CURRICULUM

Roberto Filippini Fantoni
Place and Date of Birth: Bergamo, 15/12/1944
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EDUCATION

1958-1963: Industrial Technical Institute of Bergamo, high school diploma in Industrial Chemistry.

1966-1973: Università Statale di Milano, BA and MA in Chemistry (final grade: 110/110)
I received my degree in March 1973 from the Istituto di Chimica Macromolecolare (Institute of Macromolecular Chemistry), with a thesis on cationic polymerization with isomerization, supervised by Professor Farina.

EMPLOYMENT HISTORY

1963-1966: I worked at the **Centro Ricerche Cuoio CIBA** (Leather Research Center of CIBA), focusing on polymerization of acrylic polymers, vinyl, and styrene in emulsions and suspension solution. The use of these products was limited to the tan industry.

1966-1969: I taught at a Public High School.

1969-1973: I was a consultant at **SIPAC** in charge of the following:

- Emulsion polymerization of acrylic, vinyl and styrene as a researcher in polymerization field and assistant of the industrial plant's design.
- Optimized analysis on polymers (carboxyl groups - intrinsic viscosity of polymers in emulsion and in aqueous solution)

1973-1982: I worked as a researcher at **SNIA, Management of Industrial Chemical Products** (then SNIA TECHNOPOLYMERS).

Being in charge of the Polymerization as Basic Research, Pilot Plants and of Chemical Laboratory, I worked on the following:

- Adjustment of new types of co-polyamides, polyamides 6 at very high molecular weight, polyamides 6 with different molecular weight distribution, internal plasticized polyamides (6/69/612, 6/69/636, etc.) polycondensation studies in solid state polycondensation (post-polycondensation), etc. **(1)**.
- Adjustment of polyamides and copolyamides "film grade".
- Calorimetric methods so as to determine the crystallinity percentages of polyamides **(2)**.
- Viscometric studies on polyamides in diluted solution. Calculation of Hugging and Kraemer constants for polyamide 6 and 66 **(3**).
- Theoretical studies on the molecular weights distribution of polyamides AB (6, 11, 12, etc.) with polyfunctional end groups: star and branch polyamides **(4)**.
- I collaborated with SNIA chemical division for the study of a polymerization method of

ω-aminododecanoic acid produced by SNIA pilot plants with a new patented process **(5)**.

- In the last three working years at SNIA (1979-1982), I was responsible for all the scale-up problems, from the pilot plant to the batch and continuous industrial productions, always pertaining to polyamide 6 and relevant copolyamides.

- At the beginning of 1982, I was sent from SNIA to the FCFC (Formosa Chemicals & Fibre Corporation) in Taiwan, one of the biggest Asian chemical companies, in order to restart a two-stage Zimmer's plant of 30 t/day, which was prepared for the production of PA6 for the tire-cord use (pneumatic sector).

1982-1984: I worked as a **free lance consultant**, for different companies

1984-2012: I've been working as a consultant for Mazzaferro, Brazil since 1984. In co-operation with this company, I developed a series of copolymers and I designed a two-phase polymerization plant with solid state polycondensation. The consulting contract is still opened.

1985-1988 ENICHEM FIBRE: From 1985 to 1988, I worked for this company focusing on adjusting the continuous postpolycondensation plant of Pisticci.
Afterward, I was asked for a technical report in order to make all the productions of Pisticci reach their utmost. As a consequence, I examined all their polyamide 6 production plants.
A further know-how on copolymers was the last work carried out for ENICHEMFIBRE.
All the know-how have been used at Pisticci plant.
The four relations prepared for ENICHEM have the following titles:
(1) Adjustment of a polyamide suitable to the spinning
(2) Better performances of the continuous postpolycondensation plant
(3) Analysis on the productive possibility of the polymerization plants of Pisticci: what and how to produce at best
(4) Copolyamides obtainable on the present PAM plants of Pisticci

1994-1996: I worked part-time for NoyVallesina Engineering (a Radici Group company) and VEPI

1996- 1997: I was hired full-time by NoyVallesina Engineering, which gave me the opportunity to co-operate with different companies within the Radici Group.

1997-2003: I started to work again as a free-lancer, mainly for Gruppo Bonazzi in Verona. My work there focused mainly on nylon 6 polymerization, lab problems and research and development for the two main companies of the group (Aquafil in Arco, Trento and Yulon in Lubiana - Slovenia).

1999-2000: I co-operated with Fibra DuPont Brazil, first of all to prepare a course for the technicians specialized in nylon 6 polymerization, secondly to readjust the production parameters and finally to select a type of continuous plant.

1997-2006 I worked as a free-lance consultant for Jiaxing Honglin CO.(Shanghai Province), designing 2 plants (acrylic and polyurethane emulsions) with a capacity of respectively 5000 kg/batch and 10000 kg/batch and providing know-how for the production of polyurethane and acrylic emulsions for the tanning and textile sectors.

2000-2007: I collaborated with **SNIAFA** (SNIA Argentina) to restructure the plants, the check-up methodologies and to instruct the technical personnel on the theory of polyamide 6 polymerization.

2002-2007: I cooperated with the **Company P-Group** in Ferrara, where I was responsible for

training the staff and writing the operative manual for a polyamide 6-24 t/g production plant. The plant, which was first installed in Manfredonia-Puglia, where it had never been used, was dismantled and then reassembled in Ferrara. During this process, I was responsible for the design of all the changes necessary to transform the plant from a producer of fiber-grade polyamide 6 into a producer of polyamide 6 film-grade plant (medium and high viscosity). Moreover, I designed the production control lab and started to carry-out some researches on special polyamide 6.

2007-2008: I have been working again as a consultant for the **Radici Group**, where I concentrate mainly on issues related to the production of both fiber-grade and engineering polyamides.

2006-ongoing: I have been also working as a consultant for **Acerbis Italia** in Albino-Bergamo, where I am in charge of roto-moulding caprolactam anionic polymerization. The main objectives of my work here are to improve the molding cycles and to modify the formulations in order to produce special types of polyamide 6 (self-extinguishing – elastomeric, etc.) and to develop a research program in cooperation with the Industrial Chemistry Faculty at the University of Genoa, whose labs are specialized in caprolactam anionic polymerization.

2009-2014: I was often consulted by Radicifil for adjusting formulation for nylon 6 to be used in the carpet.

From January 2014: Beaulieu of America contacted me in 2013, and in January I signed a one year contract for the modification of a continuous plant in order to produce cationic PA 6. Moreover I've to design, for the same plant, the modification for the production of high viscosity PA 6.

- **Participation in works of National or International Technical Committees**

- **Head Group of thermoplastics polyesters and polyamides Group of UNIPLAST.**

- **ISOTC '61 PLASTICS - Member of the Groups: SC9/WG8 Polyamides - SC9/WG17 Thermoplastics polyesters - SC5/WG10 Chemico-physical methods – SC5/WG18 Extractable materials**

- **Member - and for two years Coordinator - of the Technological Committee of the Macromolecular Science and Technology Italian Association (AIM).**

- **Member of the Board Council of AIM in 1998/1999 and 2000/2001.**

- **Since 1998 until 2013 - Chief Editor of AIM Magazine, the magazine of AIM.**

- **Since 1994 until 2001, Supervisor of the Board of the Ph.D., Department of Chemical Engineering, China Textile University of Shanghai.** I have organized and supervised the work of different students who have already followed a Ph.D. program. Collaboration is expired due to the untimely death of prof. Tang

- Since 2003 to external collaborator of Bergamo University for the Course of "Innovation and project management"; I carried out a series of Seminaries (8-16 hours) about "Research management" and "Patents: how and when it's possible to patent".

Publications

(1) High molecular weight polyamides: influence of moisture in production and applications - *Filippini, Filippi* - Giornate di studio della policondensazione (Days for studying polycondensation)- 19-20 Marzo 1981 - Editor AIM

(2) Measurement of crystallinity of polyamide 6 by DSC - *Coppola, Filippini, Pallesi* - Polymer, 1975 - Vol.16

(3) Viscosità in soluzione di poliammidi e loro applicabilità (Solution viscosity of polyamides and their applications) **- *Filippini*** - TECNOPOLIMERI E RESINE – 1976 August

(4) Variazione della distribuzione delle masse molecolari in policondensati a stella (Molecular weight distribution modification through star polycondensation polymers) **- *Filippini, Fornaroli, Farina*** - 4° Convegno Italiano di Scienza e Tecnologia delle Macromolecole - Colleferro - 1979 October - Editor AIM

(5) Il nylon 12 secondo il processo SNIA Viscosa (Nylon 12 through SNIA Viscosa process) **- *Rossi, Filippini, Dall'Asta*** - TECNOPOLIMERI E RESINE – 1977 August

(6) Processing effects on polymeric materials - *Filippini* - 16th Congress-School of Gargnano - 1994 - Processing of thermoplastic polymers: fundamental and technological aspects - AIM Publication

(7) I polimeri semicristallini: le poliammidi (Semi-crystalline polymers: polyamides) - *Filippini* - 17° Convegno-Scuola di Gargnano - 1995 - *Materiali Polimerici: Struttura e Processabilità* - Editor AIM

(8) English and Italian Edition of the Book: **"Poliammide 6 - Chimica di base della polimerizzazione del caprolattame" - "Polyamide 6 - Base chemistry of caprolactam polymerization" *Filippini***
Edited by NOYVallesina Engineering for its customers and purchased to different Italian Universities

(9) La polimerizzazione del ε-caprolattame (ε-caprolactam polymerization) - *Filippini* - 13° Convegno-Scuola di Gargnano - 1991 - *Metodi Industriali di polimerizzazione* - Editor AIM

(10) Rapida determinazione di monomeri acrilici residui nella polimerizzazione in emulsione (Rapid analysis of residual acrylic monomers in emulsion polymerization**) - *Filippini, Gritti, Guaita*** - Convegno Italiano di Scienza e Tecnologia delle Macromolecole - Milan - 1987 October - Editor AIM

(11) Poliacrilati e poliuretani in acqua nella rifinizione - La tecnica a release (Aqueous polyacrilates and polyurethanes in leather finishing – Release technology) **- *Locati, Calciati, Filippini*** - Tecnologie Conciarie - 1990 September- pg. 55-80

(12) Polymers in the leather finishing - The reticulation of the aqueous top – *Locati, Filippini* - Tan Technologies - 1993 May - pg. 97-112

(13) Los polimeros en el acabado del cuero - La reticulacion de los top al agua (Polymers in leather finishing – Aqueous tops cross-linking) **- *Locati, Filippini*** - Tan Technologies - Spanish Edition 1994 - pg. 118-128

(14) The simulation of hydrolytic polymerization of ε-caprolactam with bifunctional chain-endings - ***Lin, Filippini, Tang*** - The 2nd China-Italy Joint Polymer Symposium - /1995 October 17th-20th - pg. 83-84 - Polymer Division of Chinese Chemical Society and Associazione Italiana di Scienza e Tecnologie delle Macromolecole

(15) Viscosity-Molecular Weight relation for bifunctional chain-ended polyamides 6 - ***Lin, Tang, Filippini*** - The 2nd China-Italy Joint Polymer Symposium – 1995 October 17-20 pg. 85-86 - Polymer Division of Chinese Chemical Society and Associazione Italiana di Scienza e

Tecnologie delle Macromolecole

(16) Simulation of heat characteristics in a nylon 6 polymerization tube reactor-VK column - *Huang, Lin, Tang, Filippini* - First East-Asian Polymer Conference (EAPC-1) - 11-1995 October 15th - pg. 26-27

(17) A Theoretical model for ε-caprolactam polymerization: comparison with practical results on continuous plants - *Crotti, Filippini, Tang* - 1st Congress of European Chemical Engineering (ECCE-1) - Firenze – 1997 May 4th-7th

(18) Simulation of the hydrolytic polymerization of ε-caprolactam with bifunctional regulators - *Tang* , *Lin, Huang, Filippini* - Die Angewandte Makromolekulare Chemie 250 (1997) pg. 1-14 (Nr. 4321)

(19) Metodi industriali di policondensazione (Industrial methods of polycondensation) - *Filippini* - 22° Convegno-Scuola di Gargnano - 2000 – *Produzione industriale di polimeri* - Editor AIM

(20) HALS in polyamide 6 polymerization – *Filippini, Sanfilippo*– Macromolecular Symposia – H.K. Kricheldorf – Wiley-VCH - 2003 – pag. 362-373

(21) Simulation of nylon 6 polymerization in an industrial two-step VK tubular reactor - *Wenhua*, *Huang, Tang, Filippini* – Macromol. Mater. Eng. 288 (2003) pag. 235-244

(22) Chemical e mechanical recycling of polyamides 6 and 6.6– *Filippini*, *Filippi* – 29° Convegno-Scuola di Gargnano 2008 – *Ciclo di vita dei materiali polimerici*– Editor AIM

(23) **Montecarlo technique to simulate amide interchange reactions. ". An improved model and PA6/PA66 blend system**" – ***C.Wang, Zhou, Filippini-Fantoni, X Wang*** – Journal of Applied Polymer Science

(24) **Montecarlo technique to simulate amide interchange reactions, 3** – Influence of amide interchange reactions on molecular weight distribution. – ***C.Wang, Zhou, Filippini-Fantoni, X Wang*** - Macromol. Theory and Simulations

University Course

From 2002 to 2006 I was contracted for **Subsidiary Activity in University of Bergamo** – Managerial Engineering Faculty – Course of innovation managing, where I managed a short Course: "**Managing of Researches and Patents**".

Patents

De Venuto, Filippini - SNIA Viscosa - **Poliammide Elastomerica** (Elastomeric polyamide)- Italian Patent 1977

Books

The English and Italian Edition of:

"Poliammide 6 - Chimica di base della polimerizzazione del caprolattame"

"Polyamide 6 - Base chemistry of caprolactam polymerization"

Knowledge of Foreign Languages

French fluently spoken and read: very good degree of comprehension
Portuguese fluently spoken, read and written: very good degree of comprehension
English spoken and read with regards to technical questions. Acceptable degree of comprehension.