TOR VERGATA
UNIVERSITÀ DEGLI STUDI DI ROMA

Dipartimento di Scienze e Tecnologie Chimiche

AVVISO DI SEMINARIO

Il giorno 31 Marzo alle ore 12.00

nell'aula Seminari

Il Prof. Wilfried Weber

INM – Leibniz Institute for New Materials, Saarbrücken, Germany

Saarland University, Department of Materials Science and Engineering, Saarbrücken, Germany

terrà un seminario dal titolo

"**Molecular Optogenetics**

Programming Cells and Biomaterials with Light"

Proponente: Prof. Francesco Ricci

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Molecular Optogenetics

Programming Cells and Biomaterials with Light

Wilfried Weber

INM – Leibniz Institute for New Materials, Saarbrücken, Germany

Saarland University, Department of Materials Science and Engineering, Saarbrücken, Germany

Molecular optogenetic technologies allow the control of cellular signaling processes along the whole signal transduction cascade with unmatched spatial and temporal resolution.

Based on an overview of molecular photoreceptors, we will present three aspects of our work: First, we will present extracellular optogenetic strategies to dynamically modulate biological and mechanical properties of the extracellular matrix. Here, we demonstrate that the functional coupling of photoreceptors to chemical polymers, biomolecules and surfaces allows the control of key features of matrix-cell interactions.

We further develop the concept of engineering intracellular liquid materials comprising synthetic or natural transcription factors to adjust transgene activity. We describe different approaches for the stimulus-inducible formation of liquid transcription factor condensates and demonstrate that these colocalize with target promoters and yield a several-fold increased transgene activity compared to the non-engineered transcription factor. We demonstrate that this concept can be applied to different transcription factors to increase target gene activity in cell culture and in mice.

Finally, we will present recent work on shape-morphing materials where we program mammalian and bacterial cells to induce autonomous, reversible shape morphing in engineered living materials.