

April-
June 2022

EUROPRACTICE & 2D-EPL webinar series

GRAPHENE AND THE 2D EXPERIMENTAL PILOT LINE

A EUROPRACTICE & 2D-EPL WEBINAR SERIES

2D materials have shown wonderful performance in devices for different applications. Nevertheless, new technology needs to be developed in order to bring 2D materials to mass production. Bridging the gap between graphene and related material (GRM) processes in the lab and silicon processing in the semiconductor industry is a big challenge that requires coordinated action between processing sites, tool vendors and material suppliers to take the first steps in that direction.

The [2D Experimental Pilot Line](#) (2D-EPL) is a European Commission-funded project working to bridge that gap and establish a European ecosystem for the prototype production of GRM-based electronics, photonics and sensors.

In this webinar series, created in collaboration between EUROPRACTICE and the 2D-EPL, we will discuss the properties of GRMs that make them exciting for semiconductor applications and the upcoming multi-project wafer (MPW) runs. The 2D-EPL designed these MPW runs to further grow the project's production capabilities and to give companies, universities and research institutes access to customized dies on graphene integrated wafers.

By providing access to customizable chips with flexible process flows, at an affordable price, we allow the community the opportunity to discover the value of 2D material-integrated silicon wafers for themselves.

All the webinars are hosted by Dr. Romano Hoofman (imec). Please do not hesitate to contact him with any questions at Romano.Hoofman@imec.be.

PROGRAM INCLUDES 3 WEBINARS



28 April at 16:00 CEST

Introduction to graphene and to EUROPRACTICE services

Dr. Romano Hoofman (imec) and Daniel Neumaier (AMO)

▶ [Click here to register](#)



12 May at 16:00 CEST

First 2D-EPL MPW run: Key specifications for graphene-based devices

Dr. Gordon Rinke (AMO)

▶ [Click here to register](#)



2 June at 16:00 CEST

Second 2D-EPL MPW run: Towards sensor CMOS integration

Miika Soikkeli (VTT)

▶ [Click here to register](#)

WHAT WILL YOU DISCOVER?



Part I of Webinar I:

EUROPRACTICE: A true One-Stop-Shop for Micro-/Nanoelectronics

28 April, 16:00 CEST

Dr. Romano Hoofman, imec

A true one-stop shop, EUROPRACTICE provides all range of services that you need to design and fabricate electronic circuits and smart integrated systems. We offer affordable access to a wide range of CAD tools, training courses, and state-of-the-art fabrication technologies, including Multi-Project-Wafer (MPW) prototyping and volume production.

EUROPRACTICE is a consortium of five renowned European research organisations that have provided their services to the European academia and industry over the past 25 years. Our team supports customers in all critical steps on the way from prototype design to volume production.

In the first part of the series-opening webinar, Dr. Romano Hoofman will introduce the EUROPRACTICE platform and explain how you can access it.





Part 2 of Webinar 1:

Graphene: Basic properties, manufacturing and applications

28 April, 16:00 CEST

Dr. Daniel Neumaier, AMO

Graphene, the two-dimensional carbon allotrope, has attracted significant attention in the past 17 years because of its outstanding electronic, optical and sensing properties, making it an excellent candidate for new high-performance devices.

This talk will start with a brief introduction to graphene, explaining the unique properties and key material parameters. Afterwards the perspective of graphene in several fields of application will be discussed and the key remaining challenges will be outlined. A focus will be laid on applications in the field of photodetectors for visible and IR light, magnetic fields sensors, as well as chemical and biological sensors, matching the application focus of the first MPW run offered within the 2D-EPL project.

A key challenge for these graphene-based devices is the large-scale manufacturing, which represents also the R&D focus of the 2D-EPL project. The current state-of-the-art for the fabrication of graphene-based devices will be discussed in the last part of this presentation, including the different possible fabrication routes and options, and the expected performance figures or merit.



First 2D-EPL MPW run: Key specifications for graphene-based devices

12 May, 16:00 CEST

Dr. Gordon Rinke, AMO

Devices based on graphene have attracted a lot of attention due to the extraordinary electronic, optical and sensing properties of graphene and consequently its effect on the device performance. The fabrication on large scale and thus the availability and the introduction into the market remains challenging.

With the aim to develop critical tools and materials and make 2D materials compatible to the standards in industry, the European project “2D Experimental Pilot Line (2D-EPL)” tries to establish a route for 2D material integration on large scale. In the framework of this project, several multi-project wafer (MPW) runs are provided where interested participants can include their designs as dies on joint wafers. They are based on the current available technology and have different target applications. The first run is mainly intended for graphene sensors and will be offered by AMO GmbH.

In this webinar, an overview of the general process steps for graphene-based devices is given together with some application examples. Furthermore, the offered baseline process and general details for this MPW run are presented.





Second 2D-EPL MPW run: Towards sensor CMOS integration

2 June, 16:00 CEST

Dr. Miika Soikkeli, VTT

Graphene sensor integration with CMOS readout offers unique possibilities in application areas such as imaging, diagnostics and environmental sensing. For example, multiplexing enabled by the CMOS readout integration is required for the IR cameras. It also enables multianalyte sensing for diagnostics and environmental sensing with improved statistical data analysis to improve sensing reliability. In addition, more complex signal processing can be integrated directly on the chips.

The second MPW run in the 2D-EPL project is also intended for graphene sensors and will be offered by VTT Technical Research Centre of Finland. This run will also serve as a test platform for the MPW run 4, which will focus on integrating the sensors on the CMOS readout wafers.

This webinar will give an overview of the general post-CMOS processing compatible steps for graphene sensors. It will also allow participants to dive into application examples. In addition, this talk will present the offered process and general details for this MPW run.

