



## UNIVERSITY OF PADUA

### Resume

**FULL NAME:** Bernhard A. Schrefler

**TITLE:** Professor Emeritus

**DEPARTMENT:** Civil, Environmental and Architectural Engineering

### EDUCATION:

University of Padua, Dott. Ing. (BS+MS), Civil Engineering (110/110 summa cum laude), 1967

University of Wales, Swansea Ph.D. 1984

University of Wales, Swansea D.Sc. 1992

### PROFESSIONAL REGISTRATION:

Chartered Engineer, Engineering Chamber Bolzano, Italy 1968

### CURRENT AND PREVIOUS ACADEMIC POSITIONS:

Assistant Professor, University of Padua, Faculty of Engineering, 1969-1980

Lecturer, University of Padua, Faculty of Engineering, 1973-1980

Professor, University of Padua, Faculty of Engineering, 1980-2013

Head of Institute, University of Padua, Institute for Constructions, Bridges and Roads, 1984-1986

Head of Institute, University of Padua, Institute for Structural Engineering and Structural Mechanics, 1988-1996

Head of Department, University of Padua, Department of Constructions and Transportation, 1996-2000

Professor Emeritus, University of Padua, 2014-present

### OTHER PROFESSIONAL EXPERIENCE:

Deputy Director, Management Committee of the European Centre for Pollution Research, Queen Mary and Westfield College, University of London, 1990-1994;

Secretary General, International Centre for Mechanical Sciences, Udine, 2001-present

Affiliated Scientist, Houston Methodist Hospital Research Institute, 2012-present

### CONSULTING

Palasport Milan, Studio Romaro, Padova

Reversed Field Pinch RFX, Consortium CNR-Istituto Gas Ionizzati, Padova

Historical Bridge Conservation (1900), Municipality of Bolzano

NET Next European Torus, EURATOM, Bussels and Garching

ColumbusTeleskope, Istituto di Astronomia, University of Padua

Giotto Mission to Halley, Mirror, Istituto di Astronomia, University of Padua

ITER International Thermonuclear Experimental Reactor, Euratom

ITER International Thermonuclear Experimental Reactor, Fusion for Energy F4E, Barcelona

Subsidence of the Upper Adriatic Sea, Court of Justice, Rovigo

Heavy Ion Facility, Fusion for Energy F4E, Barcelona

Brenner Motorway, Trento

Brenner Base Tunnel, Bolzano

GSA Firehydroshock, Udine

## **MEMBERSHIPS IN PROFESSIONAL AND HONORARY SOCIETIES:**

National (Italian) Academy of Sciences (dei XL)  
Galileian Academy of Sciences, Humanities and Arts  
Istituto Veneto di Scienze, Lettere ed Arti  
Corresponding Member Istituto Lombardo  
Fellow, International Association of Computational Mechanics (IACM)  
Member Réunion Internationale des Laboratoires d'Essais et de Recherches sur les Matériaux et les Constructions (RILEM)  
Member, Italian Association of Theoretical and Applied Mechanics (AIMETA)  
Member International Society for Rock Mechanics (ISRM)  
Member Italian Geotechnical Association (AGI)  
Member Gesellschaft fuer angewandte Mathematik und Mechanik (GAMM)  
Member American Society of Mechanical Engineers (ASME)  
Member American Association for the Advancement of Science(AAAS)  
Member of Interpore

## **PRESENT AND PAST PROFESSIONAL SOCIETY AND MAJOR GOVERNMENTAL COMMITTEES, EDITORIAL BOARDS, AND CONFERENCES ORGANIZED/CHAired:**

### **Societies/Committees**

Member, Scientific Council, International Network of Centres for Computer Applications, (INCCA ) UNESCO  
Member, Scientific Council, Institut Méditerranéen de Technologie (Marseille)  
Member, Managing Council, European Community of Computational Methods in Applied Sciences (ECCOMAS)  
Member, Bureau, European Community of Computational Methods in Applied Sciences (ECCOMAS)  
Member, Scientific Council, International Center for Numerical Methods in Engineering, (CIMNE) Barcelona  
Coordinator, Italian Group for Computational Mechanics (GIMC)  
Member, General Council International Association of Computational Mechanics (IACM)  
Member, Executive Council International Association of Computational Mechanics (IACM)  
Member, EUROMECH Solid Mechanics Congress Committee  
Chairman, EUROMECH Solid Mechanics Congress Committee  
Secretary General, EUROMECH  
Member, EUROMECH Solid Mechanics Prize Committee  
Member, Hill Prize Committee, International Union for Theoretical and Applied Mechanics (IUTAM)  
Member, IUTAM Congress Committee  
Member, IUTAM Executive Committee of Congress Committee  
Member, IUTAM Bureau  
Member, Panel PE8 Process and Products Engineering, Advanced Grants, European Research Council (2009, 2011, 2013)  
Chairman, Panel PE8 Advanced Grants, European Research Council (2014, 2016)  
Chairman, Evaluation Committee, Faculty of Mechanical Engineering University of Technology of Eindhoven (2014)  
Chairman, Evaluation Committee, Faculty of Mechanical Engineering University of Twente (2014)  
Expert, Scientific Committee, Commissariat de l'Energie Atomique (CEA) France  
Member, Executive Council, Network for Mathematics, Computing and Simulation for Industry (MACSI-net)  
Member, Conseil d'Enseignement et de Recherche, Ecole Polytechnique, Paris

Member, Scientific Council, Coordination Committee for Studies of Structural Engineering, Italian research Council (CNR)

Member, Consulting Committee for Structural Engineering, Italian Research Council (CNR)

### **Editorial Boards**

Associate Editor *International Journal of Environment and Pollution* 1991-1994

Associate Editor *European Journal of Mechanics A/Solids* 1995-2001

Associate Editor *Computer Methods in Applied Mechanics & Engineering* 2001-2005

Regional Editor *Mechanics Research Communications*, 2003-present

Corresponding Editor *Computer Modeling in Engineering & Sciences*, 2008-2011

Co-editor *Asia-Pacific Journal of Computational Engineering*, 2014-present

Associate Editor *Biomedical Microdevices*, 2016-

Editorial Boards:

*Int. Journal of Communications in Applied Numerical Methods; Meccanica, (1987-1994) Int. Journal of Computer Applications in Technology; Int. Journal of Numerical Methods in Engineering; Int. Journal Métodos Numéricos para Cálculo y Diseño en Ingeniería; Journal of Marine Systems (1990-2002); International Journal for Engineering Modelling; Mechanics of Advanced Materials and Structures; Engineering Analysis and Design; Computers and Structures, Int. Journal for Computational Civil and Structural Engineering, Archives of Computational Methods in Engineering; Journal of Applied Mathematics and Mechanics ZAMM, Engineering Computation, Transport in Porous Media, European Journal of Mechanics A/Solids, Computers in Concrete, Structural Engineering and Mechanics, Computational Methods in Engineering Science and Mechanics, Interaction and Multiscale Mechanics: an International Journal, Computers, Materials and Continua; Int. Journal of Medical Nano Research; Advanced Modeling and Simulation in Engineering Sciences.*

### **Conferences organized/chaired**

Co-organizer, 2nd Int. Conference on Numerical Methods in Thermal Problems, Island of San Giorgio Maggiore, Venice, 1981

Co-organizer, 2nd Int. Conference on Numerical Methods in Laminar and Turbulent Flow, Island of San Giorgio Maggiore, Venice, 1981

Co-organizer, Int. Conference on Engineering Software for Microcomputers, Island of San Giorgio Maggiore, Venice, 1984

Co-organizer, 2nd Int. Conference on Numerical Methods in Transient and Coupled Problems, Island of San Giorgio Maggiore, Venice, 1984

Co-organizer, Int. Conference on Microcomputers in Engineering: Development and Application of Software, Swansea, 1986

Co-organizer, Int. Conference on Computer Modelling in Ocean Engineering, Venice, Island of San Servolo, 1988

Co-organizer, Int. Conference on Computer Aided Training in Science and Technology, CIMNE, Barcelona, 1990

Co-organizer, Int. Conference on Computer Modelling in Ocean Engineering, CIMNE, Barcelona, 1991

Co-organizer, Ninth Int. Conference on Finite Elements in Fluids, Venice, Auditorium Santa Margherita, 1995

Co-Organizer, Conference on Computational Mechanics and the Use of Computers in Engineering, University of Padua, 1998

Co-organizer, Workshop on Environmental Geomechanics, Monte Verità, Ascona, Switzerland, 2002

Co-organizer, Int. Conference on Computational Methods for Coupled Problems in Science and Engineering, Ibiza, 2005  
Co-organizer, Conference on Computational Methods for Coupled Problems in Science and Engineering II, Santorini, Greece, 2007  
Co-organizer and co-chairman, 8<sup>th</sup> World Congress for Computational Mechanics WCCM8/ECCOMAS, Venice, 2008  
Co-organizer and Chairman, Conference on Computational Methods for Coupled Problems in Science and Engineering III, Ischia, 2009  
Co-organizer, Conference on Computational Methods for Coupled Problems in Science and Engineering. Proceedings IV, Kos, Greece, 2011  
Co-organizer, The first NEMB Venice workshop on Cancer Nanotechnology, Istituto Veneto, Venice, 2012  
Co-organizer, Conference on Computational Methods in Science and Engineering V, Ibiza, 2013  
Co-organizer and Chair, Conference on Coupled Problems in Science and Engineering. VI, Venice, Island of San Servolo, 2015  
Local Co-organizer, IUTAM Symposium on Helicity, Structures and Singularity in Fluid and Plasma Dynamics, Istituto Veneto, Venice April 11-15, 2016  
Co-organizer, Conference on Coupled Problems in Science and Engineering. VII, Island of Rhodes, Greece, 2017.

#### **OTHER PROFESSIONAL HIGHLIGHTS**

Member, Evaluation Committee, Deutsche Exzellenz Initiative  
Member, Evaluation Committee, Ecole Centrale, Paris  
Member, Evaluation Committee, Laboratory LMT, Ecole Normale Supérieure, Cachan  
Member, Evaluation Committee, CIMNE, UPC Barcellona  
Member, Committee of Hydrogen Simulation Research, Fukuoka, Japan  
Visiting Professor, CIMNE, Barcelona  
Visiting Professor, University of Technology of Lodz (Poland)  
Visiting Professor, Gdansk University of Technology  
Visiting Professor, Conservatoire National des Arts et des Métiers (CNAM), Paris  
Visiting Professor, Ecole Normale Supérieure (ENS), Cachan  
Visiting Professor, University of Marne la Vallée, France  
Visiting Professor, Universiti Teknologi (UTM) Malaysia  
Visiting Professor, Birla Center, Hyderabad, India  
Visiting Professor, Dalian University of Technology, China  
Visiting Professor, Chuo University, Tokyo  
Visiting Professor, Ecole Polytechnique Fédérale Lausanne (EPFL)  
Visiting Professor, ACES, University of Texas, Austin  
Visiting Professor, Health Science Center, University of Texas, Houston  
Visiting Professor, University of New South Wales, Sydney  
Visiting Professor, Université Cergy Pontoise, France  
Visiting Professor, Ecole Centrale, Nantes, France  
Visiting Professor Ecole Nationale Supérieure Travaux Publics ENTPE, Yaounde, Cameroon

#### **UNIVERSITY COMMITTEES/ADMINISTRATIVE ASSIGNMENTS:**

Member, Budget Committee for Teaching staff, University of Padua  
Member, Award Committee "Progetto Giovani", University of Padua

## HONORS AND AWARDS:

- 1996 Elected Corresponding Member of the Galileian Academy
- 1998 Fellow, International Association for Computational Mechanics (IACM)
- 2000 Elected Member of the Galileian Academy
- 2000 Doctorate honoris causa, St. Petersburg State Technical University
- 2001 Honorary Visiting Professor, Dalian University of Technology, China
- 2002 Doctorate honoris causa, University of Technology of Lodz
- 2002 Computational Mechanics Award, (IACM)
- 2002 Elected Corresponding Member of the Istituto Veneto
- 2002 Highly Commended Paper Award, Emerald Press, Engineering Computations (Co-authors H.W. Zhang, R. de Borst, O.M. Heeres).
- 2005 Honorary Fellow, University of Wales, Swansea
- 2005 Elected Corresponding Member of Istituto Lombardo di Scienze, Lettere ed Arti.
- 2006 Honorary Doctorate in Engineering, Leibniz University Hanover
- 2006 Chevalier de l'ordre des Palmes Académiques, France
- 2006 IACM O.C. Zienkiewicz Award, International Association for Computational Mechanics
- 2007 Honorary Professor, Dalian University of Technology, China
- 2007 Elected Member of the National (Italian) Academy of Sciences ("dei XL")
- 2008 Doctorate honoris causa, Russian Academy of Sciences
- 2009 Maurice A. Biot Medal, American Society of Civil Engineers ASCE
- 2010 Doctorate honoris causa, Ecole Normale Supérieure, Cachan
- 2010 Euler Medal, European Community for Computational Methods in Applied Sciences
- 2011 Olgierd A. Zienkiewicz Medal, Polish Association of Computational Mechanics
- 2012 Lifetime Achievements Award, International Conference on Computational & Experimental Engineering and Sciences (ICCES)
- 2012 Elected Member of the Istituto Veneto di Scienze, Lettere ed Arti
- 2012 Elected Bureau Member, International Union for Theoretical and Applied Mechanics
- 2012 *Bytes and Science*, A book celebrating the 70<sup>th</sup> birthday of Bernhard A. Schrefler, (eds., G. Zavarise and D. P. Boso), CIMNE, Barcelona, Spain
- 2016 Hans-Fischer-Senior Fellowship, Institute for Advanced Study, Technical University of Munich
- 2016 Gauss-Newton Medal (IACM Congress Medal)
- 2017 Interpore Lifetime Honorary Membership Award, Interpore - The International Society for Porous Media
- 2017 "75 Jahre Prof. Bernhard Schrefler" Meeting celebrating the 75th birthday of Bernhard A. Schrefler, UNIBZ, Freie Universität Bozen – Libera Università di Bolzano, October 4<sup>th</sup>, 2017.

## RESEARCH ACTIVITY:

Dr. Schrefler has addressed fundamental aspects of applied and computational mechanics, and diverse applications to problems of practical interest. His contributions to structural and materials mechanics include the pseudo three-dimensional analysis of tall buildings, variable thickness plates, cable structures and related stability problems, membranes and wrinkling, asymptotic theory of homogenization with second order and boundary layer correctors, hierarchical and concurrent multi scale methods, thermo-electro-mechanical contact, use of Artificial Neural Networks (ANN) as constitutive models and for parameter identification for symbolic constitutive models.

In the field of technology for thermonuclear controlled fusion he contributed to the design of the reversed field pinch fusion device RFX (coils, vacuum vessel, shell, support structure, radiation in a

torus, graphite first wall), and to the analysis of superconducting coils for ITER (International Thermonuclear Experimental Fusion Reactor).

In porous media mechanics he was the first to apply Biot's theory to surface subsidence due to withdrawal of water (Venice) and gas (Ravenna), to extend Biot's theory to two- and three phase flow, and to introduce the generalized Bishop's stress, today the most used stress tensor in partially saturated soils mechanics. He also addressed non isothermal elastic plastic consolidation, infinite elements in isothermal and non-isothermal consolidation, large strain quasi-static and dynamic partially saturated soil behaviour, strain localization in fully and partially saturated soils, cavitation modelling, constitutive modelling for partially saturated soils, partitioned solution procedures and their numerical properties, CBS stabilizing algorithm and discontinuous Galerkin method for porous media, thermo-hydro-mechanical analysis of partially saturated porous media, inclusion of air-water interfaces, carbonation of concrete, three-fluids model for concrete with application to concrete under very high temperatures, concrete at early ages and non-isothermal leaching. The concrete model has been incorporated into several general purpose computer programs. His current research focuses on tumor growth modeling and transport of nanoparticles in diseased microvasculature and on hydraulic fracturing.