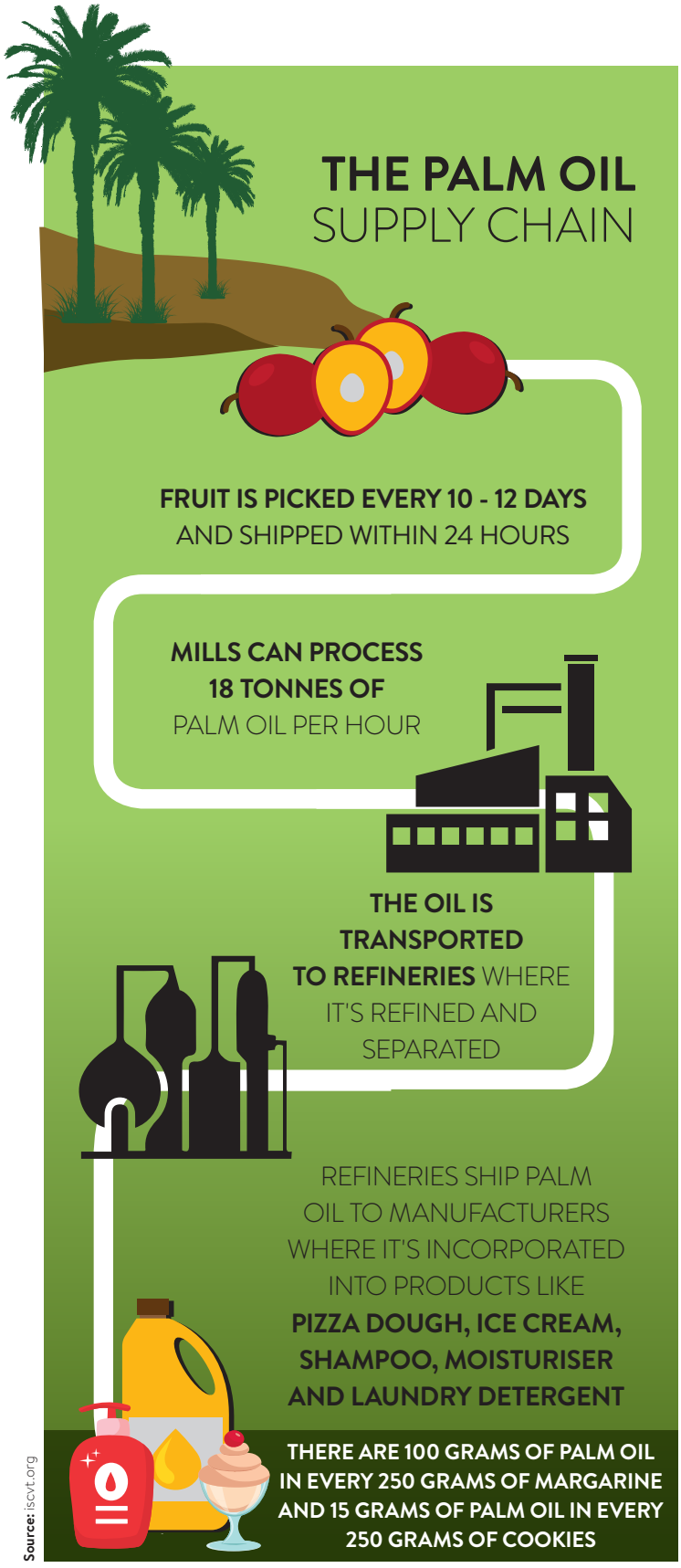
If you own a Facebook account, there's little chance you'll have made it into 2019 without seeing *Rang-Tan*, the controversial Christmas advert from UK-based supermarket Iceland, which made use of a cartoon produced by environmental charity Greenpeace. Indeed, after being banned due to Britain's regulations on political advertising back in November, the promo went viral, racking up more than 30 million views globally on social media within just a week of its release. The subject of this headline-grabbing short film? Palm oil, and its environmental impact.

An edible vegetable oil that comes from the fruit of oil palm trees, palm oil is one of the modern food industry's most prolifically used ingredients and, in recent years, has gained a reputation as one of the world's most environmentally damaging crops.

While traditionally oil palm trees were native to Africa, around 100 years ago the trees were taken to South-East Asia, where they were originally viewed as a purely ornamental crop. However, as demand for their oil began to increase, more and more oil palms were planted across the region until now, of the 44 countries producing palm oil globally, it is Indonesia and Malaysia that make up over 85% of the world's supply. And it is here that the impact of our growing reliance on palm oil is being most keenly felt.

THE PROLIFERATION OF PALM OIL

Palm oil is used in nearly everything consumed in modern society on a daily basis, amounting to demand for a staggering 66 million tonnes globally each year. Charities including the World Wildlife Fund (WWF) and Greenpeace say the ingredient can be found in close to 50% of the packaged products stocked in supermarkets across the globe, from pizza and chocolate to deodorant and lipstick, as well as in animal feed and a range of modern biofuels. And while palm oil is rarely used as a straightforward cooking oil outside of South-East Asia, most shoppers likely use far more palm oil than they actually realise. Have you ever bought a Kit-Kat, Colgate toothpaste, Johnson's baby lotion, Dove soap, Doritos, Kellogg's Pop Tarts, Ritz crackers, M&Ms or Head & Shoulders shampoo? Then you're a palm oil consumer. ›



It's easy to see why palm oil has become so popular with food and cosmetics producers. An extremely versatile ingredient, palm oil is semi-solid at room temperature so can keep spreads spreadable. It is resistant to oxidation, so can give products a longer shelf-life, and unlike olive oil, it's stable at high temperatures, meaning it can be used to give fried products a crispy texture. Palm oil is also odourless and colourless, meaning it doesn't alter the look or smell of the food products it is used in – a serious benefit for major food companies.

Palm oil is also an incredibly efficient crop, meaning reducing our over-reliance on it is incredibly tricky. Palm oil plantations produce more oil per land area than any other equivalent vegetable oil crop, meeting 35% of the world's vegetable oil demand on just 10% of the land. To get the same amount of alternative oils such as soybean or coconut, anything from four to ten times more land would be required, meaning the problems inherent in mass production of anything requiring forest space would simply shift to a different part of the world. Furthermore, palm oil is an important crop for the GDP of emerging economies, including Indonesia and Malaysia, and millions of smallhold farmers depend on palm oil for their livelihood.

CONTROVERSIAL CROP

So why the controversy? To produce palm oil, fruit is collected from palm oil trees, which live an average of 28 – 30 years. The problem being that at a young age, the trees grow too high for the fruit to be easily reached, leading producers to cut down the plants in order to make room for new trees. Meanwhile, across Indonesia and Malaysia, where trade in palm oil is a huge income generator, existing rainforests and peatlands are being razed to the ground to create space for new palm oil tree plantations.

In Indonesia alone, an area of rainforest the size of a football pitch is torn down every 25 seconds, with palm oil driving the destruction. But not only are the country's rainforests hotspots for biodiversity, vital for regulating the Earth's climate, they are also home to more threatened and endangered species than in any other nation on Earth. The impact? Bornean orangutan numbers more than halved between 1999 and 2015 with the loss of around 150,000 individual animals. That amounts to a staggering 25 orangutan deaths every day. The endangered pygmy elephant and Sumatran rhino populations of the region have also been gravely impacted by deforestation, while the combination of forest loss with the conversion of carbon rich peat soils sees the palm oil industry emit millions of tonnes of greenhouse gases into the atmosphere each year, greatly contributing to climate change.

Left: Palm oil plantations produce more oil per land area than any other equivalent vegetable oil crop

Charities active in the sector say exploitation of workers and child labour are also rife, leading to calls for a major overhaul of the way the industry operates.

Nonetheless, the WWF warns that even the most committed environmentalist should think twice before attempting to boycott palm oil altogether, given the number of livelihoods dependant on its production. Instead, the charity recommends that consumers switch to products containing only certified palm oil.

THE MOVE TOWARDS CERTIFICATION

The key message, say environmental charities, is that palm oil can be produced more sustainably, and standards across the industry could be vastly improved if consumer demand was sufficient to force change.

Since 2004, the Roundtable of Sustainable Palm Oil (RSPO) has operated to increase production standards and set best practice guidelines for both palm oil producers and industry buyers. RSPO-certified palm oil is produced using methods that protect both the environment and the local communities who depend on its production for their livelihoods, ensuring that palm oil can continue to play a key role in food security. Today, the body is backed by almost every level of the food and farming industry, as well as by a host of environmental charities, who play an active role in helping to shape RSPO standards and guidelines.

Nonetheless, Greenpeace says consumers have a role to play too. The charity is trying to force brands including Nestlé, Unilever and Mars to put pressure on their suppliers to clean up production methods and work towards full RSPO certification.

So, as consumers, what can we do to reduce our use of a product used so prolifically? According to campaigners, simply shopping more responsibly and carefully can have a huge impact. By switching to products that contain only 100% RSPO-certified oil, and eschewing alternatives that do not, consumers have a key role to play in cleaning up the palm oil industry. It's time to start reading those labels...

PALM OIL GOES BY MANY ALIASES ON INGREDIENT LABELS:

PALM KERNEL
PALM KERNEL OIL
PALM FRUIT OIL
PALMATE
PALMITATE
PALMOLEIN
STEARATE
STEARIC ACID
ETHYL PALMITATE

FINDING SUSTAINABLE **PALM OIL**

CHECK THE ROUNDTABLE ON SUSTAINABLE PALM OIL (RSPO) DATABASE

LOOK FOR THE RSPO LABEL ON PRODUCTS

TELL RETAILERS YOU WANT TO BUY PRODUCTS THAT USE SUSTAINABLE PALM OIL

Source: rspo.org, davidsuzuki.org

MAN'S BEST FRIEND

Although it is still early days, the potential for dogs to significantly assist in the detection of human illness and disease is huge.

Professor Steve Lindsay and a handful of colleagues recently attended the American Society of Tropical Medicine and Hygiene's annual meeting in New Orleans. They were there for one reason: to present groundbreaking research into sniffer dogs and their ability to identify the odour of malaria.

"While our findings are at an early stage, in principle we have shown that dogs could be trained to detect malaria-infected people by their odour with a credible degree of accuracy," said Lindsay, a Public Health Entomologist at Durham University in the UK. "This could provide a non-invasive way of screening for the disease at ports of entry in a similar way to how sniffer dogs are routinely used to detect fruit and vegetables or drugs at airports."

Apart from the obvious benefits of helping to prevent the spread of malaria and ensuring that those who require treatment receive it, the study raised the profile of a little known field of medical research – the use of dogs to identify the odour of human disease.

Amongst the list of institutions that had contributed to the research was a UK charity called Medical Detection Dogs (MDD). Co-founded by Dr Claire Guest just over 10 years ago, it not only contributes to the fight against cancer, but helps with the detection of life-threatening diseases, despite receiving no government funding.

Although to many it sounds like science fiction, the charity combats diseases in two ways. Firstly, through the use of bio-detection dogs that are trained to detect the odour of diseases such as cancer in urine, breath and swab samples. And secondly, via medical alert assistance dogs, which can detect minute changes in an individual's personal odour and alert them to life-threatening health conditions. Both utilise the power of a dog's smell.

Dogs are able to detect tiny odour concentrations – around one part per trillion (the >

Above: Freya, a Springer Spaniel, is among the dogs trained to sniff out the scent of malaria

equivalent of one teaspoon of sugar in two Olympic-sized swimming pools) – and are therefore potentially able to detect diseases much earlier than is currently possible. As such, the charity is already working with the UK's National Health Service on an ethically-approved study into the dogs' ability to detect urological cancers. It is also running a proof-of-principle trial exploring the ability of dogs to detect breast cancer.

Medical alert assistance dogs are also supporting people with complex health conditions – people who have limited awareness of an impending life-threatening medical event. To date, MDD has placed over 100 such dogs, helping people with type one diabetes, postural orthostatic tachycardia syndrome, endocrine disorders, and those who suffer from episodes of sudden health deterioration.

The malaria research, however, represented the charity's first foray into the detection of parasitic diseases.

"The possible potential to train dogs to detect tropical disease where diagnostics are poor, such as leishmaniasis and trypanosomiasis, is huge," said Guest, who was a co-author of the study. "I believe that this study indicates that dogs have an excellent ability to detect malaria and if presented with an individual infected with the parasite or a piece of recently worn clothing, their accuracy levels will be extremely high. This is a reliable, non-invasive test and is extremely exciting for the future."

Although the research was led by Durham University and funded by the Bill & Melinda Gates Foundation, it was also carried out by the London School of Hygiene & Tropical Medicine (LSHTM), MDD, and the Medical Research Council Unit The Gambia (MRCG) at the London School of Hygiene & Tropical Medicine. Additional partners included the University of Dundee and the National Malaria Control Programme, The Gambia.

Researchers used nylon socks to collect foot odour samples from apparently healthy children aged five to 14 in the Upper River Region of The Gambia, in West Africa. Using a simple finger-prick test the children were also screened to determine if they had the malaria parasite plasmodium falciparum in their blood.

The sock samples were then transported to MDD's purpose-built research and training facilities near Milton Keynes, where two dogs, a Labrador-Golden Retriever cross called Lexi, and a Labrador called Sally, were trained to distinguish between the scent of children infected with malaria parasites and those who were uninfected.

In total 175 sock samples were tested, including those of all 30 malaria-positive children identified by the study, and 145 from uninfected children. The dogs were able to correctly identify 70% of the malaria-infected samples. What's more, the dogs were also able to correctly identify 90% of the samples without malaria parasites.

Professor Umberto D'Alessandro, Unit Director at the MRCG and co-author of the research, said: "Detecting malaria-infected but otherwise healthy people is a laborious and time-consuming process that requires collecting a blood sample to be then processed in a well-equipped laboratory.

"New approaches to facilitate the identification of infected individuals to be treated would help enormously in addressing the human reservoir of infection and possibly reduce malaria transmission. The opportunity to use trained dogs for this purpose is promising. Results show that it may be possible to identify infected people by their body odour."

An accompanying study introduced a fake bio-detection dog to Gambian villages to gauge their acceptability, with researchers reporting that most people were favourably disposed to their use in principle.

The results of the study are broadly in line with the criteria for procurement of rapid diagnostic tests. However, further research is needed to see if dogs can directly sniff out malaria in people infected with the disease. Future studies are also needed to see if dogs can detect malaria in the odour of infected people from other parts of the world before the animals could be used in the field.

None of this comes cheap. The cost of training and placing a medical alert assistance dog, for instance, is $37,000, while the cost of training a bio-detection dog (which only works on site) is $14,700, with an ongoing monthly cost of $770. As MDD is not supported by the UK government, the cost of training the dogs is currently covered by sponsorship and fundraising.

These costs cover a dog's training, with the length of time to train a bio-detection dog varying, depending on a number of different factors, including the odour they are being trained to detect, the sample type they are using, and the dog itself (all dogs learn at different speeds). It genera, it takes six to eight months for a dog to reach a good level of performance, with the dogs taught using reward-based methods and clicker training.

MDD isn't alone, of course. The US-based Dogs for Diabetics trains dogs to recognise the chemical changes in blood sugar in order to provide an alert prior to the onset of hypoglycaemia, while other researchers have used dogs to detect ovarian cancer. Clostridium difficile, a bacteria that can infect the bowel and cause diarrhoea, has also been found to be detectable by dogs.

WHY MALARIA MUST DIE

THE WORLD
Health Organisation estimates that there were **219 million** cases of malaria in 2017

MALARIA
continues to claim the lives of more than **435,000** people each year, largely in Africa

CHILDREN
under five are especially vulnerable; **every two minutes** a child dies from this preventable and curable disease

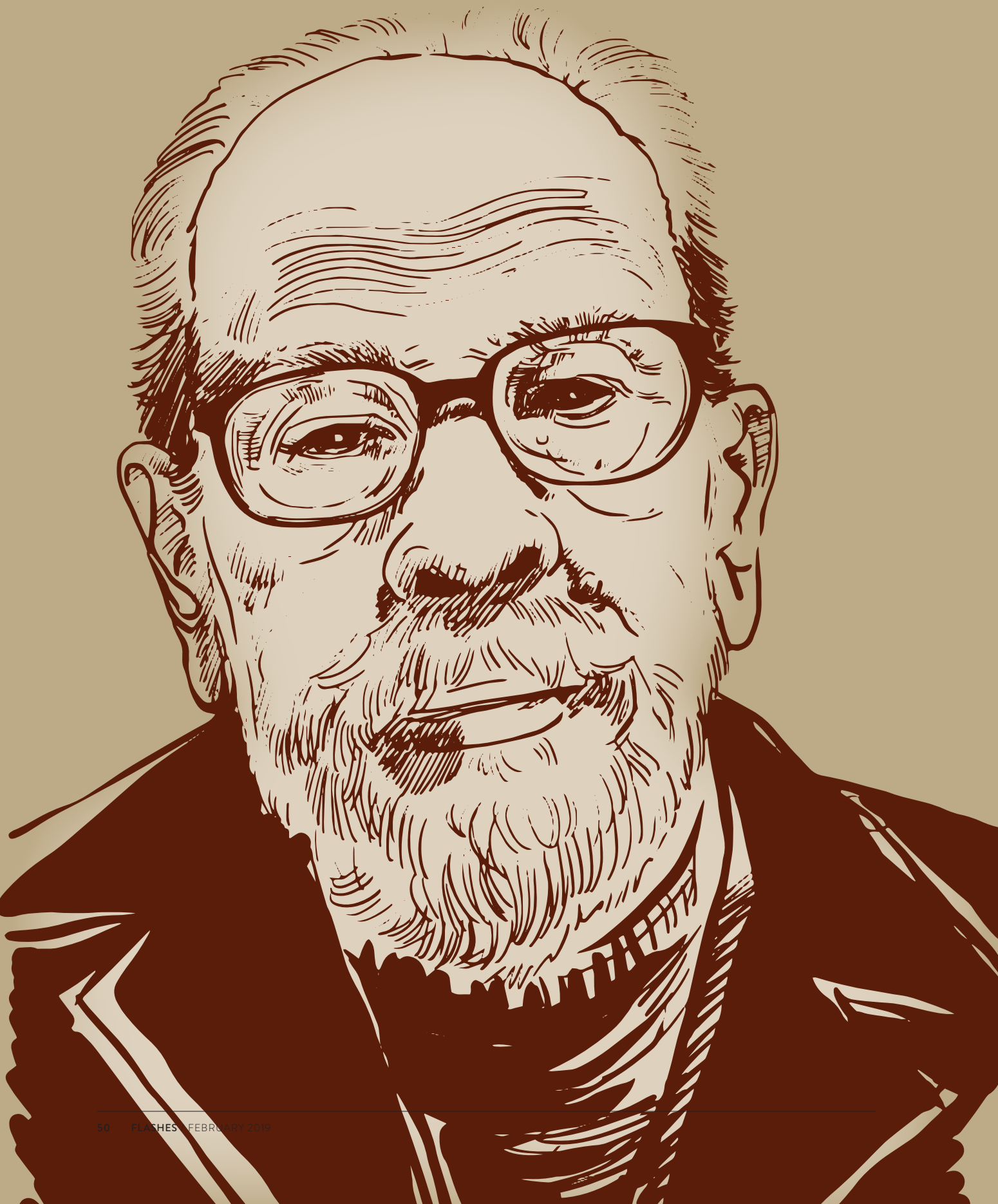
THE NUMBER
of malaria cases in Rwanda fell by **430,000** between **2016** and 2**017**

IN 2017,
an estimated **US$3.1 billion** was invested in malaria control and elimination efforts globally by governments of malaria endemic countries and international partners

15 COUNTRIES
in **sub-Saharan Africa** and **India** carried almost **80%** of the global malaria burden. Five countries accounted for nearly half of all malaria cases worldwide: **Nigeria** (25%), **Democratic Republic of the Congo** (11%), **Mozambique** (5%), **India** (4%) and **Uganda** (4%)

AN ESTIMATED
276 million rapid diagnostic tests (RDTs) were sold globally in 2017

LEFT: Bio-detection dogs and medical alert assistance dogs both utilise the animal's sense of smell



A NOVEL APPROACH

Remembering Naguib Mahfouz, the first Arab writer to win the Nobel Prize for Literature.

Naguib Mahfouz once famously said: "You can tell whether a man is clever by his answers. You can tell whether a man is wise by his questions."

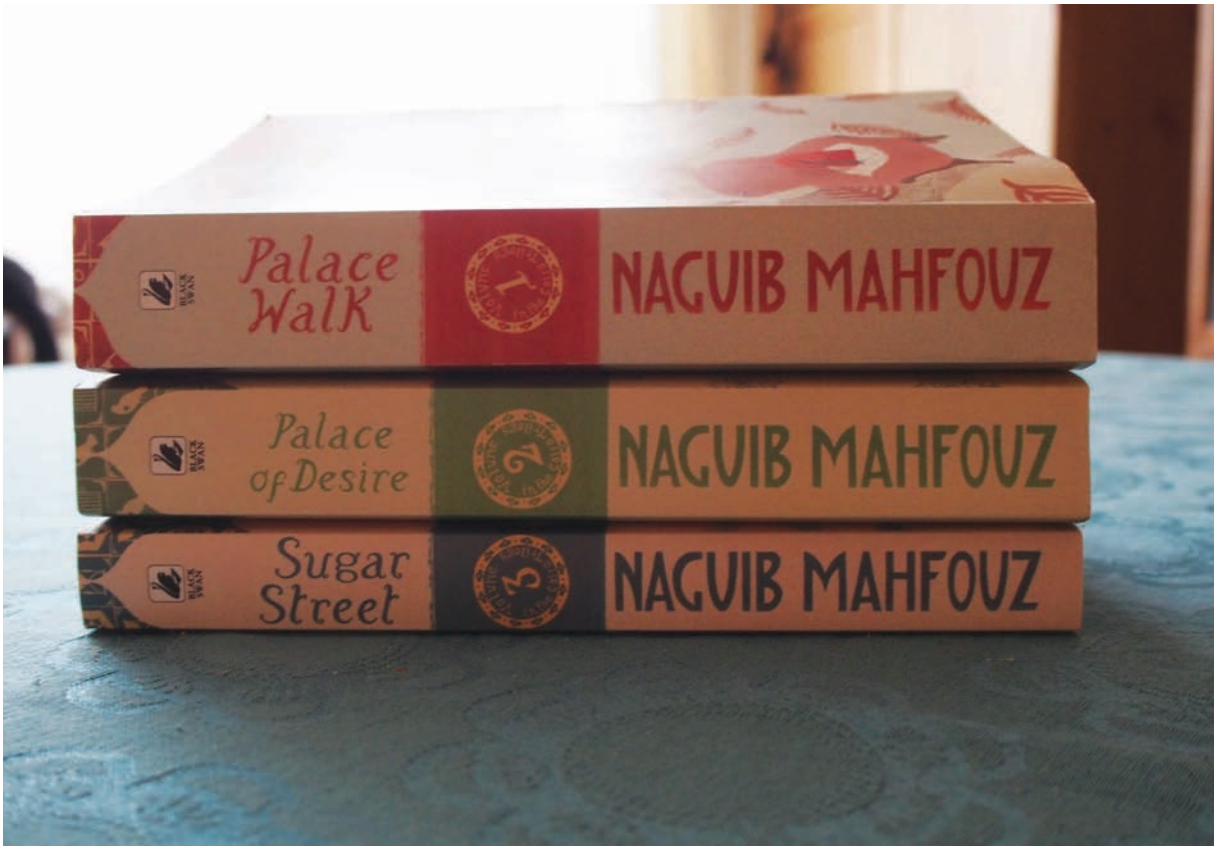
Throughout his 70-year career, which spanned scores of novels, short stories, films and plays, the acclaimed Egyptian author posed questions about religion, politics, gender roles and nationalism, and sought answers in the everyday occurrences of his beloved Cairo. Today, there's no debating that Mahfouz – the first Arabic writer to win the Nobel Prize for Literature – was both extremely clever and inherently wise.

The youngest of seven children, Mahfouz was born in 1911 to a devout Muslim family, and spent his early years in al-Gamaliya, a centuries-old quarter in Cairo. It's the bustling alleyways and characters of this neighbourhood – and Mahfouz's reaction to the social upheaval of his country, including the Egyptian revolution against British rule in 1919 – that form the backbone of his fiction.

An avid reader from an early age, Mahfouz's literary influences included Egyptian authors Hafiz Najib, Taha Hussein and Salama Moussa, as well as European greats such as Tolstoy, Dostoevsky, Chekhov, Proust, Kafka, Joyce, Faulkner and Shaw. With his vivid depictions of life in the Egyptian capital, critics dubbed him the Dickens of Cairo, with *Newsweek* saying: "The alleys, the houses, the palaces and mosques and the people who live among them are evoked as vividly in Mahfouz's work as the streets of London were conjured by Dickens."

"I read a lot of European novels when I was a young man," Mahfouz once told journalist Jay Parini of *The Guardian*. "And I've continued to read them. A writer must read. Dickens, of course, was especially important for me," he said. "The world breaks before you in his books, its light and darkness. Everything is there."

Mahfouz started writing in primary school, but it wasn't until after he'd completed a degree



Above: Today, Mahfouz is best remembered for *The Cairo Trilogy*

in philosophy and begun working as a civil servant that his literary career took shape. In what would be considered a serious 'side hustle' in today's terms, Mahfouz worked in various ministries by day, including as Director of Censorship in the Bureau of Art, and a consultant to the Ministry of Culture, before returning home to write in the evenings, a practice he continued until retiring from civil service in 1971.

He told *The Paris Review* in 1992: "I was always a government employee. I didn't make any money from my writing until much later. I published about 80 stories for nothing. On the contrary, I spent on literature – on books and paper."

Yet this double life did nothing to hinder Mahfouz's output. In 1939 he published *Abath Al-Aqdar* (*Mockery of the Fates*), the first in what he'd planned to write as a series of 30 historical novels. *Rhadopis* and *Kifah Tibah* (*The Struggle of Thebes*) followed in 1943 and 1944 respectively, before he abandoned the past in favour of the present, shifting his focus to the social and political fabric of modern-day Cairo. Over the next four decades, the prodigious writer penned 34 novels, 350 short stories and 25 screenplays. A further 30 of his novels have been adapted into films.

"Mahfouz was of massively important influence on Arabic literature; he was our greatest living novelist

"The Arab world also won the Nobel with me. I believe that international doors have opened, and that from now on, literate people will consider Arab literature also. We deserve that recognition"

NAGUIB MAHFOUZ

for a very long time," said Egyptian novelist Ahdaf Souief. "Mahfouz was an innovator in the use of the Arabic language; he embodied the whole development of the Arabic novel starting with historical novels in the late 1940s through realism, through experimentalism and so on."

Today, he is best remembered for *The Cairo Trilogy* (1956-57). Set in al-Gamaliya and named after real streets from his childhood (*Palace Walk*, *Palace of Desire* and *Sugar Street*), the three books depict the changing fortunes of Cairo through the lens of one family, beginning in 1919, the year of the Egyptian Revolution, and ending in 1944, as the Second World War was coming to a close.

The Cairo Trilogy "deals with the human condition on a large scale," said Dr Rasheed El Enany, Professor of Arabic and Comparative Literature. "Every human passion and condition is in it: whatever type of person you are, whatever your life experience, it will have something to say to you."

It was the universality of his themes that captured the attention of the Swedish Academy. In awarding him the Nobel Prize for Literature in 1988, Professor Sture Allén said: "Your rich and complex work invites us to reconsider the fundamental things in life. And the poetic quality of your prose can be felt across the language barrier... forming an Arabian narrative art that applies to all mankind."

Shortly after receiving the award, Mahfouz said: "The Arab world also won the Nobel with me. I believe that international doors have opened, and that from now on, literate people will consider Arab literature also. We deserve that recognition."

Prior to winning the prize, only a handful of Mahfouz's novels had appeared in the West. Today, Mahfouz's work has been published in more than 600 editions and 40 languages. "The Nobel Prize has given me, for the first time in my life, the feeling that my literature could be appreciated on an international level. One effect that the Nobel Prize seems to have had is that more Arabic literary works have been translated into other languages," he said.

Six years later, a botched attack left Mahfouz with nerve damage to his right hand. From then, he couldn't hold a pen for more than a few minutes a day, and although he continued to dictate his works, his output slowed.

His final major work, a series of stories about the afterlife, was published in 2005. "I wrote *The Seventh Heaven* because I want to believe something good will happen to me after death," he told the Associated Press in December 2005. A short time later, in August 2006, Mahfouz passed away. At the time, Egyptian President Hosni Mubarak described him as "a cultural light who brought Arab literature to the world. He expressed the values of enlightenment and tolerance that reject extremism".

Above: Sculptures of Egyptian Nobel Prize winners (l-r) Ahmed Zewail, Anwar Sadat and Naguib Mahfouz on the main road to Cairo

And now, 12 years on, the Nobel laureate's words speak to us once again. Last year, Egyptian critic Mohamed Shoair discovered a box of unpublished manuscripts at Mahfouz's daughter's home, and 18 of these have been released in a collection titled *The Whispers of Stars*. The publisher, Saqi Books, said: "With Mahfouz's often ironic, always insightful observation of the human character, this priceless discovery is wonderful news for fans of one of the world's best-loved novelists."

NOBEL MUSEUM 2019

Under the title **'Sharing Worlds'**, this year's **Nobel Museum** organised by the Mohammed bin Rashid Al Maktoum Knowledge Foundation celebrates the Nobel Prize in Literature. Focusing on the work of selected **Nobel laureates in literature**, and featuring an interactive exhibition suitable for all ages, the Museum runs from **3 February to 2 March, at La Mer**, in Dubai. The Museum is open Sunday to Thursday, 9am – 10pm, and Friday, 2pm – 10pm.

LEADERS IN **LITERATURE**

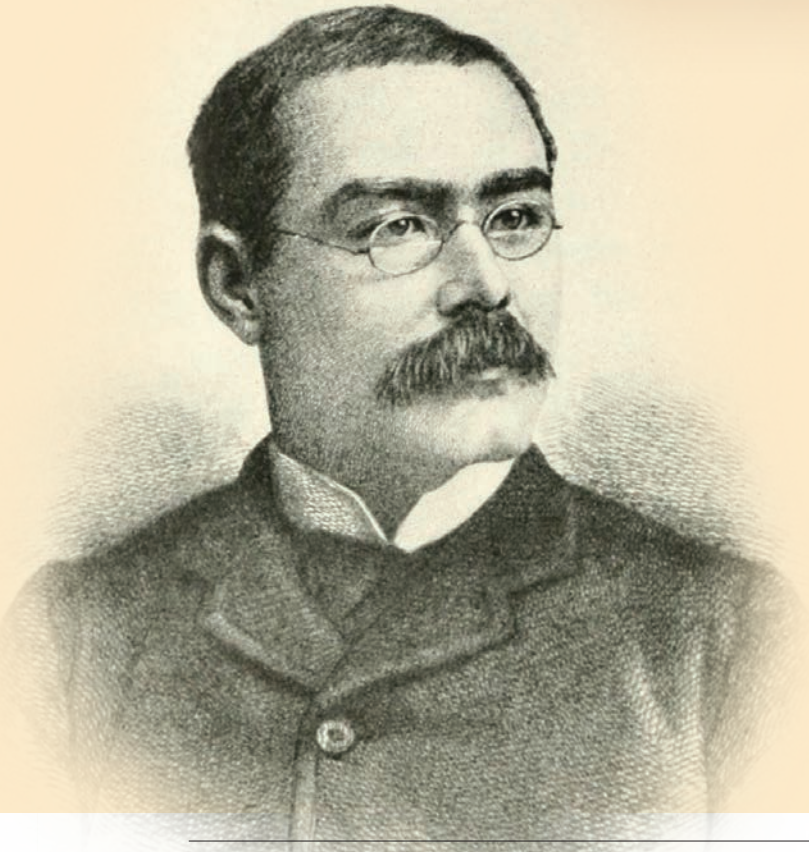
What makes a Nobel Prize for Literature winner, and who will 2019's recipients join in the hall of fame? We look back at the careers of some of the award's most celebrated winners from the last century.

1901: SULLY PRUDHOMME

The Nobel Prize for Literature's inaugural winner had been destined for a career in engineering until an eye disease forced him to end his studies. Turning to the law to make his living, Prudhomme also began to spend more time writing poetry, a hobby he had initially embarked on as a student. His publishing debut came in 1865 and respect for his work began to grow, but it was with his ascension to the French Academy in 1881 that his notoriety really reached new heights.

In 1901, the Swedish Academy selected him as the first-ever winner of the Nobel Prize for Literature "in special recognition of his poetic composition, which gives evidence of lofty idealism, artistic perfection and a rare combination of the qualities of both heart and intellect".

However, by the time of his selection, his health had already begun to decline and he died just six years later, in 1907, after using the money from his prize to establish a fund for publishing the work of young French poets.



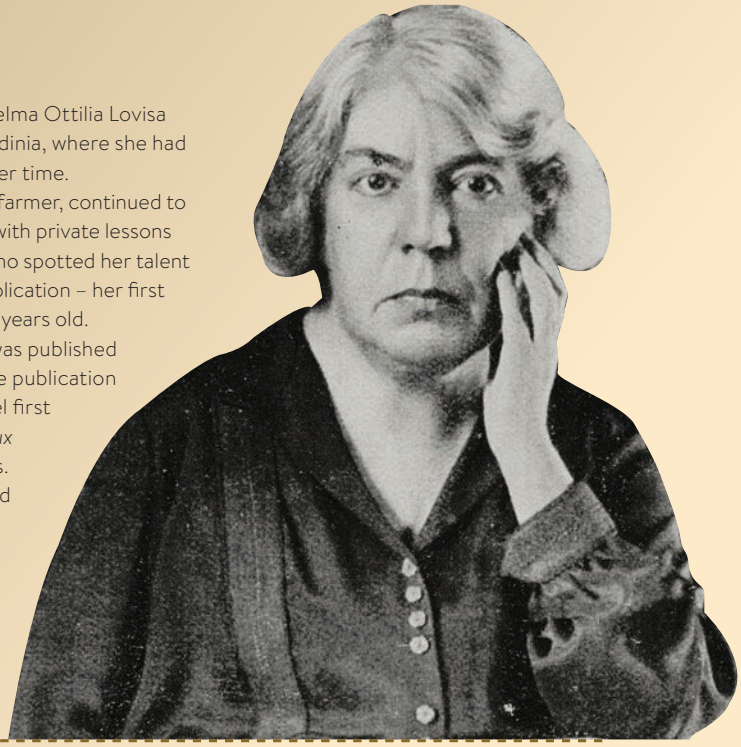
1907: RUDYARD KIPLING

The first Nobel winner to remain a global household name today, Kipling was born and raised in what was then known as British India, before receiving his further education in England. He returned to India in 1882 to work as a journalist for a number of Anglo-Indian newspapers.

His literary career kicked off in 1886 with the publication of *Departmental Ditties*, but he then quickly rose to fame as a prolific writer of short stories. Kipling was also the poet of the British Empire and wrote a host of well-regarded works about the movement's military men before, in 1894, *The Jungle Book* was released to huge acclaim, going on to become a revered children's classic.

He was 42 years old when the Academy recognised him as the winner of the 1907 Nobel Prize "in consideration of the power of observation, originality of imagination, virility of ideas and remarkable talent for narration, which characterise the creations of this world-famous author".

1926: GRAZIA DELEDDA

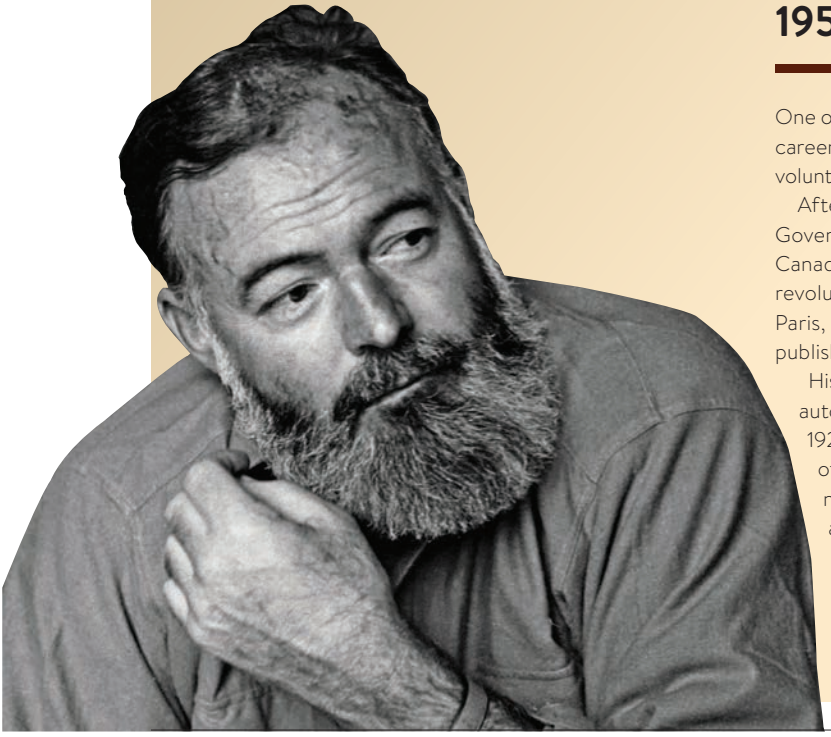


The Swedish Committee's second female winner (after Selma Ottilia Lovisa Lagerlöf was victorious in 1909), Deladda hailed from Sardinia, where she had attended school for just four years – a norm for girls of her time.

Nonetheless, her father, a fairly well-off landowner and farmer, continued to encourage her intellectual development by providing her with private lessons from a local elementary school teacher. It was this tutor who spotted her talent for writing, urging her to send her short stories out for publication – her first piece appeared in a fashion magazine when she was just 13 years old.

Her first novel, *Fior di Sardegna*, or *Flower of Sardinia*, was published when Deladda was just 21, but it wasn't until 1903, with the publication of *Elias Portolú* that she was to rise to fame, with the novel first translated by Paris-based cultural magazine *Revue des deux Mondes* and then into a host of other European languages.

By the time of her award in 1926, Deladda had published 25 novels and was recognised by the committee "for her idealistically inspired writings, which with clarity picture the life on her native island and with depth and sympathy deal with human problems in general."



1954: ERNEST HEMINGWAY

One of the world's most acclaimed authors, Hemingway started his career as a journalist in the USA at the age of 17, before enlisting with a volunteer ambulance unit in the Italian Army during the First World War.

After being wounded, and subsequently decorated by the Italian Government, Hemingway returned to journalism in the USA and Canada, before being posted back to Europe to cover the Greek revolution. In the 1920s, he found himself as an American expat in Paris, an experience covered in his first novel *The Sun Also Rises*, published in 1926.

His subsequent works followed a similar vein, exploring his own autobiographical experiences through the art of the novel, from 1929's *A Farewell to Arms*, the study of an American ambulance officer's disillusionment in the war, to arguably his most ambitious novel, 1940's For *Whom the Bell Tolls*, drawing on his experiences as a reporter during Spain's civil war.

It was, however, for *The Old Man and the Sea* that he drew the attention of the Swedish Committee, which awarded him in recognition of "his mastery of the art of narrative, and for the influence that he has exerted on contemporary style".

1957: ALBERT CAMUS

Born in Algeria, Albert Camus moved to France at the age of 25. After working as a political journalist, his breakthrough came with the novel *The Stranger*, published in 1942, which concerns the absurdity of life, a theme he returns to in other books, including his philosophical work *The Myth of Sisyphus*.

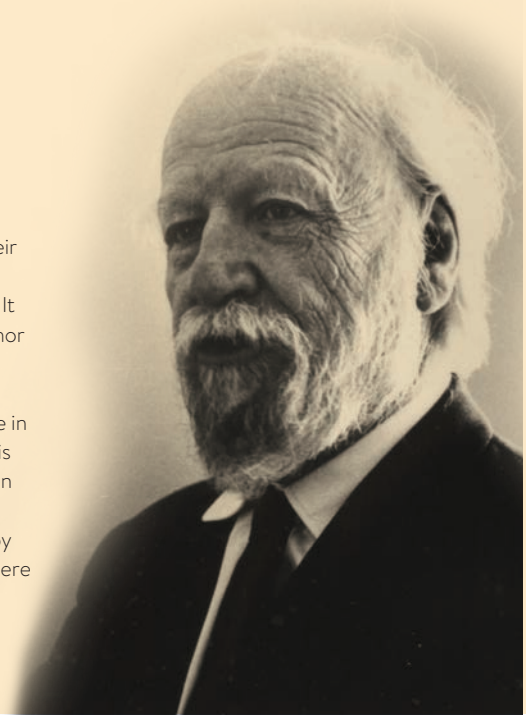
His best-selling and highly influential works include *The Plague* (1947) and the 1956 published *The Fall*. Described as "a brilliant portrayal of a man who has glimpsed the hollowness of his existence", *The Fall* explores man's relationship with guilt. His unfinished autobiography *The First Man* was published posthumously after Camus passed away in 1960.

Active also in the theatre as a producer and playwright, Camus also adapted plays by Calderon, Lope de Vega and more.

He was awarded the Nobel Prize in Literature "for his important literary production, which with clear-sighted earnestness illuminates the problems of the human conscience in our times".

During his Nobel Banquet speech, Camus said: "True artists scorn nothing: they are obliged to understand rather than to judge."

1983: WILLIAM GOLDING

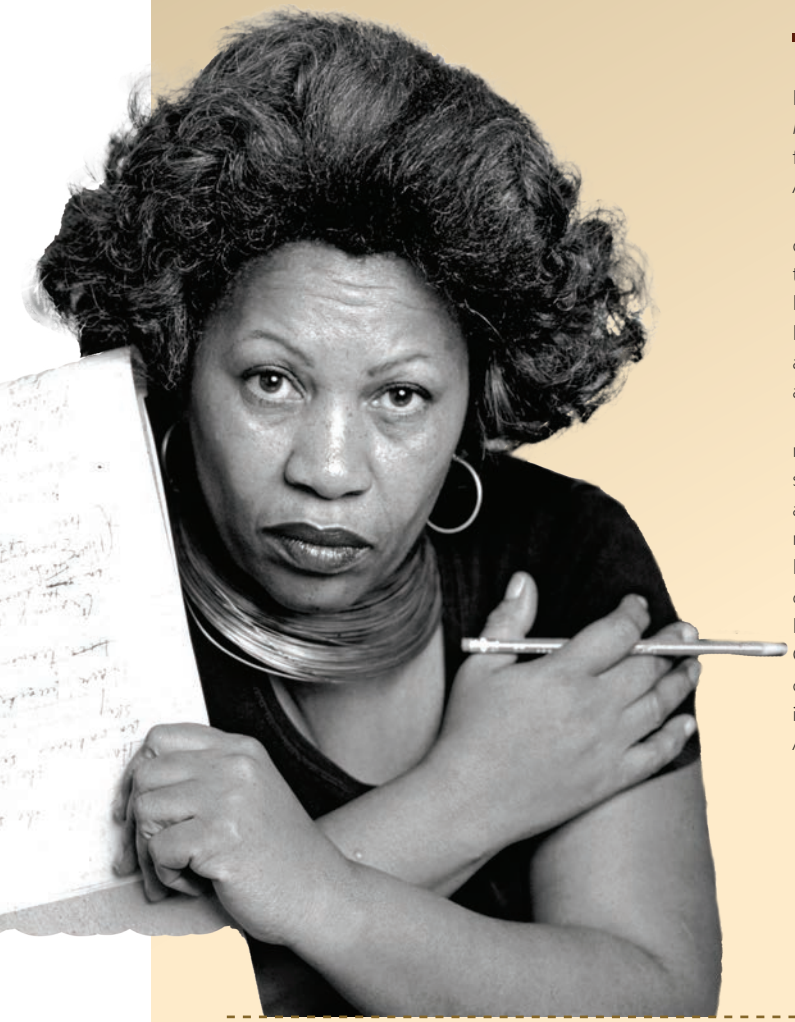


"Words may, through the devotion, the skill, the passion, and the luck of writers prove to be the most powerful thing in the world," said William Golding in his Nobel lecture of 1983, after he won the Nobel Prize in Literature that year.

A British novelist, playwright and poet, Golding was best known for his novel *Lord of the Flies*, published over 60 years ago. The classic novel telling the tale of a group of British boys stranded on an uninhabited island, and their disasterous attempt to govern themselves, has sold more than 25 million copies in English alone and has been translated into all the major languages. It has been made into two films and dramatised for the stage. Celebrated author Stephen King insists *Lord of the Flies* is "as exciting, relevant and as thought-provoking now as it was when Golding published it in 1954".

In fact, the battle between civilization and savagery is a recurring theme in a number of Golding's books. With over a dozen novels published during his career, the former school teacher was awarded the Booker Prize for fiction in 1980 for *Rites of Passage*. In 1983, the same year as he was awarded the Nobel Prize for Literature, Golding was made a Companion of Literature by the Royal Society of Literature, another extremely prestigious award as there are only 10 Companions at any one time.

Appointed CBE in 1966 and knighted in 1988, Golding died while at home in Cornwall, England, in 1993.



1993: TONI MORRISON

Born into a working-class family in Ohio, USA, Morrison is widely renowned as one of literature's foremost commentators on the African-American experience.

A voracious reader as a child, Morrison's work draws heavily on her experiences listening to the tales of her father. Having studied and taught English at several colleges, including Washington DC's renowned Howard University, she worked as a publishing house editor before her debut as an author in 1970.

Her work revolves around the history and modern-day experiences of Black America, and she is widely recognised by critics as having an incredible ear for dialogue. She has been a member of the American Academy of Arts and Letters since 1981, and was awarded a number of literary prizes, including the 1988 Pulitzer Prize, before being recognised by the Swedish Committee in 1993 as a writer "who in novels characterised by visionary force and poetic import, gives life to an essential aspect of American reality".

NOBEL MUSEUM 2019

Under the title **'Sharing Worlds'**, this year's **Nobel Museum** organised by the Mohammed bin Rashid Al Maktoum Knowledge Foundation celebrates the Nobel Prize in Literature. Focusing on the work of selected **Nobel laureates in literature**, and featuring an interactive exhibition suitable for all ages, the Museum runs from **3 February to 2 March, at La Mer**, in Dubai. The Museum is open Sunday to Thursday, 9am – 10pm, and Friday, 2pm – 10pm.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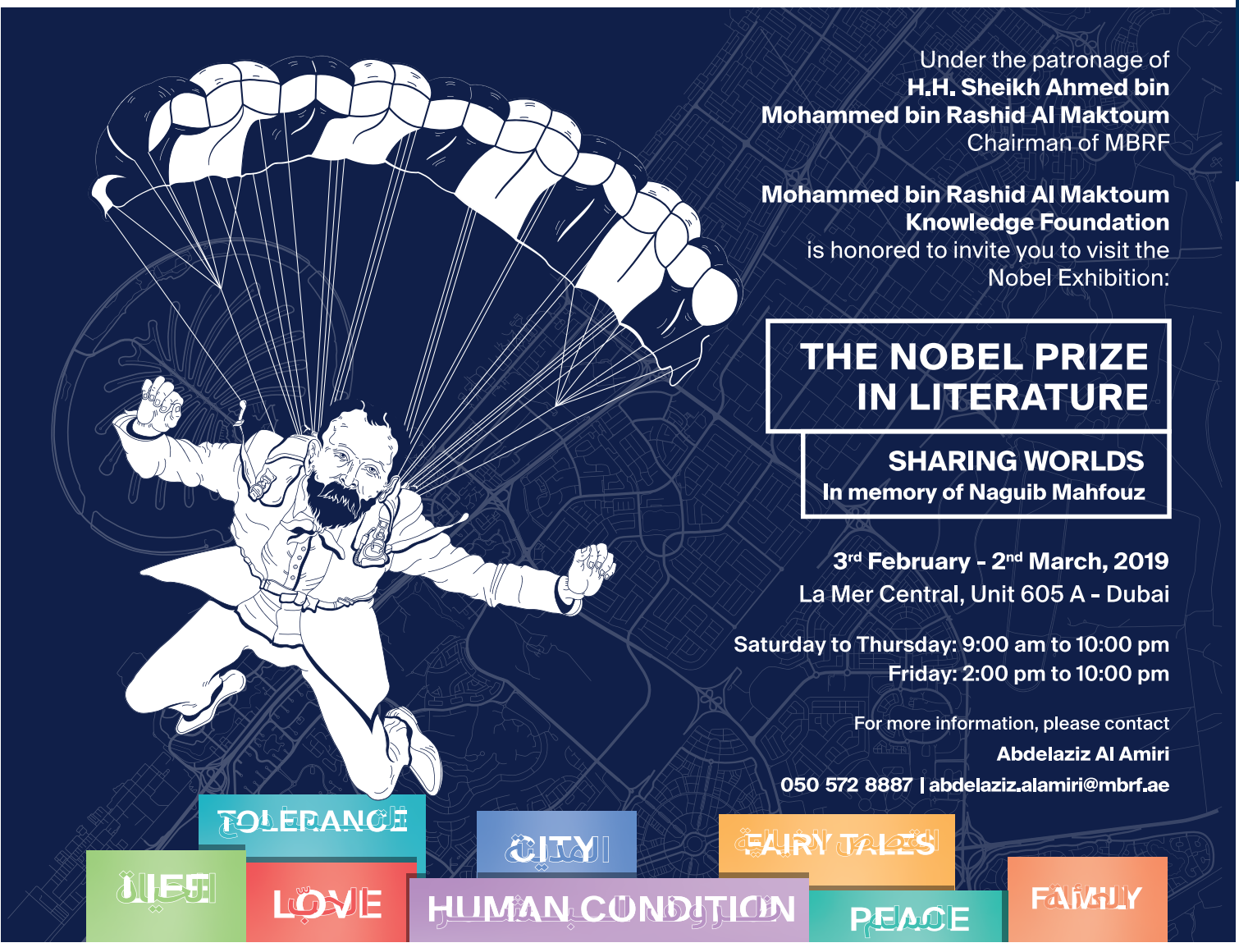

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