Acknowledgements

It is my great pleasure to express my gratitude to all those who supported me during my pursuit of a Ph.D. degree.

A huge thank you should go, firstly, to my supervisor, Prof. Antonio Di Bartolomeo, without whom I would have never been able to be involved in this new topic. Under his supervision, I have had many opportunities to expose myself to various research projects and to be introduced in excellent research institutions. Thanks to him, I also had the possibility to meet several lab-mates with whom I established good physics conversation, learning important technical skills, ideas and proposals.

Finally, he gave me the support, the encouragement, and his continuous research instructions during my PhD activities as well as during my thesis work. I would like to thanks to Prof. Saverio Russo and Prof. Bill Barnes, from Exeter University, which collected me to work in their lab group and on the other hands for giving me interesting projects to carry on.

In particular Saverio, has had a great scientific influence during my PhD time at Center for Graphene Science, collaborating with him I had the possibility to appreciate his excellent teaching and support.

Results presented in this thesis would not have been possible without the close collaboration of Dr.Filippo Giubileo, Dr.Francesco Romeo and the rest of the people afferent to the Graphene Based-Device Group at University of Salerno. From University of Salerno I want to thank Prof.Angela Nigro, advisor of my Master Degree in Physics. Since then, she followed my scientific carrier.

I am thankful to the great support staff of the Physics Department at Exeter University at Georgetown University and not last at University of Aquila, for their huge enthusiastic interest in science, and for helping me to clarify interesting experimental physics concepts.

Special thanks go to my friend Prof. Francesco Marra, an amazing engineer and mentor, who represents a pillar for my carrier, and for my future. He encouraged me to look
ahead, believing in my education, skills and passions, especially, he gave me the right motivations to present myself and all my experience in technology company contest. Also, I want to give my great appreciation to my family for their never stop to hope in me and my girlfriend, I met during the first year of the PhD. She encouraged and supported me, with love, during all steps of my PhD time.

I would like to give thanks to my friends, Dr.Luca Parisi (Dr.Wolf), Dr.Sergey Mirzoyan (The Superlosco), Dr.Pasquale Marra (Sintetico), Dr.Alfredo Attisano (BigFoot), Dr.Gennaro Sica (ZiCka), The Losco’s group, The Overload, The Romanoff and above all The Cura Ludovico.

Finally, I want to send my thanks to my colleagues of Altran Group for sharing this last year between my new activities as consultant engineer for the realization of the fuselage of the Boeing 787, and enjoyed time spent together.

The completion of this PhD represents the closing of one memorable phase of my life but new and more exciting and reminding phases await.