

Biographical Information on Prof. Zdeněk P. Bažant

Dr. Bažant holds the chairs of W.P. Murphy Professor of Civil Engineering and Materials Science at Northwestern University (since 1990) and of McCormick School Professor (since 2002). A native of Prague, he received the degree of Civil Engineer from the Czech Technical University in Prague (ČVUT) in 1960, and a Ph.D. in engineering mechanics from the Czechoslovak Academy of Sciences (ČSAV) in 1963. Further he received a postgraduate diploma in theor. physics from Charles University in Prague in 1966, and attained Docent habilitation at ČVUT in 1967. During 1961-63 he worked in Prague as bridge engineer, and during 1964-67 he was a research engineer and adjunct assistant prof. at ČVUT. After visiting appointments at CEBTP, Paris, Univ. of Toronto and Univ. of California, Berkeley, he started teaching in 1969 at Northwestern University, where he became full professor in 1973, and in 1990 was appointed to the W.P. Murphy distinguished professorial chair. During 1974-79 and 1992-96 he headed the Structural Engrg. Program, and during 1981-87 he served as the (founding) Director of the Center for Concrete and Geomaterials. He was a visiting prof. or scientist at Royal Inst. of Technology (Stockholm), Chalmers University (Göteborg), Politecnico di Milano, ETH Zürich, EPFL (Lausanne), Ecole Normale Supérieure (Paris-Cachan), T.U. München, M.I.T., Stanford Univ., California Inst. of Technology, Univ. of California, Berkeley, Univ. of Cape Town, Univ. of Adelaide, Ecole des Ponts et Chaussées (Paris), INSA Lyon, Lulea University, Sweden, T.U. Stuttgart, T.U. Wien, Universidad Politecnica de Madrid, Universidad Politecnica de Catalunya, Barcelona, and Univ. of Tokyo. 44 doctoral dissertations and many M.S. theses were completed under his advisorship.

Dr. Bažant has authored over 450 scientific articles in refereed journals and many proceedings papers. They deal mainly with structural materials (concrete, rocks, soils, composites, ceramics, ice, snow, and metals on approach to nanoscale) and structural analysis—particularly fracture mechanics, size effect, stability, creep, plasticity, thermal and moisture effects, computational methods, probabilistic models and new materials. His citation index is one of two highest in solid mechanics (about 550 first-author citations annually). He published 3 textbooks/reference volumes: *Stability of Structures: Elastic, Inelastic, Fracture and Damage Theories* (with L. Cedolin, Oxford University Press 1991 and Dover 2003, 1010 pp.), *Fracture and Size Effect in Concrete and Other Quasibrittle Materials* (with J. Planas, CRC Press 1998, 603 pp.), and *Inelastic Analysis of Structures* (with M. Jirásek, J. Wiley 2002, 756 pp.); 3 monographs: *Scaling of Structural Strength* (Hermes), *Concrete at High Temperatures* (with M. Kaplan, Longman 1996), *Concrete Creep in Structural Analysis* (SNTL 1966). He has edited (and contributed chapters to) 17 other books.

He served (1988-94) as the *Editor (in-chief)* of ASCE *Journal of Engrg. Mechanics*. He is a Regional Editor of *Intern. Journal of Fracture*, and has served as member of editorial boards of 23 other journals. In 1993, he was *president* of the Society of Engrg. Science. He was (1991-93) the first *president* of Intern. Assoc. for Fracture Mechanics of Concrete Structures (IA-FraMCoS), and of Intern. Soc. of Concrete Creep and Durability Mechanics (IA-CONCREEP), both based in Evanston. He chaired the ACI Comm. on Fracture Mechanics, Concrete Structures Division of the Intern. Assoc. for Structural Mechanics in Reactor Technology, ASCE-EMD Programs Comm. and ASCE-EMD Comm. on Properties of Materials. In RILEM, he has chaired committees on creep and on fracture scaling. He organized and chaired IUTAM Prager Symp. (Evanston 1983), 4th RILEM Int. Symp. on Concrete Creep (Evanston 1986); FraMCoS1 (Breckenridge 1992); 3 NSF Workshops (incl. Material Durability Modeling, Prague 2002, Concrete Creep, Lausanne 1980), Europe-U.S. Workshop on Fracture and Damage (NSF & Eur. Union, Prague 1994), AFOSR Workshop on Localization

(Minneapolis 1987), France-U.S. Workshop on Strain Localization and Damage (Paris-Cachan 1988), RILEM 5th Int. Symp. on Concrete Creep (Barcelona, 1993), NSF-Eur. Union Workshop on Quasibrittle Materials in Prague (1994), etc. He has given over 50 plenary, general or principal lectures at major conferences, several hundred guest seminars, and over 12 intensive short courses at universities abroad. Since 1970, he received over 50 research grants and contracts (totaling over \$9 mil.) from NSF, AFOSR, ONR, ARO, DoE, DNA, Oak Ridge Nat. Lab., EPRI, Los Alamos Nat. Lab., WES, ARPA, KEPRI and Shimizu Corp., Tokyo. An Illinois Registered Structural Engineer (S.E.), he has consulted for many firms and for two decades served as staff consultant on nuclear reactor structures to Argonne National Laboratory.¹

Dr. Bažant is a *member* of **National Academy of Sciences**² and of **National Academy of Engineering**³; and *foreign member* of Austrian Academy of Sciences, Academia di Scienze e Lettere, Milan, and Engrg. Academy of Czech Republic. He received **four honorary doctorates**: Czech Technical University, Prague (1991), Universität Karlsruhe, Germany (1997), University of Colorado (2000) and Politecnico di Milano (2001). In 1996, Soc. of Engrg. Science awarded him the *Prager Medal*.⁴ In 1997, Am. Soc. of Mechanical Engrs. awarded him the *W.R. Warner Medal*.⁵ In 1996, Am. Soc. of Civil Engrs. awarded him the *Newmark Medal*.⁶ His other honors include: 2003 Lifetime Achievement Award from ASCE Illinois Str. Div.; 1975 *L'Hermite Medal* from RILEM;⁷ 1990 *Torroja Gold Medal* from Building Res. Institute of Spain; *Šolín Medal* from ČVUT 1998; *Stodola Gold Medal* 1999 from Slovak Acad. of Sci.; *Medal of Merit* from Czech Soc. for Mechanics, 1992; *Croes Medal* (1997), *Huber Research Prize* (1976) and *T.Y. Lin Award* (1977) from ASCE; *Guggenheim* (1978), *Ford Foundation* (1967), *JSPS* (Japan 1995), *Kajima Foundation* (Tokyo 1987), *NATO Senior Scientist* (France 1988) and *ASTEF* (France 1966) *Fellowships*; *A. von Humboldt Award* (Germany 1989); Roy Lecture Award, Am. Ceram. Soc. 2001; ICOSSAR Lecture Award, 2001; 1991 Nat. Science Council of China (Taiwan) *Lectureship Award*, 1992 *Best Engrg. Book of the Year Award* (Assoc. of Am. Publishers), *Meritorious Publication Award* (1992) from Struct. Engrs. Assoc.; 2002 ISI HIGHLY Cited Scientist; *Outstanding New Citizen* from Metropolitan Chicago Citizenship Council (1976); *Honorary Member* of Build. Res. Institute of Spain (1991), of Czech Soc. of Civil Engrs. (Prague 1991), and of Czech Soc. for Mechanics (1992); a *Fellow* of Am. Academy of Mechanics, Am. Soc. of Mechanical Engineers (ASME), Am. Society of Civil Engrs. (ASCE), Am. Concrete Institute (ACI), Soc. of Engrg. Sci. (SES) and RILEM (Int. Union of Res. Lab. in Mater. & Struct., Paris).⁸

¹Also, in 1959, he received in Czechoslovakia a patent on safety ski binding, mass produced used by 1962 by about one third of skiers in that country (exhibited in New England Ski Museum).

²Elected in 2002 with the citation: "Bažant discovered the scaling law for the energetic size effect in quasibrittle structural failure bridging ductile and brittle behaviors, verified it experimentally for many important materials, showed its use for measuring fracture characteristics, and conceived nonlocal and crack-band models now widely used in numerical simulations of quasibrittle failure of structures."

³Elected in 1996 with the citation "contributions to solid mechanics, particularly structural stability and size effects in fracture."

⁴given for "outstanding contributions to solid mechanics".

⁵which honors "outstanding contributions to the permanent literature of engineering". Cited for "important contributions to solid mechanics, focusing on the size-effect law for failure of brittle structures, modeling of material damage from softening, local a nonlocal concepts, stability and propagation of fracture and damage in material and thermodynamic concepts associated with stability of non-elastic structures".

⁶which honors "a member who, through contributions to structural mechanics, has helped substantially to strengthen the scientific base of structural engineering". Cited for "fundamental contributions to the understanding of constitutive behavior of structural materials, nonlinear fracture mechanics and stability of structures".

⁷Cited for "brilliant developments in mechanics of materials, thermodynamics of creep and stability theory, bridging experimental and theoretical research"

⁸Fruther, in 1955, he was the Winner of Mathematical Olympics of Czechoslovakia.