Unique in its properties, Gallium Nitride is the semiconductor material which enabled the LED revolution in lighting, the blue laser, and the availability of compact light sources covering the green to ultraviolet spectrum. GaN-based High Electron Mobility Transistors are becoming the devices of choice for high-efficiency radiofrequency power amplifiers, essential for the next generation of wireless network infrastructure, 5G. The development of GaN-on-Si High Electron Mobility Transistors technology expanded the capabilities of this material to power electronic applications up to 1200 V and beyond, reducing energy losses in photovoltaic conversion systems, providing smaller and lighter power supplies. At higher voltages, a number of new applications e.g. to electric transportation systems, electrical energy management will be possible when the availability of free-standing GaN crystalline substrate will allow the development of GaN vertical devices, an objective which currently attracts the interest of a wide research community.

Substantial energy savings and environmental benefits resulted from the global adoption of solid-state lighting and from the increased efficiency of electronic systems based on high-voltage, wide bandgap GaN-based materials. All this has been possible thanks to the work of Hiroshi Amano, 2014 Physics Nobel Prize Laureate, who will contribute two lessons to this course. The 2-days intensive PhD course (14 hours in total) will cover material growth, devices and modeling of GaN-based electronic and optoelectronic devices. Within the course, Dr. Farid Medjdoub (CNRS IEMN, Lille, France) will speak about device and technology of HEMT transistors for microwave and power switching applications; Dr. Matteo Meneghini, will present physics and technology of GaN LEDs; Prof. Giovanni Verzellesi (Department of Engineering Science and Methods, University of Modena and Reggio Emilia) will present results on physical modeling and device simulation of GaN-based electronic devices and III-V MOS electronic devices.

Venue : Aula Magna, Dipartimento di Ingegneria dell’Informazione, Via Gradenigo 6/A, 36131 Padova, Italy

Registration : Registration is free but mandatory before September 10 at the very latest, as availability of seats is limited. We also suggest to make hotel reservation as soon as possible, as September is a very busy month in Padova. In case you have difficulties in finding a hotel, please contact us. Please register by sending a mail with subject “GaN PhD SCHOOL” to both Matteo Meneghini, menego@dei.unipd.it and Enrico Zanoni zanoni@dei.unipd.it with subject “GaN PhD SCHOOL”
Lessons

Tuesday, September 19
09.00-10.45 Matteo Meneghini “Physics and technology of GaN-based Light Emitting Diodes”
10.45-11.00 Break
11.00-13.00 Hiroshi Amano “Ultraviolet Light Emitting Diodes”
13.00-14.30 Lunch break
14.30-16.15 Giovanni Verzellesi “Physical modeling and device simulations of GaN High Electron Mobility Transistors”
16.15-16.30 Break
16.30-18.15 Farid Medjdoub “Evolution of GaN High Electron Mobility Transistors for rf systems applications”

Wednesday, September 20
09.00-10.45 Hiroshi Amano “Gallium Nitride growth for optoelectronics and power devices: what’s achievable now and which limits we have”
10.45-11.00 Break
11.00-13.00 Farid Medjdoub “Evolution of GaN High Electron Mobility Transistors transistors for power switching applications”
13.00-14.30 Lunch break
14.30-16.00 Giovanni Verzellesi “Statistical Variability in Nano-Scale MOSFETs with III-V Semiconductor Channels”

The short course is followed by the workshop “New electronic technologies for sustainable systems: from the Internet of Things to the Internet of Energy”, held on September 21, Thursday (entire day) at the Sala della Scuola della Carità, Chiesa di San Francesco Grande, Via S. Francesco, 61, 35121 Padova, see the program in the following.

Even for the workshop there is no registration fee, but registration is mandatory to guarantee access: please notice that the number of seats in the meeting room is very limited (80); we kindly ask you to register as soon as possible and mandatorily before September 10 at the very latest. Registration after that date or on-site does not guarantee access to the workshop. For workshop registration, please send an email with subject “SUSTAINABLE SYSTEMS WORKSHOP” to both menego@dei.unipd.it AND enrico.zanoni@unipd.it

Separate registration to the workshop is needed also if you registered for the PhD school.

The school is sponsored by the University of Padova Department of Information Engineering, with the contribution of the Italian Ministry of Foreign Affairs and International Cooperation (MAECI), “Direzione Generale per la Promozione del Sistema Paese”
How to reach the Department / the workshop:

**by air:** Venezia "Marco Polo" Airport. From the airport, travel to Padova (49 km) by: (a) SITA coach (every 30 minutes) until 10 pm; OR (b) Train from Venezia–Mestre railway station. The airport is linked to the train station by ATVO Fly bus or ACTV city bus no. 5; OR (c) Air Service (tel. +39-049 8704425, reservation@airservicepadova.it) or Landomas minibus (tel. +39-049 8600382, landomas@landomas.it). Book at least 24 hours in advance.

**by air:** Treviso "Antonio Canova" Airport. This airport serves low-cost airlines. Travel to Padova (62 km) by La Marca coach until 8.30 pm or by train. The airport is linked to the train station by ACTT bus no. 6.


**by train:** The complex of San Francesco Grande in Padua is within a 15 minute walk from the Padova railway station. There are train services from/to Venice, Trieste, Verona, Milan, Bologna, Florence and Rome. For timetables and information: Trentitalia (high speed and local trains) www.trenitalia.com Italo (long-distance, high speed trains only) phone: +390689371892 www.italotreno.it

Hotels close to the conference:

**MAJESTIC TOSCANELLI**** via dell’Arco 2 (City centre)
Tel.: +39 049 663244 Fax: +39 049 8760025 (from 110€)
Email: majestic@toscanelli.com www.toscanelli.com

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Email: alsanto@alsanto.it www.alsanto.it

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**IGEA** via Ospedale 87
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Email: info@hoteligea.it www.hoteligea.it (from 68€)

**Best Western HOTEL GALILEO **** (outside the city centre)
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