

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.**
Leader of the group : Biomimetic interfaces

Main research topics: Molecular basis of functional immobilization of redox enzymes on nanostructured electrochemical interfaces. Hydrogen enzymatic fuel 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. The aim is to get the molecular basis for the oriented immobilization of enzymes on electrochemical interfaces which favors fast electron transfer process. I especially developed original electrochemical interfaces for enzymatic reactions, including catalytic reduction of metals by cytochromes, and catalytic transformation of H₂ and O₂ by hydrogenases and multi copper oxidases respectively. I recently designed the first high temperature H₂/O₂ enzymatic fuel cell.

POSITIONS AT CNRS	2013	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
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

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> ».

ADMINISTRATIVE FUNCTIONS

2014-18	Vice-chair of the International Society of Electrochemistry, division Bioelectrochemistry
2018-	Member of the Bioelectrochemical Society committee
2012-14	French National Chemistry Institute Committee
2008-12	CNRS Evaluation Committee, Electrochemistry division, Section 13
2012-16	CNRS Evaluation Committee, Interdisciplinary division, Section 52
2015-	Vice-President of French Chemical Society, SCF, Electrochemistry Division
2010-	Secretary of the French Group of Bioelectrochemistry (GFB)

CONFERENCE ORGANIZATION

2019	Chair of the symposium dedicated to fuel cells and biofuel cells, ISE, Durban (South Africa)
2017	Chair of the symposium dedicated to bioelectrochemistry, ISE, Providence (USA)
2016	Organization of the international Hydrogenase Conference, Marseille, France
2014, 2016, 2018	Organization of GFB conferences, France

RESEARCH GUIDANCE

Ongoing: 1 Associate Professor, 1 researcher CNRS, 2 PhD, 2 Masters, 1 Engineer
Completed: 5 PhD

AWARDS

2015 Environnement, Energy, Climat Academic research award : «An environmental sensor wirelessly powered by a H₂/O₂ enzymatic fuel cell».

2012 Innovation Award for environment delivered by ADEME: « High temperature H₂/O₂ enzymatic fuel cell »

1989 SAFT-Leclanché Innovation Award: “High power Li/liquid cathod batteries »

PUBLICATIONS

95 Publications, 40 invited communications, 80 oral communications, 2 patents

TEN RECENT RELEVANT PUBLICATIONS

1- Catalyst, 8 (2018) 192

Vivek Pratap Hitaishi, Romain Clement, Nicolas Bourassin, Marc Baaden, Anne de Poulpique, Sophie Sacquin-Mora, Alexandre Ciaccafava, Elisabeth Lojou

Controlling redox enzyme orientation at planar electrodes

2- Chem. Sci. 9 (2018) 4879-4891

X. Wang, M. Roger, R. Clément, S. Lecomte, F. Biaso, L. A. Abriata, P. Mansuelle, I. Mazurenko, M.T. Giudici-Ortoni, E. Lojou, M. Ilbert

Electron transfer in an acidophilic bacterium: interaction between a diheme cytochrome and a cupredoxin

3- Sust. Energ. & Fuels, 1 (2017) 1475-1501.

I. Mazurenko, X. Wang, A. de Poulpique, E. Lojou

H₂/O₂ enzymatic fuel cells : from proof-of-concept to powerful devices

4- Energy & Environmental Science 10 (2017) 1966-1982.

I. Mazurenko, K. Monsalve, P. Infossi, M.T. 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 a thermostable H₂/O₂ Enzymatic Fuel Cell

5- Current Opinion in Electrochemistry 5 (2017) 74-84

I. Mazurenko, A. de Poulpique, E. Lojou

Recent developments in high surface area bioelectrodes for enzymatic fuel cells

6- 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 O₂ reduction

7- 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 O₂ Reduction by Myrothecium verrucaria Bilirubin Oxidase Probed by Surface Plasmon Resonance, PMIRRAS and Electrochemistry

8- 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

9- 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 H₂ oxidation

10- J. Am. Chem. Soc., 132 (2010) 6991-7004

M. Pandelia, V. Fourmond, P. Tron-Infossi, **E. Lojou**, P. Bertrand, C. Leger, M.T. Giudici-Ortoni, W. Lubitz

Membrane-bound hydrogenase I from the hyperthermophilic bacterium Aquifex aeolicus: enzyme activation, redox intermediates and oxygen tolerance