



# Intelligent characterization of photovoltaic devices from an industrial perspective

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**Code:** 2024cc07

**Web link:** <https://www.upo.es/formacionpermanente/cursos-de-verano/intelligent-characterization-of-photovoltaic-devices-from-an-industrial-perspective>

**Dates:** 20<sup>th</sup> and 21<sup>st</sup> of June 2024

**Duration:** 15 hours

**Credits:** 2 ECTS

**Registration fee:** 60,00 €\*  
\*additional 10€ for the expedition of certificate.

**Format:** Hybrid (Possibility to attend in person or online)

**Management:** **Mr. Paul Pistor.** Department of Physical, Chemical and Natural Systems. Distinguished Beatriz Galindo Researcher. Universidad Pablo de Olavide (UPO)– Centre for Nanoscience and Sustainable Technologies (CNATS).

**Mr. Víctor Izquierdo-Roca.** Researcher. Instituto de Investigación en Energía de Cataluña (IREC) Deputy Head of the Solar Energy Materials and Systems Group (SEMS)

## Summary

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Photovoltaics (PV) are crucial in fighting climate change and transitioning to green energy sources. Third-generation photovoltaic technology aims to achieve high-efficiency devices and improved adaptability for different applications in different sectors. However, the precise and complicated production process results in huge amounts of waste due to defects.

In this context, the establishment of advanced characterization methodologies is important to identify production deviations and faulty devices as early as possible.

Artificial intelligence (AI) can make a large impact in advanced monitoring and data interpretation. With the use of AI, in-line industrial inspection will improve the quality of third-generation PV and reduce its environmental impact by minimizing the waste of energy and valuable materials during production.

Based on our experience within the European Project Platform Zero (<https://www.platform-zero-project.eu/>), in this summer school we revise important AI enhanced characterization and monitoring tools from an industrial perspective in view of their direct in-line implementation into PV production lines.

## Addressed to:

This summer school is directed towards industrial engineers and PhD students from the fields of photovoltaics, related opto-electronic applications/material sciences that are interested in technology transfer and would like to learn more about advanced characterization techniques, the use of AI and the demands and concerns from an industrial perspective.

## Program

### Thursday, 20<sup>th</sup> of June 2024

8h30 - 9h00	Reception
9h00 - 9h30	Welcome and Opening Words <ul style="list-style-type: none"><li>Bruno Martínez Haya. Departamento de Sistemas Físicos, Químicos y Naturales. Universidad Pablo de Olavide. Director Centre for Nanoscience and Sustainable Technologies (CNATS).</li></ul>
9h30 - 10h30	Talk: " <b>Photovoltaics – Introduction and Status</b> ". <ul style="list-style-type: none"><li>Paul Pistor. Investigador Distinguido "Beatriz Galindo Senior". Department of Physical, Chemical and Natural Systems, Universidad Pablo de Olavide (UPO), CNATS.</li></ul>
10h30 - 11h30	Talk: " <b>Inorganic heterojunction devices technologies</b> ". <ul style="list-style-type: none"><li>Pedro Vidal Fuentes. Researcher. Instituto de Investigación en Energía de Cataluña (IREC). Responsible for the synthesis laboratory of materials and photovoltaic (PV) devices</li></ul>
11h30 - 12h00	Break.
12h00 - 13h00	Talk: " <b>Up and coming - Emerging PV technologies</b> ". <ul style="list-style-type: none"><li>Clara Aranda Alonso. Researcher. Department of Physical, Chemical and Natural Systems, Universidad Pablo de Olavide (UPO).</li></ul>

- 13h00 - 14h00** Talk: **"From Photons to Electrons - Optoelectronic Characterization of PV Devices"**.
- Juan Antonio Anta Montalvo. Professor at the Department of Physical, Chemical and Natural Systems, Universidad Pablo de Olavide (UPO).
- 15h30 - 16h30** Talk: **"Reading Photons- Spectroscopic Characterization"**.
- Victor Izquierdo Roca. Researcher Instituto de Investigación en Energía de Cataluña (IREC) Deputy Head of the Solar Energy Materials and Systems Group (SEMS).
  - Maxim Guc, Researcher (SEMS / IREC).
- 16h30 - 17h30** Talk: **"From Light to Decisions: The Journey of Image Formation in Pixels"**.
- Filip Hendrichovsky. Researcher. Australian Institute of Technology (AIT).
- 17h30 - 20h00** Workshop: **"Practical aspects of opto-electronic and spectroscopic measurements of PV modules"**.
- Renán Andrés Escalante Quijano. PostDoc / Department of Physical, Chemical and Natural Systems, Universidad Pablo de Olavide (UPO).
  - Juan Carlos Expósito. PhD student. Universidad Pablo de Olavide (UPO).
  - Victor Izquierdo Roca. (SEMS / IREC).
  - Maxim Guc, Researcher (SEMS / IREC).

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## Friday, 21<sup>st</sup> of June 2024

- 09h00 - 10h00** Talk: **"Machine Learning in the Context of Material Research"**
- Said Hamad Gómez. Department of Physical, Chemical and Natural Systems, Universidad Pablo de Olavide (UPO).
- 10h00 - 11h00** Talk: **"The Rise of AI-Driven Visual Inspection: Streamlining Processes and Enhancing Quality"**.
- Filip Hendrichovsky (AIT).
- 11h00 - 11h30** Descanso.
- 11h30 - 12h30** Talk: **"(Big) Data Engineering – A practical perspective"**.
- Paul Heinzlreiter. Software Engineer. RISC Software GmbH.
- 12h30 - 13h30** Talk: **"Challenges of Inline Control in Industrial Processes: Adapting Laboratory Characterization to Industry"**.
- Victor Izquierdo Roca (IREC).

**13h30 - 14h30**

Talk: **"Maximising the impacts of Platform-ZERO research: our dissemination, exploitation and communication strategy"**.

- Regis Decorme. Researcher. Managing Partner at R2M Solution France.

**14h30 - 15h00**

Round Table: **"Perspectives and Challenges"**.

**Participants:**

- Paul Pistor.
- Maxim Guc.
- Filip Hendrichovsky.
- Paul Heinzleiter.
- Regis Decorme.

**15h00 - 15h30**

Closing remarks and Farewell.

## Sponsors



**Fundación**

**Cajasol**

## Collaborators



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## Contact

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