

## PERSONAL INFORMATION

## Alessandro Minguzzi



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Sex M | Date of birth 13/11/1980 | Nationality Italian

## WORK EXPERIENCE

- 2013-2020 **Assistant Professor (Ricercatore a tempo determinato B, time defined, tenure track).**  
University of Milan, Department of Chemistry
- 2008-2013 **Post-doctorate researcher**  
University of Milan, Department of Chemistry
- *Study of electrocatalysts for the oxygen evolution reaction. Setup and use of innovative methods for studying electrocatalysts.*
- 2011 **Visiting Researcher (2 weeks, under invitation), funded by “Ayudas para Estancias de Investigadores Invitados 2011”**  
University of Alicante, Institute of Electrochemistry
- Complete a project on the screening of semiconductors activity by scanning electrochemical microscopy *A. Minguzzi et al, ChemElectroChem 2014, 1, 1415*
- 2010 and 2007 **Visiting Researcher (6 months)**  
The University of Texas at Austin, Texas, US. Laboratories of Allen J. Bard
- Training and studies on scanning electrochemical microscopy – SECM for the rapid screening of electrocatalysts (*A. Minguzzi et al. Anal. Chem. 2008, 80, 4055–4064; J. Rodriguez-Lopez et al, J. Phys. Chem. C 2010, 114, 186455*)
  - Development of Dynamic potential/pH diagrams (*A. Minguzzi et al. Chem. Sci., 2012, 3, 217*).
- 2008 **Visiting Researcher (1.5 months)**  
The University of Venice, Italy. Laboratories of Prof. S. Daniele
- deepen my knowledge on the use of the SECM (*A. Minguzzi et al, J. Phys. Chem. C 2015, 119, 2941-2947*)
- 2007-2008 **Oronzio and Niccolò De Nora Fellow**  
University of Milan, Department of Chemistry  
Project “*Rapid screening of electrocatalysts by Scanning Electrochemical Microscopy*”
- 2006 **Visiting Researcher (2 weeks) funded by D29 COST action**  
Laboratoire d'Electrochimie et Synthèse Organique, Institut de Chimie et des Matériaux Paris Est
- preparation and use of cavity-microelectrodes (*A. Vertova et al. J Appl Electrochem 2008, 38, 965*)

EDUCATION AND TRAINING

- 2004-2007 **PhD in Industrial Chemistry**  
 Università degli Studi di Milano, Italy
  - Thesis Title: *Advanced oxygen electrocatalysts for energy conversion devices: research and development of innovative synthetic paths and investigation methodologies.*
  - Supervisor: Prof. Sandra Rondinini
  
- 1999-2004 **Master in Industrial Chemistry (5-years degree)**  
 Università degli Studi di Milano, Italy

PERSONAL SKILLS

Mother tongue(s) Italian

Other language(s)	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C2	C1	C2	C1	C1
French	A2	A2	A2	A1	A1
Russian	A2	A2	A2	A2	A1

Levels: A1/A2: Basic user - B1/B2: Independent user - C1/C2 Proficient user  
[Common European Framework of Reference for Languages](#)

## ADDITIONAL INFORMATION

## Publications

My research is mainly focused on physical chemistry and electrochemistry, with a particular focus on energy conversion and pollution remediation. My core topic is the development and use of innovative techniques and methods for studying basic phenomena in electrochemistry and photoelectrochemistry or to rapidly screen libraries of electrode materials. My literature production demonstrates my activity in (i) fundamental studies on **oxygen evolution catalysts (OER)**, in water electrolysis for H<sub>2</sub> production), also by means of (ii) **operando X-ray absorption spectroscopy (XAS)**. I developed FEXRAV and published the first example of operando pump&probe XAS. (iii) The use of **scanning electrochemical microscopy (SECM)** for the study of electron transfer kinetics, and for the screening of electrocatalysts; (iv) the preparation and characterization of **new materials for electrochemistry** and photoelectrochemistry

**Summary of publications record:** 50 published papers in peer-reviewed international journals, (17 as senior and/or corresponding author, 14 as first author) 4 book chapters, 917 citations, h-index=16 (Scopus)

10 Most relevant publications in peer-reviewed international journals  
IF= 2017 Impact Factor CIT= total number of citations

1. [IrOx nanoparticles local structure unaltered during the OER: low reorganization energy.](#)  
A. Minguzzi\*, C. Locatelli, O. Lugaresi, E. Achilli, G. Cappelletti, M. Scavini, M. Coduri, P. Masala, B. Sacchi, A. Vertova, P. Ghigna, S. Rondinini, "Easy Accommodation of Different Oxidation States in Iridium Oxide Nanoparticles with Different Hydration Degree as Water Oxidation Electrocatalysts" **ACS Catalysis**, 5 (2015) 5104–5115 IF=11.384, CIT=34 First Author AND Corresponding Author\*
2. [Ir oxidation state are \(III\) and \(V\) in hydrous IrOx during the OER](#)  
A. Minguzzi\*, O. Lugaresi, E. Achilli, C. Locatelli, A. Vertova, P. Ghigna, S. Rondinini. "Observing the Oxidation State Turnover in Heterogeneous Iridium-Based Water Oxidation Catalysts", **Chemical Science** 5 (2014), 3591-3597 IF=9.063, CIT=62 First Author AND Corresponding Author\*
3. [First complete book chapter on electrochemical, operando X-ray absorption spectroscopy](#) Defined, by one of the two Editors as the "definitive work on XAS in electrochemistry" (private communication). P. Ghigna and A. Minguzzi\*, "X-ray absorption spectroscopy in electrochemistry: from fundamentals to the fixed energy x-rays absorption voltammetry" book chapter in *Electroanalytical Chemistry: a Series of Advances*, 2017, Editors A.J. Bard and C. Zosky. CRC Press.. Corresponding Author\*
4. [SECM is used to monitor the production of O<sub>2</sub> from a highly efficient photoanode](#)  
F. Malara, A. Minguzzi, M. Marelli, S. Morandi, R. Psaro, V. Dal Santo, A. Naldoni "α-Fe<sub>2</sub>O<sub>3</sub>/NiOOH: An Effective Heterostructure for Photoelectrochemical Water Oxidation" **ACS Catalysis**, 5 (2015) 5292–5300 IF=11.384 CIT=59
5. [Comparative analysis of different OER catalysts by means of a novel data representation strategy](#)  
A. Minguzzi, Fu-Ren F. Fan, A. Vertova, S. Rondinini, A.J. Bard, "Dynamic potential–pH diagrams application to electrocatalysts for water oxidation" **Chemical Science** 3 (2012) 217-229 First Author, IF=9.063, CIT=120.
6. [Facile synthesis of a stable and active Cu-based photoelectrode for H<sub>2</sub> production](#)  
T. Baran, S. Wojtyła, C. Lenardi, A. Vertova, P. Ghigna, E. Achilli, M. Fracchia, S. Rondinini, A. Minguzzi\* "An efficient Cu<sub>x</sub>O photocathode for hydrogen production in neutral pH: new insights from combined spectroscopy and electrochemistry" **ACS Applied Materials and Interfaces**, 2016, 8, 21250–21260, IF= 8.097, CIT=12 Corresponding Author
7. [A new XAS technique for operando studies of electrochemical systems](#)  
A. Minguzzi\*, O. Lugaresi, C. Locatelli, S. Rondinini, F. D'Acapito, E. Achilli, Paolo Ghigna "Fixed Energy X-Ray Absorption Voltammetry" **Analytical Chemistry** 85 (2013) 7009-7013 IF=5.886, CIT=20 First Author AND Corresponding Author\*
8. [First and sole operando pump&probe XAS in photoelectrochemistry](#)  
T. Baran, M. Fracchia, A. Vertova, E. Achilli, A. Naldoni, F. Malara, G. Rossi, S. Rondinini, P. Ghigna, A. Minguzzi\*, F. D'Acapito "Operando and Time-Resolved X-Ray Absorption Spectroscopy for the Study of Photoelectrode Architectures" *Electrochimica Acta* 207 (2016) 16–21 INVITED IF=4.803, CIT=5 Corresponding Author\*

9. **SECM used to study the mediated role of Pt oxides in the oxidation of various reductants**  
J. Rodriguez Lopez, A. Minguzzi, A.J. Bard " Reaction of Various Reductants with Oxide Films on Pt Electrodes as Studied by the Surface Interrogation Mode of Scanning Electrochemical Microscopy (SI-SECM): Possible Validity of a Marcus Relationship" **Journal of Physical Chemistry C.** (2010) 114 18645 IF=4.484, CIT=32
10. **Sustainable production of H<sub>2</sub>O<sub>2</sub> and recognition of reactive oxygen species**  
T. Baran, S. Wojtyła, A. Minguzzi\*, S. Rondinini, A. Vertova "Achieving efficient H<sub>2</sub>O<sub>2</sub> production by a visible-light absorbing, highly stable photosensitized TiO<sub>2</sub>" **Applied Catalysis B: Environmental** 244 (2019) 303–312 IF=11.698 CIT=0 Corresponding Author\*

#### Invited presentations and seminars

1. XLVI Annual meeting of the Italian Crystallographic Association, 26-29 June 2017: Keynote lecture "Operando (photo)electrochemical X-ray absorption spectroscopy "
2. 2016 SSRL/LCLS Users Meeting, Stanford Linear Accelerator Center, Menlo Park, CA, USA: 5-7 October 2016: "Ir- and Cu-based (photo)electrodes as studied by operando X-ray absorption spectroscopy".
3. "Y-RICH 2016 (Young Research Ideas in Chemistry), Italian Chemical Society, Rome 10 June 2016: "IrOx (photo-)electrocatalysts as studied by operando X-ray absorption spectroscopy"
4. The 8th International Workshop on SECM: Microsystem, Micromanipulation and Microfabrication, Xiamen, China, 9-12 Oct. 2015: "SECM for the study and the screening of photoelectrode architectures",
5. 3rd Indo Italian Workshop on Electrochemistry 2015, New Delhi, India, 2-3 July 2015 (invitation from the Scientific Office of the Italian Embassy in India): "In-situ X-ray absorption spectroscopy on (photo) electrocatalysts: new methods and innovative techniques towards new insights on reaction mechanisms"
6. SAES Energy Storage Day, at SAES Getters S.p.A. headquarters, Lainate (MI), 5 May 2015: "Oxygen Evolution Reaction in Electrochemical and Photoelectrochemical Devices: Novel Methods Towards the Understanding of Reaction Mechanisms and New Materials"
7. Stanford Linear Accelerator Center, Menlo Park, CA, USA, 02 February 2016: "Rapid Screening and In-Operando X-Ray Absorption Spectroscopy of Oxygen Evolution Reaction (Photo-) Electrocatalysts"
8. University of Southampton, Department of Chemistry, UK. 03 March 2016: "Oxygen Evolution Reaction (Photo-)Electrocatalysts as studied by Scanning Electrochemical Microscopy and X-Ray Absorption Spectroscopies"
9. Interdisciplinary Centre for Nanostructured Materials and Interfaces (CIMaINa). Milan, Italy, 30 January 2015 "Principles and uses of an electrochemical "lens": The Scanning Electrochemical Microscopy"
10. University of Gothenburg/Chalmers University, Gothenburg, Sweden, 15 January 2015: "In-situ X-ray absorption spectroscopy on (photo-)electrocatalysts: new methods and innovative techniques towards new insights on reaction mechanisms"
11. University of Alicante, Institute of Electrochemistry, Spain, 30 June 2011: "Design and characterization of oxygen evolution electrocatalysts by cavity-microelectrodes and scanning electrochemical microscopy"

#### Conferences

More than 80 oral/poster presentation at national and international conferences since 2005

- Funded projects**
- 2007- now 8 **proposals funded by the European Synchrotron Radiation Facility** (Grenoble, FR) as main proposer, plus a 2-years block allocation group one, 3 as co-proposer. 1 proposal as co-proposer at ELETTRA (Trieste). The total number of allocated shift (each shift is an 8h beamtime) is about 200. Each shift at the ESRF has a cost of about 18 000 Euro. Therefore, the total beamline given as PI is equivalent of a ca. **1 600 000 euro fund**.
- 2013-2017 **Futuro in Ricerca 2013**, head of the UniMI research unit for a project entitled "Low-cost photoelectrodes architectures based on the redox cascade principle for artificial photosynthesis" (budget of the research unit about 160 000 Euro), in collaboration with CNR-ISTM
- 2015-2017 **Piano di sostegno alla Ricerca**, Università degli Studi di Milano, three projects funded as principal investigator (budgets of 6 600, 2 400 and 2 200 Euro)
- 2017 Fondo per il finanziamento delle attività base di ricerca – FFABR, funded (3 000 Euro budget)
- Organization of scientific meetings (selection)**
- 2018 Symposium Organizer for the International Society of Electrochemistry 2018 Annual Meeting
- 2016 co-Chair of the 2016 "Giornate dell'Elettrochimica Italiana", the annual meeting of the electrochemistry division of the Italian Chemical Society, 86 participants, Gargnano, Italy
- 2016 co-Chair of the 2016 "Il Mediterranean Symposium: Electrochemistry for Environment and Energy", a meeting born in collaboration between the Spanish and Italian electrochemists, 78 participants, Gargnano, Italy
- 2015 Advisory Committee for the 3rd Indo-Italo Workshop on Electrochemistry for Energy and Health (New Dehli, India, 2-3/07/2015)
- Institutional responsibilities**
- 2016 - now responsible for the Departmental outreach activities devoted to train secondary school students for the "Giochi della Chimica", the local level competition for the selection of the most promising students that will participate to the International Chemistry Olympiad. Every year I coordinate the work of 5-6 "coaches" (PhD students and assistant professors) for the training of 20-30 students
- 2014-now Member of the teaching board of PhD in Industrial Chemistry, University of Milan, Italy
- 2013-2016 Department's Council Member, University of Milan /Dipartimento di Chimica/Italy
- Commissions of trust**
- 2018 Member of the **evaluation committee** for a PhD student's final exam, Department of Chemistry, Università degli Studi di Milano, Italy
- 2017 Member of the **evaluation committee** for a PhD student's thesis defense, Department of Chemistry and Molecular Biology, University of Gothenburg, Sweden
- 2016-2017 Member of the **Editorial Board** for the Special Issue of the Journal of Electroanalytical Chemistry covering selected papers from the "2nd E3 Mediterranean Symposium: Electrochemistry for Environment and Energy".
- 2016 **Evaluator**, Italian Agency for the Evaluation of Universities and Research Centers (ANVUR)/Italy
- 2015 **Evaluator** of scientific projects, Israel Science Foundation (ISF) / Israel
- 2015 **Evaluator** of research and professional activities / Institutes of the Czech Academy of Sciences (CAS)/ Czech Republic
- Reviewer** for major journals such as Nature, Nature Energy, Nature Catalysis, Nature Communications, JACS, NanoLetters, Advanced Materials, ACS Nano, ACS Catalysis, Advanced Energy Materials etc.

Honours and awards	<ol style="list-style-type: none"><li>1. <b>Premio Primo Levi 2014</b>, for the best publication on Chemistry written by an under-35 Italian author in 2014</li><li>2. <b>International Society of Electrochemistry Travel Award</b> in recognition to the quality of my research and as contribution to the participation to the 62nd Annual Meeting of the ISE (out of 32 applications)</li><li>3. 2nd <b>Poster Award</b> at the 7th Workshop on SECM at Ein Gedi (Israel) (out of 19 candidates)</li><li>4. <b>“Fiamm S.p.A.” prize</b> issued by the Electrochemical Division of the Italian Chemical Society for one of the best PhD thesis in electrochemistry.</li><li>5. <b>“AMEL” prize</b> issued by the Electrochemical Division of the Italian Chemical Society for one of the best Master Degree thesis in electrochemistry.</li><li>6. Scholarship, issued by <b>Fondazione Oronzio and Niccolò De Nora</b>, on a project on “Rapid screening of electrocatalysts by Scanning Electrochemical Microscopy”</li></ol>
Memberships	Member of the International Society of Electrochemistry Member of the Italian Chemical Society <b>2013- 2020 Member elected</b> of the Board of the Electrochemistry division of the Italian Chemical Society
Certifications	State habilitation as <b>associate professor</b> in physical chemistry (settore concorsuale 03/A2, settore scientifico disciplinare CHIM/02)
Didactic activities (selection)	<p>2013 - now Lecturer of <b>“Environmental Electrochemistry”</b>, Master degree in Industrial Chemistry, University of Milan, Italy</p> <p>From 2019- Lecturer of <b>“Metal Science and Corrosion”</b>, Master degree in Industrial Chemistry, University of Milan, Italy</p> <p>2015 Responsible for the laboratory of Physical Chemistry, Bachelor degree in Industrial Chemistry, University of Milan, Italy</p> <p>2018 Invited lecturer. “Photoelectrochemistry: from basic concept to devices” at the “1st ENERCHEM School: chemistry for the energy transition”, Florence, Italy, March 20-24 <a href="http://www.enerchem-school.it/">http://www.enerchem-school.it/</a></p> <p>2017 Invited lecturer. “Fixed Energy X-ray Absorption Spectroscopy” at the Conventional and High-Energy Spectroscopies for Inorganic, Organic and Biomolecular Surfaces and Interfaces School, Florence, Italy, November 27-30. <a href="https://www2.chim.unifi.it/vp-297-chess-2017-scuola-di-analisi-delle-superfici.html">https://www2.chim.unifi.it/vp-297-chess-2017-scuola-di-analisi-delle-superfici.html</a></p>