

## ANDREA MELE

### EDUCATION

Ph.D. (Dottorato di Ricerca)    Chemical Sciences, Università di Genova, 1987-1990  
Concentrations:                    Physical Organic Chemistry  
Degree (Laurea)                    Chemistry, Università di Genova, 1986  
Concentrations:                    Synthetic Organic Chemistry

### WORKING POSITION

2011:                    Full Professor, Politecnico di Milano, Dept. Chemistry, Materials and Chemical Engineering  
                              "G. Natta" (SSC: 03/B2; SSD: CHIM/07)  
2002- 2010:           Associate Professor, Politecnico di Milano, Dept. "G. Natta" (03/B2 – CHIM/07)  
1994-2001:           Research Assistant (Ricercatore), Politecnico di Milano, Dept. "G. Natta"  
1991-1993:           Technical Assistant (Tecnico Laureato), Politecnico di Milano, Dept. "G. Natta"  
1990-1991:           Post-doctoral fellow, Glycobiology Institute – Dept. of Biochemistry, University di Oxford  
                              (UK) EU grant, SCIENCE project, Grant Science Plan - ERB SC1\*CT00058 – Research project:  
                              New NMR Methods for Conformational Studies on Oligosaccharides and Glycoproteins

### ACADEMIC ACTIVITY

Chair:                    Nuclear Magnetic Resonance (NMR) and Mass Spectrometry Facilities of Dept. "G. Natta" of  
                              Politecnico di Milano  
Coordinator:           Chemistry Section of Dept. "G. Natta" – Politecnico di Milano (2013-2015) and (2016-2019)  
Member:                Scientific Board of Dept "G. Natta" – Politecnico di Milano (2013-2015) and (2016-2019,  
                              Director's Delegate)  
Member:                Executive Board (Giunta) of Dept "G. Natta" – Politecnico di Milano (2013-2015) and (2016-  
                              2019)  
Member:                Scientific Board of the PhD course in Industrial Chemistry and Chemical Engineering –  
                              Politecnico di Milano (2013 - today)

### MANAGING ACTIVITY

Member of the  
Board of Director        European Society of Ionic Matter (2019 – today)  
Member:                Italian member of the Managing Committee of the EU COST Action CM1206 EXIL -  
                              Exchange on Ionic Liquids. 22 February 2013 – 30 March 2017.  
Member:                Italian member of the European Cyclodextrin Society.  
Co-Chair:                Associazione italiana Chimica e Tecnologia delle Ciclodestrine (CDTec  
                              <http://www.cdtec.unito.it/>) 12 October 2006 - today  
Member:                Board of Directors (Consiglio d'Amministrazione) Istituto di Chimica e Biochimica  
                              "G. Ronzoni" – Milano (25 September 2012 – 31 December 2018).  
Member:                Joint Committee (Comitato Paritetico) CNR – Politecnico di Milano 24 February  
                              2015-today.

## AWARDS

- 2019 Winner of Switch2Product – Innovation Challenge 2019 with **Bi-Rex** Project (Biomass recovery, recycling and extraction)
- 2019 Honorable Mention at “Premio per l’innovazione amica dell’ambiente – Lagambiente 2019” competition with project **Bi-Rex**.
- 2017 Gold Medal of GIDRM/GIRM for Nuclear Magnetic Resonance Spectroscopy  
GIRM: <https://www.soc.chim.it/it/gruppi/risonanze/home>  
GIDRM: <http://www.gidrm.org/>  
Motivation for the award: <http://www.gidrm.org/index.php/activities/gidrm-girm-gold-medal>

## PROFESSIONAL AFFILIATIONS AND MEMBERSHIPS

- Member: American Chemical Society
- Member: Scientific Board of The European Cyclodextrin Society
- Associate: National Research Council – Institute of Molecular Recognition Chemistry (CNR-ICRM)  
5 October 2006-31 December 2019  
National Research Council – Institute of Chemical Sciences and Technology (Istituto di Scienze e Tecnologie Chimiche – SCITEC), 1 January 2020 – today.

## TEACHING

- 1) General Chemistry (1993-present) for 1st year Engineering students
- 2) Quality Control of Chemical Products (1999-present) for 3rd year Chemical Engineering students
- 3) Physical Methods for Chemical Analysis (2003-2008; 2020 - present) for Chemical Engineering master students (Laurea Magistrale)
- 4) Advanced analytical methods and data analysis (2004-present) for Ph.D programme in Industrial Chemistry and Chemical Engineering, Politecnico di Milano

## VISITING PROFESSOR

- 1) Université du Littoral – Côte d’Opale Dunkerque (France) 16 – 28 April 2016
- 2) Université du Littoral – Côte d’Opale Dunkerque (France) 17 – 23 June 2018 (within Galileo Project Grant G18\_392)
- 3) École Normale Supérieure de Lyon (France) 2 – 6 September 2019 (within Galileo Project Grant G18\_392)

## AREAS OF RESEARCH AND EXPERTISE

- 2) Molecular encapsulation of biologically active compounds in polymeric matrixes: structure and dynamics by NMR spectroscopy, high-resolution magic angle spinning NMR, vibrational spectroscopies and molecular dynamics.
- 3) Non-covalent Interactions in Supramolecular Assemblies (host-guest complexes and micellar aggregates) via NOE data and diffusion NMR.
- 4) Cyclodextrin chemistry: inclusion complexes and their structural characterization. Synthesis, characterization and applications of cyclodextrin nanospogges (CDNS) and related hydrogels.
- 5) Molecular Characterization of Room Temperature Ionic Liquids (RTILs) and Deep Eutectic Solvents (DES). Solute-Solvent Interactions in RTILs and DES: intermolecular NOEs, diffusion measurements via pulsed field gradient spin-echo NMR.
- 6) Structure and Conformation of Organic Molecules by multinuclear NMR methods and molecular modelling.
- 7) Photoluminescent nanostructured materials: synthesis, characterization and spectral properties of aza-helicenes and transition metal complexed of aza-helicenes.

## **PUBLICATIONS and BIBLIOMETRIC DATA (1988-present)**

220 published papers on ISI indexed international journals, 3 book chapters.

WoS ResearcherID: C-7448-2011

ORCID: [orcid.org/0000-0002-0351-0538](https://orcid.org/0000-0002-0351-0538)

H-index / citations (5 JUL 2021)

Scopus: 38 / 5527

Google Scholar ([public profile](#)): 40 / 6085

IRIS public list of publications:

<https://re.public.polimi.it/browse?type=author&order=ASC&rpp=100&authority=rp13489#.YOKx0OgzZPY>

## **PATENTS**

Italian Patent Application 102019000007175 (23 May 2019)

Italian Patent Application 102019000016973 (29 September 2019)

Italian Patent Application 102020000012028 (2020)

International Patent Application PCT/IB2021/054370 (2021)

International Patent Application PCT/IB2021/054371 (2021)

## **ACTIVITY AS EDITOR**

Guest Editor 2013 – *The Journal of Inclusion Phenomena and Macrocyclic Chemistry*, vol 75 special issue for the 2<sup>nd</sup> European Conference on Cyclodextrins

Guest Editor 2019 – *Polymers*, special issue on [Cyclodextrin-Containing Polymers](#).

Editor 2019 – *Nanosponges and their applications*, Andrea Mele and Francesco Trotta Eds, Wiley

## **SCIENTIFIC COLLABORATIONS**

École Normale Supérieure (ENS) de Lyon (F), Imperial College London (UK), Auckland University of Technology, Auckland (New Zealand), University of Tübingen (D), University of Ulm (D), University of Salamanca (E), King's College London (UK), Marquette University, Milwaukee (USA), Osaka University (JP), CNRS - Université Rennes1 (F), CNRS – Villeurbanne (F), Université Littoral Côte d'Opal Dunkerque (F), University of Palermo, Bergamo, Milano, Pisa, Ferrara, Trento, Salento, Politecnico di Bari, National Research Council (CNR), ENEA – Rome, ELETTRA Synchrotron Trieste.

## **MAIN PROPONENT IN LARGE SCALE FACILITIES EXPERIMENTS-APPROVED PROPOSALS**

Elettra Synchrotron Trieste

A systematic investigation of Deep Eutectic Solvents / water mixtures

Proposal **20192397** IUVS beamline@ELETTRA

Exploring the H-bond features in Deep Eutectic Solvents-Cyclodextrin-Water ternary systems

Proposal **20185445** IUVS beamline@ELETTRA

### CERIC

Enzymes in ionic liquids. What is the effect of Ionic Liquids (ILs) on the structure of an enzyme? A molecular investigation on a cellulase in different ILs

Proposal **20162014** IUVS beamline@ELETTRA, SISSI beamline@ELETTRA

### CERIC-ERIC

Relaxation properties of a drug model in cyclodextrin-based cross-linked polymers: a combined NMR and Raman spectroscopy investigation

Proposal **20147045** IUVS beamline@ELETTRA, 600 MHz NMR (magic) spectrometer@Slovenian NMR Centre

## **FUNDINGS**

H2020-MSCA-RISE-2019 – WORLD (Waste Oils Recycle and Development – Project Number: 873005)

Project Coordinator. Project accepted December 2019.

French-Italian Competitive Call “Galileo” 2018 – Grant G18-392 “New Supramolecular Green Solvents for VOC Abatement”.

PI of the Italian Partnership.  
January 2018- January 2020.

COST Action CM1206 EXIL - Exchange on Ionic Liquids. 22 February 2013 – 31 March 2017.

Delegate for Italy in the Managing Committee.

PRIN 2010-2011 Progetto 2010FPTBSH 008 “Nanotecnologie molecolari per il rilascio controllato di farmaci – NANOMED” (2010FPTBSH).

Local Coordinator of the Research Unit Politecnico di Milano.  
1 February 2013 - 31 January 2016

FP7 EU project “GREENLION: Advanced Manufacturing Processes for Low Cost GREENER Li-ION Batteries”.  
GA: NMP2-LA-2011-285268.

Local Coordinator of the Research Unit Politecnico di Milano.  
1 November 2011 – 31 October 2015.

CARIPLO Bank Foundation Research Grant. Project: “Nanostructured Photoluminescent Materials”. Grant 2007.5378.

Project Principal Investigator (PI).  
14 February 2008-13 February 2010.

#### **Other fundings:**

PRIN 2002, 2003, 2006: Participant in Politecnico di Milano local unit.

The research activity and the recruitment of young scientist have been extensively based also on Research Contracts, Consultancy, Testing for Large and Small-Medium Enterprises since 2000.

A non-exhaustive list of companies includes:

*Agrolinz-Melamine Int. Italia – Lusochimica - ICAP-SIRA Chemicals and Polymers – Intercos Cosmetics – Mapei – ENI – Recordati Farmaceutici – Nearchimica – Oxon Sipcam Agrochemicals – Dipharma – OLON – BAXTER - AKZO NOBEL - NOURYON.*

#### **REVIEWING ACTIVITY**

- Referee: Italian Agency for Research Evaluation (CIVR, Comitato Indirizzo Valutazione Ricerca), Research Projects of National Relevance (PRIN), Italian Ministry for University and Research (MIUR) and VQR (Valutazione Qualità della Ricerca) since 16 November 2004
- Referee: ERA-Chemistry “Open Initiative 2010”, EU Funding plan for Austria, Belgium, Germany, Hungary, Ireland and Spain participating countries.
- Referee: National Research Foundation – South Africa. SOUTH AFRICA – ARGENTINA Science and Technology Research Cooperation - Joint call for project proposal 2011.
- Referee: FRS-FNRS (Fonds de la Recherche Scientifique – Belgium), calls Large equipments – Infrastructures, Credit de Recherche 2011-2019.
- Member: International referees panel for the defense of PhD Thesis, CNRS-Université de Lyon 1- ESCPE Lyon (28 June 2016)
- Member: International referees panel for the defense of PhD Thesis, University of Iceland at Reykjavik (18 January 2019)
- Referee: ISI Indexed Journals: ACS Sustainable Chemistry and Engineering, Angewandte Chemie, Beilstein Journal of Organic Chemistry, Catalysis Today, Chemical Reports (Nature Publishing Group), ChemPhysChem, Chemistry – A European Journal, Chemistry – An Asian Journal, Chemical Sciences (RSC), Chemical Communications (RSC), Carbohydrate Polymers, Carbohydrate Research, European Journal of Organic Chemistry, European Journal of Pharmaceutical Sciences, Journal of Organic Chemistry (ACS), Journal of Physical Chemistry (ACS), Journal of Physical Chemistry Letters (ACS), Journal of Chemical Physics (APS), Journal of the American Chemical Society (ACS), Journal of Chemical & Engineering Data (ACS), Journal of the American Society for Mass Spectrometry (ASMS), Journal of

Chromatography, Journal of Inclusion Phenomena and Macrocyclic Chem. Journal of Fluorine Chemistry, Langmuir (ACS), New Journal of Chemistry (RSC), PhysChemChemPhys (RSC), RSC Advances, Supramolecular Chemistry.

## INTERNATIONAL INVITED AND PLENARY LECTURES

13) Update on NMR spectroscopy in cyclodextrin chemistry

Plenary Lecture

6<sup>th</sup> European Conference on Cyclodextrins

October 2-4, 2019

Santiago de Compostela (E)

Chair: Prof. Carmen Alvarez-Lorenzo - University of Santiago de Compostela---

12) NMR Methods for Ionic Liquids Technology

Invited Lecture

ReGaLIs Autumn School 2018

November 7-8, 2018

Santiago de Compostela (E)

Chair: Prof. Louis Miguel Varela Cabo - Faculty of Physics. Universidade de Santiago de Compostela

11) NMR Methods for Ionic Liquids

Invited Speaker

GORDON RESEARCH CONFERENCE

August 14-19, 2016

Newry, ME (USA)

Chair: Prof. Anja-Verena Mudring----

10) Azahelicenes: synthesis, structural properties and use as ligands

Invited Conference

Institut de Sciences Chimique de Rennes

UMR 6626 CNRS-Université de Rennes 1

April 26, 2016

Chair: Prof. Jeanne Crassous----///----

9) Inside new materials: structure and dynamics of cyclodextrin-based polymers in solution and in the gel state

Plenary Lecture

EUROCD 2015 – 4rd European Conference on Cyclodextrins

Lille (France) 6 – 9 October 2013

Chair: Prof. Bernard Martel – Université Lille 1 (France)----///----

8) Room Temperature Ionic Liquids (RTILs) for oil industry. A case study

Invited Conference

ELETTRA Synchrotron Trieste

<https://www.elettra.trieste.it/science/seminars-archive.html?xid=20150012>

Trieste 27 May 2015

Chair: Dr Claudio Masciovecchio----///----

7) Cyclodextrin Nanosponges: Present and Perspectives

Invited Lecture

3rd European Conference on Cyclodextrins

Antalya (Turkey) 2 – 4 October 2013

Chair: Prof. Erem Bilensoy – Hacettepe University (Ankara, Turkey)----///----

6) Mass Spectrometric Investigations on Host-Guest Complexes of Cyclodextrins.

Keynote lecture.

1st French Italian Conference on Mass Spectrometry: Fundamentals and Applications of Mass Spectrometry.

Siena, 30 June – 4 July 2008.

Chair: Prof. Gianluca Giorgi – Università di Siena, Prof. Jean-Claude Tabet – Université Pierre et Marie Curie (Paris VI).----///----

5) Local Structure and Solvation Properties of Model Ionic Liquid [BMIm]<sup>+</sup> [BF<sub>4</sub>]<sup>-</sup>: an NMR and Molecular Dynamics Study.

Invited Lecture

Global COE Program – Bio-Environmental Chemistry.

Osaka (Japan), 7 maggio 2008.

Chair: Prof. Yoshihisa Inoue – Osaka University.----///----

4) Reverse Micelles: Structural Features and Synthesis of Nanoparticles.

Invited lecture

Molecular Captors and Encapsulation Days.

Bruxelles (B), 3-4 Aprile 2008.

Chair: Prof. Kristin Bartik – ULB Bruxelles.----///----

3) The Structure of Some Complexes of  $\beta$ -Cyclodextrin with Glycoconjugates via X-ray Crystallography and NMR Spectroscopy

Invited oral communication

3rd Asian Cyclodextrin Conference.

Nankai University – Tianjin (P. R. China) 8 – 12 maggio 2005.

Chair: Prof. Yu Liu – Nankai University.----///----

2) NOE Studies on 1-n-Butyl-3-Methylimidazolium Tetrafluoroborate ([BMIm]<sup>+</sup> [BF<sub>4</sub>]<sup>-</sup>) with and without Added Water.

Invited lecture

CERC3-Chairman of the European Research Councils' Chemistry Committees.

Young Chemists' Workshop: Neoteric Solvents as Reaction Media: Reality and Future.

St. Malo (F), 17 – 21 aprile 2004.

Chair: Prof. Michel Vaultier – Université de Rennes.----///----

1) Investigation of the Structure of Ionic Liquids and their Interactions with Water by Nuclear Overhauser Effect.

Invited oral communication

226th American Chemical Society National Meeting.

New York (USA), 7 – 11 settembre 2003.

Chair: Prof. Ken Seddon – QUILL Center at Queen's University in Belfast (UK)

Prof. R. D. Rogers – University of Alabama

Dr. S. Pandey – Indian Institute of Technology----///----

## ORGANIZATION OF WORKSHOPS AND SYMPOSIA

9) 4<sup>th</sup> International Cyclodextrin Summer School  
Milano, June 10 – 12, 2019  
Chair of the School

8) HR-MAS NMR: metabolomics and multivariate analysis.  
GIDRM NMR Day  
Milano, 6 June 2017  
Chair of the Workshop----///----

7) Smart materials for technology: preparation, self-assembly, characterization, modeling  
VII WORKSHOP NAZIONALE AICING (Associazione Italiana Chimica per Ingegneria)  
Milano, 12-13 June 2017  
Chair of the Workshop----///----

6) Third International Summer School on Cyclodextrins  
June 29-July 1, 2016, Asti (Italy)  
<http://www.cdtec.unito.it/summer2016/CD.htm>  
Chair of the School----///----

5) Ionic liquids@polimi: technology and science  
International Workshop  
Milano, 23 October 2013  
Chair of the Workshop----///----

4) Third European Conference on Cyclodextrins  
October 2-4, 2013, Antalya (Turkey)  
Member of the International Scientific Board----///----

3) Second International Summer School On Cyclodextrins  
May 8-9, 2013, Giardini Naxos (Messina, Italy)  
Member of the Scientific Board----///----

2) 1H High Resolution MAS NMR: perspectives and applications from physical-chemistry to biomedicine  
One-day workshop in collaboration with Società Chimica Italiana – GIDRM  
Milano 9 July 2012  
Chair of the Workshop----///----

1) First Summer School on Cyclodextrins. Pharmaceutical Applications and State of the Art.  
June 6-8, 2010 – Research Centre of Porto Conte – Alghero (SS) Italy  
<http://www.cdtec.unito.it/summer2010/committee.html>  
Member of the Scientific Board----///----