

2023 International Solvay Chair in Chemistry

Inaugural Lecture



Professor Ehud Gazit (Tel-Aviv University, Israel)

From Molecule to Mosaic: Where Life's Puzzles Find Assembly

For over two decades, we have delved into the fundamental building blocks of nature, identifying the minutest biomolecular elements capable of forming ordered nano-scale structures. Adopting a minimalist approach, we've identified the essential modules that promote molecular self-assembly across proteins, peptides, metabolites, and lipids. With this systematic methodology, we've unraveled the mechanisms leading to the formation of cerebral amyloid nano-deposits in severe disorders including Alzheimer's and Parkinson's diseases. Our novel mechanistic understanding has culminated in the development of therapies now in advanced clinical trials. In the domain of nanobiotechnology, our research illuminates how basic biochemical modules can forge versatile nanostructures with unique properties encompassing optics, mechanics, piezoelectricity, and semiconductivity. We've deciphered and emulated nature's utilization of these physical and chemical principles in captivating phenomena, such as the night vision of nocturnal animals and chameleons' color-changing abilities. Our most recent exploration has broadened the amyloid narrative, unveiling that even individual metabolites can assemble into amyloid-like structures. This discovery has implications for important genetic disorders, including Phenylketonuria, diagnosed via a simple heel prick test in every newborn. Fascinatingly, our understanding of metabolite assembly in physiology and pathology is highly important for numerous age-related maladies allowing us to clarify previously unexplained epidemiological associations. Taken together, we chart the assembly protocols and rules of the biomolecular mosaic across physiology, pathology, and nanotechnology defining the intricate dance of assembly that shapes the vast and diverse biomolecular landscape.

TUESDAY 19 SEPTEMBER 2023 AT 4:00 PM

COFFEE AND TEA WILL BE SERVED AT 3:45 P.M AND DRINKS AT 5:00 P.M. IN FRONT OF THE SOLVAY ROOM

UNIVERSITÉ LIBRE DE BRUXELLES - CAMPUS PLAINE
BOULEVARD DE LA PLAINE - ACCESS 2 - 1050 BRUSSELS
QUARTIER JAUNE - BUILDING NO - 5TH FLOOR - SOLVAY ROOM

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The inaugural lecture will be followed by several lectures at the VUB:

Lecture 1 on Monday 25 September 2023 (4-6 pm)

Molecular Self-Assembly (I) Principles and Physiology

From molecular principles to biological optics: The role of self-assembly in night vision, chameleon camouflage and beyond. **Venue: VUB - building i.2.01**

Lecture 2 on Wednesday 27 September 2023 (1-3 pm)

Molecular Self-Assembly (II) Nanotechnology

From peptide semiconductors to steel-like rigidity: The role of self-assembly in designing biomolecular materials with unique physical properties. **Venue: VUB - building i.0.01**

Lecture 3 on Monday 2 October 2023 (4-6 pm)

Molecular Self-Assembly (III) Pathology

From age-related neurodegeneration to inborn metabolic disorders and back: The pathological implications of molecular self-assembly. **Venue: VUB - building i.2.01**

VUB – Campus Etterbeek



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