Paolo Canu

• EDUCATION
1992 - PhD in Chemistry
Scuola Normale Superiore di Pisa. Advisor: Prof. Carrà
Chemical Engineering Department, Univ. of Wisconsin, Prof. H. W. Ray/Prof. W.E. Stewart.
1986 - Chemical Engineering Bachelor (5y).
Politecnico di Milano. Advisor: Prof. G. Buzzi Ferraris and P. Forzatti
1980 – Classical Studies high school degree

• CURRENT POSITION
2006 Full Professor (scientific area: Applied Physical Chemistry)
Department of Industrial Engineering, University of Padua, Italy

• PREVIOUS POSITIONS
1998, Associate Professor (scientific area: Applied Physical Chemistry)
Department of Chemical Engineering Principles and Practice, University of Padua, Italy
1994, Lecturer (scientific area: Chemical Plants)
Institute of Chemical Plants University of Padua, Italy
1992, Process Engineer
ACTEA (Radici Group) Environmental Engineering R&D

• CURRENT TEACHING ACTIVITIES
Chemical Reaction Engineering,12 ECTS, M.Sc. Chemical Engineering, Univ. of Padua
Fuels and Combustion, 9 ECTS M.Sc. Energetic Engineering, Univ. of Padua

• PREVIOUS TEACHING ACTIVITIES
Over 20 years of teaching at the University of Padua, several courses have been offered within the Chemical Engineering, Materials, Environmental, and Energy curricula. These include:
Chemical Thermodynamics, Transport Phenomena, Applied Physical Chemistry, Applied Chemical Kinetics, Introduction to Computational Fluid Mechanics, Environmental Chemical Engineering Biochemical Engineering Principles, Theory of Chemical Process Development, Granular Material Technology

Previous teaching activity at Politecnico of Milan as assistant, in courses of Physical-Chemistry, Chemistry, Design of Experiments, Numerical Methods.

Teaching at foreign Universities within Erasmus Teaching Staff Mobility programmes include
Industrial Chemistry and Reaction Engineering Lab., Åbo Akademi, Turku, Finland
University of Liège, Laboratoire de Génie chimique, Insititut de Chimie, Liege - Belgique
National Technical University of Athens, School of Chemical Engineering Athens- Greece

Two student's textbooks:
Chimica Fisica Applicata-Cinetica Chimica, Edizioni Libreria Progetto, Padova, 1996; CLUP 2003
Termodinamica per l'Ingegneria Chimica – Il corso attraverso gli esercizi, CLEUP, 1999, 2000

• INSTITUTIONAL RESEARCH PROJECTS

2016-2019 PARTIAL-PGMs: Development of novel, high Performance hybrid TWV/GPF Automotive afteR treatment systems by raTIonAL design: substitution of PGMs and Rare earth materials, Research and Innovation Actions, NMP 23 – 2015 - Partner
2012-2016 Development of NEXT GENeration cost efficient automotive CATalysts, EU-DGRI, FP7-NMP-201 l-SMALL-S (G.A 280890) – Partner
2012-2014 Integrated development of innovative, noble metal free catalytic converters for automotive application, Progetti di Ricerca di Ateneo, University of Padua
2011-2014 Sviluppo di un combustore ultra low NOx per H_2, Regione del Veneto e il Ministero dell'Ambiente e della Tutela del territorio e del Mare, Project # H77I10000630008, Partner
2002-2004 Catalizzatori Strutturati per Combustione Pulita, Progetti di Ricerca di Ateneo, University of Padua
2006 Sviluppo e progettazione di un sistema di gassificazione di biomasse vegetali di piccola taglia per la produzione di syngas, Dipartimento di Ingegneria Civile e Ambientale Università degli Studi di Trento, Partner
2000-2006 REPLAST: Recupero di materia prima da plastiche (PE) di scarto per depolimerizzazione selettiva, Regione Veneto, Misura 2.3: "attività di ricerca e trasferimento di tecnologia" del DOCUP Obiettivo n. 2
2003, Partner - programma di ricerca scientifica (FIRB): *Modellazione chimico-fisica del comportamento di particelle solide al contorno di sistemi liquidi in flusso* within the national project *Miscelazione di fluidi incomprimibili: aspetti fondamentali, modellazione della turbolenza, metodologie sperimentali computazionali ed analitiche applicate a reattori agitati a geometria semplificata* National coordinator: Prof. A. Paglianti
2003, Partner - programma di ricerca scientifica di rilevante interesse nazionale (PRIN): *Caratterizzazione sperimentale e simulazione del moto di letti granulari densi* within the national project *Caratterizzazione sperimentale e modelli di simulazione per sistemi fluido-solido granulari nell'industria di processo* National coordinator: Prof. L. Gibilaro
2002 Partner- Research program ESA/MAP *A Novel system for in vitro detection of gravity effects on primary haemostasis* Coordinator Prof. De Marco (CRO – Aviano)
2001, Partner - programma di ricerca scientifica di rilevante interesse nazionale (PRIN): *Cinetica dei processi di pirolisi di biomasse e rifiuti plastici* within the national project *Processi di pirolisi in letto fluido per il recupero di materia e di energia da rifiuti plastici* National coordinator: Prof. U. Arena
2000, Partner - programma di ricerca scientifica di rilevante interesse nazionale (PRIN): *Trasporto, aggregazione e deposizione di particelle ai contorni di un sistema solido-liquido all'interno di un progetto nazionale dal titolo Analisi e modellazione di processi di miscelazione di sistemi solido-liquido: fenomeni di dispersione del solido, distribuzione, aggregazione, deposizione.* National coordinator: Prof. Magelli.
1998 member of Polito unit - programma di ricerca scientifica di rilevante interesse nazionale (PRIN): *Simulazione di processi di precipitazione e aggregazione in sistemi turbolenti liquido-solido.* National coordinator: Prof. Baldi.

• INDUSTRIAL RESEARCH PROJECTS

The research activity has been supported and stimulate over the years by several industrial research contracts, with EVC, GlaxoSmithkline, Enichem, Aprilia, Basell, Ciba, Biasi, Centro Ricerche Danieli, MCZ, EdilKamin, Acque del Chiampo, AirLife, AreaImpianti, BSG Caldaie, CORTAL, DBS instruments, Illy Caffe, Polidoro Bruciatori, QID tech, SIMEM, Casale, Nordica-Extraflame

• SUPERVISION OF GRADUATE STUDENTS AND POSTDOCTORAL FELLOWS

PhD Student Advisor or co-advisor (15 students), University of Padua, Italy
Graduate Student Advisor (>150 students), University of Padua, Italy
Undergaduate Student Advisor (10 students), University of Padua, Italy

• INSTITUTIONAL RESPONSIBILITIES
2006-2010 Chair of the Chemical Engineering School (Bachelor and Master courses)
Member of several commissions: Industrial Eng. PhD School, Industrial Area Scientific Research, Dept. Resources and Development, Students orientation and advisory
Local coordinator of Erasmus agreements with the following institutions: Institute National Polytechnique de Toulouse (F), Royal Institute of Technology, Stockholm, (S), Åbo Akademi, Turku, (F), Umeå University, Umeå (S), Heriot-Watt University, Edimburgh (UK) Technical University of Eindhoven (NL).

• COMMISSIONS OF TRUST AND REVIEWING

Member of selection committees at Dept and University level, for research fellowships, temporary and permanent staff, both technical and teaching/research.

Reviewer of Applied Catalysis A: General, Applied Catalysis B: Environmental, Acta Mechanica, Catalysis Today, Chemical Engineering Journal, Chemical Engineering Science, Chemical Engineering and Processing, Powder Technology, Ceramics International, Chemical Engineering Research and Design, Chemical Engineering Science: Fluidized Bed Applications, Catalysis Science and Technology, Drug Development and Industrial Pharmacy, Energy, Energy and Fuels, Fuel, Environment Development and Sustainability, Environmental Science & Technology, Industrial & Engineering Chemistry Research, International Journal of Chemical Reactor Engineering, International Journal of Pharmaceutics, Journal of Analytical and Applied Pyrolysis, Journal of Agricultural and Food Chemistry, Journal of Chemical & Engineering Data, The Journal of Supercritical Fluids, Waste Management.

• INTERNATIONAL COLLABORATIONS

Prof. Eric Climent, Laboratoire de Génie Chimique, Toulouse (F)
Transport and adhesion in colloidal suspensions
Prof. L. Pettersen, K. Engval, R. Lanza, KTH, Stockholm-(S)
Catalysis in methane partial oxidations and automotive applications
Prof. M. Sint-Annaland, F. Gallucci TU/e, Eindhoven-(NL)
Reacting solids for chemical looping combustion
Prof. T. Salmi, D. Murzin , AboAkademi, Turku (F)
GLS reactors (direct $H2O_2$ synthesis)

Prof. J-P Mikkola, Department of Chemistry Technical Chemistry, Umeå University (S)
GLS reactors
Prof. N. Papayannakos, NTU Athens (GR)
Catalysts and reactors for automotive applications
Prof. J-P Paul, Université Lille (F)
DFT kinetics of oxides catalysts

• RESEARCH INTERESTS

Applied kinetics, with special interest on multiphase reactors (mostly fluid-solids interfaces). Multiphase flow, with (or without) reactions, with emphasis on solids, mainly particulate and possibly porous. Both experimental and theoretical (modeling) methods are routinely used and combined. Interest focuses on the combination of detailed surface chemistry (microkinetics approach) and complex flow modeling through CFD, mostly on catalytic and thermal decomposition applications.

Applications involve:
Transport and adhesion in colloidal suspensions (S in L and S in G)
Mechanisms in reacting solids, including secondary fuels, wastes and metallurgical applications
Catalysts and reactors for direct $H2O_2$ synthesis
Catalysts and reactors for (partial) oxidation reactions, including automotive exhaust treatment;
Application and critical analysis of microkinetics mechanisms for heterogeneous (catalytic) reactions;
Heterogeneopus catalytic reactions mechanism on model surfaces, in simplified flow configurations
Industrial catalyst testing, under steady and time-variable conditions
Development of simplified kinetics from details mechanism, for homogeneous and heterogeneous reactions
Development and testig of novel, intermediate temperature electrodes and electrolytes to be used in SOFCs and SOECs.
Processing and handling of granular solids, including rheological submodels for continuous approaches