

**UNIVERSITY OF GENOVA**

*Doctorate School of Sciences and Technologies  
of Chemistry and Materials*

**XXIV CYCLE YEARBOOK**

The Doctorate School in Sciences and Technologies of Chemistry and Materials was born in the spring of 2005, when the Ministry of Education and Research has urged all the universities to better rationalise and organize the doctorate courses. Although the guidelines given by the Ministry were not very precise, in my personal opinion the Doctorate Schools should be dedicated to the organization and supervision of different doctorate courses in areas affine from the scientific point of view. They should establish general rules common to all students and organize the coursework as a whole (whereas in the past the course work has been organized and regulated independently by each doctorate course).

For this reason, this newborn School, instead of trying to gather together teachers belonging to the same Faculty, preferred to assemble scientists who can share similar scientific interests, irrespective to the Faculty or Department they belong to. The School spans all the subjects related to chemistry (including medicinal chemistry, food and cosmetic chemistry, environmental chemistry, industrial and polymer chemistry, but excluding biochemistry) plus material science (with contributions from chemists, physics and engineers). Accordingly, the school has activated three discrete doctorate courses:

- Chemical Sciences and Technologies
- Pharmaceutical, Food and Cosmetic Science
- Material Science and Technology

The School begun its activity on January 1, 2006 and thus the XXIV cycle was the fourth one to be organized by it.

**From 2011 the Doctorate School holds the ECTN Chemistry Doctorate EUROLABEL®**


At the end of December 2011, 14 out of the 17 students of the XIV cycle of the School have finished their program. Three of them resigned during the programme (Claudia Calcagno, Giuseppe Christian Fusella and Roberto Mangano).

The remaining 14 students have passed the final defense on February 8 or 9, acquiring the degree of "Research Doctor". Furthermore, on the same dates, two students from previous cycles (Federico Wrubl, XXII cycle) and Chiara Rotolo (XXIII cycle) acquired the degree too.

During an official ceremony held on February 9, I had the honour and the pleasure to deliver to all these 16 students a final certificate, reporting all their activities during the doctorate. As already done in the last years, I have now put together all these certificates, adding some general informations about the School.

I hope that this "yearbook" could remain for the new Doctors as a memory of these three years dedicated to the advancement of science, and, I am sure of that, also to the improvement of their own scientific skills and human merits.

To all of them I would like to present my best wishes for a successful and gratifying career!



Luca Banfi  
Director of the School

## MANAGEMENT COUNCILS OF THE SCHOOL

The school is governed by a **Board of Professors**, formed by 12 members, who elect a Director. For the XXIV cycle the board of professors was formed by:

- Luca Banfi (director), DCCI, Organic Chemistry
- Giovanni Carlo Alfonso, DCCI, Industrial Chemistry
- Alessandro Balbi, DISCIFAR, Medicinal Chemistry
- Gabriella Borzone, DCCI, Inorganic Chemistry
- Guido Busca, DIChEP, Industrial and Technological Chemistry
- Alessandra Gliozzi, DIFI, Applied Physics
- Silvia Lanteri, DICTFA, Analytical Chemistry
- Emanuele Magi, DCCI, Analytical Chemistry
- Franco Merlo, DCCI, Physical Chemistry
- Angelo Ranise, DISCIFAR, Medicinal Chemistry
- Saverio Russo, DCCI, Industrial Chemistry
- Carla Villa, DISCIFAR, Pharmaceutical technologies

Each doctorate course has a coordinator and a specific **Board of Professor**. For the XXIV cycle the boards of professors were formed by:

### *Chemical Sciences and Technologies*

- Luca Banfi (coordinator), DCCI, Organic Chemistry.
- Enrico Franceschi, DCCI, Physical Chemistry
- Emanuele Magi, DCCI, Analytical Chemistry
- Enrico Marsano, DCCI, Industrial Chemistry
- Franco Merlo, DCCI, Physical Chemistry
- Maria Rosa Pinasco, DCCI, Metallurgy
- Saverio Russo, DCCI, Industrial Chemistry
- Adriana Saccone, Inorganic Chemistry
- Sergio Thea, DCCI, Organic Chemistry

### *Medicinal, Food, and Cosmetic Sciences*

- Alessandro Balbi (coordinator), DISCIFAR, Medicinal Chemistry
- Annamaria Bassi, DIMES, General Pathology
- Vincenzo Bertini, DICTFA, Organic Chemistry
- Raffaella Boggia, DICTFA, Food Chemistry
- Silvia Lanteri, DICTFA, Analytical Chemistry
- Emilia Mariani, DISCIFAR, Pharmaceutical Technologies
- Angelo Ranise, DISCIFAR, Medicinal Chemistry
- Bruno Tasso, DISCIFAR, Medicinal Chemistry
- Carla Villa, DISCIFAR, Pharmaceutical Technologies

### *Material Science and Technology*

- Gabriella Borzone (coordinator), DCCI, Inorganic Chemistry
- Giovanni Carlo Alfonso, DCCI, Industrial Chemistry
- Guido Busca, DIChEP, Industrial and Technological Chemistry
- Maurizio Canepa, DIFI, Experimental Physics
- Giacomo Cerisola, DIChEP, Chemistry Foundations of Technologies

- Maurizio Ferretti, DCCI, Physical Chemistry
- Enrico Galleani, DIFI, Experimental Physics
- Alessandra Gliozzi, DIFI, Applied Physics
- Gianguido Ramis, DIChEP, Chemistry Foundations of Technologies

The **Scientific Committee**, formed by experts outside the university of Genova, has the function of evaluating the activity of the school and to propose recommendations for its improvement. It must issue a report at the start of each cycle, containing possible suggestions, and an evaluation report at the end of each cycle. For the XXIV cycle it was formed by:

- Jean-Pierre Bros, universit  Aix-Marseille 1 (France)
- Giovanni Camino (Politecnico di Torino ad Alessandria)
- Fabio Comin, ESRF, Grenoble (France)
- Cristina Emanuel (L'Oreal, Milano)
- Sergio Fera (ILVA, Genova)
- Stephen Hanessian, Universit  de Montr al (Canada), and University of California, Irvine (USA).
- Alberto Modelli, ST Microelectronics, Agrate Brianza (MI)
- Angelo Nora (FACI, Carasco)
- Daniele Piomelli (IIT, Genova and UC, Irvine)
- Bernard Testa, Universit  Lausanne (Switzerland)
- Antonio Triolo, Menarini Ricerche (Firenze)

### **RESEARCH ACTIVITY**

The total number of credits achieved in 3 years is 180. The research activity is the most important part of the doctorate course. Therefore the School has decided that this activity must correspond to a minimum of 150 credits and a maximum of 160 credits.

The research and course activities of the School are held in the followings Departments: Dep. of Chemistry and Industrial Chemistry (DCCI), Dep. of Pharmaceutical Sciences (DISCIFAR), Dep. of Chemistry and Pharmaceutical and Food Technologies (DICTFA), Department of Chemical and Process Engineering "G.B. Bonino" (DICheP), Department of Physics (DIFI).

At the end of each year, the students presented a written report and an oral presentation on their activity, which were evaluated by the Board of Professor of the specific doctorate.

### **COURSEWARE**

The remaining 20 to 30 credits are divided into these categories:

- Type A credits: short courses (4-6 hours) given by experts external to the university of Genova. Each course will have a value of 1 credit.
- Type B credits: courses given by the faculty of the School. 1 credit will correspond to 7 hours of lessons. The courses will be either of 2 or 3 credits.
- Type C credits: attendance to seminars held at the Departments involved (or in special cases also elsewhere). 1 credit corresponds to 8 seminars.
- Type D credits: participation to national or international schools for Ph.D. students. Typically a week school will count as 2 credits.
- Type E credits: the student will prepare (also through a bibliographic search) and present a seminar on a particular subject (different from its own research work). A seminar of this kind will correspond to 2 credits.
- Type F credits: only in particular cases, when the student must fill an important gap in disciplines necessary for his/her research work, the student can be invited by the Board of Professors to attend courses activated inside one of the "master" laureas related to the subjects of the school.

Each student has chosen the distribution of these credits according to the specific rules independently established by each doctorate course.

During the three-year period spanned by the XXIV cycle, the School has activated **21 type A Courses** and **24 type B courses specific for the doctorate (for a total of 55 credits)**, plus other 7 courses in common with the master degrees. The School has informed of about 80 seminars given at the University of Genova and related to the subjects of the School. The courses, schools, workshops and seminars followed by each student are listed in the following certificates.

### **STUDENTS OF XXIV CYCLE**

*Students who completed in due time the Doctorate Programme*

- Francisco Ardini (STC)
- Lucia Bagnasco (STC)
- Emma Barbareschi (STC)
- Antonello Bignasca (STC)
- Valentina Caratto (STM)
- Paola Cirrincione (SFAC)
- Simona Erika Cozza (STM)
- Lucia Frassoni (STM)
- Wishwanath Kalyani (STC)
- Anna Maria Lanteri (SFAC)
- Francesca Musumeci (SFAC)
- Kieu Nguyen (STC)
- Giulia Priarone (SFAC)
- Alessia Provino (STC)

*Students from previous cycles who underwent the defense in 2012*

- Chiara Rotolo (SFAC)
- Federico Wrubl (STC)



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CHEMISTRY AND MATERIALS*



*(HOLDING THE ECTN CHEMISTRY DOCTORATE EUROLABEL®)*

PH.D. CERTIFICATE OF  
**FRANCISCO ARDINI**



**Doctorate Course:**

*Chemical Sciences and Technologies*

**Start of the Doctorate Program:**

*January 1<sup>st</sup>, 2009*

**End of the Doctorate Program:**

*December 31<sup>st</sup>, 2011*

**Advisor:**

*Prof. Marco Grotti*

**Thesis Title:**

*Development of innovative analytical methods  
based on ICP-MS for the determination  
of chemicals of environmental and  
toxicological interest*

**Defense Date:**

*February 9<sup>th</sup>, 2012*

On February 9<sup>th</sup>, 2012, at the Department of Chemistry and Industrial Chemistry, Francisco Ardini has orally presented his doctorate research work in front of the Commission, formed by

- Prof. Paolo Ferloni, University of Pavia
- Prof. Ornella Abollino, University of Torino
- Prof. Gabriele Cacciamani, University of Genova

The written Dissertation had been previously sent to the Commission members. After careful examination of the Dissertation, of the student's oral presentation, of the overall activity of the student during the three years of doctorate studies, the Commission

**HAS APPROVED THE THESIS OF FRANCISCO ARDINI,  
CONFERRING ON HIM THE TITLE OF**

**RESEARCH DOCTOR IN  
CHEMICAL SCIENCES AND TECHNOLOGIES**

The commission has evaluated the thesis and the overall activity of Dr. Francisco Ardini as  
**EXCELLENT**

Genova, February 9<sup>th</sup>, 2012

The Director of the Doctorate School  
(Prof. Luca Banfi)

The Coordinator of the Doctorate Course  
(Prof. Luca Banfi)

# ACTIVITY REPORT

## *Research Activity*

The research activity was mainly carried out at the Department of Chemistry and Industrial Chemistry (University of Genova). However, Francisco Ardini **has also spent a research period of 2.5 months abroad**, at the Departamento de Química Analítica, Nutrición y Bromatología, Alicante (Spain) from 17/1/2011 to 31/3/2011.

## *Scientific Publications*

Original publications on ISI Journals:

- 1) Grotti, M.; Soggia, F.; Ardini, F.; Frache, R., Determination of sub-nanomolar levels of iron in sea-water using reaction cell inductively coupled plasma mass spectrometry after Mg(OH)<sub>2</sub> coprecipitation, *Journal of Analytical Atomic Spectrometry*, **2009**, 24, 522-527. IMPACT FACTOR (2010): 4.372.
- 2) Ardini, F.; Soggia, F.; Rugi, F.; Udisti, R.; Grotti, M., Comparison of inductively coupled plasma spectrometry techniques for the direct determination of rare earth elements in digests from geological samples, *Analytica Chimica Acta*, **2010**, 678, 18-25. IMPACT FACTOR (2010): 4.311.
- 3) Ardini, F.; Soggia, F.; Rugi, F.; Udisti, R.; Grotti, M., Conversion of rare earth elements to molecular oxide ions in a dynamic reaction cell and consequences on their determination by inductively coupled plasma mass spectrometry, *Journal of Analytical Atomic Spectrometry*, **2010**, 25, 1588-1597. IMPACT FACTOR (2010): 4.372.
- 4) Ardini, F.; Magi, E.; Grotti, M., Determination of ultratrace levels of dissolved metals in seawater by reaction cell inductively coupled plasma mass spectrometry after ammonia induced magnesium hydroxide coprecipitation, *Analytica Chimica Acta*, **2011**, 706, 84-88. IMPACT FACTOR (2010): 4.311.
- 5) Grotti, M.; Soggia, F.; Ardini, F.; Magi, E., Major and trace element partitioning between dissolved and particulate phases in Antarctic surface snow, *Journal of Environmental Monitoring*, **2011**, 13, 2511-2520. IMPACT FACTOR (2010): 1.810.

## *Communications at Conferences*

Oral communications:

- 1) Ardini, F.; Grotti, M.; Soggia, F.; Udisti, R.; Rugi, F.; Development of new analytical methods based on ICP-MS for the determination of rare earth elements in geological samples, ISA 2010, Rimini, 17-19/6/2010
- 2) Ardini, F.; Grotti, M.; Soggia, F.; Abelmoschi, M.L.; Magi, E.; Distribuzione di elementi in tracce in piante "wild-type" e geneticamente modificate sottoposte a stress abiotici, XXII Convegno Nazionale della Divisione di Chimica Analitica della Società Chimica Italiana, Como, 12-16/9/2010.
- 3) Ardini, F.; Terol, A.; Grotti, M.; Todolo, J.L., Application of high temperature liquid chromatography coupled to inductively coupled plasma mass spectrometry for speciation analysis of environmental samples, "XXIV Congresso Nazionale della Società Chimica Italiana", Lecce, 11-16/9/2011

Posters:

- 4) Ardini, F.; Grotti, M.; Soggia, F.; Udisti, R.; Rugi, F., "Development of new analytical methods based on ICP-MS for the determination of rare earth elements in geological samples", Giornate Italo-Francesi di Chimica, Genova, 26-27/4/2010.
- 5) Ardini, F.; Soggia, F.; Grotti, M., Dynamic reaction cell approaches for the analysis of environmental matrices by ICP-MS, "European Winter Conference on Plasma Spectrochemistry 2011", Zaragoza (Spain), 30/1-4/2/2011.

## *Congresses Attended*

- 1) "Spettrometria di massa in Liguria", Genova, 1/12/2009.
- 2) "Giornate Italo-Francesi di Chimica", Genova, 26-27/4/2010.
- 3) "Incontri di Spettroscopia Analitica (ISA) 2010", Rimini, 16-18/6/2010.
- 4) "XXII Convegno Nazionale della Divisione di Chimica Analitica della Società Chimica Italiana", Como, 12-16/9/2010.
- 5) "European Winter Conference on Plasma Spectrochemistry", Zaragoza (Spain), 30/1-6/2/2011.
- 6) "XXIV Congresso Nazionale della Società Chimica Italiana", Lecce, 12-16/9/2011.

## *Courseware*

During his doctorate, Francisco Ardini has acquired 25 credits of Courseware.

## *Courses attended and passed (19 credits)*

*Courses Given by Teachers of the University of Genova:*

- 1) New topics about food composition and analysis (2 credits) (2009).
- 2) Microwave technology applied to chemical processes (2 credits) (2009).
- 3) Chemometric strategies and algorithms and their applications (3 credits) (2009).
- 4) Fundamentals of scanning and transmission electronic microscopy (3 credits) (2010).
- 5) Experimental design (3 credits) (2010)

*Courses Given by invited experts:*

- 1) Radiodrugs in anti-cancer therapy: preparation and pharmacokinetics (Marco Chinol, Ist. Europeo di Oncologia) (2009) (1 credit).
- 2) Advanced spectroscopies for single molecule measurements (Salvatore Cannistraro, Università della Tuscia) (2009) (1 credit).
- 3) The LC-MS toolbox for structural elucidation of trace compounds: applications in drug discovery and development (Antonio Triolo) (2010) (1 credit).
- 4) Synthesis, formulation and marketing of generic drugs (Graziano Castaldi, Chemelectiva, Novara) (2010) (1 credit).

***National and International Schools or Workshops (2 credits)***

- 1) Metodi Innovativi nell'Analisi Chimica Ambientale, Feltre (BL), 6-10/9/2010 (2 credits).

***Seminars Given (2 credits)***

- 1) 5/10/2011, Dept. of Chemistry and Industrial Chemistry, "Synergic analytical techniques for the study of cultural heritage artefacts".

***Seminars Attended (2 credits)***

- 1) 6/2/2009, Dept. of Physics, "L'energia del futuro", Prof. Carlo Rubbia, CERN, Ginevra.
- 2) 3/3/2009, Dept. of Chemistry and Industrial Chemistry, "Ipotesi chimica sull'origine della vita: dal Big Bang alla comparsa dei primi organismi viventi", Prof. Piero Ugliengo, Università di Torino.
- 3) 13/5/2009, Dept. of Chemistry and Industrial Chemistry, "Microalghe: una risorsa per produrre biodiesel ed alimenti", Prof. M. Tredici, Università di Firenze.
- 4) 3/12/2009, Dept. of Physics "La tecnologia e materiali per l'ultra alto vuoto". Prof. L. Scaltrito, Politecnico di Torino.
- 5) 10/2/2010, Dept. of Chemistry and Industrial Chemistry, "Invisibility. Camouflage techniques.", Prof. Maria Gazda, Faculty of Applied Physics & Mathematics, Gdansk University of Technology, Danzig, Poland.
- 6) 16/2/2010, Dept. of Physics, "Inquinamento atmosferico, cambiamenti climatici e fisica nucleare", Prof. Paolo Prati, INFN, Genova.
- 7) 8/6/2010, Dept. of Chemistry and Industrial Chemistry, "L'opzione nucleare in Italia", Dr. Stefano Maggiolo, Agenzia Regionale per la Protezione dell'Ambiente Ligure (A.R.P.A.L.).
- 8) 17/9/2010, Dept. of Chemistry and Industrial Chemistry, "Activated Peptides: for Ligation and Large Cyclic Transition States", Prof. A.R. Katritsky, University of Florida, Gainesville.
- 9) 8/10/2010, Dept. of Chemistry and Industrial Chemistry, "Formation mechanism of silver nanoparticle 1D microstructures and their hierarchical assembly into 3D superstructures", Lorenza Suber, C.N.R., Roma.
- 10) 12/10/2010, Dept. of Chemistry and Industrial Chemistry, "Organic Synthesis "on water"", Valentina Cerulli
- 11) 12/10/2010, Dept. of Chemistry and Industrial Chemistry, "Self-assembly and crystallization in block copolymers", Dario Cavallo
- 12) 12/10/2010, Dept. of Chemistry and Industrial Chemistry, "Splitting fotocatalitico dell'acqua", Alessio Rindi
- 13) 06/05/2011, Dept. of Chemistry and Industrial Chemistry, "Approcci analitici innovativi per caratterizzare i materiali organici in dipinti", Prof.ssa Maria Perla Colombini, (Università di Pisa)
- 14) 22/06/2011, Dept. of Chemistry and Industrial Chemistry "Identification and characterization of unknown compounds in urine of neuroblastoma patients", Dott. Carlo Scapolla, Dept. of Chemistry and Industrial Chemistry
- 15) 20/07/2011, Dept. of Chemistry and Industrial Chemistry, "Organic and hybrid solar cells: fundamentals and recent advances", Dr. Luiz Carlos Pimentel Almeida (Universidade Estadual de Campinas, San Paolo del Brasile)
- 16) 5/10/2011, Dept. of Chemistry and Industrial Chemistry, "Olives and Olive Oil in Health and Disease Prevention", Nguyen, K. T. N.
- 17) 11/10/2011, Dept. of Chemistry and Industrial Chemistry, "Analytical methods for anti-doping control in sport", A. Bignasca.

***Teaching Assistance***

Francisco Ardini has assisted the course of "Laboratory of Analytical Chemistry 1" (bachelor degree in Chemistry and Chemical Technologies) (40 hours)(2008/2009, second semester) and the course of "Laboratory of Analytical Chemistry 1" (bachelor degree in Chemistry and Chemical Technologies) (40 hours)(2009/2010, second semester).





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PH.D. CERTIFICATE OF  
**LUCIA BAGNASCO**



**Doctorate Course:**  
*Chemical Sciences and Technologies*  
**Start of the Doctorate Program:**  
*January 1<sup>st</sup>, 2009*  
**End of the Doctorate Program:**  
*December 31<sup>st</sup>, 2011*

**Advisors:**  
*Prof. Maria Maddalena Carnasciali*  
*Prof. Maria Elisabetta Cosulich*

**Thesis Title:**  
*Innovative and multidisciplinary techniques  
for food characterization*

**Defense Date:**  
*February 9<sup>th</sup>, 2012*

On February 9<sup>th</sup>, 2012, at the Department of Chemistry and Industrial Chemistry, Lucia Bagnasco has orally presented her doctorate research work in front of the Commission, formed by

- Prof. Paolo Ferloni, University of Pavia
- Prof. Ornella Abollino, University of Torino
- Prof. Gabriele Cacciamani, University of Genova

The written Dissertation had been previously sent to the Commission members. After careful examination of the Dissertation, of the student's oral presentation, of the overall activity of the student during the three years of doctorate studies, the Commission

**HAS APPROVED THE THESIS OF LUCIA BAGNASCO,  
CONFERRING ON HER THE TITLE OF**

**RESEARCH DOCTOR IN  
CHEMICAL SCIENCES AND TECHNOLOGIES**

Genova, February 9<sup>th</sup>, 2012

The Director of the Doctorate School  
(Prof. Luca Banfi)

The Coordinator of the Doctorate Course  
(Prof. Luca Banfi)

# ACTIVITY REPORT

## *Research Activity*

The research activity was mainly carried out at the Department of Chemistry and Industrial Chemistry (University of Genova). However, Lucia Bagnasco has also carried out researches for about 5 months at the Dept. of Chemistry and Pharmaceutical and Food Technologies, University of Genova. Furthermore Lucia Bagnasco has spent a short period at the Department of Drug Sciences, University of Pavia, from 5/7 to 15/7/2011.

## *Scientific Publications*

### *Communications at Conferences*

Oral communications:

- 1) Bagnasco, L., "Caratterizzazione chimica delle produzioni locali: il caso dell'Oliva Taggiasca in salamoia", Convegno all'interno della manifestazione 'OLIOLIVA 2009', Imperia, 29/11/2009.
- 2) Bagnasco, L.; Casolino, M.C.; Casale, M.; Lanteri, S.; Cosulich, M.E.; Pistarino, E.; De Costa, N.; Medini, L., "Modellamento di classe per la discriminazione delle olive da tavola di cultivar Taggiasca mediante la spettroscopia nel vicino infrarosso", IV Simposio Italiano di Spettroscopia nel Vicino Infrarosso 'NIR ITALIA 2010', Sestri Levante (GE), 13-14/5/2010.
- 3) Bagnasco L.; Oliveri, P.; Cosulich, M.E.; Morelli, C.; Speranza, G., "Valutazione del gusto umami mediante lingua elettronica voltammetrica e analisi multivariata", SAYCS 2010, Pesaro, 18-20/10/2010.

Posters:

- 4) Bagnasco, L.; Casale, M.; Pistarino, E., "Multidisciplinary techniques to certify Taggiasca olives", Giornate Italo-Francesi di Chimica, Genova, 26-27/4/2010.
- 5) Bagnasco, L.; Casolino, C.; Medini, L., "Near infrared spectroscopy and class modelling techniques to discriminate Taggiasca table olives", International Conference on NIR Spectroscopy, Cape Town (South Africa), 15-20/5/2011.

### *Congresses Attended*

- 1) "Valorizzazione del prodotto agroalimentare", Torino, 15/6/2009.
- 2) "Alimenti sicuri e corretta alimentazione", Genova, 27/11/2009
- 3) "Convegno inside the fair 'OLIOLIVA 2009'", Imperia, 29/11/2009.
- 4) "Spettrometria di massa in Liguria", Genova, 1/12/2009.
- 5) "IV Simposio Italiano di Spettroscopia nel Vicino Infrarosso 'NIR ITALIA 2010'", Sestri Levante (GE), 13-14/5/2010.
- 6) "Giornate Italo-Francesi di Chimica", Genova, 26-27/4/2010.
- 7) "SAYCS 2010", Pesaro, 18-20/10/2010
- 8) "International Conference on NIR Spectroscopy", Cape Town (South Africa), 15-20/5/2011.

## *Courseware*

During her doctorate, Lucia Bagnasco has acquired 31.3 credits of Courseware.

### *Courses attended and passed (19 credits)*

*Courses Given by Teachers of the University of Genova:*

- 1) New topics about food composition and analysis (2 credits) (2009).
- 2) NMR spectroscopy in the characterization of synthetic polymers (2 credits) (2009).
- 3) Chemometric strategies and algorithms and their applications (3 credits) (2009).
- 4) Vibrational spectroscopy (2 credits) (2009).
- 5) Instrumental techniques for trace elements determination in pharmaceuticals, food products and environmental samples (2 credits) (2010)
- 6) Pharmaceutical biotechnologies (3 credits) (2010)

*Courses Given by invited experts:*

- 1) Advanced spectroscopies for single molecule measurements (Salvatore Cannistraro, Università della Tuscia) (2009) (1 credit).
- 2) Development of dyes in the cosmetic industry: the L'Oreal case (Cristina Emmanuel, L'Oreal) (2009) (1 credit).
- 3) Bioplastics (A. Casale, Proplast) (2009) (1 credit).
- 4) Scale-up of Oral Solid Dosage Forms Manufacturing Processes – Technological and Regulatory Key Facts (Paolo Gatti) (2010) (1 credit).
- 5) An introduction to the basic of research and innovation in industry (Claudio Boffito, Saes Getter) (2011) (1 credit).

### ***National and International Schools or Workshops (8.3 credits)***

- 1) *Scuola di Chemiometria*, Genova, 26-29/1/2009 (2 credits).
- 2) *Sviluppi e applicazioni di fasi stazionarie innovative in cromatografia liquida*, Milano, 17/3/2009. (0.5 credits).
- 3) *Farmaci peptidici e peptoidici*, Pavia, 17/4/2009. (0.5 credits).
- 4) *14° Corso di Spettrometria di Massa*, Certosa di Pontignano, 21-26/3/2010. (2 credits).
- 5) *L'innovazione Raman ultraportatile: lo spettrometro Pharma ID*, Milano, 31/3/2011 (0.3 credits).
- 6) *La valorizzazione delle peculiarità territoriali attraverso gli aspetti sensoriali del prodotto*, Albenga (SV), 20/7/2011 (0.5 credits).
- 7) *Giornata di studio sul tema "L'uso del software R nella chemiometria"*, 8/9/2011, Genova (0.5 credits).
- 8) *School of Experimental Design*, Genova, 19-23/9/2011 (2 credits).

### ***Seminars Given (2 credits)***

- 1) 11/10/2011, Dept. of Chemistry and Industrial Chemistry, "L'imaging iperspettrale, un emergente strumento analitico per il controllo di qualità e di processo alimentare ed ambientale."

### ***Seminars Attended (2 credits)***

- 1) 6/2/2009, Dept. of Physics, "L'energia del futuro", Prof. Carlo Rubbia, CERN, Ginevra.
- 2) 27/2/2009, Dept. of Pharmaceutical Sciences, "Chiral chromatography : a mature technology, a scientific challenge", Prof. Christian Roussel, Marseille, France.
- 3) 27/2/2009, Dept. of Pharmaceutical Sciences, "Chemistry derived from N-(o-amino-phenyl) thiazoline-2-thione", Federico Andreoli, Marseille, France.
- 4) 3/3/2009, Dept. of Chemistry and Industrial Chemistry, "Ipotesi chimica sull'origine della vita: dal Big Bang alla comparsa dei primi organismi viventi", Prof. Piero Ugliengo, Università di Torino.
- 5) 13/3/09, Dept. of Chemistry and Industrial Chemistry, "Macromolecular engineering for nanostructured materials via Atom Transfer Radical Polymerization (ATRP)", Prof. Krzysztof Matyjaszewski, Department of Chemistry, Carnegie Mellon University, Pittsburgh, PA, USA.
- 6) 28/4/2009, Dept. of Chemistry and Industrial Chemistry, "Flussi e accumuli di energia accoppiati a trasferimenti protonici in biosistemi", Prof. A. Morelli, Università di Genova.
- 7) 16/2/2010, Dept. of Physics, "Inquinamento atmosferico, cambiamenti climatici e fisica nucleare", Prof. Paolo Prati, INFN, Genova.
- 8) 25/2/2010, Dept. of Chemistry and Pharmaceutical and Food Technologies, "Optimization methods in chromatography", Prof. Rafael Cela, Universidad de Santiago di Compostela.
- 9) 18/5/2010, Dept. of Chemistry and Industrial Chemistry, "Sports materials", Dr. Andy Watson, Institute for Materials Research, University of Leeds (UK).
- 10) 8/7/2010, Dept. of Chemistry and Industrial Chemistry, "Linear Rigid-Rod Polyelectrolytes: High Conductivity at Low Relative Humidity Due to "Frozen-in" Free Volume. Applications to Fuel Cell Technology", Prof. Morton Litt, Dept. Macromolecular Sciences and Engineering, Case Western University, Cleveland OH, USA.
- 11) 3/9/2010, Dept. of Physics, "Ab initio study of the Raman spectra and the crystallization kinetics of chalcogenides phase-change materials, Prof. Riccardo Mazzarello, Aachen University (D).
- 12) 22/11/2010, Dept. of Pharmaceutical Sciences, "Le Micotossine nelle colture e nei prodotti alimentari", Silvia Mannino.
- 13) 22/11/2010, Dept. of Pharmaceutical Sciences, "Molecular Dynamics Simulation: an updated overview on Prion Protein ", Gerolamo Vettoretti.
- 14) 29/3/2011, Dept. of Chemistry and Industrial Chemistry, "La spettroscopia Raman nelle indagini sui beni culturali: stato dell'arte e sviluppi", Emilio Mario Castellucci, Dipartimento di Chimica "Ugo Schiff" e Laboratorio Europeo di Spettroscopie non Lineari (LENS), Università di Firenze.
- 15) 8/7/2011, Università di Pavia, "Il report scientifico", M. Cagnotti.
- 16) 15/7/2011, Università di Pavia, "La presentazione scientifica", M. Cagnotti.
- 17) 5/10/2011, Dept. of Chemistry and Industrial Chemistry, "Synergic analytical techniques for the study of cultural heritage artefacts", F. Ardini
- 18) 5/10/2011, Dept. of Chemistry and Industrial Chemistry, "Olives and Olive Oil in Health and Disease Prevention", Nguyen, K. T. N.
- 19) 20/10/2011, Dept. of Chemistry and Industrial Chemistry – Genova "Formation of hybrid compounds of interest in cultural heritage monitored by neutron scattering", Dott.ssa Claudia Mondelli (Institut Langevin, Grenoble – Francia)

### ***Teaching Assistance***



UNIVERSITÀ DEGLI STUDI DI GENOVA  
*DOCTORATE SCHOOL IN  
SCIENCES AND TECHNOLOGIES OF  
CHEMISTRY AND MATERIALS*



*(HOLDING THE ECTN CHEMISTRY DOCTORATE EUROLABEL®)*

PH.D. CERTIFICATE OF  
**EMMA BARBARESCHI**



**Doctorate Course:**

*Chemical Sciences and Technologies*

**Start of the Doctorate Program:**

*January 1<sup>st</sup>, 2009*

**End of the Doctorate Program:**

*December 31<sup>st</sup>, 2011*

**Advisors:**

*Prof. Adriana Saccone*

*Prof. Paola Guarnone*

**Thesis Title:**

*High temperature behaviour of advanced and  
standard metallic materials for use in power plants*

**Defense Date:**

*February 9<sup>th</sup>, 2012*

On February 9<sup>th</sup>, 2012, at the Department of Chemistry and Industrial Chemistry, Emma Barbareschi has orally presented her doctorate research work in front of the Commission, formed by

- Prof. Paolo Ferloni, University of Pavia
- Prof. Ornella Abollino, University of Torino
- Prof. Gabriele Cacciamani, University of Genova

The written Dissertation had been previously sent to the Commission members. After careful examination of the Dissertation, of the student's oral presentation, of the overall activity of the student during the three years of doctorate studies, the Commission

**HAS APPROVED THE THESIS OF EMMA BARBARESCHI,  
CONFERRING ON HER THE TITLE OF**

**RESEARCH DOCTOR IN  
CHEMICAL SCIENCES AND TECHNOLOGIES**

Genova, February 9<sup>th</sup>, 2012

The Director of the Doctorate School  
(Prof. Luca Banfi)

The Coordinator of the Doctorate Course  
(Prof. Luca Banfi)

# ACTIVITY REPORT

## *Research Activity*

The research activity was entirely carried out in the Laboratory of Advanced Materials, Ansaldo Ricerche, Genova.

### *Scientific Publications*

#### *Communications at Conferences*

Oral communications:

- 1) Barbareschi, E.; Guarnone, P.; Giostra, A.; Zappaterra, M., "High Temperature Failure of Expansion Joints Due to Stress Relaxation Cracking", Charles R. Morin Memorial Symposium on Failure Analysis and Prevention, Materials Science and Technology 2009, Pittsburgh (U.S.A.), 26-29/19/2009.
- 2) Barbareschi, E.; Costa, A.; Vacchieri, E.; Guarnone, P., "Application of the EBSD technique to the study of the evolution of a MCrAlYRe coating", EBSD 2011, Düsseldorf (Germany), 28-30/3/2011.
- 3) Barbareschi, E.; Davies, H.; Fry, A.T.; Guarnone, P.; Piedra, E.M., "High temperature corrosion of TBC in presence of V compounds", "25th International Conference on Surface Modification Technologies", Trollhattan (Svezia), 20-22/6/2011.

Posters:

- 4) Barbareschi, E.; Bonadei, A.; Costa, A.; Guarnone, P.; Vacchieri, E., "Assessment of a residual life evaluation tool for gas turbine blades and vanes based on microstructural evolution of a NiCoCrAlY+Re coating", 9th Liège Conference on Materials for Advanced Power Engineering, Liège (B), 27-29/9/2010.
- 5) Vacchieri, E.; Costa, A.; Barbareschi, E.; Guarnone, P., "Damage evaluation through EBSD maps on Ni based superalloys after high temperature mechanical testing", EBSD 2011, Düsseldorf (Germany), 28-30/3/2011.

#### *Congresses Attended*

- 1) "Materials Science and Technology", Pittsburgh (U.S.A), 26-29/19/2009.
- 2) "9th Liège Conference on Materials for Advanced Power Engineering", Liège (B), 27-29/9/2010.
- 3) "EBSD 2011", Düsseldorf (Germany), 28-30/3/2011.
- 4) "25th International Conference on Surface Modification Technologies", Trollhattan (Svezia), 20-22/6/2011.

## *Courseware*

During her doctorate, Emma Barbareschi has acquired 27.5 credits of Courseware.

#### *Courses attended and passed (20 credits)*

*Courses Given by Teachers of the University of Genova:*

- 1) Synthesis, structure, and functional properties of intermetallic materials (2 credits) (2009).
- 2) Advanced microscopy (dalla microscopia alla nanoscopia) (3 credits) (2009).
- 3) Mathematical methods for chemistry (2 credits) (2010).
- 4) Surface Science (3 credits) (2010)
- 5) Fundamentals of scanning and transmission electronic microscopy (3 credits) (2011).
- 6) Course on "Ansaldo Energia" product (2009) (3 credits).

*Courses Given by invited experts:*

- 1) Magnetic Structure (Peter Rogl, Vienna University) (2009) (1 credit).
- 2) Development of dyes in the cosmetic industry: the L'Oreal case (Cristina Emmanuel, L'Oreal) (2009) (1 credit).
- 3) Clathrates: Formation, Crystal Chemistry, Phase Relations and Properties (Peter Rogl, Vienna University) (2010) (1 credit).
- 4) Defects in solids (Peter Rogl, Vienna University) (2011) (1 credit).

#### *National and International Schools or Workshops (3.5 credits)*

- 1) *EBSD and EDS operator course*, organized by EDAX, Tilburg, The Netherlands, 9-13/3/2009. (2 credits).
- 2) *Comunicatori si nasce e si diventa*, organized by My Ways, Genova, 24/1/2011, 31/1/2011, 7/2/2011. (1.5 credits)

#### *Seminars Given (4 credits)*

- 1) 22/4/2010, "Nozioni di Chimica Generale, trattamenti sulle acque, problematiche di corrosione", lecture given to ALPIQ personnel in San Severo Electric Plant
- 2) 30/5/2011, "Applicazioni della tecnica EBSD nel campo dei materiali per l'energia", Università di Pavia.
- 3) 26/10/2011, Sviluppo di materiali per l'impiego in impianti a vapore SuperCritici e UltraSuperCritici", Dept. of Chemistry and Industrial Chemistry, Genova.

***Seminars Attended (0 credits)***

- 1) 20/7/2011, Dept. of Chemistry and Industrial Chemistry, "Organic and hybrid solar cells: fundamentals and recent advances" (Dr. Luiz Carlos Pimentel Almeida, Universidade Estadual de Campinas, San Paolo del Brasile).

***Teaching Assistance***



UNIVERSITÀ DEGLI STUDI DI GENOVA  
*DOCTORATE SCHOOL IN  
SCIENCES AND TECHNOLOGIES OF  
CHEMISTRY AND MATERIALS*



*(HOLDING THE ECTN CHEMISTRY DOCTORATE EUROLABEL®)*

PH.D. CERTIFICATE OF  
**ANTONELLO BIGNASCA**



**Doctorate Course:**

*Chemical Sciences and Technologies*

**Start of the Doctorate Program:**

*January 1<sup>st</sup>, 2009*

**End of the Doctorate Program:**

*December 31<sup>st</sup>, 2011*

**Advisor:**

*Prof. Maria Carmela Ianni*

**Thesis Title:**

*Development of biomimetic techniques to evaluate trace elements and organic matter bioaccessible fractions in solid environmental matrices*

**Defense Date:**

*February 9<sup>th</sup>, 2012*

On February 9<sup>th</sup>, 2012, at the Department of Chemistry and Industrial Chemistry, Antonello Bignasca has orally presented his doctorate research work in front of the Commission, formed by

- Prof. Paolo Ferloni, University of Pavia
- Prof. Ornella Abollino, University of Torino
- Prof. Gabriele Cacciamani, University of Genova

The written Dissertation had been previously sent to the Commission members. After careful examination of the Dissertation, of the student's oral presentation, of the overall activity of the student during the three years of doctorate studies, the Commission

**HAS APPROVED THE THESIS OF ANTONELLO BIGNASCA,  
CONFERRING ON HIM THE TITLE OF**

**RESEARCH DOCTOR IN  
CHEMICAL SCIENCES AND TECHNOLOGIES**

Genova, February 9<sup>th</sup>, 2012

The Director of the Doctorate School  
(Prof. Luca Banfi)

The Coordinator of the Doctorate Course  
(Prof. Luca Banfi)



# ACTIVITY REPORT

## *Research Activity*

The research activity was mainly carried out at the Department of Chemistry and Industrial Chemistry (University of Genova). However, Antonello Bignasca **has also spent a research period of 1.5 months abroad**, participating to the Italian scientific expedition in Antarctica from 11/11/2011 to 16/12/2011.

### *Scientific Publications*

Original publications on ISI Journals:

- 1) Ianni, C.; Bignasca, A.; Magi, E.; Rivaro, P., Metal bioavailability in marine sediments measured by chemical extraction and enzymatic mobilization, *Microchemical Journal*, **2010**, 96, 308-316. IMPACT FACTOR (2010): 2.480.
- 2) Bignasca, A.; Ianni, C.; Magi, E.; Rivaro, P., Using proteolytic enzymes to assess metal bioaccessibility in marine sediments, *Talanta*, **2011**, 86, 305-15. IMPACT FACTOR (2010): 3.722.
- 3) Massolo, S.; Bignasca, A.; Sarkar, S. K.; Chatterjee, M.; Bhattacharya, B. D.; Alam, A., Geochemical fractionation of trace elements in sediments of Hugli River (Ganges) and Sundarban wetland (West Bengal, India), *Environmental Monitoring and Assessment*, **2012**, in press. Published online at <http://dx.doi.org/10.1007/s10661-012-2519-y>. IMPACT FACTOR (2010): 1.436.

### *Communications at Conferences*

Oral communications:

- 1) Bignasca, A., Ianni, M.C., "Evaluation of a biomimetic approach to study metals bioavailability in marine sediments", Giornate Italo-Francesi di Chimica, Genova, 26-27/4/2010.
- 2) Bignasca, A., Ianni, M.C., "Sviluppo di nuove metodiche per la determinazione di metalli biodisponibili nei sedimenti: utilizzo di enzimi proteolitici". XXII Convegno Nazionale della Divisione di Chimica Analitica della Società Chimica Italiana, Como, 12-16/9/2010.
- 3) Bignasca, A., Ianni, M.C., "Metal Bioaccessibility in Soils: a Comparison among Different Analytical Strategies", SAYCS, Pesaro, 17-19/10/2011.

### *Congresses Attended*

- 1) "Spettrometria di massa in Liguria", Genova, 1/12/2009.
- 2) "Giornate Italo-Francesi di Chimica", Genova, 26-27/4/2010.
- 3) "XXII Convegno Nazionale della Divisione di Chimica Analitica della Società Chimica Italiana", Como, 12-16/9/2010.
- 4) "SAYCS", Pesaro, 17-19/10/2011.

## *Courseware*

During his doctorate, Antonello Bignasca has acquired 28 credits of Courseware.

### *Courses attended and passed (18 credits)*

*Courses Given by Teachers of the University of Genova:*

- 1) Bioorganic chemistry (2 credits) (2009).
- 2) New topics about food composition and analysis (2 credits) (2009).
- 3) Microwave technology applied to chemical processes (2 credits) (2009).
- 4) Fundamentals of scanning and transmission electronic microscopy (3 credits) (2010).
- 5) Experimental design (3 credits) (2010).
- 6) Instrumental techniques for trace elements determination in pharmaceuticals, food products and environmental samples (2 credits) (2010).

*Courses Given by invited experts:*

- 1) Radiodrugs in anti-cancer therapy: preparation and pharmacokinetics (Marco Chinol, Ist. Europeo di Oncologia) (2009) (1 credit).
- 2) Advanced spectroscopies for single molecule measurements (Salvatore Cannistraro, Università della Tuscia) (2009) (1 credit).
- 3) The LC-MS toolbox for structural elucidation of trace compounds: applications in drug discovery and development (Antonio Triolo) (2010) (1 credit).
- 4) Synthesis, formulation and marketing of generic drugs (Graziano Castaldi, Chemelectiva, Novara) (2010) (1 credit).

### *National and International Schools or Workshops (6 credits)*

- 1) *Metodi Innovativi nell'Analisi Chimica Ambientale*, Feltre (BL), 7-12/9/2009 (2 credits).
- 2) *14° corso di spettrometria di massa per dottorandi di ricerca*, Certosa di Pontignano (Siena), 21-26/3/2010 (2 credits).
- 3) *School of Experimental Design*, Genova, 6-10/9/2010. 2 credits.



### ***Seminars Given (2 credits)***

- 1) 11/10/2011, Dept. of Chemistry and Industrial Chemistry, "Analytical methods for anti-doping control in sport".

### ***Seminars Attended (2 credits)***

- 1) 6-2-2009, Dept. of Physics, "L'energia del futuro", Prof. Carlo Rubbia, CERN, Ginevra.
- 2) 3/3/2009, Dept. of Chemistry and Industrial Chemistry, "Ipotesi chimica sull'origine della vita: dal Big Bang alla comparsa dei primi organismi viventi", Prof. Piero Ugliengo, Università di Torino.
- 3) 13/5/2009, Dept. of Chemistry and Industrial Chemistry, "Microalghe: una risorsa per produrre biodiesel ed alimenti", Prof. M. Tredici, Università di Firenze.
- 4) 6/10/2009, Dept. of Chemistry and Industrial Chemistry, "Chimica della fotografia, dai sali d'argento ai pixel", F. Wrubl.
- 5) 10/2/2010, Dept. of Chemistry and Industrial Chemistry, "Invisibility. Camouflage techniques.", Prof. Maria Gazda, Faculty of Applied Physics & Mathematics, Gdansk University of Technology, Danzig, Poland.
- 6) 16/2/2010, Dept. of Physics, "Inquinamento atmosferico, cambiamenti climatici e fisica nucleare", Prof. Paolo Prati, INFN, Genova.
- 7) 25/2/2010, Dept. of Chemistry and Pharmaceutical and Food Technologies, "Optimization methods in chromatography", Prof. Rafael Cela, Universidad de Santiago di Compostela.
- 8) 8/6/2010, Dept. of Chemistry and Industrial Chemistry, "L'opzione nucleare in Italia", Dr. Stefano Maggiolo, Agenzia Regionale per la Protezione dell'Ambiente Ligure (A.R.P.A.L.).
- 9) 17/9/2010, Dept. of Chemistry and Industrial Chemistry, "Activated Peptides: for Ligation and Large Cyclic Transition States", Prof. A.R. Katritsky, University of Florida, Gainesville.
- 10) 1/10/2010, Dept. of Chemistry and Industrial Chemistry, "TOPOS vs. Intermetallics", Prof. Vladislav A. Blatov, Department of Chemistry, Samara State University (Russia).
- 11) 12/10/2010, Dept. of Chemistry and Industrial Chemistry, "Self-assembly and crystallization in block copolymers", Dario Cavallo
- 12) 12/10/2010, Dept. of Chemistry and Industrial Chemistry, "Splitting fotocatalitico dell'acqua", Alessio Rindi
- 13) 26/10/2010, Dept. of Chemistry and Industrial Chemistry, "Il rischio sanitario associato alle biotossine algali nei frutti di mare", Giuliana Ottonello.
- 14) 29/3/2011, Dept. of Chemistry and Industrial Chemistry, "La spettroscopia Raman nelle indagini sui beni culturali: stato dell'arte e sviluppi", Emilio Mario Castellucci, Dipartimento di Chimica "Ugo Schiff" e Laboratorio Europeo di Spettroscopie non Lineari (LENS), Università di Firenze.
- 15) 22/06/2011, Dept. of Chemistry and Industrial Chemistry, "Identification and characterization of unknown compounds in urine of neuroblastoma patients", Dott. Carlo Scapolla, Dept. of Chemistry and Industrial Chemistry
- 16) 5/10/2011, Dept. of Chemistry and Industrial Chemistry, "Synergic analytical techniques for the study of cultural heritage artefacts", F. Ardini
- 17) 5/10/2011, Dept. of Chemistry and Industrial Chemistry, "Olives and Olive Oil in Health and Disease Prevention", Nguyen, K. T. N.

### ***Teaching Assistance***

Antonello Bignasca has assisted the course of "Laboratory of Analytical Chemistry 1" (bachelor degree in Chemistry and Chemical Technologies) (40 hours)(2008/2009, second semester) and the course of "Laboratory of Analytical Chemistry 1" (bachelor degree in Chemistry and Chemical Technologies) (40 hours)(2009/2010, second semester).



UNIVERSITÀ DEGLI STUDI DI GENOVA  
*DOCTORATE SCHOOL IN  
SCIENCES AND TECHNOLOGIES OF  
CHEMISTRY AND MATERIALS*



*(HOLDING THE ECTN CHEMISTRY DOCTORATE EUROLABEL®)*

PH.D. CERTIFICATE OF  
**VALENTINA CARATTO**



**Doctorate Course:**  
*Materials Science and Technology*  
**Start of the Doctorate Program:**  
*January 1<sup>st</sup>, 2009*  
**End of the Doctorate Program:**  
*December 31<sup>st</sup>, 2011*  
**Advisor:**  
*Prof. Maurizio Ferretti*  
**Thesis Title:**  
*Synthesis of nanoscale phases for functional  
applications: effect of particle size  
and dimensionality*  
**Defense Date:**  
*February 8<sup>th</sup>, 2012*

On February 8<sup>th</sup>, 2012, at the Department of Chemistry and Industrial Chemistry, Valentina Caratto has orally presented her doctorate research work in front of the Commission, formed by

- Prof. Guido Biscontin, University of Venezia
- Prof. Carla Cannas, University of Cagliari
- Prof. Gilda Zanicchi, University of Genova

The written Dissertation had been previously sent to the Commission members. After careful examination of the Dissertation, of the student's oral presentation, of the overall activity of the student during the three years of doctorate studies, the Commission

HAS APPROVED THE THESIS OF VALENTINA CARATTO,  
CONFERRING ON HER THE TITLE OF

**RESEARCH DOCTOR IN  
MATERIALS SCIENCE AND TECHNOLOGY**

Genova, February 8<sup>th</sup>, 2012

The Director of the Doctorate School  
(Prof. Luca Banfi)

The Coordinator of the Doctorate Course  
(Prof. Gabriella Borzone)

# ACTIVITY REPORT

## *Research Activity*

The research activity was mainly carried out at the Department of Chemistry and Industrial Chemistry (University of Genova). However, Valentina Caratto **has also spent a period abroad**, working in the Laboratory of Nanotechnology and Solar Energy of the Chemistry Institute at University of Campinas (Brazil) under the guidance of Prof. Ana Flávia Nogueira (23/3/2011-28/4/2011). Furthermore, she went several times to Cagliari for short stays at the Research Center Ecotec (Dr. Riccardo Orrù).

## *Scientific Publications*

Original publications on ISI Journals:

- 1) Caratto, V.; Ferretti, M.; Setti, L., "Synthesis of TiO<sub>2</sub>-rutile nanoparticles by PLA in solution", *Appl. Surf. Sci.*, **2012**, 2393–2396. IMPACT FACTOR (2010): 1.795

Original publications on non ISI Journals:

- 2) Caratto, V.; Livoti, V.; Pezzati, E.; Aliakbarian, B.; Perego, P.; Ferretti, M., "Studio dell'attività fotocatalitica di nanoparticelle di TiO<sub>2</sub> su batteri Gram negativi", *La Chimica e l'Industria*, **2011**, (ottobre), 98-101.

## *Communications at Conferences*

Oral communications:

- 1) Caratto, V., "Nuova via di sintesi di TiO<sub>2</sub> nanometrico con PLA in soluzione", 10<sup>th</sup> S.A.Y.C.S., Pesaro, 18-20/10/2010.
- 2) Caratto, V.; Livoti, V.; Pezzati, E.; Perego, P.; Ferretti, M., "Studio dell'attività fotocatalitica di nanoparticelle di TiO<sub>2</sub> su batteri Gram negativi", Convegno nazionale "Chimica verde, Chimica sicura", Pavia, 22-24/6/2011.

Posters:

- 3) Caratto, V.; Ferretti, M.; Orrù, R., "New TiO<sub>2</sub> synthesis technique for green organic solar cells", Hybrid and Organic Photovoltaics Conference, Assisi, 23-27/5/2010.
- 4) Caratto, V.; Bernini, C.; Ferretti, M., "TiO<sub>2</sub> for organic solar cells", Inauguration Congress of SPIN Institute of National Research Council, Genova, 10-11/6/2010.

## *Congresses Attended*

- 1) "Hybrid and Organic Photovoltaics Conference", Assisi, 23-27/5/2010.
- 2) "Inauguration Congress of SPIN Institute of National Research Council", Genova, 10-11/6/2010.
- 3) "NANO2010", Roma, 13-17/9/2010.
- 4) "10<sup>th</sup> S.A.Y.C.S., Pesaro", 18-20/10/2010
- 5) "Chimica verde, Chimica sicura", Pavia, 22-24/6/2011.

## *Courseware*

During her doctorate, Valentina Caratto has acquired 23.0 credits of Courseware.

## *Courses attended and passed (10 credits)*

*Courses Given by Teachers of the University of Genova:*

- 1) Advanced microscopy (3 credits) (2009).
- 2) Superconductivity (3 credits) (2009).

*Courses Given by invited experts:*

- 1) Clathrates: Formation, Crystal Chemistry, Phase Relations and Properties (Peter Rogl, Vienna University) (2010) (1 credit).
- 2) Approaches to Synthesis and Characterization of Metal Oxide Magnetic Nanomaterials (Lorenza Suber, C.N.R., Roma) (2010) (1 credit).
- 3) Nanomagnetism and magnetic recording. (Prof. Marco Affronte, Università di Modena) (2010) (1 credit).
- 4) An introduction to the basic of research and innovation in industry (Claudio Boffito, Saes Getter) (2011) (1 credit).

## *National and International Schools or Workshops (8.5 credits)*

- 1) "School on superconductors and Functional oxides", 16-30/5/2009, Marina di Pisciotta (SA) (4 credits).
- 2) "Giornata di studio sul REACH", Monserrato (CA), 18/12/2009 (0.5 credits).
- 3) "Le Nuove Fonti di Energia e l'Efficienza Energetica nell'Ingegneria", Roma, 27/06-2/07/2010 (2 credits).
- 4) 5° Corso nazionale di introduzione alla fotochimica, Bologna, 13-17/9/2010 (2 credits)

## *Seminars Given (2 credits)*

The student presented 2 seminars as final test for the 2 attended courses given by internal lecturers (see above).

### ***Seminars Attended (2.5 credits)***

- 1) 6-2-2009, Dept. of Physics, "L'energia del futuro", Prof. Carlo Rubbia, CERN, Ginevra.
- 2) 3/3/2009, Dept. of Chemistry and Industrial Chemistry, "Ipotesi chimica sull'origine della vita: dal Big Bang alla comparsa dei primi organismi viventi", Prof. Piero Ugliengo, Università di Torino.
- 3) 28/4/2009, Dept. of Chemistry and Industrial Chemistry, "Flussi e accumuli di energia accoppiati a trasferimenti protonici in biosistemi", Prof. A. Morelli, Università di Genova.
- 4) 13/5/2009, Dept. of Chemistry and Industrial Chemistry, "Microalghe: una risorsa per produrre biodiesel ed alimenti", Prof. M. Tredici, Università di Firenze.
- 5) 17/2/2010, Dept. of Chemistry and Industrial Chemistry, "Chimica e Colore", Prof. Paolo Piaggio, Università di Genova.
- 6) 8/3/2010, Dept. of Physics, "Emission of Coherent THz Radiation from intrinsic Josephson Crystals", Prof. Ruggiero Vaglio, CNR-SPIN e Università di Napoli "Federico II".
- 7) 18/5/2010, Dept. of Chemistry and Industrial Chemistry, "Sports materials", Dr. Andy Watson, Institute for Materials Research, University of Leeds (UK).
- 8) 8/6/2010, Dept. of Chemistry and Industrial Chemistry, "L'opzione nucleare in Italia", Dr. Stefano Maggiolo, Agenzia Regionale per la Protezione dell'Ambiente Ligure (A.R.P.A.L.).
- 9) 21/6/2010, Dept. of Chemistry and Industrial Chemistry, "Materiali per l'energia: risultati recenti su bulk ceramici termoelettrici e film superconduttori a base di Fe", Dr. Paolo Mele, Department of Materials Science and Engineering, Kyushu Institute of Technology.
- 10) 3/9/2010, Dept. of Physics, "Ab initio study of the Raman spectra and the crystallization kinetics of chalcogenides phase-change materials", Prof. Riccardo Mazzarello, Aachen University (D).
- 11) 8/10/2010, Dept. of Chemistry and Industrial Chemistry, "Formation mechanism of silver nanoparticle 1D microstructures and their hierarchical assembly into 3D superstructures", Lorenza Suber, C.N.R., Roma.
- 12) 12/10/2010, Dept. of Chemistry and Industrial Chemistry, "Organic Synthesis "on water"", Valentina Cerulli
- 13) 12/10/2010, Dept. of Chemistry and Industrial Chemistry, "Self-assembly and crystallization in block copolymers", Dario Cavallo
- 14) 14/10/2010, Dept. of Physics, "Growing semiconductor nanostructures with an AFM tip", Marco Rolandi, University of Washington, Seattle, WA (USA).
- 15) 2/11/2010, Dept. of Physics, "Dynamics of reactions at surfaces", Gerhard Ertl, Max Planck Gesellschaft, Berlin.
- 16) 22/11/2010, Dept. of Pharmaceutical Sciences, "Combinatorial Chemistry", Laura Buffa.
- 17) 22/11/2010, Dept. of Pharmaceutical Sciences, "Le Micotossine nelle colture e nei prodotti alimentari", Silvia Mannino.
- 18) 22/11/2010, Dept. of Pharmaceutical Sciences, "Molecular Dynamics Simulation: an updated overview on Prion Protein ", Gerolamo Vettoretti.
- 19) 3/12/2010, Dept. of Chemistry and Industrial Chemistry, "Magnetic properties of nanoparticles: the effect of particle size and beyond...", Davide Peddis, C.N.R., Istituto di Struttura della Materia, Roma
- 20) 20/07/2011, Dept. of Chemistry and Industrial Chemistry, "Organic and hybrid solar cells: fundamentals and recent advances", Dr. Luiz Carlos Pimentel Almeida, Universidade Estadual de Campinas, Sao Paulo, Brasil.
- 21) 11/10/2011, Dept. of Chemistry and Industrial Chemistry, "L'imaging iperspettrale, un emergente strumento analitico per il controllo di qualità e di processo alimentare ed ambientale.", L. Bagnasco.
- 22) 20/10/11, Dept. of Chemistry and Industrial Chemistry, "Formation of hybrid compounds of interest in cultural heritage monitored by neutron scattering", Claudia Mondelli, Institut Langevin, Grenoble, France.

### ***Teaching Assistance***

Valentina Caratto has assisted the courses of Laboratory of Physical Chemistry 1 (bachelor degree in Material Science) 2010/2011) (30 hours).



UNIVERSITÀ DEGLI STUDI DI GENOVA  
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*(HOLDING THE ECTN CHEMISTRY DOCTORATE EUROLABEL®)*

PH.D. CERTIFICATE OF  
**PAOLA CIRRINCIONE**



**Doctorate Course:**

*Pharmaceutical, Food and Cosmetic Sciences*

**Start of the Doctorate Program:**

*January 1<sup>st</sup>, 2009*

**End of the Doctorate Program:**

*December 31<sup>st</sup>, 2011*

**Advisor:**

*Prof. Gabriele Caviglioli*

**Thesis Title:**

*Study of a bioadhesive and drug release controlling  
matrix obtained by direct compression  
and thermal treatment*

**Defense Date:**

*February 9<sup>th</sup>, 2012*

On February 9<sup>th</sup>, 2012, at the Department of Pharmacy, Paola Cirrincione has orally presented her doctorate research work in front of the Commission, formed by

- Prof. Daniela Barlocco, First University of Milano
- Prof. Paolo Colombo, University of Parma
- Prof. Alessandro Balbi, University of Genova

The written Dissertation had been previously sent to the Commission members. After careful examination of the Dissertation, of the student's oral presentation, of the overall activity of the student during the three years of doctorate studies, the Commission

**HAS APPROVED THE THESIS OF PAOLA CIRRINCIONE,  
CONFERRING ON HER THE TITLE OF**

**RESEARCH DOCTOR IN  
PHARMACEUTICAL, FOOD AND COSMETIC SCIENCES**

The commission has evaluated the thesis and the overall activity of Dr. Paola Cirrincione as  
**EXCELLENT**

Genova, February 9<sup>th</sup>, 2012

The Director of the Doctorate School  
(Prof. Luca Banfi)

The Coordinator of the Doctorate Course  
(Prof. Alessandro Balbi)

# ACTIVITY REPORT

## *Research Activity*

The research activity was mainly carried out at the Department of Chemistry and Pharmaceutical and Food Technologies (now Department of Pharmacy) (University of Genova). However, Paola Cirrincione has also **spent a 4 months period abroad**, in the research group of Prof. Juergen Siepmann, at the Université Lille Nord de France (FR), (01/06/2011-30/09/2011).

## *Scientific Publications*

Patents:

- 1) Caviglioli, G.; Cafaggi, S.; Parodi, B.; Russo, E.; Bignardi, G.; Cirrincione, P. "A method for the production of bioadhesive compact matrices that can be used either as such or for the prolonged release of active substances, and compact matrices thus obtained", International Patent WO2010028826
- 2) Caviglioli, G.; Parodi, B.; Cafaggi, S.; Russo, E.; Cirrincione, P.; Chinol, M.; Paganelli, G., "A conjugate of human albumin and 2-(4-isothiocyanatobenzyl)-1,4,7,10-tetraazacyclododecane-1,4,7,10-tetraacetic acid useful for the localization of radionuclides for diagnostic and therapeutic purposes", Int. Patent Appl. PCT UGE003BWO.

## *Communications at Conferences*

Oral communications:

- 1) Cirrincione, P.; Caviglioli, G.; Cafaggi, S.; Parodi, B.; Russo, E., "Studio preliminare di formulazione di compresse rivestite mediante dry coating", Doctoral Summer School "Nuovi Materiali Funzionali per Applicazioni Farmaceutiche e Biomediche", Rende (CS), 12-19/9/2010.

Posters:

- 1) Cirrincione, P., "A spectroscopic method to evaluate the thiourea-conjugation of polyazacarboxylate chelating ligand to the micro-dispersed systems", Doctoral Summer School "Sistemi Nanoparticellari", Cagliari, 7-9/9/2009
- 2) Caviglioli, G.; Cirrincione, P.; Russo, E.; Parodi, B.; Cafaggi, S.; Bignardi, G., "Modification of drug release from tablets produced by direct compression", XXI Simposio A.D.R.I.T.E.L.F. "Veicolazione dei farmaci: aspetti tecnologici innovativi", Cagliari, 10-13/9/2009.
- 3) Caviglioli, G.; Cirrincione, P.; Russo, E.; Parodi, B.; Cafaggi, S.; Bignardi, G., "Investigational study on an innovative matrix for extended drug release obtained by submitting to a thermal treatment tablets produced by direct compression". 7th World Meeting on Pharmaceutics, Biopharmaceutics and Pharmaceutical Technology, La Valletta (Malta), 8-11/3/2010

## *Congresses Attended*

- 1) "XXI Simposio A.D.R.I.T.E.L.F.-Veicolazione dei farmaci: aspetti tecnologici innovativi", Cagliari, 10-13/9/2009.
- 2) "Towards Drug Delivery Systems: When the Drug doesn't like the Standards", Milano, 2/12/2009.
- 3) "7<sup>th</sup> World Meeting on Pharmaceutics, Biopharmaceutics and Pharmaceutical Technology", La Valletta (Malta), 8-11/3/2010

## *Courseware*

During her doctorate, Paola Cirrincione has acquired 26.0 credits of Courseware.

## *Courses attended and passed (16 credits)*

*Courses Given by Teachers of the University of Genova:*

- 1) New topics about food composition and analysis (2 credits) (2009).
- 2) NMR spectroscopy in the characterization of synthetic polymers (2 credits) (2009)
- 3) Experimental design (3 credits) (2010).
- 4) Instrumental techniques for trace elements determination in pharmaceuticals, food products and environmental samples (2 credits) (2010).
- 5) Innovative pharmaceutical dosage forms: preparation and control methods (2 credits) (2010).

*Courses Given by invited experts:*

- 1) Magnetic Structure (Peter Rogl, Vienna University) (2009) (1 credit).
- 2) Radiodrugs in anti-cancer therapy: preparation and pharmacokinetics (Marco Chinol, Ist. Europeo di Oncologia) (2009) (1 credit).
- 3) The LC-MS toolbox for structural elucidation of trace compounds: applications in drug discovery and development (Antonio Triolo) (2010) (1 credit)
- 4) Synthesis, formulation and marketing of generic drugs (Graziano Castaldi, Chemelectiva, Novara) (2010) (1 credit).
- 5) Scale-up of Oral Solid Dosage Forms Manufacturing Processes – Technological and Regulatory Key Facts (Paolo Gatti) (2010) (1 credit).

### ***National and International Schools or Workshops (6.0 credits)***

- 1) *Doctoral Summer School "Sistemi Nanoparticellari"*, Cagliari, 7-9/9/2009 (1.5 credits).
- 2) *Multidisciplinary Strategies to target the Central Nervous System*, Modena, 5-7/11/2009 (1.5 credits).
- 3) *Doctoral Summer School "Nuovi Materiali Funzionali per Applicazioni Farmaceutiche e Biomediche"*, Rende (CS), 12-19/9/2010 (2 credits).
- 4) *Advanced drug delivery systems*, Milano, 2/11/2010 (0.5 credits).
- 5) *Poorly Soluble Drugs Workshop*, Lille (France), 15/9/2011 (0.5 credits).

### ***Seminars Given (2 credits)***

- 1) 2/12/2011, Dept. of Pharmaceutical Sciences, "Blood brain barrier".

### ***Seminars Attended (2 credits)***

- 1) 27/2/2009, Dept. of Pharmaceutical Sciences, "Chiral chromatography : a mature technology, a scientific challenge", Prof. Christian Roussel, Marseille, France.
- 2) 27/2/2009, Dept. of Pharmaceutical Sciences, "Chemistry derived from N-(o-amino-phenyl) thiazoline-2-thione", Federico Andreoli, Marseille, France.
- 3) 27/3/2009, Dept. of Chemistry and Pharmaceutical and Food Technologies, "La gestione dei dispositivi medici", Dott.ssa Tiziana Corsetti e Dott.ssa Elena Bestoso.
- 4) 3/4/2009, Dept. of Chemistry and Pharmaceutical and Food Technologies, "La nutrizione parenterale", Dott.ssa Attilia Grassi e Dott.ssa Sabrina Beltrami.
- 5) 24/4/2009, Dept. of Chemistry and Pharmaceutical and Food Technologies, "I farmaci oncologici e le norme di buona preparazione", Dott.ssa Barbara Rebesco e Dott.ssa Federica Mina.
- 6) 28/5/2009, Faculty of Engineering, "An overview of the European Patent System", Dott. Mauro Boero (funzionario dell'Ufficio Europeo Brevetti).
- 7) 27/4/2010, Dept. of Chemistry and Pharmaceutical and Food Technologies, "Sistemi innovativi per la veicolazione di acidi nucleici", Elias Fattal, Université de Paris Sud, UMR CNRS 8612 Physico-Chimie - Pharmacotechnie – Biopharmacie.
- 8) 22/11/2010, Dept. of Pharmaceutical Sciences, "Combinatorial Chemistry", Laura Buffa.
- 9) 22/11/2010, Dept. of Pharmaceutical Sciences, "Le Micotossine nelle colture e nei prodotti alimentari", Silvia Mannino.
- 10) 22/11/2010, Dept. of Pharmaceutical Sciences, "Molecular Dynamics Simulation: an updated overview on Prion Protein ", Gerolamo Vettoretti.
- 11) 11/3/2011, Dept. of Chemistry and Pharmaceutical and Food Technologies, "L'organizzazione della industria farmaceutica secondo le GMP", Dr. Raffaella Pintus, Bruschettoni S.r.l.
- 12) 17/5/2011, Dept. of Chemistry and Pharmaceutical and Food Technologies, "Biosensory analysis of food samples: interpreting results", Prof. Tormod Naes, Nofima, Norway and University of Copenhagen, Denmark
- 13) 11/10/2011, Dept. of Chemistry and Industrial Chemistry, "L'imaging iperspettrale, un emergente strumento analitico per il controllo di qualità e di processo alimentare ed ambientale.", L. Bagnasco.
- 14) 11/10/2011, Dept. of Chemistry and Industrial Chemistry, "Analytical methods for anti-doping control in sport", A. Bignasca.
- 15) 21/10/2011, Dept. of Chemistry and Industrial Chemistry, "From interesting to useful: the contribution of porous solids to the society", Gérard Férey, Université de Versailles, France.
- 16) 2/12/2011, Dept. of Pharmaceutical Sciences, "Fungicidi chimici usati in agricoltura: impatto sociale, patogeni target ed evoluzione", A.P. Lanteri.
- 17) 2/12/2011, Dept. of Pharmaceutical Sciences, "Click chemistry, an interesting tool in pharmaceutical sciences", F. Musumeci.
- 18) 2/12/2011, Dept. of Pharmaceutical Sciences, "Processi di estrazione assistiti da microonde", G. Priarone
- 19) 2/12/2011, Dept. of Pharmaceutical Sciences, "Rare diseases and orphan drugs", C. Rotolo.

### ***Teaching Assistance***

Paola Cirrincione has assisted the courses of "Pharmaceutical technology, socio-economy and legislation I" and "Pharmaceutical technology, socio-economy and legislation II" (Master Degree in Pharmacy)(2009/2010)(60 hours); "Pharmaceutical technology, socio-economy and legislation I" and "Pharmaceutical technology, socio-economy and legislation II" (Master Degree in Pharmacy)(2010/2011)(60 hours).





UNIVERSITÀ DEGLI STUDI DI GENOVA  
*DOCTORATE SCHOOL IN  
SCIENCES AND TECHNOLOGIES OF  
CHEMISTRY AND MATERIALS*



*(HOLDING THE ECTN CHEMISTRY DOCTORATE EUROLABEL®)*

PH.D. CERTIFICATE OF  
**ERIKA SIMONA COZZA**



**Doctorate Course:**  
*Materials Science and Technology*  
**Start of the Doctorate Program:**  
*January 1<sup>st</sup>, 2009*  
**End of the Doctorate Program:**  
*December 31<sup>st</sup>, 2011*  
**Advisor:**  
*Prof. Orietta Monticelli*  
**Thesis Title:**  
*Study of Novel Approaches for the  
Preparation of Nanostructured Polymeric  
Films with Unique Properties*  
**Defense Date:**  
*February 8<sup>th</sup>, 2012*

On February 8<sup>th</sup>, 2012, at the Department of Chemistry and Industrial Chemistry, Erika Simona Cozza has orally presented her doctorate research work in front of the Commission, formed by

- Prof. Guido Biscontin, University of Venezia
- Prof. Carla Cannas, University of Cagliari
- Prof. Gilda Zanicchi, University of Genova

The written Dissertation had been previously sent to the Commission members. After careful examination of the Dissertation, of the student's oral presentation, of the overall activity of the student during the three years of doctorate studies, the Commission

HAS APPROVED THE THESIS OF ERIKA SIMONA COZZA,  
CONFERRING ON HER THE TITLE OF

**RESEARCH DOCTOR IN  
MATERIALS SCIENCE AND TECHNOLOGY**

Genova, February 8<sup>th</sup>, 2012

The Director of the Doctorate School  
(Prof. Luca Banfi)

The Coordinator of the Doctorate Course  
(Prof. Gabriella Borzone)



# ACTIVITY REPORT

## *Research Activity*

The research activity was mainly carried out at the Department of Chemistry and Industrial Chemistry (University of Genova). However, Erika Simona Cozza **has also spent a 7 months period abroad**, at Tufts University, Medford (MA, U.S.A.) in the research laboratory of Prof. Peggy Cebe (Polymer Physics Group), from Jan. 17, 2011 through July 31, 2011. Furthermore, she collaborated, throughout the whole doctorate, with Politecnico di Torino, Alessandria location.

## *Scientific Publications*

Original publications on ISI Journals:

- 1) Cozza, E. S.; Monticelli, O.; Marsano, E., Electrospinning: A Novel Method to Incorporate POSS Into a Polymer Matrix, *Macromolecular Materials and Engineering*, **2010**, 295, 791-795. IMPACT FACTOR (2010): 1.916.
- 2) Monticelli, O.; Fina, A.; Cozza, E. S.; Prato, M.; Bruzzo, V., POSS vapor phase grafting: a novel method to modify polymer films, *Journal of Materials Chemistry*, **2011**, 21, 18049-18054. IMPACT FACTOR (2010): 5.101.
- 3) Cozza, E. S.; Monticelli, O.; Cavalleri, O.; Marsano, E., Preparation, Characterization and Properties of Nanofibers based on Poly(vinylidene fluoride) and Polyhedral Oligomeric Silsesquioxanes, *Polymers for Advanced Technologies*, **2011**, in press. Published on line: DOI:10.1002/pat2037. IMPACT FACTOR (2010): 1.776
- 4) Monticelli, O.; Bocchini, S.; Frache, A.; Cozza, E. S.; Cavalleri, O.; Prati, L., Simple method for the preparation of composites based on PA6 and partially exfoliated graphite, *Journal of Nanomaterials*, **2012**, in press. Published on line (Research Article 938962). IMPACT FACTOR (2010): 1.675.
- 5) Cozza, E.S.; Bruzzo, V.; Carniato, F.; Marsano, E.; Monticelli, O., *ACS Applied Materials & Interfaces*, **2012**, in press (published online: DOI: 10.1021/am201766r). IMPACT FACTOR (2010): 2.925.

## *Communications at Conferences*

Oral communications:

- 1) Cozza, E.S., "Preparation and Characterization of Nanocomposite Nanofibers based on POSS and Cellulose Acetate", 3rd National Forum of Young Researchers in Materials Science and Technology, Padova 22-24/03/2010

Posters:

- 2) Cozza, E.S.; Monticelli, O.; Marsano, E., "Influence of Electrospinning Parameters on Nanofibrous Polymeric Membrane Formation", GIFC 2010, Genova, 26-27/04/2010.

## *Congresses Attended*

- 1) "Nanotecnologie nei PV", Alessandria, 20/10/2009
- 2) "3rd National Forum of Young Researchers in Materials Science and Technology", Padova 22-24/03/2010
- 3) "GIFC 2010", Genova, 26-27/04/2010

## *Courseware*

During her doctorate, Erika Simona Cozza has acquired 19.0 credits of Courseware.

## *Courses attended and passed (14 credits)*

*Courses Given by Teachers of the University of Genova:*

- 1) Dendritic macromolecules: synthesis and reactivity (2 credits) (2009).
- 2) Viscoelasticity: the paradigmatic example of polymers (2 credits) (2009).
- 3) NMR spectroscopy in the characterization of synthetic polymers (2 credits) (2009).
- 4) Surface Science (3 credits) (2010)

*Courses attended at Tufts University:*

- 5) Introduction to Solid State Physics: Soft Condensed Matter (2011) (2 credits).

*Courses Given by invited experts:*

- 1) Electrical Properties of Glasses (Michel Duclot, Joseph Fourier University, Grenoble) (2009) (1 credit).
- 2) Bioplastics (A. Casale, Proplast) (2009) (1 credit).
- 3) Soft Tissue Mechanics (Gerrit W.M. Peters, Eindhoven University of Technology, Mechanical Engineering Materials Technology) (2010) (1 credit).

## *National and International Schools or Workshops (0.5 credits)*

- 1) Short Course "Nanocomposites chemistry and processing, basic aspects", Alessandria, 25-26/6/2009 (0.5 credits).

## *Seminars Given (2 credits)*

The student presented 4 seminars as final test for the 4 attended courses given by internal lecturers (see above).

### ***Seminars Attended (2.5 credits)***

- 1) 6/2/2009, Dept. of Physics, "L'energia del futuro", Prof. Carlo Rubbia, CERN, Ginevra.
- 2) 18/2/2009, Auditorium Confindustria, Genova, "Dai dolci all'acciaio", various speakers (organized by Confindustria).
- 3) 3/3/2009, Dept. of Chemistry and Industrial Chemistry, "Ipotesi chimica sull'origine della vita: dal Big Bang alla comparsa dei primi organismi viventi", Prof. Piero Ugliengo, Università di Torino.
- 4) 13/3/09, Dept. of Chemistry and Industrial Chemistry, "Macromolecular engineering for nanostructured materials via Atom Transfer Radical Polymerization (ATRP)", Prof. Krzysztof Matyjaszewski, Department of Chemistry, Carnegie Mellon University, Pittsburgh, PA, USA.
- 5) 28/4/2009, Dept. of Chemistry and Industrial Chemistry, "Flussi e accumuli di energia accoppiati a trasferimenti protonici in biosistemi", Prof. A. Morelli, Università di Genova.
- 6) 13/5/2009, Dept. of Chemistry and Industrial Chemistry, "Microalghe: una risorsa per produrre biodiesel ed alimenti", Prof. M. Tredici, Università di Firenze.
- 7) 18/5/2009, Dept. of Chemistry and Industrial Chemistry, "Calcolo dello spettro NMR con metodi DFT: applicazione alla determinazione strutturale di molecole organiche complesse", Prof. Alessandro Bagno, Università di Padova.
- 8) 3/7/2009, Dept. of Chemistry and Industrial Chemistry, "Materiali polimerici per il risparmio energetico: diodi elettroluminescenti e celle fotovoltaiche", Silvia Destri, Istituto per lo Studio delle Macromolecole (ISMAL), CNR, Milano.
- 9) 27/7/2009, Dept. of Chemistry and Industrial Chemistry, "Insulated molecular wires as model conjugated polymers with controlled interstrand interactions", Prof. Franco Cacialli, Department of Physics and Astronomy (CMMP Group) and London Centre for Nanotechnology, University College London.
- 10) 6/10/2009, Dept. of Chemistry and Industrial Chemistry, "Chimica della fotografia, dai sali d'argento ai pixel", F. Wrubl.
- 11) 6/10/2009, Dept. of Chemistry and Industrial Chemistry, "Acciai inossidabili: aspetti metallurgici della saldatura", M. Fabbreschi.
- 12) 8/10/09, Dept. of Chemistry and Industrial Chemistry, "Point-contact spectroscopy: a method for the study of the electron-quasiparticle interaction function", Prof. Marian Reiffers, Institute of Experimental Physics, Kosice (Slovakia).
- 13) 20/11/2009, Dept. of Chemistry and Industrial Chemistry "Materials for solar energy", L. Francis.
- 14) 20/11/2009, Dept. of Chemistry and Industrial Chemistry, "Role of dendrimers in Drug Delivery", A. Ullah.
- 15) 20/11/2009, Dept. of Chemistry and Industrial Chemistry, "Polimeri per uso nel fotovoltaico", E. Casazza.
- 16) 17/2/2010, Dept. of Chemistry and Industrial Chemistry, "Chimica e Colore", Prof. Paolo Piaggio, Università di Genova.
- 17) 18/5/2010, Dept. of Chemistry and Industrial Chemistry, "Sports materials", Dr. Andy Watson, Institute for Materials Research, University of Leeds (UK).
- 18) 28/1/2011, Tufts University, "How Does Surface Tension Emerge From Structure in Biological Tissues?", Dr. Lisa Manning, Tufts University
- 19) 31/1/2011, Tufts University, "Ghostly Neutrinos: Past, Present and Future.", Dr. Alexandre de Sousa, Tufts University.
- 20) 7/2/2011, Tufts University, "Controlling Self-Organization of Liquid Crystals with Surface Patterning", Dr. Tim Atherton, Case Western Reserve University.
- 21) 16/2/2011, Tufts University, "Coupling Molecular and Field Mechanics for Multiscale Modeling of Soft Matter", Dr. Nickos Voulgarakis, University of California, Berkeley.
- 22) 15/4/2011, Tufts University, "A Superconducting Circuit Analogue of a Black Hole", Miles Blencowe, Dartmouth College.
- 23) 22/4/2011, Tufts University, "Infrared Hall Conductivity in Graphene and Other Interesting Materials", John Cerne, SUNY Buffalo.
- 24) 12/09/2011, Dept. of Chemistry and Industrial Chemistry, "Polymeric nanocomposites: an overview from science to technology", Masami Okamoto, Toyota Technological Institute, Nagoya, Japan.

### ***Teaching Assistance***



UNIVERSITÀ DEGLI STUDI DI GENOVA  
*DOCTORATE SCHOOL IN  
SCIENCES AND TECHNOLOGIES OF  
CHEMISTRY AND MATERIALS*



*(HOLDING THE ECTN CHEMISTRY DOCTORATE EUROLABEL®)*

PH.D. CERTIFICATE OF  
**LUCIA FRASSONI**



**Doctorate Course:**

*Materials Science and Technology*

**Start of the Doctorate Program:**

*January 1<sup>st</sup>, 2009*

**End of the Doctorate Program:**

*December 31<sup>st</sup>, 2011*

**Advisor:**

*Prof. Rinaldo Marazza*

*Prof. Maria Clelia Galassi*

**Thesis Title:**

*The painting materials of painters working in  
Genoa in the xvi and xvii century*

**Defense Date:**

*February 8<sup>th</sup>, 2012*

On February 8<sup>th</sup>, 2012, at the Department of Chemistry and Industrial Chemistry, Lucia Frassoni has orally presented her doctorate research work in front of the Commission, formed by

- Prof. Guido Biscontin, University of Venezia
- Prof. Carla Cannas, University of Cagliari
- Prof. Gilda Zanicchi, University of Genova

The written Dissertation had been previously sent to the Commission members. After careful examination of the Dissertation, of the student's oral presentation, of the overall activity of the student during the three years of doctorate studies, the Commission

HAS APPROVED THE THESIS OF LUCIA FRASSONI,  
CONFERRING ON HER THE TITLE OF

**RESEARCH DOCTOR IN  
MATERIALS SCIENCE AND TECHNOLOGY**

Genova, February 8<sup>th</sup>, 2012

The Director of the Doctorate School  
(Prof. Luca Banfi)

The Coordinator of the Doctorate Course  
(Prof. Gabriella Borzone)

# ACTIVITY REPORT

## *Research Activity*

The research activity was entirely carried out at the Department of Chemistry and Industrial Chemistry (University of Genova).

### *Scientific Publications*

Original publications on non ISI Journals:

- 1) Vicini, S.; Bensi, P.; Mairani, A.; Princi, E.; Frassoni, L., "Indagine sulla tavolozza pittorica di alcuni pittori attivi a Genova nel XVII e XVIII secolo attraverso l'analisi chimica stratigrafica", *ARKOS*, **2009**, 25-35.

### *Communications at Conferences*

Oral communications:

- 1) Frassoni, L., "L'affresco della Cappella Bellincini nel Duomo di Modena. Caratterizzazione dei materiali, della tecnica pittorica e studio dello stato di conservazione", Cimitero Monumentale di Staglieno: valorizzazione, diagnostica, intervento, Genova, 5/6/2009.
- 2) Bongiorno, V.; Frassoni, L.; Parodi, E., "Diagnostica preliminare su alcuni monumenti e discussione su alcune tecniche di conservazione e restauro", Celebrazioni del 160° anniversario dell'apertura del Cimitero Monumentale di Staglieno, 29-30/10/2011, Genova.

Posters:

- 3) Brunetti, F.; Bruzzone, R.; De Cupis, F.; Frassoni, L., "Madonna del Rosario in N.S. della Consolazione Church, Genova: science dealing with restoration", Interim Meeting of Five ICOM-CC Working Groups: Wood/Furniture/Lacquer, Textile, Roma, 23- 25/3/2010.
- 4) Bongiorno, V.; Bruzzone, R.; Frassoni, L.; parodi, E., "Il Bucintoro al Molo di Venezia il giorno della Sensa: interpretation of style and attribution hypothesis with the support of non-invasive or micro-invasive diagnostic analyses", First International Congress Chemistry for Cultural heritage, (ChemCH), Ravenna, 30/6-3/7/2010.
- 5) Frassoni, L.; Bongiorno, V.; Marazza, R.; Picardo, P.; Nicula, S., "Characterization Of Cultural Heritage Materials: Terra A Portable Xrd And Xrf Instrument", Fourth Residential Summer School on Conservation Science Teruel, Spagna, 19-30/7/2010.
- 6) Bongiorno, V.; Campodonico, S.; Frassoni, L.; Piccardo, P., "Micro – Raman, SEM-EDXS and LOM – DIF investigation on a Cu-base reparation plug from a bronze monument subjected to laser ablation", Fourth Residential Summer School on Conservation Science Teruel, Spagna, 19-30/7/2010

### *Congresses Attended*

- 1) "The National Gallery Technical Bulletin 30th Anniversary Conference, Studying Old Master Paintings - Technology and Practice", London, 16-18/9/2009.
- 2) "Interim Meeting of Five ICOM-CC Working Groups": "Wood/Furniture/Lacquer, Textile", Roma, 23-25/3/2010.
- 3) "First International Congress Chemistry for Cultural Heritage", (ChemCH), Ravenna, 30/6-3/7/2010.
- 4) "Giornate sul restauro", Sarzana, 10-12/9/2010.
- 5) "Caravaggio's Painting Technique", Firenze, 17/9/2010.
- 6) "Restaurare. Tramandare cultura conservando la materia", 9-16/4/2011, Genova.
- 7) "Giornate sul restauro", 16/9/2011, Sarzana (SP).
- 8) "Giornata internazionale di studi sulla conservazione della ceramica contemporanea all'aperto", 14/10/2011, Albisola Marina (SV).

## *Courseware*

During her doctorate, Lucia Frassoni has acquired 28.0 credits of Courseware.

### *Courses attended and passed (10 credits)*

*Courses Given by Teachers of the University of Genova:*

- 1) Fundamentals of scanning and transmission electronic microscopy (3 credits) (2009).
- 2) Vibrational spectroscopy (2 credits) (2009).
- 3) Application of RAMAN spectroscopy in material science (2 credits) (2010)

*Courses Given by invited experts:*

- 1) "Advanced spectroscopies for single molecule measurements (Salvatore Cannistraro, Università della Tuscia)", (2009) (1 credit).
- 2) Soft Tissue Mechanics (Gerrit W.M. Peters, Eindhoven University of Technology, Mechanical Engineering Materials Technology) (2010) (1 credit)
- 3) Synthesis, formulation and marketing of generic drugs (Graziano Castaldi, Chemelectiva, Novara) (2010) (1 credit).

### ***National and International Schools or Workshops (14 credits)***

- 1) "3<sup>rd</sup> Residential Summer School on Conservation Science", Aristotle University of Thessaloniki, Greece, 19-31/7/2009 (3 credits).
- 2) "I Scuola nazionale di chimica dell'Ambiente e dei Beni Culturali. Ambiente e Beni Culturali: sinergie per una nuova professionalità nel campo chimico", Torino, 21-25/9/2009 (2 credits).
- 3) "Structural behaviour and failure mechanisms of easel paintings", Venaria Reale (TO), 24-26/2/2010 (1.5 credits).
- 4) "Materiali, tecniche e diagnostica nei Beni Culturali", Genova, 29-30/4/2010 (1 credit).
- 5) "Training on Spectroscopic Techniques (Invasive and non invasive) for Cultural Heritage", Ravenna, 27-29/6/2010 (1.5 credits).
- 6) "Fourth Residential Summer School on Conservation Science", Teruel, Spain, 19-30/7/2010 (3 credits).
- 7) "1<sup>st</sup> Thematic School on Metallic Materials for Cultural Heritage", 2-8/9/2011, Genova (2 credits).

### ***Seminars Given (2 credits)***

The student presented 3 seminars as final test for the 3 attended courses given by internal lecturers (see above).

### ***Seminars Attended (2 credits)***

- 1) 6/2/2009, Dept. of Physics, "L'energia del futuro", Prof. Carlo Rubbia, CERN, Ginevra.
- 2) 3/3/2009, Dept. of Chemistry and Industrial Chemistry, "Ipotesi chimica sull'origine della vita: dal Big Bang alla comparsa dei primi organismi viventi", Prof. Piero Ugliengo, Università di Torino.
- 3) 18/12/2009, Faculty of Literature and Philosophy, "Culture figurative e confronto tra fiandre e italia dal XV al XVII secolo", Prof. G. Bonsanti, Università di Firenze.
- 4) 16/2/2010, Dept. of Physics, "Inquinamento atmosferico, cambiamenti climatici e fisica nucleare", Prof. Paolo Prati, INFN, Genova.
- 5) 17/2/2010, Dept. of Chemistry and Industrial Chemistry, "Chimica e Colore", Prof. Paolo Piaggio, Università di Genova.
- 6) 23/2/2010, Faculty of Architecture, "Il ruolo del controllo chimico nell'intervento di restauro", Dr. Marco Nicola, Nicola Restauri (AT) (4 ore).
- 7) 9/3/2010, Faculty of Architecture, "Degradazione e interventi sui metalli", Dr. Paolo Piccardo, Università di Genova. (4 ore)
- 8) 16/3/2010, Dept. of Physics, "I numeri della musica. I rapporti tra musica, matematica e fisica da Pitagora ai tempi moderni, Proff. R. Musenich e G. Dillon, Università di Genova.
- 9) 23/4/2010, Dept. of Territory and its Resources, "Mappatura degli edifici di rilevanza storico-artistica", Prof. Marco Lezzerini, Dipartimento di Scienze della Terra, Università di Pisa.
- 10) 18/5/2010, Dept. of Chemistry and Industrial Chemistry, "Sports materials", Dr. Andy Watson, Institute for Materials Research, University of Leeds (UK).
- 11) 21/6/2010, Dept. of Chemistry and Industrial Chemistry, "Materiali per l'energia: risultati recenti su bulk ceramici termoelettrici e film superconduttori a base di Fe", Dr. Paolo Mele, Department of Materials Science and Engineering, Kyushu Institute of Technology.
- 12) 12/10/2010, Dept. of Chemistry and Industrial Chemistry, "Organic Synthesis "on water"", Valentina Cerulli
- 13) 12/10/2010, Dept. of Chemistry and Industrial Chemistry, "Self-assembly and crystallization in block copolymers", Dario Cavallo
- 14) 29/3/2011, Dept. of Chemistry and Industrial Chemistry, "La spettroscopia Raman nelle indagini sui beni culturali: stato dell'arte e sviluppi", Emilio Mario Castellucci, Dipartimento di Chimica "Ugo Schiff" e Laboratorio Europeo di Spettroscopia non Lineari (LENS), Università di Firenze.
- 15) 26/05/2011, Dept. of Chemistry and Industrial Chemistry, "Approcci analitici innovativi per caratterizzare i materiali organici in dipinti", Maria Perla Colombini, Università di Pisa.
- 16) 22/6/2011, Dept. of Chemistry and Industrial Chemistry, "Identification and characterization of unknown compounds in urine of neuroblastoma patients", Carlo Scapolla, Università di Genova.
- 17) 20/10/11, Dept. of Chemistry and Industrial Chemistry, "Formation of hybrid compounds of interest in cultural heritage monitored by neutron scattering", Claudia Mondelli, Institut Langevin, Grenoble, France.
- 18) 26/10/2011, Dept. of Chemistry and Industrial Chemistry, "Catalysis by hydrotalcites and related materials", Wishwanath Kalyani.

### ***Teaching Assistance***



UNIVERSITÀ DEGLI STUDI DI GENOVA  
*DOCTORATE SCHOOL IN  
SCIENCES AND TECHNOLOGIES OF  
CHEMISTRY AND MATERIALS*



*(HOLDING THE ECTN CHEMISTRY DOCTORATE EUROLABEL®)*

PH.D. CERTIFICATE OF  
**VISHWANATH KALYANI**



**Doctorate Course:**  
*Chemical Sciences and Technologies*  
**Start of the Doctorate Program:**  
*January 1<sup>st</sup>, 2009*  
**End of the Doctorate Program:**  
*December 31<sup>st</sup>, 2011*  
**Advisor:**  
*Prof. Paolo Nanni*  
**Thesis Title:**  
*Soft-chemical hydrothermal synthesis  
of Perovskite nanostructures*  
**Defense Date:**  
*February 9<sup>th</sup>, 2012*

On February 9<sup>th</sup>, 2012, at the Department of Chemistry and Industrial Chemistry, Vishwanath Kalyani has orally presented his doctorate research work in front of the Commission, formed by

- Prof. Paolo Ferloni, University of Pavia
- Prof. Ornella Abollino, University of Torino
- Prof. Gabriele Cacciamani, University of Genova

The written Dissertation had been previously sent to the Commission members. After careful examination of the Dissertation, of the student's oral presentation, of the overall activity of the student during the three years of doctorate studies, the Commission

**HAS APPROVED THE THESIS OF VISHWANATH KALYANI,  
CONFERRING ON HIM THE TITLE OF**

**RESEARCH DOCTOR IN  
CHEMICAL SCIENCES AND TECHNOLOGIES**

Genova, February 9<sup>th</sup>, 2012

The Director of the Doctorate School  
(Prof. Luca Banfi)

The Coordinator of the Doctorate Course  
(Prof. Luca Banfi)

# ACTIVITY REPORT

## *Research Activity*

The research activity was mainly carried out at the IENI Institute of of the National Research Council, Genova. However, Vishwanath Kalyani **has also spent a research period of 4 months abroad**, at the Department of Metallurgical Engineering and Materials Science of the Indian Institute of Technology Bombay, India, from 1/5/2011 to 31/08/2011.

## *Scientific Publications*

Original publications on ISI Journals:

- 1) Buscaglia, M. T.; Sennour, M.; Buscaglia, V.; Bottino, C.; Kalyani, V.; Nanni, P., Formation of  $\text{Bi}_4\text{Ti}_3\text{O}_{12}$  One-Dimensional Structures by Solid-State Reactive Diffusion. From Core-Shell Templates to Nanorods and Nanotubes, *Crystal Growth & Design*, **2011**, 11, 1394-1401. IMPACT FACTOR (2010): 4.390.

## *Communications at Conferences*

Oral communications:

- 1) Kalyani, V.; Buscaglia, V.; Nanni, P., "Single- and multiphase ferroics and multiferroics with restricted geometries", (SIMUFER), Diepenbeek (Belgium), March 2011.
- 2) Kalyani, V.; Buscaglia, V.; Nanni, P., "Synthesis of Perovskite Nanostructure via Simple Hydrothermal Process, Processing and Application of Ceramics", The Ninth Students Meeting and ESR workshop, 16-18/11/2011, Novi Sad (Serbia).

## *Congresses Attended*

- 1) "Single- and multiphase ferroics and multiferroics with restricted geometries (SIMUFER)", Diepenbeek (Belgium), March 2011.
- 2) "Processing and Application of Ceramics, The Ninth Students Meeting and ESR workshop", 16-18/11/2011, Novi Sad (Serbia).

## *Courseware*

During his doctorate, Vishwanath Kalyani has acquired 18.0 credits of Courseware.

## *Courses attended and passed (13 credits)*

*Courses Given by Teachers of the University of Genova:*

- 1) Vibrational spectroscopy (2 credits) (2009)
- 2) Fundamentals of scanning and transmission electronic microscopy (3 credits) (2010).
- 3) Surface Science (3 credits) (2010).

*Courses Given by invited experts:*

- 1) Magnetic Structure (Peter Rogl, Vienna University) (2009) (1 credit).
- 2) Ionic Liquids (C. Chiappe, Pisa University), (2009) (1 credit).
- 3) Clathrates: Formation, Crystal Chemistry, Phase Relations and Properties (Peter Rogl, Vienna University) (2010) (1 credit).
- 4) Approaches to Synthesis and Characterization of Metal Oxide Magnetic Nanomaterials (Lorenza Suber, C.N.R., Roma) (2010) (1 credit).
- 5) The application of transition metal catalysis in multicomponent and domino reactions (Thomas Müller, Düsseldorf University, Germany) (2011) (1 credit).

## *National and International Schools or Workshops (1.5 credits)*

- 1) 3<sup>rd</sup> National Workshop "Materiali funzionali per l'industria elettrica ed elettronica" Genova, 14-16/7/2009 (1.5 credits)

## *Seminars Given (2 credits)*

- 1) 26/11/2011, Dept. of Chemistry and Industrial Chemistry, "Catalysis by Hydrotalcites and Related Materials."

## *Seminars Attended (1.5 credits)*

- 1) 25/3/2009, IENI-CNR, "Experimental methods for investigations of thermophysical and structure-sensitive properties of metallic melts", Dr. Yuriy Plevachuk, Ivan Franko National University, Department of Metal Physics, Lviv, Ukraine.
- 2) 12/5/2009, IENI-CNR, "Oxygen Partial pressure effect on surface tension of metallic melt", P. Hibiya (Japan)
- 3) 14/5/2009, IENI-CNR "Impedance Spectroscopy and Fuel Cells", Prof. Zdravko Stoyanov, Bulgarian Academy of Sciences, Sofia.
- 4) 15/10/2009, IENI-CNR, "On Fuel cell energy", Dr. Song (Korea)

- 5) 11/10/2009, IENI-CNR, "Magnetolectric and Multiferroic oxide", Vincenzo Buscaglia.
- 6) 25/11/2009, IENI-CNR, "The European COST ACTION 531 & MP00602 on lead free replacement solder material", Andy Watson, University of Leeds (UK)
- 7) 18/5/2010, Dept. of Physics, "Comprendere un catalizzatore eterogeneo tramite misure di diffrazione di raggi-x in situ", Roberto Felici, European Synchrotron Radiation Facility, Grenoble, France.
- 8) 6/10/2010, Dept. of Chemistry and Industrial Chemistry, "Clusters in composti intermetallici", Monika Skrobanska.
- 9) 6/10/2010, Dept. of Chemistry and Industrial Chemistry, "Molecular Modeling in Drug Design: Ligand-based drug design and Structure-based drug design", Paola Zito.
- 10) 12/10/2010, Dept. of Chemistry and Industrial Chemistry, "Organic Synthesis "on water"", Valentina Cerulli
- 11) 12/10/2010, Dept. of Chemistry and Industrial Chemistry, "Self-assembly and crystallization in block copolymers", Dario Cavallo
- 12) 12/10/2010, Dept. of Chemistry and Industrial Chemistry, "Splitting fotocatalitico dell'acqua", Alessio Rindi
- 13) 10/11/2010, IENI-CNR, Studies of ceramics surface & interface using lithography based model experiment. By prof. Glaeser , University of California, Berkley.
- 14) 26/9/2011, IENI-CNR, "Role of interfaces in the search of materials for radiation and mechanical extremes", Jose Alfredo Caro (USA).

### *Teaching Assistance*





UNIVERSITÀ DEGLI STUDI DI GENOVA  
*DOCTORATE SCHOOL IN  
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CHEMISTRY AND MATERIALS*



***(HOLDING THE ECTN CHEMISTRY DOCTORATE EUROLABEL®)***

PH.D. CERTIFICATE OF  
**ANNA PAOLA LANTERI**



**Doctorate Course:**

*Pharmaceutical, Food and Cosmetic Sciences*

**Start of the Doctorate Program:**

*January 1<sup>st</sup>, 2009*

**End of the Doctorate Program:**

*December 31<sup>st</sup>, 2011*

**Advisors:**

*Prof. Giovanni Romussi*

*Dr. Giovanni Minuto*

**Thesis Title:**

*Secondary bioactive metabolites with  
phytoiatric activity*

*from Salvia L. species*

**Defense Date:**

*February 9<sup>th</sup>, 2012*

On February 9<sup>th</sup>, 2012, at the Department of Pharmacy, Anna Paola Lanteri has orally presented her doctorate research work in front of the Commission, formed by

- Prof. Daniela Barlocco, First University of Milano
- Prof. Paolo Colombo, University of Parma
- Prof. Alessandro Balbi, University of Genova

The written Dissertation had been previously sent to the Commission members. After careful examination of the Dissertation, of the student's oral presentation, of the overall activity of the student during the three years of doctorate studies, the Commission

**HAS APPROVED THE THESIS OF ANNA PAOLA LANTERI,  
CONFERRING ON HER THE TITLE OF**

**RESEARCH DOCTOR IN  
PHARMACEUTICAL, FOOD AND COSMETIC SCIENCES**

Genova, February 9<sup>th</sup>, 2012

The Director of the Doctorate School  
(Prof. Luca Banfi)

The Coordinator of the Doctorate Course  
(Prof. Alessandro Balbi)

# ACTIVITY REPORT

## *Research Activity*

The research activity was mainly carried out at the Department of Chemistry and Pharmaceutical and Food Technologies (now Department of Pharmacy) (University of Genova). However, Anna Paola Lanteri has also **spent a 5 months period abroad**, at the Department of Plant Microbe Interactions, University of Utrecht (NL), (10/10/2010-28/02/2011). Moreover, in 2009, she often went to Research Centre "Sperimentazione e Assistenza Agricola" in Albenga (Savona) in order to carry out special measurements.

## *Scientific Publications*

Original publications on ISI Journals:

- 1) Bisio, A.; Fraternali, D.; Damonte, G.; Millo, E.; Lanteri, A. P.; Russo, E.; Romussi, G.; Parodi, B.; Ricci, D.; De Tommasi, N., Phytotoxic Activity of *Salvia x jamensis*, *Natural Product Communications*, **2009**, 4, 1621-1630. IMPACT FACTOR (2010): 0.894.

## *Communications at Conferences*

Posters:

- 1) Minuto, G.; Minuto, A.; Lanteri, A.P.; Masia, S.; Bruzzone, C.; Bisio, A.; Cafaggi, S.; Russo, E.; Romussi, G., "Estrazione, saggi in vitro e saggi in vivo di sostanze naturali a partire da specie del genere *Salvia*", Giornate Fitopatologiche 2010, Cervia (RA), 9-12/3/2010.

## *Congresses Attended*

- 1) "Giornate fitopatologiche 2010", 9-12/3/2010, Cervia.

## *Courseware*

During her doctorate, Anna Paola Lanteri has acquired 21.0 credits of Courseware.

## *Courses attended and passed (14 credits)*

*Courses Given by Teachers of the University of Genova:*

- 1) In vitro tests for evaluation of toxicity and biological action of chemical compounds (2009) (2 credits).
- 2) New topics about food composition and analysis (2009) (2 credits).
- 3) Bioinformatics (2009) (3 credits).
- 4) Chemometric strategies and algorithms and their applications (2009) (3 credits).
- 5) Databases classification: bibliographic, chemical substances, chemical reactions, numeric patents (2010) (2 credits).

*Courses Given by invited experts:*

- 1) An introduction to the basic of research and innovation in industry (Claudio Boffito, Saes Getter) (2011) (1 credit).
- 2) Nucleic acids in medicinal chemistry: targets or drugs? (Claudia Sissi, Università di Padova) (2011) (1 credit).

## *National and International Schools or Workshops (3.0 credits)*

- 1) Scuola nazionale della Società Italiana di Fitochimica, Alghero (SS), 2-4/10/2009 (1.5 credits).
- 2) Scuola nazionale della Società Italiana di Fitochimica, Tirrenia (PI), 30/09-2/10/2010 (1.5 credits).

## *Seminars Given (2 credits)*

- 1) 2/12/2011, Dept. of Pharmaceutical Sciences, "Fungicidi chimici usati in agricoltura: impatto sociale, patogeni target ed evoluzione".

## *Seminars Attended (2 credits)*

- 1) 27/2/2009, Dept. of Pharmaceutical Sciences, "Chiral chromatography : a mature technology, a scientific challenge", Prof. Christian Roussel, Marseille, France.
- 2) 27/2/2009, Dept. of Pharmaceutical Sciences, "Chemistry derived from N-(o-amino-phenyl) thiazoline-2-thione", Federico Andreoli, Marseille, France.
- 3) 3/4/2009, Dept. of Chemistry and Pharmaceutical and Food Technologies, "La nutrizione parenterale", Dott.ssa Attilia Grassi e Dott.ssa Sabrina Beltrami.
- 4) 24/4/2009, Dept. of Chemistry and Pharmaceutical and Food Technologies, "I farmaci oncologici e le norme di buona preparazione", Dott.ssa Barbara Rebesco e Dott.ssa Federica Mina.
- 5) 17/05/2011, Dept. of Chemistry and Pharmaceutical and Food Technologies, "Sensory analysis of food samples: interpreting results", Prof. Tormod Naes
- 6) 21/10/2011, Dept. of Chemistry and Industrial Chemistry, "From interesting to useful: the contribution of porous solids to the society", Gérard Férey, Université de Versailles, France.
- 7) 25/10/2011, Palazzo Tursi, "Fitoterapia: dall'unità d'Italia ad oggi, verso il domani" Prof. Roberto Della Loggia

- 8) 25/10/2011, Palazzo Tursi, "Fitoderivati, bersagli biomolecolari e utilizzo in terapia" Prof.ssa Nunziatina De Tommasi
- 9) 21/11/2011, Dept. of Physics, "Synthesis of metal nanoparticles at the surface and embedded in polymeric matrix by ion beam irradiation", Prof. Jai Prakash
- 10) 22/11/2011, Dept. of Chemistry and Industrial Chemistry, "Synthesis as an enabling Science: from Concept to Practice", Stephen Hanessian, Université de Montreal and Irvine University.
- 11) 25/11/2011, Dept. of Chemistry and Industrial Chemistry, "Materiali per lo stoccaggio dell'idrogeno in stato solido: recenti risultati e possibili sviluppi", Giovanni Principi, Università di Padova.
- 12) 26/11/2011, Dept. of Chemistry and Industrial Chemistry, "Catalysis by Hydrotalcites and Related Materials.", W. Kalyani
- 13) 26/11/2011, Dept. of Chemistry and Industrial Chemistry, "Sviluppo di materiali per l'impiego in impianti a vapore SuperCritici e UltraSuperCritici", E. Barbareschi,
- 14) 2/12/2011, Dept. of Pharmaceutical Sciences, "Blood brain barrier", P. Cirrincione.
- 15) 2/12/2011, Dept. of Pharmaceutical Sciences, "Click chemistry, an interesting tool in pharmaceutical sciences", F. Musumeci.
- 16)) 2/12/2011, Dept. of Pharmaceutical Sciences, "Processi di estrazione assistiti da microonde", G. Priarone
- 17) 2/12/2011, Dept. of Pharmaceutical Sciences, "Rare diseases and orphan drugs", C. Rotolo.

### ***Teaching Assistance***

Anna Paola Lanteri has assisted the courses of: "Drug Analysis I" (Master Degree in Chemistry and Pharmaceutical Technologies)(2009/2010)(42 hours); "Drug Analysis" (Master Degree in Pharmacy)(2009/2010)(18 hours); "Drug Analysis" (Master Degree in Pharmacy)(2010/2011)(30 hours); "Analytical Chemistry" (Master Degree in Chemistry and Pharmaceutical Technologies)(2010/2011)(30 hours).



UNIVERSITÀ DEGLI STUDI DI GENOVA  
*DOCTORATE SCHOOL IN  
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CHEMISTRY AND MATERIALS*



**(HOLDING THE ECTN CHEMISTRY DOCTORATE EUROLABEL®)**

PH.D. CERTIFICATE OF  
**FRANCESCA MUSUMECI**



**Doctorate Course:**

*Pharmaceutical, Food and Cosmetic Sciences*

**Start of the Doctorate Program:**

*January 1<sup>st</sup>, 2009*

**End of the Doctorate Program:**

*December 31<sup>st</sup>, 2011*

**Advisor:**

*Prof. Silvia Schenone*

**Thesis Title:**

*Synthesis of heterocyclic compounds as  
protein kinase inhibitors*

**Defense Date:**

*February 9<sup>th</sup>, 2012*

On February 9<sup>th</sup>, 2012, at the Department of Pharmacy, Francesca Musumeci has orally presented her doctorate research work in front of the Commission, formed by

- Prof. Daniela Barlocco, First University of Milano
- Prof. Paolo Colombo, University of Parma
- Prof. Alessandro Balbi, University of Genova

The written Dissertation had been previously sent to the Commission members. After careful examination of the Dissertation, of the student's oral presentation, of the overall activity of the student during the three years of doctorate studies, the Commission

**HAS APPROVED THE THESIS OF FRANCESCA MUSUMECI,  
CONFERRING ON HER THE TITLE OF**

**RESEARCH DOCTOR IN  
PHARMACEUTICAL, FOOD AND COSMETIC SCIENCES**

The commission has evaluated the thesis and the overall activity of Dr. Francesca Musumeci as  
**EXCELLENT**

Genova, February 9<sup>th</sup>, 2012

The Director of the Doctorate School  
(Prof. Luca Banfi)

The Coordinator of the Doctorate Course  
(Prof. Alessandro Balbi)

# ACTIVITY REPORT

## *Research Activity*

The research activity was mainly carried out at the Department of Pharmaceutical Sciences (now Department of Pharmacy) (University of Genova). However, Francesca Musumeci has also **spent a 3 months period abroad**, in the research group of Prof. Murphy, at the National University of Ireland, Galway (Ireland), (01/06/2011-31/08/2011). Moreover, she has also spent two short periods in the Dipartimento Farmaco Chimico Tecnologico of Siena University 11-15/1/2010 and 18-26/2/2010).

## *Scientific Publications*

Original publications on ISI Journals:

- 1) Schenone, S.; Brullo, C.; Musumeci, F.; Bruno, O.; Botta, M., A(1) Receptors Ligands: Past, Present and Future Trends, **2010**, *Current Topics in Medicinal Chemistry*, 10, 878-901. IMPACT FACTOR (2010): 4.112.
- 2) Schenone, S.; Brullo, C.; Musumeci, F.; Botta, M., Novel dual Src/Abl inhibitors for hematologic and solid malignancies, **2010**, *Expert Opinion on Investigational Drugs*, 19, 931-945. IMPACT FACTOR (2010): 4.337.
- 3) Radi, M.; Brullo, C.; Crespan, E.; Tintori, C.; Musumeci, F.; Biava, M.; Schenone, S.; Dreassi, E.; Zamperini, C.; Maga, G.; Pagano, D.; Angelucci, A.; Bologna, M.; Botta, M., Identification of potent c-Src inhibitors strongly affecting the proliferation of human neuroblastoma cells, *Bioorganic & Medicinal Chemistry Letters*, **2011**, 21, 5928-5933. IMPACT FACTOR (2010): 2.661.
- 4) Radi, M.; Dreassi, E.; Brullo, C.; Crespan, E.; Tintori, C.; Bernardo, V.; Valoti, M.; Zamperini, C.; Daigl, H.; Musumeci, F.; Carraro, F.; Naldini, A.; Filippi, I.; Maga, G.; Schenone, S.; Botta, M., Design, Synthesis, Biological Activity, and ADME Properties of Pyrazolo[3,4-d]pyrimidines Active in Hypoxic Human Leukemia Cells: A Lead Optimization Study, *Journal of Medicinal Chemistry*, **2011**, 54, 2610-2626. IMPACT FACTOR (2010): 5.207.
- 5) Riva, R.; Banfi, L.; Castaldi, G.; Ghislieri, D.; Malpezzi, L.; Musumeci, F.; Tufaro, R.; Rasparini, M., Selective Chemical Oxidation of Risperidone: A Straightforward and Cost-Effective Synthesis of Paliperidone, *European Journal of Organic Chemistry*, **2011**, 2319-2325. IMPACT FACTOR (2010): 3.206.
- 6) Schenone, S.; Brullo, C.; Musumeci, F.; Biava, M.; Falchi, F.; Botta, M., Fyn Kinase in Brain Diseases and Cancer: The Search for Inhibitors, *Current Medicinal Chemistry*, **2011**, 18, 2921-2942. IMPACT FACTOR (2010): 4.630.
- 7) Schenone, S.; Brullo, C.; Musumeci, F.; Radi, M.; Botta, M., ATP-Competitive Inhibitors of mTOR: An Update, *Current Medicinal Chemistry*, **2011**, 18, 2995-3014. IMPACT FACTOR (2010): 4.630.
- 8) Tuccinardi, T.; Zizzari, A. T.; Brullo, C.; Daniele, S.; Musumeci, F.; Schenone, S.; Trincavelli, M. L.; Martini, C.; Martinelli, A.; Giorgi, G.; Botta, M., Substituted pyrazolo[3,4-b]pyridines as human A(1) adenosine antagonists: Developments in understanding the receptor stereoselectivity, *Organic & Biomolecular Chemistry*, **2011**, 9, 4448-4455. IMPACT FACTOR (2010): 3.451.
- 9) Schenone, S.; Brullo, C.; Musumeci, F.; Radi, M.; Castagnolo, D., Src Kinase Inhibitors: An Update on Patented Compounds, *Curr. Med. Chem.*, **2011**, 18, 5061-5078. IMPACT FACTOR (2010): 4.630.

## *Communications at Conferences*

Oral communications:

- 1) Musumeci, F.; Schenone, S.; Brullo, C.; Radi, M.; Botta, M., "Synthesis of new pyrazolo[3,4-d]pyrimidine derivatives as dual Src/Abl inhibitors", III EWDSy, Certosa di Pontignano (Siena), 23-27/05/2010
- 2) Musumeci, F., "One-pot synthesis of indolyl- pyrrolones as Pim1 inhibitors", SAYCS, Pesaro, 17-19/10/2011.

Posters:

- 3) Musumeci, F.; Schenone, S.; Brullo, C.; Bruno, O.; Botta, M., "Synthesis of new pyrazolo[3,4-d]pyrimidines 6-alkyl substituted Bcr-Abl tyrosine kinase inhibitors", Giornate italo-francesi di chimica, Genova 26-27/04/10.

## *Congresses Attended*

- 1) Giornate italo-francesi di chimica, Genova 26-27/04/10
- 2) "Focus sul rischio da farmaci: promuovere la sicurezza in ambito ospedaliero e territoriale", Genova, 15/6/2010.
- 3) SAYCS, Pesaro, 17-19/10/2011.

## *Courseware*

During her doctorate, Francesca Musumeci has acquired 32.5 credits of Courseware.

## *Courses attended and passed (17 credits)*

*Courses Given by Teachers of the University of Genova:*

- 1) Bioorganic chemistry (2 credits) (2009).
- 2) NMR spectroscopy in the characterization of synthetic polymers (2 credits) (2009).
- 3) Microwave technology applied to chemical processes (2 credits) (2009).
- 4) Databases classification: bibliographic, chemical substances, chemical reactions, numeric patents (2 credits) (2010)
- 5) Pharmaceutical biotechnologies (3 credits) (2010).

*Courses Given by invited experts:*

- 1) Radiodrugs in anti-cancer therapy: preparation and pharmacokinetics (Marco Chinol, Ist. Europeo di Oncologia) (2009) (1 credit).
- 2) Development of dyes in the cosmetic industry: the L'Oreal case (Cristina Emmanuel, L'Oreal) (2009) (1 credit).
- 3) Fragment-based drug design (Eduard Felder, Nerviano Medical Sciences) (2009) (1 credit).
- 4) Synthesis, formulation and marketing of generic drugs (Graziano Castaldi, Chemelectiva, Novara) (2010) (1 credit).
- 5) Polymer Assisted Solution Phase Combinatorial Synthesis (Luca Raveglia, NiKem Research) (2010) (1 credit).
- 6) The application of transition metal catalysis in multicomponent and domino reactions (Thomas Müller, Düsseldorf University, Germany) (2011) (1 credit).

***National and International Schools or Workshops (11.0 credits)***

- 1) ESMEC, European School of Medicinal Chemistry, Urbino, 13-18/9/2009 (2 credits).
- 2) IX laboratorio di metodologie sintetiche in chimica farmaceutica, Siena, 14-18/2/2010 (2 credits).
- 3) III European Workshop in Drug Synthesis, Certosa di Pontignano (Siena), 23-27/5/2010 (2 credits).
- 4) Il settore cosmetico: un'opportunità di lavoro per laureati in discipline scientifiche, Dept. of Pharmaceutical Sciences, 11/6/2010 (0,5 credits).
- 5) ESMEC-European School of Medicinal Chemistry, Urbino, 4-9/7/2010 (2 credits).
- 6) Giornata scientifica in onore del Prof. Fabio Sparatore, Genova, 22/10/2010 (0,25 credits).
- 7) Presentazione di SCOPUS, CSB di Ingegneria, 13/10/2010 (0.25 credits).
- 8) X Laboratorio di Metodologie Sintetiche in Chimica Farmaceutica, Siena, 13-17/2/2011 (2 credits).

***Seminars Given (2 credits)***

- 1) 2/12/2011, Dept. of Pharmaceutical Sciences, "Click chemistry, an interesting tool in pharmaceutical sciences".

***Seminars Attended (2.5 credits)***

- 1) 27/2/2009, Dept. of Pharmaceutical Sciences, "Chiral chromatography : a mature technology, a scientific challenge", Prof. Christian Roussel, Marseille, France.
- 2) 27/2/2009, Dept. of Pharmaceutical Sciences, "Chemistry derived from N-(o-amino-phenyl) thiazoline-2-thione", Federico Andreoli, Marseille, France.
- 3) 3/4/2009, Dept. of Chemistry and Pharmaceutical and Food Technologies, "La nutrizione parenterale", Dott.ssa Attilia Grassi e Dott.ssa Sabrina Beltrami.
- 4) 15/5/2009, Dept. of Pharmaceutical Sciences, "Farmaci recentemente approvati: uno sguardo critico al passato e un trend per il futuro, Dr. Paolo Pevarello, Preclinical Research Director, Newron Pharmaceuticals S.p.A.
- 5) 6/11/2009, Faculty of Medicine, "Targeting beta-amyloid in Alzheimer's Disease: chemical, biochemical and modeling studies", A. Carotti, Università di Bari
- 6) 20/11/2009, Dept. of Chemistry and Industrial Chemistry "Materials for solar energy", L. Francis.
- 7) 20/11/2009, Dept. of Chemistry and Industrial Chemistry, "Role of dendrimers in Drug Delivery", A. Ullah.
- 8) 20/11/2009, Dept. of Chemistry and Industrial Chemistry, "Polimeri per uso nel fotovoltaico", E. Casazza.
- 9) 12/2/2010, Dept. of Internal Medicine, "Nuovi approcci terapeutici nel trattamento della neurodegenerazione", Prof. P. Costantino, Istituto Scientifico San Raffaele, Milano.
- 10) 14/5/2010, Dept. of Pharmaceutical Sciences, "Radicali liberi e antiossidanti. Il ruolo del farmacista nella prevenzione delle malattie del nostro tempo", Eugenio IORIO, Presidente dell'Osservatorio Internazionale dello Stress Ossidativo.
- 11) 16/7/2010, Dept. of Chemistry and Industrial Chemistry, "Formation of Multiple Stereocenters via Organocatalysis", Dr. Marco Bella, Dip. Chimica, Università "La Sapienza" Roma
- 12) 17/9/2010, Dept. of Chemistry and Industrial Chemistry, "Activated Peptides: for Ligation and Large Cyclic Transition States", Prof. A.R. Katritsky, University of Florida, Gainesville.
- 13) 6/10/2010, Dept. of Chemistry and Industrial Chemistry, "Molecular Modeling in Drug Design: Ligand-based drug design and Structure-based drug design", Paola Zito.
- 14) 12/10/2010, Dept. of Chemistry and Industrial Chemistry, "Organic Synthesis "on water"", Valentina Cerulli
- 15) 21/10/2010, Faculty of Medicine, " Ligandi multisito e multitarget quali potenziali agenti terapeutici nelle malattie neurodegenerative", Angelo Carotti, Università di Bari.
- 16) 26/10/2010, Dept. of Chemistry and Industrial Chemistry, "La combinazione della catalisi di metalli di transizione e organocatalisi", Anna Piatek.
- 17) 26/10/2010, Dept. of Chemistry and Industrial Chemistry, "Diversity oriented synthesis of heterocyclic compounds exploiting isocyanides and alkynes in multicomponent reactions", Fabio De Moliner.
- 18) 22/11/2010, Dept. of Pharmaceutical Sciences, "Combinatorial Chemistry", Laura Buffa.
- 19) 22/11/2010, Dept. of Pharmaceutical Sciences, "Le Micotossine nelle colture e nei prodotti alimentari", Silvia Mannino.
- 20) 22/11/2010, Dept. of Pharmaceutical Sciences, "Molecular Dynamics Simulation: an updated overview on Prion Protein ", Gerolamo Vettoretti.
- 21) 20/5/2011, Dept. of Pharmaceutical Sciences, "Le proteine Stat come potenziali target per nuovi antitumorali, D. Barlocco.

- 22) 22/11/2011, Dept. of Chemistry and Industrial Chemistry, "Synthesis as an enabling Science: from Concept to Practice", Stephen Hanessian, Université de Montreal and Irvine University.
- 23) 2/12/2011, Dept. of Pharmaceutical Sciences, "Blood brain barrier", P. Cirrincione.
- 24) 2/12/2011, Dept. of Pharmaceutical Sciences, "Fungicidi chimici usati in agricoltura: impatto sociale, patogeni target ed evoluzione", A.P. Lanteri.
- 25) 2/12/2011, Dept. of Pharmaceutical Sciences, "Processi di estrazione assistiti da microonde", G. Priarone
- 26) 2/12/2011, Dept. of Pharmaceutical Sciences, "Rare diseases and orphan drugs", C. Rotolo.

### ***Teaching Assistance***

Francesca Musumeci has assisted the courses of: "Drug Analysis II" (Master Degree in Chemistry and Pharmaceutical Technologies)(2008/2009)(60 hours); "Drug Analysis II" (Master Degree in Chemistry and Pharmaceutical Technologies)(2009/2010)(60 hours); "Drug Analysis II" (Master Degree in Chemistry and Pharmaceutical Technologies)(2010/2011)(60 hours). Moreover, Francesca Musumeci has been a teaching tutor for the courses of "Pharmaceutical and Toxicological Chemistry" (2008/2009)(40 hours), "Pharmaceutical and Toxicological Chemistry" (2009/2010)(37 hours) and "General and Inorganic Chemistry" (2010/2011)(40 hours).



UNIVERSITÀ DEGLI STUDI DI GENOVA  
*DOCTORATE SCHOOL IN  
SCIENCES AND TECHNOLOGIES OF  
CHEMISTRY AND MATERIALS*



*(HOLDING THE ECTN CHEMISTRY DOCTORATE EUROLABEL®)*

PH.D. CERTIFICATE *OF*  
**KIEU THI NGOC NGUYEN**



**Doctorate Course:**

*Chemical Sciences and Technologies*

**Start of the Doctorate Program:**

*January 1<sup>st</sup>, 2009*

**End of the Doctorate Program:**

*December 31<sup>st</sup>, 2011*

**Advisor:**

*Prof. Emanuele Magi*

**Thesis Title:**

*Hyphenated Techniques for the Study of endocrine  
disrupting UV filters in water samples*

**Defense Date:**

*February 9<sup>th</sup>, 2012*

On February 9<sup>th</sup>, 2012, at the Department of Chemistry and Industrial Chemistry, Kieu Thi Ngoc Nguyen has orally presented her doctorate research work in front of the Commission, formed by

- Prof. Paolo Ferloni, University of Pavia
- Prof. Ornella Abollino, University of Torino
- Prof. Gabriele Cacciamani, University of Genova

The written Dissertation had been previously sent to the Commission members. After careful examination of the Dissertation, of the student's oral presentation, of the overall activity of the student during the three years of doctorate studies, the Commission

**HAS APPROVED THE THESIS OF KIEU THI NGOC NGUYEN,  
CONFERRING ON HER THE TITLE OF**

**RESEARCH DOCTOR IN  
CHEMICAL SCIENCES AND TECHNOLOGIES**

Genova, February 9<sup>th</sup>, 2012

The Director of the Doctorate School  
(Prof. Luca Banfi)

The Coordinator of the Doctorate Course  
(Prof. Luca Banfi)



# ACTIVITY REPORT

## *Research Activity*

The research activity was entirely carried out at the Department of Chemistry and Industrial Chemistry (University of Genova).

### **Scientific Publications**

Original publications on ISI Journals:

- 1) Nguyen, K. T. N.; Scapolla, C.; Di Carro, M.; Magi, E., Rapid and selective determination of UV filters in seawater by liquid chromatography-tandem mass spectrometry combined with stir bar sorptive extraction, *Talanta*, **2011**, 85, 2375-2384. IMPACT FACTOR (2010): 3.722.
- 2) Magi, E.; Di Carro, M.; Scapolla, C.; Nguyen, K. T. N., Stir Bar Sorptive Extraction and LC-MS/MS for Trace Analysis of UV Filters in different Water Matrices, **2012**, *Chromatographia*, in press (accepted on January 31, 2012). IMPACT FACTOR (2010): 1.075.

### **Communications at Conferences**

Posters:

- 1) Nguyen, K.T.N.; Magi, E.; Scapolla, C.; Di Carro, M., Determination of UV filters in Water Samples by Stir Bar Sorptive Extraction followed by HPLC-DAD and Tandem Mass Spectrometry, *16<sup>th</sup> International Symposium on Separation Sciences (ISSS)*, Roma, 6-10/9/2010. Awarded as best poster.
- 2) "Development of a Stir Bar Sorptive Extraction and Liquid Chromatography-Tandem Mass Spectrometry method for Trace Analysis of UV Filters", Nguyen, K.T.N.; Scapolla, C.; Di Carro, M.; Magi, E., *17<sup>th</sup> International Symposium on Separation Sciences*, Cluji-Napoca, Romania, 5-9/9/2011.

### **Congresses Attended**

- 1) "Spettrometria di Massa in Liguria", Genova, 1/12/2009.
- 2) "16<sup>th</sup> International Symposium on Separation Sciences (ISSS)", Roma, 6-10/9/2010.
- 3) "17<sup>th</sup> International Symposium on Separation Sciences", Cluji-Napoca, Romania, 5-9/9/2011.
- 4) "Convegno E.C.M "Interferenti endocrine nelle acque destinate al consumo umano: approccio metodologico e valutazioni", Genova, 30/11/2011.

## **Courseware**

During her doctorate, Kieu Thi Ngoc Nguyen has acquired 25.0 credits of Courseware.

### **Courses attended and passed (20 credits)**

*Courses Given by Teachers of the University of Genova:*

- 1) Bioorganic Chemistry (2 credits)(2009)
- 2) Chemometric strategies and algorithms and their applications (3 credits)(2009)
- 3) Experimental design (3 credits)(2010)
- 4) Instrumental techniques for trace elements determination in pharmaceuticals, food products and environmental samples (2 credits)(2010)
- 4) Mathematical methods for chemistry (2 credits)(2010)

*Courses Given by invited experts:*

- 1) Magnetic Structure (Peter Rogl)(1 credit)(2009)
- 2) Electrical Properties of Glasses (Michel Duclot)(1 credit)(2009).
- 3) Ionic liquids (Cinzia Chiappe)(1 credit)(2009).
- 4) Fragment-based drug design (Eduard Felder)(1 credit)(2009).
- 5) "Bioplastics (Antonio Casale)(1 credit)(2009)
- 6) Clathrates: Formation, Crystal Chemistry, Phase Relations and Properties (Peter Rogl)(1 credit)(2010)
- 7) Soft Tissue Mechanics (Gerrit W.M. Peters)(1 credit)(2010)
- 8) An introduction to the basic of research and innovation in industry (Claudio Boffito, Saes Getter) (1 credit) (2011).

### **National and International Schools or Workshops (1 credit)**

- 1) *Transylvania Summer School in Chromatography-second edition, TSSC 2011, "Past, Present and Future in Chromatography"*, Cluji-Napoca, Romania, 4-5/9/2011 (1 credit).

### ***Seminars Given (2 credits)***

- 1) 5/10/2011, Genova, Dept. of Chemistry and Industrial Chemistry, "Olives and Olive Oil in Health and Disease Prevention"

### ***Seminars Attended (2 credits)***

- 1) 13/3/09, Dept. of Chemistry and Industrial Chemistry, Genova, "Macromolecular engineering for nanostructured materials via Atom Transfer Radical Polymerization (ATRP)", Prof. Krzysztof Matyjaszewski, Department of Chemistry, Carnegie Mellon University, Pittsburgh, PA, USA.
- 2) 28/4/2009, Dept. of Chemistry and Industrial Chemistry, Genova, "Flussi e accumuli di energia accoppiati a trasferimenti protonici in biosistemi", Prof. A. Morelli, Università di Genova.
- 3) 3/7/2009, Dept. of Chemistry and Industrial Chemistry, Genova, "Materiali polimerici per il risparmio energetico: diodi elettroluminescenti e celle fotovoltaiche", Silvia Destri, Istituto per lo Studio delle Macromolecole (ISMAC), CNR, Milano.
- 4) 28/9/2009, Dept. of Chemistry and Industrial Chemistry, Genova, "Impact of preparative processes on bread properties and crumb texture", A. L. Ong
- 5) 28/9/2009, Dept. of Chemistry and Industrial Chemistry, Genova, "Cyclodextrins: Chemistry and their use in enzyme technology", S. Jadhav
- 6) 10/2/2010 Dept. of Chemistry and Industrial Chemistry, Genova, "Invisibility. Camouflage techniques.", Prof. Maria Gazda, Faculty of Applied Physics & Mathematics, Gdansk University of Technology, Danzig, Poland.
- 7) 16/6/2010 Dept. of Chemistry and Industrial Chemistry, Genova, "Magnetic frustration, a way to new exotic phases", Prof. Julian G. Sereni, Lab. Bajas Temperaturas, CAB - CNEA, 8400 S.C. de Bariloche, Argentina.
- 8) 6/10/2010 Dept. of Chemistry and Industrial Chemistry, Genova, "Clusters in composti intermetallici", Monika Skrobanska.
- 9) 6/10/2010 Dept. of Chemistry and Industrial Chemistry, Genova, "Molecular Modeling in Drug Design: Ligand-based drug design and Structure-based drug design", Paola Zito.
- 10) 3/12/2010 Dept. of Chemistry and Industrial Chemistry, Genova, "Magnetic properties of nanoparticles: the effect of particle size and beyond...", Davide Peddis, C.N.R., Istituto di Struttura della Materia, Roma
- 11) 17/1/2011, Dept. of Chemistry and Industrial Chemistry, "Opportunities in photocromism: when "light is heavy", Dr. Chiara Bertarelli, Dipartimento di Chimica, Materiali e Ingegneria Chimica "Giulio Natta", Politecnico di Milano.
- 12) 6/5/2011, Dept. of Chemistry and Industrial Chemistry, "Approcci analitici innovativi per caratterizzare i materiali organici in dipinti", Maria Perla Colombini, Università di Pisa.
- 13) 22/6/2011, Dept. of Chemistry and Industrial Chemistry, Identification and characterization of unknown compounds in urine of neuroblastoma patients, Carlo Scapolla, Università di Genova.
- 14) 5/10/2011, Dept. of Chemistry and Industrial Chemistry, "Synergic analytical techniques for the study of cultural heritage artefacts", F. Ardini
- 15) 11/10/2011, Dept. of Chemistry and Industrial Chemistry, "L'imaging iperspettrale, un emergente strumento analitico per il controllo di qualità e di processo alimentare ed ambientale.", L. Bagnasco.
- 16) 11/10/2011, Dept. of Chemistry and Industrial Chemistry, "Analytical methods for anti-doping control in sport", A. Bignasca.
- 17) 14/10/2011, Dept. of Chemistry and Industrial Chemistry, "Transition Metal Catalysis as an Entry to Multicomponent Synthesis of Heterocycles, T.J.J. Müller, Heinrich-Heine University Düsseldorf (Germany).
- 18) 21/10/2011, Dept. of Chemistry and Industrial Chemistry, "From interesting to useful: the contribution of porous solids to the society", Gérard Férey, Université de Versailles, France.
- 19) 26/10/2011, Dept. of Chemistry and Industrial Chemistry, "Catalysis by hydrotalcites and related materials", Wishwanath Kalyani.
- 20) 09/11/2011, Dept. of Chemistry and Industrial Chemistry, "Degradation of glass at the interface with metals", E. Greiner-Wrona, Wroclaw, Poland.
- 21) 22/11/2011, Dept. of Chemistry and Industrial Chemistry, "Synthesis as an enabling Science: from Concept to Practice", Stephen Hanessian, Université de Montreal and Irvine University.

### ***Teaching Assistance***



UNIVERSITÀ DEGLI STUDI DI GENOVA  
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CHEMISTRY AND MATERIALS*



*(HOLDING THE ECTN CHEMISTRY DOCTORATE EUROLABEL®)*

PH.D. CERTIFICATE OF  
**GIULIA PRIARONE**



**Doctorate Course:**

*Pharmaceutical, Food and Cosmetic Sciences*

**Start of the Doctorate Program:**

*January 1<sup>st</sup>, 2009*

**End of the Doctorate Program:**

*December 31<sup>st</sup>, 2011*

**Advisors:**

*Prof. Carla Villa*

*Prof. Annamaria Bassi*

**Thesis Title:**

*Procedures of Green Chemistry in the  
synthesis and delivery of cosmetic active  
ingredients*

**Defense Date:**

*February 9<sup>th</sup>, 2012*

On February 9<sup>th</sup>, 2012, at the Department of Pharmacy, Giulia Priarone has orally presented her doctorate research work in front of the Commission, formed by

- Prof. Daniela Barlocco, First University of Milano
- Prof. Paolo Colombo, University of Parma
- Prof. Alessandro Balbi, University of Genova

The written Dissertation had been previously sent to the Commission members. After careful examination of the Dissertation, of the student's oral presentation, of the overall activity of the student during the three years of doctorate studies, the Commission

**HAS APPROVED THE THESIS OF GIULIA PRIARONE,  
CONFERRING ON HER THE TITLE OF**

**RESEARCH DOCTOR IN  
PHARMACEUTICAL, FOOD AND COSMETIC SCIENCES**

Genova, February 9<sup>th</sup>, 2012

The Director of the Doctorate School  
(Prof. Luca Banfi)

The Coordinator of the Doctorate Course  
(Prof. Alessandro Balbi)

# ACTIVITY REPORT

## *Research Activity*

The research activity was entirely carried out at the Department of Pharmaceutical Sciences (now Department of Pharmacy) (University of Genova).

### *Scientific Publications*

#### *Communications at Conferences*

Posters:

- 1) Priarone, G.; Villa, C., "Procedure ecocompatibili microonde mediate nella preparazione di argille organofile d'interesse cosmetico e farmaceutico", Scuola Dottorale Nazionale in Tecnologie Farmaceutiche "Sistemi Nanoparticellari", Cagliari, 7-9/9/2009
- 2) Villa, C.; Mariani, E.; Priarone, G.; Leonelli, C.; Rosa, R., "New organoclays for cosmetic and pharmaceutical applications", XXI Simposio A.D.R.I.T.E.L.F. "Veicolazione dei farmaci: aspetti tecnologici innovativi", Cagliari, 10-13/9/2009.

#### *Congresses Attended*

- 1) "Technical Meeting during COSMOPROF", Bologna, 3/4/2009.
- 2) "XXI Simposio A.D.R.I.T.E.L.F. "Veicolazione dei farmaci: aspetti tecnologici innovativi"", Cagliari, 10-13/9/2009.
- 3) "Meeting Unipro during COSMOPROF", Bologna, 16-18/04/2010.
- 4) "COSMOPROF", Bologna, 19/3/2011.
- 5) "36° congresso nazionale SICCC (Società Italiana di Chimica e Scienze Cosmetologiche)-La scienza cosmetica tra etica e creatività", Milano, 15/11/2011.

## *Courseware*

During her doctorate, Giulia Priarone has acquired 31.75 credits of Courseware.

#### *Courses attended and passed (21 credits)*

*Courses Given by Teachers of the University of Genova:*

- 1) In vitro tests for evaluation of toxicity and biological action of chemical compounds (2 credits) (2009).
- 2) Microwave technology applied to chemical processes (2 credits) (2009).
- 3) Chemistry of cosmetic products (4 credits) (2009).
- 4) Databases classification: bibliographic, chemical substances, chemical reactions, numeric patents (2 credits) (2010).
- 5) Instrumental techniques for trace elements determination in pharmaceuticals, food products and environmental samples (2 credits) (2010).
- 6) Innovative pharmaceutical dosage forms: preparation and control methods (2 credits) (2010).
- 7) Main plants used in phytocosmesis and their constituents (2 credits) (2010).

*Courses Given by invited experts:*

- 1) Development of dyes in the cosmetic industry: the L'Oreal case (Cristina Emmanuel, L'Oreal) (2009) (1 credit).
- 2) Fragment-based drug design (Eduard Felder, Nerviano Medical Sciences) (2009) (1 credit).
- 3) Approaches to Synthesis and Characterization of Metal Oxide Magnetic Nanomaterials (Lorenza Suber, C.N.R., Roma) (2010) (1 credit).
- 4) Synthesis, formulation and marketing of generic drugs (Graziano Castaldi, Chemelectiva, Novara)(Graziano Castaldi) (2010) (1 credit).
- 5) Polymer Assisted Solution Phase Combinatorial Synthesis (Luca Raveglia, NiKem Research) (2010) (1 credit).

#### *National and International Schools or Workshops (5.75 credits)*

- 1) Drug discovery da piante - Sviluppo di Fitofarmaci, Pavia 3/7/2009 e 10/7/2009 (1 credit).
- 2) Scuola Dottorale Nazionale in Tecnologie Farmaceutiche "Sistemi Nanoparticellari", Cagliari, 7-9/9/2009 (1.5 credits).
- 3) School of experimental design, Genova, 21-25/9/2009 (2 credits).
- 4) Il settore cosmetico: un'opportunità di lavoro per laureati in discipline scientifiche, Genova, 11/6/2010 (0.25 credits).
- 5) Course "Colture cellulari: i metodi alternativi nell'ottemperanza della normativa UE REACH", Genova, 23-24/9/2010 (1 credits).

#### *Seminars Given (2 credits)*

- 1) 2/12/2011, Dept. of Pharmaceutical Sciences, "Processi di estrazione assistiti da microonde".

### ***Seminars Attended (3 credits)***

- 1) 27/2/2009, Dept. of Pharmaceutical Sciences, "Chiral chromatography : a mature technology, a scientific challenge", Prof. Christian Roussel, Marseille, France.
- 2) 27/2/2009, Dept. of Pharmaceutical Sciences, "Chemistry derived from N-(o-amino-phenyl) thiazoline-2-thione", Federico Andreoli, Marseille, France.
- 3) 6/2/2009, Dept. of Physics, "L'energia del futuro", Prof. Carlo Rubbia, CERN, Ginevra.
- 4) 3/3/2009, Dept. of Chemistry and Industrial Chemistry, "Ipotesi chimica sull'origine della vita: dal Big Bang alla comparsa dei primi organismi viventi", Prof. Piero Ugliengo, Università di Torino.
- 5) 28/4/2009, Dept. of Chemistry and Industrial Chemistry, "Flussi e accumuli di energia accoppiati a trasferimenti protonici in biosistemi", Prof. A. Morelli, Università di Genova.
- 6) 24/4/2009, Dept. of Chemistry and Pharmaceutical and Food Technologies, "I farmaci oncologici e le norme di buona preparazione", Dott.ssa Barbara Rebesco e Dott.ssa Federica Mina.
- 7) 15/5/2009, Dept. of Pharmaceutical Sciences, "Farmaci recentemente approvati: uno sguardo critico al passato e un trend per il futuro, Dr. Paolo Pevarello, Preclinical Research Director, Newron Pharmaceuticals S.p.A.
- 8) 6/11/2009, Faculty of Medicine, "Targeting beta-amyloid in Alzheimer's Disease: chemical, biochemical and modeling studies", A. Carotti, Università di Bari
- 9) 27/11/2009, Dept. of Pharmaceutical Sciences, "Retinopatie e Diabete: ruolo del fattore di crescita vascolare (VEGF)", F. Catalano.
- 10) 27/11/2009, Dept. of Pharmaceutical Sciences, "Spettroscopia atomica di assorbimento ed emissione: basi teoriche e strumentazione", C. Macciò.
- 11) 27/11/2009, Dept. of Pharmaceutical Sciences, "Spettroscopia atomica di assorbimento ed emissione: aspetti pratici e applicazioni", M. Carrozza.
- 12) 27/11/2009, Dept. of Pharmaceutical Sciences, "Flow chemistry, a new efficient technique for today's chemists", M. Caviglia.
- 13) 27/1/2010, Dept. of Territory and its Resources, "Quasicristalli Naturali: Un nuovo "stato della materia" in natura", Dr. Luca Bindi, Università di Firenze.
- 14) 26/2/2010, Dept. of Chemistry and Pharmaceutical and Food Technologies, "Le sostanze bioattive dei licheni: natura, vie sintetiche ed aspetti applicativi", Prof. P. Modenesi, Università di Genova.
- 15) 27/4/2010, Dept. of Chemistry and Pharmaceutical and Food Technologies, "Sistemi innovativi per la veicolazione di acidi nucleici", Elias Fattal, Université de Paris Sud, UMR CNRS 8612 Physico-Chimie - Pharmacotechnie – Biopharmacie.
- 16) 8/10/2010, Dept. of Chemistry and Industrial Chemistry, "Formation mechanism of silver nanoparticle 1D microstructures and their hierarchical assembly into 3D superstructures", Lorenza Suber, C.N.R., Roma.
- 17) 22/11/2010, Dept. of Pharmaceutical Sciences, "Combinatorial Chemistry", Laura Buffa.
- 18) 22/11/2010, Dept. of Pharmaceutical Sciences, "Le Micotossine nelle colture e nei prodotti alimentari", Silvia Mannino.
- 19) 22/11/2010, Dept. of Pharmaceutical Sciences, "Molecular Dynamics Simulation: an updated overview on Prion Protein ", Gerolamo Vettoretti.
- 20) 16/12/2010, Dept. of Pharmaceutical Sciences, "Presentation of REAXYS database", Dr. Denis Reidy, Elsevier.
- 21) 2/02/2011, Dipartimento di Scienze Farmaceutiche "Pietro Pratesi" dell'Università degli Studi di Milano, "Formulazioni e nanoformulazioni: esperienze applicative e tecniche di caratterizzazione".
- 22) 11/3/2011, Dept. of Chemistry and Pharmaceutical and Food Technologies, "L'organizzazione della industria farmaceutica secondo le GMP", Dr. Raffaella Pintus, Bruschettini S.r.l.
- 23) 15/4/2011, Dept. of Pharmaceutical Sciences, "Scambio di pratiche terapeutiche e medicinali tra vecchio e nuovo mondo", Prof. F. Surdich.
- 24) 23/05/2011, Dept. of Pharmaceutical Sciences "Presentazione della banca dati SCIVERSE SCOPUS", Dr. Massimiliano Bearzot (associate account manager Elsevier).
- 25) 14/06/2011, Dept. of Biology, "Dieta - geni - longevità, prof. Valter Longo (Andrus gerontology center - University Southern California).
- 26) 2/12/2011, Dept. of Pharmaceutical Sciences, "Blood brain barrier", P. Cirrincione.
- 27) 2/12/2011, Dept. of Pharmaceutical Sciences, "Fungicidi chimici usati in agricoltura: impatto sociale, patogeni target ed evoluzione", A.P. Lanteri.
- 28) 2/12/2011, Dept. of Pharmaceutical Sciences, "Click chemistry, an interesting tool in pharmaceutical sciences", F. Musumeci.
- 29) 2/12/2011, Dept. of Pharmaceutical Sciences, "Rare diseases and orphan drugs", C. Rotolo.

### ***Teaching Assistance***



UNIVERSITÀ DEGLI STUDI DI GENOVA  
*DOCTORATE SCHOOL IN  
SCIENCES AND TECHNOLOGIES OF  
CHEMISTRY AND MATERIALS*



**(HOLDING THE ECTN CHEMISTRY DOCTORATE EUROLABEL®)**

PH.D. CERTIFICATE OF  
**ALESSIA PROVINO**



**Doctorate Course:**

*Chemical Sciences and Technologies*

**Start of the Doctorate Program:**

*January 1<sup>st</sup>, 2009*

**End of the Doctorate Program:**

*December 31<sup>st</sup>, 2011*

**Advisor:**

*Prof. Pietro Manfrinetti*

**Thesis Title:**

*Study of the structural and magnetic properties variation  
in binary and ternary intermetallic systems  
by the effect of substitutional atoms*

**Defense Date:**

*February 9<sup>th</sup>, 2012*

On February 9<sup>th</sup>, 2012, at the Department of Chemistry and Industrial Chemistry, Alessia Provino has orally presented her doctorate research work in front of the Commission, formed by

- Prof. Paolo Ferloni, University of Pavia
- Prof. Ornella Abollino, University of Torino
- Prof. Gabriele Cacciamani, University of Genoa

The written Dissertation had been previously sent to the Commission members. After careful examination of the Dissertation, of the student's oral presentation, of the overall activity of the student during the three years of doctorate studies, the Commission

HAS APPROVED THE THESIS OF ALESSIA PROVINO,  
CONFERRING ON HER THE TITLE OF

**RESEARCH DOCTOR IN  
CHEMICAL SCIENCES AND TECHNOLOGIES**

The commission has evaluated the thesis and the overall activity of Dr. Alessia Provino as  
**EXCELLENT**

Genova, February 9<sup>th</sup>, 2012

The Director of the Doctorate School  
(Prof. Luca Banfi)

The Coordinator of the Doctorate Course  
(Prof. Luca Banfi)

# ACTIVITY REPORT

## *Research Activity*

The research activity was mainly carried out at the Department of Chemistry and Industrial Chemistry, Genova. However, Alessia Provino **has also spent a research period of 12 months abroad** (23/9/2010-10/10/2011), in the group of Prof. Karl A. Gschneidner at the Ames Laboratory of the U.S. Department of Energy (operated by Iowa State University, Ames, Iowa, U.S.A.).

## *Scientific Publications*

Original publications on ISI Journals:

- 1) Shah, K. V.; Bonville, P.; Manfrinetti, P.; Provino, A.; Dhar, S. K., Crystal structure and magnetic properties of  $RCu_{5-x}Pd_x$  (R = Pr, Nd, Sm and Eu) alloys, *Journal of Magnetism and Magnetic Materials*, **2009**, 321, 3164-3170. IMPACT FACTOR (2010): 1.690
- 2) Manfrinetti, P.; Provino, A.; Gschneidner, K. A. Jr., On the  $RMgSn$  rare earth compounds, *Journal of Alloys and Compounds*, **2009**, 482, 81-85. IMPACT FACTOR (2010): 2.138
- 3) Dhar, S. K.; Kulkarni, R.; Hidaka, H.; Toda, Y.; Kotegawa, H.; Kobayashi, T. C.; Manfrinetti, P.; Provino, A., Pressure and magnetic field tuned quantum critical point in the Kondo antiferromagnet  $CePtZn$ , *Journal of Physics-Condensed Matter*, **2009**, 21. IMPACT FACTOR (2010): 2.332
- 4) Manfrinetti, P.; Provino, A.; Morozkin, A. V.; Isnard, O., Magnetic structure of the NaCl-type  $NdSb$  compound, *Journal of Alloys and Compounds*, **2009**, 487, L28-L29. IMPACT FACTOR (2010): 2.138
- 5) Provino, A.; Gschneidner, K. A. Jr.; Manfrinetti, P., Structure and thermal stability of the  $RMgPb$  rare earth compounds, and the anomalous melting behaviour of  $SmMgPb$ , *Journal of Alloys and Compounds*, **2010**, 497, 131-138. IMPACT FACTOR (2010): 2.138
- 6) Ritter, C.; Morozkin, A. V.; Oskolkov, K. S.; Nirmala, R.; Isnard, O.; Manfrinetti, P.; Provino, A., Magnetic ordering of the  $R_4Sb_3$  compounds (R = Pr, Nd, Sm) and of  $Pr_2Nd_2Sb_3$ , *Journal of Alloys and Compounds*, **2010**, 494, 28-33. IMPACT FACTOR (2010): 2.138
- 7) Morozkin, A. V.; Isnard, O.; Manfrinetti, P.; Provino, A.; Ritter, C.; Nirmala, R.; Malik, S. K., The magnetic ordering in the  $Ho_6FeTe_2$  compound, *Journal of Alloys and Compounds*, **2010**, 498, 13-18. IMPACT FACTOR (2010): 2.138
- 8) Morozkin, A. V.; Mozharivskiy, Y.; Svitlyk, V.; Nirmala, R.; Isnard, O.; Manfrinetti, P.; Provino, A.; Ritter, C., Magnetic properties of  $Fe_2P$ -type  $R_6CoTe_2$  compounds (R = Gd-Er), *Journal of Solid State Chemistry*, **2010**, 183, 1314-1325. IMPACT FACTOR (2010): 2.261
- 9) Kulkarni, P. D.; Dhar, S. K.; Provino, A.; Manfrinetti, P.; Grover, A. K., Self-magnetic compensation and shifted hysteresis loops in ferromagnetic samarium systems, *Physical Review B*, **2010**, 82. IMPACT FACTOR (2010): 3.774
- 10) Ritter, C.; Provino, A.; Manfrinetti, P.; Gschneidner, K. A., Jr., The magnetic structures of  $RMgSn$  compounds (R = Ce, Pr, Nd, Tb), *Journal of Alloys and Compounds*, **2011**, 509, 9724-9732. IMPACT FACTOR (2010): 2.138
- 11) Provino, A.; Kumar, N.; Manfrinetti, P.; Dhar, S. K., Crystal structure and magnetic properties of  $RCu_4Be$  (R = rare earth) compounds, *Journal of Applied Physics*, **2011**, 109, 07E134(1-3). IMPACT FACTOR (2010): 2.079

Other publications:

- 1) Provino, A.; Manfrinetti, P.; Mazzone, D.; Bernini, C.; Boffito, C.; Corazza, A.; Coda, A., New materials for technological applications from the Ti-Cr-Cu ternary system, in *Cooper alloys: preparation, properties and applications*, Nova Publishers, *Materials Science series*, **2011**, Chapter 10, 213-246.

## *Communications at Conferences*

Oral communications:

- 1) Provino, A., Manfrinetti, P.; Mazzone, D.; Bernini, C.; Boffito, C.; Corazza, A.; Coda, A., "Phase equilibria in the ternary system Ti-Cr-Cu at 800°C", JCAT 2009, Tozeur (Tunisia) 14-16/5/2010.
- 2) Provino, A.; Neeraj, K.; Manfrinetti, P.; Dhar, S.K., "Crystal Structure and Magnetic Properties of  $RCu_4Be$  (rare earths) Compounds", 55<sup>th</sup> Annual Conference on Magnetism and Magnetic Materials, Atlanta (U.S.A.), 14-18/11/2010.
- 3) Provino, A.; Fornasini, M.L.; Paudyal, D.; Dhar, S.K.; Manfrinetti, P.; Pecharsky, V.K.; Gschneider Jr., K.A., "MnCu<sub>4</sub>In: a new high temperature ferromagnet", American Physical Society (APS) Meeting, Dallas (TX, USA) 21-25/3/2011.
- 4) Provino, A., Mudryk, Y.; Manfrinetti, P.; Paudyal, D.; Pecharsky, V.K.; Gschneider, Jr., K.A., "New Compounds in the Ternary R-Ni-In System (R = rare earths)", 26<sup>th</sup> Rare Earth Research Conference (RERC11), Santa Fé (New Mexico, USA), 19-23/6/2011.
- 5) Provino, A., Mudryk, Y.; Paudyal, D.; Smetana, P.; Manfrinetti, P.; Pecharsky, V.K.; Gschneider, Jr., K.A., Corbett, J. D., "Crystal structure of  $Tb_5Ni_2In_4$  and  $Y_5Ni_2In_4$  and magnetic properties in  $Dy_5Ni_2In_4$ ", 56<sup>th</sup> Annual Conference on Magnetism & Magnetic Materials, Phoenix (Arizona, USA), 30/10-3/11/2011.

Posters:

- 6) Provino, A.; Gschneider, K. A.; Pani, M.; Manfrinetti, P., "Melting behaviour of the rare earth compounds  $RMgX$  (X = Sn, Pb)", MEDICTA 2009, Marsiglia 15-19/6/2009



- 7) Provino, A.; Manfrinetti, P.; Mazzone, D.; Bernini, C.; Boffito, C.; Corazza, A.; Coda, A., "New materials for technological applications from the Ti-Cr-Cu ternary system", Congresso di Inaugurazione dell'Istituto SPIN del Consiglio Nazionale delle Ricerche", Genova, 10-11/6/2010.
- 8) Provino, A.; Dhar, S.K.; Paudyal, D.; Morozkin, A.V.; Manfrinetti, P.; Gschneidner, Jr., K.A., "Structure and magnetic properties of the RScSb compounds (R = Rare Earth)", TMS 2011 Annual Meeting & Exhibition (The Minerals, Metals & Materials Society 2011 Annual Meeting), 27-2/3-3/2011, San Diego (CA), USA.
- 9) Provino, A.; Fornasini, M.L.; Mazzone, D.; Dhar, S.K.; Paudyal, D.; Manfrinetti, P.; Gschneider Jr., K.A., "Structure and stability of new compounds in the R-Au-Sn system (R = rare earths)", MRS Local Chapter Symposium on Rare Earth Materials, Ames (IA, USA), 7/4/2011.

### ***Congresses Attended***

- 1) "Convegno sulla calorimetria ed analisi termica MEDICTA 2009", Marsiglia 15-19/6/2009.
- 2) "Convegno sulla calorimetria ed analisi termica JCAT 2009", Tozeur (Tunisia) 14-16/5/2010.
- 3) "Congresso di Inaugurazione dell'Istituto SPIN del Consiglio Nazionale delle Ricerche", Genova, 10-11/6/2010.
- 4) "55<sup>th</sup> Annual Conference on Magnetism and Magnetic Materials", Atlanta (U.S.A.), 14-18/11/2010.
- 5) "TMS 2011 Annual Meeting & Exhibition (The Minerals, Metals & Materials Society 2011 Annual Meeting)", 27-2/3-3/2011, San Diego (CA), USA.
- 6) "American Physical Society (APS) Meeting", Dallas (TX, USA) 21-25/3/2011.
- 7) "26<sup>th</sup> Rare Earth Research Conference (RERC11)", Santa Fé (New Mexico, USA), 19-23/6/2011.
- 8) "56<sup>th</sup> Annual Conference on Magnetism & Magnetic Materials" (MMM2012), Phoenix (Arizona, USA), 30/10-3/11/2011.

### ***Courseware***

During her doctorate, Alessia Provino has acquired 26.6 credits of Courseware.

### ***Courses attended and passed (18 credits)***

*Courses Given by Teachers of the University of Genova:*

- 1) Synthesis, structure, and functional properties of intermetallic materials (2 credits) (2009).
- 2) Chemometric strategies and algorithms and their applications (3 credits). (2009).
- 3) Fundamentals of scanning and transmission electronic microscopy (3 credits) (2009).
- 4) Mathematical methods for chemistry (2 credits) (2010).
- 5) Topics in solid state physics (3 credits) (2010)

*Courses Given by invited experts:*

- 1) Magnetic Structure (Peter Rogl, Vienna University) (2009) (1 credit).
- 2) Electrical Properties of Glasses (Michel Duclot, Joseph Fourier University, Grenoble) (2009) (1 credit).
- 3) Ionic Liquids (C. Chiappe, Pisa University) (2009) (1 credit).
- 4) Soft Tissue Mechanics (Gerrit W.M. Peters, Eindhoven University of Technology, Mechanical Engineering Materials Technology) (2010) (1 credit)
- 5) Use of neutrons in material science (C. Mondelli, Institute Laue-Langevin, Grenoble) (2011) (1 credit).

*Other courses:*

- 6) Course MSE-651 "Powder Diffraction Methods", (Prof. Vitalij Pecharsky), attended at Ames in January-May, 2011 (3 credits, but the final exam was not taken).

### ***National and International Schools or Workshops (3.6 credits)***

- 1) La Superconduttività nelle applicazioni al alto campo, Genova, 26/2/2010 (2 ore). (0.1 credits).
- 2) High T<sub>c</sub> superconductivity in Fe-based superconductors: a new challenge for research, CNR-SPIN, Genova, 27-28/5/2010 (1 credit).
- 3) MRS Local Chapter Symposium on Rare Earth Materials, Ames (IA, USA), 7/4/2011 (0.5 credits).
- 4) 11<sup>th</sup> Canadian Neutron Summer School, Chalk River (Ontario, Canada), 8-13/5/2011 (2 credits).

### ***Seminars Given (2 credits)***

- 1) 21/12/2011, Dept. of Chemistry and Industrial Chemistry, "Neutron Diffraction in the Study of Materials".

### ***Seminars Attended (3 credits)***

- 1) 28/4/2009, Dept. of Chemistry and Industrial Chemistry, "Flussi e accumuli di energia accoppiati a trasferimenti protonici in biosistemi", Prof. A. Morelli, Università di Genova.
- 2) 13/5/2009, Dept. of Chemistry and Industrial Chemistry, "Microalghe: una risorsa per produrre biodiesel ed alimenti", Prof. M. Tredici, Università di Firenze.
- 3) 18/5/2009, Dept. of Chemistry and Industrial Chemistry, "Calcolo dello spettro NMR con metodi DFT: applicazione alla determinazione strutturale di molecole organiche complesse, Prof. Alessandro Bagno, Università di Padova.



- 4) 3/7/2009, Dept. of Chemistry and Industrial Chemistry, "Materiali polimerici per il risparmio energetico: diodi elettroluminescenti e celle fotovoltaiche", Silvia Destri, Istituto per lo Studio delle Macromolecole (ISMAC), CNR, Milano.
- 5) 27/7/2009, Dept. of Chemistry and Industrial Chemistry, "Insulated molecular wires as model conjugated polymers with controlled interstrand interactions", Prof. Franco Cacialli, Department of Physics and Astronomy (CMMP Group) and London Centre for Nanotechnology, University College London.
- 6) 28/7/2009, Dept. of Chemistry and Industrial Chemistry, "Why can't you use thermal neutrons to study gadolinium-based materials?", Prof. Dominic Ryan, Mc Gill University (Montreal).
- 7) 8/10/09, Dept. of Chemistry and Industrial Chemistry, "Point-contact spectroscopy: a method for the study of the electron-quasiparticle interaction function", Prof. Marian Reiffers, Institute of Experimental Physics, Kosice (Slovakia).
- 8) 9/10/2009, Dept. of Physics, "Controlled Fabrication of Epitaxial Functional Oxide Artificial Nano-wire and Nanodot Structures and their giant properties", H. Tanaka, Institute of Scientific and Industrial Research (ISIR-Sanken), Osaka University (Japan)
- 9) 9/10/2009, Dept. of Physics, "Stochastic Resonance in Vanadium Dioxide: Toward Creation of Biomimetic Devices with Neuronal Signal Processing", T. Kanki, Institute of Scientific and Industrial Research (ISIR-Sanken), Osaka University (Japan)
- 10) 27/1/2010, Dept. for the Study of Territory and its Resources, "Quasicristalli Naturali: Un nuovo "stato della materia" in natura", Dr. Luca Bindi, Università di Firenze.
- 11) 10/2/2010, Dept. of Chemistry and Industrial Chemistry, "Invisibility. Camouflage techniques.", Prof. Maria Gazda, Faculty of Applied Physics & Mathematics, Gdansk University of Technology, Danzig, Poland.
- 12) 12/2/2010, Dept. of Internal Medicine, "Quando le staminali sono maligne", Prof. E. Boncinelli, Istituto Scientifico San Raffaele, Milano.
- 13) 16/2/2010, Dept. of Physics, "Inquinamento atmosferico, cambiamenti climatici e fisica nucleare", Prof. Paolo Prati, INFN, Genova.
- 14) 17/2/2010, ore 10.30, Dept. of Chemistry and Industrial Chemistry, aula 3, "Chimica e Colore", Prof. Paolo Piaggio, Università di Genova.
- 15) 16/3/2010, Dept. of Physics, "I numeri della musica. I rapporti tra musica, matematica e fisica da Pitagora ai tempi moderni, Proff. R. Musenich e G. Dillon, Università di Genova.
- 16) 8/6/2010, Dept. of Chemistry and Industrial Chemistry, "L'opzione nucleare in Italia", Dr. Stefano Maggiolo, Agenzia Regionale per la Protezione dell'Ambiente Ligure (A.R.P.A.L.).
- 17) 16/6/2010, Dept. of Chemistry and Industrial Chemistry, "Magnetic frustration, a way to new exotic phases", Prof. Julian G. Sereni, Lab. Bajas Temperaturas, CAB - CNEA, 8400 S.C. de Bariloche, Argentina.
- 18) 21/6/2010, Dept. of Chemistry and Industrial Chemistry, "Materiali per l'energia: risultati recenti su bulk ceramici termoelettrici e film superconduttori a base di Fe", Dr. Paolo Mele, Department of Materials Science and Engineering, Kyushu Institute of Technology.
- 19) 8/7/2010, Dept. of Chemistry and Industrial Chemistry, "Linear Rigid-Rod Polyelectrolytes: High Conductivity at Low Relative Humidity Due to "Frozen-in" Free Volume. Applications to Fuel Cell Technology", Prof. Morton Litt, Dept. Macromolecular Sciences and Engineering, Case Western University, Cleveland OH, USA.
- 20) 12/10/2010, Ames Laboratory (U.S.A.), "Controlling magnetism of a complex metallic system via predicted atomic substitution", Prof. Y. Mudryk.
- 21) 12/10/2010, Ames Laboratory (U.S.A.), "Doping and structural defects - their import in determining critical materials behavior", Prof. Duane D. Johnson.
- 22) 3/2/2011, Ames Laboratory (U.S.A.), "Electron probe microanalysis and X-ray analysis in scanning electron microscopes. Application to archeological paints", Prof. Gustavo Castellano.
- 23) 8/2/2011, Ames Laboratory (U.S.A.), "First Principles Calculation for Electronic Structure of  $\text{La}_{1-x}\text{Sr}_x\text{CoO}_3$  and X-ray Absorption Spectra", Prof. Yongbin Lee.
- 24) 10/2/2011, Ames Laboratory (U.S.A.), "The influence of Nd-Co substitution on the magnetic properties of strontium hexaferrite particles", Prof. Paula Bercoff.
- 25) 30/3/2011, Ames Laboratory (U.S.A.), "Fukushima: Timeline, Facts, and Implications for Nuclear Power", Prof. Margaret Harding.
- 26) 4/5/2011, Ames Laboratory (U.S.A.), "Double Perovskites: Chemical Order, Magnetism and Half Metallicity", Prof. Patrick Woodward (Department of Chemistry, Ohio State University).
- 27) 23/5/2011, Ames Laboratory (U.S.A.), "From challenge to opportunity: single crystal growth of Iron-Based Superconductors", Prof. Yong Liu.
- 28) 7/6/2011, Ames Laboratory (U.S.A.), "Advanced Electron Microscopy of Nanostructures and Defects in Functional Materials", Prof. Jiaqing He, Guest Scientist at Northwestern University, Evanston, Illinois.
- 29) 15/7/2011, Ames Laboratory (U.S.A.), "Atomic interactions and thermoelectric properties of intermetallic compounds", Prof. Yuri Green.
- 30) 25/11/2011, Dept. of Chemistry and Industrial Chemistry, "Materiali per lo stoccaggio dell'idrogeno in stato solido: recenti risultati e possibili sviluppi", Giovanni Principi, Università di Padova.

### *Teaching Assistance*



UNIVERSITÀ DEGLI STUDI DI GENOVA  
*DOCTORATE SCHOOL IN  
SCIENCES AND TECHNOLOGIES OF  
CHEMISTRY AND MATERIALS*



*(HOLDING THE ECTN CHEMISTRY DOCTORATE EUROLABEL®)*

PH.D. CERTIFICATE OF  
**CHIARA ROTOLO**



**Doctorate Course:**

*Pharmaceutical, Food and Cosmetic Sciences*

**Start of the Doctorate Program:**

*January 1<sup>st</sup>, 2008*

**End of the Doctorate Program:**

*December 31<sup>st</sup>, 2011*

**Advisor:**

*Prof. Angelo Ranise*

**Thesis Title:**

*Synthesis and derivatization of heterocyclic (pyrazoles, 2-thiobarbituric acids) and linear (push-pull enamines) derivatives as antiproliferative and anti-HIV-1 agents*

**Defense Date:**

*February 9<sup>th</sup>, 2012*

On February 9<sup>th</sup>, 2012, at the Department of Pharmacy, Chiara Rotolo has orally presented her doctorate research work in front of the Commission, formed by

- Prof. Daniela Barlocco, First University of Milano
- Prof. Paolo Colombo, University of Parma
- Prof. Alessandro Balbi, University of Genova

The written Dissertation had been previously sent to the Commission members. After careful examination of the Dissertation, of the student's oral presentation, of the overall activity of the student during the three years of doctorate studies, the Commission

**HAS APPROVED THE THESIS OF CHIARA ROTOLO,  
CONFERRING ON HER THE TITLE OF**

**RESEARCH DOCTOR IN  
PHARMACEUTICAL, FOOD AND COSMETIC SCIENCES**

Genova, February 9<sup>th</sup>, 2012

The Director of the Doctorate School  
(Prof. Luca Banfi)

The Coordinator of the Doctorate Course  
(Prof. Alessandro Balbi)

# ACTIVITY REPORT

## *Research Activity*

The research activity was mainly carried out at the Department of Pharmaceutical Sciences (now Department of Pharmacy) (University of Genova). However, Chiara Rotolo has also spent a 1 month research period (1/1/2008-31/1/2008) at the private company Nerviano Medical Sciences, Nerviano (MI).

## *Scientific Publications*

### *Communications at Conferences*

Oral communications:

- 1) Rotolo, C.; Canepa, E.; Spallarossa, A.; Ranise, A., "Parallel sequential four-component one-pot regioselective synthesis of diversely and densely substituted pyrazoles", Giornate italo-francesi di chimica, Genova 26-27/04/10.

Posters:

- 2) Rotolo, C; Cesarini, S; Canepa, E; Spallarossa, A; Ranise, A, "Reattività di accettori di Michael atipici con nucleofili azotati", 8° Sigma-Aldrich Young Chemists Symposium, Pesaro 20-22/10/2008.
- 3) Rotolo, C., "Parallel diversity-oriented synthesis of new antiproliferative and hiv-1 agents via push-pull alkene building blocks", ESMEC-European School of Medicinal Chemistry, Urbino, 4-9/7/2010

### *Congresses Attended*

- 1) "SAYCS", Pesaro, 20-22/10/2008.
- 2) "5<sup>th</sup> Annual Meeting of the European Network of Doctoral Studies in Pharmaceutical Sciences", Milano, 17/11/2008.
- 3) "SAYCS (Sigma-Aldrich Young Chemists Symposium)", Pesaro, 12-14/10/2009.
- 4) "Giornate italo-francesi di chimica", Genova 26-27/04/2010
- 5) "Focus sul rischio da farmaci: promuovere la sicurezza in ambito ospedaliero e territoriale", Genova, 15/6/2010.

## *Courseware*

During her doctorate, Chiara Rotolo has acquired 30.0 credits of Courseware.

### *Courses attended and passed (16 credits)*

*Courses Given by Teachers of the University of Genova:*

- 1) Databases classification: bibliographic, chemical substances, chemical reactions, numeric patents (2008)(2 credits).
- 2) Pharmaceutical biotechnologies (2008)(3 credits).
- 3) Bioinformatics (2009) (3 credits).
- 4) Bioorganic chemistry (2010) (2 credits).

*Courses Given by invited experts:*

- 1) Biotechnological drugs (B. Gatto, University of Padova) (2008) (1 credit).
- 2) Organic synthesis in microreactors" and "Surfaces and microchannel with controlled wettability for new materials and devices (M. Maggini and T. Carofiglio, University of Padova) (2008) (1 credit)
- 3) "Ionic Liquids (C. Chiappe, Pisa University)", C. Chiappe (Pisa University) (2009).
- 4) Fragment-based drug design (2009) (1 credit).
- 5) Soft Tissue Mechanics (Gerrit W.M. Peters, Eindhoven University of Technology, Mechanical Engineering Materials Technology) (2010) (1 credit).
- 6) Nucleic acids in medicinal chemistry: targets or drugs? (C.Sissi, Università di Padova) (2011) (1 credit).

### *National and International Schools or Workshops (9.0 credits)*

- 1) *Finanziamenti della Comunità Europea per la Ricerca*, Nerviano, 9/1/2008 (0.5 credits).
- 2) *Malattie rare e problematiche connesse*, Nerviano, 10/1/2008 (0.5 credits).
- 3) *Principi di farmacovigilanza*, Nerviano, 11/1/2008 (0.5 credits).
- 4) *Strategie dell'industria farmaceutica a livello mondiale*, Nerviano, 14/1/2008 (0.5 credits).
- 5) *Analisi del mercato farmaceutico*, Nerviano, 15/1/2008 (0.5 credits).
- 6) *Tecniche innovative. La progettazione di nuovi farmaci. Tecniche di bioinformatica e cheminformatica*, Nerviano, 17/1/2008 (0.5 credits).
- 7) *Brevetti e proprietà industriale*, Nerviano, 18/1/2008 (0.5 credits)
- 8) *Procedure di registrazione del farmaco*, Nerviano, 21/1/2008 (0.5 credits)
- 9) *ESMEC-European School of Medicinal Chemistry*, Urbino, 6-11/7/2008 (2 credits)
- 10) *Winter Modeling*, Pisa, 26/2/2010 (0.5 credits).
- 11) *Il settore cosmetico: un'opportunità di lavoro per laureati in discipline scientifiche*, Dept. of Pharmaceutical Sciences, 11/6/2010 (0.5 credits).

12) ESMEC-European School of Medicinal Chemistry, Urbino 4-9/7/2010 (2 credits).

### **Seminars Given (2 credits)**

1) 2/12/2011, Dept. of Pharmaceutical Sciences, "Rare diseases and orphan drugs".

### **Seminars Attended (3 credits)**

- 1) 1/4/2008, Dept. of Chemistry and Industrial Chemistry, aula magna, "Cinquant'anni giocando ad aprire e chiudere eterocicli", Prof. Domenico Spinelli, Università di Bologna.
- 2) 11/04/2008, Faculty of Medicine, "Targeting the chaperone HSP-90 for the treatment (but not only) of cancer", prof. Stefano Moro, Università di Padova.
- 3) 6/5/2008, Dept. of Chemistry and Industrial Chemistry, "Metallazione regio- e stereoselettiva di eterocicli: utilità sintetica", Prof. Saverio Florio, Università di Bari.
- 4) 10/6/2008, Dept. of Chemistry and Industrial Chemistry, "Studio preclinico in vitro ed in vivo dell'attività antitumorale di nuove molecole a struttura 1,3-butadienica", Dr. Maurizio Viale, Istituto Nazionale per la Ricerca sul Cancro di Genova.
- 5) 3/7/2008, Dept. of Chemistry and Industrial Chemistry, "Potent XIAP Antagonists by a Fragment-Based MCR Approach", Ilaria Monfardini, DOBIG, Genova.
- 6) 26/9/2008, Dept. of Chemistry and Industrial Chemistry, "Interferenti Endocrini: nuovo pericolo per la salute umana o falso allarmismo?", C. Liscio.
- 7) 3/11/2008, Dept. of Chemistry and Industrial Chemistry, "La Diversity oriented synthesis di collezioni di molecole", D.ssa Chiara Ghiron, SienaBiotech.
- 8) 3/11/2008, Dept. of Chemistry and Industrial Chemistry, "Sfruttare la chemiodiversità delle sostanze naturali", Prof. G. Appendino, Università del Piemonte Orientale.
- 9) 7/11/2008, Dept. of Pharmaceutical Sciences, "L'approccio computazionale nella Chimica Farmaceutica: cenni teorici ed applicazioni pratiche", E. Cichero.
- 10) 7/11/2008, Dept. of Pharmaceutical Sciences, "Derivati cumarinici con potenziale attività antivirale verso il virus dell'epatite C", M. Giampieri.
- 11) 7/11/2008, Dept. of Pharmaceutical Sciences, "Configurazione assoluta: sguardo sui metodi chimico-fisici per la sua determinazione, contributo dell'HPLC chirale, un caso di studio di alcol secondario e suoi derivati", A. Romussi.
- 12) 7/11/2008, Dept. of Pharmaceutical Sciences, "Sistemi gelificanti in situ per applicazioni biomediche", R: Stefani.
- 13) 7/11/2008, Dept. of Pharmaceutical Sciences, "Green Chemistry e sviluppo sostenibile", B. Trucchi.
- 14) 24/11/2008, Dept. of Pharmaceutical Sciences, "Lipidomica", Prof. Daniele Piomelli, Louise Turner Arnold Chair in the Neurosciences, Professor of Pharmacology and Biological Chemistry and Director of the Center for Drug Discovery-University of California, Irvine CA.
- 15) 15/9/2009, Faculty of Medicine, "The dengue virus NS2B-NS3 protease as a potential drug target", Prof. Gerd Katzenmeier, Institute of Molecular Biosciences, Mahidol, University at Salaya.
- 16) 6/11/2009, Faculty of Medicine, "Targeting beta-amyloid in Alzheimer's Disease: chemical, biochemical and modeling studies", A. Carotti, Università di Bari
- 17) 20/11/2009, Dept. of Chemistry and Industrial Chemistry "Materials for solar energy", L. Francis.
- 18) 20/11/2009, Dept. of Chemistry and Industrial Chemistry, "Role of dendrimers in Drug Delivery", A. Ullah.
- 19) 12/2/2010, Dept. of Internal Medicine, "Quando le staminali sono maligne", Prof. E. Boncinelli, Istituto Scientifico San Raffaele, Milano.
- 20) 12/2/2010, Dept. of Internal Medicine, "Nuovi approcci terapeutici nel trattamento della neurodegenerazione", Prof. P. Costantino, Istituto Scientifico San Raffaele, Milano.
- 21) 30/4/2010, Dept. of Pharmaceutical Sciences, "L'etnofarmacologia tra empirismo e scienza", Prof. A. Guerci, Università di Genova.
- 22) 14/5/2010, Dept. of Pharmaceutical Sciences, "Radicali liberi e antiossidanti. Il ruolo del farmacista nella prevenzione delle malattie del nostro tempo".
- 23) 20/5/2011, Dept. of Pharmaceutical Sciences, "Le proteine Stat come potenziali target per nuovi antitumorali, D. Barlocco.
- 24) 2/12/2011, Dept. of Pharmaceutical Sciences, "Blood brain barrier", P. Cirrincione.
- 25) 2/12/2011, Dept. of Pharmaceutical Sciences, "Click chemistry, an interesting tool in pharmaceutical sciences", F. Musumeci.
- 26) 2/12/2011, Dept. of Pharmaceutical Sciences, "Processi di estrazione assistiti da microonde", G. Priarone
- 27) 2/12/2011, Dept. of Pharmaceutical Sciences, "Fungicidi chimici usati in agricoltura: impatto sociale, patogeni target ed evoluzione", A.P. Lanteri.

### **Teaching Assistance**

Chiara Rotolo has assisted the courses of: "Drug Analysis I" (Master Degree in Chemistry and Pharmaceutical Technologies)(2009/2010)(60 hours); "Drug Analyses I" (Master Degree in Pharmacy)(2011/2012)(30 hours); "Drug Analyses II" (Master Degree in Pharmacy)(2011/2012)(30 hours). Moreover, Chiara Rotolo has been a teaching tutor for the courses of "Human Anatomy" (2009/2010).



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PH.D. CERTIFICATE  
*OF*  
**FEDERICO WRUBL**



**Doctorate Course:**  
*Chemical Sciences and Technologies*  
**Start of the Doctorate Program:**  
*January 1<sup>st</sup>, 2007*  
**End of the Doctorate Program:**  
*December 31<sup>st</sup>, 2010*

**Advisor:**  
*Prof. Pietro manfrinetti*

**Thesis Title:**  
*Synthesis and characterization of rare earth ternary  
intermetallic compounds*

**Defense Date:**  
*February 9<sup>th</sup>, 2012*

On February 9<sup>th</sup>, 2012, at the Department of Chemistry and Industrial Chemistry, Federico Wrubl has orally presented his doctorate research work in front of the Commission, formed by

- Prof. Paolo Ferloni, University of Pavia
- Prof. Ornella Abollino, University of Torino
- Prof. Gabriele Cacciamani, University of Genova

The written Dissertation had been previously sent to the Commission members. After careful examination of the Dissertation, of the student's oral presentation, of the overall activity of the student during the three years of doctorate studies, the Commission

**HAS APPROVED THE THESIS OF FEDERICO WRUBL,  
CONFERRING ON HIM THE TITLE OF**

**RESEARCH DOCTOR IN  
CHEMICAL SCIENCES AND TECHNOLOGIES**

*The commission has evaluated the thesis and the overall activity of Dr. Federico Wrubl as  
EXCELLENT*

Genova, February 9<sup>th</sup>, 2012

The Director of the Doctorate School  
(Prof. Luca Banfi)

The Coordinator of the Doctorate Course  
(Prof. Luca Banfi)

# ACTIVITY REPORT

## *Research Activity*

The research activity was mainly carried out at the Department of Chemistry and Industrial Chemistry (University of Genova). However, Federico Wrubl has also spent a research period of 1 month abroad, at the University of Vienna, Institut für Physikalische Chemie, from 19/5/2008 to 17/6/2008. He has also spent a research period of 2 months abroad, at the Tata Institute of Fundamental Research of Mumbai (India), in the group directed by Prof. S.K. Dhar, from 2/3/2009 to 30/4/2009. Finally he has also carried out diffraction experiments in Grenoble, from 26-29/6/2008 and 19-20/5/2009.

## *Scientific Publications*

Original publications on ISI Journals:

- 1) Dhar, S. K.; Shah, K. V.; Bonville, P.; Manfrinetti, P.; Wrubl, F., Structure and magnetic properties of  $U_2Fe_3Ge$ , *Solid State Communications*, **2008**, 147, 217-220. IMPACT FACTOR (2010): 1.981
- 2) Shah, K. V.; Bonville, P.; Manfrinetti, P.; Wrubl, F.; Dhar, S. K., The  $Yb_2Al_{1-x}Mg_xSi_2$  series from a spin fluctuation ( $x=0$ ) to a magnetically ordered ground state ( $x=1$ ), *Journal of Physics-Condensed Matter*, **2009**, 21. IMPACT FACTOR (2010): 2.332.
- 3) Wrubl, F.; Pani, M.; Manfrinetti, P.; Rogl, P., Synthesis and crystal structure of  $RMgSi_2$  compounds (R = La, Ce, Pr, Nd), a particular example of linear intergrowth, *Journal of Solid State Chemistry*, **2009**, 182, 716-724. IMPACT FACTOR (2010): 2.261.
- 4) Manfrinetti, P.; Wrubl, F.; Kulkarni, R.; Dhar, S. K., The structure and magnetic properties of  $Th_4Mn_{13}Sn_5$ , *Intermetallics*, **2009**, 17, 529-531. IMPACT FACTOR (2010): 2.335
- 5) Joshi, D. A.; Wrubl, F.; Manfrinetti, P.; Dhar, S. K., Magnetic properties of  $RMgSi_2$  (R=La, Ce, Pr, and Nd) compounds, *Physical Review B*, **2009**, 80, art. 214412. IMPACT FACTOR (2008): 3.322. IMPACT FACTOR (2010): 3.774
- 6) Manfrinetti, P.; Morozkin, A. V.; Isnard, O.; Wrubl, F.; Mozharivskiy, Y.; Svitlyk, V., Magnetic ordering of novel La(3)NiGe(2)-type R(3)CoGe(2) compounds (R = Pr, Nd, Sm, Gd-Dy), *Intermetallics*, **2011**, 19, 321-326. IMPACT FACTOR (2010): 2.335
- 7) Ritter, C.; Wrubl, F.; Hill, A. H.; Pani, M.; Manfrinetti, P., Crystal and magnetic structure of the  $R_{15}Si_9C$  compounds (R = Ho, Er, Tb), *Journal of Physics-Condensed Matter*, **2011**, 23. IMPACT FACTOR (2010): 2.332
- 8) Wrubl, F.; Shah, K. V.; Joshi, D. A.; Manfrinetti, P.; Pani, M.; Ritter, C.; Dhar, S. K., Superstructure and magnetic properties of  $R_{15}X_9C$  compounds (R = rare earth; X = Si and Ge), *Journal of Alloys and Compounds*, **2011**, 509, 6509-6517. IMPACT FACTOR (2010): 2.138

## *Communications at Conferences*

Posters:

- 1) Wrubl, F.; Shah, K.V.; Manfrinetti, P.; Pani, M.; Joshi, D. A.; Dhar, S. K. " Superstructure and magnetic properties of  $R_{15}Ge_9C$  (R = light rare earth) and  $R_{15}Si_9C$  (R = heavy rare earth) compounds", XXXVII Congresso nazionale di chimica fisica, Camogli (Genova), 24-29 Febbraio 2008.
- 2) Wrubl, F.; Manfrinetti, P.; Dhar, s. K.; Shah, K. V.; Bonville, P., "A magnetic study of the new compound  $U_2Fe_3Ge$ ", XXXVII Congresso nazionale di chimica fisica, Camogli (Genova), 24-29/2/2008
- 3) Wrubl, F.; Mollica, A.; Buffoli, A., "A simple electrochemical test cell for the measurement of stainless steel pitting potential", XXXVII Congresso nazionale di chimica fisica, Camogli (Genova), 24-29/2/2008.
- 4) Wrubl, F.; Pani, M.; Manfrinetti, P.; Rogl, P., " $CeMgSi_2$ , a new example of linear intergrowth structure", Congresso di Cristallografia SIMP-AIC, 7-12 settembre 2008

## *Congresses Attended*

- 1) "XXXVII Congresso nazionale di chimica fisica dal titolo "Chimica fisica crocevia della scienza"", Camogli (Genova), 24-29/2/2008.
- 2) "Congresso di Cristallografia SIMP-AIC", 11-12/9/2008.

## *Courseware*

During his doctorate, Federico Wrubl has acquired 27.5 credits of Courseware.

## *Courses attended and passed (19 credits)*

Courses Given by Teachers of the University of Genova:

- 1) Functional magnetic materials (2 credits) (2007).
- 2) Fundamentals of scanning and transmission electronic microscopy (3 credits) (2007).
- 3) Intermetallics compounds(2 credits) (2007).

- 4) Physical chemistry of solid state and surfaces (4 credits) (2007).
- 5) Advanced microscopy (3 credits) (2008).

*Courses Given by invited experts:*

- 1) Symmetry in Solids (Peter Rogl, Vienna University) (2007) (1 credit).
- 2) Martensitic Transformations (Peter Rogl, Vienna University) (2008) (1 credit).
- 3) Technologies for control of CO<sub>2</sub> in the atmosphere: from confinement to reutilization (M. Aresta, University of Bari and University of Tianjin) (2008) (1 credit).
- 4) Magnetic Structure (Peter Rogl, Vienna University) (2009) (1 credit)
- 5) Ionic Liquids (C. Chiappe, Pisa University) (2009) (1 credit).

***National and International Schools or Workshops (4 credits)***

- 1) MathCryst 2008 (Summer School on Mathematical and Theoretical Crystallography), Gargnano (BS) 27-4/2-5-2008 (2 credits).
- 2) Summer School "Structure Determination from Powder Diffraction Data", Paul Scherrer Institut, Villigen (Svizzera), 18-22/6/2008 (2 credits).

***Seminars Given (2 credits)***

- 1) 6/10/2009, Dept. of Chemistry and Industrial Chemistry, "Chimica della fotografia, dai sali d'argento ai pixel".

***Seminars Attended (2.5 credits)***

- 1) 14/3/2007, Dept. of Chemistry and Industrial Chemistry, "Cavitands at work: from molecular recognition to supramolecular polymers", Prof. Enrico Dalcanale, Università di Parma.
- 2) 4/5/2007, Dept. of Chemistry and Industrial Chemistry, "Energie rinnovabili: materiali e tecnologie per celle a combustibile a carbonati fusi", Dr. Paolo Capobianco, Ansaldo Fuel Cells.
- 3) 14/5/2007, ore 16.00, Dept. of Physics, "X-ray and neutron scattering: methods and examples", Dr. Olivier Plantivin, European Synchrotron Radiation Facility.
- 4) 4/06/2007, Dept. of Chemistry and Industrial Chemistry, "Nanoparticelle e salute: aspetti chimici e morfologici alla base della potenziale pericolosità di materiali particellari sempre più piccoli, Prof.ssa Bice Fubini, Università di Torino.
- 5) 26/9/2007, Dept. of Chemistry and Industrial Chemistry, "Click Chemistry", Anna Mumot,
- 6) 11/12/2007, Dept. of Chemistry and Industrial Chemistry, "Intermetallic compounds per applicazioni speciali", Dr. Claudio Boffito e Dr. Alessio Corazza di SAES Getters S.p.A. di Lainate (MI).
- 7) 20/2/2008, Dept. of Chemistry and Industrial Chemistry, "Exotic Behaviours of some Rare Earth Intermetallic Compounds" Karl Gschneider Jr, Iowa State University, USA.
- 8) 20/2/2008, Dept. of Chemistry and Industrial Chemistry, "...Et d'autres Calorimètres", Jean Pierre Bros, Université Aix- Marseille I, France.
- 9) 20/2/2008, Dept. of Chemistry and Industrial Chemistry, "MSIT, 20 years Phase Diagram Data Compilation & Evaluation", Günther Effenberg, MSIT, Stuttgart (Germania).
- 10) 2/4/2008, Dept. of Chemistry and Industrial Chemistry, "High pressure high temperature technique as a tool for the synthesis of ceramic materials with transition metals in mixed valence state", Dr. Alberto Ubaldini, Advanced Nano Materials Laboratory, National Institute for Materials Science (NIMS), Tsukuba (Japan).
- 11) 22/4/2008, Dept. of Chemistry and Industrial Chemistry, "La grande macchina dei suoni: le tecnologie e i materiali degli organi a canne", Prof. Umberto Anselmi Tamburini, Dipartimento di Chimica Fisica dell'Università di Pavia.
- 12) 26/9/2008, Dept. of Chemistry and Industrial Chemistry, "Interferenti Endocrini: nuovo pericolo per la salute umana o falso allarmismo?", C. Liscio.
- 13) 26/9/2008, Dept. of Chemistry and Industrial Chemistry, "Carbon Nanotube: A leading material", P. Waghmare.
- 14) 26/9/2008, Dept. of Chemistry and Industrial Chemistry, "Crescita di Cristalli Singoli", R. Pasero.
- 15) 30/9/2008, Dept. of Chemistry and Industrial Chemistry, "Proprietà magnetiche inusuali in composti intermetallici", Prof. Julián G. Sereni, Low Temperature Division, CAB-CONICET, S.C. di Bariloche, Argentina.
- 16) 24/11/2008, Dept. of Chemistry and Industrial Chemistry, "Alkaline earth metals and europium intercalation into graphite in the presence of lithium", Dr. Nicolas Emery, Laboratoire de Chimie du Solide Minéral, Université /Henri Poincaré/ Nancy I, France.
- 17) 1/12/2008, Dept. of Chemistry and Industrial Chemistry, "Reazioni Tandem IEDHDA (Inverse Electron Demand Hetero-Diels-Alder) e cicloadizioni 1,3-dipolari di nitroalcheni", M. Maccagno
- 18) 1/12/2008, Dept. of Chemistry and Industrial Chemistry, "Sensori Chimici", P. Lecinska.
- 19) 13/5/2009, Dept. of Chemistry and Industrial Chemistry, "Microalghe: una risorsa per produrre biodiesel ed alimenti", Prof. M. Tredici, Università di Firenze.
- 20) 27/7/2009, Dept. of Chemistry and Industrial Chemistry, "Insulated molecular wires as model conjugated polymers with controlled interstrand interactions", Prof. Franco Cacialli, Department of Physics and Astronomy (CMMP Group) and London Centre for Nanotechnology, University College London.

- 21) 28/7/2009, Dept. of Chemistry and Industrial Chemistry, "Why can't you use thermal neutrons to study gadolinium-based materials?", Prof. Dominic Ryan, Mc Gill University (Montreal).
- 22) 6-10-2009, Dept. of Chemistry and Industrial Chemistry, "Acciai inossidabili: aspetti metallurgici della saldatura", M. Fabbreschi.

### *Teaching Assistance*