

ICH2019

12th INTERNATIONAL CONFERENCE ON HYDROGENASES

AND OTHER REDOX (BIO)CATALYSTS FOR ENERGY CONVERSION

MAR 31 - APR 4 . LISBON . PORTUGAL
CAMPUS DE CAMPOLIDE . UNIVERSIDADE NOVA DE LISBOA



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Welcome Message

On behalf of the Organizing Committee we welcome you to the 12th International Hydrogenase Conference and to the charming city of Lisbon. Since the first International Hydrogenase Conference held in Szeged (Hungary) in 1985, these successful meetings have been held every three years. It is now hosted for the second time in Portugal, after the 3rd International Hydrogenase Conference that took place in Tróia (1991), chaired by José J. G. Moura. As in the previous Hydrogenases Conferences, all fronts of fundamental and applied research on hydrogenases are covered in the scientific program, ranging from microbiology to chemical synthesis of biomimetic compounds. Additionally, research on related redox (bio)catalysts for energy conversion, such as formate dehydrogenases, CO-dehydrogenases, nitrogenases, and photosystems, is included within the scope of the conference. An exciting scientific program has been elaborated by the Organizing Committee, with the aid of the Scientific Committee, and thanks to your contributions. It comprises 14 sessions of oral presentations, including seven plenary and five keynote lecturers. In addition, two poster sessions will take place with selected flash poster presentations included in the oral program.

We thank the support of our sponsors, Turismo de Lisboa, Turismo de Portugal, Chemical Science, Luso-American Foundation, ITQB NOVA and CTQB. We also acknowledge the involvement and support of the Scientific Committee and the Organizing Committee, and the excellent help from local organizer Ana Borges and from our students before and during the conference.

The 12th International Hydrogenase Conference is a great opportunity for all researchers working in the topic to meet again, exchange ideas and results, to have thrilling discussions and to enhance scientific collaborations. Furthermore, it is a fantastic chance to enjoy the city of Lisbon with its superb historical and cultural heritage, and beautiful coastline and surroundings, as well to experience the portuguese gastronomy and hospitality.

Bem vindos/Bienvenidos

Inês Cardoso Pereira

Antonio Lopez de Lacey

Conference chairs

General Information

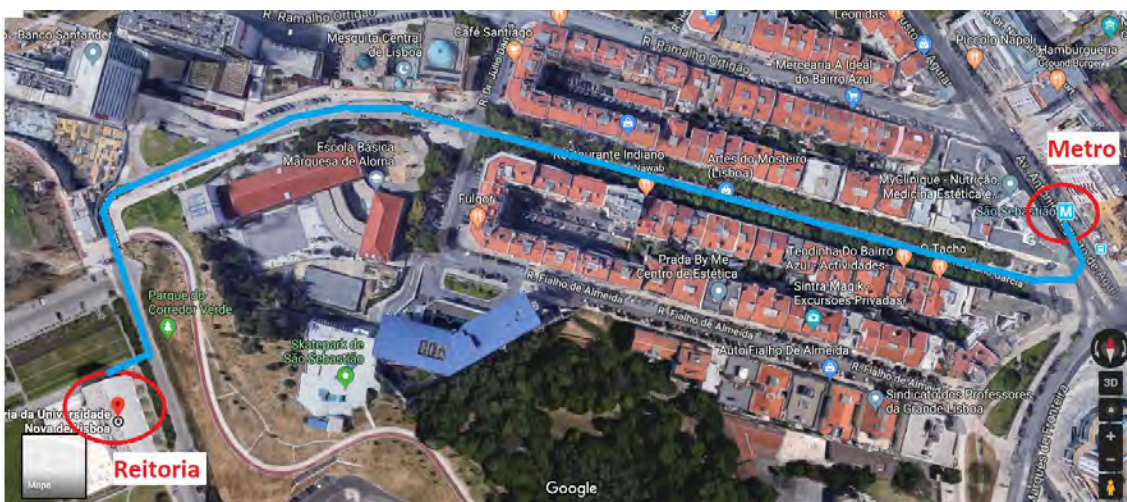
Venue

The conference will take place at the **Rectory of Universidade NOVA de Lisboa** in Campolide. Sessions will be held in Hall B.



Directions

From the airport take the subway **Red** line and exit at the terminal station (**S. Sebastião**). From downtown take the **Blue** line at exit at the same station. After exiting S. Sebastião station walk 11 mins to the Rectory of Universidade NOVA de Lisboa. Follow the blue line in the map below.



Registration

Registration will be open on the **31st March from 15h00 to 17h00**, in the main hall. The registration fee includes all sessions, lunch and coffee breaks, welcome reception and poster sessions, but not the final dinner.

WiFi

Free wifi is available in the building through Eduroam and AuditorioUNL networks.

Information for speakers

Speakers have to bring their presentations to the conference room beforehand and at least 15 mins before their session starts. Connection of personal computers will not be allowed.

Poster Sessions

Posters (A0 size) will be on display in the main hall throughout the conference, and two poster sessions will take place. **Odd**-numbered posters will be presented on **Monday, 1st Apr, 18h30-20h00**, and **even**-numbered posters will be presented on **Tuesday, 2nd Apr, 18h30-20h00**.

Awards

There will be three awards for best poster presentations. The awards will be presented on **Thursday 4th Apr, at 12h30** after the Keynote Lecture and just before lunch.

Group Photo

On Wednesday **3rd Apr at 12h50**, after the Plenary Lecture, we will meet outside in the staircase for a group photo.

Meals

Lunches and coffee breaks will be served in the main hall.

Social Program

The **Welcome Reception** will take place on Sun 31st March at 18h00 in the main hall.

An **optional trip to Sintra** will take place on Wed 3rd April, leaving from the conference site. You need to pay this directly to the travel agents at the registration.

The **final dinner** will take place in downtown Lisbon at **Restaurante Zambeze** starting with a welcome drink at **19h30**. To get to the restaurant you should take the subway and exit in the

"**Baixa-Chiado**" station (served by Blue and green lines), taking the exit to "**Rua do Crucifixo**". When you exit continue in the street right in front ("**Rua da Victoria**") and walk all along until the end, where you will see a building with the letters "**ELEVADOR**" on top. This building is in **Rua dos Fanqueiros, nº 178**, where you should go in and take the elevator up. You will exit in **Rua da Madalena**, where you turn left and then walk across the small square (**Largo Chão do Loureiro**) and turn right. At the end of this small street there is a supermarket (**Pingo Doce**) where you take another **elevator** to take you up to the restaurant (**7th floor**).

Useful Contacts

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Campolide Police Station (PSP): +351 213 858 817

National Emergency number: 112

Programme

31st March Sunday	
15:00–17:00	Arrival, Registration and Poster mounting
16:50–19:30	Welcome and Opening Plenary Lecture
16:50–17:00	<i>Welcome Address: Inês A. C. Pereira, ITQB NOVA and Antonio L. De Lacey, ICP/CSIC</i>
17:00–17:10	<i>Welcome Address: Cláudio M. Soares, ITQB NOVA Director</i>
17:10–18:00	<i>Opening Plenary Lecture: Wolfgang Lubitz, Max-Planck Institute for Chemical Energy Conversion, Germany</i> Solving problems in hydrogenase research by advanced physical techniques
18:00–19:30	Welcome Reception
1st April Monday	
8:40–10:30	Session I <i>Chair: Oliver Lenz</i>
8:40–9:30	<i>Plenary Lecture: Thomas Happe, Ruhr-University Bochum, Germany</i> Deciphering enzymatic hydrogen production to the atomic level
9:30–9:50	Deborah B. Zamble , University of Toronto, Canada Metal transfer between the nickel maturation factors of the [NiFe]-hydrogenase enzyme
9:50–10:10	Gary Sawers , Martin-Luther University Halle, Germany Dissection of the protein interactions on the pathway to [NiFe]-hydrogenase maturation
10:10–10:30	Marta Albareda , Polytechnical University of Madrid, Spain Identification of glutamate residues relevant for efficient maturation of <i>Rhizobium leguminosarum</i> [NiFe] hydrogenase
10:30–11:00	Coffee Break
11:00–12:30	Session II <i>Chair: Marisela Vélez</i>
11:00–11:20	Pedro M. Matias , Nova University of Lisbon, Portugal Improving the O ₂ tolerance of a [NiFeSe] hydrogenase

11:20–11:40	Yoshiki Higuchi , University of Hyogo, Japan Role of water network for O ₂ -stability of [NiFe]-hydrogenases
11:40–12:00	Anne Volbeda , University of Grenoble Alpes/CEA/CNRS, France Investigating the redox properties of the special proximal cluster of <i>E. coli</i> hydrogenase-1 by combining structural studies with semi-empirical calculations
12:00–12:30	<i>Keynote Lecture:</i> John W. Peters , Washington State University, USA Two decades of structural insights into the mechanism of [FeFe]-hydrogenases
12:30–14:00	Lunch
14:00–15:40	Session III <i>Chair: Deborah Zamble</i>
14:00–14:20	<i>Flash Poster Presentations I:</i> M. Roger, A. Vidal-Meireles, V. Engelbrecht, B. Soboh, B. Németh, A. Poladyan
14:20–14:40	Kirstin Gutekunst , Christian Albrechts University, Germany The cyanobacterial bidirectional NiFe-hydrogenase fine-tunes metabolism under oxic conditions
14:40–15:00	Constanze Pinske , Martin-Luther University Halle-Wittenberg, Germany Dissecting the Role of [NiFe]-hydrogenases in <i>pmf</i> generation
15:00–15:20	Peter Lindblad , Uppsala University, Sweden Cyanobacterial H ₂ evolution, native and artificial systems
15:20–15:40	Myriam Brugna , Aix Marseille University/CNRS, France A new mechanistic model for an O ₂ -protected electron-bifurcating hydrogenase, Hnd from <i>Desulfovibrio fructosovorans</i>
15:40–16:10	Coffee Break
16:10–18:20	Session IV <i>Chair: Inês A. C. Pereira</i>
16:10–16:30	<i>Flash Poster Presentations II:</i> O. Lampret, S. Carr, S. Zacarias, C. Lorent, K. Nutschan
16:30–16:50	Holger Dobbek , Humboldt University of Berlin, Germany Expanding universe of Ni,Fe-containing carbon monoxide dehydrogenases

16:50–17:10	Sébastien Dementin , Aix Marseille University/CNRS, France Unusual properties of the Ni-containing carbon monoxide dehydrogenase from <i>Desulfovibrio vulgaris</i>
17:10–17:30	Silke Leimkühler , University of Potsdam, Germany The mechanism of formate oxidation catalyzed by formate dehydrogenase from <i>Rhodobacter capsulatus</i>
17:30–17:50	Luis M. Rubio , Polytechnical University of Madrid, Spain Hydrogen overproducing <i>Rhodobacter capsulatus</i> strains obtained by genome-wide mutagenesis and high-throughput screening
17:50–18:20	<i>Keynote Lecture:</i> Oliver Einsle , Albert Ludwigs University of Freiburg, Germany A nitrogen-fixing hydrogenase?
18:20–19:50	Poster session Participants presenting odd -numbered posters should preferentially be present at their poster

2nd April Tuesday	
8:40–10:30	Session V <i>Chair: Michael B. Hall</i>
8:40–9:30	<i>Plenary Lecture:</i> Vincent Artero , University of Grenoble Alpes/CNRS/CEA, France Bioinspired catalytic materials for hydrogen technologies
9:30–9:50	Marcetta Y. Darensbourg , Texas A&M University, USA Oxygen uptake in complexes related to [NiFeS]- and [NiFeSe]-H ₂ ase active sites
9:50–10:10	Wolfgang Weigand , Friedrich Schiller University of Jena, Germany [FeFe] hydrogenase mimic with a (SCH ₂) ₂ P=O moiety
10:10–10:30	Wendy J. Shaw , Pacific Northwest National Laboratory, USA Impact of an outer coordination sphere on catalysts for CO ₂ hydrogenation
10:30–11:00	Coffee Break
11:00–12:30	Session VI <i>Chair: Anne K. Jones</i>
11:00–11:20	Thomas B. Rauchfuss , University of Illinois at Urbana-Champaign, USA Strategies for labeling the [FeFe] hydrogenase and its precursors

11:20–11:40	Gustav Berggren , Uppsala University, Sweden Exploring [FeFe] hydrogenase using synthetic chemistry
11:40–12:00	Federica Arrigoni , University of Milano-Bicocca, Italy H ₂ oxidation and proton reduction in [FeFe]-hydrogenase biomimetics: looking backwards and forwards for new synthetic mimics. The DFT viewpoint
12:00–12:30	<i>Keynote Lecture: Xile Hu</i> , Federal Polytechnical School of Lausanne, Switzerland Models and semi-synthetic enzymes of [Fe]-hydrogenase
12:30–14:00	Lunch
14:00–15:40	Session VII <i>Chair: Cláudio M. Soares</i>
14:00–14:20	<i>Flash Poster Presentations III: H. J. Redman, S. C. Marguet, P. Skorupa, T. M. Barbosa, C. J. Kulka, S. Kendall-Price</i>
14:20–14:40	Michael B. Hall , Texas A&M University, USA Abstract modeling NiFe-Hydrogenase and biomimetic complexes
14:40–15:00	Maurizio Bruschi , University of Milano-Bicocca, Italy Theoretical insights into stereoelectronic and catalytic properties of the NiFe-containing carbon monoxide dehydrogenases (NiFe-CODH)
15:00–15:20	Edward Reijerse , Max-Planck Institute for Chemical Energy Conversion, Germany The electronic structure of the H-cluster in [FeFe] hydrogenase: Limitations of density functional theory and implications for the catalytic mechanism
15:20–15:40	Michael Haumann , Freie University of Berlin, Germany Hydrogen catalysis in [FeFe]-hydrogenase: insight from spectroscopy and theory
15:40–16:10	Coffee Break
16:10–18:20	Session VIII <i>Chair: Antonio L. De Lacey</i>
16:10–16:30	<i>Flash Poster Presentations IV: L. Kertess, A. R. Oliveira, E. E. Moore, M. Miller, V. Davis</i>
16:30–16:50	Stephen P. Cramer , SETI Institute, USA Vibrational spectroscopy of hydrogenases with synchrotron Mössbauer X-rays — applications to hydride states

16:50–17:10	James Birrell , Max-Planck Institute for Chemical Energy Conversion, Germany The catalytic mechanism of [FeFe] Hydrogenase: a tale of two sites
17:10–17:30	Sven T. Stripp , Freie University of Berlin, Germany The dynamic hydrogen bonding network of [FeFe]-hydrogenases
17:30–17:50	Ingo Zebger , Technical University of Berlin, Germany Insights into the oxygen tolerance and structure of bidirectional NAD ⁺ -reducing [NiFe] hydrogenases using vibrational and EPR spectroscopies, model compounds and theory
17:50–18:20	<i>Keynote Lecture:</i> Kylie A. Vincent , University of Oxford, UK Watching [NiFe]-hydrogenases in action: mechanistic insight from infrared spectroscopic studies during electrocatalytic turnover
18:20–19:50	Poster session Participants presenting even -numbered posters should preferentially be present at their poster

3rd April	
Wednesday	
8:40–10:30	Session IX <i>Chair: Pedro M. Matias</i>
8:40–9:30	<i>Plenary Lecture:</i> Seigo Shima , Max-Planck Institute for Terrestrial Microbiology, Germany Catalytic mechanism of [Fe]-hydrogenase and biosynthesis of the FeGP cofactor
9:30–9:50	Gerrit J. Schut , University of Georgia, USA Evolutionary path of modern day respiratory complexes from a proton-reducing [NiFe]-hydrogenase ancestor
9:50–10:10	Martin Winkler , Ruhr University Bochum, Germany Filling in the blanks in [FeFe]-hydrogenase research
10:10–10:30	Patricia Rodríguez-Maciá , Max-Planck Institute for Chemical Energy Conversion, Germany Caught in the H_{inact} : crystal structure and X-ray spectroscopy of an O ₂ tolerant state in [FeFe] hydrogenase
10:30–11:00	Coffee Break

11:00–12:50	Session X <i>Chair: Wendy J. Shaw</i>
11:00–11:20	Hannah S. Shafaat , Ohio State University, USA Learning from the best: model metalloenzymes that imitate hydrogenase and carbon monoxide dehydrogenase
11:20–11:40	Elisabeth Lojou , CNRS/Aix Marseille University Enzyme distribution and stability in a thermostable H ₂ /O ₂ enzymatic fuel cell
11:40–12:00	Matthias Stein , Max Planck Institute for Dynamics of Complex Technical Systems, Germany The rate and routes of electron transfer in an enzymatic fuel cell
12:00–12:50	<i>Plenary Lecture:</i> Maria João Romão , Nova University of Lisbon, Portugal Metal-dependent formate dehydrogenases and the reversible interconversion of CO ₂ and formate
12:50–14:00	Lunch
14:30–18:30	Excursion/Free time

4th April	Thursday
8:40–10:30	Session XI <i>Chair: Marcella Darensbourg</i>
8:40–9:30	<i>Plenary Lecture:</i> Christophe Léger , CNRS/Aix Marseille University, France Electrochemistry for studying and using biological and synthetic catalysts of hydrogen oxidation and production
9:30–9:50	Anne K. Jones , Arizona State University, USA Three opposites? Electrocatalytic comparison of the [FeFe]-hydrogenases of <i>Clostridium pasteurianum</i>
9:50–10:10	Olaf Rüdiger , Max-Planck Institute for Chemical Energy Conversion, Germany Alterations at the [4Fe-4S] sub-cluster coordinating cysteines tune the catalytic bias of [FeFe] hydrogenase
10:10–10:30	José J. G. Moura , Nova University of Lisbon, Portugal Enzymatic CO ₂ reduction: towards a catalyst to use the abundant atmospheric CO ₂
10:30–11:00	Coffee Break

11:00–12:30	Session XII <i>Chair: Marcos Pita</i>
11:00–11:20	Adrian Ruff , Ruhr University Bochum, Germany Hydrogenases embedded in low potential redox polymers: from protected bioanodes to high current densities H ₂ /air biofuel cells
11:20–11:40	Vincent Fourmond , Aix-Marseille University/CNRS Tuning redox hydrogels films embedding hydrogenases for optimal protection against O ₂
11:40–12:00	Nicolas Plumeré , Ruhr University Bochum, Germany Achieving Complete O ₂ -Insensitivity of <i>DvMF</i> [NiFe] hydrogenase in Redox Active Films
12:00-12:30	<i>Keynote Lecture: Fraser A. Armstrong</i> , University of Oxford, UK Recent mechanistic insight from genetic variants of <i>E. coli</i> hydrogenases
12:30–14:00	Lunch
14:00–15:40	Session XIII <i>Chair: José Palacios</i>
14:00–14:20	Szilvia Z. Tóth , Hungarian Academy of Sciences, Hungary Establishment of a highly efficient, photoautotrophic and sustainable H ₂ production system in the green alga <i>Chlamydomonas reinhardtii</i>
14:20–14:40	Chris Greening , Monash University, Australia New roles for aerobic hydrogen metabolism: from enzymes to ecosystems
14:40–15:00	Stefan Frielingsdorf , Technical University of Berlin, Germany The quest for high affinity toward H ₂
15:00–15:20	Isabelle Meynial-Salles , University of Toulouse/CNRS/INRA/INSA, France Roles of the F-domain in the [FeFe] hydrogenase of <i>Clostridium acetobutylicum</i>
15:20–15:40	Francesca Valetti , University of Torino, Italy Dissecting the protein moiety role in an oxygen resistant [FeFe]-hydrogenase
15:40–16:10	Coffee Break

16:10–18:00	Session XIV <i>Chair: Christophe Léger</i>
16:10–16:30	Lars Lauterbach , Technical University of Berlin, Germany An O ₂ -tolerant hydrogenase applied in biotechnological application: biosynthesis of <i>N</i> -heterocycles at the expense of H ₂ , O ₂ and diamines
16:30–16:50	Jenny Zhang , University of Cambridge, UK Semi-artificial photosynthesis: a platform for studying and rewiring natural photosynthetic pathways in vitro and in vivo
16:50–17:10	Marcos Pita , CSIC, Spain Photobioelectrochemical production of H ₂ using FTO electrodes modified with a NiO-In ₂ S ₃ p-n junction hosting <i>D. gigas</i> hydrogenase
17:10–17:30	R. Brian Dyer , Emory University, USA Time-resolved infrared studies of hydrogenase mechanisms
17:30–18:20	<i>Plenary Lecture:</i> Paul W. King , National Renewable Energy Laboratory, USA Accessing reactive intermediates of enzymes that catalyze H ₂ and N ₂ activation
18:20–18:30	<i>Final Address:</i> Inês A. C. Pereira and Antonio L. De Lacey
19:30-23:30	Conference Dinner at Zambeze restaurant (downtown Lisbon)

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ICH2019

PROGRAM

MAR 31 - APR 4
LISBON. PORTUGAL

	MARCH 31ST	APRIL 1ST	APRIL 2ND	APRIL 3RD	APRIL 4TH
	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY
08:40 - 09:30		T. HAPPE	V. ARTERO	S. SHIMA	C. LÉGER
09:30 - 09:50		D. B. ZAMBLE	M. Y. DARENSBOURG	G. J. SCHUT	A. K. JONES
09:50 - 10:10		G. SAWERS	W. WEIGAND	M. WINKLER	O. RÜDIGER
10:10 - 10:30		M. ALBAREDA	W. J. SHAW	P. RODRÍGUEZ-MACIÁ	J. J. G. MOURA
10:30 - 11:00		COFFEE BREAK	COFFEE BREAK	COFFEE BREAK	COFFEE BREAK
11:00 - 11:20		P. M. MATIAS	T. B. RAUCHFUSS	H. S. SHAFAT	A. RUFF
11:20 - 11:40		Y. HIGUCHI	G. BERGGREN	E. LOJOU	V. FOURMOND
11:40 - 12:00		A. VOLBEDA	F. ARRIGONI	M. STEIN	N. PLUMERÉ
12:00 - 12:30		J. W. PETERS	X. HU	M. J. ROMÃO	F. A. ARMSTRONG
12:30 - 12:50		LUNCH	LUNCH		LUNCH
12:50 - 14:00				LUNCH	
14:00 - 14:20		FLASH POSTERS	FLASH POSTERS		
14:20 - 14:40		K. GUTEKUNST	M. B. HALL		
14:40 - 15:00		C. PINSKE	M. BRUSCHI		
15:00 - 15:20	REGISTRATION	P. LINDBLAD	E. REIJERSE		
15:20 - 15:40		M. BRUGNA	M. HAUMANN		
15:40 - 16:10		COFFEE BREAK	COFFEE BREAK		
16:10 - 16:30		FLASH POSTERS	FLASH POSTERS		
16:30 - 16:50		H. DOBBEK	S. P. CRAMER		
16:50 - 17:10	WELCOME SESSION	S. DEMENTIN	J. BIRRELL		
17:10 - 17:30	W. LUBITZ	S. LEIMKÜHLER	S. T. STRIPP		
17:30 - 17:50		L. M. RUBIO	I. ZEBGER		
17:50 - 18:20	WELCOME RECEPTION	O. EINSLE	K. A. VINCENT		
18:20 - 19:30		POSTER SESSION	POSTER SESSION		
19:30 - 20:00					FINAL ADDRESS
					DINNER