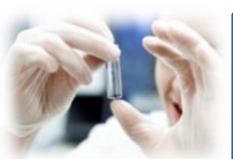


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# ELCOREL NEWS

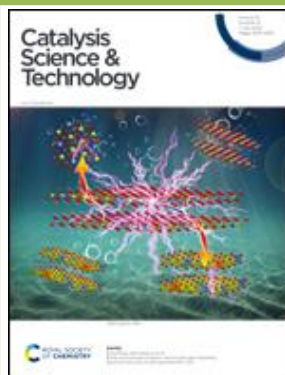
## ELECTROCHEMICAL CONVERSION OF RENEWABLE ELECTRICITY INTO FUELS AND CHEMICALS

A Marie Skłodowska Curie Innovative Training Network (ITN) - **ELCoREL** – is supported by the European Commission to train the new generation of experts capable to develop and implement novel technologies capable of storage of renewable electricity into fuels and chemicals.



### ELCoREL

aims at both scientific and technological aspects of the storage of renewable electricity in fuels and chemicals. To meet this goal the ELCoREL consortium relies on work of 14 Early Stage Researcher (ESR) who carry out research aiming at development of systematic knowledge supporting development of novel tailored catalysts meeting specific activity and selectivity targets for oxygen evolution and CO<sub>2</sub> reduction. The involvement of two industrial partners ensures rapid application of the fundamental science in electrochemical technology.



### New publication by our ESR fellow Davide Pavesi



#### PAPER

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Check for updates

Cite this: *Catal. Sci. Technol.*, 2020, 10, 4264

#### CO<sub>2</sub> electroreduction on bimetallic Pd-In nanoparticles†

Davide Pavesi,<sup>a</sup> Farhan S. M. Ali,<sup>c</sup> Dimitra Anastasiadou,<sup>d</sup> Tanja Kallio,<sup>e</sup> Marta Figueiredo,<sup>d</sup> Gert-Jan M. Gruter,<sup>ae</sup> Marc T. M. Koper<sup>b</sup> and Klaas Jan P. Schouten<sup>ab</sup>

<https://pubs.rsc.org/en/content/articlelanding/2020/cy/d0cy00831a#divAbstract>



## ELCOREL workshop in Milan in Italy in January 2020...

A regular ELCOREL meeting has happened once again. ELCOREL meeting, which all the ESR fellows are waiting with anticipation – to see friends, to share news, to intensively learn something new. Awaiting with bated breath – to present their modest results in front of giants of science. This time it was in Milan, the industrial heart of Italy, cradle of De Nora enterprise. Right before the pandemic burst.

The workshop topic was announced as “Material aspects of contemporary (electro-) catalysis”. For the first time for our project, the topic of materials production was so deeply addressed. Probably, if these topics were touched upon at the beginning of the project, they would arouse interest among a much smaller audience of ESR fellows. This reflects the fact that everyone managed not only to plunge into their topics, but also to touch the technology of materials production itself, making them multilateral researchers. Now everyone was worried about the nuances of the micro and nano world – how to stabilize particles, how to tune their morphology, how to increase surface area, how to exfoliate to obtain 2D materials. Genuine interest was expressed by the full audience, eagerly absorbing each slide, as well as a vivid discussion at the end of the lectures, from which even Italian coffee and cakes could not distract.

The completion of this topic was a lecture by Senior Scientist from De Nora - Dr. Emanuele Instali, who provided a broad overview of the steps to be taken from the idea to the commercial product in the field of catalysts.

Since the project is in the final stage, for many ESR an open question is - what do I do after PhD? In support of the young scientists, a lecture was organized, reviewing the possibilities of further career growth, as well as many tips were put forward that should help in order to understand the direction and to overcome fears for the future, starting to prepare for it now.

But a scientist does not live by science only. Since we are all curious people, we were undoubtedly interested in the venue of the conference. Milan is a versatile city with a rich history, without which it is impossible to imagine modern Italy. Of course, for such a short period you will not be able to cover much, so we went to one of the most iconic places in Milan - Biblioteca Ambrosiana. There, masterpieces of the outstanding geniuses of Italy were presented to our eyes - Leonardo, Raphael, Caravaggio and others.

We also got acquainted with the everyday culture of Italy, by our own hands - through the art of making pizza. As usual, the devil is in the details. Conducted by a charming chief called Roberto, who taught us the skill of making pizza and explained the difference between “Roman” and “Neapolitan”. After a long, busy day, the pizzas we cooked were great. We shared them with each other, enjoying wonderful company of ELCOREL, with this aromatic Italian wine. We will all miss that magnificent event in Milan and we would like to thank the organizers for the work done!

Text by Vladislav Buravet (Heyrovsky Institute), Photo by Klaudiv Soukupová (Elcorel)



This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 722614.

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# WE INTRODUCE...



## „FEDE“ Federico Dattila

is an Italian physicist interested in renewable energies and environmental sustainability. Though having a humanistic high school background, he got a Bachelor of Science (2015) and a Master of Science (2017) degree in Physics at the University of Turin (Italy). He developed the master thesis project in collaboration with Chalmers University of Technology through the ERASMUS program (Gothenburg, Sweden, spring 2017). In addition, he actively promoted sustainability in his university through the foundation of [greenTO](#), a student association (2016). He is currently an Early Stage Researcher (ESR) within ELCoREL at the Institute of Chemical Research of Catalonia (ICIQ, Tarragona, Spain) under the supervision of Prof. Núria López.

**Would you like to tell something about studies and your Master thesis?** During the secondary school, I planned to become either a lawyer or a politician. For that reason, I went to a humanistic high school, where I studied ancient Greek, ancient Latin, philosophy and plenty of literature. I then got scared by the dark side of humanity and decided to choose science. I did Bachelor and Master of Science in Physics, slowly moving toward Chemistry. Indeed, my master thesis focused on the synthesis and characterization of photo-electrochemical solar cells modified with carbon nanotubes, Gold nanoparticles and graphene oxide. For my PhD I completed my transformation into a chemist (for now just theoretical).

**What are you "doing" (scientific work) at the moment?** I am struggling with experiments in Avantium. Apart from the joke, I am synthesizing some catalysts with the help of Davide Pavesi (a very good teacher!) and characterizing their performance either on a small scale or on a gas diffusion electrode. In addition, I am helping Davide with Density-functional theory. He is modeling some catalysts that he synthesized last year and we are looking for scaling relationships on those materials!

**Your experience from the secondment during this project (if applicable)?** Secondments are the first big opportunity which ELCoREL provided me with. Last summer I spent 1.5 months at the University of Leiden and I am now working in Avantium until the end of June, for a total of 4 months. In Leiden I got the chance to get a deeper understanding on electrochemistry and its fundamental equation. Here in Avantium, I finally managed to see real chemical products and real catalysts. Apart from science, I got to strengthen a lot my network and improved a lot my European side. I felt so welcome in Netherlands, as well as I felt in Spain.

**How do you like the workshops and meetings organized within the Elcorel project?** Periodic workshops and meeting are the second big advantage of being part of the ELCoREL project. You get to learn electrochemistry and catalysis from the best scientists in the field and enlarge a lot your network. Finally, I felt I improved a lot my presentation skills as well. During each meeting, I got so many feedbacks from other senior scientists, Núria and the other fellows. I really start thinking as a real scientist now (even if still on a small scale!).

**What is your current location and how is life in the foreign country far from home and family?** I am currently in Amsterdam. I have been living here for the last 3 months and I was very lucky to stay here during COVID19. Of course, it was hard to be far away from my family and friends in Italy and Spain, but at least I avoided a hard lockdown. My previous 2.5 years in Spain have been amazing. Given the similar language, I could integrate very fast in Tarragona and my research institute (i.e. ICIQ) and I felt in love with some aspects of the Spanish society. It will be hard to leave Tarragona in the future.

**What are your hobbies and interests?** It would be easier to point out what I do not like to do, still I will give it a try. I love playing sports (volleyball, running, beach volleyball) and trekking in the mountains. In my spare time I love history, philosophy and social books as well as scientific outreach. It is so important for me to feel integrated in our society, so I am keen in any social activity. During the last year I also rediscovered the art of cooking and I enjoy it very much (mostly Italian food!).

**What is your favorite color?** I have two. Purple and red. Purple reminds me of equality, red of energy.

**What is your favorite meal?** I am vegetarian, so you may be surprised about my suggestion. I definitely love pasta and pizza in general. In particular, I would say homemade tagliatelle with a vegetarian carbonara sauce, prepared with tofu or beans instead of bacon. Delicious!

**What is your favorite drink?** I love almost all the wines from Piedmont, my region in Italy. As an aperitif, I would definitely choose an aperol spritz.

**What is your favorite music?** Again I have a very wide musical selection, from classical music, songs in my dialect, rock to reggaeton. I update my selection very fast, however my favorite is the national anthem of Italy. It was written by an Italian patriot, [Goffredo Mameli](#), when he was just 20 years old. Every time I listen to this song, I can feel the passion and the ideals of the people who built Italy.

**What is your favorite place / city / destination / country?** I have traveled a lot in Europe in the last years, anyway I am still very connected to my own country. I can lose myself between the vineyards in Langhe (close to Turin, Piedmont, Italy) or just walking across Rome. As a second option, I would say Valencia. It's the Spanish city I love more, a wonderful balance between Tarragona and Barcelona. Instead, in the future I would like to visit South America and get lost there!

**What are your plans for the future?** For now I am mainly concentrated on my PhD thesis. After this step, I would like to spend a bit more time in Tarragona since I am very connected to this city and ICIQ. However, in maximum 2 years from now I would like to come back to Italy. Thanks to the ELCoREL network, I got to discover the existence of an electrochemical group at the Polytechnic of Turin. After almost 5 years abroad, I would like to bring back to my city what I learned in Sweden, Spain and Netherlands.

**Anything else you would like to tell us?** I just want to thank all the people involved in the ELCoREL project. I feel so lucky I have met you all. I learned a lot during these 3 years and I will always remember these special years. Last but not least, I would like to thank European Union and whoever believes in it. Without an European Union, I would probably be an unsatisfied Italian physicist. Thanks to Europe, I could travel abroad, learn and widen personal and scientific skills. Thus, I will never stop believing in Europe!

*Thank you and all the best! KS*

## „MATT“ Matthew Philips



Matt received his B.S. in Chemical and Biomolecular Engineering, graduating with Highest Honors, from The Georgia Institute of Technology. After graduating, he worked for R&D companies in the electrochemistry field where he gained knowledge and experience in: the design of experiments, test station design and fabrication, electrochemical cell optimization, and process engineering separations. He is currently working as a Senior Process Engineer at Avantium, where he's working on a team to advance the research on electrocatalytic CO<sub>2</sub> conversion performed at his former employer, Liquid Light.



**What are you "doing" (scientific work) at the moment?** My work is focused on the optimization of the electrochemical conversion of CO<sub>2</sub> to formate - a building block for other high value chemicals that can be used to make plastics, cosmetic additives, or even dissolvable stitches. A gas diffusion electrode is the most promising technology to make this reaction economically viable. My research aims to optimize the layers in a gas diffusion electrode to increase its efficiency at converting CO<sub>2</sub> at industrially relevant rates.

**How do you like the workshops and meetings organized within the Elcorel project?** They are great! It's always nice to physically meet with the other ESRs and hang out for a week and discuss our research, as well as learn new subjects and expand our professional network. Getting to see a new city in Europe is the cherry on top.

**What is your current location and how is life in the foreign country far from home and family?** I'm living in Amsterdam, The Netherlands. It's an amazing city, there is always something to do and the canals are beautiful when the weather is nice. It has been tough living an ocean away from home. I really miss my family and friends from home but I'm grateful we live in a time where video calling is possible.

**What are your hobbies and interests?** I enjoy Ultimate frisbee, cooking, and video games in my free time. I'm also interested in 3D printing which I've gained a lot of experience in during my studies.

**What is your favorite meal?** Either Chicken and Waffle or Philly Cheesesteak

**What is your favorite drink?** Arizona Green Tea or a milkshake IPA from Tired Hands Brewery

**What is your favorite music?** Muse is my favorite band, there is not a single song I don't like by them.

**What is your favorite place / city / destination / country?** Besides Amsterdam, I'd have to say Switzerland is my favorite place I've been so far because of its landscapes and ample hiking opportunities.

*Thank you and good luck! KS*



*This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 722614.*

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**Join us  
for the next  
workshop!**

**...this time hopefully  
we will be meeting  
in the Netherlands!  
...open for public!**



## WORKSHOP ON/off-LINE!

### „Industrial (Electro-) Catalysis“

Commercialization of Technology and Innovation: what do you need to bring your research to the market?

organized by Avantium Chemicals 14-16 October 2020



#### ?PROGRAM?

Lectures  
Discussions  
Meetings  
People  
Industry  
On-line game



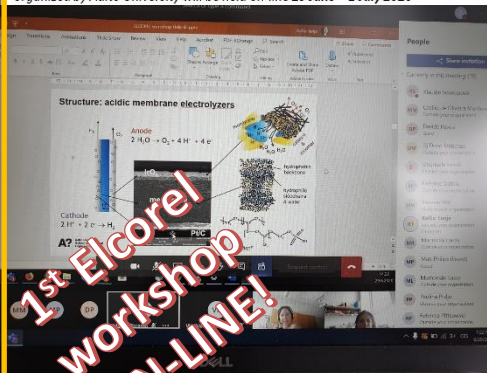
The workshop will train the participants in aspects of industry-related catalysis research such as testing, scale up, optimization, reactor modelling, and (economic) feasibility evaluations of the (electro)catalytic technologies.

We believe in a fossil-free world

**Let's go!**

*It will be decided in September  
according to the actual situation  
if we can meet off-line...*

**ELCORE WORKSHOP ON-LINE!**  
The ELCORE Summer School on  
„Electrochemical Engineering and Catalysis-related Energy Applications“  
& Workshop on Proposal Writing  
organized by Aalto University will be held on-line 29 June – 1 July 2020



**ELCORE NEW DATES, NEW PLACE...**



Universiteit  
Leiden  
The Netherlands



**Chateau Liblice  
2021**

**March 28 – April 2**  
Baroque castle – hotel and  
conference venue near Prague,  
Czech Republic  
<http://www.zamek-liblice.cz/en/>

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**...the impressions from Milan  
January 2020**

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