



# UNIVERSITÀ DEGLI STUDI DELL'AQUILA

**Prof. Alberto Gallifuoco**

## **Curriculum scientifico**

(Aggiornato il 2023/01/05)

(30/05/83) Laurea in Ingegneria Chimica Università di Napoli 110/110 e lode;  
(1985) Contrattista Dipartimento di Ingegneria Chimica (Univ. Napoli) su progetti afferenti al PFE-2 ENEA;  
(1989-1991) Ricercatore presso il Dipartimento di Ingegneria Industriale (Cassino);  
(1989) Dottore di Ricerca in Ingegneria Chimica;  
(1991) Ricercatore di Chimica Applicata, Università di L'Aquila  
(1993-1995) Professore supplente di Principi di ingegneria Biochimica  
(Diploma Universitario in Ingegneria Chimica) Università degli Studi di L'Aquila;  
(1993-2000) Professore supplente di Principi di Ingegneria Biochimica  
(Laurea Quinquennale in Ingegneria Chimica) Università degli Studi di L'Aquila;  
(2000 ad oggi) Professore Associato di Principi di Ingegneria Chimica

### **Incarichi istituzionali**

Vicepresidente CDCS in Ingegneria Chimica, Università di L'aquila;  
Presidente del CAD in Ingegneria Chimica (2012-2018);

Membro del comitato direttivo Fondazione Filaurò;

Membro del Collegio dei docenti del Dottorato di Ricerca in Ingegneria Industriale, dell'Informazione e di economia

Referee per "Industrial and Engineering Chemical Research", "Chemical Engineering Journal"

Membro del Collegio dei Revisori progetti PRIN

### **Insegnamenti impartiti**

PRINCIPI DI INGEGNERIA BIOCHIMICA D.U. 1993-1995

PRINCIPI DI INGEGNERIA BIOCHIMICA 1993-2019

PRINCIPI DI INGEGNERIA CHIMICA c. i. METODI MATEMATICI PER L'INGEGNERIA CHIMICA 2002

FONDAMENTI DELLE OPERAZIONI UNITARIE DELL'INDUSTRIA CHIMICA 2003-2019

FONDAMENTI DEI PROCESSI DI SEPARAZIONE DELL'INDUSTRIA AGROALIMENTARE 2008-2010

FLUID DYNAMICS 2010-2012

ELEMENTI INTRODUTTIVI DI INGEGNERIA CHIMICA 2019-2022

PRINCIPI DI INGEGNERIA CHIMICA 2022 ad oggi

## FENOMENI DI TRASPORTO 2021 ad oggi

### **Attività di ricerca**

Il Prof. Alberto Gallifuoco svolge ininterrottamente attività scientifica da 40 anni ed è autore di circa 100 pubblicazioni di cui oltre 70 su riviste internazionali e proceedings di congressi internazionali con referee.

Biotecnologie industriali;

Ingegneria delle reazioni biochimiche;

Energia da biomassa;

Processi idrotermici di conversione energetica di scarti industriali.

### **Versione in Inglese**

(30/05/83) Degree in Chemical Engineering University of Naples 110/110 cum laude;

(1985) Contractor Department of Chemical Engineering (Univ. Napoli) on projects related to PFE-2 ENEA;

(1989-1991) Researcher at the Department of Industrial Engineering (Cassino);

(1989) PhD in Chemical Engineering;

(1991) Researcher in Applied Chemistry, University of L'Aquila

(1993-1995) Substitute Professor of Principles of Biochemical Engineering

(University Diploma in Chemical Engineering) University of L'Aquila;

(1993-2000) Substitute Professor of Principles of Biochemical Engineering

(Five-year degree in Chemical Engineering) University of L'Aquila;

(2000 to present) Associate Professor of Principles of Chemical Engineering

### **Institutional duties**

CDCS Vice-President in Chemical Engineering, University of L'Aquila;

President of CAD in Chemical Engineering (2012-2018);

Member of the management committee of the Filauro Foundation;

Member of the Academic Board of the PhD in Industrial, Information and Economics Engineering

Referee for "Industrial and Engineering Chemical Research", "Chemical Engineering Journal"

Member of the Board of Auditors of PRIN projects

## **Teachings**

PRINCIPLES OF BIOCHEMICAL ENGINEERING D.U. 1993-1995

PRINCIPLES OF BIOCHEMICAL ENGINEERING 1993-2019

PRINCIPLES OF CHEMICAL ENGINEERING and MATHEMATICAL METHODS FOR CHEMICAL ENGINEERING 2002

FUNDAMENTALS OF UNIT OPERATIONS OF THE CHEMICAL INDUSTRY 2003-2019

FOUNDATIONS OF THE SEPARATION PROCESSES OF THE AGRI-FOOD INDUSTRY 2008-2010

FLUID DYNAMICS 2010-2012

INTRODUCTORY ELEMENTS OF CHEMICAL ENGINEERING 2019-2022

PRINCIPLES OF CHEMICAL ENGINEERING 2022 to date

TRANSPORT PHENOMENA 2021 to date

## **Research activity**

Industrial biotechnology;

Engineering of biochemical reactions;

Biomass energy;

Hydrothermal energy conversion processes of industrial waste.

Prof. Alberto Gallifuoco has been carrying out uninterrupted scientific activity for 40 years and is the author of about 100 publications of which over 70 in international journals and proceedings of international conferences with referee.

## Main publications

Alfani F., Cantarella M., **Gallifuoco A.**, Scardi V.

"Enzyme stability and glucose inhibition in cellulose saccharification"

*Annals N.Y. Acad. Sci.* **434**, 39-43 (1984)

Cantarella M., Scardi V., **Gallifuoco A.**, Tafuri M.G. and Alfani F.

"Yeast cell entrapment in polymeric hydrogels: a kinetic study in membrane reactors"

*Membranes and Membrane Processes*, 233-240 (1986)

Cantarella M., Cantarella L., **Gallifuoco A.**, Pezzullo L. and Alfani F.

"Immobilization of Acid Phosphatase in 2-hydroxyethylmethacrylate gels"

*Polymers in Medicine II*, **34**, 117-126 (1986)

Alfani F., Cantarella L., **Gallifuoco A.**, Pezzullo L., Cantarella M. and Scardi V.

"Characterization of the  $\beta$ -glucosidase activity associated with immobilized cellulase from *Aspergillus niger*"

*Annals N.Y. Acad. Sci.* **501**, 503-507 (1987)

Cantarella M., Cantarella L., Cirielli G., **Gallifuoco A.** and Alfani F.

"Sucrose bioconversion in membrane reactors"

*J. Membr. Sci.* **41**, 225-236 (1989)

Alfani F., Cantarella L., Cantarella M., **Gallifuoco A.**, Scardi V.

"Thermodynamic Analysis of the stability enhancement of acid phosphatase by gel immobilization in proteins"

*Latin American Applied Research* **20**, 47-51, (1990)

**Gallifuoco A.**, Annetta A., Alfani F., Colella C. and Cantarella M.

"Exploratory study on separation of water-ethanol vapour mixtures: selective adsorption on natural zeolites."

*Gas Separation Technology* **8**, 521-526 (1990)

Alfani F., **Gallifuoco A.**, Cantarella M.

"Study of Michaelis-Menten kinetics with linear-type product inhibition in ultrafiltration membrane reactors: mathematical model, experimental and data correlation"

*Chem. Eng. J. and Biochem. Eng. J.* **43**, B43-B51 (1990)

Alfani F., Cantarella L., **Gallifuoco A.** and Cantarella M.

"Membrane reactors for the investigation of product inhibition on enzyme activity?"

*J. Membr. Sci.* **52**, 339-350 (1990)

Cantarella M., Cantarella L., Cirielli G., **Gallifuoco A.** and Alfani F.

"Product inhibition studies in membrane reactors"

*Annals N.Y. Acad. Sci.* **613**, 279-289 (1991)

Cantarella M., Cantarella L., **Gallifuoco A.**, Alfani F.

"Invertase activity of *Saccharomyces cerevisiae* cells entrapped in poly-2-hydroxyethylmethacrylate gels: kinetic and thermostability study in membrane reactors."

*J. of Biotechnology* **24**, 159-168, (1992)

Cicarelli P., Astarita G., **Gallifuoco A.**

"Continuous kinetic lumping of catalytic cracking processes"

*AIChE Journal* **38**, 7, 1038-1044, (1992)

Cantarella M., Cantarella L., **Gallifuoco A.** and Alfani F.

"Enzymatic Hydrolysis of Cellulose in Water-Immiscible Solvent Systems"

*Annals N.Y. Acad. Sci.* **672**, 318-322 (1992)

Colella C., Pansini M., and Alfani F., Cantarella M., and **Gallifuoco A.**

"Selective water adsorption from aqueous ethanol-containing vapours by phillipsite rich volcanic tuff"

*Microporous Materials* **3**, 219-226 (1994)

Alfani F., Cantarella M., **Gallifuoco A.** and Colella C.

"Synthetic zeolites as carrier for enzyme immobilization in laboratory-scale fixed bed columns"

*Studies in Surface Science and Catalysis* **84**, 1115-1122 (1994)

Alfani F., Cantarella M., **Gallifuoco A.** and Romano V.

"On the effectiveness factor of immobilized enzymes with linear mixed-type product inhibition kinetics"

*Biochem. Eng. J.* **57**, B23-29 (1995)

Alfani F., Cutarella N., **Gallifuoco A.**, Cantarella M. and Golini P., Franzosi G., Bianchi D.

"Preliminary investigation for the continuous enzymatic production of 7-aminocephalosporanic acid"

*Annals N.Y. Acad. Sci.* **750**, 491-495 (1995)

Dinnella C., Stagni A., Lanzarini G., Alfani F., Cantarella M., **Gallifuoco A.**

"Pectin degradation in UF-membrane reactors with commercial pectinases?"

*Progress in Biotechnology* **14**, Elsevier, 439- 449 (1996)

Cantarella M., Alfani F., Cantarella L., **Gallifuoco A.**

"Entrapment of enzymes and cells in poly (2-Hydroxyethyl Methacrylate) supports"  
*Methods in Biotechnology* **1**, Humana Press Inc., 67-76 (1997)

Alfani F., Cantarella M., Cutarella N., **Gallifuoco A.**, Golini P., Bianchi D.

"Enzymatic conversion of cephalosporin C into glutaryl 7-aminocephalosporanic acid. A study in different reactor configurations?"

*Biotechnology Letters* **19**, 175-178 (1997)

**Gallifuoco A.**, D'Ercole L., Alfani F., Cantarella M., Spagna G., Pifferi P.G.

"On the use of chitosan immobilized b-glucosidase in wine-making: kinetics and enzyme inhibition?"

*Process Biochemistry* **33**, 2, 163-168 (1998)

Alfani F., Cantarella M., **Gallifuoco A.**

"Immobilized enzyme three-phase reactors for oxidation of cephalosporin C?"

*Biocatalysis and Biotransformations*, **16**, 395-409 (1998)

**Gallifuoco A.**, Alfani F., Cantarella M., Spagna G., Pifferi P.G.

"Immobilized b-glucosidase for winemaking industry: study of biocatalyst operational stability in laboratory-scale continuous reactors?"

*Process Biochemistry***35**, 1-2, 179-185 (1999)

Alfani F., **GallifuocoA.**, Saporosi A., Spera A. and Cantarella M.

"Comparison of SHF and SSF process for the bioconversion of steam-exploded wheat straw".

*J. of Industrial Microbiology & Biotechnology***25**, 184-192 (2000)

Cantarella M., Alfani F., Cantarella L., **Gallifuoco A.**, Saporosi A.

"Biosaccharification of cellulosic biomass in immiscible solvent-water mixtures?"

*J. Molecular Catalysis B: Enzymatic***11**(4-6), 867-875 (2001)

**GallifuocoA.**, Alfani F., Cantarella M., Viparelli P.

"Studying enzyme-catalyzed depolymerizations in continuous reactors".

*Ind. Eng. Chem. Res.* **40**, 5184-5190 (2001)

**Gallifuoco A.**, Alfani F., Cantarella M.

"Advantages of continuous over batch reactors for the kinetic analysis of enzymes inhibited by a unknown substrate impurity".

*Biotechnology & Bioengineering* **79**, 6, 641-646 (2002)

**Gallifuoco A.**, Alfani F., Cantarella M., Viparelli P.

"A new experimental procedure for monitoring molecular weight breakdown during enzymatic degradation of polygalacturonic acid in continuous membrane reactors".

*Ind. Eng. Chem. Res.* **42**, 3937-3942 (2003)

Cantarella M., Cantarella L., **GallifuocoA.**, Spera A. and Alfani F.

"Effect of inhibitor released during steam-explosion treatment of poplar wood on subsequent enzymatic hydrolysis and SSF?"

*Biotechnology Progress* **20**, 200-206 (2004)

Viparelli, P., Alfani F., **GallifuocoA.**, Cantarella M.

"Effect of quaternary ammonium salts on the hydrolysis of n-glutaryl-L-phenylalanine catalysed by α-chymotrypsin?

*Journal of Molecular Catalysis B: Enzymatic*, **28**, 2-3 101-110 (2004)

Cantarella M., Cantarella L., **Gallifuoco A.**, Frezzini R. and Spera A.

?A study in UF-membrane reactor on activity and stability of nitrile hydratase from *Microbacterium imperiale* CBS 498-74 resting cells for propionamide production?

*Journal of Molecular Catalysis B:Enzymatic***29**,1-6, 105-113 (2004)

Cantarella M., Cantarella L., **GallifuocoA.**, Spera A. and Alfani F.

"Comparison of different detoxification methods of steam-exploded poplar wood for ethanol bioproduction in SHF and SSF?

*Process Biochemistry* **39**, 1533-1542 (2004)

**Gallifuoco A.**, Cantarella M., Viparelli P., Marucci M.

?Polygalacturonic acid/endo-polygalacturonase system: a kinetic study in batch reactors?

*Biotechnology Progress***20**, 1430-1436 (2004)

Cantarella M., Cantarella L **Gallifuoco A.**, Spera A.

?Use of a UF-membrane reactor for controlling selectively the nitrile hydratase-amidase system in *Microbacterium imperiale*CBS-498-74 resting cells. Case study: benzonitrile conversion.

*Enzyme Microb. Technol.* **38**, 126-134 (2006).

Cantarella M., Cantarella L., **Gallifuoco A.**, Spera A.

?Nitrile bioconversion by *Microbacterium. Imperiale* CBS 498-74 resting cells in batch and UF membrane bioreactors?

*J. Ind. Microbiol. Biot.* **33**, 208-214 (2006)

**Gallifuoco A.**, Cantarella M., Marucci M

?Investigating the kinetics of the enzymatic depolymerization of polygalacturonic acid in continuous UF -membrane reactors?

*Biotechnology Progress***23**, 1111-1117 (2007)



Cantarella M., Cantarella L., **Gallifuoco A.**, Intellini R., Kaplan O., Spera A., Martinková, L.

?Amidase-catalyzed production of nicotinic acid in batch and continuous stirred membrane reactors?

*Enzyme Microb. Technology* **42**, 222-229 (2008)

Cantarella M., , **Gallifuoco A.**, Spera A., Cantarella L. , Kaplan O., Martinková, L

?UF-Membrane Bioreactors for Kinetics Characterization of Nitrile Hydratase-Amidase Catalyzed Reactions: a Short Survey?

*Modern Biocatalysis: Stereoselective and Environmentally Friendly Reactions*, Wiley-VCH Verlag GmbH & Co., Weinheim, 273-285 (2009)

Cantarella L., , **Gallifuoco A.**, Malandra A., Martinková, L., Pasquarelli, F., Spera A., Cantarella M.

?Application of continuous stirred membrane reactor to 3-cyanopyridine bioconversion using the nitrile hydratase-amidase cascade system of *Microbacterium imperiale* CBS 498-74?

*Enzyme Microb. Technology* **47**, 64-70 (2010)

Cantarella L., , **Gallifuoco A.**, Malandra A., Martinková, L., Pasquarelli, F., Spera A., Cantarella M.

?High-yield continuous production of nicotinic acid via nitrile hydratase-amidase cascade reactions using cascade CSMRs?

*Enzyme Microb. Technology* **48**, 345-350 (2011)

Cantarella M., Cantarella L., **Gallifuoco A.**, Spera A., Martinková L.

?Nicotinic acid bio-production by *Microbacterium imperiale* CBS 489-74: Effect of 3-cyanopyridine and temperature on amidase activity?

*Process Biochemistry* **47**, 1192-1196 (2012)

Cantarella L., **Gallifuoco A.**, Spera A., Cantarella M.

?Nitrile, amide and temperature effects on amidase-kinetics during acrylonitrile bioconversion by nitrile-hydratase/amidase in-situ cascade system?

*Bioresource Technology* **142**, 320-328 (2013)

**Gallifuoco A.**, Taglieri L., Scimia F., Papa A., Di Giacomo G.

?Hydrothermal carbonization of biomass: new experimental procedures for improving the industrial processes?.

*Bioresource Technology* **244**, 160-165 (2017)

**Gallifuoco A.**, Taglieri L., Scimia F., Papa A., Di Giacomo G.

?Hydrothermal Conversions of Biomass: Assessment of Kinetic Models Using Liquid-Phase Electrical Conductivity Measurements?.

*Waste Management*, *77*, 586-592 (2018).

**Gallifuoco A.**, Di Giacomo G.

?Novel kinetic studies on biomass hydrothermal carbonization?.

*Bioresource Technology* *266*, 189-193. (2018)

**Gallifuoco A.**, Taglieri L., Scimia F., Papa A., Di Giacomo G.

?New Insights into the Evolution of Solid and Liquid Phases During Hydrothermal Carbonization of Lignocellulosic Biomasses?. *Biomass and Bioenergy* *121*, 122-127 (2019).

**Gallifuoco A.**

?A new approach to the kinetic modeling of biomass hydrothermal carbonization?. *ACS Sustainable Chem. Eng.* *7* (15), 13073-13080 (2019)

**Gallifuoco A.**, Taglieri L., Papa A.A.,

?Hydrothermal carbonization of waste biomass to fuel: a novel technique for analyzing experimental data?.

*Renewable Energy* *149*, 1254-1260 (2020).

Gallucci, K., Taglieri, L., Papa, A.A., Di Lauro, F., Ahmad, Z., **Gallifuoco A.**

?Non-energy valorization of residual biomasses via HTC. CO<sub>2</sub> capture onto activated hydrochars?.

*Applied Sciences* *10*, 1879-1892 (2020).

Papa A.A., Taglieri L., **Gallifuoco A.**

?Hydrothermal carbonization of waste biomass: an experimental comparison between process layouts?. *Waste management* *114*, 72-79 (2020).

**Gallifuoco A.,** Papa A.A., Taglieri L.

?Modeling biomass hydrothermal carbonization by the maximum information entropy criterion?.

*Reaction Chemistry & Engineering*, 6, 920-928 (2021).

**Gallifuoco A.,** Papa A.A., Taglieri L.

?Biomass hydrothermal carbonization: Markov-Chain Monte Carlo data analysis and modeling?.

*Frontiers in Chemical Engineering* 3, 20-34 (2021).

Papa A.A., Di Carlo, A., Bocci, E., Taglieri L., Del Zotto, L., **Gallifuoco A.**

?Energy analysis of an integrated plant: fluidized bed steam gasification of hydrothermally treated biomass coupled to solid oxide fuel cells?.

*Energies*, 14, 7331 (2021).

**Gallifuoco A.,** Taglieri L., Papa A.A., Di Carlo A..

?Advanced biomass-to-value chains by integrating hydrothermal carbonization into complex conversion process schemes?.

*Chemical Engineering Transactions*, 92, 67-72 (2022).

**Gallifuoco A.,** Papa, A.A., Spera A., Taglieri L., Di Carlo A.

?Dynamics of liquid-phase platform chemicals during the hydrothermal carbonization of lignocellulosic biomass?.

*Bioresource technology reports*, 19, 101177-101184 (2022).