

"There is Nothing so Theoretical as a Good Method"

Anthony G. Greenwald
Department of Psychology
University of Washington
Direct questions to: agg@u.washington.edu
[Analysis details are on the following sheets](#)

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Numbers of Nobel Prize Awards Given for Theory versus Method, 1991-2011

	Physiology Medicine	Chemistry	Physics	Total
theory	2 9%	4 15%	8 29%	14 18%
method	21 91%	22 85%	20 71%	63 82%

1. In each discipline, the explanation of there being more than 21 total awards for the 21 years is the occasional practice of dividing Nobel Prizes between two distinct contributions.
2. For the Physiology-Medicine awards it is sometimes difficult to judge method versus theory from the press releases (two were classified as jointly for method and theory, counting 0.5 toward each).
3. For awards categorized as being for method, a large majority (71%) were classified as having been given for methods that were newly created by the awardee(s). The remaining 29% used existing methods, which often included methods for which the creators had previously received Nobel awards. Of the method awards that were judged to have relied on already-existing methods, 3 (16%) were in Physics, 4 (22%) were in Chemistry, and 11.33 (62%) were in Physiology-Medicine (one of three co-recipients of the 2000 award relied on existing methods).

NOBEL PRIZES FOR PHYSICS 1991-2011

Year	Laureate Name	Contribution Citation	Type of Contribution	Supporting Material from Press Release	URL for Nobel Foundation press release	For method-coded contributions, indications that method was new vs. old or new use of old method
1991	Pierre-Gilles de Gennes	"for discovering that methods developed for studying order phenomena in simple systems can be generalized to more complex forms of matter, in particular to liquid crystals and polymers"	theory	" has described mathematically how e.g. magnetic dipoles, long molecules or molecule chains can under certain conditions form ordered states, and what happens when they pass from an ordered to a disordered state."	http://nobelprize.org/nobel_prizes/physics/laureates/1991/press.html	
1992	Georges Charpak	"for his invention and development of particle detectors , in particular the multiwire proportional chamber"	method (which stimulated theory)	"due to his work particle physicists have been able to focus their interest on very rare particle interactions, which often reveal the secrets of the inner parts of matter"	http://www.nobel.se/physics/laureates/1992/press.html	"for his invention and development of particle detectors, in particular the multiwire proportional chamber"
1993	Russell A. Hulse & Joseph H. Taylor, Jr	"for the discovery of a new type of pulsar , a discovery that has opened up new possibilities for the study of gravitation"	method (which stimulated theory)	"revolutionary "space laboratory" has been obtained for testing Einstein's general theory of relativity and alternative theories of gravity. So far, Einstein's theory has passed the tests with flying colours."	http://www.nobel.se/physics/laureates/1993/press.html	"discovery": new use of an existing method (clear method-theory synergy_
1994	Bertram N. Brockhouse	"for the development of neutron spectroscopy "	method (which stimulated theory)	"the technique ... is contributing actively to the elucidation of the forces that bind atoms to one another in solid bodies and that determine, for instance, the transition from the solid state to the fluid state"	http://www.nobel.se/physics/laureates/1994/press.html	for the development of neutron spectroscopy
1994	Clifford G. Shull	"for the development of the neutron diffraction technique "	method	"He has shown how neutrons may be used to determine the atomic structure of a material"	http://www.nobel.se/physics/laureates/1994/press.html	"for the development of the neutron diffraction technique"
1995	Martin L. Perl	"for the discovery of the tau lepton "	method (which stimulated theory)	" discovery of the tau was the first sign that a third "family" of fundamental building blocks existed"	http://www.nobel.se/physics/laureates/1995/press.html	contributions to the development of neutron scattering techniques for studies of condensed matter for the development of neutron spectroscopy
1995	Frederick Reines	"for the detection of the neutrino "	method	"a pioneering contribution that opened the doors to the region of "impossible" neutrino experiments"	http://www.nobel.se/physics/laureates/1995/press.html	discovery: use of existing method
1996	David M. Lee, Douglas D. Osheroff, & Robert C. Richardson	"for their discovery of superfluidity in helium-3 "	method (which stimulated theory)	"The discovery heralded the start of intensive research on the new quantum liquid. A particularly important contribution was made by the theoretician Anthony Leggett, who assisted in the interpretation of the discovery."	http://www.nobel.se/physics/laureates/1996/press.html	The researchers at Cornell University were low-temperature specialists and had built their apparatus themselves.

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1997	Steven Chu, Claude Cohen-Tannoudji, & William D. Phillips	"for development of methods to cool and trap atoms with laser light."	method	" ... have developed methods of using laser light to cool gases to the μK temperature range and keeping the chilled atoms floating or captured in different kinds of 'atom traps'."	http://www.nobel.se/physics/laureates/1997/press.html	"for development of methods to cool and trap atoms with laser light."
1998	Robert B. Laughlin, Horst L. Störmer, & Daniel C. Tsui	"for their discovery of a new form of quantum fluid with fractionally charged excitations."	method (which stimulated theory)	Störmer and Tsui "made the discovery in 1982 in an experiment using extremely powerful magnetic fields and low temperatures. Within a year of the discovery ... Laughlin had succeeded in explaining their result."	http://www.nobel.se/physics/laureates/1998/press.html	"In their refined experimental studies of the quantum Hall effect, using among other things lower temperatures and more powerful magnetic fields,"
1999	Gerardus 't Hooft & Martinus J. G. Veltman	"for elucidating the quantum structure of electroweak interactions in physics"	theory	"... having placed particle physics theory on a firmer mathematical foundation . Experiments at accelerator laboratories ... have recently confirmed many of the calculated results."	http://www.nobel.se/physics/laureates/1999/press.html	
2000	Zhores I. Alferov & Herbert Kroemer	"for developing semiconductor heterostructures used in high-speed- and optoelectronics"	method	" ... have invented and developed fast opto- and microelectronic components based on layered semiconductor structures, termed semiconductor heterostructures"	http://www.nobel.se/physics/laureates/2000/press.html	" ... have invented and developed fast opto- and microelectronic components based on layered semiconductor structures, termed semiconductor heterostructures"
2000	Jack S. Kilby	"for his part in the invention of the integrated circuit "	method	"... invention and development of the integrated circuit, the chip"	http://www.nobel.se/physics/laureates/2000/press.html	"...invention and development of the integrated circuit, the chip"
2001	Eric A. Cornell, Wolfgang Ketterle, & Carl E. Wieman	"for the achievement of Bose-Einstein condensation in dilute gases of alkali atoms, and for early fundamental studies of the properties of the condensates"	method	" ... have caused atoms to "sing in unison" – thus discovering a new state of matter , the Bose-Einstein condensate (BEC)"	http://www.nobel.se/physics/laureates/2001/press.html	"for the achievement of Bose-Einstein condensation in dilute gases of alkali atoms, and for early fundamental studies of the properties of the condensates"
2002	Raymond Davis Jr. & Masatoshi Koshiba	"for pioneering contributions to astrophysics, in particular for the detection of cosmic neutrinos "	method	" ... constructed a completely new detector, a gigantic tank filled with 600 tonnes of fluid, which was placed in a mine. ... The work of Davis and Koshiba has led to unexpected discoveries and a new, intensive field of research, neutrino-astronomy. "	http://www.nobel.se/physics/laureates/2002/press.html	" ... constructed a completely new detector, a gigantic tank filled with 600 tonnes of fluid, which was placed in a mine. ... The work of Davis and Koshiba has led to unexpected discoveries and a new, intensive field of research, neutrino-astronomy."

NOBEL PRIZES FOR PHYSICS 1991-2011

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2002	Riccardo Giacconi	"for pioneering contributions to astrophysics, which have led to the discovery of cosmic X-ray sources"	method	In order to investigate cosmic X-ray radiation, ... it is necessary to place instruments in space. Riccardo Giacconi has constructed such instruments His contributions laid the foundations of X-ray astronomy ."	http://www.nobel.se/physics/laureates/2002/press.html	In order to investigate cosmic X-ray radiation, ... it is necessary to place instruments in space. Riccardo Giacconi has constructed such instruments. ... His contributions laid the foundations of X-ray astronomy."
2003	Alexei A. Abrikosov, Vitaly L. Ginzburg, & Anthony J. Leggett	"for pioneering contributions to the theory of superconductors and superfluids"	theory	"Alexei Abrikosov succeeded in explaining this phenomenon theoretically. His starting point was a theory that had been formulated for type-I superconductors by Vitaly Ginzburg and others, but which proved to be so comprehensive that it was also valid for the new type." "The decisive theory explaining how the atoms interact and are ordered in the superfluid state was formulated in the 1970s by Anthony Leggett."	http://www.nobel.se/physics/laureates/2003/press.html	
2004	David J. Gross, H. David Politzer, & Frank Wilczek	"for the discovery of asymptotic freedom in the theory of the strong interaction"	theory	"This discovery was expressed in 1973 in an elegant mathematical framework that led to a completely new theory, Quantum Chromodynamics, QCD. This theory was an important contribution to the Standard Model"	http://nobelprize.org/physics/laureates/2004/press.html	
2005	Roy J. Glauber	"for his contribution to the quantum theory of optical coherence"	theory	"Roy Glauber has established the basis of Quantum Optics, in which quantum theory encompasses the field of optics."	http://nobelprize.org/nobel_prizes/physics/laureates/2005/	
2005	John L. Hall & Theodor W. Hänsch	"for their contributions to the development of laser-based precision spectroscopy, including the optical frequency comb technique "	method	"This technique makes it possible to carry out studies of, for example, the stability of the constants of nature over time and to develop extremely accurate clocks and improved GPS technology."	http://nobelprize.org/nobel_prizes/physics/laureates/2005/	"for their contributions to the development of laser-based precision spectroscopy, including the optical frequency comb technique"
2006	John C. Mather & George F. Smoot	"for their discovery of the blackbody form and anisotropy of the cosmic microwave background radiation"	method	"The success of COBE was the outcome of prodigious team work involving more than 1,000 researchers, engineers and other participants. . . . These measurements also marked the inception of cosmology as a precise science ."	http://nobelprize.org/nobel_prizes/physics/laureates/2006/press.html	"The success of COBE was the outcome of prodigious team work involving more than 1,000 researchers, engineers and other participants. . . . These measurements also marked the inception of cosmology as a precise science."

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2007	Albert Fert & Peter Grünberg	"for the discovery of Giant Magnetoresistance"	method	"each independently discovered a totally new physical effect – Giant Magnetoresistance or GMR. . . . The GMR effect was discovered thanks to new techniques developed during the 1970s to produce very thin layers of different materials."	http://nobelprize.org/nobel_prizes/physics/laureates/2007/press.html	"each independently discovered a totally new physical effect – Giant Magnetoresistance or GMR. . . . The GMR effect was discovered thanks to new techniques developed during the 1970s to produce very thin layers of different materials."
2008	Yoichiro Nambu	"for the discovery of the mechanism of spontaneous broken symmetry in subatomic physics"	theory	"Yoichiro Nambu formulated his mathematical description of spontaneous broken symmetry in elementary particle physics. . . . Nambu's theories permeate the Standard Model of elementary particle physics."	http://nobelprize.org/nobel_prizes/physics/laureates/2008/press.html	
2008	Makoto Kobayashi & Toshihide Maskawa	"for the discovery of the origin of the broken symmetry which predicts the existence of at least three families of quarks in nature"	theory	"It is only in recent years that scientists have come to fully confirm the explanations that Kobayashi and Maskawa made in 1972. . . . The results were exactly as Kobayashi and Maskawa had predicted almost three decades earlier."	http://nobelprize.org/nobel_prizes/physics/laureates/2008/press.html	
2009	Charles Kuen Kao	"for groundbreaking achievements concerning the transmission of light in fibers for optical communication"	theory	"He carefully calculated how to transmit light over long distances via optical glass fibers. . . . The first ultrapure fiber was successfully fabricated just four years later, in 1970."	http://nobelprize.org/nobel_prizes/physics/laureates/2009/press.html	
2009	Willard S. Boyle & George E. Smith	"for the invention of an imaging semiconductor circuit – the CCD sensor"	method	" invented the first successful imaging technology using a digital sensor , a CCD (Charge-Coupled Device). The CCD technology makes use of the photoelectric effect"	http://nobelprize.org/nobel_prizes/physics/laureates/2009/press.html	" invented the first successful imaging technology using a digital sensor , a CCD (Charge-Coupled Device). The CCD technology makes use of the photoelectric effect"
2010	Andre Geim & Konstantin Novoselov	for groundbreaking experiments regarding the two-dimensional material graphene"	method	" Using regular adhesive tape they managed to obtain a flake of carbon with a thickness of just one atom. . . . with graphene, physicists can now study a new class of two-dimensional materials with unique properties. Graphene makes experiments possible that give new twists to the phenomena in quantum physics."	http://nobelprize.org/nobel_prizes/physics/laureates/2010/press.html	" Using regular adhesive tape they managed to obtain a flake of carbon with a thickness of just one atom. . . . with graphene, physicists can now study a new class of two-dimensional materials with unique properties. Graphene makes experiments possible that give new twists to the phenomena in quantum physics."

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2011	Saul Perlmutter, Brian P. Schmidt, Adam G. Riess	"for the discovery of the accelerating expansion of the Universe through observations of distant supernovae".	method	"the two research teams found over 50 distant supernovae whose light was weaker than expected - this was a sign that the expansion of the Universe was accelerating"	http://www.nobelprize.org/nobel_prizes/physics/laureates/2011/press.html	discovery: the two research teams found over 50 distant supernovae whose light was weaker than expected - this was a sign that the expansion of the Universe was accelerating"
						The 2011 only Physics award is (so far) the only one in which the method seems already established, with the awardees exploiting existing technology, recognizing that the method was capable of doing more than it previously had.
	51 awardees					

NOBEL PRIZES FOR CHEMISTRY 1991-2011

Year	Laureate Name	Contribution Citation	Type of Contribution	Supporting Material from Press Release	URL for Nobel Foundation press release	For method-coded contributions, indications that method was new vs. old or new use of old method
1991	Richard R. Ernst	"for his contributions to the development of the methodology of high resolution nuclear magnetic resonance (NMR) spectroscopy"	method	" . . . a dramatic increase in both the sensitivity and the resolution of the instruments , two areas in which Ernst has contributed more than anybody else. . . . discovered that the sensitivity of NMR spectra could be increased dramatically if the slow radiofrequency sweep that the sample was exposed to was replaced by short and intense radiofrequency pulses."	http://nobelprize.org/nobel_prizes/chemistry/laureates/1991/press.html	"for his contributions to the development of the methodology of high resolution nuclear magnetic resonance (NMR) spectroscopy "
1992	Rudolph A. Marcus	"for his contributions to the theory of electron transfer reactions in chemical systems "	theory	" theoretical work on electron transfer - work which has greatly stimulated experimental developments in chemistry"	http://www.nobel.se/chemistry/laureates/1992/press.html	
1993	Kary B. Mullis	"for his invention of the polymerase chain reaction (PCR) method "	method	(see below)	http://www.nobel.se/chemistry/laureates/1993/press.html	"for his invention of the polymerase chain reaction (PCR) method "
1993	Michael Smith	"for his fundamental contributions to the establishment of oligonucleotide-based, site-directed mutagenesis and its development for protein studies"	method (which stimulated theory)	"[Their methods] have further hastened the rapid development of genetic engineering. The two methods have greatly stimulated basic biochemical research and opened the way for new applications in medicine and biotechnology."	http://www.nobel.se/chemistry/laureates/1993/press.html	"[Their methods] have further hastened the rapid development of genetic engineering . The two methods have greatly stimulated basic biochemical research and opened the way for new applications in medicine and biotechnology. "
1994	George A. Olah	"for his contributions to carbocation chemistry"	method (which stimulated theory)	"Olah and co-workers discovered that stable carbocations could be prepared through the use of a new type of extremely acid compounds ... "superacids".... Olah's discovery completely transformed the scientific study of the elusive carbocations."	http://www.nobel.se/chemistry/laureates/1994/press.html	"Olah and co-workers discovered that stable carbocations could be prepared through the use of a new type of extremely acid compounds ... "superacids".... Olah's discovery completely transformed the scientific study of the elusive carbocations. "
1995	Paul Crutzen, Mario Molina, & F. Sherwood Rowland	"for their work in atmospheric chemistry, particularly concerning the formation and decomposition of ozone"	theory	" Molina and Rowland ... calculated that if human use of CFC gases was to continue at an unaltered rate the ozone layer would be depleted by many percent after some decades. Their prediction created an enormous attention"	http://www.nobel.se/chemistry/laureates/1995/press.html	

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1996	Robert F. Curl, Jr., Harold W. Kroto, & Professor Richard E. Smalley	"for their discovery of fullerenes "	method	"By fine-tuning the experiment they were able in particular to produce clusters with 60 carbon atoms and clusters with 70. They found high stability in C60, which suggested a molecular structure of great symmetry."	http://www.nobel.se/chemistry/laureates/1996/press.html	"By fine-tuning the experiment they were able in particular to produce clusters with 60 carbon atoms and clusters with 70. They found high stability in C60, which suggested a molecular structure of great symmetry."
1997	Paul D. Boyer & John E. Walker	"for their elucidation of the enzymatic mechanism underlying the synthesis of adenosine triphosphate (ATP)"	theory	"Boyer and his co-workers have proposed , on the basis of biochemical data, a mechanism for how ATP is formed from adenosine diphosphate (ADP) and inorganic phosphate. Walker and his co-workers have established the structure of the enzyme and verified the mechanism proposed by Boyer."	http://www.nobel.se/chemistry/laureates/1997/press.html	
1997	Jens C. Skou	"for the first discovery of an ion-transporting enzyme , Na ⁺ , K ⁺ -ATPase"	method	"discovery of the enzyme sodium, (Na ⁺ , K ⁺ -ATPase). This enzyme maintains the balance of sodium and potassium ions in the living cell"	http://www.nobel.se/chemistry/laureates/1997/press.html	discovery: reading of the press release indicates this is a 2nd (one in Physics) example of pushing an established method to a further limit
1998	Walter Kohn	"for his development of the density-functional theory "	theory	"formed the basis for simplifying the mathematics in descriptions of the bonding of atoms, a prerequisite for many of today's calculations"	http://www.nobel.se/chemistry/laureates/1998/press.html	
1998	John A. Pople	"for his development of computational methods in quantum chemistry"	method	"developed the entire quantum-chemical methodology now used in various branches of chemistry"	http://www.nobel.se/chemistry/laureates/1998/press.html	"developed the entire quantum-chemical methodology now used in various branches of chemistry" "John Pople is rewarded for developing computational methods"
1999	Ahmed H. Zewail	"for showing that it is possible with rapid laser technique to see how atoms in a molecule move during a chemical reaction"	method (which stimulated theory)	"pioneering investigation of fundamental chemical reactions, using ultra-short laser flashes, on the time scale on which the reactions actually occur. Professor Zewail's contributions have brought about a revolution in chemistry and adjacent sciences"	http://www.nobel.se/chemistry/laureates/1999/press.html	"for showing that it is possible with rapid laser technique to see how atoms in a molecule move during a chemical reaction"
2000	Alan J. Heeger, Alan G. MacDiarmid, & Hideki Shirakawa	"for the discovery and development of conductive polymers "	method	"... their revolutionary discovery that plastic can, after certain modifications, be made electrically conductive....[they] have subsequently developed conductive polymers into a research field of great importance for chemists as well as physicists."	http://www.nobel.se/chemistry/laureates/2000/press.html	"rewarded for their revolutionary discovery that plastic can, after certain modifications, be made electrically conductive"

NOBEL PRIZES FOR CHEMISTRY 1991-2011

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2001	William S. Knowles & Ryoji Noyori	"for their work on chirally catalysed hydrogenation reactions"	method	"have developed molecules that can catalyse important [hydrogenation] reactions so that only one of the two mirror image forms is produced"	http://www.nobel.se/chemistry/laureates/2001/press.html	" have developed molecules that can catalyse important [hydrogenation] reactions so that only one of the two mirror image forms is produced "
2001	K. Barry Sharpless	"for his work on chirally catalysed oxidation reactions"	method	"is awarded half of the Prize for developing chiral catalysts for another important type of reaction – oxidation."	http://www.nobel.se/chemistry/laureates/2001/press.html	" is awarded half of the Prize for developing chiral catalysts for another important type of reaction – oxidation. "
2002	John B. Fenn & Koichi Tanaka	"for their development of soft desorption ionisation methods for mass spectrometric analyses of biological macromolecules"	method	"John B. Fenn and Koichi Tanaka have developed methods that make it possible to analyse biological macromolecules ..."	http://www.nobel.se/chemistry/laureates/2002/press.html	" for their development of soft desorption ionisation methods for mass spectrometric analyses of biological macromolecules "
2002	Kurt Wüthrich	"for his development of nuclear magnetic resonance spectroscopy for determining the three-dimensional structure of biological macromolecules in solution"	method	" development of another favourite method among chemists , nuclear magnetic resonance"	http://www.nobel.se/chemistry/laureates/2002/press.html	" for his development of nuclear magnetic resonance spectroscopy for determining the three-dimensional structure of biological macromolecules in solution "
2003	Peter Agre & Roderick MacKinnon	"for discoveries concerning channels in cell membranes"	method	"Peter Agre succeeded in isolating a membrane protein that, a year or so later, he realised must be the long-sought-after water channel. This decisive discovery opened the door to a whole series of biochemical, physiological and genetic studies ..." "Roderick MacKinnon surprised the whole research community when in 1998 he was able to determine the spatial structure of a potassium channel."	http://www.nobel.se/chemistry/laureates/2003/press.html	discovery: this one is difficult to code, but it may be an example of using existing methods.

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2004	Aaron Ciechanover, Avram Hershko, & Irwin Rose	"for the discovery of ubiquitin-mediated protein degradation"	method	". . . together discovered ubiquitinmediated proteolysis, a process where an enzyme system tags unwanted proteins with many molecules of the 76-amino acid residue protein ubiquitin."	http://www.nobelprize.org/nobel_prizes/chemistry/laureates/2004/press.html	discovery: This could be another case of pushing an existing method: "Using such an extract Aaron Ciechanover, Avram Hershko and Irwin Rose, in a series of epoch-making biochemical studies in the late 1970s and early 1980s, succeeded in showing that protein degradation in cells takes place in a series of step-wise reactions that result in the proteins to be destroyed being labelled with the polypeptide ubiquitin."
2005	Yves Chauvin, Robert H. Grubbs, & Richard R. Schrock	"for the development of the metathesis method in organic synthesis"	method	"In metathesis reactions, double bonds are broken and made between carbon atoms in ways that cause atom groups to change places. This happens with the assistance of special catalyst molecules."	http://nobelprize.org/nobel_prizes/chemistry/laureates/2005/#	"for the development of the metathesis method in organic synthesis"
2006	Roger D. Kornberg	"for his studies of the molecular basis of eukaryotic transcription"	method	"Kornberg's contribution has culminated in his creation of detailed crystallographic pictures describing the transcription apparatus. . . . The pictures are so detailed that separate atoms can be distinguished and this makes it possible to understand the mechanisms of transcription and how it is regulated. "	http://nobelprize.org/nobel_prizes/chemistry/laureates/2006/press.html	"Kornberg's contribution has culminated in his creation of detailed crystallographic pictures describing the transcription apparatus. . . . The pictures are so detailed that separate atoms can be distinguished and this makes it possible to understand the mechanisms of transcription and how it is regulated."
2007	Gerhard Ertl	"for his studies of chemical processes on solid surfaces"	method	"Step by step he has created a methodology for surface chemistry by demonstrating how different experimental procedures can be used to provide a complete picture of a surface reaction. . . . Acquiring a complete picture of the reaction requires great precision and a combination of many different experimental techniques."	http://nobelprize.org/nobel_prizes/chemistry/laureates/2007/press.html	"Step by step he has created a methodology for surface chemistry by demonstrating how different experimental procedures can be used to provide a complete picture of a surface reaction. . . . Acquiring a complete picture of the reaction requires great precision and a combination of many different experimental techniques."

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2008	Osamu Shimomura, Martin Chalfie, & Roger Y. Tsien	"for the discovery and development of the green fluorescent protein, GFP".	method	"this protein has become one of the most important tools used in contemporary bioscience . With the aid of GFP, researchers have developed ways to watch processes that were previously invisible."	http://nobelprize.org/nobel_prizes/chemistry/laureates/2008/press.html	"for the discovery and development of the green fluorescent protein, GFP ".
2009	Venkatraman Ramakrishnan, Thomas A. Steitz, & Ada E. Yonath	"for studies of the structure and function of the ribosome"	method	"for having showed what the ribosome looks like and how it functions at the atomic level. All three have used a method called X-ray crystallography to map the position for each and every one of the hundreds of thousands of atoms that make up the ribosome."	http://nobelprize.org/nobel_prizes/chemistry/laureates/2009/press.html	"It would actually take another 20 years of hard work before Ada Yonath managed to generate an image of the ribosome where she could determine the location of each atom."
2010	Richard F. Heck, Ei-ichi Negishi, & Akira Suzuki	"for palladium-catalyzed cross couplings in organic synthesis"	method	" This chemical tool has vastly improved the possibilities for chemists to create sophisticated chemicals, for example carbon-based molecules as complex as those created by nature itself. . . . Palladium-catalyzed cross coupling . . . provided chemists with a more precise and efficient tool to work with."	http://nobelprize.org/nobel_prizes/chemistry/laureates/2010/press.html	" This chemical tool has vastly improved the possibilities for chemists to create sophisticated chemicals, for example carbon-based molecules as complex as those created by nature itself. . . . Palladium-catalyzed cross coupling . . . provided chemists with a more precise and efficient tool to work with. "
2011	Dan Shechtman	"for the discovery of quasicrystals".	method	"On the morning of 8 April 1982, an image counter to the laws of nature appeared in Dan Shechtman's electron microscope"	http://www.nobelprize.org/nobel_prizes/chemistry/laureates/2011/press.html	discovery: "On the morning of 8 April 1982, an image counter to the laws of nature appeared in Dan Shechtman's electron microscope"
	45 awardees					

NOBEL PRIZES FOR PHYSIOLOGY OR MEDICINE 1991-2011

Year	Laureate Name	Contribution Citation	Type of Contribution	Supporting Material from Press Release	URL for Nobel Foundation press release	For method-coded contributions, indications that method was new vs. old or new use of old method
1991	Erwin Neher & Bert Sakmann	"for their discoveries concerning the function of single ion channels in cells"	method (which stimulated theory)	"The two German cell physiologists . . . have together developed a technique that allows the registration of the incredibly small electrical currents . . . this new knowledge and this new analytical tool has during the past ten years revolutionized modern biology, facilitated research, and contributed to the understanding of . . ."	http://nobelprize.org/nobel_prizes/medicine/laureates/1991/press.html	"The two German cell physiologists . . . have together developed a technique that allows the registration of the incredibly small electrical currents . . . this new knowledge and this new analytical tool has during the past ten years revolutionized modern biology, facilitated research, and contributed to the understanding of . . ."
1992	Edmond H. Fischer & Edwin G. Krebs	"for their discoveries concerning 'reversible protein phosphorylation as a biological regulatory mechanism'"	method (which stimulated theory)	"They purified and characterized the first enzyme of this type . Their fundamental finding initiated a research area which today is one of the most active and wide-ranging."	http://www.nobel.se/medicine/laureates/1992/press.html	discovery probably using existing methods: "They purified and characterized the first enzyme of this type. Their fundamental finding initiated a research area which today is one of the most active and wide-ranging."
1993	Richard J. Roberts & Phillip A. Sharp	"for their discovery of 'split genes' "	method (which stimulated theory)	"independently discovered that genes could be discontinuous, that is, a given gene could be present in the genetic material (DNA) as several, well-separated segments. . . . Roberts' and Sharp's discovery has changed our view on how genes in higher organisms develop during evolution."	http://www.nobel.se/medicine/laureates/1993/press.html	discovery: "One of several possible explanations was that the DNA segment corresponding to this end was not located in the immediate vicinity of the rest of the gene. To determine where this segment was located on the long DNA molecule, they used electron microscopy. They surprisingly found"
1994	Alfred G. Gilman & Martin Rodbell	"for their discovery of 'G-proteins and the role of these proteins in signal transduction in cells'"	theory & method	[press release doesn't make it clear whether the contribution should be regarded as theory or method; so it will be treated as half of each]	http://www.nobel.se/medicine/laureates/1994/press.html	
1995	Edward B. Lewis, Christiane Nüsslein-Volhard, & Eric F. Wieschaus	"for their discoveries concerning 'the genetic control of early embryonic development'"	method	"Using Drosophila Nüsslein-Volhard and Wieschaus were able to identify and classify a small number of genes that are of key importance in determining the body plan and the formation of body segments."	http://www.nobel.se/medicine/laureates/1995/press.html	"The strategy used by the two young scientists was novel. It established that genes controlling development could be systematically identified."

NOBEL PRIZES FOR PHYSIOLOGY OR MEDICINE 1991-2011

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1996	Peter C Doherty & Rolf M Zinkernagel	"for their discoveries concerning 'the specificity of the cell mediated immune defence'"	method (which stimulated theory)	"there was an unexpected discovery : the T-lymphocytes ... were not able to kill virus-infected cells from another strain of mice. What decided whether or not a cell was eliminated by these killer lymphocytes was [whether] they carried the 'correct' variant of histocompatibility antigens, those of the infected mouse itself."	http://www.nobel.se/medicine/laureates/1996/press.html	"there was an unexpected discovery : the T-lymphocytes, even though they were reactive against that very virus, were not able to kill virus-infected cells from another strain of mice. What decided whether or not a cell was eliminated by these killer lymphocytes was not only if they were infected with the virus, but also if they carried the "correct" variant of histocompatibility antigens, those of the infected mouse itself."
1997	Stanley B. Prusiner	"for his discovery of 'Prions - a new biological principle of infection'"	method (which stimulated theory)	"in 1982 he and his colleagues successfully produced a preparation derived from diseased hamster brains that contained a single infectious agent. All experimental evidence indicated that the infectious agent was comprised of a single protein, and Prusiner named this protein a prion, an acronym derived from 'proteinaceous infectious particle.'"	http://www.nobel.se/medicine/laureates/1997/press.html	The press release indicates that the award was for a long series of studies that appeared to (very perseveringly) use methods related to ones used previously to isolate genes and demonstrate their function.
1998	Robert F. Furchtgott, Louis J. Ignarro, & Ferid Murad	"for their discoveries concerning 'nitric oxide as a signalling molecule in the cardiovascular system'" (RFF & LJI produced results that FM interpreted theoretically)	method (which stimulated theory)	"Furchtgott ... demonstrated in an ingenious experiment that acetylcholine dilated blood vessels only if the endothelium was intact. He concluded that blood vessels are dilated because the endothelial cells produce an unknown signal molecule that makes vascular smooth muscle cells relax"	http://www.nobel.se/medicine/laureates/1998/press.html	"Furchtgott ... demonstrated in an ingenious experiment that acetylcholine dilated blood vessels only if the endothelium was intact. He concluded that blood vessels are dilated because the endothelial cells produce an unknown signal molecule that makes vascular smooth muscle cells relax "
1999	Günter Blobel	"for the discovery that 'proteins have intrinsic signals that govern their transport and localization in the cell'"	theory	" [Blobel] postulated that proteins secreted out of the cell contain an intrinsic signal that governs them to and across membranes. ... Based on elegant biochemical experiments, Blobel described in 1975 the various steps in these processes."	http://www.nobel.se/medicine/laureates/1999/press.html	

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2000	Arvid Carlsson, Paul Greengard & Eric Kandel	"for their discoveries concerning 'signal transduction in the nervous system'"	method (1/3 existing method)	"have made pioneering discoveries concerning one type of signal transduction between nerve cells, referred to as slow synaptic transmission"	http://www.nobel.se/medicine/laureates/2000/press.html	"Arvid Carlsson developed an assay that made it possible to measure tissue levels of dopamine with high sensitivity." "Paul Greengard showed that slow synaptic transmission involves a chemical reaction called protein phosphorylation." "With the nervous system of a sea slug as experimental model [Eric Kandel] has demonstrated how changes of synaptic function are central for learning and memory."
2001	Leland H. Hartwell, R. Timothy (Tim) Hunt, & Paul M. Nurse	"for their discoveries of 'key regulators of the cell cycle'"	method	" seminal discoveries concerning the control of the cell cycle. They have identified key molecules that regulate the cell cycle in all eukaryotic organisms"	http://www.nobel.se/medicine/laureates/2001/press.html	"[Leland Hartwell] used baker's yeast, <i>Saccharomyces cerevisiae</i> , as a model system, which proved to be highly suitable for cell cycle studies." "He used a different type of yeast, <i>Schizosaccharomyces pombe</i> , as a model organism." "The discovery of cyclin, which was made using sea urchins, <i>Arbacia</i> , as a model system..."
2002	Sydney Brenner, H. Robert Horvitz, & John E. Sulston	"for their discoveries concerning 'genetic regulation of organ development and programmed cell death'"	method	"By establishing and using the nematode <i>Caenorhabditis elegans</i> as an experimental model system , possibilities were opened to follow cell division and differentiation from the fertilized egg to the adult."	http://www.nobel.se/medicine/laureates/2002/press.html	"By establishing and using the nematode <i>Caenorhabditis elegans</i> as an experimental model system , possibilities were opened to follow cell division and differentiation from the fertilized egg to the adult."
2003	Paul C. Lauterbur & Peter Mansfield	"for their discoveries concerning magnetic resonance imaging"	method	Lauterbur "described how addition of gradient magnets to the main magnet made it possible to visualize a cross section of tubes with ordinary water surrounded by heavy water." Mansfield "utilized gradients in the magnetic field in order to more precisely show differences in the resonance."	http://www.nobel.se/medicine/laureates/2003/press.html	Lauterbur "described how addition of gradient magnets to the main magnet made it possible to visualize a cross section of tubes with ordinary water surrounded by heavy water." Mansfield "utilized gradients in the magnetic field in order to more precisely show differences in the resonance."

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2004	Richard Axel & Linda B. Buck	"for their discoveries of odorant receptors and the organization of the olfactory system"	method	". . . examined the sensitivity of individual olfactory receptor cells to specific odorants. By means of a pipette, they . . . showed exactly which odorant receptor gene was expressed in that cell. . . . " . . . showed that receptor cells carrying the same type of receptor converge their processes into the same glomerulus, and Axel's research group used sophisticated genetic technology to demonstrate in mice the role of the receptor in this process."	http://www.nobel.se/medicine/laureates/2004/press.html	". . . examined the sensitivity of individual olfactory receptor cells to specific odorants. By means of a pipette, they . . . showed exactly which odorant receptor gene was expressed in that cell. . . . " . . . showed that receptor cells carrying the same type of receptor converge their processes into the same glomerulus, and Axel's research group used sophisticated genetic technology to demonstrate in mice the role of the receptor in this process."
2005	Barry J. Marshall & J. Robin Warren	"for their discovery of the bacterium <i>Helicobacter pylori</i> and its role in gastritis and peptic ulcer disease"	method	"together they initiated a study of biopsies from 100 patients. After several attempts, Marshall succeeded in cultivating a hitherto unknown bacterial species (later denoted <i>Helicobacter pylori</i>) from several of these biopsies."	http://nobelprize.org/nobel_prizes/medicine/laureates/2005/press.html	"together they initiated a study of biopsies from 100 patients. After several attempts, Marshall succeeded in cultivating a hitherto unknown bacterial species (later denoted <i>Helicobacter pylori</i>) from several of these biopsies. "
2006	Andrew Z. Fire & Craig C. Mello	"for their discovery of RNA interference - gene silencing by double-stranded RNA"	method	"Their discovery clarified many confusing and contradictory experimental observations and revealed a natural mechanism for controlling the flow of genetic information. This heralded the start of a new research field. "	http://nobelprize.org/nobel_prizes/medicine/laureates/2006/press.html	" After a series of simple but elegant experiments, Fire and Mello deduced that double-stranded RNA can silence genes, that this RNA interference is specific for the gene whose code matches that of the injected RNA molecule, and that RNA interference can spread between cells and even be inherited. "
2007	Mario R. Capecchi, Sir Martin J. Evans, & Oliver Smithies	"for their discoveries of principles for introducing specific gene modifications in mice by the use of embryonic stem cells"	method	"Their discoveries led to the creation of an immensely powerful technology referred to as gene targeting in mice. It is now being applied to virtually all areas of biomedicine – from basic research to the development of new therapies."	http://nobelprize.org/nobel_prizes/medicine/laureates/2007/press.html	" Their discoveries led to the creation of an immensely powerful technology referred to as gene targeting in mice. It is now being applied to virtually all areas of biomedicine – from basic research to the development of new therapies. "
2008	Harald zur Hausen	"for his discovery of human papilloma viruses causing cervical cancer"	theory & method	" Against the prevailing view during the 1970s, Harald zur Hausen postulated a role for human papilloma virus (HPV) in cervical cancer. . . . Harald zur Hausen pursued this idea for over 10 years by searching for different HPV types"	http://nobelprize.org/nobel_prizes/medicine/laureates/2008/press.html	

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2008	Françoise Barré-Sinoussi & Luc Montagnier	"for their discovery of human immunodeficiency virus"	method	"By 1984, Barré-Sinoussi and Montagnier had obtained several isolates of the novel human retrovirus , which they identified as a lentivirus Barré-Sinoussi and Montagnier's discovery made rapid cloning of the HIV-1 genome possible. "	http://nobelprize.org/nobel_prizes/medicine/laureates/2008/press.html	Descriptions in the press release do not mention any newly created methods.
2009	Elizabeth H. Blackburn, Carol W. Greider, & Jack W. Szostak	"for the discovery of how chromosomes are protected by telomeres and the enzyme telomerase"	method	"Elizabeth Blackburn and Jack Szostak discovered that a unique DNA sequence in the telomeres protects the chromosomes from degradation. Carol Greider and Elizabeth Blackburn identified telomerase , the enzyme that makes telomere DNA. These discoveries explained how the ends of the chromosomes are protected by the telomeres and that they are built by telomerase. . . . a discovery that has stimulated the development of new therapeutic strategies. "	http://nobelprize.org/nobel_prizes/medicine/laureates/2009/press.html	Descriptions in the press release do not mention any newly created methods.
2010	Robert G. Edwards	"for the development of in vitro fertilization"	method	"His efforts were finally crowned by success on 25 July, 1978, when the world's first "test tube baby" was born. During the following years, Edwards and his co-workers refined IVF technology and shared it with colleagues around the world."	http://nobelprize.org/nobel_prizes/medicine/laureates/2010/press.html	"His efforts were finally crowned by success on 25 July, 1978, when the world's first "test tube baby" was born. During the following years, Edwards and his co-workers refined IVF technology and shared it with colleagues around the world."
2011	Bruce A. Beutler & Jules A. Hoffmann	"for their discoveries concerning the activation of innate immunity"	method	"[Hoffman] had access to flies with mutations in several different genes including Toll. . . . When Hoffmann infected his fruit flies with bacteria or fungi, he discovered that Toll mutants died because they could not mount an effective defense." "Beutler and his colleagues discovered that mice resistant to LPS had a mutation in a gene that was quite similar to the Toll gene of the fruit fly. This Toll-like receptor (TLR) turned out to be the elusive LPS receptor."	http://www.nobelprize.org/nobel_prize/medicine/laureates/2011/press.html	Descriptions in the press release do not mention any newly created methods.
2011	Ralph M. Steinman	"for his discovery of the dendritic cell and its role in adaptive immunity"	method	"Ralph Steinman discovered, in 1973, a new cell type that he called the dendritic cell. . . . In cell culture experiments, he showed that the presence of dendritic cells resulted in vivid responses of T cells to such substances."	http://www.nobelprize.org/nobel_prize/medicine/laureates/2011/press.html	Descriptions in the press release do not mention any newly created methods.

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	48 awardees					The coding for 2001 assumes that developing a novel model organism is more properly treated as newly invented (than existing) method

NOBEL PRIZES TO PSYCHOLOGICAL RESEARCHERS POST WORLD WAR II

Year	Laureate Name	Contribution Citation	Type of Contribution	Supporting Material from Press Release	URL for Nobel Foundation press release
1949	Walter Rudolf Hess	for his discovery of the functional organization of the interbrain as a coordinator of the activities of the internal organs	method	Through the use of a refined and accurate technique he has succeeded in applying stimulation to or causing the destruction of very small areas, and thus he has been able to study the effect of the stimulus, as well as of the disappearance of a function	http://nobelprize.org/nobel_prizes/medicine/laureates/1949/press.html
1961	Georg von Békésy	for his discoveries of the physical mechanism of stimulation within the cochlea	method	Von Békésy's distinction is, however, to have recorded the events in this fragile biological miniature system. Authorities in this field evaluate the elaborate technique which he developed for this purpose as being worthy of a genius. By microdissection he reaches anatomical structures difficult of access, uses advanced teletechnique for stimulation and recording, and employs high magnification stroboscopic microscopy for making apparent complex membrane movements, the amplitudes of which are measured in thousandths of the millimeter.	http://nobelprize.org/nobel_prizes/medicine/laureates/1961/press.html
1967	Ragnar Granit, Haldan K. Hartline, George Wald	for their discoveries concerning the primary physiological and chemical visual processes in the eye	method	We honour Ragnar Granit for his discovery of elements in the retina possessing differential spectral sensitivities as determined by means of electrophysiological methods. The first work together with Svætichin appeared in 1939. It was followed by an impressive series of investigations which led to the conclusion that there are different types of cones representing three characteristic spectral sensitivities.	http://nobelprize.org/nobel_prizes/medicine/laureates/1967/press.html
1973	Karl von Frisch	for their discoveries concerning organization and elicitation of individual and social behaviour patterns	method	observational studies to deduce means of communicating direction and distance of food source	http://nobelprize.org/nobel_prizes/medicine/laureates/1973/press.html
1973	Konrad Lorenz		method	observational studies of imprinting	
1973	Nikolaas Tinbergen		method	experiments to determine the nature of releaser stimuli for instinctive behavior	
1981	Roger W. Sperry	for his discoveries concerning the functional specialization of the cerebral hemispheres	method	In experiments on monkeys Sperry found that, if these connections were severed, each cerebral hemisphere would retain its ability to learn, but that what had been learned by one hemisphere was not accessible to the other. [H]e was able, through brilliantly designed test procedures, to show that each cerebral hemisphere in these patients had its own world of consciousness and was entirely independent of the other with regard to learning and retention	http://nobelprize.org/nobel_prizes/medicine/laureates/1981/press.html
1981	David H. Hubel, Torsten N. Wiesel	for their discoveries concerning information processing in the visual system	method	By tapping nerve-cell impulses in the various layers of the visual cortex, Hubel and Wiesel have been able to demonstrate that the message reaching the brain from the eyes undergoes an analysis in which the various components of the retinal image are interpreted with respect to their contrasts, linear patterns and the movement of the image across the retina	http://nobelprize.org/nobel_prizes/medicine/laureates/1981/press.html

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Year	Laureate Name	Contribution Citation	Type of Contribution	Supporting Material from Press Release	URL for Nobel Foundation press release
2000	Avid Carlsson, Paul Greengard, Eric Kandel	for their discoveries concerning signal transduction in the nervous system	method	With the nervous system of a sea slug as experimental model he has demonstrated how changes of synaptic function are central for learning and memory.	http://nobelprize.org/nobel_prizes/medicine/laureates/2000/press.html
2002	Daniel Kahneman	for having integrated insights from psychological research into economic science, especially concerning human judgment and decision-making under uncertainty	method & theory	Kahneman's main findings concern decision-making under uncertainty, where he has demonstrated how human decisions may systematically depart from those predicted by standard economic theory. Together with Amos Tversky (deceased in 1996), he has formulated prospect theory as an alternative, that better accounts for observed behavior	http://nobelprize.org/nobel_prizes/economics/laureates/2002/press.html