

CURRICULUM VITAE

Elisabeth LOJOU

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CURRENT POSITION **Research Director at National Center for Scientific Research (CNRS), UMR 7281 Bioénergétique et Ingénierie des Protéines (BIP) Marseille, France.**

Main research topics: Electrochemical interface functionalization for direct and mediated electron transfer on redox enzymes. Hydrogen biofuel cell development.

As an electrochemist, my topics have evolved from an industrial research devoted to the development of new liquid cathodes for high power lithium cells to more fundamental queries concerning long range electron transfer within biological macromolecules. My current interest focuses on the functional immobilization of enzymes from extremophilic bacteria onto electrodes. I achieved an expertise in modifications of electrodes and construction of supramolecular architectures, mimicking protein environments, including physiological partner or membrane, or offering a suitable host matrix. I especially develop original electrochemical interfaces for enzymatic reactions, including catalytic reduction of metals by cytochromes and catalytic transformation of H₂ and O₂ by hydrogenases and oxidases respectively. I recently designed the first efficient H₂/O₂ biofuel cells ever reported.

POSITIONS AT CNRS	2007	Research Director CNRS, BIP, Marseille, « Energy metabolism of extremophiles » group
	1995	Researcher CNRS, BIP, Marseille, « Electrochemistry of proteins » group
	1990	Researcher, Electrochem., Catalysis and Organic Synthesis lab., Thiais, France

POST-DOC	1989	SAFT-Leclanché Company, Poitiers, France
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UNIVERSITY GRADES	2003	Accreditation to supervise research in chemistry, Aix-Marseille University
	1988	PhD thesis Paris XII University
	1985	Engineer of National School of Chemistry, Rennes, France

PUBLICATIONS	88 publications.
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DISTINCTIONS	2015	Award of Public Research for Environment and Energy: « H ₂ /O ₂ biofuel cell for powering of a wireless sensor ».
	2012	ADEME Award for Innovation and Environment : « High temperature H ₂ /O ₂ biofuel cell »
	1989	Innovation Award of SAFT-Leclanché Company: “High power liquid cathode battery “

SOME RECENT CONTRACTS AS A COORDINATOR

2016-20	ANR Energy 2016, « ENZYMOR », « <i>Electrode rationalization for efficient bioelectrocatalysis</i> ». 450 k€
2013-17	ANR BioME 2013, « CAROUCCELL », « <i>Cathode and Anode Rationalization for an Outstanding H₂/O₂ biofuel CELL</i> ». 450 k€
2010-14	ANR Bioenergy “BIOPAC” « <i>Functional hyperthermophilic hydrogenases immobilization onto carbon supports in view of efficient hydrogen oxidation catalysis</i> ». 550 k€
2014	Hubert Curien Program, ULYSSES France/Ireland « <i>Electroactive Biofilms for H₂ production</i> ».

TEACHING

2011-	Master 2 « MATER, Materials for Energy », Aix-Marseille University.
2012 -	Polytech, Marseille, « Fuel cells and biofuel cells »
2012	Master 2 « Chemistry » Pierre and Marie Curie University
2013-15	Thematic schools 1) Microreactors, Microsensors, Microbattery, 2) Enzymatic fuel cells, 3) Surface Functionalization.

ADMINISTRATIVE FUNCTIONS

2014-18	Vice-chair of the International Society of Electrochemistry, division Bioelectrochemistry
2012-14	French National Chemistry Institute Committee
2008-12	CNRS Evaluation Committee, Electrochemistry division
2012-16	CNRS Evaluation Committee, Interdisciplinary division
2015-	Vice-President of French Chemical Society, SCF, Electrochemistry Division
2010-	Secretary of the French Group of Bioelectrochemistry (GFB)

CONFERENCE ORGANIZATION

2017	Organization of Symposium 4 dedicated to bioelectrochemistry, ISE, Providence, USA
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2016 Organization of the Hydrogenase Conference, Marseille, France
 2014, 2016 Organization of the GFB conferences, France

PUBLICATIONS 2011-2017

- Electrochim. Acta**, 56 (2011) 3359-3368
 A. Ciaccafava, M. Alberola, S. Hameury, P. Infossi, M.T. Giudici-Ortoni, E. Lojou
Hydrogen bioelectrooxidation in ionic liquids: from cytochrome c_3 redox behavior to hydrogenase activity
- Functional Nanoscience** (ed. M. G. Hicks & C. Kettner) Beilstein Institute, Frankfurt, (2011) 129-142
 A. Cornish-Bowden, M. L. Cárdenas, E. Lojou
"Reflections on Energy Conversion in Biological and Biomimetic Systems"
- Electrochim. Acta** 56 (2011) 10385
 E. Lojou
Hydrogenases as catalysts for fuel cells: strategies for efficient immobilization at electrode interfaces
- Angew. Chem. Int. Ed.**, 51(2012)953-956
 A. Ciaccafava, P. Infossi, M. Ilbert, M. Guiral, S. Lecomte, M.T. Giudici-Ortoni, E. Lojou
Electrochemistry, AFM and PM-IRRAS spectroscopy of immobilized hydrogenase: role of a trans-membrane helix on enzyme orientation for efficient H_2 oxidation
- The Journal of Biological Chemistry**, 287 (2012) 19936-19948
 C. Aussignargues, M.C. Giuliani, P. Infossi, E. Lojou, M. Guiral, M.T. Giudici-Ortoni, M. Ilbert
A rhodanese functions as a sulfur supplier for key enzymes in sulfur energy metabolism
- Biochem. Society Trans.**, 40 (2012) 1324-1329
 M. Roger, C. Castelle, E. Lojou, P. Infossi, M. Guiral, M.T. Giudici-Ortoni, M. Ilbert
Mineral respiration under extreme acidic conditions: from a supramolecular organization to molecular adaptation in Acidithiobacillus ferrooxidans
- Adv. Microbial. Physiol.**, 61 (2012) 125-194
 M. Guiral, L. Prunetti, C. Aussignargues, A. Ciaccafava, P. Infossi, M. Ilbert, E. Lojou, M.T. Giudici-Ortoni
The hyperthermophilic bacterium Aquifex aeolicus: from respiratory pathways to extremely resistant enzymes and biotechnological applications
- Electrochemistry communications**, 23 (2012) 25-28
 A. Ciaccafava, A. De Poulpique, V. Techer, M.T. Giudici-Ortoni, S. Tingry, C. Innocent, E. Lojou
An outstanding bioanode for an innovative powerful and mediatorless H_2/O_2 biofuel cell
- Electrochimica Acta**, 82 (2012) 115-125
 A. Ciaccafava, A. De Poulpique, P. Infossi, S. Robert, R. Gadiou, M.T. Giudici-Ortoni, S. Lecomte, E. Lojou
A friendly detergent for H_2 oxidation by Aquifex aeolicus membrane-bound hydrogenase immobilized on graphite and SAM-modified gold electrodes
- Electroanalysis**, 25(2013) 685-695
 A. De Poulpique, A. Ciaccafava, K. Szot, B. Pillain, P. Infossi, M. Guiral, M. Opallo, M.T. Giudici-Ortoni, E. Lojou*
Exploring properties of an hyperthermophilic membrane-bound hydrogenase at carbon nanotube modified electrodes for a powerful H_2/O_2 biofuel cell
- Electrochim. Acta**, 111 (2013) 434-440
 K. Szot, A. De Poulpique, A. Ciaccafava, H. Marques, M. Jonsson-Niedziolka, J. Niedziolka-Jonsson, F. Marken, E. Lojou, M. Opallo
Carbon nanoparticulate films as effective scaffolds for mediatorless bioelectrocatalytic hydrogen oxidation
- Phys. Chem. Chem. Phys.**, 15 (2013) 16463-16467.
 A. Ciaccafava, C. Hamon, P. Infossi, V. Marchi, M.T. Giudici-Ortoni, E. Lojou*
Light induced reactivation of O_2 -tolerant hydrogenase from the hyperthermophilic bacterium Aquifex aeolicus
- Phys. Chem. Chem. Phys.**, 16 (2014) 1366-1378
 A. de Poulpique, H. Marques-Knopf, V. Wernert, R. Gadiou, M.T. Giudici-Ortoni, E. Lojou
Carbon Nanofiber Mesoporous Films: Efficient Platforms for Bio-Hydrogen Oxidation in Biofuel Cells
- PlosOne**, 9 (2014) e98941
 M. Roger, F. Biaso, C. Castelle, M. Bauzan, F. Chaspoul, E. Lojou, G. Sciarra, S. Caffarri, M.T. Giudici-Ortoni, M. Ilbert
Spectroscopic characterization of a green copper site in a single-domain cupredoxin
- Electrochimica Acta**, 126 (2014) 104-114
 A. de Poulpique, A. Ciaccafava, E. Lojou*
New trends in enzyme immobilization at nanostructured interfaces for efficient electrocatalysis in biofuel cells.
- Anal. Bioanal. Chem.**, 406 (2014) 1011-1027.
 M. Roger, A. de Poulpique, A. Ciaccafava, M. Ilbert, M. Guiral, M.T. Giudici-Ortoni, E. Lojou
Reconstitution of supramolecular organization involved in energy metabolisms at electrochemical interfaces for biosensing and bioenergy production.
- Electrochem. Com.**, 42 (2014) 72-74
 A. de Poulpique, A. Ciaccafava, R. Gadiou, S. Gounel, M.T. Giudici-Ortoni, N. Mano, E. Lojou
Design of a H_2/O_2 biofuel cell based on thermostable enzymes
- Phys. Chem. Chem. Phys.**, 16 (2014) 11318-11322
 F. Oteri, A. Ciaccafava, A. de Poulpique, E. Lojou, M. Baaden, S. Sacquin-Mora
Fluctuations in the dipole moment of membrane-bound hydrogenase from Aquifex aeolicus account for its adaptability to charged electrodes
- Chem. Com.**, 50 (2014) 4961-5076 – Front cover
 C. Hamon, A. Ciaccafava, P. Infossi, R. Puppo, P. Even-Hernandez, E. Lojou, V. Marchi
Synthesis and Enzymatic activity of an O_2 resistant hydrogenase/CdSe@CdS quantum rod bioconjugate
- ChemElectroChem**, 1 (2014) 1724-1750 - Revue invitée, VIP, Front cover
 A. de Poulpique, D. Ranava, K. Monsalve, M.T. Giudici-Ortoni, E. Lojou
Biohydrogen for a new generation of H_2/O_2 biofuel cells: a sustainable energy perspective
- The Journal of Physical Chemistry**, 118 (2014) 13800-13811
 F. Oteri, M. Baaden, E. Lojou, S. Sacquin-Mora
Multiscale simulations give insight into the hydrogen in- and out-pathways of [NiFe]-hydrogenases from Aquifex aeolicus and Desulfovibrio fructosovorans.
- J. Org. Chem.**, 79 (2014) 6615-6626

- M. Rosselin, F. Choteau, K. Zéamari, K. Nash, A. Das, E. Lojou, B. Tuccio, F. A. Villamena, G. Durand
Reactivity of beta-Substituted α -Phenyl-N-tert-butyl Nitrones
PlosOne, 9 (2014) e98941
- M. Roger, F. Biaso, C. Castelle, M. Bauzan, F. Chaspoul, E. Lojou, G. Sciara, S. Caffarri, MT. Giudici-Ortoni, M. Ilbert
Spectroscopic characterization of a green copper site in a single-domain cupredoxin
Nature Com., 6 (2015) 6283
- S. Benomar, D. Ravana, M.L. Cárdenas, E. Trably, Y. Rafrafi, J. Hamelin, E. Lojou, J.P. Steyer, M.T. Giudici-Ortoni
Nutritional stress induces interspecies interactions with exchange of cell material and energetic coupling
Bioelectrochemistry, 106 (2015) 47-55
- K. Monsalve, A. de Poulpiquet, M. Roger, S. Nitsche, D. Byrne-Kodjabachian, V. Marchi, E. Lojou
Gold nanoparticle-based electrodes for H_2/O_2 enzymatic biofuel cells
Chem. Commun., 51 (2015) 7747-7450
- N. Lalaoui, A. de Poulpiquet, R. Haddad, P. Infossi, A. Le Goff, M. Holzinger, S. Gounel, N. Mano, E. Lojou, S. Cosnier
A membraneless air-breathing hydrogen biofuel cell based on direct wiring of thermostable enzymes on carbon nanotube electrodes
Electrochem. Com. 60 (2015) 216-220
- K. Monsalve, I. Mazurenko, N. Lalaoui, A. Le Goff, M. Holzinger, P. Infossi, S. Nitsche, J.Y. Lojou, M.T. Giudici-Ortoni, S. Cosnier, E. Lojou
A H_2/O_2 enzymatic fuel cell as a sustainable power for a wireless device
ChemElectroChem 3 (2016) 2179-2188
- K. Monsalve, I. Mazurenko, C. Gutierrez-Sanchez, M. Ilbert, P. Infossi, S. Frielingsdorf, M.T. Giudici-Ortoni, O. Lenz, E. Lojou
Impact of carbon nanotube surface chemistry on H_2 oxidation by membrane-bound O_2 -tolerant hydrogenases.
ACS Catalysis, 6 (2016) 5482-5492
- C. Gutierrez-Sanchez, A. Ciaccafava, P.Y. Blanchard, K. Monsalve, M.T. Giudici-Ortoni, S. Lecomte, E. Lojou
*Efficiency of Enzymatic O_2 Reduction by *Myrothecium verrucaria* Bilirubin Oxidase Probed by Surface Plasmon Resonance, PMIRRAS and Electrochemistry*
ACS Appl. Mater. Interfaces 8 (2016) 23074-23085
- I. Mazurenko, K. Monsalve, J. Rouhana, P. Parent, C. Laffon, A. Le Goff, S. Szunerits, R. Boukherroub, M.T. Giudici-Ortoni, N. Mano, E. Lojou
How the intricate interactions between carbon nanotubes and two bilirubin oxidases control direct and mediated O_2 reduction
BBA Bioenergetics, 1858 (2017) 351-359
- M. Roger, G. Sciara, F. Biaso, E. Lojou, X. Wang, M. Bauzan, MT. Giudici-Ortoni, A. Vila, M. Ilbert
Impact of copper ligand mutations on a cupredoxin with a green copper center
Angew. Chem. Int. Ed., 56(2017)7774-7778
- S. Rengaraj, R. Haddad, E. Lojou, N. Duraffourg, M. Holzinger, A. Le Goff, V. Forge
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Sust. Energ. Fuels, (2017) DOI : 10.1039/c7se00180k
- I. Mazurenko, X. Wang, A. de Poulpiquet, E. Lojou
 H_2/O_2 enzymatic fuel cells : from proof-of-concept to powerful devices
ACS Catalysis 7(2017)3916-3923
- Anne de Poulpiquet, Christian H. Kjaergaard, Ievgen Mazurenko, Jad Rouhana, Pascale Infossi, Sébastien Gounel, Roger Gadiou, Marie-Thérèse Giudici-Ortoni, Edward I. Solomon, Nicolas Mano, and Elisabeth Lojou
Mechanism of chloride inhibition of bilirubin oxidases and its dependence on potential and pH
Current Opinion in Electrochemistry (2017) DOI/10.1016/j.coelec.2017.07.001
- I. Mazurenko, A. de Poulpiquet, E. Lojou
Recent developments in high surface area bioelectrodes for enzymatic fuel cells
Energy & Environmental Science 10 (2017) 1966-1982.
- I. Mazurenko, K. Monsalve, P. Infossi, MT. Giudici-Ortoni, F. Topin, N. Mano, E. Lojou
Impact of Substrate Diffusion and Enzyme Distribution in 3D-Porous Electrodes: a combined electrochemical and modelling study of thermostable H_2/O_2 Enzymatic Fuel Cell