



## Andrea De Zanet

### Research Student

My PhD research project is related to the design of novel earth abundant heterogenous catalysts for the green chemical production of hydrogen. This is part of "SLOWCat", a major project across different scientific departments at Loughborough University, which is working towards new low-dimensional catalysts, optimized for the treatment of biomasses for the generation of chemicals and fuels.



In terms of the general topic, I think catalysis research is fascinating. It has been an important area to study, understand and develop ever since chemical processes were discovered.

Thus, after working in this sector for a little while, I would say that it's easy to understand how many implications catalytical materials have for our lives and, how many different paths a career in this sector can lead to. In particular, hydrogen research has grown in relevance recently, because of the increasing demand both as a chemical and for energy purposes. In this context, biomasses are promising candidates as green alternatives to carbon fossils for hydrogen/fuels production.

I am happy that my own work, in some way, allows me to give my contribution towards the Net Zero Carbon target of 2050.

<b>Post 16 Education</b> High School Diploma in Scientific Studies, in Italy	<b>Higher Education:</b> Master degree in Material Science in Italy
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### Why did you choose to research catalysis?

I started to specialise more on heterogenous catalysis and functional inorganic materials during my master project thesis in Italy, when I was studying catalysts based on perovskites for the car catalytic converters. In catalysis you have to investigate the properties of the catalysts and try to optimize them according to the performance the materials are exhibiting for a specific application. I always found analysing data exciting and then making hypothesis for new adjustments to make to synthetical methods, characterizations or tests, which are the key aspects when working in this field.





## WHY IT MATTERS... CHEMISTRY



Loughborough  
University

**Andrea's advice:** The research world is always changing and going through an unstoppable upgrade process. Therefore, during the undergraduate experience, I would always consider keeping most of the doors open and “give a chance” to most of the topics you're studying.

Then, when it's time, let your natural interest help you find your own niche in which to develop your future career. One day you'll become an expert in something and you will liaise with someone who's an expert of a subject linked with what you are doing. In the long term, a variety of knowledge helps making connections, developing new concepts and speeding up the learning process.

### Andrea's experience as a student

As a Loughborough second year PhD student I may say this experience provides new challenges every day, they help fortify you as a researcher and as a person. This is also my first experience completely spent abroad, so I won't hide how difficult it was at the beginning of my journey without knowing the language very well. However, I've found a very encouraging and stimulating environment here: being in contact with other cultures and people with which to share experiences, I think has opened my mind and helped me develop skills I would have never been able to develop by working exclusively in my home country.

### Career

I am currently a PhD student in the Chemistry department and I'm working on the synthesis of heterogeneous catalysts used for the production of hydrogen. The catalytic system I'm focusing on is the transition metal carbides, which are materials of high mechanical and chemical robustness, that has been shown in some cases to be close to noble metals in terms of electronic and consequently also catalytical properties. For this reason, they have recently started to be studied as cheaper alternatives to noble metals which are still the most used for catalysts.

I did my undergraduate degree in Italy where the course was structured to prepare you to have a very comprehensive knowledge about materials and their main properties either for an industrial or an academic career. Although, it was during the master thesis in which I started forging my main skills as a researcher. What I found useful at the time was that we were supposed to build our own project mostly independently, which is difficult at first, but it trains you a lot for the future, particularly for a PhD. Fortunately, in fact, what I have found here as a PhD was a very similar approach, but with obviously bigger number of things to implement and develop inside a longer timeframe.