Antonio FASANO - CURRICULUM

Birth date: June 17, 1941
Birthplace: Milano (Italy).
Degree in Physics *cum laude*, University of Florence, March 6, 1966.
Fellowships: Italian CNR, Univ. of Florence (1966-Sept.1967), NATO Senior, Austin Univ. (Texas) (July-Sept.1973).
Military service: Italian Air Force (Oct.1968-Dec.1969), at the Atmosphere Physics Laboratory (Bologna).

POSITIONS - AFFILIATIONS

Present position: Scientific Manager at FIAB, Vicchio (Firenze, Italy), since Jan. 2013.
Professor Emeritus University of Florence (2013)
Member of the Accademia Nazionale dei Lincei - Rome (since 2011).
Member of the Accademia Toscana di Scienze e Lettere (*Colombaria*) – Florence (since 2019)
Founding Partner of the Accademia di Ingegneria e Tecnologia (ITATEC) (founded 2022)

Former University position: Full professor of Analytical Mechanics, Faculty of Science, University of Florence (since Nov. 1978). **Retired** (Nov. 1st, 2011)

Previous positions:
Assistant professor (temporary), Univ. of Florence (March - Oct. 1966)
Assistant professor (permanent), Univ. of Florence (Sept. 1967 - Oct. 1975)
Full professor at Univ. of Bari (Nov. 1975 - Oct. 1978), Faculty of Engineering
Associate to the Italian CNR Institute IASI (Inst. for Systems Analysis and Informatics), Rome (2010-2021).

DIRECTION OF SCIENTIFIC INSTITUTIONS

President of the European Consortium of Mathematics in Industry (ECMI) (1991-92)
President of CIMAB (Interuniversitary Center for Mathemarics Applied to Biology) since foundation (1998) to 2010
Vice-President of I2T3 (Industrial Innovation Through Technological Transfer) since foundation (2000) to 2009

DIRECTION OF RESEARCH PROJECTS

Director of annual scientific research programmes financed by the University of Florence (1981-1985).
Director of a national research project (Evolution equation and applications) financed by the Italian Minister of Education (1982-91).
Director of the national research project "Nonlinear problems in analysis and its applications to physics, chemistry and biology" (1991-1997), financed by the Italian Minister of Universities and Scientific Research.

Director of the Florence Section of the CNR Strategic Project "Industrial and technological applications of mathematics" (1986- 87).
Director of the Florence Section of the CNR Special Project "Mathematical Modelling and Industrial Applications" (1988).
Director of the Florence Section of the CNR Special Project "Methods and Math. Models for Industry" (1989-90).
Director of the Florence Section of the CNR Special Project "Mathematical Methods for Advanced Materials and Technologies" (1994).
Director of the Florence Section of the CNR Special Project "Advanced Methods and Models..." (1995-96).
Director of the Florence Section of the CNR Special Project on Fluid Dynamics (1998-199).

Director of the Florence Section of the Human Capital Mobility Programme "Mathematics as an Industrial Resource", based in Oxford (1993-94).
Director of the Florence section of HCM Contract "Singularities & Interfaces in Nonlinear PDE's" (1994-95), based in Leiden.

Principal investigator U.S. Army - ERO: change of phase in porous media (ECMI Contract, 1992-96).
Principal investigator Illy Caffe' project: nonlinear filtration (ECMI Contract, 1991-1997).
Principal investigator CNR project: Fluid flows coupled with nonlinear processes (1997-98)

Director of the Florence Section of the Italian MURST Project "Mathematical Analysis of Phase Transition ..." (1998-2000) (coord. A. Visintin, Trento).
Director of the Florence Section of the Italian MURST Project "Free Boundary Problems ..." (2000-2002) (coord. A. Visintin, Trento).
Director of the Florence Section of the Italian MIUR Project “Free Boundary Problems…” (2002-2004) (coord. A. Visintin, Trento).
Director of the Florence Section of the Italian MIUR Project “Free Boundary Problems…” (2005-2006) (coord. A. Visintin, Trento).
Director of the Italian MIUR Project “Mathematics of growth…” (2007-2008).
Director of the Italian MIUR Project “Mathematical models for multicomponent systems in medical and environmental sciences” (2009-2011)

Director of the Florence Section of the Italian FIRB Project on Applications of Mathematics to Biology (2003-2006) (coord. E. Beretta, Urbino).

Scientific Responsible for I2T3 of DINIS EEC Project (Optimal Design of Shoe Insoles) (2003-2004).
Scientific Responsible for I2T3 of the Contract between Enitecnologie and I2T3 on Wax deposition in the pipelining of waxy crude oils (2003).
Scientific Responsible for I2T3 of the contract between Tecnotessile and I2T3 for a research on water filters (2003).

Director of the Florence Section of the INdAM contract on Mathematical Models and Methods in Populations Dynamics (2003-2004) (coordinator M. Iannelli, Trento)

Coordinator of the Project GOFIM (Optimal Management of Membrane Filtration Processes), financed by the Foundation for Research and Innovation, University of Florence, 2008-2009.

Responsible for the Math. Department U. Dini (Univ. of Florence) in the LIFE+ European Project PURIFAST on waste water treatment, coordinated by Tecnotessile, Prato Italy (2009-11)

PARTICIPATION IN OTHER RESEARCH CONTRACTS

U.S. Army - ERO: free boundary problems in diffusion with mass transfer (1982-84)
SNAMPROGETTI: mathematical models for coal-water slurries (1987-1996).
EEC Contract (1987-88) on "Mathematical models of phase transitions and numerical simulation".
CNR contract: Filtration in porous media (dir. Primicerio, Firenze(1990-91), dir. F. Rosso, Firenze(1993)).
CNR contract: Solidification of polymers (dir. V. Capasso, Bari (1990-91), dir. C. Verdi, Milano (1994)).
ASI contract: crystallization of polymers (dir. V. Capasso, Milano, (1996-97)).
ESF Programme on "The mathematical treatment of free boundary problems" (1993-95), based in Lisbon, dir. J.F. Rodrigues.
CNR Project Math. Methods and Models in the Investigation of Biological Phenomena, dir. M. Iannelli, Trento (1999-2001).
INdAM Project on Mathematics and Medicine, dir. A. Quarteroni Milan (2005).
RESOLVE (European Project based in Vienna on the study of fibrosis), 2008
MAC-GEO (Project financed by Tuscany Region, Italy, about geothermal resources in Tuscany), 2008-2010
Contract between ENI (Milan) and the Math. Department U.Dini (Florence), on the rheology of waxy crude oils, 2008-2009.
IMPULSO, Contract between VITROCISET (Roma) and the University of Florence for security plans in harbours (2010-2011).
CREA (Math. Department U. Dini, Florence – Tuscany Region), 2011-2012

MEMBERSHIP IN ASSOCIATIONS

U.M.I. (Unione Matematica Italiana), life member
SIAM (until 2017)
Founding member of SIMAI (Società Italiana per la Matematica Applicata e Industriale).
Founding member of ECMI (European Consortium for Mathematics in Industry)
Founding and life member of ISAAC
IFNADI

INTERNATIONAL CONFERENCES AND COURSES ORGANIZED

International Conference on "Free boundary problems: theory and applications" (Montecatini, 1981).
Workshop on "Solidification on binary alloys" (Florence 1985).
CIME Course on "Nonlinear diffusion problems" (Montecatini 1985).
Mathematics in Industry (ICTP, Trieste 1989).
CIME Course on "Industrial Mathematics" (Bari 1990).
International Conference ECMI 93 (Montecatini, 1993).
Minisymposium on Change of Phase at the Annual SIAM Conference in Los Angeles (1993).
Session on Change of Phase at the Int. Conf. on Free Boundary Problems (Toledo, 1993).
ECMI-SIMAI Workshop (Capri, 1994).
Minisymposium on Nucleation, memory effects and crystal growth in Polymers at ICIAM 95 (Hamburg 1995)
First Italian-Japanese Symposium on Fluid Dynamics (Capri, 1996)
Session on Porous Media at ISAAC Conference (Delaware, June 1997)
CIME Course "Flows in porous media and industrial applications" (Cetraro, 1998)
Summer Course in Industrial Mathematics (IST, Lisbon 7-12 June, 1999)
Workshop on Non-Newtonian and viscoelastic fluid flows: mathematical Theory, modelling and applications (Scuola Norm. Sup. Pisa, 2000)
Session on Mathematical Models of the Workshop Math. Models in Soil Mechanics (Scilla, 2000)
Minisymposium on Fuels Pipelining (ECMI 2000, Torre Normanna)
Summer School in Industrial Mathematics (July 2001, Pontignano)
International Conference Free Boundary Problems 2002 (Trento)
Case Studies in Industrial Mathematics (2003), Scuola Norm. Sup., Pisa
Free Boundary Problems (2004), Montecatini.
Minisymposium on Mathematical Models in Oil Industry (2006), SIMAI Conference, Baia Samuele
Minisymposium on Mathematics and Monuments Conservation, ICIAM 2007, Zurich
Mathematics and Monuments Restoration (Centro De Giorgi & Scuola Normale Superiore, Pisa 2007)
EMS CIME Course on Glass Manufacturing, Montecatini Sept. 2008
Thematic (invited) Minisymposium on Cancer Modeling, ICIAM 2011, Vancouver.

Member of the Programme Scientific Committee of ICIAM 2015- Beijing
Member of the Sci. Comm. of “Mathematics for Biomedicine” Accademia Naz. Dei Lincei- CNR, Rome 2018

TEACHING AT OTHER INSTITUTIONS

II Seminario sobre el Problema de Stefan (Rosario, Argentina, 1986).
2nd Workshop on "Mathematics in Industry" (Trieste-ICTP 1987).
Free boundary problems in industry (Kaiserslautern 1988).
Free boundary problems with industrial applications (Bari 1989).
Sèminaire de Mathèmatiques Supèrieures "Shape Optimization and Free Boundary Problems" (Montrèal 1990).

Mathematical models based on free boundary problems (Eindhoven, 1990).
PhD course in math. Univ. La Sapienza, Rome (1991).
Free boundary problems and applications, Eindhoven (1993).
Modelling crystal growth in polymers, Madrid, Univ. Complutense (1995)
Nonlinear filtration processes in porous media, Tokyo, Chiba Univ. (1995)
Flows in porous media, Linz (1996)
Filtration processes, SISSA , Trieste (1997)
Mathematical Modelling in Polymer Science, Instituto Superior Tecnico, Lisbon (1999)
Mathematical Models of Industrial Processes, Roma La Sapienza, Dec. 2003
Mathematical Modelling of Industrial Processes, PhD in Math. for Technology and Industry at the Scuola Normale Superiore, Pisa (2001-2006, 2008, 2009)

INVITED SPEAKER at a number of Conferences and Seminars in various countries, including
ICIAM 91, Washington
Various Conferences of national math. societies: UMA Argentina (1986), SEMA Spain (1994), UMI Italy (1995)
Italian-Japanese symposium on fluid dynamics (1996)
Alan Tayler Memorial Lecture at ECMI 98 (Gothenburg)
Seminario Matematico Università di Milano (1997, 2000)
Manifestazioni Anno Mondiale per la Matematica, Brescia (2000)
CICAM - Chinese-Italian meeting on Biomathematics, Napoli (2001)
MATB 2001, Leipzig (2001)
International Conference on Mathematical Modelling of Tumours, Vanderbilt Univ., Nashville (TN) USA (2002)
4th International Workshop on Mechanics, Chennai (Madras), India (2003)
Workshop on Mathematical Challenges Arising in Cancer Models, MBI, Ohio State Univ., Columbus (Nov. 2003)
Opening Talk of the Academic Year, Math. Inst. Univ. Complutense, Madrid (2002)
BIOMAT 2007 (Granada, 2007)
FBP 2008 (Stockholm, 2008)
Ubiquitous Diffusion (Scuola Estiva Fisica Matematica, Ravello 2007)
Lectures on Modelling Cancer Growth and Treatments, Lisbon Dec. 2008
Mathematical Methods in System Biology (Tel Aviv, Jan. 2010)
Workshop on Math. Models of Blood Coagulation (Lisbon April 2010)
Summer School on Fluid-Structure Interactions for Biological Flows (Prague 2011)
Workshop on New Anticoagulant Therapies (Milan 2012)
Workshop on Mathematics in the Prevention Strategies in Life Sciences (Lisbon 2015)
Workshop on Mathematics in Biology (Lisbon 2016)
Life and Matter Sciences | Madrid, 23 November, 2018 (Academia Real)
Leonardo e il corpo dell'uomo (Accademia Naz. Lincei & ISS, Rome, 2019)
Passeggiate matematiche nei vasi sanguigni (Acc. La Colombaria, 2020)
SIMAI Minisymposium in memory of Alberto Gandolfi (Parma, 2021)
The hidden strength of Mathematics: Esophageal temperature during atrial ablation (Acc. La Colombaria, 2023)
Cornerstones in Science: Andrea Vesalio (Acc. La Colombaria, 2024)

ACTIVITY ABROAD

Guest of the University of Rosario and of the Argentinian Math. Union (1986)
Guest of the Academy of Science in Moscow, in Novosibirsk, and Alma Ata (Kazhakstan) (1989)

Guest of the Academy of Science in Beijing (1991)
Guest Professor at the University of Linz (1996)
Guest of the Isaac Newton Chair in Cambridge (2000)
Guest of Texas A&M University, College Station, USA (2001, 2002, 2004, 2005, 2007)
Guest of the Indian Institute of Technology, Chennai, India (2003)
Guest of Vanderbilt University, Nashville, USA (2004, 2008)
Guest of Universidad Complutense, Madrid (2007, 2008, 2009)
Guest of Max Plank Institute, Leipzig (2007)
Guest of WPI, Worcester (USA) (2008)
Guest of ICM Warsaw (2009, 2011)
Guest of Instituto Superior Tecnico, Lisbon (2008, 2010, 2012, 2015)
Guest of Academy of Sciences, Prague (2011)
Guest of MBI, Columbus Ohio (USA) (2011)
Guest of the University of San Carlos (Brazil) and of Univ. S. Paulo in S. Paulo (Brazil) (2011)

Member of PhD Committees: TU Eindhoven NL, IST Lisbon PT

DIRECTION OF PH.D. PROGRAMMES

Member of Board of the Ph.D. Programme in Mathematics at the University of Florence (1996-2010)
Member of the Scientific Council of the Ph.D. Programme in Mathematics for Technology and Industry at the Scuola Normale Superiore, Pisa, (2000-2010).

OTHER ACTIVITIES

Reviewer of Mathematical Reviews and of Zentralblatt für Mathematik (retired 2009).
ECMI Reviewer (1993-1999).
USA-NSF Referee
CANADA-NSERC Referee
Referee for various other national Scientific Agencies (Austria, Spain, Sweden, Italy, etc.)
Italian MIUR Referee
Referee for the activities of the International Centre for Theoretical Physics (Trieste)
Referee for many mathematics and engineering journals.
Member of the Committee for the International Prize "Feltrinelli" (250,000.00 euros) 2016.
Member of the Committee for the Prize "Feltrinelli Giovani" (50,000 euros) 2017

MEMBERSHIP IN BOARDS AND COUNCILS OF MATH. ASSOCIATIONS

Member of the Scientific Committee of the National Group for Mathematical Physics (GNFM) of the Italian CNR., since 1982, reappointed in 1997. Since 1999 GNFM has been transferred to INdAM (Istituto Nazionale di Alta Matematica), reappointed from 2000 to 2006.
Member of the Scientific Board for the translation of the Soviet Encyclopaedia of Mathematics (1994).
Member of the Board of ECMI (1985-1994) and of the Council of ECMI (1994-96, 1997-98)
Member of the Board of UETP Toscana (1990-1997)
Member of the Scientific Committee of IAN (Ist. Analisi Numerica, CNR, Pavia, 1996-2001)
Member of the Scientific Committee if IAGA (Ist. Analisi Globale e Applicazioni, CNR, Firenze, 1997-2001)
Member of the Board of ISAAC (since foundation, 1997, to 2001)
Member of the Board of IFNADI (since 1997 to retirement)
Member of the Scientific Council of UMI (2000-2007)
Representative of the University of Florence at CIMAB (Centro Interuniversitario per la Matematica Applicata alla Biologia, since foundation, 1998, to retirement).
President of CIMAB (since foundation, 1998, to 2010)
ECMI President (1991-92).
Vice-president of I2T3 (Industrial Innovation Through Technological Transfer), since foundation (2000) to 2009
Member of the Board of FIMIM (Florence Initiative for Mathematics in Industry & Management), since foundation (2000) to closure (2004)
Member of the Advisory Board of DFG-Research Center "Mathematics for Key Technologies" (MATHEON), Berlin (2003-2010).
Member of the Scientific Committee of the Publishing House "Firenze University Press" (2007 – 2009).
Member of the Scientific Council of the Instituto de Matematica Interdisciplinar (IMI), Universidad Complutense, Madrid, since foundation (2008) to retirement.
Representative of the University of Florence in the Board of the Centro Interuniv. Matematica per la Tecnologia (Catania, founded 2008), until 2011.
Representative of the University of Florence in the Board of Centre Mathematics and Industry (founded 2010), until 2011.

MEMBER OF THE EDITORIAL BOARD OF

NONLINEAR DIFFERENTIAL EQUATIONS & APPLICATIONS, Birkhäuser, since foundation (1994) to 2001.
SURVEYS FOR MATHEMATICS IN INDUSTRY, Springer Verlag, since foundation (1991), terminated in 2002
EUROPEAN JOURNAL OF APPLIED MATHEMATICS, Cambridge University Press (since 1994 to retirement)
MECCANICA, Kluwer (1990-1995) (1998-2011)
ADVANCES IN MATHEMATICAL SCIENCES AND APPLICATIONS, Gakkotosho, since foundation (1992)

ECMI SERIES IN INDUSTRIAL MATHEMATICS, Teubner, (1990-1999) to retirement
MAT (Universidad Austral, Rosario, Argentina) since foundation (2000) to retirement
BOLL. U.M.I. (section B) (2000-2011)
FAR EAST JOURNAL OF APPLIED MATHEMATICS since foundation (2001) to 2011
INTERFACES & FREE BOUNDARIES (2002-2006)
ADVANCES IN ENGINEERING SCIENCE AND APPLIED MATHEMATICS (Indian Institute of Technology, Madras, India) SCIENTIFIC ADVANCES PUBLISHERS, since foundation (2007) to 2011
JOURNAL OF MATHEMATICAL SCIENCES: ADVANCES AND APPLICATIONS, Scientific Publishers (India) (2008) to retirement
RENDICONTI LINCEI DI MATEMATICA APPLICATA (since 2012)

PATENTS

- Grip device for handling catheters or sheaths for medical use (Italy, dep. # FI2013A000277, Nov. 2013).
- System for monitoring esophageal temperature with alarm on temperature rate of change (European and US Patent)
- System for monitoring esophageal temperature with alarm on incorrect deployment
- System for monitoring esophageal temperature with optimized connection between catheter and electronic unit
- Esophageal thermal probe with plastic sensors, European Patent EP3155993
- System of protection of cardiac external stimulators from battery failure
- Dilating sheaths for leads extraction: Patent A (tip profile), Patent B (multilayer, EU 20172110.7-1113), Patent C (radio-opaque strip)

AWARDS

International Prize “Agostinelli” for Theoretical and Applied Mechanics, awarded by Accademia Nazionale Lincei, Rome (2007)

RESEARCH FIELDS

Partial differential equations. Free boundary problems. Heat and mass transfer. Ground freezing.
Phase change. Crystal growth. Reaction-diffusion processes.
Flows in porous media. Water filtration (ultrafiltration, granular active carbon filters). Soil hydrology. Bioremediation of polluted soils. Porous media with swelling granules.
Modelling geothermal fields.
Fluid dynamics. Non-Newtonian fluids, non-isothermal flows, fibre spinning.
Polymers science (Kolmogorov-Avrami theory, polymerisation, PVT diagrams, etc.).
Composite materials.
Glass industry
Dynamics of suspensions, dispersions, emulsions.

Mathematical models for oil industry.
Problems in food industry (coffee brewing, frying, boiling, baking, freezing).
Population dynamics.
Application of mathematics to medicine: mathematical models of tumour growth and treatments, chemotaxis and angiogenesis, bone growth, blood coagulation, hemodialysis, kidneys, blood rheology and microcirculation, vasomotion, thermal fields in ablation procedures, oxygenators, cauteries, bioimpedance, heart stimulation.
Monuments degradation and conservation (marble sulfation, growth of biofilms on monuments).
History of medicine.

FICTION

After retirement, I started publishing novels, and essays (see the section "Novels and essays).