

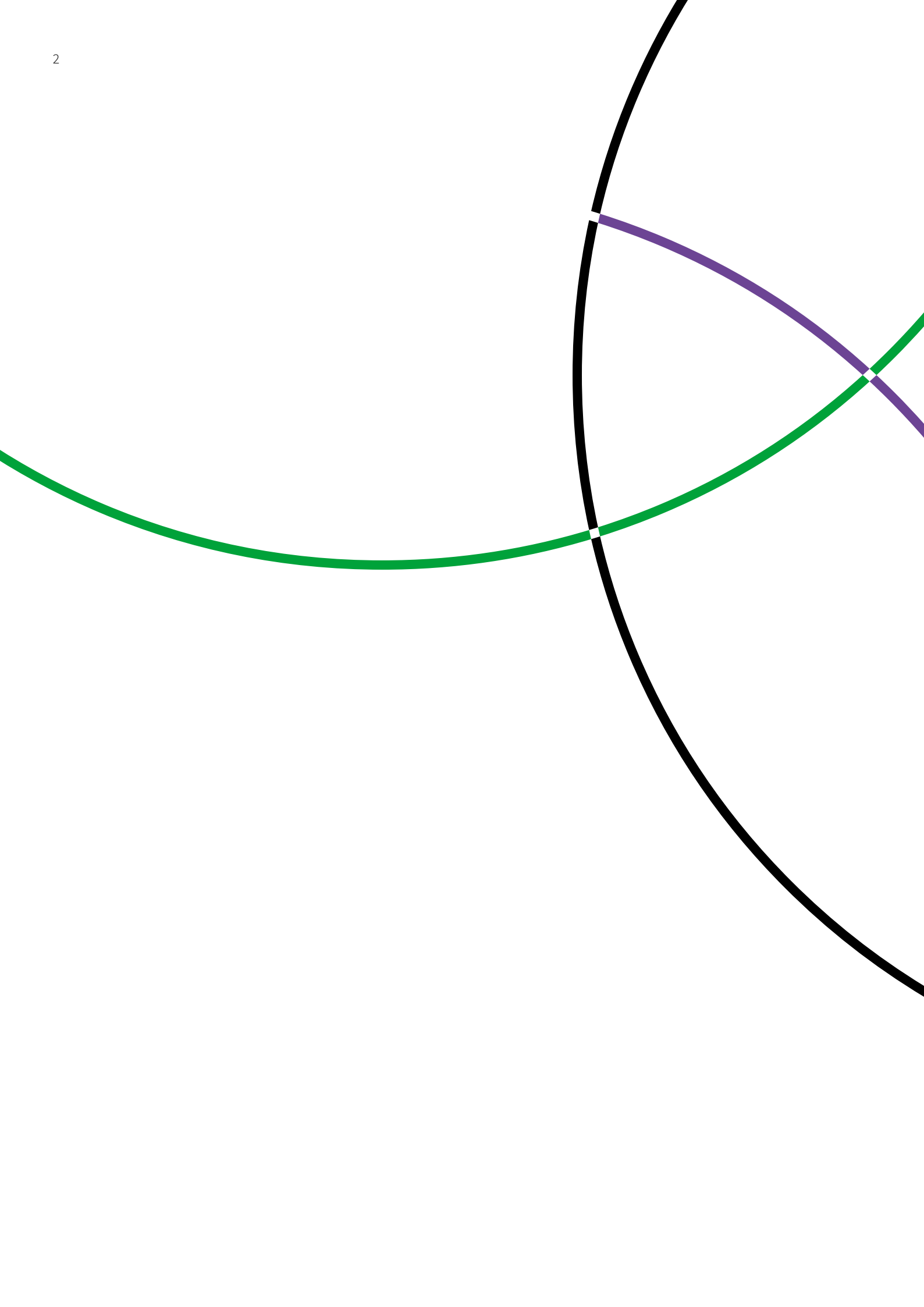


## Look up to the brightest stars

Introducing 2017's Highly Cited Researchers

**Web of Science**  
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Analytics



Just one of the strengths of *Clarivate Analytics Web of Science* and its suite of data tools is the network of citations associated with indexed source items. These citations provide a cognitive road map for those seeking to follow the progression of a given finding or advancement – a map often leading to unexpected and promising tangents that can turn research in a new direction.

And citations, of course, when tallied, serve as a testament to the utility and influence of given research, as judged by scientists themselves. Authors who consistently produce highly cited work have earned distinction, embodying the most active, visible, and consequential research in their specialty areas.

For more than two decades, the *Web of Science* has served as the basis for regular listings of researchers whose work is cited at a level markedly higher than average for their fields. *Clarivate Analytics* now presents the latest updates to these listings: First, the extensive roster of 2017's Highly Cited Researchers, based on work published and cited over the last decade. Meanwhile, an updated listing of Hottest Researchers highlights authors whose work over the last two years has caused a notable splash in the form of rapidly accumulating citations. For these two groupings, the population size and selection criteria are different, but the general principle is the same: Quantifiable impact as demonstrated by a high citation rate.

## Highly Cited Researchers

Since 2014, *Clarivate Analytics* has presented an annual listing of scientists whose publications over the previous 10 years have included a notable number of Highly Cited Papers. These reports, specified in the *Web of Science* component *Essential Science Indicators*, have amassed sufficient citations to place them among the top 1% most cited for their year of publication in one of 21 main subject fields.

Prior to 2014, previous versions of the Highly Cited Researchers listings were based on a total-citations count of a researcher's entire body of work over a given time period. However, because the total-citations metric tends to favor older or more-established authors whose work has had more time in which to accrue citations, or those who might have contributed to one or two massively cited papers, the selection criterion was changed to assess consistent production of Highly Cited Papers. This measure allows researchers who may be younger or at an earlier stage in their careers to be considered more equitably.

For the latest listing, based on a recent extraction of Highly Cited Papers covering the years 2005 to 2015, *Clarivate Analytics* data specialists undertook their usual rigorous process of identifying authors of multiple Highly Cited Papers. A key step was ensuring that these author names are disambiguated – that is, verifying that the proper researchers are identified and credited, as opposed to authors in the *Web of Science* database who might happen to have identical names.

Another important step was determining how many researchers to feature from each of the specialty areas covered in *Essential Science Indicators*. Once the authors and their primary affiliations (and, if applicable, secondary affiliations) were definitively identified, the authors were ranked by their respective numbers of Highly Cited Papers. The final allotment from each field was determined according to the field's overall size. For the fields in *Essential Science Indicators*, the size differences are striking: The journals covered in Clinical Medicine, for example, constitute nearly 20% of the total, while Space Science represents just over 1%. Ultimately, via a calculation reflecting each field's respective size, the rosters for each field were determined.

The [Highly Cited Researchers](#) site contains a detailed description of the [methodology](#) for author selection.

## Tracking Growth

The newest listing of Highly Cited Researchers features more than 3,300 unique authors, up from just over 3,000 last year. Actually, when counted by field, the overall tally of author appearances in the 2017 presentation is higher, exceeding 3,500. This is because several authors – 147, in fact – are credited for Highly Cited Papers in more than one field. Twenty authors appear in three fields.

**And one, Michael Grätzel of the Ecole Polytechnique Fédérale de Lausanne (EPFL) in Switzerland, exemplifying cross-field impact, has authored Highly Cited Papers in four Essential Science Indicators fields: Chemistry, Materials Science, Engineering, and Physics.**



In terms of national representation, the USA fields the highest number of authors, at **1,644**, an increase of **12%** overall the previous figure for the 2016 listing.



Finland and Singapore, although their respective overall totals of authors are less than 30, also posted notable percentage increases since last year, at **25%** and **21%**, respectively.



The highest increase of any nation, however, was actually achieved by China, with a **41%** jump to **249** authors, ranking third behind the USA and the UK.

## Hottest Researchers: A Different Window on Impact

As noted above, along with Highly Cited Papers, Essential Science Indicators tracks another variety of high-impact reports: Hot Papers. In contrast to the former's 10-year window (including subsequent two-month updates), the Hot Papers database captures recent reports that start accumulating citations very soon after publication, with bimonthly totals markedly above papers published at the same time in the same journals. Via comparison against baseline citation statistics in 21 main fields of science, Hot Papers are identified every two months in Essential Science Indicators.

Continuing a custom that now goes back more than 20 years, the Hot Papers data file underpins an updated listing of scientists who produced the highest numbers of rapidly cited papers over a recent period. For this newest listing, any report that met the Hot Papers threshold for at least one of the six bimonthly counts during 2016 (the latest full year for which complete Hot Papers data are available) contributed to the featured authors' individual tallies. [Note: With the full-year data for 2016, this list updates a compilation that appeared early in 2017; the previous listing was based on papers and citations tallied through September of 2016. Although similar, the present list – being based on an additional slice of data – contains some different paper totals and minor changes in the roster.]

The current list features 21 researchers who, since 2014, have each published at least 14 Hot Papers, according to citations tallied as of December 2016.

This latest collection, like its predecessors, carries one caveat: Nowadays, large, international research collaborations – in high-energy physics, for example, or clinical medicine – produce highly cited papers that may list upwards of 3,000 authors. Due to the impracticality of presenting hundreds of author names in this survey, papers with 500 or more authors were excluded from consideration.

Scientists with Multiple Hot Papers			
Name	Institution	Field	Number of Hot Papers
Michael Grätzel	École Polytechnique Fédérale de Lausanne, Switzerland	Materials	29
Henry J. Snaith	University of Oxford, UK	Physics/Materials	29
Eric S. Lander	Broad Institute of MIT and Harvard, USA	Genomics	21
Gad Getz	Broad Institute of MIT and Harvard, USA	Genomics	21
Mohammad K. Nazeeruddin	École Polytechnique Fédérale de Lausanne, Switzerland	Materials	20
Stacey B. Gabriel	Broad Institute of MIT and Harvard, USA	Genomics	20
Sam Stranks	University of Cambridge, UK	Materials	17
Peng Shi	University of Adelaide, Australia	Systems and Control Theory	17
Ahmedin Jemal	American Cancer Society, USA	Epidemiology	16
Caroline Robert	Institut Gustave-Roussy, France	Dermatology/Oncology	16
<b>Kuo-Chen Chou</b>	<b>Gordon Life Science Institute, USA</b>	<b>Genetics/Bioinformatics</b>	<b>16</b>
Antoni Ribas	Univ. of California, Los Angeles, USA	Oncology	15
John G. McHutchison	Gilead Sciences Inc., USA	Biopharmaceuticals	15
Feng Zhang	Broad Institute of MIT and Harvard, USA	Biomedical Engineering	15
Lutz Ackermann	University of Göttingen, Germany	Chemistry	15
Jedd D. Wolchok	Memorial Sloan Kettering Cancer Ctr., USA	Oncology	14
Giles E. Eperon	University of Washington, USA	Materials	14
Mietek Jaroniec	Kent State University, USA	Chemistry	14
Shen Yin	Harbin Institute of Technology, China	Industrial Informatics	14
Salim Yusuf	McMaster University, Canada	Cardiology/Epidemiology	14
Xiangke Wang	King Abdulaziz Univ., Saudi Arabia	Environmental Physicochemistry	14

Source: Clarivate Analytics Web of Science, Essential Science Indicators

## Still Ascendant: Solar Cells, Genomics

In recent Hottest Researchers listings, two dominant themes have emerged: cancer genomics, and solar cells based on the mineral perovskite. In the new list, both areas remain prominent and are embodied by several of the same researchers, with a minor shift at the top. Sharing the top rung are **Michael Grätzel**, mentioned above for his versatile showing among the Highly Cited Researchers; and **Henry J. Snaith** of Oxford (whose Highly Cited Papers, incidentally, also have a broad reach, embracing Chemistry, Materials Science, and Physics). Both authors contributed to separate batches of Hot Papers – numbering 29 – on perovskite solar cells. (Note: Throughout the list, the rank order of names is determined first by number of Hot Papers, then by the average number of citations per Hot Paper.)

Both authors are also joined on the list by collaborators. Grätzel's EPFL colleague **Mohammed K. Nazeeruddin** contributed to 20 of the papers. And former members of Snaith's Oxford lab also register: **Sam Stranks**, now at Cambridge, coauthored 17 of Snaith's 29 Hot Papers, while **Giles E. Eperon**, contributed to 14 before moving on to the University of Washington.

In the field of genomics, **Eric S. Lander**, of the Broad Institute of MIT and Harvard, retains his unique status as a perennial in these hottest-authors listings, now making his 13th appearance – this time, thanks to 21 Hot Papers. Most of these are reports from The Cancer Genome Atlas project (TCGA), a large, multi-author collaboration that has provided molecular profiles for cancers of the lung, bladder, prostate, and other organs.

Another Broad researcher, **Gad Getz**, also contributed to 21 Hot Papers, including TCGA reports. And close behind is a third Broad scientist and TCGA collaborator, **Stacey B. Gabriel**, who has placed highly in the last two listings. Her 20 Hot Papers include reports on melanoma and other malignancies, along with general analyses of cancer types and protein-coding genetic variations.

## Biomedicine, Chemistry

**Feng Zhang** of MIT, another familiar name from previous listings, reappears by virtue of 15 Hot Papers incorporating the CRISPR/Cas9 method for genome editing that he helped to pioneer. One of these papers, from 2016, reports on in vivo genome editing in a mouse model of Duchenne muscular dystrophy and the observed improvement in muscle function. This is just one example of the potentially transformative applications being explored for the method.

Trials of anticancer agents, including nivolumab in combination with ipilimumab in previously untreated melanoma, constitute the 16 Hot Papers on which **Caroline Robert** of the Institut Gustave Roussy, Villejuif, France, is among the contributors.

Ipilimumab and other immune checkpoint inhibitors also figure in the reports that bring **Antoni Ribas** of UCLA (15 Hot Papers) and **Jedd D. Wolchok** of the Memorial Sloan Kettering Cancer Center (14) to the list.

Meanwhile, other fronts in the war on cancer are reflected in the 16 Hot Papers coauthored by **Ahmedin Jemal** of the American Cancer Society. These papers report on the incidence of various forms of the disease in the US and other selected nations, as well as globally.

**Kuo-Chen Chou**, founder and director of the Gordon Life Sciences Institute, Boston, registers with 16 papers on genomics – specifically, on the use of pseudo nucleic composition, an alternative to classical sequencing methods for analyzing the function and processes of unknown DNA/RNA sequences.

Fifteen Hot Papers on drug therapy for hepatitis C earn a spot on the list for **John G. McHutchison** of Gilead Sciences in California. The studies primarily evaluate sofosbuvir, which blocks a key hepatitis C protein.

**Salim Yusuf** of McMaster University, a veteran of previous Hottest Researcher listings, returns thanks to 14 reports that offer a mix of epidemiological and clinical studies of cardiovascular disease.

Chemists also find their way to the list: In work discussed in 15 Hot Papers, **Lutz Ackermann** of the University of Göttingen, Germany, concentrates on processes related to organic synthesis. Meanwhile, the research of **Mietek Jaroniec** of Kent State University, Ohio, includes reports on various properties of carbon spheres and other nanoporous materials; in this survey, Jaroniec can boast 14 Hot Papers.

From the realms of engineering and computer science, **Peng Shi** of the University of Adelaide, Australia, reaches the list with 17 Hot Papers on the control of dynamic systems. These techniques include “sliding mode control” and other measures applied in, for example, electric drivers and robotics.

**Shen Yin** of the Harbin Institute of Technology, China, posts 14 Hot Papers. Yin specializes in harnessing data-based techniques for industrial processes. Pertinent applications include process monitoring, performance optimization and fault detection in wind turbines, among other systems.

**Xiangke Wang**, of King Abdulaziz University, Saudi Arabia, and the North China Electric Power University, Beijing, China, fields 14 papers on the use of nanotechnology, including graphene oxides, for the management of environmental pollution and nuclear waste.

## Highly Cited, *and* Hot

Not surprisingly, many authors whose recent work is on the citation fast track have also compiled impressive numbers over the longer term. That is, of the “hot” authors discussed above, all but two can also be found in the larger group of Highly Cited Researchers, whose work in the last decade has included numerous citation blockbusters. The two exceptions – Sam Stranks and Giles Eperon, the comparatively junior researchers who completed their graduate studies under list-topping Henry Snaith – have not joined the corps of the Highly Cited. Or at least (it seems safe to predict), not quite yet.

## Who we are

*Clarivate Analytics* accelerates the pace of innovation by providing trusted insights and analytics to customers around the world, enabling them to discover, protect and commercialize new ideas faster. We own and operate a collection of leading subscription-based services focused on scientific and academic research, patent analytics and regulatory standards, pharmaceutical and biotech intelligence, trademark protection, domain brand protection and intellectual property management. *Clarivate Analytics* is now an independent company with over 4,000 employees, operating in more than 100 countries and owns well-known brands that include *Web of Science*, *Cortellis*, *Derwent*, *CompuMark*, *MarkMonitor* and *Techstreet*, among others. For more information, visit [clarivate.com](http://clarivate.com)

To see the full list of Highly Cited Researchers and read more about the selection methodology and other details, please visit [clarivate.com/hcr](http://clarivate.com/hcr)

### North America

Philadelphia: +1 800 336 4474  
+1 215 386 0100

### Latin America

Brazil: +55 11 8370 9845  
Other countries: +1 215 823 5674

### Europe, Middle East and Africa

London: +44 20 7433 4000

### Asia Pacific

Singapore: +65 6775 5088  
Tokyo: +81 3 5218 6500

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