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July 19-20, 2024: Konya, Turkey

PROCEEDING BOOK OF 4TH INTERNATIONAL CONFERENCE ON SCIENTIFIC AND ACADEMIC RESEARCH ICSAR 2024

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INTRODUCTION

We had the great honor of organizing the ICSAR 2024. It was truly a great pleasure for us togreet a lot of participants from many different countries attending ICSAR 2024! We firmly believe that the conference will become an important international event in the field of cross-industry discussion about innovations in Academic Studies.

ICSAR 2024 was organized by All Science Academy located in Konya, Turkey.

Three cooperating organizations supported the two-day conference. There were 426 papers accepted for presentation at ICSAR 2024, contributed from different countries. We had plenary speeches and several well-known scientists and experts, to give invited talks at differentsessions.

The purpose of ICSAR 2024 was to provide a forum for the participants to report and review innovative ideas, with up-to-date progress and developments, and discuss novel approaches to the application in the field of their own research areas and discuss challenges of doing science.

We sincerely hope that the exchange of ideas on doing research, science and improving education will help the participants, and international cooperation sharing the common interest will be enhanced.

On behalf the Organization Committee of ICSAR 2024, we would like to heartily thank our cooperating organizations for all they have done for the conference. We would also like to thank the authors for their contribution to the proceedings; the participants and friends of ICSAR 2024, for their interest and efforts in helping us to make the conference possible; and the Editorial boards for their effective work and valuable advice, especially the ICSAR 2024 secretariat and the ICSAR 2024 staff, for their tireless efforts and outstanding services in preparing the conference and publishing the Proceedings.

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ICSAR 2024



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Abstract Book

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An Innovative Program to Train Future Nobel Laureates Belonging to Türkiye and Pakistan

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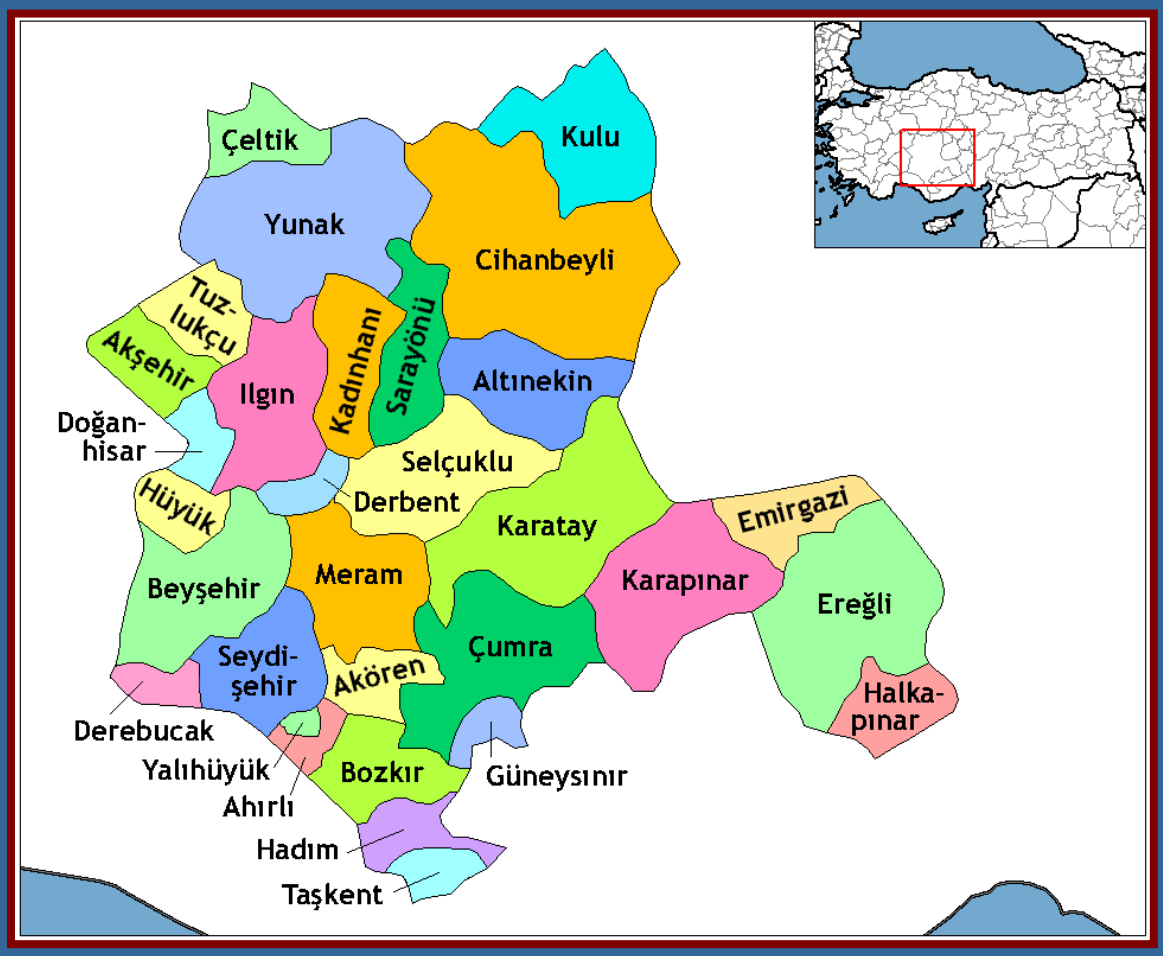
**profdrakamal@gmail.com*

Abstract – Alfred Nobel signed his final will on November 27, 1895, in which he wrote that his entire remaining estate should be used to endow "prizes to those who, during the preceding year, have conferred the greatest benefit to humankind". Nobel prizes are awarded in 5 categories, *viz.* chemistry, literature, peace, physiology and medicine as well as physics combined with the Sveriges Riksbank prize in economic sciences. However, most of the prizes are bagged by persons belonging to United States or Western Europe. Türkiye and Pakistan, each, are honored with 2 prizes (Orhan Pamuk and Aziz Sancar from Türkiye; Abdus Salam¶ and Malala Yousafzai from Pakistan — another one from British India, now in the territory of Pakistan, Subrahmanyan Chandrashekar) The author has been motivating university students through lectures delivered before the announcement of Nobel prizes in physiology and medicine as well as physics, the effort appreciated by Göran K. Hansson, Secretary General of the Royal Swedish Academy of Sciences (2015-2022). As assignment of a physics course taught at SZABIST in 2017, the author asked each student to submit a writeup and give a presentation on the life history, the significance of contribution, which merited award of Nobel prize as well as the personal qualities and the work ethics of a Nobel laureate in physics. In mathematical physics courses, taught during the fall term (second semester in University of Karachi), the author required the students to submit (in a sealed envelope) their proposed nominations of person(s) to be awarded Nobel prize in physics by September 30, with a promise to grant them bonus marks, if their nominations matched the actual award. These activities and exercises encouraged the students to study the work of Nobel laureates and motivated them to achieve excellence in the subject. In order to produce future Nobel laureates belonging to Türkiye and Pakistan, a systematic approach needs to be developed from the primary-level teaching, where students, having the willingness and the ability to think out-of-box as well as showing signs of creative thinking and critical analysis, are enrolled in enrichment programs, in which they are introduced to the life history and the struggle (like that of Marie Curie, née Skłodowska) of past winners of Nobel prize. In the secondary school, the same pupils are introduced to the significance of work of these luminaries (Nobel laureates) and in the university, these seekers of knowledge are asked to, critically, analyze the Nobel-prize winners' contributions as well as identify cutting-edge topics, which, if sysematically taken up, could win such a prize. One should realize that twenties are the formative years, in which there are avalanches of ideas, at times resulting in key contributions by prospective Nobel laureates. Examples are P. A. M. (Paul Andrian Maurice) Dirac and Lois-Victor de Broglie.

Keywords – Alfred Nobel, Karolinska Institutet, Nobel-prize announcement, Nobel-prize categories, Royal Swedish Academy of Sciences

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¶The author had the honor to meet Abdus Salam at ICTP during 1988 and P. A. M. Dirac at Fermilab during 1980 — had audience with Hans Albercht Bethe, William A. (Alfred) Fowler, Willis E. (Eugene) Lamb, T. D. (Tsung-Dao) Lee, Roger Pensrose (did not receive Nobel prize at that time), Julian Schwinger and Steven Weinberg; listened to Carl D. (David) Anderson's lecture via telephone line as well as corresponded with Eugene P. (Paul) Wigner


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Kulu
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Emirgazi
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Akören
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I. INTRODUCTION

Nobel Prizes are the most prestigious prizes, people receive during their lifetime. All other honors pale

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Table 1*a*. Announcement of the 2024 Nobel prizes, to be live streamed at https://www.nobelprize.org/prize-announcement-dates/

Day and Date	*Category*	*Awarding Institution*	*CEST*[§]	*TRT*[§]	*PKT*[§]
Monday, October 7, 2024	Physiology or Medicine	Karolinska Institutet[¶]	1130h	1230h	1430h
Tuesday, October 8, 2024	Physics	Royal Swedish Academy of Sciences[¶]	1145h	1245h	1445h
Wednesday, October 9, 2024	Chemistry	Royal Swedish Academy of Sciences[¶]	1145h	1245h	1445h
Thursday, October 10, 2024	Literature	The Swedish Academy[¶]	1300h	1400h	1600h
Friday, October 11, 2024	Peace	Committee elected by Stortinget[§]	1100h	1200h	1400h
Monday, October 14, 2024	Economic Sciences	Royal Swedish Academy of Sciences[¶]	1145h	1245h	1445h

[§]CEST**:** Central European Summer Time, sometimes referred to as CEDT (Central European Daylight Time) — Swedish Local Time, UTC (Coördinated Universal Time) + 2h (applicable in October 2024)
PKT**:** Pakistan Standard Time, UTC + 5h
TRT**:** Türkiye Standard Time, UTC + 3h
[¶]Stockholm, Sweden
[§]Norwegian Parliament, Oslo, Norway

into insignificance, once an individual becomes a Nobel laureate. The Nobel prizes consist of 5 separate prizes given to those individuals or organizations, who, during the preceding year, have contributed some work of significance, which render the greatest benefit to humankind. It was established by the 1895 will of Swedish chemist, engineer, and industrialist, Alfred Nobel, in the year before he died. The first prizes were awarded on December 10, 1901, 122-*year* ago.

Unfortunately, the share of third-world countries in this unique honor has been very small. In this paper, the author has tried to give a brief history of the Nobel prizes, details of Nobel prizes won by citizens of Türkiye and Pakistan as well as a review of the contemporary topics, which merited the award of Nobel prizes. In addition, suggestions have been given to increase the share of Nobel prizes won by persons belonging to third-world counties, in particular, Türkiye and Pakistan.

II. A Brief History of Nobel Prizes

Born in Stockholm on October 21, 1833, Alfred Nobel was a descendant of Olof Rudbeck. Alfred Nobel affixed his signatures on his third and final will dated November 27, 1895, opened and read after his death on December 10, 1896 in San Remo, Italy. In this will, he wrote that all of his remaining assets should be utilized to award "prizes to those who, during the preceding year, have conferred the greatest benefit to humankind". Nobel prizes are given in the following categories, *viz.* chemistry, literature, peace, physics as well as physiology and medicine (listed alphabetically) combined with the Sveriges Riksbank prize in economic sciences, with the status of Nobel prize. However, it is a fact that most of the prizes are won by men and women of science and letters belonging to United States or Western Europe.

Nobel prizes in different categories are announced during October of each year (schedule of 2024 announcements appears in Table 1*a*). The award ceremonies (Table 1*b* gives details of 2024 ceremonies) are held

Table 1*b*. Ceremonies for award of the 2024 Nobel prizes, to be live streamed at https://www.nobelprize.org/nobel-prize-award-cermonies/

Day and Date	*Category*	*City and Country*	*CET*[ç]	*TRT*	*PKT*
Tuesday, December 10, 2024	Physiology or Medicine	Stockholm, Sweden	1600h	1800h	2000h
Tuesday, December 10, 2024	Physics	Stockholm, Sweden	1600h	1800h	2000h
Tuesday, December 10, 2024	Chemistry	Stockholm, Sweden	1600h	1800h	2000h
Tuesday, December 10, 2024	Literature	Stockholm, Sweden	1600h	1800h	2000h
Tuesday, December 10, 2024	Peace	Oslo, Norway	1300h	1500h	1700h
Tuesday, December 10, 2024	Economic Sciences	Stockholm, Sweden	1600h	1800h	2000h

[ç]CET**:** Central European Time — Swedish Local Time, UTC + 1h (applicable in December 2024)

Table 2. Timeline for selection of the 2024 Nobel laureates
https://www.nobelprize.org/nomination-and-selection-of-nobel-laureates/

Timeline	*Action*
September 2023	Invitation to nominate sent out
January 31, 2024	Deadline for submission of nominations
March-May 2024	Evaluation reports prepared
June-August 2024	Evaluation work in progress
September 2024	The Nobel committee submits recommendations
October 2024	The Nobel prizes in various disciplines are announced (see Table 1*a* for detailed schedule)
December 10, 2024	The Nobel prizes in various disciplines are awarded (see Table 1*b* for detailed schedule)

in Oslo, Norway and Stockholm, Sweden on December 10 of each year, the death anniversary of Alfred Nobel. Timeline of nomination, announcement and award of Nobel prizes is available in Table 2. There are many activities during the Nobel week, *e. g.*, Nobel-prize-teacher summit
https://www.nobelprize.org/education-network-nobel-prize-teacher-summit/
Nobel minds (forum) https://www.nobelprize.org/nobel-minds/, press conferences by Nobel laureates, Nobel lectures in chemistry, literature, physics, physiology and medicine as well as economic sciences combined with acceptance speech by the Nobel peace laureate
https://www.nobelprize.org/streams-during-nobel-week-2024/
Details of these as well as the history and the policies for the award of Nobel prizes are available on the Nobel-prize website https://www.nobelprize.org

III. Author's Passion for Nobel Prizes and Nobel Laureates

The author has been motivating the next generation through talks given before the announcement of Nobel Prizes in the physiology or medicine [1] as well as physics [2], the effort recognized by the Secretary General of the Royal Swedish Academy of Sciences (2015-2022), Göran K. Hansson (Fig. 1).

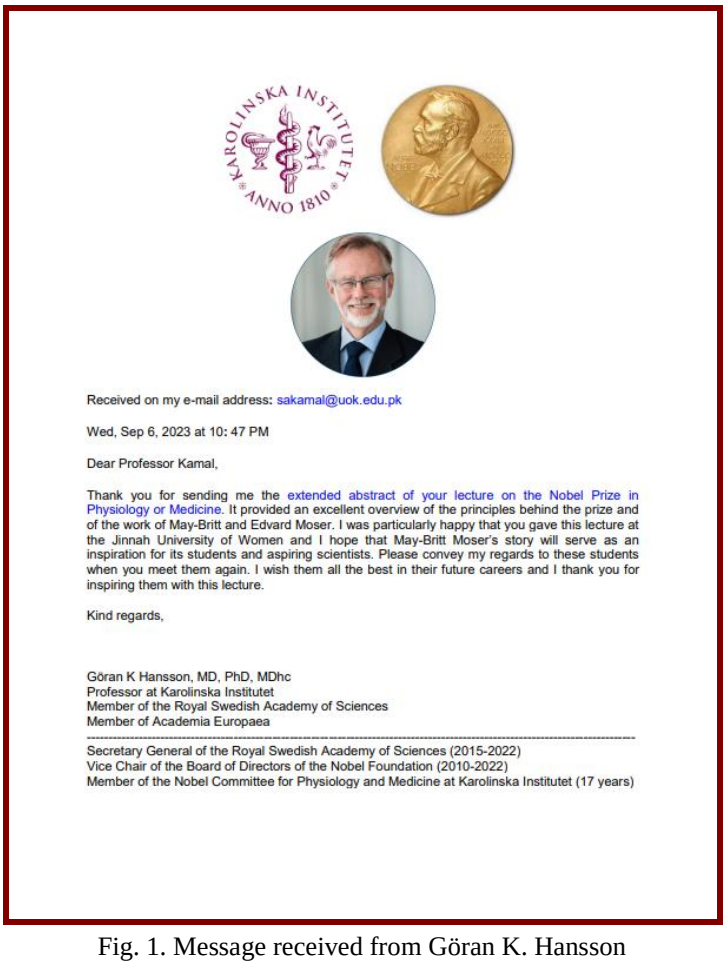


Fig. 1. Message received from Göran K. Hansson



Fig. 2*a*, *b*. Nobel laureates belonging to Türkiye — (*a*) Orhan Pamuk and (*b*) Aziz Sancar

The author gave an assignment in a physics course[1] ([1] denotes 'endnote') taught at SZABIST in 2017. In this assignment, the author asked each student to select a Nobel laureate in physics, prepare a writeup and present in front of the class, outlining the life history, the significance of contribution (which merited award of the Nobel prize) as well as the personal qualities and the work ethics of the individual. For many years, the author taught mathematical-physics course during the fall term (second semester in University of Karachi). As part of this course assignment, the author required the students to study thoroughly cutting-edge work in physics, prepare nominations for that year's Nobel prize in physics and submit (in a sealed envelope) their proposed nominations by September 30, with a promise to grant them bonus marks, if their nominations matched the actual award. The motivation of these activities and exercises is to encourage the students to explore the work of recent Nobel laureates, so that they may achieve excellence in the subject.

The author had the honor to meet P. A. M. (Paul Andrian Maurice) Dirac[2] at Fermilab (the Fermi National Accelerator Laboratory, Bativa, Illinois, United States) during 1980 and Abdus Salam[3] at ICTP (International Center for Theoretical Physics, Trieste, Italy, renamed the Abdus Salam International Center for Theoretical Physics, after his death) during 1988. Further, he had audience with Hans Albrecht Bethe[4], William A. (Alfred) Fowler[5], Willis E. (Eugene) Lamb[6], T. D. (Tsung-Dao) Lee[7], Roger Penrose[8] (did not receive Nobel prize at that time), Julian Schwinger[9] and Steven Weinberg[10]. He got an opportunity to listen to lecture of Carl D. (David) Anderson[11] via telephone line as well as corresponded with Eugene P. (Paul) Wigner[12], who sent the author Christmas card.

IV. Past Nobel Laureates from Türkiye and Pakistan

To date, there are only 2 Nobel-prize winners belonging to Türkiye. Orhan Pamuk[13] (Fig. 2*a*) was awarded the 2006 Nobel prize in literature — prize motivation**:** "who in the quest for the melancholic soul of his native city has discovered new symbols for the clash and (the) interlacing of cultures" (exact quote from the Nobel-prize website, words in paratheses added by the author). He was born on June 7, 1952 in Istanbul, Türkiye. The other Nobel laureate is Aziz Sancar[14] (Fig. 2*b*), who received the 2015 Nobel prize in chemistry (shared with Tomas Lindhal[15] and Paul Modrich[16]) — prize motivation**:** "for the mecha-nistic studies of DNA repair" (exact quote from the Nobel-prize website). He was born on September 8, 1946 in Savur, Türkiye.

Pakistan, also, has the honor to produce 2 Nobel-prize winners. Abdus Salam[3] (Fig. 3*a*) was awarded the 1979 Nobel prize in physics (shared with Sheldon Glashow[17] and Steven Weinberg[10]) — prize motivation**:** "for their contributions to the theory of the unified weak and electromagnetic interaction between elementary particles, including, inter alia, the prediction of the weak neutral current" (exact quote from the Nobel-prize website). He was born on January 29, 1926 in Jhang Maghiāna, British India (now in the territory of Pakistan) and passed away on November 21, 1996 in Oxford, England. He remained a Pakistani citizen during August 14, 1947 – November 21, 1996. The author dedicated his pre-Nobel-prize-



Fig. 3*a*, *b*. Nobel laureates belonging to Pakistan — (*a*) Abdus Salam and (*b*) Malala Yousafzai

announcement seminar on October 2, 2018 to the loving memory of Professor Salam[3] — the extended abstract of this seminar contains detailed biography of Salam[3] [2]. The other Nobel laureate is Malala Yousafzai[18] (Fig. 3*b*), who received the 2014 Nobel prize in peace (shared with Kailash Satyarthi[19]), holding the honor of the youngest Nobel laureate in human history, who received her Nobel prize on December 10, 2014 at the age of 17 *years* 04 *months* 28 *days* — prize motivation**:** "for their struggle against the suppression of children and young people and for the right of all children to education" (exact quote from the Nobel-prize website). She was born on July 12, 1997 in Mingora, Pakistan. Another astrophysicist, Subrahmanyan Chandrashekar[20], was born on October 19, 1910 in Lahore, British India (now in the territory of Pakistan) and passed away on August 21, 1995 in Chicago, Illinois, United States, who was awarded the 1983 Nobel prize in physics (shared with William A. Fowler[5]) — prize motivation**:** "for his theoretical studies of the physical processes of importance to the structure and (the) evolution of the stars" (exact quote from the Nobel-prize website, words in paratheses added by the author).

V. Future Nobel Laureates from Türkiye and Pakistan

In order to train more persons belonging to Türkiye and Pakistan to win Nobel prizes, a systematic approach must be developed right from the primary-education years, where students, full of energy and aspiration, having the willingness and the ability for out-of-box thinking as well as demonstrating signs of creative thinking and critical analysis [3], are given opportunities to enroll in enrichment programs, in which they are taught about the life history and the struggle (like that of Marie Curie, née Skłodowska[21]) of past Nobel laureates. In the secondary school, the same pupils are educated about the significance of work of these luminaries (Nobel prize winners) and in the university, these seekers of knowledge are required to, critically, analyze the Nobel laureates' contributions as well as recognize cutting-edge topics, which, if systematically taken up, could win a Nobel prize. The most productive period of life is the twenties, when there are avalanches of ideas, at times resulting in seminal contributions by prospective Nobel laureates. Examples are Dirac[2] and Lois-Victor de Broglie[22].

One of the most important factors to achieve this goal is to establish institutions, which groom and nurture minds and identify budding geniuses — right from the primary-school level [4] all the way to university. There is a need to establish MIT-standard institutions in both Türkiye and Pakistan [5] and upgrade their existing institutions (which have the potential) to reach top ranking in Asia [6]. When a prodigy is discovered, it is recommended to let that child study in the regular system, supplemented by enrichment classes and advanced courses from other seats of learning (like MIT open courseware) complemented by ZOOM sessions with experts in the field. This way, the child's personality is developed through social interaction and sport activities among students of the same age (same build for contact sport). To take out the child from a regular school and put that individual among advanced students of older ages

Table 3*a*. Nobel prizes in chemistry awarded during the last 5 *years* (2019-2023)
https://www.nobelprize.org/prizes/chemistry/

Year	*Awardee*(*s*)	*Prize Motivation from the Nobel-Prize Website*
2023	Moungi Bawendi, Louis Brus and Aleksey Yekimov	For the discovery and synthesis of quantum dots
2022	Carolyn Bertozzi , Morten Meldal and K. (Karl) Barry Sharpless	For the development of click chemistry and bio-orthogonal chemistry
2021	Benjamin List and Sir David W.C. (Willam Cross) MacMillan	For the development of asymmetric organo-catalysis
2020	Emmanuelle Charpentier and Jennifer A. (Anne) Doudna	For the development of a method for genome editing
2019	John B. (Bannister) Goodenough, Sir M. (Michael) Stanley Whittingham and Akira Yoshino	For the development of lithium-ion batteries

may become disastrous for that child from the psychological point of view.

VI. Strategies to be Adopted by Groups Aspiring to Win a Nobel Prize

For groups trying to achieve excellence to the level that they are considered for the award of Nobel prize, they should, carefully, study work habits of previous Nobel awardees and significance of their contributions. They should familiarize themselves with the current trends in cutting-edge research in their respective fields, assemble a slightly-better group, arrange some slightly-better laboratory equipment and develop a few slightly-better techniques (adapted from a talk of A. K. Jonscher in Department of Physics, University of Karachi). In order to familiarize the students with the current trend in the selection of Nobel laureates, the author has complied names of the Nobel laureates and their prize-winning work during the last 5 years (2019-2023).

Chemistry was the most important science that related to Alfred Nobel's own work. The invention of dynamite as well as the industrial processes he developed and employed were based upon chemical knowledge. Chemistry was the second prize area mentioned in Nobel's will. By looking at Table 3*a*, one notes that Nobel prizes in chemistry, during the past 5 years, have been awarded for the discovery and synthesis of quantum dots, for the development of click chemistry and bio-orthogonal chemistry as well as asymmetric organo-catalysis, a method for genome editing and lithium-ion batteries. Future prizes are expected on the interface of physics and chemistry, like the fourth law of thermodynamics [7, 8] or application of mathematical ideas to chemical processes, *e. g.*, shifting equilibria, steady states and non-equilibria.

Having broad cultural interests, Alfred Nobel his literary interests during his early youth, which lasted throughout his life. His library contained a rich as well as a broad selection of literature in various languages. During the last years of his life, he authored some fiction. Literature was the fourth prize area mentioned in Nobel's will. By looking at Table 3*b*, one notes that Nobel prizes in literature, during the last 5 years, have been awarded for Jon Fosse's innovative plays and prose which give voice to the unsayable, for the courage and clinical acuity with which Annie Ernaux uncovers the roots, estrangements and collective restraints of personal memory, for Abdulrazak Gurnah's uncompromising and compassionate continents, for Louise Glück's unmistakable poetic voice that with austere beauty makes individual existence

Table 3*b*. Nobel prizes in literature awarded during the last 5 *years* (2019-2023)
https://www.nobelprize.org/prizes/literature/

Year	*Awardee*(*s*)	*Prize Motivation from the Nobel-Prize Website*
2023	Jon Fosse	For his innovative plays and prose which give voice to the unsayable
2022	Annie Ernaux	For the courage and clinical acuity with which she uncovers the roots, estrangements and collective restraints of personal memory
2021	Abdulrazak Gurnah	For his uncompromising and compassionate penetration of the effects of colonialism and the fate of the refugee in the gulf between cultures and continents
2020	Louise Glück	For her unmistakable poetic voice that with austere beauty makes individual existence universal
2019	Peter Handke	For an influential work that with linguistic ingenuity has explored the periphery and the specificity of human experience

Table 3*c*. Nobel prizes in peace awarded during the last 5 *years* (2019-2023)
https://www.nobelprize.org/prizes/lists/all-nobel-peace-prizes/

Year	*Awardee(s)*	*Prize Motivation from the Nobel-Prize Website*
2023	Narges Mohummedi	For her fight against the oppression of women in Iran and her fight to promote human rights and freedom for all
2022	Ales Bialiatski, Memorial and Center for Civil Liberties	The Peace Prize laureates represent civil society in their home countries. They have for many years promoted the right to criticize power and protect the fundamental rights of citizens. They have made an outstanding effort to document war crimes, human right abuses and the abuse of power. Together they demonstrate the significance of civil society for peace and democracy
2021	Maria Ressa and Dmitry Muratov	For their efforts to safeguard freedom of expression, which is a precondition for democracy and lasting peace
2020	World Food Program	For its efforts to combat hunger, for its contribution to bettering conditions for peace in conflict-affected areas and for acting as a driving force in efforts to prevent the use of hunger as a weapon of war and conflict
2019	Abiy Ahmed Ali	For his efforts to achieve peace and international coöperation and, in particular, for his decisive initiative to resolve the border conflict with neighboring Eritrea

universal as well as for an influential work that with linguistic ingenuity has explored the periphery and the specificity of human experience. Future prizes may be awarded for raising the issue of the oppressed, for speaking against genocide as well as creating prose and poetry, which ignites the heart and vehemently shakes the soul (the last one adapted from a couplet of Poet of the East, Allama Sir Mohummed Iqbal).

Alfred Nobel expressed great interest in social issues and was involved in the peace movement. His acquaintance with Bertha von Suttner[23], a driving force in the international peace movement in Europe, shaped his views on peace. Bertha was, herself, later awarded the Nobel peace prize. Peace was the fifth and last prize area mentioned in Nobel's will. By looking at Table 3*c*, one notes that Nobel prizes in peace, during the past 5 years, have been awarded to incarcerated human-right activists, persons representing civil societies in their home countries and achieving peace and international coöperation, in particular, resolving border conflict in neighbouring country as well as safeguarding freedom of expression. World Food Organization was bestowed with this honor for its efforts to combat hunger in conflict-affected areas. Future prizes may be awarded on innovative approaches to achieving peace, *e. g.*, changing mindset of youngsters belonging to countries having conflicts through summer camps involving sport activities [9], developing an emotional-intelligence-based-primary-education system (6-*day* schooling with 3 days for academic activities and 3 alternate days for sport activities), which include depression-prevention and stress-release (aggression-reduction) exercises [4], extending to secondary, college and world-class university levels [5], establishing peace with the ecosystem by designing and constructing green towns, which have a balance of concrete structures and green spaces (dedicated-unidirectional, non-intersecting, leisure-walking/brisk-walking/jogging/running/cycling/biking/automobile lanes) [10], campaigning against underage and forced marriages [11-13] as well as classification and solution of childhood acute malnutrition [13, 14]. In addition, efforts to minimize soft corruption (a very significant problem in the third-world countries, retarding progress and prosperity of the ordinary people) may, also, be a candidate for a peace prize [15].

Physics was the discipline, which Alfred Nobel talked about first in his will from 1895. Toward the later part of the nineteenth century, physics was considered as the foremost of the sciences. Alfred Nobel's own research was, also, closely related to physics. Nobel prizes have been awarded both in the theoretical and the experimental physics. A deeper knowledge and an understanding of the physics as well as the mathematics behind the physical phenomenon [16] should end up in making notable contributions through creative thinking and critical analysis [3]. Of course, this means that the training of a physicist should start from concept building and end up in problem solving (in the classroom, in the laboratory, in the industry) [17]. The bold approach of Dirac[2] of not discarding the negative-energy eigenvalues in the Dirac hamiltonian as unphysical and interpreting them to represent positron brought Dirac[2], the 1933

Nobel prize in physics, for the theoretical prediction of positron, and Anderson[11], the 1936 Nobel prize in physics, for the experimental discovery of positron [16]. Albert Einstein[24] could not visualize the expansion of universe through his cosmological equation and ended up missing the important discovery, which in his own words was "the greatest blunder of my life". Another example of mathematics introducing new physics is the discovery of omega meson by Salam[3], who looked at the empty space in the group structure and interpreted it as omega meson. Examples of physics introducing new mathematics are, also, not uncommon. The examples are introduction of bosi numbers (which anti-commute) in the formulation of supersymmetry theory in an attempt to unify all forces of nature as well as definition of determinant of a general tensor [17], when the author was working on faster-than-light particles [18]. Many times, simplicity of ideas takes over elegance in mathematics. The initial formulation of special theory of relativity was not mathematically elegant, but based on simple ideas. It was Herman Minkowski, who introduced the four-dimensional-spacetime-vector-field formulation [19], which brought elegance to relativity theory by putting the equations in covariant form. The same goes with Glashow-Weinberg-Salam theory, which is based on simple ideas, but still needs mathematical elegance to be introduced by a mathematician. However, one, often, fails to realize that mathematics is the starting point of this journey to technology, a bridge through physics and engineering [20]. Many of the results in physics have a basis in mathematics, *e. g.*, continuity of the wave function in quantum mechanics (a discontinuity would imply momentum becoming infinite, corresponding to infinite force) as well as continuity of the first derivative of the wave function (a discontinuity would imply energy becoming infinite). These conditions help determine the arbitrary constants appearing in the wave function. The approach of a mathematician and a physicist to various physical formulae and concepts is, also, completely different. Take the example of two conservative forces**:**

$$Electrostatic\ Force = \frac{1}{4\pi \in_0}\frac{q_1 q_2}{r^2} \bullet Gravitational\ Force = -\frac{G m_1 m_2}{r^2}$$

A physicist realizes that electrostatic force is strong (coupling constant 1/137), whereas gravitational force is weak (coupling constant of the order of 10^{-39}). A mathematician realizes that both are inverse square, central and conservative forces by focusing on $1/r^2$ dependence of both forces. Hence, if the expression of electrical potential is derived once, no need to do that for the gravitational force again, just replace $1/\in_0$ with $4\pi G$, electrical charges with masses. Same goes with expressions of gravitational field inside and outside of a spherical-mass distribution from similar expressions for the electrostatic field as well as Gauss' law for gravitation. Even the concept of conservative forces is looked differently by a physicist and a mathematician. A physicist recognizes the conservative force as the one in which, the work done upon traversing a closed path by a (electrically-, gravitationally-) charged particle is zero, whereas a mathematician just looks at the expression of force. If this expression just depends on the generalized coördinates (not velocities, not higher-order derivatives, not time) then it is a *conservative force*, otherwise a *dissipative force*. By looking at Table 3*d*, one notes that Nobel prizes in physics during the last 5 years were awarded

Table 3*d*. Nobel prizes in physics awarded during the last 5 *years* (2019-2023)
https://www.nobelprize.org/prizes/physics/

Year	*Awardee*(*s*)	*Prize Motivation from the Nobel-Prize Website*
2023	Pierre Agostini, Ferenc Krausz and Anne L'Huillie	For experimental methods that generate attosecond pulses of light for the study of electron dynamics in matter
2022	Alain Aspect, John Clauser and Anton Zeilinger	For experiments with entangled photons, establishing the violation of Bell inequalities and pioneering quantum information science
2021	Syukuro Manabe, Klaus Hasselmann and Giorgio Parisi	For the physical modeling of Earth's climate, quantifying variability and reliably predicting global warming
2020	Roger Penrose, Reinhard Genzel and Andrea Ghez	For the discovery of a supermassive compact object at the center of our galaxy
2019	James Peebles, Michel Mayor and Didier Queloz	For the discovery of an exoplanet orbiting a solar-type star

for attosecond pulses of light for the study of electron dynamics in matter, entangled photons, establishing Bell-inequalities violation, physical modeling of earth's climate, discovery of supermassive compact object at our galaxy center as well as an exoplanet orbiting a solar-type star. Future Nobel prizes in physics may be awarded on avoiding infinities from the Lorentz and the Poincaré transformations [19], proposing the most general coördinate transformations (the scaled-Poincaré transformations) [21], investigating violation of the Kepler's second law of planetary motion [22], obtaining innovative solutions of the Einstein equation in cosmology [23], solving incompatibility problem of general relativity and quantum mechanics [24, 25], generalization of the principle of equivalence [26], proposing a generalized Hamilton's principle in terms of a lagrangian, which should be a function of generalized coördinates, generalized velocities, measure of curvature, quantum-state measure (spin, anti-symmetry, parity), measure of entropy, measure of nonlinearity, parameter describing distribution of mass (energy) in space, as the sixth paradigm of physics, which may form the basis of third quantization [27, 28], cross-lattice formulation in condensed-matter physics [29] (note that more than 25 Nobel prizes have been awarded in this discipline) and its application to liquid-crystal structure [30] as well as a comprehensive theory of unification of all forces of nature. The future of physics research should be focused on creating knowledge-based economy by converting cutting-edge physics problems into technology, bringing revenue to the nation, which engages in such activities. The author has tried to put his 2 cents in this endeavor through the small-scale (AI-based-smart glasses [31]), the medium-scale (airport-passenger-screening system based on emitted-IR and thermal radiation [32], moiré- and raster-based-bone-scanning system [33]) and the large-scale (air-spacecraft of the third millennium [34]) inventions.

Alfred Nobel had an active interest in medical research. Through Karolinska Institutet, he was introduced to the Swedish physiologist Jöns Johansson around 1890. Nobel mentioned physiology or medicine as the third prize area in his will. Nobel prize in physiology or medicine is awarded by the Nobel assembly at Karolinska Institutet, Stockholm, Sweden on discoveries, which may be an amalgamation of basic and clinical sciences. The discoveries, which may have the potential of greatest benefit to mankind, provided the problems are investigated from multiple perspectives — biophysics, mathematics and physiology. By looking at Table 3*e*, one notes that last 5-*year* discoveries focus on nucleoside-base modifications, genomes of extinct hominins and human evolution, receptors of temperature and touch, Hepatitis C virus as well as how cells sense and adapt to oxygen availability. Future Nobel prizes in physiology or medicine may be awarded for cancer research, cure of diabetes, childhood obesity (definition [35] — Claude Marcus, Head, Division of Pediatrics, Karoliska University Hospital, National Childhood Obesity Center, Karoliska Institutet, Sweden, commented on the author's proposed definition of childhood obesity**:** "Thank you very much. We are deeply concerned about how to define obesity and degree of obesity so that we can follow effects of treatment over time and association with co-morbidities. The present obesity curves are unreliable and we are now trying to identify new ways to follow obese children over time. Therefore, your paper is welcome to us.", classification [36], monitoring [37], solutions [13, 38]), new indicators of childhood obesity — estimated-adult *BMI* (body-mass index) [11, 39] and estimated-adult-

Table 3*e*. Nobel prizes in physiology or medicine awarded during the last 5 *years* (2019-2023)
https**:**//www.nobelprize.org/prizes/medicine/

Year	*Awardee*(*s*)	*Prize Motivation from the Nobel-Prize Website*
2023	Katalin Karikó and Drew Weissman	For their discoveries concerning nucleoside-base modifications that enabled the development of effective mRNA¥ vaccines against COVID-19
2022	Svante Pääbo	For his discoveries concerning the genomes of extinct hominins and human evolution
2021	David Julius and Ardem Patapoutian	For their discoveries of receptors for temperature and touch
2020	Harvey J. (James) Alter, Michael Houghton and Charles M. (Moen) Rice, Jr.	For the discovery of Hepatitis C virus
2019	William G. (George) Kaelin, Jr., Sir Peter J. (John) Ratcliffe and Gregg L. (Loenard) Semenza	For their discoveries of how cells sense and adapt to oxygen availability

¥Messenger Ribonucleic Acid, a type of single-stranded RNA involved in protein synthesis, don't confuse with microRNA (miRNA)

Table 3*f*. Svierge Riksbank prizes in economic sciences awarded during the last 5 *years* (2019-2023)
https://www.nobelprize.org/prizes/economic-sciences/

Year	*Awardee(s)*	*Prize Motivation from the Nobel-Prize Website*
2023	Claudia Goldin	For having advanced our understanding of women's labor market outcomes
2022	Ben S. (Shalom) Bernanke, Douglas W. (Warren) Diamond and Philip H. (Hallen) Dybvig	For research on banks and financial crises
2021	David Card, Joshua D. (David) Angrist and Guida W. (Wilhelmus) Imbens	For their methodological contributions to the analysis of casual relationships
2020	Paul R. (Robert) Milgrom and Robert B. (Butler) Wilson, Sr.	For improvements to auction theory and inventions of new auction formats
2019	Abhijit Banerjee, Esther Duflo and Michael Kremer	For their experimental approach to alleviating global poverty

specific *BMI* [12], height-gain-target-achievement and mass-management-target-achievement indices [12], childhood malnutrition (definition [40], classification [14], solutions [13]), childhood stunting [37], childhood wasting [36], adult obesity [41], scoliosis-risk assignment [42, 43], modelling of physiological systems (the human heart [40, 44], the human brain [45], the human spinal column [46-49]), concept of energy-channelization in human nutrition [50], nutritional-status categories, enhanced from 3 in pre-2014 (under-nutrition, over-nutrition, acute malnutrition) to 23 in 2021 (special categories — normality, obesity, wasting, tallness, stunting; regular categories — over-nutrition, under-nutrition, energy-channelization I-II; extended categories — obesity dominated over-nutrition, tallness dominated over-nutrition, tallness dominated energy-channelization I, wasting dominated energy-channelization I, wasting dominated under-nutrition, stunting dominated under-nutrition, stunting dominated energy-channelization II, obesity dominated energy-channelization II; limiting cases — energy-channelization III/puberty-induced energy-channelization, acute malnutrition, true over-nutrition, true under-nutrition, true energy-channelization I-II) [51], small, medium and big build defined through mathematical inequalities, with applications in sport-team formation and classroom-section assignment [52], physics and mathematics of brain death [53] as well as setting up mathematical equations cum inequalities linking age-of-onset of puberty to classification of puberty (excessively-early puberty, early puberty, delayed puberty, excessively-delayed puberty, precarious puberty) [54] and associating SMRs (Sexual-Maturity Ratings)/Tanner scores to stages of puberty (prepubertal, peri-pubertal, pubertal, adolescent, adult) [54, 55]. On the technological side, bone scanning using backscatter-X rays may be a candidate — remember that X rays and CT scan brought Nobel prizes of 1901 (physics) and 1979 (physiology or medicine), respectively [56].

The Sveriges Riksbank prize in economic sciences in memory of Alfred Nobel was established by the Nobel Foundation in 1968 through a donation received from Sveriges Riksbank (Sweden's central bank) on the occasion of the bank's 300th anniversary. By looking at Table 3*f*, one notes that Nobel prizes in economic sciences during the last 5 years were awarded for the study of women's labor market outcomes, banks and financial crises, methodological contributions to their analysis of casual relationships, auction theory as well as experimental approaches to alleviating global poverty. Future Nobel prizes may be awarded by applying ideas from mathematics, queuing theory, operations research (for balanced budget), modelling corruption (both hard and soft) [15] and money flow as a substance-like quantity [57] as well as ideas from physics, in particular, thermodynamics. For example, developing an uncertainty principle for econodynamics similar to Heisenberg's[25] uncertainty principle in quantum mechanics. The author has, recently, proposed 5 laws of econodynamics in analogy with the five laws of thermodynamics [58].

VII. Conclusion

In this paper, the author shed light on the history and the philosophy of Nobel prizes, with a focus on Nobel laureates belonging to Türkiye and Pakistan, each country is honored to have 2 Nobel laureates. Nobel prize is the ultimate award, which individuals can get in their lifetimes. Many videos, highlighting the achievements of Nobel laureates, are available on the Nobel-prize website. To get a feeling of these monumental contributions to the human history and the civilization, one is urged visit Nobel Prize

Museum in Stockholm, Sweden and the Nobel Peace Center in Oslo, Norway. The Nobel Foundation organizes many international events online as well as in person around the world. Although, a lot is being done to spread the spirit of the Nobel prizes and significance of work of the Nobel laureates, *e. g.*, Nobel-prize-teacher summit, Nobel minds (forum), Nobel lectures, press conferences by Nobel laureates and enrichment programs for youngsters, much more is needed to increase the share of developing countries in the Nobel honor. The author proposes creating cyber science clubs (online forums, in which children and youth from remote areas of the third-world countries can join and actively participate); summer camps, with a focus on Nobel prizes and Nobel laureates, to be held in the third-world countries (physical participation); training of teachers, who are motivated to answer smart questions by the students in language and depth appropriate to the level of students. Finally, the most important aspect is the establishment of state-of-the-art institutions starting from the primary level, going through secondary (high school/ college) and then tertiary (university) level in the third-world countries. The universities should have focus groups working in research institutes and centers affiliated with them. This dream can be materialized, only, if the governments of the third-word countries (in particular, those of Türkiye and Pakistan) take a proactive role in bringing the future generation to the forefront of cutting-edge research in the basic and the applied sciences as well as the revenue-generating technologies. Survival of nations of today rests in science and technology applied to economic growth. Nobel prizes in peace and literature remind us that a race to excel in science and technology without due regard to human values, respect for human life, honor and dignity, would bring the world to a big crunch, suffocating the humanity to oblivion.

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ENDNOTES

[1] https://www.ngds-ku.org/SZABIST/CSC1204_17.pdf

[2] https://www.nobelprize.org/prizes/physics/1931/dirac/facts/

[3] https://www.nobelprize.org/prizes/physics/1979/salam/facts/

[4] https://www.nobelprize.org/prizes/physics/1967/bethe/facts/

[5] https://www.nobelprize.org/prizes/physics/1983/fowler/facts/

[6] https://www.nobelprize.org/prizes/physics/1955/lamb/facts/

[7] https://www.nobelprize.org/prizes/physics/1957/lee/facts/

[8] https://www.nobelprize.org/prizes/physics/2020/penrose/facts/

[9] https://www.nobelprize.org/prizes/physics/1965/schwinger/facts/

[10] https://www.nobelprize.org/prizes/physics/1979/weinberg/facts/

[11] https://www.nobelprize.org/prizes/physics/1936/anderson/facts/

[12] https://www.nobelprize.org/prizes/lphysics/1963/wigner/facts/ — sent the following message to author on the occasion of celebration of 50 *years* of quantum mechanics https://www.ngds-ku.org/MSc/Thesis.pdf [page (x)]

[13] https://www.nobelprize.org/prizes/literature/2006/pamuk/facts/

[14] https://www.nobelprize.org/prizes/chemistry/2015/sancar/facts/

[15] https://www.nobelprize.org/prizes/chemistry/2015/lindahl/facts/

[16] https://www.nobelprize.org/prizes/chemistry/2015/modrich/facts/

[17] https://www.nobelprize.org/prizes/physics/1979/glashow/facts/

[18] https://www.nobelprize.org/prizes/peace/2014/yousafzai/facts/

[19] https://www.nobelprize.org/prizes/peace/2014/satyarthi/facts/

[20] https://www.nobelprize.org/prizes/physics/1983/chandrasekhar/facts/

[21] https://www.nobelprize.org/prizes/physics/1903/marie-curie/facts/

[22] https://www.nobelprize.org/prizes/physics/1929/broglie/facts/

[23] https://www.nobelprize.org/prizes/peace/1905/suttner/facts/

[24] https://www.nobelprize.org/prizes/physics/1921/einstein/facts/

[25] https://www.nobelprize.org/prizes/physics/1932/heisenberg/facts/

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Notes added after publication of this paper

a) During 2002-2011, the author conducted 2 innovative programs — the first one for students, who just wrote their O-Levels Examinations, the Early Talent Research Participation Program and the second one for those, who wrote their A-Levels Examinations, the NGDS Student Internships.

b) On October 3, 2024, the author received the following e-mail from **Heiner Linke**, Professor of Nanophysics and Chair, the Nobel Committee for Selection of Awardees of Nobel Prizes in Chemistry 2024**:**

> Dear Dr. Kamal,
>
> Thank you so much for sharing your initiative. Your enthusiasm and efforts must be very encouraging for the students. I think showing possibilities is the most important thing.
>
> I am involved in two programs that are open to students from all over the world and that you may be able to spread, to nominate and/or encourage individuals to apply**:**
>
> Lindau Nobel Laureate Meetings is open to about 600 young scientists from all over the world, annually**:** https**://**application.lindau-nobel.org/restxq/application#/application
>
> UNESCO prize for young people in STEM, also, worldwide**:** https**://**www.unesco.org/en/prizes/al-fozan
>
> Best regards,
>
> **Heiner Linke**



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