Web of Science Group

A Clarivate Analytics company

Citation Laureates

2019

Researcher Recognition

Citation Laureates 2019

Of Nobel class

The Institute for Scientific Information, part of the Web of Science Group, announces the 2019 additions to its cohort of Citation Laureates – researchers whose work is deemed to be of Nobel stature, as attested by markedly high citation tallies recorded in *Web of Science*.

On October 7, 2019, the Nobel Assembly will vote to confer science's highest honor and announce the first of the 2019 Nobel Prizes. While this annual rite inspires worldwide speculation about possible winners, the Web of Science Group has since 2002 brought special insight into identifying researchers likely to receive Nobel recognition.

In selecting these Nobel-class researchers, our analysts focus on data in *Web of Science*, an online resource reflecting the indexed contents of more than 34,000 scientific journals and other source materials. Of particular interest for us are authors of extremely highly cited papers (those cited more than 1,000 times in the *Web of Science Core Collection*). Each citation is a marker of influence, a "pellet of peer recognition," as the late sociologist of science Robert K. Merton observed. He also noted that a citation is a repayment of an intellectual debt, since authors use citations to acknowledge the previous, foundational work on which they are building.

Methodology

Papers cited more than 1,000 times are rarities. The table below shows the citation distribution of articles and proceedings papers indexed in *Web of Science* from 1970 to 2019.

(*Web of Science*, 1970-2019 Articles and Proceedings only)

Citations	Number in range	Cumulative count
100,000 – 331,679	2	2
50,000 – 99,999	10	12
10,000 – 49,999	214	226
5,000 – 9,999	612	838
3,000 – 4,999	1,371	2,209
2,000 – 2,999	2,653	4,862
1,000 – 1,999	13,850	18,712
500 – 999	55,176	73,888
0 – 499	47,003,128	47,077,016

Source: Web of Science | July 23, 2019

"It is among this extremely small group of publications that the names of most past and future Nobel laureates may be found as authors."

Out of some

47 million

papers since 1970, only 18,700 (or .04 percent) have been cited 1,000 or more times and only 4,900 (or .01 percent) have been cited 2,000 or more times.

The Citation Laureates are of Nobel class and worthy candidates for selection in this or future years.

In seeking Citation Laureates, our analysts refine their search for instances in which this highly cited work is clearly associated with a significant discovery or advance on a scale that the Nobel committees typically reward. Another pointer is provided by "predictor" prizes that often precede Nobel recognition – for example, the Lasker Awards in biomedicine. Information on receipt of prestigious awards supplements our quantitative, citation-based analysis – an approach unique to the Web of Science Group in identifying Nobel-worthy scientists – with qualitative considerations arising from past peer-review decisions.

Candidates who meet these criteria are officially designated Citation Laureates in identifying considerations arising from past peer-review decisions.

The 2019 class of honorees joins a group that now numbers more than 300. Of these, 50 have received a call to Stockholm, 29 within two years of being designated Citation Laureates. For the current selectees and those named in previous years, exactly when their call might come, or even if it will arrive in time to conform to Alfred Nobel's stipulation that the prize shall honor only living recipients, is impossible to say. In many instances, a Nobel Prize recognizes work that took place decades ago, and attempting to forecast precisely which achievement is due for a prize can be a challenge. Therefore, as in every year, this latest batch of Citation Laureates should not be considered literal predictions for the 2019 Nobel Prizes.

Physiology or medicine

For research on the Wnt signaling pathway and its role in stem cells and cancer

We recognize Clevers for describing how Wnt signaling instructs gene expression during embryogenesis, in stem cells and in cancer.

These combined insights led him to identify stem cells in the intestine and other organs. From these stem cells, he created mini-organs in-a-dish. These so-called organoids represent human intestines, liver, pancreas and others and provide a new context for drug testing using neither cell lines nor experimental animals.

Hans Clevers

Professor of Molecular Genetics at the UMC Utrecht and Utrecht University, Principal Investigator at the Hubrecht Institute (KNAW) and the Princess Máxima Center for Pediatric Oncology and Oncode Investigator, Utrecht, the Netherlands

For their discovery of T-cell tolerance by clonal elimination in the thymus

We recognize Kappler and Marrack for describing how self-tolerance is achieved in the immune system. Their research has advanced understanding of the mechanisms of auto-immune diseases, such as rheumatoid arthritis, lupus, and Guillain-Barre syndrome.

John W. Kappler

Distinguished Professor, Department of Biomedical Research, National Jewish Health, Denver, CO, United States

Philippa Marrack

Distinguished Professor, Department of Biomedical Research, National Jewish Health, Denver, CO, United States

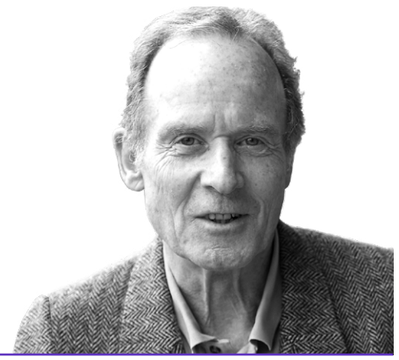
For contributions to the invention and development of optogenetics

We recognize this trio of researchers, working independently, who helped introduce a new method that uses light to observe and control neural activity. The technology constitutes a revolution in neuroscience that has already enhanced our knowledge of Parkinson's disease, vision restoration, addiction, and mood disorders.

Karl Deisseroth

Investigator of the Howard Hughes Medical Institute, and D. H. Chen Professor of Bioengineering and of Psychiatry and Behavioral Sciences, Stanford University, Stanford, CA, United States

Ernst Bamberg



Director Emeritus, Max Planck Institute of Biophysics, Frankfurt am Main, Germany

Gero Miesenböck

Waynflete Professor of Physiology and Director of the Centre for Neural Circuits and Behaviour, University of Oxford, Oxford, United Kingdom

Physics

For contributions to quantum computation and quantum cryptography

We recognize Ekert for fundamental research that unites theoretical and experimental physics with computer and information science. He is the inventor of entanglement-based quantum cryptography.

Artur K. Ekert

Professor of Quantum Physics, Mathematical Institute, University of Oxford, Oxford, United Kingdom, and Lee Kong Chian Centennial Professor, National University of Singapore, Singapore

For pioneering research on optical and electronic properties of two-dimensional nanomaterials

We recognize Heinz for contributions to understanding classes of nanoscale materials including carbon nanotubes, graphene, and two-dimensional semiconductors such as molybdenum disulfide.

Tony F. Heinz

Professor of Applied Physics and Photon Science, Stanford University, and Associate Laboratory Director for Energy Sciences, SLAC National Accelerator Laboratory, Stanford, CA, United States

For advances in density functional theory of electronic structure, revealing ‘nature’s glue’

We recognize Perdew for contributions to more thorough understanding of the nature and behavior of materials. Density functional theory provides electronic structure calculations in condensed matter physics and quantum chemistry and predicts, for example, the energy of atomic bonds.

John P. Perdew

Laura H. Carnell Professor of Physics and Chemistry, Department of Physics, Temple University, Philadelphia, PA, United States

Chemistry

For development of the 1,3-Dipolar Cycloaddition Reaction (Huisgen reaction) and the variant Copper(I)-catalyzed Azide-Alkyne Cycloaddition (Meldal)

We recognize this pair of scientists for essential contributions to synthetic organic chemistry. The reactions are modular, allowing for combinations of small units to create a wide variety of new and useful compounds.

Rolf Huisgen

Emeritus Professor of Chemistry, University of Munich, Germany

Morten P. Meldal

Professor of Chemistry, University of Copenhagen, Copenhagen, Denmark

For invention of the Southern blot method for determining specific DNA sequences

We recognize Southern for his powerful method to identify a single gene in DNA. His invention was the beginning of genetic mapping, diagnosis, and screening, and is the basis of today's personalized medicine.

Edwin M. Southern

Emeritus Professor of Biochemistry,
University of Oxford, Oxford, United Kingdom

For contributions to protein and DNA sequencing and synthesis

We recognize this trio of research pioneers who, separately and together, created tools that accelerated advances in biology and medicine. Without their inventions, which appeared in the 1980s, there would be no map of the Human Genome. This illustrates how instruments can drive knowledge, as applied science, or technology, enables basic research.

Leroy E. Hood

Senior Vice President and Chief Science Officer, Providence St. Joseph Health, Renton, WA, USA, and Chief Strategy Officer, Co-founder and Professor, Institute for Systems Biology, Seattle, WA, United States

Marvin H. Caruthers

Distinguished Professor, University of Colorado, Boulder, CO, United States

Michael W. Hunkapiller

Chief Executive Officer and President, Pacific Biosciences of California, Inc., Menlo Park, CA, United States

Economics

For research exploring the consequences of increasing returns (or network effects) in economic systems

We recognize Arthur for describing how small events and positive feedback loops act over time to lock an economy into the domination of one player out of several possible. The technology sector provides a prominent example. Arthur has also combined the new science of complexity research with economics to show how an economy functions when its players face ill-defined problems and an ever-changing system, and are unable to act with perfect rationality.

W. Brian Arthur

External Professor, Santa Fe Institute, Santa Fe, New Mexico; Fellow, Center for Advanced Study in the Behavioral Sciences, Stanford; and Visiting Researcher, System Sciences Lab, PARC, Palo Alto, California, United States

For development of formal theoretical economic models and especially models of bounded rationality

We recognize Rubinstein for his model of bargaining, which has had profound influence in Economics.

Ariel Rubinstein

Professor, School of Economics, Tel Aviv University, Tel Aviv, Israel, and Professor, Department of Economics, New York University, New York, NY, United States

For contributions to econometrics and cointegration analysis

We recognize Johansen and Juselius for developing the cointegrated VAR (vector autoregressive) method, which provides a flexible framework to study short- and long-term effects in economic time-series data. As Juselius has noted, the method helps economists avoid confirmation bias in their analyses.

Søren Johansen

Professor Emeritus, Department of Economics, University of Copenhagen, Copenhagen, Denmark

Katarina Juselius

Professor Emerita, Department of Economics, University of Copenhagen, Copenhagen, Denmark

About

About the Institute for Scientific Information

The Institute for Scientific Information (ISI) builds on the work of Dr. Eugene Garfield – the original founder and a pioneer of information science. Named after the company he founded – the forerunner of the Web of Science Group – ISI was re-established in 2018 and serves as a home for analytic expertise, guided by his legacy and adapted to respond to technological advancements.

Our global team of industry-recognized experts focus on the development of existing and new bibliometric and analytical approaches, whilst fostering collaborations with partners and academic colleagues across the global research community.

About the Web of Science Group

The Web of Science Group organizes the world's research information to enable academia, corporations, publishers and governments accelerate the pace of research. It is powered by the *Web of Science* – the world's largest publisher-neutral citation index and research intelligence platform. Its many well-known brands also include *Converis, EndNote, Kopernio, Publons, ScholarOne* and the Institute for Scientific Information (ISI). The 'university' of the Web of Science Group, ISI maintains the knowledge corpus upon which the index and related information and analytical content and services are built; it disseminates that knowledge externally through events, conferences and publications and it carries out research to sustain, extend and improve the knowledge base. The Web of Science Group is a Clarivate Analytics company.

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About Clarivate Analytics

Clarivate Analytics™ is a global leader in providing trusted insights and analytics to accelerate the pace of innovation. We have built some of the most trusted brands across the innovation lifecycle, including Web of Science™, Cortellis™, Derwent™, CompuMark™, MarkMonitor™ and Techstreet™. Today, Clarivate Analytics is on a bold entrepreneurial mission to help customers reduce the time from new ideas to life-changing innovations. For more information, please visit **clarivate.com**.

About our Researcher Recognition Programs

Using our comprehensive, high-quality data from across the Web of Science Group, measuring both quantitative and qualitative results, we recognize the people behind the ground-breaking research efforts produced each year through four recognition programs:

- Eugene Garfield Award for Innovation in Citation Analysis
- Highly Cited Researchers
- Global Peer Review Awards, powered by Publons
- Citation Laureates

Learn more at:
clarivate.com/webofsciencegroupsolutions/researcher-recognition

To find out more about the 2019 Citation Laureates, go to:
clarivate.com/webofsciencegroup/solutions/citation-laureates

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