

**Decreto Rettore Università di Roma "La Sapienza" n. 192/2019 del 16/01/2019,  
CODICE CONCORSO 2018PAR053**

**Ilaria Fratoddi  
Curriculum Vitae**

**Part I – General Information**

Full Name	Ilaria Fratoddi
Date of Birth	
Place of Birth	
Fiscal code	
Citizenship	
Permanent Address	
Mobile Phone Number	
E-mail	
Spoken Languages	

**Part II – Education**

Type	Year	Institution	Notes (Degree, Experience,...)
Laurea in Chimica	1995	Università degli Studi di Roma La Sapienza	110/110. Thesis entitled: Sintesi, caratterizzazione e proprietà di poli(N,N-dimetilpropargilamina) con siti di palladio intercalati: studio XPS, tutor A. Furlani Donda
Pre-doctorate training	1996	CNR Institute of Solid State Electronics (Istituto di Elettronica dello Stato Solid, CNR-IESS)	Scientific collaboration
Qualification for Chemistry Profession	1996	Università degli Studi di Roma La Sapienza	Abilitazione alla professione di Chimico
Admission to the PhD in Chemical Sciences, cycle XII (1996-1999) at Università di Roma "La Sapienza	1996	Università degli Studi di Roma La Sapienza	
phD in Chemical Sciences	2000	Università degli Studi di Roma La Sapienza	phD thesis entitled: Sintesi e caratterizzazione di polimeri ed oligomeri organometallici $\pi$ -coniugati". tutor A. Furlani Donda. Final exam on 7/2/2000.

### Part III A – Academic Appointments

Start	End	Institution	Position
11/1995	06/1996	CNR Institute of Solid State Electronics (Istituto di Elettronica dello Stato Solido, CNR-IESS)	Holder of a professional collaboration contract entitled: "Studio della possibilità di sintesi e caratterizzazione di strutture polimeriche per la realizzazione di dispositivi attivi e passivi"
10/96	12/1996	CNR Institute of Solid State Electronics (Istituto di Elettronica dello Stato Solido, CNR-IESS)	Holder of a professional collaboration contract entitled: "Materiali con proprietà plastiche per applicazioni come dispositivi attivi in elettronica"
02/2000	10/2000	Università degli Studi di Roma La Sapienza, Dept of Chemistry	Holder of annual scientific collaboration contract (co.co.co) entitled: "Sintesi e caratterizzazione di polimeri $\pi$ -coniugati e loro applicazione in sensoristica"
04/2001	12/2004	Università degli Studi di Roma La Sapienza, Dept of Chemistry	Holder of annual scientific collaboration contract (Assegno di Ricerca) entitled: "Polieni e poliini: sintesi, caratterizzazione e proprietà ottiche e sensoristiche"
2004		Università degli Studi di Roma La Sapienza, Dept of Chemistry	Ranked 1° at the competition for a position of "Ricercatore Universitario" in Inorganic Chemistry (CHIM 03), D.R. 10/12/2004.
2005	2008	Università degli Studi di Roma La Sapienza, Dept of Chemistry	Ricercatore Universitario non confermato, presa servizio 03/01/2005
2008	current	Università degli Studi di Roma La Sapienza, Dept of Chemistry	Ricercatore Universitario Confermato, SSD CHIM03
2012	2018	MIUR	Qualified for the role of "Professore di II fascia PA, Settore Concorsuale 03/B2, ex SSD CHIM/07, Fondamenti chimici delle Tecnologie, Macrosettore 03/B Inorganico Tecnologico"
04/2017	04/2023	MIUR	Qualified for the role of "Professore di II fascia, PA, Settore Concorsuale 03/B1, Fondamenti delle Scienze Chimiche e Sistemi Inorganici, SSD CHIM/03, Inorganic Chemistry"
04/2017	04/2023	MIUR	Qualified for the role of "Professore di I fascia, PO, Settore Concorsuale 03/B1, Fondamenti delle Scienze Chimiche e Sistemi Inorganici, SSD CHIM/03, Inorganic Chemistry"

### Part III B – Other Appointments

Year	Institution	Position
09/2019	Yerevan University, Armenia	Scientific visit and invited seminar at the ANAM Advanced Nanomaterials and Methods conference
10/2008	Mosca, Accademia Russa delle Scienze RAS, Istituto Kurnakov di Chimica Generale ed Inorganica, Russia	Scientific visit and invited seminar entitled "Nanostructured polymetallaynes and related model molecules. Synthesis and characterization"
2007 2008 2010	Università di Malaga, Dipartimento di Chimica Fisica, Spagna	In the framework of the ERASMUS Teaching Staff Mobility, visiting staff for the organization of new bilateral agreements and 8 h of classes for students and researchers on different research topics: "Organometallic Polymers", 04/ 2007 "Nanostructured polymers" 09/2008 "Nanostructured macromolecules" 10/2010 "Metal nanoparticles", 10/2010
2010 2011	Università Joseph Fourier Grenoble, France ed Istituto Neel CNRS	In the framework of the ERASMUS Teaching Staff Mobility, visiting staff for the organization of new bilateral agreements and 8 h of classes for students and researchers on different research topics: "Metal nanoparticles and core-shell systems: synthesis, characterizations and applications" 05/2010 "Synthesis and characterizations of nanostructured polymers" 05/2010 "Nanostructured macromolecules" 02/2011 "Metal nanoparticles", 02/2011
2013	Universitat Autònoma de Barcelona, Spagna	In the framework of the ERASMUS Teaching Staff Mobility, visiting staff for the organization of new bilateral agreements and 8 h of classes for students and researchers on different research topics: "Functionalized Noble Metal Nanoparticles: from Synthesis to Applicative Studies" 09/2013

#### Part IVA – Teaching experience

a.a	Institution	Lecture/Course
2000-2001	Università Roma TRE, Faculty of Science	Affidamento oneroso "Chimica dei Materiali II" per il diploma universitario in Scienza dei Materiali
2005-2006	Università Sapienza di Roma, Faculty of Science MFN	Affidamento/supplenza: "Chimica Generale ed Inorganica", Bachelor Degree, CdS Chimica, 6 CFU
2006-2007	Università Sapienza di Roma, Faculty of Science MFN	Affidamento/supplenza: "Laboratorio di Chimica Generale ed Inorganica", Bachelor Degree, CdS Chimica, 6 CFU
2005-2006	Università Sapienza di Roma, Faculty of Science MFN	Affidamento/supplenza: "Chimica e Tecnologia dei Polimeri", Bachelor Degree, CdS Chimica, 2 CFU (1 modulo)
2006-2007		
2007-2008		
2008-2009		
2005-2006	Università Sapienza di Roma, Faculty of Science MFN	Affidamento gratuito "Chimica" Bachelor Degree, CdS Fisica, 6 CFU
2006-2007		
2007-2008		
2008-2009		
2009-2010		
2010-2011		
2011-2012		
2012-2013		
2013-2014		
2010-2011	Università Sapienza di Roma, Faculty of Science MFN	Affidamento "Chimica Inorganica 1" Bachelor Degree, CdS Chimica, 6 CFU  Percentuale di valutazioni OPIS positive, studenti frequentanti (fonte Infostud, Rilevazioni Dati Studenti OPIS) relative agli ultimi anni: aa 2014-2015= 98% aa 2015-2016= 94% aa 2016-2017= 95% aa 2017-2018= 96%
2011-2012		
2012-2013		
2013-2014		
2014-2015		
2015-2016		
2016-2017		
2017-2018		
2018-2019		
2015-2016	Università Sapienza di Roma, Faculty of Science MFN	Affidamento "Chimica dei Materiali Polimerici" Master Degree, CdS Chimica analitica, 6 CFU  Percentuale di valutazioni OPIS positive, studenti frequentanti (fonte Infostud, Rilevazioni Dati Studenti OPIS) relative agli ultimi anni: aa 2015-2016= 86% aa 2016-2017= 85% aa 2017-2018= 82%
2016-2017		
2017-2018		
2018-2019		

#### Part IVB – Other teaching appointments

She was in the commission for the Bachelor Degree Final Exams in Chemistry and Industrial Chemistry.

She was in the commission for the Master Degree Final Exams in Chemistry, analytical Chemistry and Industrial Chemistry.

#### Part IV C – Supervisor of Thesis Works

Master Thesis in Chemistry, Analytical Chemistry or Industrial Chemistry, carried out at Università di Roma La Sapienza  
- Total number = 22

Thesis supervised in Sapienza, with visiting students in collaboration with other National and International Institutions,  
- Total number n = 6

Bachelor Thesis in Chemistry, Physics or Industrial Chemistry, carried out at Università di Roma La Sapienza  
- Total number = 48

#### Part IV D – Supervisor of PhD Thesis Works carried out at Università di Roma La Sapienza

cycle	Title of the PhD Thesis work	Student/PhD School
XXVIII	Nanoparticelle d'oro funzionalizzate con tioli organici ed organometallici e studio delle loro proprietà optoelettroniche	Laura Fontana Scienze Chimiche
XXXI	Development of nanomaterials and nanocomposites for sensor applications	Paolo Papa Scienze Chimiche
XXXI	Synthesis, characterization and application of hydrophilic nanostructures to the life sciences	Giovanna Testa Modelli Matematici per l'Ingegneria, Elettromagnetismo e Nanoscienza (cv Scienza dei Materiali)
XXXII	Gli oligomeri prefibrillari amiloidi di calcitonina di salmone: studio dei meccanismi d'interazione con membrane cellulari modello finalizzato alla progettazione di nanoparticelle per la diagnosi e la cura delle malattie associate Ongoing	Raoul Fioravanti Scienze Chimiche
XXXIII	Sintesi di nanoparticelle metalliche funzionalizzate per applicazioni in nanomedicina ed optoelettronica ongoing	Sara Cerra Scienze Chimiche

#### Part IV E – Tutor for PostDoc Visiting Students

From-to	Title	postDOC
09/2013-03/2014	Sintesi di nanoparticelle d'oro stabilizzate con polimeri idrofili per applicazioni biotecnologiche	<b>Dr. Taha Farghaly</b> Università El Cairo, Egitto
11/2014-05/2015	Immobilizzazione di molecole farmacologicamente attive su nanoparticelle d'oro per applicazioni in dermatologia	<b>Dr.ssa Hagar Bessar</b> Università Zedig, El Cairo, Egitto
02/2015-03/2015	Sintesi di quantum dots e loro interazione con nanoparticelle metalliche	<b>Dr. Luzia Rodzic</b> Università Cracovia, Polonia
10/2016-03/2017	Synthesis of metal nanoparticles	<b>Dr. Kenya Motokuni</b> Università Fukuoka, Giappone

#### Part V - Society memberships, Awards and Honors

Year	Title
1996	Member n 9881 of Società Chimica Italiana
2012	Member of CNIS (Centro delle Nanotecnologie per l'Ingegneria della Sapienza)
2015	Award for the teaching of Chimica Inorganica I: a.a. 2013-2014, second edition: INSEGNAMENTO UNIVERSITARIO ECCELLENTE. This award is assigned once a year by the Dean of the Faculty of Science of University of Rome "La Sapienza" for the teachings given during the previous academic year. The prize is assigned to the 5% of the teachers of the Faculty who distinguished in the teaching.
2018	Award for the teaching of Chimica Inorganica I: a.a. 2017-18, fourth edition: INSEGNAMENTO UNIVERSITARIO ECCELLENTE. This award is assigned once a year by the Dean of the Faculty of Science of University of Rome "La Sapienza" for the teachings given during the previous academic year. The prize is assigned to the 5% of the teachers of the Faculty who distinguished in the teaching.

## Part VI - Funding Information

### Part VI A grants as PI-principal investigator

Year	Title	Program	Grant value (Euro)
2017	Bando Nazionale sul Finanziamento della Attività Base di Ricerca. GU n.297 del 21-12-2016 - Suppl. Ordinario n. 57	Fondo FFARB-Ministero MIUR	3000
2017	Nanomaterials for optoelectronics and nanobiotechnologies: synthesis, characterization and applicative studies on functionalized metal nanoparticles and polymer based nanostructures	Ateneo Sapienza Ricerca, RM11715C792D1AF3	12500
2017	Visiting Professors: Prof. Grigorian Souren	Ateneo Sapienza C26V17R7ER Professori Visitatori	3 months
2016	Functionalized metal nanoparticles for sensor and drug delivery applications	Ateneo Sapienza Ricerca, 2016	11000
2015	Synthesis and characterization of functionalized metal nanoparticles for advanced applications	Ateneo Sapienza Ricerca C26A15H5J9	11000
2014	Functionalized noble metals nanoparticles: from synthesis to applicative studies for optoelectronics and biophotonics	Ateneo Sapienza Ricerca C26A14FCZP	8500
2013	Sintesi e caratterizzazione di nanoparticelle metalliche funzionalizzate con dimensioni e proprietà modulabili per applicazioni in biofotonica	Ateneo Sapienza Ricerca C26A13HRZ4	7000
2011	Nanoparticelle polimeriche e metalliche funzionalizzate: sintesi, caratterizzazione e studi applicativi in biotecnologia e fotovoltaico	Ateneo Sapienza Ricerca C26A11PKS2	12000

**Part VI B grants as coinvestigator**

Year	Title	Program	Grant total value
2013-2014	Preparazione di materiali nanostrutturati innovativi a base polimerica e compositi come assorbitori di etilene prodotto dalla frutta nelle fasi di stoccaggio e trasporto	Grant ENEA Progetto: "Risparmio di energia elettrica nei settori: civile, industria e servizi" Obiettivo: "Tecnologie per l'industria del freddo" Resp ENEA L. Quercia, Resp. sapienza M.V. Russo	25000
2011	Polimeri nanostrutturati per applicazioni avanzate in biomedicina	Ateneo Sapienza FARI Anno: 2011 - prot. C26I11WH3P Resp M.V. Russo	7000
2010	Sintesi e caratterizzazione di nanomateriali: particelle polimeriche e metalliche funzionalizzate per applicazioni in biomedicina	Progetti di Ricerca di Università Sapienza Anno: 2010 – prot. C26A10ZSHC Resp M.V. Russo	10000
2009	Sintesi e caratterizzazione di nanosistemi: particelle polimeriche e metalliche funzionalizzate per applicazioni in sensoristica e biomedicina	Progetti di Ricerca di Università Anno: 2009 - prot. C26A09AS5R Resp M.V. Russo	12000
2008	Sviluppo sintetico e caratterizzazione elettronica avanzata di nuovi sistemi molecolari d'interesse nelle scienze dei materiali nano strutturati	Ricerca di Ateneo Federato AST-prot. 26F09MA27 Resp. S. Stranges	10000
2010-2011	Polimeri nanostrutturati per applicazioni avanzate in biomedicina	Progetti di Grande Rilevanza, selezionati nel quadro del Programma Esecutivo di cooperazione scientifica e tecnologica tra Italia e Brasile nel settore MA-5, Materiali Avanzati, Ministero Affari Esteri Resp. M.V. Russo	40000
2008-2010	Satellite structure of photoelectron spectra of atoms and chemical compounds	CNR/RAS 2008-2010 Resp. L. Avaldi	
2008	Sintesi e caratterizzazione di polimeri nano strutturati e macrocicli tetrapirrolici	Progetti di Ricerca di Università 2008 prot C26A08LHEK Resp. M.V. Russo	20000

**Part VII A – Organization Activities and other institutional roles**

<b>Period</b>	<b>Role</b>
2012-2016	Member of the Commission for Quality Control (Team Qualità) for the didactics in Chemistry Bachelor and Master Degrees
2011-2016	Referent for Area CUN CHIM03, Macroarea 1-Ateneo Sapienza (Referente d'area)
2013-2016	Member of the "Giunta" for Chemistry Department (from 31/10/2013, 3 years)
2016	Member of "Giunta " of Science MFN Faculty from 24/02/2016, to 31/10/2016
2015	Responsible of the Quality Control team for the Master Degree in Chemistry (Responsabile del Riesame)
2015-ongoing	RAM, "Referente Accademico per la Mobilità Internazionale" for Chemistry and Industrial Chemistry (delibera di Facoltà del 10/12/2015)
2015-ongoing	CAM, Coordinatore Accademico per la Mobilità Internazionale for Chemistry and Industrial Chemistry (delibera di Facoltà del 10/12/2015)
2015-ongoing	Member of the PhD Board of the PhD School in Chemical Sciences of the University of Rome La Sapienza
2016	Member of the commission for the admission to the PhD School in Chemical Sciences of the University of Rome La Sapienza (XXXII Cycle)
2017	Member of the commission for the final exam of the PhD School in Material Science Nanotechnology and Complex systems, XXIX cycle, Roma Tre
2018	Member of the Faculty commission for the teaching assignments (conferimento incarichi di insegnamento) for the a.a. 2018-2019
2018	President of two Faculty commissions for TOLC-S tests for a.a. 2018-2019 (14/09/2018 and 17/09/2018)
2010-ongoing	Member for Faculty Commissions for Erasmus grants mobility for students

## Part VII B– Reviewer and Editorial Activity

### Projects referee

2018	Referee for research proposals submitted to the FONDECYT Regular 2019 grant competition, an initiative of the Chilean National Science and Technology Commission (CONICYT, Chile)
2015-ongoing	Referee for national Projects (Reprise Register of Expert Peer Reviewers for Italian Scientific Evaluation MIUR)
2013-2015	Referee for the Ministero dell'Istruzione dell'Università e della Ricerca (MIUR – Italian Administration) in the frame of the calls: FIRB 2013
2011-2013	Referee for the evaluation of research products conferred in the VQR 2004-2010.

### Journals referee

Editor	Journals
Elsevier	Sensors & Actuators: B. Chemical, Acta Biomaterialia, Polymer, Journal of Organometallic Chemistry, Colloids and Surfaces B: Biointerfaces, Colloids and Surfaces A, Materials Letters
Wiley	Journal of Applied Polymer Science, Chemistry - A European Journal
ACS	ACS Applied Materials & Interfaces, Langmuir, ACS Applied Nano Materials, ACS Biomaterials Science & Engineering
Royal Society of Chemistry	Dalton Transactions, Inorganic Chemistry Frontiers, Journal of Materials Chemistry B, Nanoscale.
MPDI	Journal of Nanomaterials, Nanomaterials
Future Medicine	Nanomedicine
Springer	Transition Metal Chemistry, Journal of Nanostructure in Chemistry

### Editorial Activity

Date	Journal/role
2018-ongoing	New Multidisciplinary Journal Sci (MPDI): Member of the Advisory Board ISSN 2413-4155, mdpi.com/journal/sci; <a href="https://www.mdpi.com/journal/sci/editors">https://www.mdpi.com/journal/sci/editors</a>
2015-ongoing	Journal of Nanomaterials (Hindawi): Member of the Editorial Board peer-reviewed, open access journal, Impact Factor 2016 = 1.871
2018-ongoing	Sensors, section Chemical Sensors (MPDI): Member of the Editorial Board peer-reviewed, open access journal, Impact Factor 2016 = 2.677
2018	Sensors, special Issue Nanoparticles based Gas Sensors (MPDI): Guest Editor peer-reviewed, open access journal, Impact Factor 2016 = 2.677

2018	Bioengineering, special Issue Gold Nanoparticles based Bioengineering Applications (MPDI): Guest Editor peer-reviewed, open access journal, Impact Factor 2016 = 2.677
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2018	Materials, special Issue Noble Metal Nanoparticles (MPDI): Guest Editor peer-reviewed, open access journal, Impact Factor 2016 = 2.677
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#### Chair Activity and last Conferences

2017	Conferenza NanoInnovation Conference and Exhibition, (Roma 26-29 Settembre 2017), sessione Nanotechnology for new devices and systems, Chair
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2018	ICONAN International Conference On Nanomedicine And Nanobiotechnology 2018 Scientific Committee - <a href="https://iconan2018.exordo.com">https://iconan2018.exordo.com</a> (Rome on Sept 26-28th, 2018)
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2019	ICONAN International Conference On Nanomedicine And Nanobiotechnology 2018 Scientific Committee - <a href="https://iconan2019.exordo.com">https://iconan2019.exordo.com</a> (Monaco, De, Oct 16-18th, 2019)
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2019	Share Science, Faculty of Sciences, Sapienza University, Organizing committee (Oct 28-30, 2019)
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2019	Advanced Nanomaterials and Methods - ANAM2019 International Young Scientist School and Workshop, seminar and talks on invitation, 25 September - 2 October 2019, Yerevan, Armenia, <a href="https://anam2019.org/index.php">https://anam2019.org/index.php</a>
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## Part VIII– Research Activities

My research interest concerns the topics of Inorganic Chemistry, and specifically chemical synthesis, structural and functional characterizations of innovative and nanostructured materials with the final aim of developing knowledge-based materials for advanced technological applications. In particular, my research approach integrates the advanced synthesis methods for organometallic complexes and rigid rod polymers, nanostructured polymers, and functionalized metal nanoparticles, with structural and functional characterization of the materials, that are suitable for applications in optoelectronics, sensors, photonics, nanomedicine and biotechnology. In the following paragraphs, the research topics are summarized in three main subject areas.

Keywords	Brief Description
Pt(II) and Pd(II) square planar complexes	<b>Organometallic polymers and model molecules</b> The research on organometallic polymers and model molecules concerned an important field of Inorganic Chemistry, focusing on the synthesis of new alkynyl complexes, model molecules, oligomers and rigid rod polymers and their structural characterization. The focus of this topic was aimed at the obtainment of p-conjugated systems: the extension of the conjugation length through the metal d electrons can be tuned by a proper choice of the synthetic parameters and make these materials good candidates for example for optoelectronic applications. We focused our studies on derivatives of 1,4-diethynylbenzene, 2,6-diethynyl-4-nitroaniline, 1,1'-bisethynyl-4,4'-biphenyl or diethynylporphyrin, and thanks to metal-carbon coupling reactions (i.e. Stille and Hagihara routes) soluble and stable mononuclear, binuclear and polynuclear complexes were obtained in the presence of square planar Pt(II) or Pd(II) complexes. The synthetic pathways were compared, and it was possible to isolate oligomers with a very well-defined number of repeating units. FTIR, UV-vis, PL, $^1\text{H}$ , $^{31}\text{P}$ , $^{13}\text{C}$ -NMR, GPC and XPS studies were used to assess the structural features and synchrotron radiation spectroscopies such as NEXAFS, EXAFS and REFL-EXAFS allowed to study the local structure around the metal centers and molecular orientation onto different substrates. Morphology studies were carried out by SEM and AFM and the materials were successfully used as chemical sensors in MBQ and SAW devices. The interaction with donor analytes like $\text{H}_2\text{S}$ was studied and with combined spectroscopic techniques and EXAFS studies highlighted the formation of pentacoordinated platinum units in square-pyramidal geometry. This Research activity was supported by Ateneo grants Sapienza 2000-2014; MAE bilateral agreement with Brazil 2010. This research activity is represented by 25 papers in international journals and 1 international patent.
Metal Alkynyl complexes	
Rigid-rod polymers	
Conjugated polymers	
Metal polyyenes	

Keywords	Brief Description
Nanostructured polymers	<b>Nanostructured polymers: polyacetylene derivatives, polyacrylates and copolymers</b>
Monosubstituted polyacetylenes	<p>Another topic of my research was focused on the synthesis of bulk and nanostructured polymers. Starting from monosubstituted polyacetylene derivatives, synthesized in the presence of Rh(I) complexes or with on purpose prepared Pd(II) complexes, I obtained a series of conjugated monosubstituted polyacetylenes. These materials showed the advantage, compared the polyacetylene, of being soluble and easily processable, maintaining however the semi conduction properties due to the alternate system of conjugated double bonds. One of the main objectives of this study was to obtain thin films suitable for resistive sensor applications and the tests carried out proved these materials to be sensitive to very low levels of relative humidity and alcohols (down to 0.02 mol/m<sup>3</sup>) with reproducible and selective response. In order to drive the deposition of nanostructured films, a physical method for precipitation was object of an international patent. The idea was to control the precipitation by using an osmosis-based procedure. The method revealed to be applicable to really different polymers, either synthetic and natural, giving rise to different shapes and sizes from micro to the nanoscale. The research's interest towards the synthesis of nanostructured polymers was then oriented to the radical polymerization in emulsion conditions, in order to obtain polymeric nanobeads with different surface functionalities. Among others, acrylate monomers were used both alone and in the presence of co-monomers. The potentiality of this method was exploited and polymeric nanospheres with sizes in the range 50-800 nm were obtained. When deposited in large scale domains, the nanospheres self-assembly in ordered photonic crystals and the surface functionality can be tuned towards different degrees of hydrophilicity. These last systems were tested to be biocompatible and used in the loading of drugs and bioactive molecules (such as antibodies or enzymes) and tested in drug delivery and biocatalysis applications.</p>
Polyacrylates	This Research activity was supported by Ateneo grants Sapienza 2010-2017; ENEA 2013.
Polymeric nanospheres	This research activity is represented by 23 papers in international journals, 1 book chapter, and 1 international patent.
Drug loading and release	
Nanobiotechnology	
Sensors	

Metal nanoparticles	<b>Metal nanoparticles with tunable surface functionalization</b>
AuNPs, AgNPs, PtNPs	<p>In recent years, my research activity has mostly concerned the synthesis and structural characterization of functionalized metal nanoparticles. This relatively recent branch of Inorganic Chemistry studies systems on the nanoscale, their characterizations and the relationship between structure and properties. In particular, my investigation was focused on the synthesis of Au, Ag, Pt, and Pd nanoparticles, systems with very low size (2-40 nm) and tunable functional layers onto the surface. In the first studies, the synthesis was optimized for organic alkylic and aromatic thiols, either in water or in organic solvent conditions. With this approach water or organic solvent stable colloidal suspension can be obtained. Hydrophilic and hydrophobic thiols were proved to be stable ligands on the metal surface. The structural and morphology characterizations (FTIR, Far-IR, ATR, UV-vis, PL, NMR, XPS, GIXD, XAS SEM, AFM, TEM) were carried out together with the dynamic light scattering and Zeta potential studies. The surface charge is a fundamental subject in this field and, in particular, positively or negatively charged nanoparticles were obtained. In order to tune this feature, reactions in the presence of a mixture of thiols were also carried out. As an applicative development of these studies, hydrophilic gold and silver nanoparticles were used as drug loading systems. One of the most recent result successfully demonstrated the topical delivery of the drug methotrexate for medical application. Moreover, the previous studies I carried out on organometallic Pt(II) and Pd(II) complexes have been my inspiration for a one-pot diacylation reaction on organometallic derivatives and allowed to produce stable metal nanoparticles starting from mononuclear and dinuclear metal thiolate complexes. This last topic is currently under study in my laboratory: when a terminal dithiolate is used, it is possible to obtain interconnected metal nanoparticles, which open new perspectives in the solid state applications for example in optoelectronic devices. Experimental tests on electric conductivity successfully demonstrated a semi-conductive characteristic of the interconnected metal nanoparticles which varies depending on the chosen dithiolate.</p>
Hydrophilic metal nanoparticles	
Hydrophobic metal nanoparticles	
Optoelectronics	
Drug loading and release	
	This Research activity was supported by Ateneo grants Sapienza 2014-2017.
	This research activity is represented by 45 papers in international journals.

## Part IX – Summary of Scientific Achievements

Product type	Number	Data Base
Total number of papers on international peer reviewed journals	107	Scopus
Total number of Book Chapters on Scopus	3	Scopus
Total number of Conference Papers Scopus	7	Scopus
Total number of papers, including conference papers and books	117	Scopus
Total number of Patents	2 + 2 ongoing	Scopus
H index	29	Scopus
Total number of citations	2200	Scopus
Average citations per publication	20.6 (obtained as 2200/107)	Scopus
	20.1 (considering only the citations of the 107 papers, equal to 2155, i.e. 2155/107)	Scopus
Total Impact Factor*	330	Journal Citation Reports (JCR)
Average Impact Factor per publication*,¥	3,1	Journal Citation Reports (JCR)
Number of papers in the last 10 years	80 (76 on international journals + 4 conference papers)	Scopus
H index in the last 15 years	27	Scopus
Total Number of Papers as corresponding author	40	Scopus
Total Number of Papers as Last Author (Leader Researcher)	13	Scopus
Total Number of Papers as First Author	27	Scopus

The Impact Factor is related to the year of publication (for the most recent publications, if not yet available, the IF related to the previous year of the publication year is used). ¥ Obtained by (Total Impact Factor) / 107 since the book chapters, conference papers and patents do not contribute to the total impact factor.

Total Impact factor calculated from data obtained using the Journal of Citation Reports database; Citation retrieved from Scopus (on 09/2019); Average Citation per Product calculated in respect to the number of products quoted in the Scopus Database.

## Part X– Direction or Participation to the activities of a research group characterized by international and national collaboration.

My research activity is carried out in the Dpt of Chemistry of Sapienza and I coordinate my research group called Laboratorio Materiali Nanostrutturati independently from 4 years. In my laboratory I have the opportunity to discuss daily the research results with several master students and during this time I was supported by the work of the PhD students I have tutored. I had the opportunity to coordinate also postdocs as visiting scientists and this gave to me the chance to improve the national and international collaborations.

In the last years I collaborated with several colleagues at the department of Chemistry, only to cite some of them: C. Palocci (biocatalysis), M. Delfini, F. Sciubba (NMR), A. Cartoni (radioguided surgery), M. Bassetti, (organic synthesis), E. Bodo (theoretical studies), D. Dini (applications in energy). Moreover, in my research I work in collaboration with several national and international groups for specific characterizations and applicative tests. It follows a short indicative list of the main collaborations together with the most relevant publications in collaboration:

### National collaborations:

Thanks to the collaboration with Prof G. Familiari, R. Matassa, R. Li Voti, A. Belardini, C. Sibilìa (Sapienza) and F. De Matteis, P. Proposito (Tor Vergata), I had the opportunity to deeply investigate the photonic behaviour of nanostructured polymers and plasmonic nanoparticles.

- Electron Microscopy Reveals Soluble Hybrid Network of Individual Nanocrystal Self-Anchored by Bifunctional Thiol Fluorescent Bridges  
Matassa, R., Familiari, G.; Battaglione, E.; Sibilìa, C.; Lehu, G.; Belardini, A.; Venditti, I.; Fontana, L.; Fratoddi, I., *Nanoscale* 2016, 8, 18161-18169
- Electronic Properties of a Functionalized Noble Metal Nanoparticles Covalent Network  
Fratoddi, I.\*; Matassa, R. Fontana, L., Venditti, I.; Familiari, G.; Battocchio, C.; Magnano, E.; Nappini, S.; Lehu, G.; Belardini, A.; Li Voti, R.; Sibilìa, C., *J Phys Chem C* 2017, 121, 18110-18119
- From nanospheres to microribbons: self-assembled Eosin Y doped PMMA nanoparticles as photonic crystals  
De Angelis, R.; Venditti, I.; Fratoddi, I.; De Matteis, F.; Proposito, P.; Cacciotti, I.; D'Amico, L.; Nanni, F.; Yadav, A.; Casalboni, M.; Russo, M. V., *Journal of Colloid and Interface Science*, 2014, 414, 24-32

The collaboration with Prof. C. Battocchio (Roma Tre) had the main objective to elucidate the structural properties of materials with synchrotron assisted techniques.

- Self-Assembling Monolayers of dialkynyl bridged Pd(II) thiols obtained by thermally induced multilayer desorption: thermal and chemical stability investigated by SR-XPS  
Battocchio, C.; Fratoddi, I.; Bondino, F.; Malvestuto, M.; Russo, M.V.; Polzonetti, G. *Chemical Physics Letters* 2012, 527, 57-62
- Gold nanoparticles stabilized with aromatic thiols: interaction at the molecule-metal interface and structure of the molecular shell investigated by SR-XPS and NEXAFS  
Battocchio, C.; Porcaro, F.; Mukherjee, S.; Magnano, E.; Nappini, S.; Fratoddi, I.; Quintiliani, M.; Russo, M.V.; Polzonetti, G. *J Phys Chem C*, 2014, 118, 8159 - 8168

The collaboration with Dott. A. Bearzotti (CNR) was mainly focused on sensing studies with resistive and microbalance quartz devices.

- Platinum nanoparticles on electrospun titania nanofibers as hydrogen sensing material working at room temperature  
Fratoddi, I.; Macagnano, A.; Battocchio, C.; Zampetti, E.; Venditti, I.; Russo, M.V.; Bearzotti, A. *Nanoscale*, 2014, 6, 9177-9184.

The biological studies, such as biocompatibility and tests on cells and murine models were carried out with the collaboration of several groups, for example:

Polidinic Gemelli and Physics Department Sapienza, prof R. Faccini and P.Giordano on radioguided surgery:

- Feasibility of  $\beta$ -particle Radio Guided Surgery for a variety of "nuclear medicine" Radionuclides  
Mancini-Terracciano, C.; Donnarumma, R.; Bencivenga, G.; Bocci, V.; Cartoni, A.; Collamati, F.; Fratoddi, I.; Giordano, A.; Indovina, L.; Maccora, D.; Marafini, M.; Mirabelli, R.; Morganti, S.; Rotili, D.; Russomando, A.; Scotognella, T.; Solfaroli Camillocci, E.; Toppi, M.; Traini, G.; Venditti, I.; Faccini, F. *Physica Medica*, 2017, 43, 127–133

University of Tor Vergata, dr. E. Botti and University of Modena, Prof. G. Pellacani, L.Benassi for murine models studies and for topical drug delivery studies on nanoparticles.

- Functionalized gold nanoparticles for topical delivery of methotrexate for the treatment of psoriasis  
Bessar, H.; Venditti, I.; Benassi, L.; Vaschieri, C.; Azzoni, P.; Pellacani, G.; Magnoni, C.; Botti, E.; Casagrande, V.; Federici, M.; Costanzo, A.; Fontana, L.; Testa, G.; Mostafa, F. F.; S. A. Ibraim; Russo, M.V.; Fratoddi, I.\*; *Colloids and Surfaces B: Biointerfaces* 2016, 141, 141–147
- Effects of topical methotrexate loaded gold nanoparticle in cutaneous inflammatory mouse model  
Fratoddi, I.; Benassi, L.; Botti, E.; Vaschieri, C.; Venditti, I.; Bessar, H.; Mai, S. A.; Azzoni, P.; Magnoni, C.; Costanzo, A.; Casagrande, V.; Federici, M.; Bianchi, L.; Pellacani, G. *Nanomedicine: Nanotechnology, Biology, and Medicine*, accepted 2019

#### **International Collaborations**

The collaboration with prof. S. Grigorian (University of Siegen, Germany) helped to study the electronic transport mechanism of nanomaterials. Moreover, the GIXD and XRay absorption studies carried out in collaboration were used to investigate the 3D arrangement of metal nanoparticles. Prof Grigorian spent three months here in Sapienza during 2018, thanks to a grant as a Visiting Professor. This experience was really important to consolidate our collaboration and during his stay we submitted applications for synchrotron shifts (Dormund and Paris) and for an international call joint with a group in the university of Marseille. We are waiting for the referring process.

- Local structure of semicrystalline P3HT films probed by nanofocused coherent x-rays  
Kurta, R.P.; Grodd, L.; Mikayelyan, E.; Gorobtsov, O.Y.; Zaluzhnyy, I.A.; Fratoddi, I.; Venditti, I.; Russo, M.V.; Sprung, M.; Vartanyants, I.A.; Grigorian, S. *Phys. Chem. Chem. Phys.*, 2015, 17, 7404-7410
- Structural studies on drop-cast film based on functionalized gold nanoparticles network: the effect of heating treatment  
Fontana, L.; Fratoddi, I.\*; Venditti, I.; Ksenzov, D.; Russo, M.V.; Grigorian, S. *Applied Surface Science* 2016, 369, 115-119

Another important international collaboration is with prof C.F.O. Graeff (University of Bauru). We obtained an important grant in 2010 and we started a fruitful collaboration on the use of metal polyyenes and recently one of the Master student I am tutoring was in Brazil for a visit of 6 months supported by a grant of Regione Lazio. We are planning new researches together and we applied for a Brazilian grant together.

- Structural Changes of Conjugated Pt-Containing Polymetallaynes Exposed to Gamma Ray Radiation Doses  
Fratoddi, I.; Bronze-Uhle, E.S.; Batagin-Neto, A.; Fernandes, D.M.; Bodo, E.; Battocchio, C.; Venditti, I.; Decker, F.; Russo, M.V.; Polzonetti, G.; Graeff, C.F.O. *J. Phys. Chem. A* 2012, 116, 8768–8774
- Poly [1,1'-bis(ethynyl)-4,4'-biphenyl(bis-tributylphosphine)Pt(II)] solutions used as low dose ionizing radiation dosimeter  
Bronze-Uhle, E. S.; Batagin-Neto, A.; Fernandes, D. M.; Fratoddi, I.; Russo, M. V., O. Graeff, C. F. *Applied Physics Letters*, 2013, 102, 241917 4

I recently started a new collaboration with Prof. R. Huirache Acuna (University of Mexico) and we are organizing an exchange visit for PhD students on the preparation and applications of nanoparticles in biotechnology.

## Part – XI Conference communications

The results of my research work have been presented by me and by my co-workers with poster (P) and oral (O) presentation in more than 180 communications held at national and international congresses from 1996 to 2019.

Herein I give a short list of a selection of the most relevant communications in the last 5 years. When the contribution was an oral by myself, I wrote **O\***.

- 1)** Nanostructured polymers decorated with Cu(I) salts as novel active materials for ethylene detection  
Caprioli, F.; Di Lorenzo, P.; Palumbo, D.; Venditti, I.; Fratoddi, I.; Russo, M.V.; Quercia, L.  
symposium B: Advanced functional materials for environmental monitoring and applications of the E-MRS 2014 Spring Meeting, Lille (France) from May 26 to 30, 2014. (P)
- 2)** Functional Gold Nanoparticles for biomedical applications  
Venditti, I.; Fratoddi, I.; Porcaro, F.; Battocchio, C.; Polzonetti, G.; Russo, M.V.  
XXV Congresso della Società Chimica Italiana, Arcavacata di Rende, Cs, 6-12 settembre 2014 (O)
- 3)** Bifunctional ligands as capping agent for gold nanoparticles: synthesis and characterizations  
Fontana, L.; Fratoddi, I.; Venditti, I.; Russo, M.V.  
XXV Congresso della Società Chimica Italiana, Arcavacata di Rende, Cs, 6-12 settembre 2014 (P)
- 4)** Structural properties of semicrystalline P3HT films probed by nanofocused diffraction  
Kurta, R.; Grodd, L.; Mikayelyan, E.; Gorobtsov, O.; Zaluzhnyy, I.; Fratoddi, I.; Venditti, I.; Sprung, M.; Grigorian, S.; Vartanyants, I.  
XTOP conference 2014, 12<sup>th</sup> Biennial Conference on High Resolution X-ray Diffraction and Imaging  
14-19 September 2014 Villard de Lans France (O)
- 5)** Hydrophobic noble metal nanoparticles: synthesis, characterization and perspectives as gas sensing materials  
Bearzotti, A.; Fontana, L.; Fratoddi, I.; Venditti, I.; Testa, G.; Rasi, S.; Gatta, V.; Russo, M.V.; Zampetti, E.; Papa, P.; Macagnano, A.  
EuroSensors 2015 XXIX edition of the conference series Freiburg, Germany, September 6 to 9, 2015 (P).
- 6)** Gold and silver nanoparticles conjugated with Rhodamine B isothiocyanate: synthesis and depth characterization  
Venditti, I.; Sciubba, F.; Delfini, M.; Battocchio, C.; Polzonetti, G.; Fontana, L.; Testa, G.; Russo, M.V.; Fratoddi, I.  
XXLIII Congresso della Società Chimica Italiana-Chimica Inorganica, Camerino, 9-12 settembre 2015, (P).
- 7)** Femtosecond time-resolved optical studies of functionalized metal nanoparticle systems  
Catone, D.; O'Keeffe, P.; Paladini, A.; Toschi, F.; Turchini, S.; Testa, G.; Cartoni, A.; Fratoddi, I.; Venditti, I.; Avaldi, L.  
Third COST Conference on Optical Nanospectroscopy Rome March 22-25, 2016 (O)
- 8)** Gold and silver functionalized nanoparticles as advanced materials for optoelectronic devices  
Fontana, L.; Venditti, I.; Fratoddi, I.; Leahu, G.; Belardini, A.; Li Voti, R.; Sibilia, C.; Familiari, G.; Matassa, M.  
Fotonica, 2016 Roma 6-8 giugno 2016 (O)
- 9)** Yttrium embedded in dye doped polymeric nanoparticles  
Venditti, I.; Fratoddi, I.; Testa, G.; Cartoni, A.; Fontana, L.; Faccini, R.; Solfaroli, E.  
ECIS Rome 2-6 September 2016 (P)
- 10)** Gold and silver functionalized nanoparticle-based networks as advanced materials for optoelectronics  
Fratoddi, I.; Testa, G.; Fontana, L.; Venditti, I.; Russo, M.V.; Belardini, A.; Li Voti, R.; Leahu, G.; Sibilia, C.; Battocchio, C.; Porcaro, F.; Carlini, L.; Polzonetti, G.; Matassa, R.; Familiari, G.  
Società Chimica Italiana, Congresso Chimica Inorganica Padova 11-14/09/2016 (**O\***)
- 11)** Charged Noble Metal Nanoparticles: Hydrophilic Systems for Advanced Nanotechnologies  
Venditti, I.; Testa, G.; Fontana, L.; Cartoni, A.; Battocchio, C.; Porcaro, F.; Carlini, L.; Polzonetti, G.; Russo, M.V.; Fratoddi, I.  
Società Chimica Italiana, Congresso Chimica Inorganica Padova 11-14/09/2016 (O)
- 12)** Interaction of colloidal silver nanoparticles with Ni<sup>2+</sup>: sensing application

Mochi, F.; Venditti, I.; Fratoddi, I.; Battocchio, C.; Carlini, L.; Iucci, G.; Casalboni, M.; De Matteis, F.; Proposito, P.  
Eurosensors 2017, 3-6/09/2017, Parigi (P)

**13)** Networks based on functionalized noble metal nanoparticles: advanced materials for optical and electronic applications

Fratoddi, I.; Venditti, I.; Fontana, L.; Sibilia, C.; Leahu, G.; Belardini, A.; Li Voti, R.; Battocchio, C.; Matassa, R.; Familiari, G.

Società Chimica Italiana, Congresso Chimica Inorganica Paestum Sa 10-14/09/2017 (O\*)

**14)** Drug delivery systems: hydrophilic gold nanoparticles for controlled drug loading and release

Venditti, I.; Porchia, M.; Tisato, F.; Santini, C.; Pellei, M.; Iucci, G.; Battocchio, C.; Pietrosanti, C.; Testa, G.; Fratoddi, I.

Società Chimica Italiana, Congresso Chimica Inorganica Paestum Sa 10-14/09/2017 (O)

**15)** Hybrid metal-organic conductive network with plasmonic nanoparticles and fluorene

Fontana, L.; Fratoddi, I.; Matassa, R.; Familiari; Venditti, I.; Battocchio, C.; Magnano, E.; Nappini, S.; Leahu, G.; Belardini, A.; Li Voti, R.; Sibilia, C.

SPIE Prague 09/2017 (P)

**16)** Characterization of noble metal functionalized nanoparticles-based networks by Photoacoustic Spectroscopy

Fontana, L.; Fratoddi, I.; Matassa, R.; Familiari; Leahu, G.; Belardini, A.; Li Voti, R.; Sibilia, C.

Twentieth Symposium on thermophysical properties, Boulder, Colorado, USA, nel periodo 24–29 Giugno, 2018, <http://www.thermosymposium.nist.gov/> (P), premiato come miglior contributo

**17)** Noble Metal Functionalized Nanoparticles based Networks: Synthesis, and Photoacoustic Spectroscopy Characterizations

Fratoddi, I.; Matassa, R.; Li Voti, R.; Grigorian, S.; Fioravanti, F.; Fontana, L.; Familiari, G.; Leahu, G.; Belardini, A.; Sibilia, C.

46° Congresso Nazionale di Chimica Inorganica-SCI (Bologna 10-13 settembre 2018) (O\*)

**18)** Functionalized Noble Metal Nanoparticles: Advanced Materials for Optoelectronics and Nanomedicine Applications

Fratoddi, I.; Cerra, S.

Advanced Nanomaterials and Methods - ANAM2019 International Young Scientist School and Workshop 25 September - 2 October 2019, Yerevan, Armenia (O\*, su invito)

## Part – XII Complete list of Publications

Here follows the complete list of publications present on Scopus on 09/2019. The corresponding author is asterisked. The Impact Factor, IF (Journal of Citation Reports database) is related to the year of publication; for the most recent publications, if not yet available, the reported IF corresponds to the previous year with respect to the publication year. The IF for 2017 (last available year) is also reported together with the number of citations retrieved from Scopus (on 09/2019).

### XII-A: Publications on international Journals, Total number of papers = 107

#### 1) Synthesis and XPS Characterisation of Organometallic Pd Containing Polymers from Monosubstituted Acetylenes

Russo, M. V.; Furlani, A.; Altamura, P.; Fratoddi, I.; Polzonetti, G.

Polymer 1997, 38(14), 3677-3690.

doi:10.1016/S0032-3861(96)00925-1

[IF(1997) 1.529; IF(2017) 3.48; cit. 28]

#### 2) X-ray photoelectron spectroscopy and scanning electron microscopy characterization of novel poly(monosubstituted) acetylenes containing doping species

Russo, M. V.; Polzonetti, G.; Furlani, A.; Bearzotti, A.; Fratoddi, I.; Altamura, P.

Journal of Vacuum Science & Technology, A: Vacuum, Surfaces, and Films 1998, 16(1), 35-44.

doi:10.1116/1.581006

[IF(1998) 0.101; IF(2017) 1.761; cit. 6]

#### 3) Electrical and morphological characterization of new $\pi$ -conjugated polymer films as gas sensors

Altamura, P.; Bearzotti, A.; D'Amico, A.; Foglietti, V.; Fratoddi, I.; Furlani, A.; Padeletti, G.; Russo, M. V.; Scavia, G.

Materials Science & Engineering, C: Biomimetic Materials, Sensors and Systems 1998, C5(3,4),217-221.

doi:10.1016/S0928-4931(97)00046-5

[IF(1998) 0.402; IF(2017) 5.08; cit. 14]

#### 4) Second Harmonic Generation in PMMA films doped with Organometallic Complexes

Casalboni, M.; D'Amato, R.; Fratoddi, I.; Furlani, A.; Pizzoferrato, R.; Sarcinelli, F.; Senesi, R.; Vannucci, A.; Varasi, M.

Radiation Effects and Defects in Solids 1999, 150(1-4),629-634.

Doi: 10.1080/10420159908226236

[IF(1999) 0.183; IF(2017) 0.52; cit. 1]

#### 5) Investigation by Impedance Spectroscopy on the behaviour of Poly-(N,N dimethylpropargylamine) as Humidity Sensor

Quartarone, E.; Mustarelli, P.; Magistris, A.; Russo, M. V.; Fratoddi, I.; Furlani, A.

Solid State Ionics, 2000, 136-137, 667-670.

doi: 10.1016/S0167-2738(00)00334-9

[IF(2000) 1.529; IF(2017) 2.75; cit. 48]

#### 6) Organometallic Polymers: Synthesis and Electro-Optical Properties

Fratoddi, I.\*; Altamura, P.; Lo Sterzo, C.; Furlani, A.; Galassi, E.; D'Amico, A.; Russo, M.V.

Polymers for Advanced Technologies 2002, 13(3-4) 269-274.

doi: 10.1002/pat.185

[IF(2002) 0.487; IF(2017) 2.14; cit. 12]

#### 7) Sensitivity of a platinum-polyene-based sensor to low relative humidity and chemical vapors

Caliendo, C.; Fratoddi, I.; Russo, M. V.

Applied Physics Letters 2002, 80(25), 4849-4851

doi:10.1063/1.1489095

[IF(2002) 3.849; IF(2017) 3.495; cit. 55]

#### 8) Study of chemical structure and conjugation length in organometallic Pt(II) oligomers and polymers containing 1,4-diethynylbenzene derivatives as bridging units

Fratoddi, I.\*; Battocchio, C.; Furlani, A.; Mataloni, P.; Polzonetti, G.; Russo, M. V.

Journal of Organometallic Chemistry 2003, 674(1-2), 10-23.

doi:10.1016/S0022-328X(03)00156-6

[IF(2003) 2.042; IF(2017) 1.946; cit. 42]

**9) Response of a Pt-Polyyne membrane in surface acoustic wave sensors: experimental and theoretical approach**

Caliendo, C.; [Fratoddi, I.](#); Russo, M. V.; Lo Sterzo, C.  
Journal of Applied Physics 2003, 93(12), 10071-10077  
doi:10.1063/1.1574176  
[IF(2003) 2.171; IF(2017) 2.18; cit. 31]

**10) Diethynyl-Zn-Porphyrin based assemblies: optical and morphological studies of nanostructured thin films**

[Fratoddi, I.](#); Battocchio, C.; D'Amato, R.; Di Egidio, G. P.; Ugo, L.; Polzonetti, G.; Russo, M. V.  
Materials Science & Engineering, C: Biomimetic and Supramolecular Systems 2003, C23(6-8), 867-871.  
doi:10.1016/j.msec.2003.09.152  
[IF(2003) 1.12; IF(2017) 5.08; cit. 10]

**11) Structure of a monolayer of Pd-Diethynylbiphenyl deposited on chromium studied by Total Reflection Exafs**

D'Acapito, F.; [Fratoddi, I.](#); D'Amato, R.; Russo, M. V.; Contini, G.; Davoli, I.; Mobilio, S.; Polzonetti, G.  
Sensors and Actuators, B: Chemical 2004, B100(1-2), 131-134.  
doi:10.1016/j.snb.2003.12.032  
[IF(2004) 2.083; IF(2017) 5.67; cit. 8]

**12) Organometallic Platinum(II) and Palladium(II) polymers containing 2,6-diethynyl-4-nitroaniline bridging spacer and related dinuclear model complexes**

D'Amato, R.; [Fratoddi, I.](#)\*; Cappotto, A.; Altamura, P.; Delfini, M.; Bianchetti, C.; Bolasco, A.; Polzonetti, G.; Russo, M. V.  
Organometallics 2004, 23(12), 2860-2869  
doi: 10.1021/om049972w  
[IF(2004) 3.196; IF(2017) 4.051; cit. 26]

**13) Electrical and Morphological Characterization of Poly(Monosubstituted)Acetylene Based Membranes: Application as Humidity and Organic Vapours Sensors**

[Fratoddi, I.](#)\*; Altamura, P.; Bearzotti, A.; Furlani, A.; Russo, M. V.  
Thin Solid Films, 2004, 458(1-2), 292-298  
doi:10.1016/j.tsf.2003.12.065  
[IF(2004) 1.598; IF(2017) 1.94; cit. 27]

**14) Resistive type sensor for Humidity and short alcohols detection**

Palummo, L.; [Fratoddi, I.](#); Russo, M.V.; Bearzotti, A.  
Sensor Letters 2004, 2(3, 4), 205-210.  
doi: 10.1166/sl.2004.058  
[IF(2004) 0.418; IF(2017) 0.558; cit. 7]

**15) NEXAFS study of a Pt-containing rod-like organometallic polymer (Pt-DEBP). Molecular orientation onto hcp, Au/Si(111), Cr/Si(111) and Si(111) surfaces**

Battocchio, C.; [Fratoddi, I.](#); Russo, M. V.; Polzonetti, G.  
Chemical Physics Letters 2004, 400(4-6), 290-295.  
[doi:10.1016/j.cplett.2004.10.126](#)  
[IF(2004) 2.438; IF(2017) 1.69; cit. 22]

**16) Preparation of Nanostructured Organometallic Polymer/Palladium Hybrids by Metal Vapor Synthesis: Structure and Morphology**

Belotti, F.; [Fratoddi, I.](#); La Groia, A.; Martra, G.; Mustarelli, P.; Panziera, N.; Pertici, P.; Russo, M. V.  
Nanotechnology 2005, 16(11), 2575-2581  
doi: 10.1088/0957-4484/16/11/018  
[IF(2005) 3.037; IF(2017) 3.404; cit. 9]

**17) Local structure parameters through the fitting of XANES spectra using a multidimensional interpolation: application to the Pd K-edge of Pd-diethynylbiphenyl polymer**

Smolentsev, G.; Soldatov, A. V.; D'Acapito, F.; Polzonetti, G.; [Fratoddi, I.](#)

Journal of Physics-Condensed Matter 2006, 18(3), 759-766.

doi: [10.1088/0953-8984/18/3/001](https://doi.org/10.1088/0953-8984/18/3/001)

[IF(2006) 2.038; IF(2017) 2.617; cit. 10]

**18) Synthesis and characterization of new difunctional alkynylated ( $\eta^6$ -arene)( $\eta^4$ -cycloocta-1,5-diene)Ru(0) complexes as molecular models for organometallic polymers**

Panziera, N.; Pertici, P.; [Fratoddi, I.\\*](#); La Groia, A.; Russo, M. V.

Journal of Organometallic Chemistry 2006, 691(12), 2648-2656.

doi: [10.1016/j.jorganchem.2006.01.058](https://doi.org/10.1016/j.jorganchem.2006.01.058)

[IF(2006) 2.332; IF(2017) 1.95; cit. 2]

**19) XAS Study of a Pt-Containing Rod-like Organometallic Polymer**

Battocchio, C.; D'Acapito, F.; Smolentsev, G.; Soldatov, A. V.; [Fratoddi, I.](#); Contini, G.; Davoli, I.; Polzonetti, G.; Mobilio, S.

Chemical Physics 2006, 325(2-3), 422-428

doi: [10.1016/j.chemphys.2006.01.014](https://doi.org/10.1016/j.chemphys.2006.01.014)

[IF(2006) 1.98; IF(2017) 1.71; cit. 9]

**20) Platinum (II) dialkynyl bridged binuclear complex and related multinuclear oligomer: comparison of EXAFS and X-ray Crystal Structure Studies**

Battocchio, C.; D'Acapito, F.; [Fratoddi, I.](#); La Groia, A.; Polzonetti, G.; Roviello, G.; Russo, M.V.

Chemical Physics 2006, 328(1-3), 269-274.

doi: [10.1016/j.chemphys.2006.07.011](https://doi.org/10.1016/j.chemphys.2006.07.011)

[IF(2006) 1.984; IF(2017) 1.71; cit. 15]

**21) Intermolecular stacking of a tetranuclear cyclic Pt(II) complex: NMR characterization and X-ray crystal structure of cis-trans-cis-trans tetra[ $\mu$ -2,6-diethynyl-4-nitroaniline-bis(tri(p-tolyl)phosphine)platinum(II)]**

[Fratoddi, I.\\*](#); Delfini, M.; Sciubba, F.; Hursthouse, M. B.; Ogilvie, H. R.; Russo, M. V.

J. Organomet. Chem 2006, 691(26), 5920-5926

doi: [10.1016/j.jorganchem.2006.09.059](https://doi.org/10.1016/j.jorganchem.2006.09.059)

[IF(2006) 2.332; IF(2017) 1.95; cit. 5]

**22) Nanostructured organometallic polymer and palladium/polymer hybrid: surface investigation and sensitivity to relative humidity and hydrogen in Surface Acoustic Wave sensors**

Caliendo, C.; Contini, G.; [Fratoddi, I.\\*](#); Irrera, S.; Pertici, P.; Scavia, G.; Russo, M.V.

Nanotechnology 2007, 18 (12) 125504(1-7)

doi: [10.1088/0957-4484/18/12/125504](https://doi.org/10.1088/0957-4484/18/12/125504)

[IF(2007) 3.31; IF(2017) 3.404; cit. 21]

**23) Nanostructured polymetallaynes of controlled length: synthesis and characterization of oligomers and polymers from 1,1'-bis-(ethynyl)4,4'-biphenyl bridging Pt(II) or Pd(II) centres**

[Fratoddi, I.\\*](#); Battocchio, C.; Groia, A.L.; Russo, M.V.

J. Polymer Sci, Part A Polymer Chemistry 2007, 45(15), 3311-3329

doi: [10.1002/pola.22081](https://doi.org/10.1002/pola.22081)

[IF(2007) 3.529; IF(2017) 2.499; cit. 28]

**24) Dinuclear Pt and Pd Complexes with Metalloporphyrin Bridges: a Nexafs Study of the Electronic Structure and Self Assembling Properties**

Battocchio, C.; [Fratoddi, I.](#); Iucci, G.; Russo, M. V.; Goldoni, A.; Parent, Ph.; Polzonetti, G.

Materials Science & Engineering C-Materials for Biological Applications 2007, 27(5-8) 1338-1342

doi: [10.1016/j.msec.2006.06.014](https://doi.org/10.1016/j.msec.2006.06.014)

[IF(2007) 1.49; IF(2017) 5.08; cit. 5]

**25) Nanostructured Gold/Conjugated Polymer Hybrids by Metal Vapor Synthesis: Preparation, Chemical Structure and Morphology**

[Fratoddi, I.\\*](#); Panziera, N.; Pertici, P.; Martra, G.; Bertinetti, L.; Russo, M. V.

Materials Science & Engineering C-Materials for Biological Applications 2007, 27(5-8) 1305-1308

doi:10.1016/j.msec.2006.09.039  
[IF(2007) 1.49; IF(2017) 5.08; cit. 4]

**26) Gold nanoclusters - organometallic polymer nanocomposites: synthesis and characterization**

Vitale, F.; Mirengi, L.; Piscopiello, E.; Pellegrini, G.; Trave, E.; Mattei, G.; Fratoddi, L.; Russo, M. V.; Tapfer, L.; Mazzoldi, P.

Materials Science & Engineering C-Materials for Biological Applications 2007, 27(5-8), 1300–1304

doi:10.1016/j.msec.2006.06.041

[IF(2007) 1.49; IF(2017) 5.08; cit. 29]

**27) Binuclear Transition-Metal complexes on Gold: Molecular Orientation by Angular Dependent NEXAFS Spectroscopy**

Battocchio, C.; Fratoddi, L.; Russo, M. V.; Carravetta, V.; Monti, S.; Iucci, G.; Borgatti, F.; Polzonetti, G.

Surface Science 2007, 601(18) 3943–3947

doi:10.1016/j.susc.2007.04.154

[IF(2007) 1.86; IF(2017) 1.99; cit. 7]

**28) Lipolytic enzymes with improved activity and selectivity upon adsorption on polymeric nanoparticles**

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**XII-B: Book Chapters**

**1) Breakthroughs for gold nanoparticles: perspectives and applications**

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Expert Commentary, in "Gold Nanoparticles: Properties, Characterization and Fabrication.", 2010, Editor: P. Chow (Nova Science Publishers, Inc NY) chapter 13, 299-306 ISBN: 978-1-61668-009-1

**2) Chapter 1 "Nanostructured macromolecules" in Advances in macromolecules: perspectives and applications**

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Expert Commentary, in Nanotechnology Research Developments, (2008), Editor: R. Jiménez-Contreras, (Nova Science Publishers, Inc NY) ISBN 1-60021-899-7, pp 1-5.

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##### 1) Highly Ethynylated Polymers: Synthesis and Applications for Humidity Sensors

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##### 4) Structural properties of $\pi$ - $\pi$ Conjugated network in polymer thin films studied by x-ray cross-correlation analysis

Kurta, R. P.; Grodd, L.; Mikayelyan, E.; Gorobtsov, O.Y.; Fratoddi, I.; Venditti, I.; Sprung, M.; Grigorian, S.; Vartanyants, I.A.

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##### 5) Semiconductor-metal phase transition of vanadium dioxide nanostructures on silicon substrate: Applications for thermal control of spacecraft

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##### 7) Gold and silver nanoparticles-based networks as advanced materials for optoelectronic devices

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## XII-D: Patents

### **1) Method for controlling the dimensions and the morphology of nanostructural polymeric materials, materials thereby obtained and uses thereof**

Palocci, C.; Russo, M. V.; Belsito, C.M.A.; Cernia, E.; D'Amato, R.; Fratoddi, I.; Panzavolta, F.; Soro, S.; Venditti, I.  
Brevetto depositato in data 9 novembre 2004 n° RM2004A000555. PCT/IT20057000653 International Publication Number WO 2006051572 A3 20060518

### **2) Ionizing radiation dosimeter for measuring doses of ionizing radiation, comprises a sealed holder that houses an organometallic polymer formulation dissolved in a halogenated organic solvent in different concentrations**

Graeff, C.F. O.; Bronze Uhle, E. S.; Fernandes, D.M.; Russo, M.V.; Fratoddi, I.;  
Brevetto internazionale 2014 Patent Number: WO2014201536-A1. Patent Assignee: UNIV ESTADUAL PAULISTA DE MESQUITA FILHO. PCT/BR2014/000234

### **3) Chelati metallici della benzilguanidina come substrati del trasportatore della norepinefrina e loro uso come radiofarmaci**

Faccini, R.; Solfaroli Camillocci, E.; Rotili, D.; Ciogli, A.; Cartoni, A.; Fratoddi, I.; Venditti, I.  
richiesto il 20/01/2018, ha superato positivamente la procedura, in attesa di PCT.

### **4) Propulsore ionico ad alta efficienza**

Di Lellis, A.M.; Fratoddi, I.; Venditti, I.; Leoni, R.; Gaggero, A.; Mattioli, F.; Selci, S.  
domanda numero 10201800004653 richiesto il 18/04/2018, ha superato le prime valutazioni, in attesa.

La sottoscritta presenta questo curriculum firmato come dichiarazione sostitutiva di certificazione ai sensi del DPR 445/2000, ed è consapevole delle sanzioni penali nelle quali incorrerebbe per dichiarazioni mendaci. Tale curriculum è accompagnato da fotocopia di un documento di riconoscimento valido (art. 76 DPR 445/2000) e dalle dichiarazioni di cui all'allegato C.

Roma, 17/09/2019

Dott.ssa Ilaria ~~Fratoddi~~