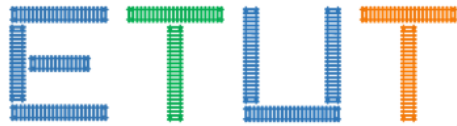


# European Training network in collaboration with Ukraine for electrical Transport

A Marie-Sklodowska-Curie Innovative Training Network within the Horizon 2020 Programme of the European Commission.



This project has received funding from the European Union's EU Framework Programme for Research and Innovation Horizon 2020 under Grant Agreement No 955646.



**UNITED KINGDOM**

The University of Nottingham



**NETHERLANDS**

UNIVERSITY OF TWENTE.



**UKRAINE**

Dnipro national university of railway transport named after academician V.Lazaryan



## Are you in your final year as master student or just graduated as master?

### Societal objectives

Provide bigger career perspective for Ukrainian engineers via collaboration with top western universities. To train more electrical engineers, making them available for European society. Implementation of the newly developed and acquired knowledge by close collaboration with industry via secondments, training schools and case studies and thus actually contribute to the EU 2020 ambitions.

### Doctoral training objectives

Develop a structural doctoral programme in PE and EMC by 3 leading research groups at renowned universities, in close collaboration with industry. Strengthen and structure the initial training of researchers at European level. Provide trained researchers with the necessary skills to work in industry. Improve career perspectives by broad skills development, and building a durable consortium in research and training.

### Scientific objectives

Advanced models and simulation methods allowing for uncertainty for connected devices and systems. Novel modulation techniques for decreased and permissible interference. Full experimental evaluation and characterisation in time- and frequency-domain electromagnetics of transport installations.

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University of Nottingham (UN) in United Kingdom	University of Twente (UT) in Netherlands	Dnipro national university of railway transport named after academician V.Lazaryan (UD) in Ukraine
The power electronic lab is the largest in the UK and a key laboratory in Europe, and will be used for experiments for validation of. Fully instrumented and equipped experimental EMC laboratory. Access to HPC facility for validation of models and simulation	State of the art software tools and multi-channel digitisers and processing, test equipment (VNA, TDR). Power electronic laboratory for performing experiments. EMC equipment to perform experiments for validation of the models and simulation results	Ukrainian university for rail transport. State of the art software tools and test equipment to perform experiments for electrical transport. The recruited fellows will be able to use all facilities of the faculty available to other employees



The University of  
**Nottingham**

**UNIVERSITY  
OF TWENTE.**



You will become an Early Stage researched (ESR), meaning that you are within the first four years of your research career, enrolled in a doctoral (PhD) programme. You will enter within the ETUT project an inter and multi-disciplinary characteristic with the presence of the three universities from the three countries having top-class expertise in Telecommunication Systems (TS), Power Electronics (PE) and ElectroMagnetic Compatibility (EMC). You will make use and help to create a sustainable collaboration amongst the universities and the partner organisations to bridge the gap between the academia and industry. You will develop and integrate advanced methods to model, design, evaluate, measure and monitor economic measures for a safe, reliable, efficient and greener electrical transport and power system. You will be provided a Marie-Sklodowska-Curie Action (MSCA) adventure on personal development, academic experience; industrial experience and the scientific world.

You will be given an unique opportunity as the industrial partners will make their top facilities available, make scientific and practical materials available during specially organised Summer Schools and the secondments. You will be provided with a mentor from an industrial partners which helps you to adopt also a strong industrial and pragmatic thinking, provides you with care career possibilities outside the academia and suggestions on how to strengthen their professional profile.

Network Rail	MM Tech	Lambda Engineering	THALES	Transautomatic	Prydniprovskia Railway
NR has experience with EMC in the rail sector in both power delivery and signalling. Detailed data on electrical impedances of Network Rail equipment for EMC. In-house developed EMC analysis software. Focusing on complex railway stations.	MMT has a wealth of experience in the design, construction and operation of electric vehicles using the latest technology as well as design and construction techniques	Lambda Engineering is a small engineering company performing research, training and consultancy to large companies. It has dedicated equipment for power line interference measurements and investigations.	Multinational company in safety critical complex systems. 106 engineers, 15 EMC laboratories, and 5 of them are accredited. All key EMC facilities are available for the Early Stage Researcher (ESR) to use. THALES, as complex system integrator.	Transautomatics is a scientific and industrial company with the main objectives in designing and implementing signalling, micro-processor and relay interlocking systems, automatic crossing alarm systems.	One of the largest branches of Ukrainian railway which serves for biggest industrial cities. Includes more than 244 stations. Main objective: maintaining and implementing new railway automation devices.

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Personal development	Academic Experience	Industrial Experience	Scientific World
Apart from the obvious advantage of improving language skills, you are able to develop an understanding of different cultures and approaches towards life and communicate effectively. Making you a better person. Working in a project forces you to build time management skills and prepares you to respect strict deadlines. Although this can come with blood, sweat and tears, you are given the opportunity to learn from your colleagues how to handle it and enrich your own personal development .	Participating in MSCA projects gives the possibility to follow courses proposed and provided by the different universities as well as special planned Summer Schools organized by yourselves, universities and industrial partners. During the mandatory courses in the first year of your PhD, you will find out how to effectively manage your data, search for relevant scientific material, how to write and publish papers, how to develop presenting skills, and all the core principles of research integrity.	Industrial Secondments is an important part of the life of an Early Stage Researcher (ESR). Collaborating with industry gives a real-life experience as well as provides relevant for the research original and practical cases. You often visit and stay at your industrial partner for a longer period working closely with the industrial colleagues on immediate challenges. The secondments, industrial and academic, allow you to collaborate and exchange the experience, learn from the best and perform hands on work.	Writing papers to publish the new insights learned during the project and presenting them at various international conferences are one of the essential parts of the Early Stage Researcher (ESR) life. They give the possibility to say to the scientific world what are you doing and why it is necessary. A great opportunity to exchange your knowledge with leading experts. Another aspect of the conferences, together with the scientific component, is the opportunity to dive into various cultural experiences.

## How the life of an Early Stage Researcher (ESR) looks like?

<p><b>Dasha Nemashkalo</b> <i>Ukrainian</i> <b>ESR or SCENT at UT</b></p> 	<p><b>Karol Niewiadomski</b> <i>Polish</i> <b>ESR of SCENT at UN</b></p> 	<p><b>Denis Pokotilov</b> <i>Ukrainian</i> <b>ESR of ETOPIA at UT</b></p> 	<p><b>Angel Pena Quintal</b> <i>Mexican</i> <b>ESR of ETOPIA at UN</b></p> 
<p>“The biggest thing that bothered me before I applied and during a fair share of time after I was accepted – that I am not ready. I expected to see a big unknown world where I can’t fit. But the word “Training” in the acronym is not by accident. You don’t have to be an Albert Einstein from day one (Although it’s cool if you are). Participating in the project enables to learn from the best in a field and complete almost all kinds of courses you can think of to gain a bit of a confidence and lots of the experience.”</p>	<p>“After announced a member in SCENT, I was extremely happy. The happiness quickly evaporated and exchanged for the opposite feeling of anxiety, especially about moving abroad and all the administrative stuff related to that. Lots of questions but people to assist. As it turned out, I was not the only one struggling and I was also not the only one that had to ask for help. People here were friendly and helpful, and I quickly realized that I can manage to live abroad and feel good about it!”</p>	<p>“When I received an invitation to interview in ETOPIA, I was overjoyed. The moments of preparation, as well as the announcement of the results of the interview, were very exciting. The full realization that I would be spending the next 4 years quickly changed from joy to alarm. Many questions arose in my head related to housing and other issues of life abroad. However, the friendly team and sympathetic colleagues helped me quickly adapt and start my research career. A huge number of possibilities opened up.</p>	<p>“After I got accepted, a different life started, with this many thoughts came to my mind telling me if I would be able to convey a good and meaningful research. Life is a made of moments, this applies to my current project. There will be moments for learning, moments for researching and moments for celebrating goals, the main aim is to never stop doing things and enjoy them. One of the benefits is the knowledge I can gain from well-known academics and companies all over Europe.”</p>

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## Project Details

Project Website

<http://www.etut-itn.org/>

Details of the 12 PhD positions and recruitment process

<https://www.utwente.nl/en/eemcs/pe/footer/20201104-phd-positions-in-msca-etn-etut-recruitment.pdf>

European website with recruitment information

<https://euraxess.ec.europa.eu/jobs/575816>

More information regarding Pre-recruitment event

<http://www.etut-itn.org/prerecruitmentevent>

## Information regarding the participating universities

University of Nottingham (UN) in United Kingdom

<https://www.nottingham.ac.uk/>

University of Twente (UT) in Netherlands

<https://www.utwente.nl/en/>

Dnipro national university of railway transport named after academician V.Lazaryan (UD) in Ukraine

<http://diit.edu.ua/>

## Information Regarding European Commission

European Commission website of the project

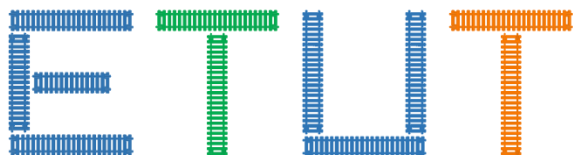
<https://cordis.europa.eu/project/id/955646>

Marie-Sklódowska-Curie Action (MSCA)

<https://www.ec.europa.eu/msca>

ETUT strongly encourages the participation of female researchers in science

[https://www.genderportal.eu/sites/default/files/resource\\_pool/mapping-the-maze-getting-more-women-to-the-top-in-research\\_en.pdf](https://www.genderportal.eu/sites/default/files/resource_pool/mapping-the-maze-getting-more-women-to-the-top-in-research_en.pdf)



A Marie-Sklódowska-Curie Action (MSCA) Innovative Training Network (ITN) European Joint Doctorates (EJD) within the Horizon 2020 Programme of the European Commission.

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## Wednesday 27<sup>th</sup> of January 2021

### Program of the online Pre-Recruitment Event

Time (CET)	Topic
13:30	Background of ETUT
14:00	What are the positions?
14:55	What means being an ESR?
15:25	Closure
15:30	End

Meet the supervisors to ask about the different positions

Prof. dr. A. Ferreira	Prof. dr. F. Leferink	Prof. dr. V. Havryliuk	Prof. dr. P. Wheeler.	Prof. dr. D. Thomas
Dr. J. Popovic	Dr. N. Moonen	Dr. T. Serdiuk	Dr. A. Watson	Dr. S. Greedy

Meet a ESR to ask them about what it means being an ESR

Dasha Nemashkalo Ukrainian ESR of SCENT at UT	Karol Niewiadomski Polish ESR of SCENT at UN
Denys Pokotilov Ukrainian ESR of ETOPIA at UT	Angel Pena Quintal Mexican ESR of ETOPIA at UN



# 12 PhD positions in the EU Horizon 2020 Marie Skłodowska-Curie Project: ETUT

Applications are invited for 12 PhD positions ("Early Stage Researchers, ESR") to be funded by the Marie-Skłodowska-Curie Innovative Training Network "ETUT – European Training network in collaboration with Ukraine for electrical Transport" within the Horizon 2020 Programme of the European Commission. The ETUT Beneficiaries are 3 universities: University of Twente (UT, in NL), the University of Nottingham (UN, in UK), and the Dnepropetrovsk national university of railway transport named after academician V.Lazaryan (UD, in UA). The industrial involvement is completed by 6 Partner Organisations: THALES, Transavtomatic, MM Tech, Lambda Engineering, Prydniprovsk Railway, and Network Rail. Every university will hire 4 ESR. The 4 ESRs hired by Dnepropetrovsk national university will finalise their research project at either the University of Twente (2 ESR) or the University of Nottingham (also 2 ESR) and will obtain a double-degree.

## Key dates:

- 1 November 2020: Launch of 12 ESR Positions
- 31 March 2021: Deadline for application
- 15 April 2021: Circulation list "ETUT preselected candidates"
- 1 Sept 2021: Targeted starting date for ESR contracts

## Key background info



This project has received funding from the European Union's EU Framework Programme for Research and Innovation Horizon 2020 under Grant Agreement No. 955646.

### Research Fields

Electrical/Electronic Engineering – Power Electronics – Electromagnetic Compatibility

### Career Stage

Early Stage Researcher (ESR). i.e. less than 4 years full-time equivalent of research after obtaining the M.Sc. degree

### Benefits and salary

The successful candidates will receive an attractive salary in accordance with the MSCA regulations for Early Stage Researchers. The exact (net) salary will be confirmed upon appointment and is dependent on local tax regulations and on the country correction factor (to allow for the difference in cost of living in different EU Member States). The salary includes a living allowance, a mobility allowance and a family allowance (if applicable). The guaranteed PhD funding is for 36 months (i.e. EC funding, additional funding is possible, depending on the local Supervisor, and in accordance with the regular PhD time in the country of origin). In addition to their individual scientific projects, all fellows will benefit from further continuing education, which includes internships and secondments, a variety of training modules as well as transferable skills for the Jobs of Tomorrow acquired through a unique immersive learning.

### On-line Recruitment Procedure

All applications proceed through the on-line recruitment portal.

<https://www.utwente.nl/en/organisation/careers/>

Candidates provide all requested information including a detailed CV. Europass format obligatory:

<https://europass.cedefop.europa.eu/documents/curriculum-vitae>, a motivation letter and transcripts of bachelor and master degree. Master students who will graduate in the next coming months are welcome to apply. In that case, please provide an overview of the transcripts that are already available. During the registration, applicants will need to prove that they are eligible (cf. ESR definition, mobility criteria, and English language proficiency). The deadline for

the on-line registration is 31 March 2021. The ETUT Recruitment Committee selects candidates for the Recruitment Event. The selected candidates provide a 20-minute presentation and are interviewed by the Recruitment Committee. Candidates will be given a domain-relevant peer-reviewed paper (prior to the recruitment event) by their prioritised Supervisor and will be asked questions about this paper during the interview to check if the candidate has the right background/profile for the ESR position. Prior to the recruitment event, online interviews between the Supervisors and the candidates are recommended, along with on-line personality tests. If local circumstances in the country of residence of a candidate or supervisor do not allow for travels (e.g. due to COVID-19 restrictions), a good quality digital connection will need to be organised. The final decision on who to recruit is communicated shortly after the Recruitment Event. The selected ESRs are to start their research as quickly as possible (target date: 1 Sept. 2021). For more information about the position, you are encouraged to send an e-mail to [pe-recruitment@utwente.nl](mailto:pe-recruitment@utwente.nl)

### Applicants need to fully respect three eligibility criteria (to demonstrated in the Europass CV):

1. **Early-stage researchers (ESR)** are those who are, at the time of recruitment by the host, in the first four years (full-time equivalent) of their research careers. This is measured from the date when they obtained the degree which formally entitles them to embark on a doctorate, either in the country in which the degree was obtained or in the country in which the research training is provided, irrespective of whether or not a doctorate was envisaged.
2. **Conditions of international mobility of researchers:** Researchers are required to undertake transnational mobility (i.e. move from one country to another) when taking up the appointment. At the time of selection by the host organisation, researchers must not have resided or carried out their main activity (work, studies, etc.) in the country of their host organisation for more than 12 months in the 3 years immediately prior to their recruitment. Short stays, such as holidays, are not taken into account.
3. **English language:** Network fellows (ESRs) must demonstrate that their ability to understand and express themselves in both written and spoken English is sufficiently high for them to derive the full benefit from the network training.

ESR1	Host: UT (NL)	PhD enrolment: UT	Start date: M6	Duration: 36M	Deliverable: 5.1
<b>Supervisor / co-supervisor:</b> Prof. Ferreira - dr. Popovic (UT)					
<b>Project Title and related WP:</b> Battery surveillance and protection techniques combined with power converter (WP5)					
<b>Objectives:</b> To integrate all electronic functions around the chemical battery beyond the power electronic conversion, including health management for the cells in the battery, for balancing the cells to maximise battery lifetime as well as residual value, and techniques to reduce the risk of thermal runaway.					
ESR2	Host: UT (NL)	PhD enrolment: UT	Start date: M6	Duration: 36M	Deliverable: 6.1
<b>Supervisor/co-supervisor:</b> Prof. Leferink – dr. Moonen (UT)					
<b>Project Title and related WP:</b> Smart control and modulation of power electronics for EMC (WP6)					
<b>Objectives:</b> To develop new modulation techniques for power electronics based on the EM environment and corresponding limits such that the complete system will not create interference and will obey the emission requirements, conducted as well as radiated. To validate these mitigation methods in real converters via experiments, and to provide the sensitivity with respect to production variation as well as environment variation.					
ESR3	Host: UT (NL)	PhD enrolment: UT	Start date: M6	Duration: 36M	Deliverable: 7.1
<b>Supervisor / co-supervisor:</b> Prof. Ferreira – dr. Popovic (UT)					
<b>Project Title and related WP:</b> High-frequency high-power power transformer for line side converters (WP7)					
<b>Objectives:</b> To develop line side high-frequency high-power transformers capable of dealing with medium voltage common mode voltage for grid connection of ships/boats.					
ESR4	Host: UT (NL)	PhD enrolment: UT	Start date: M6	Duration: 36M	Deliverable: 8.1
<b>Supervisor / co-supervisor:</b> Prof. Leferink – dr. Vogt-Ardatjew (UT)					
<b>Project Title and related WP:</b> External and internal radiated EM environment analysis to prevent EMI (WP8)					
<b>Objectives:</b> Statistically describe both the external and internal EM environment of a transport vehicle, also in motion. Investigate the effect of the boundaries on the field coupled from the outside as well as sourced from within the chassis. Expose the worst-case scenarios of coupling on the sensitive components and define the best preventive measures to combat the possible EMI.					
ESR5	Host: UD (UA)	PhD enrolment: UD-UT	Start date: M6	Duration: 36M	Deliverable: 5.2
<b>Supervisor / co-supervisor:</b> Prof. Havryliuk (UD) - dr. Tetiana Serdiuk (UD) / Prof. Ferreira (UT)					
<b>Project Title and related WP:</b> Battery management systems and traction supply railway system with railway level crossing of new type (WP5)					
<b>Objectives:</b> To perform experiments on the power quality like voltage variations at long distances and impact of converter pollution, using the experimental techniques of UT. These effects shall be modelled and again validated, in combination with effect of low temperature, with a focus on battery operated equipment and new railway crossing equipment					
ESR6	Host: UD (UA)	PhD enrolment: UD-UT	Start date: M6	Duration: 36M	Deliverable: 6.2
<b>Supervisor / co-supervisor:</b> Prof. Havryliuk (UD) - dr. T. Serdiuk (UD) / Prof. Leferink (UT)					
<b>Project Title and related WP:</b> EMC of traction supply railway system with new (digital) communication devices (WP6)					
<b>Objectives:</b> To develop multi-channel time-domain measurement technique for evaluation of EMC issues in rail transport. Then to develop us the results for time-diversity communication techniques for railway systems which are being rolled out in Ukraine, including interfacing with the European rail traffic management system (ERTMS).					
ESR7	Host: UD (UA)	PhD enrolment: UD-UN	Start date: M6	Duration: 36M	Deliverable: 7.2
<b>Supervisor / co-supervisor:</b> Prof. Havryliuk (UD) - dr. T. Serdiuk (UD) / Prof. Wheeler (UN)					
<b>Project Title and related WP:</b> EMC of dc traction supply railway system (power converters) with automatics devices (WP7)					
<b>Objectives:</b> To perform case and field studies with low-power bi-directional converters for using the railway electrical system supporting the local electrical network, using the power electronics from UT and UN, and to develop models for scaled-up simulations and what-if scenario's.					
ESR8	Host: UD (UA)	PhD enrolment: UD-UN	Start date: M6	Duration: 36M	Deliverable: 8.2
<b>Supervisor / co-supervisor:</b> Prof. Havryliuk (UD) - dr. Tetiana Serdiuk (UD) / Prof. Thomas (UN)					
<b>Project Title and related WP:</b> EMC of dc and ac traction supply railway systems with automatics devices (WP8)					
<b>Objectives:</b> To evaluate the EM performance of new automatic devices in Ukraine, and to find possibilities for improved coexistence with lower implementation costs. To develop interference risk-reduction techniques for large railway system networks.					
ESR9	Host: UN (UK)	PhD enrolment: UN	Start date: M6	Duration: 36M	Deliverable: 5.3
<b>Supervisor / co-supervisor:</b> Prof. Wheeler - dr. A. Watson (UN)					
<b>Project Title and related WP:</b> Optimised power converter topology, incorporating battery management systems (WP5)					
<b>Objectives:</b> To develop new or improved power converter topologies that can be used for battery management as well as charging and controlling the propulsion motor in an electric vehicle.					
ESR10	Host: UN (UK)	PhD enrolment: UN	Start date: M6	Duration: 36M	Deliverable: 6.3
<b>Supervisor / co-supervisor:</b> Prof. Thomas - dr. Greedy (UN)					
<b>Project Title and related WP:</b> Time / Frequency domain characterisation of converter emissions (WP6)					
<b>Objectives:</b> To study output waveforms to develop methodologies for efficiently measuring and quantifying in a meaningful way the time dependent radiation and conducted emissions from power electronic converters. To develop techniques in complexity reduction and optimisation with the very large data sets.					
ESR11	Host: UN (UK)	PhD enrolment: UN	Start date: M6	Duration: 36M	Deliverable: 7.3
<b>Supervisor / co-supervisor:</b> Prof. Wheeler - dr. Watson (UN)					
<b>Project Title and related WP:</b> Line side converter to enable the railway to be a collaborative user of electrical energy (WP7)					
<b>Objectives:</b> To apply modern power converter topologies to enable lower cost electrification of railway networks, with an emphasis on areas with weak electrical utility networks, and evaluate via several trade-off studies, including costs					
ESR12	Host: UN (UK)	PhD enrolment: UN	Start date: M6	Duration: 36M	Deliverable: 8.3
<b>Supervisor / co-supervisor:</b> Prof. Thomas - dr. Greedy (UN)					
<b>Project Title and related WP:</b> Optimal simulation of converter emissions for first time right design (WP8)					
<b>Objectives:</b> To develop methodologies for efficiently modelling the conducted emissions from power electronic converters including the common mode, including model development, measurement, and data processing, such to achieve coexistence between power electronic, and sensor and communication systems. To include all the source and coupling paths in the converter, as well as the measurement system so as to provide a direct comparison with measured results.					