INTERNATIONAL SCHOOL
Enabling Technologies, Applications, and Methods for Emerging 5G Systems

The School focuses on a program of lectures, assembled by experts in the area of 5G networks. The objective of this school is to teach the main features of emerging 5G technologies from the networking perspective. Students will have the opportunity to participate in a stimulating forum of scientists, to present their own work, to obtain feedbacks and to start up collaborations. Lectures will provide background on 5G wireless communication concepts, with particular emphasis on the IoT paradigm, broadcast/multicast convergence in next-generation networks, and D2D/M2M communications in 5G networks. Through the course of the lectures, connections will be made to network architectures and protocols design, including radio resource management topics, while also introducing the mathematics associated with the analysis and optimization of wireless communication systems. The School is tailored towards Researchers, PhDs, Masters, and Bachelor Students active or interested in future mobile networks. The School is held in the framework of the RUDN University Competitiveness Enhancement Program "5-100". The IEEE BTS Italy Chapter is technical co-organizer of the event. The School is also supported by the EURECA student association from the University Mediterranea of Reggio Calabria.

ORGANIZING AND PROGRAMME COMMITTEE
Giuseppe Araniti (Italy); Konstantin Samouylov (Russia); Yevgeni Koucheryavy (Finland); Sergey Andreev (Finland)

ORGANIZERS
University Mediterranea of Reggio Calabria – DIIES Dep. (Italy)
Peoples' Friendship University of Russia (RUDN University) (Russia)
Tampere University of Technology (Finland)
IEEE BTS Italy Chapter

9-11
October 2017
University Mediterranea of Reggio Calabria
REGGIO DI CALABRIA, ITALY

UFFICIOMARKETINGMEDITERRANEA

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IEEE Boadcast Technology Society Italy Chapter

Ordine degli Ingegneri di Reggio Calabria

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17.15 – 18.00 – On Distributed Medium Access Control for mmWave-based 5G WLAN and WPAN Applications
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18.00 – 19.00 – Leveraging Heterogeneous Connectivity in Converged 5G-IoT Ecosystem
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Topics and Speakers

Antonio Iera

Social Virtual Objects in the Edge Cloud

Antonio Iera

*ARTS Laboratory – University Mediterranea of Reggio Calabria
- DIIES Department, Reggio Calabria, Italy*

Abstract: The *Internet of Things (IoT)* will be populated by an immense number of heterogeneous devices with unequal capabilities in terms of processing, communication, and available energy. These elements make the IoT a very complex environment, which poses new challenges that cannot be faced by even very smart objects individually. Social behavior is the answer found by several creatures to face the complexity of the surrounding environment. Accordingly, the concept of *Social Internet of Things (SIoT)* has been recently introduced and is the subject of a rapidly increasing research effort. However, most of the IoT devices miss the processing and communication capabilities required to create and manage social relationships. *IoT Cloud and Fog platforms*, hosting cyber counterparts of physical objects, represent an essential component for the continuous deployment, provisioning, and execution of IoT applications. Merging *social network features* and *cloud/fog platforms* in the context of the IoT is very promising in the view of deploying a plethora of novel IoT services for future 5G systems. During this lecture the introduction of social notions into the IoT will be motivated and the basic concepts of the SIoT paradigm explained. Besides, the role played by Cloud and Fog computing technology in supporting the IoT is discussed and a critical overview of the main solutions proposed so far in the literature are presented.

Biography: Prof Antonio Iera graduated in Computer Engineering at the University of Calabria, Italy, in 1991 and received a Master Diploma in Information Technology from CEFRIEL/Politecnico di Milano, Italy, in 1992 and a Ph.D. degree from the University of Calabria in 1996. Since 1997 he has been with the University of Reggio Calabria and currently holds the position of full professor of Telecommunications and Director of the Laboratory for Advanced Research into Telecommunication Systems (www.arts.unirc.it). IEEE Senior Member since 2007. His research interests include, next generation mobile and wireless systems, RFID systems, and Internet of Things.

Yuliya Gaidamaka

Modelling selection strategies of the P2P streaming network

Yuliya Gaidamaka

*Applied Probability and Informatics Department,
Peoples' Friendships University of Russia (RUDN University), Moscow,
Russia*

Abstract: The lecture outlines how mathematical models are being used to address current issues of research activities concerning quality of service and performance parameters of the modern and future P2P live streaming networks. First, we begin with classification of P2P networks and their performance measures for each type of the network – filesharing and streaming. After that, we move on to detailed description of the buffering mechanism in streaming P2P networks. Then, we turn to modeling for a P2PTV streaming network. We build a mathematical model, which takes into account network join/disjoin probabilities, playback lags between peers, i.e. the time difference of two peers playing the streaming video, and download and upload rates for each peer. We try to develop the effective selection strategy for key performance measures of a streaming P2P network. We consider several types of selection strategies: neighbor selection strategy, peer selection strategy and chunk selection strategy. In cases when mathematical modeling is to complicated we use own developed "P2P-network Simulator".

Biography: Prof. Yuliya Gaidamaka received the Ph.D. in Mathematics from the Peoples' Friendship University of Russia in 2001. Since then, she has been an associate professor in the university's Department of Applied Probability and Informatics. Her current research focuses on performance analysis of 4G/5G networks and M2M communications, P2P networks, signaling networks congestion control, queuing theory, and mathematical modeling of communication networks. She is the author of more than 50 scientific and conference papers and one book. Her email address is gaydamaka_yuv@rudn.university.

Valeriy Naumov

Loss Systems with Random Resource Requirements

Valeriy Naumov

Service Innovations Research Institute, Helsinki, Finland

Abstract: Starting from fundamental research of A.K. Erlang many mathematical models were developed for the performance analysis of telecommunication networks. In this lectures we consider loss systems, loss networks, loss systems with random resource requirements, loss systems with positive and negative customers, and network of cooperating loss systems.

Biography: Prof. Valeriy Naumov has received M.Sc. degree from the People's Friendship University (PFU) in 1972 and Ph.D. degree from the Computing Centre of the Russian Academy of Sciences in 1979. He has been doing research in several positions in PFU (1973 – 1996, 2006 - 2007), Helsinki University of Technology (1984 - 1985), Institute for Problem of Information Transmission (1992 - 1994), Deutsche Bundespost Telekom (1994 - 1995), Lappeenranta University of Technology (1996 – 2005), Norwegian University of Science and Technology (2006), University of Jyväskylä (2008), University of Oulu (2009-2011) and Research Institute of Finnish Economy (2011-2013). Currently he is CTO of the Service Innovation Research Institute, Helsinki. His areas of expertise include information technology and performance analysis.

Antonino Orsino

NR 3GPP Standardization Activities Overview: The Way to Forthcoming 5G Systems

Dr. Antonino Orsino

Researcher, Ericsson Research, Finland

https://www.ericsson.com/

Abstract: This talk intends to cover the latest agreements and enhancements that have been done/proposed in the context of the 3GPP Standardization activities. Those activities around NR (5G) have started with the view of having the specifications included in next 3GPP Releases 15 and 16. A pre-commercial version of NR will first be deployed for the 2018 Winter Olympics in Pyeongchang, South Korea, and the first commercial deployment (based on 3GPP Release 15) is penciled in for the 2020 Summer Olympics in Tokyo. In this talk, is provided an in-depth review about the current 5G NR standardization in 3GPP by focusing on those key technologies and aspects that represent the main enablers for providing the expected requirements that 5G is targeting at. Among them, we can mention the use of a new radio spectrum, tight-interworking between LTE and NR, network slicing, new control and user plane concepts. These advanced technologies are based on key design decisions that have been made as part of the ongoing 5G NR 3GPP standardization, and will be critical to meet the increasing connectivity requirements for emerging consumer mobile broadband experiences (for example, virtual reality, augmented reality, and connected cloud computing) as well as to enable new high-reliability, low-latency services for use cases like autonomous vehicles and industrial equipment.

Biography: Dr. Antonino Orsino is currently a Guest Research at Ericsson Research, Finland. He received the B.Sc. degrees in Telecommunications Engineering from University Mediterranea of Reggio Calabria, Italy, in 2009 and the M.Sc. from University of Padova, Italy, in 2012. He also received his Ph.D. from University Mediterranea of Reggio Calabria, Italy, in 2017. He is actively working in 3GPP 5G standardization activities and his current research interests include Device-to-Device and Machine-to-Machine communications in 4G/5G cellular systems, and Internet of Things. He has (co-)authored over 50 papers (published, e.g., in IEEE Communications Magazine, and IEEE Wireless Communications), several patents, and 3GPP standardization contributions in the areas of NR control plane and propagation. He is an IEEE Member and also a team leader for the factory automation use case within the IEEE 5G Roadmap Application and Services Working Group.

Giuseppe Araniti

Group oriented Communications in the 5G Era: From the Human towards the Machine Traffic Perspective

Giuseppe Araniti

ARTS Laboratory – University Mediterranea of Reggio Calabria - DIIES Department , Reggio Calabria, Italy

Abstract: Group-oriented services (broadcast, multicast, etc.) represent an effective solution to simultaneously convey data to a group of terminals through point-to-multipoint (PtM) communications. These services are able to improve capacity and spectrum efficiency in cellular systems which are crucial for the development of 5G networks, as highlighted, for instance, in recent METIS and 5GNOW European research projects. In the vision of future 5G systems where a massive growth of connected devices is expected, group-oriented services are expected to play a fundamental role. In this context, video transmission is considered as the "killer" human- and group-oriented application. However, high quality video transmission is a bandwidth-hungry application with stringent requirements in terms of jitter and data rate. A further key development trend towards the 5G era is the wide diffusion of low-power devices and a fast network densification to support the deployment of the Internet of Things (IoT). In this field, machine-type communications (MTC) push towards the design of effective solutions to deliver small amount of data simultaneously to a very large (and unpredictable) number of MTC/IoT devices. Group-oriented communications in the MTC/IoT environment require low latency and low overhead procedures in order to save battery resources. Based on these considerations, the ecosystem of 5G group-oriented services is expected to be really heterogeneous and requiring network flexibility according to the different service requirements. Research and industrial organizations are, therefore, being very active in the definition of well performing solutions to best handle this kind of traffic in cellular environments where the limited radio resources and the dissimilar channel quality experienced by users/devices are challenging aspects

Biography: Dr. Giuseppe Araniti is an Assistant Professor of Telecommunications at the University Mediterranea of Reggio Calabria, Italy. From the same University he received the Laurea (2000) and the Ph.D. degree (2004) in Electronic Engineering. His major area of research includes Personal Communications Systems, Enhanced Wireless and Satellite Systems, Traffic and Radio Resource Management, Multicast and Broadcast Services, device-to-device and machine type communications over 5G cellular networks. He is *author* of more than 130 scientific papers including international journals, conferences, book chapters and tutorial. He is IEEE Senior Member and Associate Editor of IEEE Access journal.

Maurizio Murroni

Bridging Broadcast, Broadband and Cellular Communications in 5G future networks

Maurizio Murronii

MCLab at DIEE – University of Cagliari
Cagliari, Italy

Abstract: The migration from analog to digital of the broadcasting technologies is today a reality also for terrestrial transmission. Digital Terrestrial Television (DTT) is evolving to offer interactive services and a degree of flexibility which can be exploited to offer tailored applications to users which include for instance interactivity, different levels of personalization, and innovative location-based, as well as context - aware, services. Furthermore, DTT services are likely to be broadcast also wirelessly, exploiting advanced broadband access technologies such as WiFi, WiMAX, LTE-A. Last, but not least, TV and broadcast services for mobile users are being launched in many countries using DVB T2 and DVB-NGH. In the near future, in a 5G perspective, a set of different technologies able to offer personalized and customized services to different classes of users are expected in the area of wireless broadcasting and convergence of technologies is auspicious. This concept entails different levels of convergence, namely at terminal level (one device fits all), at service level (convergence of traditional fixed, mobile and broadcast services), at transport and network level with a common and standardized set of protocols and at access layer thanks to the harmonic coexistence of different radio technologies. This talk aims to investigate the state-of-the-art research work concerning the integration of different access technologies for bridging broadcast, broadband wireless and cellular communications. A first introduction will overview the current alternative technologies to classic DTT broadcasting for both fixed and mobile services. Then, some results about the coexistence of different broadband and broadcast services will be presented. Finally, new bridging technologies for broadcast and cellular networks will be proposed.

Biography: Maurizio Murroni received a M.Sc. degree in Electronic Engineering in 1998 and a Ph.D. degree in Electronic Engineering and Computers in 2001 from the University of Cagliari. He was graduate visiting scholar at the School of Electronic Engineering, Information Technology and Mathematics, University of Surrey, Guildford, U.K. in 1998 and a visiting Ph.D. scholar at the Image Processing Group, Polytechnic University, Brooklyn, NY, USA, in 2000. In 2006, he was visiting lecturer at the Dept. of Electronics and Computers at the Transilvania University of Brasov in Romania and in 2011 visiting professor at the Dept. Electronics and Telecommunications, Bilbao Faculty of Engineering, University of the Basque Country (UPV/EHU) in Spain. Currently, is assistant professor at the Department of electrical and Electronic Engineering of the University of Cagliari. Since October 2010, he is coordinator of the research unit of the Italian University Consortium for Telecommunications (CNIT) at the University of Cagliari and since 2016 chair of the IEEE Broadcast Technology Society Italy chapter. Dr. Murroni is co-author of an extensive list of journal articles and peer-reviewed conference papers and received several best paper awards. He served as chair for various international conferences and workshops. He was co-author of the 1900.6-2011 - IEEE Standard for Spectrum Sensing Interfaces and Data Structures for Dynamic Spectrum Access and other Advanced Radio Communication Systems. His research currently focuses on broadcasting, cognitive radio system, signal processing for radio communications, multimedia data transmission and processing.

Alex Pyattaev

On Distributed Medium Access Control for mmWave-based 5G WLAN and WPAN Applications

Dr. Alex Pyattaev

YL-Verkot Oy, Tampere, Finland

Abstract: The directional nature of mmWave communications has raised multiple challenges to the MAC researchers. The directivity of transmissions and reception means that one must be transmitting not just at the right time, but also in the right direction to be heard. Thus, coordination of larger networks becomes unimaginably complex task. How can multiple networks coordinate their transmissions? Can we leverage directivity to pack more links into the same area? In the talk, we will answer these questions for a truly distributed system. We will also look at the future potential of directive transmission systems in terms of area capacity as well as reliability. Finally, we will consider novel, yet unexplored subjects of research and engineering related to mmWave medium access.

Biography: Dr. Alex Pyattaev is the CTO and a co-founder of YL-Verkot. He holds a PhD in communications engineering from Tampere University of Technology. Alexander has over 10 years of industrial R&D experience, publications on a variety of networking-related topics in internationally recognized venues, as well as several technology patents. His primary research interest lies in the area of future wireless communications and networking: advanced shared spectrum access, smart radio technology selection and flexible, adaptive topologies.

Sergey Andreev

**Leveraging Heterogeneous Connectivity
in Converged 5G-IoT Ecosystem**

Dr. Sergey Andreev

W.I.N.T.E.R. Group, Tampere University of Technology, Finland

http://winter-group.net/

Abstract: This talk intends to familiarize a broad audience with the recent developments behind the concept of the Internet of Things (IoT). To this end, we review the emerging and most challenging IoT applications, including wearable devices, mission-critical actuators, automation sensors, and mobile industrial robots. A particular attention is paid to the adequate wireless connectivity enablers supporting the evolution of both consumer and industrial IoT domains. Here, the fifth-generation (5G) mobile networks are expected to take a leading role by offering a variety of appropriate communications mechanisms. These include multi-radio and direct connectivity, (ultra-)dense networking solutions, and the use of extremely high frequency transmissions, just to name a few. In this talk, we comprehensively review the unique challenges posed recently by an impressive variety of machine-type IoT devices, with their characteristic stringent performance requirements, and the capabilities that heterogeneous 5G-grade radio access technologies would need to develop for accommodating those.

Biography: Dr. Sergey Andreev is Senior Research Scientist at Tampere University of Technology (Finland), where he is coordinating W.I.N.T.E.R. Group (http://winter-group.net/) focusing on 5G and IoT centric research. He has (co-)authored over 100 papers (including those in IEEE JSAC, IEEE Communications Magazine, and IEEE Wireless Communications), several patents, and a number of IEEE and 3GPP standardization contributions in the areas of multi-radio heterogeneous networking, cooperative and proximate communications, energy efficiency, and machine-to-machine applications. This innovation activity has been well covered in media on both national and international levels. Sergey has been reviewer for numerous visible conferences and top-level international journals; he was named Exemplary Reviewer by IEEE Communications Letters in 2013. He has also been invited expert at a number of workshops, held many guest lectures at industry and academia worldwide, as well as acted as a keynote speaker. Recently, he has been recipient of highly competitive personal research grant by the Academy of Finland (9% success rate), as well as several other prestigious scholarships and awards.

Kerstin Johnsson

Swarm Formation and Communication in Beyond-5G Systems

Dr. Kerstin Johnsson

Senior Researcher,
Wireless Communications Laboratory,
Intel

Abstract: In this talk, we will investigate the key research questions surrounding swarm formation and communication. For example, how should devices enter into and maintain formation, particularly when obstacles are encountered? What is the best way to steer a given formation: centrally, distributed, or a hybrid thereof? What current technologies/standards are best suited for maintaining formation vs. communication among devices? Finally, how can we take advantage of swarm intelligence to improve performance and reduce the required amount of measurement, processing, and communication? We will look at what the current state of the art is in these areas and discuss potential next steps.

Biography: Kerstin Johnsson is a Senior Research Scientist in the Wireless Communications Laboratory at Intel, where she conducts research on MAC, network, and application layer optimizations that improve the mobile client experience while reducing wireless operator costs. She graduated from Stanford with a Ph.D. in Electrical Engineering and has more than 15 years' experience in the wireless industry. She is the author of numerous publications and patents in the field of wireless communications.

Venue Information

The International School on Enabling Technologies, Applications, and Methods for Emerging 5G Systems will be held at the Università degli Studi Mediterranea di Reggio Calabria – Ingegneria, Reggio Calabria, Italy. More information about the University can be found here.
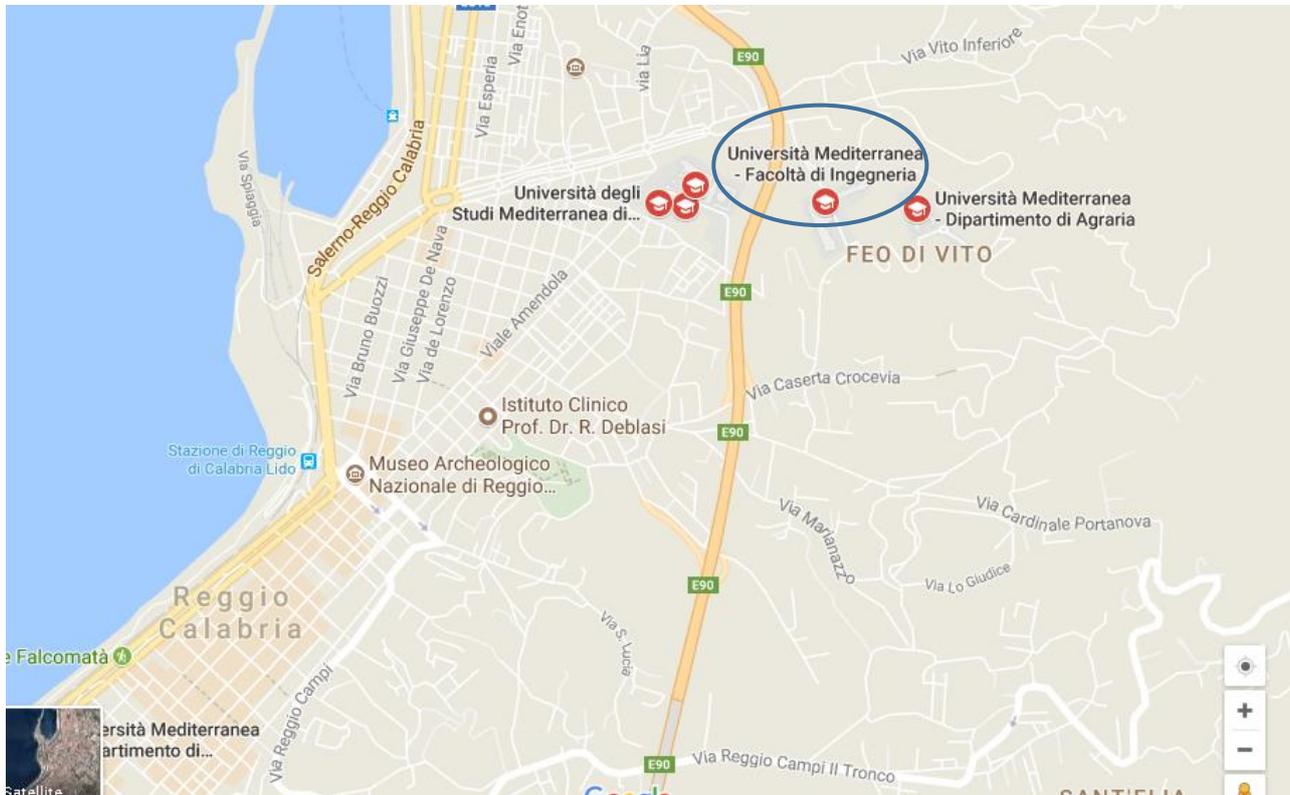
Coordinates can be found here.

Address of the International School
Aula Magna – Ingegneria
Università degli Studi Mediterranea di Reggio Calabria
Via Graziella
89124 Feo di Vito
Reggio Calabria (RC)
Italy

WiFi Information

Eduroam is also available.

Reggio City WIFI
The Lungomare (promenade) "Falcomatà", the most representative place in the city, center of cultural life and an intense summer tourist season, is covered by "Reggio Calabria Wireless" hot spots, and in other areas of the city center, as shown in the "Maps" section of the website.
More information can be found here: http://www.reggiowireless.com/index_en.htm

Directions

How to get from the Airport to the City Centre

1. Bus
Public buses go at regular intervals between the airport and the city centre.
- The bus line no 27 goes daily every hour from 7.00 to 19.00 between the airport and the city centre. Journey time approx. 20 min.
- The bus line no 28 goes daily every hour from 7.30 to 19.30 between the airport and the city centre. Journey time approx. 20 min.

Costs: single ticket € 1.50
Tickets are available at the newsstand in the airport terminal.

2. Taxi
A taxi stand can be found in front of the airport terminal. Transfer time from the airport to the city centre is approx. 15 minutes.
According to the Giunta Comunale resolution nr. 83 of 19 June 2015, taxi costs should be:

From-To	Fixed Costs (without supplements)
Airport – Train Central Station	Euro 12,00
Airport – Museo Nazionale	Euro 16,00
Airport – Port Reggio Calabria	Euro 18,00

How to get from the airport to the School Venue
Take the bus line no 27 direction "Facoltà Agraria" and get out at the stop **"S. Brunello"** (then walk to the school venue). See "From the stop "S. Brunello" to the school venue (on foot)".

How to get from the City Centre to the School Venue
There are three possible ways to get to the school venue from the city center:

1. Take the bus line no 27 direction "Facoltà Agraria" and get out at the stop **"S. Brunello"** (then walk to the school venue). See "From the stop "S. Brunello" to the school venue (on foot)".

Bus stops of Line 27: Aeroporto - Via Ravagnese Inferiore - Ponte S. Agata - Via Gebbione – Viale Calabria - Argine Calopinace - Piazza Garibaldi - Via S. Francesco da Paola - Via del Torrione - Via Romeo - Museo - Viale Amendola - Via Mons. De Lorenzo - Via XXV Luglio - Viale Zerbi (Porto) - Viale Boccioni - Terminal Ponte Libertà - **S. Brunello** - Facoltà Agraria

Timetable of Line 27: see Timetables Public Transport

2. Take the bus line no 5 or 10 direction "Vito Superiore" and get out at the stop **"S. Brunello"** (then walk to the school venue). See "From the stop "S. Brunello" to the school venue (on foot)".

Bus stops of Line 5 or 10: Riparo Vecchio - S. Sperato - Modena - Via del Seminario - Viale Europa - Via Pio XI - Via Sbarre C.li - Ponte S. Pietro - Argine Dx Calopinace - Piazza Garibaldi (Stazione FS) – Via S. Francesco da Paola - Via del Torrione - via Domenico Romeo (INPS) - Museo - Viale Amendola – Via Ibico - Argine Annunziata - **S. Brunello** - Vito Superiore - Vito Superiore

Timetable of Line 5 or 10: see Timetables Public Transport

3. You can reach the school venue from the city center also by foot. In this case, the destination is Via Graziella, 89124 Reggio Calabria. For example, from the Museum bus stop it takes about 30 minutes (about 1,8 Kilometres)
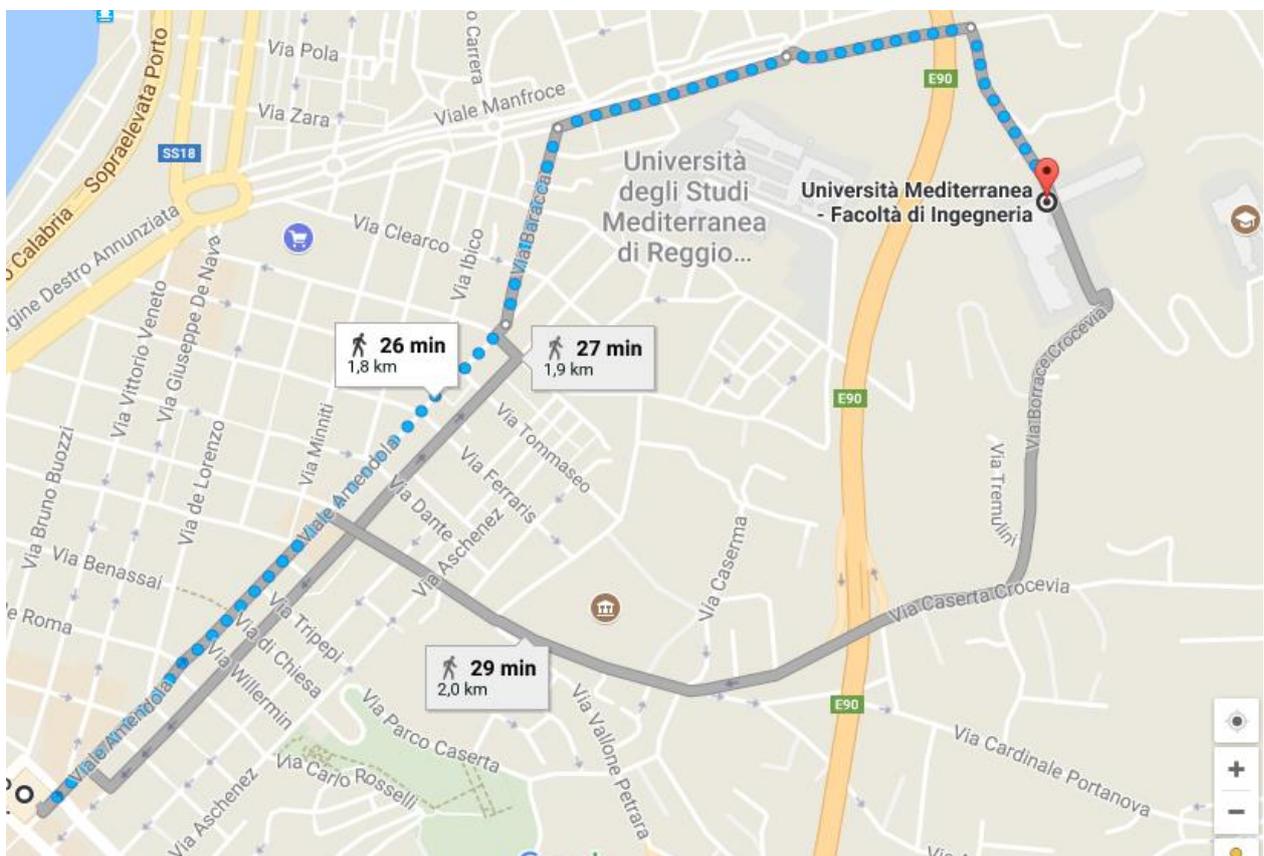
Walking distance from the city center to the school venue

Use this stop: Via Domenico Romeo.
The **line 5 + 10 + 27** stop at the university.
Stop: S. Brunello
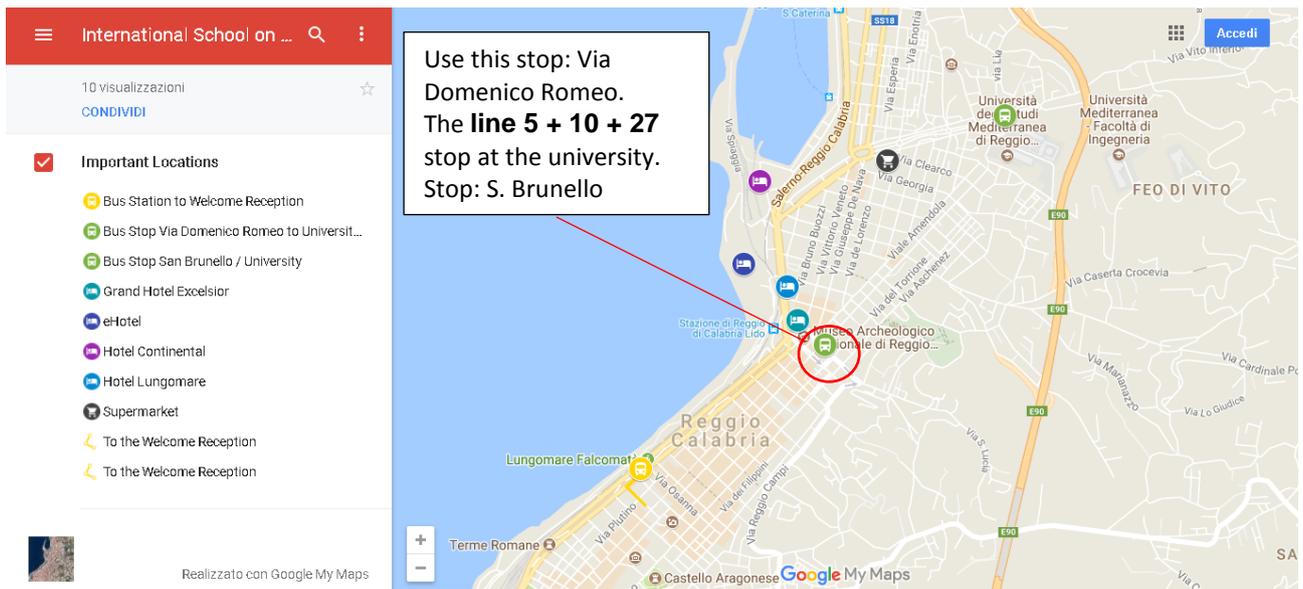
Note: Bus Line 27 will approximately leave from the bus stop „Via Domenico Romeo" between 08.15 – 08.25 → please be there at 8.10! The bus lines 5 + 10 should depart in the same time frame (usually a few minutes after line 27).

Get out here!

Check out the International School on 5G Google Maps to get all details.

From the stop "S. Brunello" to the School Venue (on foot)

Here you can see an overview how to get from the bus stop "**S. Brunello**" to the school venue.

Bus Stop "S. Brunello"

On the right of the bus stop "**S. Brunello**", you can see the parking lot of the University and the four towers of the University. Walk through the parking lot, walk upstairs and follow the pedestrian path. At the top of the stairs take the pedestrian walk on the left and follow the signs "INTERNATIONAL SCHOOL 2017".
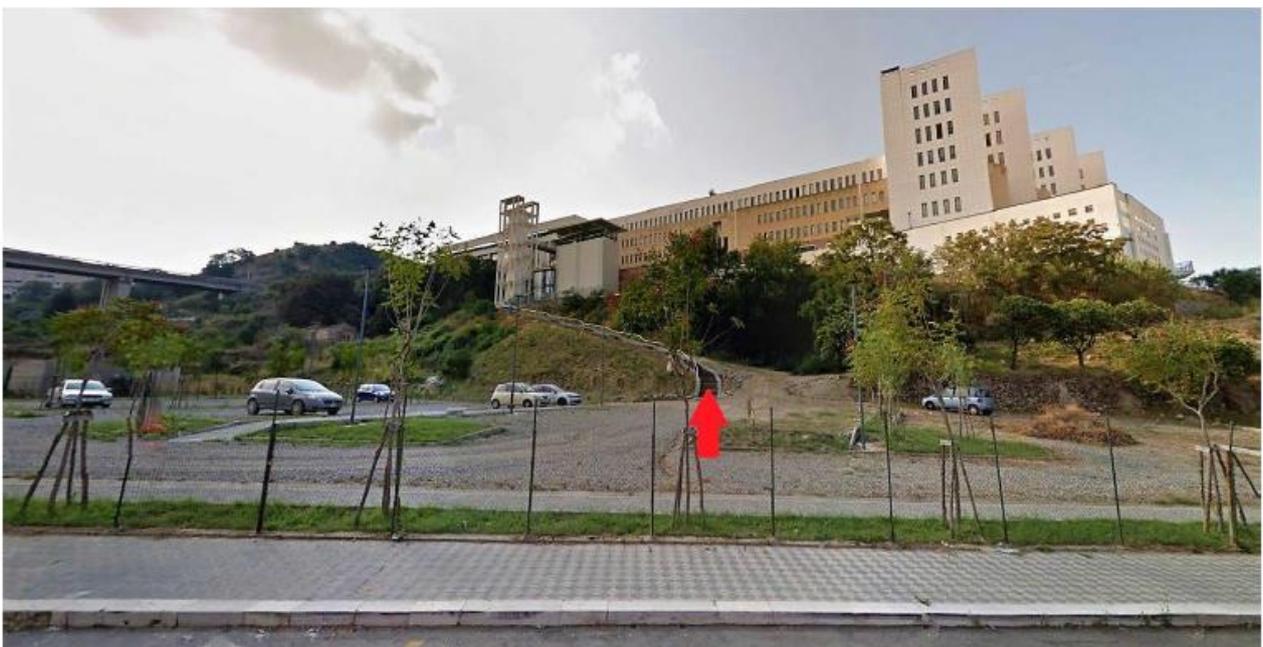
Stairs to the International School venue

How to get from the School Venue to the City Center

There are three possible ways to get from the venue to the city center:

1. Take the bus line no 27 from the bus stop **"S. Brunello"**. This stop is a few meters away from the bus stop where you get-off when you arrive at S.Brunello; it is on the right side of the downhill road, a few meters ahead of the cars parked in the picture above. The bus stops of the city center are from "Via De Nava" to "Stazione FS C.le".

Bus stops of Line 27: Facoltà Agraria - **S. Brunello** - Viale Libertà - Ponte Libertà - Via De Nava - Via XXV Luglio - Viale Zerbi (Porto) - Via Roma - **Via De Nava - Museo - Largo Colombo - Corso Matteotti - Stazione FS C.le** - Argine Calopinace - Viale Calabria - Via Gebbione - Ponte S. Agata - Via Ravagnese Inferiore – Aeroporto

Timetable of Line 27: see Timetables Public Transport

2. Take the bus line no 5 or 10 from the bus stop "**S. Brunello**". This stop is a few meters away from the bus stop where you get-off when you arrive at S.Brunello; it is on the right side of the downhill road, a few meters ahead of the cars parked in the picture above. The bus stops of the city center are from "Via De Nava" to "Stazione FS C.le".

Bus stops of Line 5 or 10: Vito Superiore - Vito Superiore - **S. Brunello** - Argine Annunziata - Via Pensilvania - Viale Amendola - Via XXV Luglio - **Via De Nava - Museo - Corso Matteotti - Stazione FS C.le** - Argine Sx Calopinace - Ponte S. Pietro - Argine Calopinace - Viale Europa - Via del Seminario - Modena - S. Sperato - Riparo Vecchio

Timetable of Line 5 or 10: see Timetables Public Transport

3. You can reach the city center from the school venue also on foot: for example, reaching the Museo takes about 30 minutes (about 1,8 Kilometres).

Public Transport in Reggio Calabria

In Reggio Calabria the public bus service (ATAM) is operating. To reach the School venue, take either the bus n. 27 or the bus n. 5 or 10 (stop S. Brunello), line starting from "Aeroporto".

Timetable of Line 27: (Stop at University: S. Brunello)

Linee 27 Aeroporto-Università																
Aeroporto (Parcheggio)	07:00	08:00	08:15	09:00	09:45	10:00	11:00	12:00	12:15	13:00	14:00	15:00	16:00	17:00	18:00	19:00
Viale Calabria	07:10	08:10	08:25	09:10	09:55	10:10	11:10	12:10	12:25	13:10	14:10	15:10	16:10	17:10	18:10	19:10
Piazza Garibaldi	07:17	08:17	08:32	09:17	10:02	10:17	11:17	12:17	12:32	13:17	14:17	15:17	16:17	17:17	18:17	19:17
Viale Zerbi (incrocio Boccioni)	07:27	08:27	08:42	09:27	–	10:27	11:27	12:27	12:42	13:27	14:27	15:27	16:27	17:27	18:27	19:27
Terminal Ponte Libertà	07:29	08:29	08:44	09:29	–	10:29	11:29	12:29	12:44	13:29	14:29	15:29	16:29	17:29	18:29	19:29
S. Brunello	07:32	08:32	08:47	09:32	–	10:32	11:32	12:32	12:47	13:32	14:32	15:32	16:32	17:32	18:32	19:32
Facoltà Ingegneria	07:34	08:34	08:49	09:34	–	10:34	11:34	12:34	12:49	13:34	14:34	15:34	16:34	17:34	18:34	19:34
Facoltà Agraria	07:41	08:41	08:56	09:41	–	10:41	11:41	12:41	12:56	13:41	14:41	15:41	16:41	17:41	18:41	19:41
Facoltà Agraria	07:45	08:45	09:00	09:45	10:45	11:45	12:45	13:00	13:45	14:45	15:45	16:45	17:45	18:45	19:45	
S. Brunello	07:50	08:50	09:05	09:50	10:50	11:50	12:50	13:05	13:50	14:50	15:50	16:50	17:50	18:50	19:50	
Ponte Libertà	07:52	08:52	09:07	09:52	10:52	11:52	12:52	13:10	13:52	14:52	15:52	16:52	17:52	18:52	19:52	
Viale Zerbi (incrocio XXV Luglio)	07:54	08:54	09:09	09:54	10:54	11:54	12:54	–	13:54	14:54	15:54	16:54	17:54	18:54	19:54	
Museo	07:57	08:57	09:12	09:57	10:57	11:57	12:57	–	13:57	14:57	15:57	16:57	17:57	18:57	19:57	
Stazione FS C.le	08:02	09:02	09:17	10:02	11:02	12:02	13:02	–	14:02	15:02	16:02	17:02	18:02	19:02	20:02	
Viale Calabria (incr. Botteghelle)	08:06	09:06	09:21	10:06	11:06	12:06	13:06	–	14:06	15:06	16:06	17:06	18:06	19:06	–	
Aeroporto (Parcheggio)	08:16	09:16	09:31	10:16	11:16	12:16	13:16	–	14:16	15:16	16:16	17:16	18:16	19:16	–	

Bus stops at the city center from Via de Nava to Stazione FS C.le:

Facoltà Agraria - S. Brunello - Viale Libertà - Ponte Libertà - **Via De Nava - Via XXV Luglio - Viale Zerbi (Porto) - Via Roma - Via De Nava - Museo - Largo Colombo - Corso Matteotti - Stazione FS C.le** - Argine Calopinace - Viale Calabria - Via Gebbione - Ponte S. Agata - Via Ravagnese Inferiore - Aeroporto

Timetable of Line 5-10: (Stop at University: S. Brunello)

Linee 5-10 Riparo-S. Brunello/Vito																	
Riparo Vecchio	–	06:15	–	06:55	07:20	–	08:15	08:35	09:15	09:55	10:15	10:55	11:35	11:55	12:55	13:40	
Piazza Garibaldi	05:40	06:30	07:00	07:15	07:40	08:15	08:35	08:55	09:35	10:15	10:35	11:15	11:55	12:15	13:15	14:00	
S. Brunello	05:53	06:45	07:14	07:28	07:55	08:30	08:50	09:10	09:50	10:30	10:50	11:30	12:08	12:30	13:30	14:15	
Vito Superiore	06:00	–	07:25	–	08:05	08:40	–	–	–	10:40	–	11:40	–	12:40	13:40	14:25	
Riparo Vecchio	14:55	15:15	16:15	–	16:55	17:55	18:15	18:35	–	19:30	19:45						
Piazza Garibaldi	15:15	15:35	16:35	16:55	17:15	18:15	18:35	18:55	19:30	19:50	20:05						
S. Brunello	15:30	15:50	16:50	17:10	17:30	18:30	18:50	19:10	19:45	–	20:20						
Vito Superiore	–	16:00	–	17:20	–	–	–	–	19:55	–	–						
Vito Superiore	–	06:05	–	–	07:25	08:15	08:40	–	–	–	10:40	–	11:50	–	12:55	13:40	
S. Brunello	–	06:15	06:45	07:30	07:35	08:25	08:50	09:05	09:25	10:05	10:50	11:05	12:00	12:12	13:05	13:50	
Piazza Garibaldi	06:01	06:29	07:00	07:43	07:48	08:40	09:05	09:20	09:40	10:20	11:05	11:20	12:05	12:22	13:20	14:05	
Riparo Vecchio	06:15	06:49	07:20	08:03	08:10	09:00	–	09:40	10:00	10:40	11:25	11:40	12:35	–	13:40	14:25	
Vito Superiore	14:30	–	16:00	–	17:20	–	–	–	–	20:00							
S. Brunello	14:40	15:35	16:10	17:05	17:30	17:45	18:45	19:05	19:25	20:10	20:35						
Piazza Garibaldi	14:55	15:50	16:25	17:20	17:45	18:00	19:00	19:20	19:40	20:25	20:50						
Riparo Vecchio	15:15	16:10	16:45	17:40	18:05	18:20	19:20	19:40	20:00	20:45	21:10						

Bus stops at the city center from Via de Nava to Stazione FS C.le:

ito Superiore (Linea 5) - Vito Superiore - S. Brunello - Argine Annunziata - Via Pensilvania - Viale Amendola - Via XXV Luglio - **Via De Nava - Museo - Corso Matteotti - Stazione FS C.le** - Argine Sx Calopinace - Ponte S. Pietro - Argine Calopinace - Viale Europa - Via del Seminario - Modena - S. Sperato - Riparo Vecchio

Useful Information

Tourist Information
Associazione Proloco Città di Reggio Calabria
Via Venezia 1 89128 Reggio Calabria RC Italy +39 329 323 4407

Emergency Numbers	
Fire service	115
Police	112
Ambulance/ rescue	118
European emergency	112

Drinking Water

Officially, it is safe to drink the tap water in Italy. Generally, however, people do not drink tap water.

Opening Hours of Shops in Reggio

Shop opening hours may depend indicatively. Pharmacies are open from 8:00 -13:00 with a break until 16:00 and closing at 19:30. Small convince food shops are open from 8:00-13:00 with a break until 16:00/16:30 and then open again until 20:00.
There is a supermarket not far from the school venue called *IperCoop* with the following opening hours: 8:30 to 21:00 with no breaks. IperCoop Address: Via De Nava, 1, 89123 Reggio Calabria RC
Other shops are typically open from 9:00-13:00 with a break until 16/16:30 and closing at 20:00.

Tipping:

Tipping in restaurants in Italy is not obligatory. However, if you are happy with the service you can leave a 10% tip of the bill or simply round up to a convenient number. Be aware that in some restaurants supplements through the *servizio* (service charge) on your restaurant bill and/or the *coperto* (cover charge), sometimes both may be applied. In that case, a service fee is being charged and an additional tip is not necessary.

About Reggio Calabria

Reggio di Calabria (Italian pronunciation: [ˈreddʒo di kaˈlaːbrja], also [ˈrɛddʒo]; Sicilian-Calabrian dialect: *Rìggiu*, Italic-Greekof Bovesia: *Righi*, Ancient Greek: Ῥήγιον, *Rhḗgion*, Latin: *Rhēgium*), commonly known as **Reggio Calabria** or simply **Reggio** in Southern Italy, is the largest city and the most populated *comune* of Calabria, Southern Italy. It is the capital of the Metropolitan City of Reggio Calabria and the seat of the Regional Council of Calabria.

Reggio is located on the "toe" of the Italian Peninsula and is separated from the island of Sicily by the Strait of Messina. It is situated on the slopes of the Aspromonte, a long, craggy mountain range that runs up through the centre of the region. The third economic centre of mainland Southern Italy, the city proper has a population of more than 200,000 inhabitants spread over 236 square kilometres (91 sq mi), while the fast-growing urban area numbers 260,000 inhabitants. About 560,000 people live in the metropolitan area, recognised in 2015 by Italian Republic as a metropolitan city.

As a major functional pole in the region, it has strong historical, cultural and economic ties with the city of Messina, which lies across the strait in Sicily, forming a metro city of less than 1 million people.

Reggio is the oldest city in the region, and despite its ancient foundation – *Ρηγιον* was an important and flourishing colony of Magna Graecia – it has a modern urban system, set up after the catastrophic earthquake on 28 December 1908, which destroyed most of the city. The region has been subject to earthquakes.

It is a major economic centre for regional services and transport on the southern shores of the Mediterranean. Reggio, with Naples and Taranto, is home to one of the most important archaeological museums, the prestigious National Archaeological Museum of Magna Græcia, dedicated to Ancient Greece (which houses the Bronzes of Riace, rare example of Greek bronze sculpture, which became one of the symbols of the city). Reggio is the seat, since 1907, of the Archeological Superintendence of Bruttium and Lucania.

The city centre, consisting primarily of Liberty buildings, has a linear development along the coast with parallel streets, and the promenade is dotted with rare magnolias and exotic palms. Reggio has commonly used popular nicknames: The "city of Bronzes", after the Bronzes of Riace that are testimonials of its Greek origins; the "city of bergamot", which is exclusively cultivated in the region; and the "city of Fatamorgana", an optical phenomenon visible in Italy only from the Reggio seaside.

More details can be found here.