Programming Artificial Biomolecular Communication with DNA Nanotechnology

Prof. Alessandro Bertucci

Universidad de Parma (Italia)

- **Jueves 26 de Noviembre a las 13 horas**
- **Aula: RFP 3er piso DQIAQF/INQUIMAE**
- **Streaming por el canal de YouTube del DQIAyQF**

Resumen

Cells use proteins to read, relay, and act on molecular signals. In this seminar, I will show how we can repurpose these natural capabilities to program synthetic DNA systems. I will first discuss how DNA-binding proteins can trigger strand displacement, implement molecular logic, and control CRISPR–Cas activity. I will then present proximity-based assays that convert antibody binding into a DNA signal, including a CRISPR–Cas13 immunoassay that detects therapeutic antibodies at femtomolar concentrations. Finally, I will show how enzyme activity can be used both as a signal for CRISPR-based sensing and as a means of controlling the transient assembly and disassembly of DNA polymers. These examples illustrate how molecular communication can be engineered for sensitive diagnostics and dynamic biomaterials.