

Pietro Rosario Tundo

Curriculum vitae (updated October 16th, 2015)

- **PERSONAL INFORMATION**

Researcher ID: F-7871-2015

Nationality: Italian

Date of birth: October 16th, 1945

URL for web site: http://www.unive.it/data/persona/5591778/pubb_tipo

- **EDUCATION**

1969 Degree on Chemistry, University of Bologna, 1st class honors.

- **CURRENT POSITION**

1989 – 2015 Professor of Organic Chemistry at the University of Venice, Ca' Foscari.

- **RELEVANT PREVIOUS POSITIONS**

1979-81 Guest researcher at T&M University, College Station (Texas);

1981-82 Guest researcher at Syracuse University (New York);

1989-90 Guest researcher at Clarkson College of Technology, Potsdam (New York).

- **FELLOWSHIPS AND AWARDS**

1982 American Chemical Society's Kendall Award (with Janos Fendler).

1997 "An Intelligent Future" award from Federchimica (Italian association of chemical industries).

- **ORGANIZED CONFERENCES AS CHAIRMAN OR CO-CHAIRMAN**

- I have established the biannual series of IUPAC Green Chemistry Conferences, the first of which was held in Dresden on 2006 and then in Moscow, Ottawa, Foz de Guazu and Durban. The next one will be held in Venice on 2016.

- I have established the series and directed ten Summer Schools on Green Chemistry in Venice (first edition held on 1998, tenth edition on 2007), seven of which were sponsored by the EU. Over the ten editions, roughly 600 PhD and Post Doc students attended.

- Symposium on "Green Chemistry: a tool for socio-economic development and environmental protection". ESOF European Science Open Forum, Munich (Germany), 15-19 July, 2006.

- NATO-ASI Workshop on New organic chemistry reaction and methodologies for green productions, Lecce and Otranto (Italy), 30 October- 10 November 2006.

- Upon appointment by the Italian Minister of Research (L. Moratti), I organized the Carnegie Group Meeting between the Ministers of Education and Research of G8 Countries; Venice, 5-7 December 2004.

- **INSTITUTIONAL RESPONSIBILITIES**

1998 – at present - Faculty member, University of Venice - Italy

1993 – 2009 I have founded: a. the Interuniversity Consortium "Chimica per l' Ambiente" (Chemistry for the Environment), INCA, embodying 31 Italian Universities on 2008; - b. The Laboratory of INCA at Marghera (design and direction) and other six INCA Laboratories in Italy. INCA's structure and activities over the years 2005-2007 were assessed by CIVR (MIUR); this evaluation suggested that INCA had the scientific leadership in the area of "Science and technologies for the sustainable development and governance".

2005 - 2015 - Chairman of MEGREC. This voluntary association of Green Chemistry Institutions of Mediterranean Countries (Egypt, Italy, Morocco, Tunisia, Algeria, Serbia, Greece and Spain) seated in Italy, was founded in Belgrade on 2005 and represents the UNESCO UNITWIN No. 731. Responsible of two "Progetti di grande rilevanza" granted by the Italian Ministry of Foreign Affairs, with Algeria (anni 2006-2008) and Argentina (anni 2002-2004).

- **COMMISSIONS OF TRUST**

2006 - 2015 - UNESCO chair on Green Chemistry, UNITWIN Network 731 with seat at Venice University.
2004 - 2006 - Member of the Advisory Board of the Green Chemistry, Monash University, Australia
2004 - 2005 - Member of the Evaluation Panel of SUNARE Project, Academy of Finland.
2014 - 2015 - Peer Review of Portuguese Foundation for Science and Technology Research Units on behalf of the European Science Foundation.
2013 - 2015 - Member of the PhD Programmes Evaluation Panel - FCT Portugal on behalf of the European Science Foundation.
1996 - present - Italian Representative on OECD for Sustainable Chemistry OECD's Programme.
2013 - 2015 - Member and President of the Italian National Committee for IUPAC.
1995 - 2015 - Evaluator of Industrial projects for the Italian Ministries for Research and for Industry.
2010 - 2015 - Evaluator of research Projects (SIR, PRIN and Montalcini) of the Italian Ministry for Research.
2014 - 2015 - Member of the International Jury of the Phosagro/UNESCO/IUPAC Award on Green Chemistry.
2015-2019 - Member of the Bureau of IUPAC

- **MEMBERSHIPS OF SCIENTIFIC SOCIETIES**

2007 - 2009 - President of the IUPAC Division III (Organic and Biomolecular Chemistry).
1995 at present - Chairman of the IUPAC Committee on Green Chemistry
2000 at present - Chairman of Working Party on "Green and Sustainable Chemistry" of Euchems (European Association for Chemical and Molecular Sciences).
1903 - 2009 - President of the Interuniversity Consortium "Chemistry for the Environment", INCA

- Membership to editorial Boards of International Journals:
2000 - 2013 Int. Ed. Board- Green Chemistry, RSC
2007 - 2015 Int. Advisory Board ChemSusChem, Wiley
2014 - 2015 Editorial Board ScienceOpen, GmbH, Berlin.
2006 - 2010 Director of the bimonthly magazine for Secondary Schools "Green. La Scienza al Servizio dell'Uomo e dell'Ambiente"

- **Scientific Leadership Profile**

I am a scientist with a high international profile [h-index 33 since 1985, 3684 citations (ISI). 271 Papers and 40 patents] who has made substantial improvement in a number of fields of chemistry. I have invented a continuous-flow system based on phase-transfer catalysis (Gas-Liquid Phase Transfer-Catalysis, GL-PTC) which is currently used in industry for the manufacturing of aryl ethers and other fine chemicals.

I have reported for the first time: - The reaction of mono-methylation of CH₂ acidic compounds based on dimethyl carbonate and its unusual mechanism; this process led to patents in Europe, USA, and Japan and concerns the production of 2-aryl propionic acids (anti-inflammatory drugs such as ibuprofen, ketoprofen, naproxen); - The selective mono-methylation of aromatic amines; - The selective carboxymethylation of aromatic amines; - The synthesis of solvents with very low toxicity, used on water-based varnishes; - New pathways and cyclisation reactions based on organic carbonates for fine chemicals (now utilized by ICI, Givaudan, for fragrances synthesis); - New reaction pathways for the synthesis of cyclic urethanes (1,3-oxazinan-2-ones). - How to domesticate war chemistry: macrocyclic ethers from mustard carbonates.

In the field of reactions of dialkyl carbonates, I am the foremost academic researcher having published the greatest number of scientific papers (ISI: 62 since 1985).

The many fields of research I have learnt and produced results within (supramolecular chemistry, phase-transfer catalysis, continuous-flow processes, photo-induced processes, artificial photosynthesis, catalysis and zeolites, detoxification methods, green chemistry understanding) are now directed toward carbonate chemistry.

Ten years track-record (2005-2015)

• Representative Publications in the last 10 years

- Grego, Sandra; Arico, Fabio; Tundo, Pietro. Highly Selective Phosgene-Free Carbamoylation of Aniline by Dimethyl Carbonate under Continuous-Flow Conditions - *ORGANIC PROCESS RESEARCH & DEVELOPMENT*, 17, 679-683 (2013).
- Arico, Fabio; Tundo, Pietro; Maranzana, Andrea; et al. Synthesis of Five-Membered Cyclic Ethers by Reaction of 1,4-Diols with Dimethyl Carbonate – *CHEMSUSCHEM*, 5, 1578-1586 (2012).
- Arico, Fabio; Toniolo, Umberto; Tundo, Pietro. 5-Membered N-heterocyclic compounds by dimethyl carbonate chemistry - *GREEN CHEMISTRY*, 14, 58-6 Green Synthesis of Dimethyl Isosorbide *CHEMSUSCHEM*, 3, 566-5 (2010).
- Tundo, Pietro; Arico, Fabio; Rosamilia, Anthony E.; et al. Reaction of dialkyl carbonates with alcohols: Defining a scale of the best leaving and entering groups – *PURE AND APPLIED CHEMISTRY*, 81, 1971-1979 (2009).
- Arico, Fabio; Toniolo, Umberto; Tundo, Pietro 5-Membered N-heterocyclic compounds by dimethyl carbonate chemistry - *GREEN CHEMISTRY*, 14, 58-61 (2012).
- Tundo P., Arico F., Gauthier G., Rossi L., Rosamilia A., Bevinakatti H., Sivert R., Newman C., Green Synthesis of Dimethyl Isosorbide, *CHEMSUSCHEM*, 3, 566-570 (2010).
- Rosamilia A., Aricò F., Tundo P., Insight into the Hard-Soft Acid-Base Properties of Differently Substituted Phenylhydrazines in Reactions with Dimethyl Carbonate. *JOURNAL OF PHYSICAL CHEMISTRY B*, 112, 14525-14529 (2008).
- Rosamilia A., Aricò F., Tundo P.. Reaction of the ambident electrophile dimethyl carbonate with the ambident nucleophile phenylhydrazine. *JOURNAL OF ORGANIC CHEMISTRY*, 73, 1559-1562 (2008).
- Tundo P., Rossi L., Loris A. Dimethyl carbonate as an ambident electrophile. *JOURNAL OF ORGANIC CHEMISTRY* 70, 2219-2224 (2005).
- Tundo P., Perosa A., Multiphasic heterogeneous catalysis mediated by catalyst-philic liquid phases , *CHEMICAL SOCIETY REVIEWS*, 36, 532-550 (2007).

• Books, Edited books, Collective publications and Series of books as Chief Editor in the last 10 years .

- I am the sole Author the book “Continuous Flow Methods in Organic Synthesis”, H. Horwood Publisher, pp. 1-378 (1991). A new Single Author book “The Chemistry of Dimethyl Carbonate”, will be published in July 2016 (*contract signed with Wiley and Sons, N.J.*).
- I am Editor in Chief (with J. Andraos) of the new Series of Book “Green Syntheses“ Published by CRC Press. Volume I was published on June 2014.
 - I am co-Editor in Chief of the Series of Books “Green Chemistry and Sustainable Technology”, Spinger. 2014 - ..
 - P. Tundo, V. Esposito “Green Chemical Reactions”, Springer Ed. 2008 ISBN: 978-1-4020-8456-0
 - P. Tundo A. Perosa and F. Zecchini Editors: Methods and Reagents for Green Chemistry , Wiley, 2007, ISBN: 978-0-471-75400-8
 - P. Tundo, W. Hölderich, W. Reschetilowski and F. Aricò, Editors: Special Issue of Pure and Applied Chemistry 2007. Proceedings from IUPAC 1st International Conference on Green-Sustainable Chemistry.
 - P. Tundo et al, Editors: “Chlorine-Free Synthesis for Green Chemistry”. Special issue of Pure and Applied Chemistry, 84, No. 3 (2012).
 - Editor or co-editor of 11 Books of the *Green chemistry series* Published by INCA.
 - Founder of the bimonthly magazine for Secondary Schools “Green. La Scienza al Servizio dell’Uomo e dell’Ambiente”

- **Granted Patents in the last 10 years**

1. P. Tundo and M. Selva, (2007). Synthesis of mono-N-substituted functionalized anilines. 03029005.0. Concessione 1431274-2007
2. P. Tundo, R. Mangano and L. Riva (2009). Water-based coating composition containing dialkyl carbonates having ether functions as coalescent agents and use thereof. WO/2009/147469, Lechler S.p.A. & INCA.
3. P. Tundo, S. Grego, M. Rigo, R. Paludetto (2010). Process for the production of Aromatic Urethanes. EP2199278A1, DOW.
4. Patrick Fuertes, Mathias Ibert, Emilie Josien, Pietro Tundo, Fabio Aricò (2013). Method for preparing dialkylcarbonates of dianhydrohexitol. US 8,399,601 B2, EU, WO2011/039483A1
5. H. Bevinakatti, C. Newman, S. Ellwood, P. Tundo, F. Aricò, M. Schroeder (2013). Cyclic ether. ICI to Givaudan. US 8,536,349 B2; EU 2178871; WO2009010791 A2; Japan JP5409619; China ZL 200880024304.4; Mexico 313779. Applications pending in India and Brazil.

- **Top 10 invited presentations in the last 10 years.**

- 40th IUPAC Congress – Beijing, China, 14-19 August, 2005.
- 10th Annual Green Chemistry & Engineering Conference, Washington, USA, 25-27 June 2006.
- VII Conference on Mechanisms of Catalytic Reactions S. Petersburg, Russia 2-4 July, 2006.
- XV Congreso Argentino de Catálisis - 4.to Congreso de Catálisis del Mercosur, La Plata, Argentina, 12-16 November 2007.
- 236th ACS National Meeting– Philadelphia (USA) - 17-21 August, 2008. Dedicated symposium.
- Symposium “CO₂, a waste or a raw material. Fate or Opportunity” Toulouse, France, 16-17 December 2008.
- China-EU Workshop on “Clean Production Technologies”, Beijing, March 17-19, 2010. Organized by the EU Commission.
- 4th IUPAC International Conference on Green Chemistry, Plenary Speaker, Foz de Iguazu, Brazil August 2002.
- 4th Congress of the European Association for Chemical and Molecular Sciences, KeyNote speaker, Istanbul August 2003. Dedicated Symposium on Green Chemistry.
- 5th IUPAC International Conference on Green Chemistry, Plenary Speaker, Durban, South Africa, August 2004.

- **Contribution to early careers of excellent researchers.**

The scientific projects, the summer schools on green chemistry, the Interuniversity Consortium “Chemistry for the Environment, INCA, the collaborations with IUPAC, UNESCO and many Chemical Societies, offered me to meet many young scientists, all of them extremely motivated in pursuing good research and green chemistry. Many of them presently hold prestigious positions in their Country; I remind not only colleagues in Italy but, just to mention a few, also in Russia, China, India, Tanzania, Egypt, Rumania, Netherlands, France, Thailand, Australia, Argentina, México, Brazil, USA, UK. In all of these Countries I am familiar with chemists with whom I had a relation on Research or/and on Education.

Riassunto delle Attività ai fini dell'inserimento in REPRISE

Ricerca di base:

Professore universitario a tempo indeterminato a partire dal 1982.

Ricerca industriale competitiva:

- a.
 1. Chair of the Working Group on Green and Sustainable Chemistry of the European Association for Chemical and Molecular Sciences, EuCheMS. On October 2015, 23 European Chemical Societies agreed to upgrade this Working Group into a Division of Green and Sustainable Chemistry.
 2. Chair of the IUPAC Committee on Green Chemistry over the years 2001-2015.
 3. Chair of the UNESCO UNITWIN 731: MEGREC: years 2006-2015.
 4. Founder and President of the Interuniversity Consortium Chemistry for the Environment over the years 1993-2009.
- b.
 1. Chair and responsible of the 488 research program (MIUR), CLUSTER C-11 "Ambiente Terrestre, Chimica per l'Ambiente". Anni 1999 - 2007.
 2. Co-chair of the FP7 EU research program "Solvsafe".
 3. Responsible of two "Progetti di grande rilevanza" granted by the Italian Ministry of Foreign Affairs, with Algeria (anni 2006-2008) and Argentina (anni 2002-2004).
 4. Coordinator of two Intas Projects (EU) with Moscow University on the years 2002- 2004.
- c. Applicazioni della catalisi di trasferimento di fase in flusso continuo (GL-PTC) e applicazioni industriale derivanti dai brevetti con ICI/Givaudan, Tessenderlo Chemie e EU-Solvsafe.
- d. Negli anni 1980-2015: 40 brevetti depositati di cui 11 concessi.
- e. Cinque brevetti concessi negli ultimi 10 anni di cui quello con ICI/Givaudan esteso in USA, Giappone, Cina, Mexico e EU (34 Paesi). In attesa di concessione in India e Brasile.

Diffusione della Cultura scientifica

- b. Founder and President of the Interuniversity Consortium Chemistry for the Environment INCA (31 universities) over the years 1993-2009.
- c.
 1. Founder and director of the Magazine of INCA Consortium: ChimicaNewsAmbiente;
 2. Interviews and articles on newspapers and organizer of the Symposium on "Green Chemistry" within ESOF European Science Open Forum, Munich (Germany), 15-19 July, 2006.
- d.
 1. Founder and Director of the bimonthly magazine for Secondary Schools "Green: la Scienza al Servizio dell'Uomo e dell'Ambiente" over the years 2006 - 2010.
 2. Green Chemistry Series, a book series on the research and applications of Green Chemistry. A few volumes of the series were sponsored by IUPAC, Intas, Wiley and Springer.
- f. I have established the series and directed ten Summer Schools on Green Chemistry in Venice (first edition held on 1998, tenth edition on 2007), sponsored by the EU, UNESCO and NATO.

In alternativa: Valutazione internazionale di progetti di ricerca, reti di ricerca, reti di dottorati di ricerca inerenti le scienze chimiche.

Finland:

2004-2005 Member of the Evaluation Panel of SUNARE Project, Academy of Finland.

Belgium:

2015. Evaluation of the research project for the Association of University Antwerp and Higher Education Institutes (AUHA), Council of the Industrial Research Fund (IOF Raad) and Industrial Research Fund (IOF)

Portugal:

a) 2014 - 2015 - Peer Review of Portuguese Foundation for Science and Technology Research Units on behalf of the European Science Foundation.

b) 2013 - 2015 - Member of the PhD Programmes Evaluation Panel - FCT Portugal on behalf of the European Science Foundation.

Inoltre: Assessment INCA

La valutazione delle strategie perseguite dal Consorzio INCA sono state verificate da una Commissione di Valutazione Internazionale attraverso la realizzazione di assessment periodici.

Questa valutazione dei prodotti scientifici e di management, primo esempio di valutazione scientifica condotta in Italia, è stata un impegno formidabile e senza precedenti per la chimica Italiana.

In particolare INCA e le sue 69 unità di ricerca appartenenti alle 31 università consorziale si sono sottoposti ad una valutazione di qualità dapprima nel 1998 e a una seconda volta nel 2003.