

Curriculum Vitae

Ahmed H. Zewail

California Institute of Technology (Caltech)
Arthur Amos Noyes Laboratory of Chemical Physics, Mail Code 127-72
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Linus Pauling Chair

Professor of Chemistry
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Director

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PERSONAL

Nationality: Egyptian and American
Place of birth: Damanhur, Egypt
Family status: Married, four children

ACADEMIC POSITIONS

Linus Pauling Professor of Chemistry and Professor of Physics, Caltech (1995-)
Director, Physical Biology Center for Ultrafast Science & Technology, Caltech (2005-)
Director, NSF Laboratory for Molecular Sciences, Caltech (1996-2007)
Linus Pauling Professor of Chemical Physics, Caltech (1990-1994)
Professor of Chemical Physics, Caltech (1982-1989)
Associate Professor of Chemical Physics, Caltech (1978-1982)
Assistant Professor of Chemical Physics, Caltech (1976-1978)
IBM Postdoctoral Fellow, University of California, Berkeley (1974-1976)
Predoctoral Research Fellow, University of Pennsylvania (1970-1974)
Teaching Assistant, University of Pennsylvania (1969-1970)
Instructor and Researcher, Alexandria University (1967-1969)
Undergraduate Trainee, Shell Corporation, Alexandria (1966)

ACADEMIC DEGREES

Alexandria University, Egypt (1967); B.S., First Class Honors
Alexandria University, Egypt (1969); M.S.
University of Pennsylvania, Philadelphia, Pennsylvania, U.S.A. (1974); Ph.D.

HONORARY DEGREES

Oxford University, U.K. (1991); M.A., h.c. (Arts)
American University in Cairo, Egypt (1993); D.Sc., h.c. (Science)
Katholieke Universiteit, Leuven, Belgium (1997); D.Sc., h.c. (Science)
University of Pennsylvania, Philadelphia, Pennsylvania, U.S.A. (1997); D.Sc., h.c. (Science)
Université de Lausanne, Switzerland (1997); D.Sc., h.c. (Science)
Swinburne University of Technology, Melbourne, Australia (1999); D.U., h.c. (University)
Arab Academy for Science, Technology and Maritime Transport, Alexandria, Egypt (1999);
H.D.A.Sc. (Appl. Science)
Alexandria University, Egypt (1999); D.Ph., h.c. (Philosophy)
University of New Brunswick, Fredericton, Canada (2000); D.Sc., h.c. (Science)
University of Rome “La Sapienza”, Italy (2000); D., h.c. (Doctor)
Université de Liège, Belgium (2000); D., h.c. (Doctor)
Queen of Angels-Hollywood Presbyterian Medical Center, Los Angeles, California, U.S.A.
(2000); Honorary Member of the Medical Staff, M.D. (Medicine)
Jadavpur University, Kolkata, India (2001); D.Sc., h.c. (Science)
Concordia University, Montréal, Canada (2002); L.L.D., h.c. (Law)
Heriot-Watt University, Edinburgh, Scotland (2002); D.Sc., h.c. (Science)
Pusan National University, Busan, Korea (2003); M.D., h.c. (Medicine)
Lund University, Sweden (2003); D.Ph., h.c. (Philosophy)
Bo ğaziçi University, Istanbul, Turkey (2003); D.Sc., h.c. (Science)
École Normale Supérieure, Paris, France (2003); D.Sc., h.c. (Science)
Oxford University, U.K. (2004); D.Sc., h.c. (Science)
Peking University, P. R. China (2004); H.D.D. (University)
Autonomous University of the State of Mexico, Toluca, Mexico (2004); D., h.c. (University)
Trinity College, University of Dublin, Ireland (2004); D.Sc., h.c. (Science)
Tohoku University, Sendai, Japan (2005); H.D.D. (University)
American University of Beirut, Lebanon (2005); D.H.L. (Humane Letters)
University of Buenos Aires, Argentina (2005); D., h.c. (University)
National University of Cordoba, Argentina (2005); D., h.c. (University)
Cambridge University, U.K. (2006); D.Sc., h.c. (Science)
Babeş-Bolyai University, Cluj, Romania (2006); H.D.D. (University)
Mansoura University, Mansoura, Egypt (2007); D.Sc., h.c. (Science)
Universiti Malaya, Kuala Lumpur, Malaysia (2007); D.Sc., h.c. (Science)
Universiti Teknologi Kuala Lumpur, Malaysia (2007); D.Sc., h.c. (Science)
Universidad Complutense de Madrid, Spain (2008); D., h.c. (Doctor)
University of Jordan, Amman, Kingdom of Jordan (2009); D.Sc., h.c. (Arts and Sciences)
École Polytechnique Fédérale de Lausanne, Switzerland (2009); D.Sc., h.c. (Science)
Southwestern University, Austin, Texas, U.S.A. (2010); D.H.L. (Humane Letters)
National Chiao Tung University, Hsinchu, Taiwan (2010); D., h.c. (University)
Lead City University, Nigeria (2010); D., h.c. (University)
Eötvös Loránd University, ELTE, Budapest, Hungary (2010); D., h.c. (Natural Sciences)
Boston University, Boston, Massachusetts, U.S.A. (2011); D.Sc., h.c. (Science)
University of Glasgow, U.K. (2011); D.Sc., h.c. (Science)
Baku State University, Baku, Azerbaijan (2011); H.D.D. (University)

University of Tunis, El Manar, Tunisia (2012); D., h.c. (University)
Yale University, New Haven, Connecticut, U.S.A. (2014); D.Sc., h.c. (Science)
University of York, U.K. (2014); H.D.D. (University)
Simon Fraser University, Vancouver, Canada (2014); D.Sc., h.c. (Science)

PROFESSORSHIPS

University of Amsterdam, John van Geuns Stichting Visiting Professor, Netherlands (1979)
University of Bordeaux, Visiting Professor, Paris, France (1981)
École Normale Supérieure, Visiting Professor, France (1983)
University of Kuwait, Visiting Professor, Kuwait (1987)
University of California, Visiting Scholar, Los Angeles, California, U.S.A. (1988)
American University in Cairo, Distinguished Visiting Professor, Egypt (1988)
Johann Wolfgang Goethe-Universität, Rolf Sammet Professor, Frankfurt, Germany (1990)
Oxford University, Sir Cyril Hinshelwood Chair, Visiting Professor, Oxford, U.K. (1991)
Texas A&M University, Visiting Professor, College Station, Texas, U.S.A. (1992)
University of Iowa, Visiting Professor, Iowa City, Iowa, U.S.A. (1992)
Collège de France, Visiting Professor, Paris, France (1995)
Katholieke Universiteit, Visiting Professor, Leuven, Belgium (1998)
University of Würzburg, Röntgen Visiting Professor, Germany (1999)
Université de Lausanne, Honorary Chair Professor, Switzerland (2000)
University of Cambridge, Linnett Professor, U.K. (2002)
United Nations University, Distinguished Chair of Science & Technology Policy,
Tokyo, Japan (2003-)
Huazhong University, Honorary Professor, Wuhan, P.R. China (2004-)
Fudan University, Honorary Professor, Shanghai, P.R. China (2004-)
École Normale Supérieure, Blaise Pascal Honorary Professor, Paris, France (2004-2005)
Tohoku University, First Honorary University Professor, Sendai, Japan (2005)
University System of Taiwan, Honorary Chair, Taipei, Taiwan (2010-2020)
Alexandria University, Distinguished Professor, Egypt (2010-)
Eötvös Loránd University, ELTE, Honorary Professor, Budapest, Hungary, (2010-)
Imperial College London, Visiting Honorary Professor, UK (2015-)

PRESIDENTIAL AND OFFICIAL APPOINTMENTS

President Obama's Council of Advisors on Science and Technology (2009-2013)
President of Egypt's Advisory Council of Distinguished Scholars and Experts (2014-)
UN Secretary General Ban Ki-moon's Scientific Advisory Board (2013-)

United States First Science Envoy to the Middle East (2009-2011)

SPECIAL HONORS

King Faisal International Prize in Science, King Faisal Foundation (1989)
First Linus Pauling Chair, Caltech (1990)
Femtochemistry Conferences; Solvay, Nobel, and International series (1993-)
Wolf Prize in Chemistry, Wolf Foundation (1993)
Order of Merit, conferred by the President of Egypt (1995)
Leonardo Da Vinci Award of Excellence, Moët Hennessy—Louis Vuitton Foundation (1995)
Robert A. Welch Award in Chemistry, Welch Foundation (1997)
Benjamin Franklin Medal, Franklin Institute, Philadelphia, Pennsylvania, U.S.A. (1998)
Nobel Prize in Chemistry, Nobel Foundation (1999)
Order of the Grand Collar of the Nile, Highest State Honor, conferred by the President of Egypt (1999)
Order of Zayed, Highest Presidential Honor, U.A.E. (2000)
Order of Cedar, Highest Rank of Commander, conferred by the President of Lebanon (2000)
Order of ISESCO, First Class, conferred by the Prince of Saudi Arabia Salman Ibn Abdel Aziz (2000)
Order of Merit, Highest State Honor, conferred by the President of Tunisia (2000)
Insignia of Pontifical Academy, conferred by the Pope John Paul II (2000)
Order of the Two Niles, First Class, Highest State Honor, conferred by the President of Sudan (2004)
Albert Einstein World Award, World Cultural Council (2006)
Cowl Hood, honor of the Coptic Orthodox Church, Bucharest, Romania (2010)
National Leadership Award, Merage Foundation (2010)
Priestley Gold Medal, highest award, American Chemical Society (2011)
Top American Leaders Award, Washington Post and Harvard University (2011)
Ordre national de la Légion d'honneur, Chevalier, decreed by President of France (2012)

PUBLIC RECOGNITION

Postage Stamps issued in Egypt: “The Portrait” (1998); “The Fourth Pyramid” (1999)
Dr. Ahmed Zewail High School, Disuq, Egypt (1998)
Dr. Ahmed Zewail Medan (Square), Alexandria, Egypt (2000)
Ahmed Zewail streets and schools in Damanhur, Disuq, Cairo and other cities, Egypt (2000-)
Ahmed Zewail Fellowships, University of Pennsylvania, Philadelphia, Pennsylvania, U.S.A. (2000-)
Ahmed Zewail Prize, American University in Cairo, Egypt (2001-)
Exhibition, Nobel Museum, Stockholm, Sweden (2001)
BBC Documentary (2001)
Postage Stamp, issued in Ghana (2002)
Ahmed Zewail Center for FemtoScience Technology, Korea (2002)
Dr. Ahmed Zewail Prize for Creativity in the Arts, Opera Culture Center, Cairo, Egypt (2004-)
Zewail Foundation for Knowledge and Development, Cairo, Egypt (2004-)
Ahmed Zewail Prizes for Excellence and Leadership, International Centre for Theoretical

Physics, Trieste, Italy (2004)
Film Documentary by Turk Pipkin, "Nobelity" (2005)
Ahmed Zewail Award for Ultrafast Science and Technology, American Chemical Society (2005-)
Ahmed Zewail Prize in Molecular Sciences, Elsevier (2006-)
Documentary, "A.-Z. Alphabet of Time", Slovak Television (2007)
Ahmed H. Zewail Gold Medal Award & Distinguished Lecture, Wayne State University, Detroit, Michigan, U.S.A. (2008-)
Ahmed Zewail Lecture Hall, Alexandria University, Egypt (2010)
Zewail Foundation Lecture Series, American University in Cairo, Egypt (2011-)
Zewail City of Science and Technology, Cairo, Egypt, Founder (2011-)
Thought Leaders 2014, Top 100 Global, Tages Anzeiger, Switzerland (2014)
Thought Leaders 2015, Top 100 Global, Tages Anzeiger, Switzerland (2015)

SELECTED AWARDS AND PRIZES

Fellow, Alfred P. Sloan Foundation (1978-1982)
Camille and Henry Dreyfus Teacher-Scholar Award, Camille and Henry Dreyfus Foundation (1979-1985)
Alexander von Humboldt Award for Senior United States Scientists, Alexander von Humboldt Foundation (1983)
Award for Especially Creative Research, National Science Foundation (1984; 1988; 1993; 2014)
Buck-Whitney Medal, American Chemical Society (1985)
Fellow, John Simon Guggenheim Memorial Foundation (1987)
Harrison Howe Award, American Chemical Society (1989)
International Award, Carl Zeiss, Germany (1992)
Earle K. Plyler Prize, American Physical Society (1993)
Medal of the Royal Netherlands Academy of Arts and Sciences, Holland (1993)
Bonner Chemiepreis, University of Bonn, Germany (1994)
Herbert P. Broida Prize, American Physical Society (1995)
Collège de France Medal, Paris, France (1995)
Peter Debye Award, American Chemical Society (1996)
Chemical Sciences Award, National Academy of Sciences, U.S.A. (1996)
J. G. Kirkwood Medal, Yale University, New Haven, Connecticut, U.S.A. (1996)
Peking University Medal, conferred by the PU President, Beijing, P. R. China (1996)
Pittsburgh Spectroscopy Award, Spectroscopy Society of Pittsburgh, Philadelphia, U.S.A. (1997)
First E. B. Wilson Award, American Chemical Society (1997)
Linus Pauling Medal Award, American Chemical Society (1997)
Richard C. Tolman Medal Award, American Chemical Society (1998)
William H. Nichols Medal Award, American Chemical Society (1998)
Paul Karrer Gold Medal, University of Zürich, Switzerland (1998)
E. O. Lawrence Award, U.S. Government (1998)
Merski Award, University of Nebraska, Lincoln, NB (1999)

Röntgen Prize, (100th Anniversary of The Discovery of X-rays), Germany (1999)
Faye Robiner Award, Ross University School of Medicine, New York City, New York, U.S.A. (2000)
Golden Plate Award, American Academy of Achievement (2000)
City of Pisa Medal, conferred by the Mayor of Pisa, Italy (2000)
Medal of “La Sapienza” (“Wisdom”), University of Rome, Italy (2000)
Médaille de l’Institut du Monde Arabe, Paris, France (2000)
Honorary Medal, Université du Centre, Monastir, Tunisia (2000)
Honorary Medal, conferred by the Mayor of Monastir, Tunisia (2000)
Distinguished Alumni Award, University of Pennsylvania, Philadelphia, Pennsylvania, U.S.A. (2002)
G. M. Kosolapoff Award, American Chemical Society (2002)
Distinguished American Service Award, American Arab Anti-Discrimination Committee (2002)
Sir C. V. Raman Award, Indian Institute of Science Education and Research, Kolkata, India (2002)
Arab American Award, National Museum, Dearborn, Michigan, U.S.A. (2004)
Gold Medal (Highest Honor), Burgos University, Burgos, Spain (2004)
Medal, Slovak Academy of Science (2005)
Gold Medal, Slovak Chemical Society (2005)
Grand Gold Medal, Comenius University, Bratislava, Slovak Republic (2005)
Medal of University of Buenos Aires, Argentina (2005)
Medal of National University of Cordoba, Argentina (2005)
Jubilee Medal, National Research Council of Egypt (2006)
Linus Pauling Medal Award, Stanford University, Stanford, California, U.S.A. (2007)
Award, American Medical Students Association (2007)
Inaugural Award of MSE, Stanford University, Stanford, California, U.S.A. (2007)
150th Anniversary Medal of the French Chemical Society, Paris (2007)
Gold Jubilee Medal (50th Anniversary), Assiut University, Assiut, Egypt (2007)
Jabir Ibn Hayyan (“Geber”) Medal, Chemical Society, Saudi Arabia (2008)
MIT Lifetime Achievement Award, Arab Students’ Organization, Massachusetts Institute of Technology, Cambridge, Massachusetts, U.S.A. (2008)
700th Anniversary Medal, Universidad Complutense de Madrid, Spain (2008)
Othmer Gold Medal, Chemical Heritage Foundation (2009)
Arab American of the Year Award, Arab Community Center for Economic and Social Services, Dearborn, Michigan, U.S.A. (2010)
Award, Sayling Wen Foundation (2010)
Medal of the City of Istanbul, “555 Year Memento of the Ottoman Empire”, conferred by the Mayor of Istanbul, Turkey (2010)
Pioneer in Photonics Award, Duke University, Durham, North Carolina, U.S.A. (2010)
375th Anniversary Celebration Medal, Eötvös Loránd University, ELTE, Budapest, Hungary (2010)
G. Robert Oppenheimer Medal, Los Alamos, (2010)
Gilbert Newton Lewis Medal, University of California at Berkeley (2010)
President’s Medal, American University in Cairo, Egypt (2011)
Al Ahram Key, Al Ahram Foundation, Cairo, Egypt (2011)
Sir Humphrey Davy Medal, Royal Society of London, U.K. (2011)

Sven Berggren Prize, Royal Physiographic (Natural Science) Society, Lund, Sweden (2011)
Honorary Award Medal, Baku State University, Baku, Azerbaijan (2011)
Medal of the University of Tunis, El Manar, Tunisia (2012)
Mendel Medal, Villanova University, Villanova, Pennsylvania (2012)
World Harmony Award, University of California at Santa Barbara (2012)
Shield of Suez Canal Authority, Egypt (2014)
Shield of Zewail City University Student Union, Egypt (2014)
Transformative Achievement Award, Society for Design and Process Science, Fort Worth, Texas (2015)

ACADEMIES AND SOCIETIES

Fellow, American Physical Society (elected 1982)
Member, National Academy of Sciences, U.S.A. (elected 1989)
Member, Third World Academy of Sciences, Italy (elected 1989)
Fellow, St. Catherine's College, Oxford, U.K. (elected 1991)
Member, Sigma Xi Society (elected 1992); Honorary Fellow (2009-)
Member, American Academy of Arts and Sciences (elected 1993)
Member, Académie Européenne des Sciences, des Arts et des Lettres, France (elected 1994)
Member, American Philosophical Society (elected 1998)
Member, Pontifical Academy of Sciences, Vatican (elected 1999)
Member, American Academy of Achievement (elected 1999)
Member, Royal Danish Academy of Sciences & Letters (elected 2000)
Fellow, American Association for the Advancement of Science (elected 2000)
Honorary Fellow, Chemical Society of India (elected 2001)
Member, Indian Academy of Sciences (elected 2001)
Foreign Member, Royal Society of London, U.K. (elected 2001)
Honorary Fellow, Sydney Sussex College, Cambridge, U.K. (elected 2002)
Foreign Fellow, Indian National Science Academy (elected 2002)
Honorary Foreign Member, Korean Academy of Science and Technology (elected 2002)
Honorary Fellow, African Academy of Sciences, Kenya (elected 2002)
Honorary Fellow, Royal Society of Chemistry, U.K. (elected 2003)
Foreign Member, Russian Academy of Sciences (elected 2003)
Foreign Member, Royal Swedish Academy of Sciences (elected 2003)
Foreign Member, Royal Academy of Belgium (elected 2003)
Honorary Fellow, Islamic World Academy of Sciences, Jordan (elected 2003)
Honorary Fellow, St. Catherine's College, Oxford, U.K. (elected 2004)
Honorary Member, European Academy of Sciences, Belgium (elected 2004)
Honorary Fellow, Literary & Historical Society, University College, Dublin, Ireland (elected 2004)
Honorary Member, Board of Advisors, National Society of High School Scholars, U.S.A. (elected 2004)
Founding Member, Academia Bibliotheca Alexandrinae, Egypt (2004)
Foreign Member, French Academy of Sciences (elected 2005)
Honorary Fellow with PM Mahathir Mohamed and PM Ahmad Badawi, Academy of

Sciences Malaysia, (elected 2005; inducted 2007)
Foreign Member, Royal Spanish Academy of Sciences, (elected 2007; inducted 2008)
Member, Chinese Academy of Sciences (elected 2009)
Honorary Member, American Chamber of Commerce (elected 2010)
Foreign Fellow, Nigerian Academy of Science (elected 2010)
Fellow, American Chemical Society (elected 2010)
Honorary President, Science Age Society, *Asr Al Alm*, Egypt (2010-)
Honorary President, Asian Nanoscience and Nanotechnology Association,
Taiwan (2010-)
Member, Royal Physiographic (Natural Science) Society, Sweden (elected 2012)
Member, Académie tunisienne des sciences, des lettres et des arts (Beit Al-Hikma), Tunisia
(elected 2012)
Foreign Member, Azerbaijan National Academy of Sciences (elected 2012)

BOARDS AND ADVISORY SERVICES

Member of Advisory and Editorial Boards; Editor of scientific journals and book series;
Chairman and Member of Organizing Committees of national and international conferences;
Member of Boards including the following:

Chief Editor, Chemical Physics Letters (1991-2007); Honorary Advisory Editor (2007-)
Member, Board of Advisors, World Scientific, Singapore (1994-)
Member, Board of Advisors, Max Planck Institute, Germany (1994-)
Member, Board of Trustees, American University in Cairo, Egypt (1999-)
Member, Board of Trustees, Bibliotheca Alexandria (2001-2005); Board of Advisors (2006-)
Member, Scientific Advisory Board, Welch Foundation (2002-)
Patron, Multilateral Initiative on Malaria (2003-)
Member, Board of Directors, Qatar Foundation (2003-2011)
Member, Scientific Advisory Board, Chalmers University of Technology, Göteborg,
Sweden (2003-)
Member, Board of Trustees, TIAA-CREF, U.S.A. (2004-2007)
Honorary Member, Board of Trustees, Future University, Sudan (2004-)
Member, Board of Advisors, Nanyang Technological University, Singapore (2005-)
Member, Scientific Council, École Normale Supérieure, Paris, France (2005-)
Co-Chair, High Level (Blue Ribbon) Amiri Panel, Kuwait (2007)
Member, International Advisory Board, King Abdullah University of Science &
Technology, Jeddah, Saudi Arabia (2007)
Honorary Member, National Advisory Board, Arab American National Museum (2007-)
President, International Jury, L'Oréal-UNESCO "For Women in Science" Awards (2007-)
Member, Supreme Council for Science and Technology, Egypt (2007-)
President, 44th International Chemistry Olympiad, American Chemical Society
(2010-2012)
Lifetime Member, President's Council, New York Academy of Sciences (2010-)
Member, UNESCO High Panel on Science, Technology, and Innovation for Development,
Paris, France (2011-)

Chairman, Board of Trustees, Zewail City of Science and Technology, Cairo, Egypt (2011-)
Member, International Solvay Institutes, Brussels, Belgium (2011-)
Member, 21st Century Council, Global Thinkers, Nicolas Berggruen Institute, Beverly Hills, California, U.S.A. (2011-)
Member, Federation of American Scientists, Board of Sponsors, Washington, D.C., U.S.A. (2012-)

PUBLICATIONS AND PRESENTATIONS

Articles

Some 600 articles (authored and co-authored) have been published in the fields of science, education, and world affairs.

Books

- (1) *Advances in Laser Spectroscopy I*, ed. A. H. Zewail, SPIE, Bellingham, 1977
- (2) *Advances in Laser Chemistry*, ed. A. H. Zewail, Springer-Verlag, Berlin-Heidelberg, 1978
- (3) *Photochemistry and Photobiology, Vols. 1 and 2*, ed. A. H. Zewail, Harwood Academic, London, 1983
- (4) *Ultrafast Phenomena VII*, eds. C. B. Harris, E. P. Ippen, G. A. Mourou and A. H. Zewail, Springer-Verlag, Berlin-Heidelberg, 1990
- (5) *The Chemical Bond: Structure and Dynamics*, ed. A. H. Zewail, Academic Press, Boston, 1992
- (6) *Ultrafast Phenomena VIII*, eds. J.-L. Martin, A. Migus, G. A. Mourou and A. H. Zewail, Springer-Verlag, Berlin-Heidelberg, 1993
- (7) *Ultrafast Phenomena IX*, eds. P. F. Barbara, W. H. Knox, G. A. Mourou and A. H. Zewail, Springer-Verlag, Berlin-Heidelberg, 1994
- (8) *Femtochemistry: Ultrafast Dynamics of the Chemical Bond*, A. H. Zewail, Vols. 1 and 2, World Scientific, Singapore, 1994
- (9) *Voyage Through Time: Walks of Life to the Nobel Prize*, A. H. Zewail, American University in Cairo (AUC), Cairo, 2002; appeared in 19 languages and editions: English, French, German, Spanish, Romanian, Hungarian, Russian, Arabic, Chinese, Korean, Bahasa Malaysia, Indonesian, Hindi, and Azerbaijani
- (10) *Age of Science (Asr Al Álm*, in Arabic), A. H. Zewail, Dar Al Shorouk, Beirut-Cairo, 2005; appeared in the 15th edition since publication in June 2005
- (11) *Time (Al Zaman*, in Arabic), Book Series, A. H. Zewail, Dar Al Shorouk, Cairo, 2007
- (12) *Dialogue of Civilizations (Hewar Al Hadarat*, in Arabic), Book Series, A. H. Zewail, Dar Al Shorouk, Cairo, 2007
- (13) *Physical Biology: From Atoms to Medicine*, ed. A. H. Zewail, Imperial College Press, London, 2008
- (14) *4D Electron Microscopy: Imaging in Space and Time*, A. H. Zewail and J. M. Thomas, Imperial College Press, London, 2010

- (15) *4D Visualization of Matter: Recent Collected Works*, A. H. Zewail, Imperial College Press, London, 2014
- (16) *Reflections on World Affairs: Peace and Politics*, A. H. Zewail, Imperial College Press, London, 2015

Patents

Luminescent Solar Energy Concentrator Devices, A. H. Zewail and J. S. Batchelder, California Institute of Technology, *U.S. Pat.* 4,227,939, October 14, 1980

Method and System for Ultrafast Photoelectron Microscope, A. H. Zewail and V. A. Lobastov, California Institute of Technology, *U.S. Pat.* 7,154,091, December 26, 2006

4D Imaging in an Ultrafast Electron Microscope, A. H. Zewail, California Institute of Technology, *U.S. Pat.* 8,203,120, June 19, 2012

Characterization of Nanoscale Structures Using an Ultrafast Electron Microscope, A. H. Zewail, California Institute of Technology, *U.S. Pat.* 8,247,769, August 21, 2012; Continued, *U.S. Pat.* 8,440,970, May 14, 2013; Continued, *U.S. Pat.* 8,686,359, April 1, 2014; Continued, *U.S. Pat.* 9,053,903, June 9, 2015

Photon Induced Near Field Electron Microscope and Biological Imaging System, A. H. Zewail, D. J. Flannigan and B. Barwick, California Institute of Technology, *U.S. Pat.* 8,429,761, April 23, 2013; Continued, *U.S. Pat.* 8,569,695, October 29, 2013; Continued, *U.S. Pat.* 8,963,085, February 24, 2015

Control Imaging Methods in Advanced Ultrafast Electron Microscopy, A. H. Zewail, J. S. Baskin, California Institute of Technology, *U.S. Pat.* 8,766,181, July 1, 2014

Method and System for 4D Tomography and Ultrafast Scanning Electron Microscopy, A. H. Zewail, O.-H. Kwon, O. F. Mohammed Abdelsaboer, D. S. Yang, California Institute of Technology, *U.S. Pat.* 8,841,613, September 23, 2014

Lectures

Some five hundred named, plenary, and keynote lectures have been given and include the following: Andersen (Hans Christian), Bernstein (UCLA, Wisconsin), Berson, Bodenstein, Cavendish (Scott Series), Celsius, Condon, Aimé Cotton, Coulson, Debye, Einstein (Berlin, New Delhi, Mexico), Ernst, Eyring, Faraday, Franklin (Benjamin), Gandhi, Helmholtz, Hinshelwood, Karrer, Kirkwood, Kistiakowsky, Lawrence, Lewis (G. N.), London, Nobel, Novartis, Noyes, Onassis, Oppenheimer, Ørsted, Othmer, Pascal (Blaise), Pauling, Perrin, Pimentel, Max Planck, Polanyi, Priestley, Raman, Roberts, Röntgen, Schrödinger, Solvay, U Thant (United Nations), Thomson (J. J.), Tolman, Watson, Welch, Wilson, and Zewail. Also given are commencement addresses and public lectures.

CURRENT RESEARCH AND WORLD AFFAIRS

Current research is devoted to structural dynamics in chemistry and biology with focus on the physics of elementary processes in complex systems. At the Center for Physical Biology, the main research is in the development of four-dimensional (4D) ultrafast electron microscopy and diffraction for atomic-scale visualization in space and time. Together with spectroscopy and large-scale computations, the goal is to understand complexity and nature of chemical and biological transformations.

A significant effort is also devoted to global affairs, particularly as they relate to science, education, and world peace. Commentaries on these global issues have appeared in *The Times*, *International Herald Tribune*, *New York Times*, *Los Angeles Times*, *Financial Times*, and *Wall Street Journal*, among other publications. Public addresses are also being given to enhance awareness of the value of knowledge for developments, in both developing and developed countries.