

## 🎓 imec-WAVES PhD Forum – 26 March 2026 🎓

Last week at imec-WAVES (Ghent University), we hosted a PhD Forum featuring four inspiring talks from our researchers. Topics spanned neuromodulation (intended and unintended), spatial diversity and multiplexing in industrial Massive MIMO environments, magnetic shielding performance, and RF-EMF exposure assessment.

### 💡 Talks Highlights

#### ◆ Joaquín Gázquez Rodríguez

##### **Intended or unintended neuromodulation?**

Neuromodulation is the alteration of nerve activity through the targeted delivery of a stimulus, it plays a crucial role in both clinical and environmental contexts. Intended neuromodulation is a controlled therapeutic intervention, often involving medical devices or techniques such as focused ultrasound waves, used to manage neurological disorders or chronic conditions. Unintended neuromodulation, on the other hand, occurs when nerve activity is altered by external factors, such as environmental electromagnetic radiation, without the purpose of modulating neural function.

#### ◆ Yunqi Feng

##### **Spatial Diversity and Multiplexing Modeling based on Massive MIMO channel measurements in Industrial Environments**

Spatial diversity and multiplexing gains are core metrics for evaluating MIMO channel performance across different channel coding schemes. The study models the two gains for a 64x4 massive MIMO system at 5.89 GHz based on channel measurements in industrial environments under different propagation conditions, in which cross-polarized channels are shown to enhance both metrics by minimizing the spatial correlation in MIMO channels. Clear spatial diversity–multiplexing trade-off relationships under different propagation conditions are also quantified.

#### ◆ Jirka Verleysen

##### **Shielding Against the Earth's Magnetic Field: Experimental and Simulation-Based Evaluation of Material Performance**

This presentation explores the design and construction of a magnetically shielded room to shield against the Earth's magnetic field. The shielding performance of electrical steel and Mu-metal is evaluated through both, experimental measurements and simulation models, allowing to analyse their efficiency and underlying shielding mechanisms.

#### ◆ Robin Wydaeghe

##### **Geometric Dosimetry for RF-EMF exposure assessment**