



# IEEE EDS Industry Placement Program

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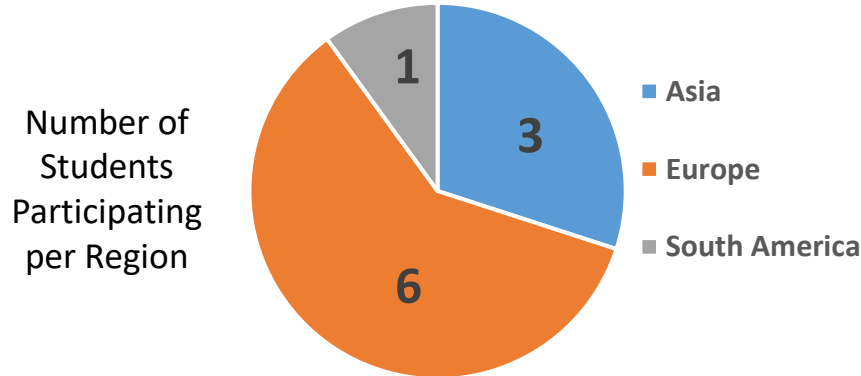


# Summary of 2020 IEEE EDS Industry Placement Program

The program sponsors current and newly graduated students to the tune of (US\$1000) each, to spend time in industry (placement) on any topic aligned with the IEEE Electron Devices Society. This includes quantum technologies, neuromorphic computing/accelerators of AI, compound semiconductors (GaN and SiC), renewables, 5G/IOT, reliability and CMOS.

The funds are meant to enable students/postdocs to link up with any company/research organization engaged in these subject areas.

In 2020, the first batch of 10 students, 3 of whom were female, benefited from the program in upcoming areas of 5G, Quantum computing, compound semiconductors and neuromorphic computing/AI accelerators.



# Summary of 2020 IEEE EDS Industry Placement Program

*(continued)*

- The student's activities ranged from interleaved resonant power factor correction circuits in GaN, to reliability characterization of RF front end modules and linearization techniques for 5G.
- There were two projects from India on recycling –
  - The use of AI techniques for assessing the damage to motor vehicles for insurance purposes.
  - Estimate the economic costs of recycling photovoltaic panels to minimize waste and environmental pollution.
- A student gained experience cleaning and installing solar panels in a lab located in Switzerland.
- Two students sponsored by BT on mitigation techniques for adversarial attacks on biometrics for continuous authentication systems and methods for physical layer security of networks, both relying on AI accelerators.



## Narges Pourshahrokhi

Hello, I'm Narges Pourshahrokhi, currently doing my PhD in machine learning at the University of Surrey UK. I undertook a 6-month industrial placement at the Applied research group in British multinational telecommunications (BT) based in Adastral Park, Ipswich, UK.

My main responsibilities included liaising with the security and cyber defence teams and Applied research to investigate cybersecurity attacks using the generative models in a continuous authentication (CA) system developed on biometric sensors. I also had the opportunity to learn about the CA system in the biometric field and develop generative models such as (GAN, KDE, MMSE) to threaten those systems and measure the amount of damages it causes to the system. I used the H-MOG dataset as well as developing Siamese CNN and OCSVM as CA system.

Throughout my time on the placement, I completed several achievements, including contributing to academia. We have submitted an academic paper to one of the top conferences in cybersecurity with biometric, IJCB 2021. We had bi-weekly meetings with my supervisors, which helped me gain soft skills, such as presentation skills, writing minutes to track my progress and organise it.

Another outstanding advantage from my placement was applying theoretical concepts that I learn at university in practice and industry.

I believe I greatly benefited from completing the placement. I was put in the deep end and tasked with jobs that actually made a difference in the company and academia. I truly felt valued and part of a team, as well as being mentored and given development training by my managers. Working in the industry for 6 months has definitely challenged me and shaped my future career aspirations.



## Sebastian Matias Pazos

During this virtual placement I worked on a feasibility assessment of an IC design for mmWave reliability tests, targeting 5G applications in RFSOI CMOS technologies. This topic was well aligned to my thesis, in which we studied aging and reliability of RF circuits, design for reliability of RF power amplifiers and robust/adaptive RF circuit design and modeling.

Being able to discuss with my supervisor and other members of GF's reliability teams on the challenges and industrial requirements around these matters gave our work a clear perspective of its potential for application in the semiconductor industry. This meant invaluable experience and training for me and contributed towards finishing my dissertation early March, for which my industry supervisor was jury.

These interactions also led to the sponsorship by GF for an IC tape-out (previous signing of NDAs between the institutions involved) of the prototype of a hot-carrier resilient RF Power amplifier designed during my PhD. Additionally, our institutions were granted access to design kits for RFSOI technologies, enabling further collaborations on the topic.

This initiative from the IEEE EDS is, from my perspective, a great chance for young professionals to directly apply their training on open problems in industry and get a glance at industrial activities as part of the professional experience during the PhD. This is especially valuable for students from region 9 where, more often than not, resources for research are scarce and industrial interaction is not as frequent as in highly developed countries. This type of grants allow us to widen our international collaboration perspectives alongside our professional horizons, adding value to the contributions performed from our region.

**Academic Advisors:** *Dr. Fernando Silveira (Universidad de la República, Uruguay), Dr. Félix Palumbo (Universidad Tecnológica Nacional, Facultad Regional Buenos Aires, Argentina)* ■ **(Virtual) Industrial placement at:** GLOBALFOUNDRIES (GF) ■ **Industry supervisor:** *Dr. Fernando Guarín, Reliability team leader for 5G applications, GLOBALFOUNDRIES*



## Jordi Muñoz Gorriz

Dear all, my name is Jordi Muñoz Gorriz and I was a PhD student from the *Universitat Autònoma de Barcelona* (Spain) writing my thesis, when I was selected for the IEEE EDS industry placements. As a general statement, I liked a lot the possibility of being able to work with state-of-the-art devices that would be impossible for me to acquire from any other way. In fact, one of the things I learnt is how difficult it can be to collaborate with industry. Moreover, despite my awareness of NDAs and confidential information in industry, what surprised me the most, is the difference between the papers I am used to writing in academia compared to the lack of information in papers written by industry.

As an experience, not only I was able to work with very advanced devices, but also to study other aspects of breakdown phenomena that I had never worked with before. I love to learn new topics and this collaboration was the perfect excuse. However, I really missed being able to electrically characterize the devices. I also love going to the laboratory from time to time. But there was nothing to do about it, the remote working was the most secure and responsible decision.

After this industry placement, I finished my thesis and now I am still working with my academic tutor, Prof. Enrique Miranda. Also, we are still in contact with my industry mentor, Maria Toledano, and we have made a new proposal to her group. We still don't know if this collaboration will succeed, but it is true that it will be easier thanks to this IEEE EDS industry placement!





## *Abidemi Eleyele*

I did my industrial placement, an internship position in the Digital Power group of Huawei Research and development centre, Sweden starting from February to October 2020. I could only spend just a month in the office before being asked to stay and work remotely from home.

However, the head of the group (Dr Grover Torrico-Bascopé) was also my supervisor. It also happened that my master thesis was written during the internship period. My research project was to design an Isolated single-stage power factor correction (PFC) AC/DC converter with active and passive ripple cancellation circuit needed to remove the second-order output harmonic common to single-stage PFC converters. I was also tasked to study wide bandgap materials such as GaNs and Sic switches required to implement my research.

My supervisor was so supportive and always ready to help me while still teaching me how to work alone despite my little knowledge in the field. I quickly adapted to the recent trends and got me up and running in around ten weeks, starting from minimum expertise in the area. On top of that, I also learned and developed leadership capabilities and made networks in the industry.

After the internship program, He commended me for being an intelligent person with very high problem-solving skills. He also praised the core skills such as proficiency in power electronic circuit and control design abilities I developed. At Huawei, I was able to learn to work independently and learn how to solve very complex problems in a simple, fast and very efficient way.

Finally, due to my immense contribution to the group and the field of power electronics, my supervisor recommended that I be hired for a Power Electronics Engineer position, which I currently hold. The company is offering to sponsor me for an industrial PhD position, as I am now in talks with universities to secure a supervisor. Thanks

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## Aarti Rathi

Through this IEEE industrial sponsorship, I got to know about the working environment in industry. However, it was virtual, but the continuous support and regular interactions with my supervisors (both industry and academic) helped me in knowing and deeply understanding concepts. This work also helped me in gaining a publication in a prestigious conference i.e. IEEE International Reliability Physics Symposium (IRPS), based on the reliability characterization and analysis of power amplifier circuits in PDSOI MOSFETs in sub 6GHz that I undertook.

This internship also helped me in making contacts with the industry people (GlobalFoundries) that may further help me in my career growth. A heartfelt thanks to my supervisors and the EDS team.

*Ph.D. Scholar*

*Electrical Engineering Indian Institute of Technology Delhi*



## Nagaditya Poluri

Hello my name is Nagaditya Poluri. I had just finished my PhD at the University of Sheffield in March '20 when the pandemic arrived. Support from the IEEE EDS society was very welcome during this uncertain time.

Collaboration with the industry partner, Psemi, helped me to understand the current interests and focus aspects of the industry and consumer requirement in future communication system 5G. This understanding enabled me to orient the focus of my academic research specifically in the issues surrounding the design of linear chips at frequencies above 30 GHz. Additionally, a virtual tour of their lab introduced me to new equipment and measurement techniques.