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Seminar Announcement

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Ben-Gurion University of the Negev, Israel

FULLERENE-LIKE ARCHITECTURE IN NANO-, MICRO- AND MACRO-WORLDS

September 20th, 2023

at 2:00 pm

Department of Chemistry – Aula Avogadro

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FULLERENE-LIKE ARCHITECTURE IN NANO-, MICRO- AND MACRO-WORLDS

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The discovery of C₆₀, a third variety of carbon, in addition to the more familiar diamond and graphite forms, has generated enormous interest in many areas of science. Furthermore, it turns out that C₆₀ is only the first of an entire class of closed-cage polyhedral molecules consisting of only carbon atoms - the fullerenes (C₂₀, C₂₄, C₂₆, ... C₆₀, ...C₇₀, ... C₁₀₀₀₀₀₀-carbon nanotubes). This talk presents the main mathematical principles for engineering fullerene-like structures (based on symmetry considerations and Euler relation between the numbers of faces, vertices, and edges in polyhedra). I will discuss how Nature, using fullerene-like structures, minimizes energy and matter resources in molecules, nanoclusters, viruses, and living organisms. Examples of the achievement of such goals in architecture are also presented. Discussion of scientific terms and concepts will be held in the context of the history of their discoveries. History of discoveries of fullerenes and carbon nanomaterials made at the end of the XX century will be punctuated by excursions into the depths of time - until the Renaissance, and even Antiquity.



Eugene A. Katz is a professor at the Ben-Gurion University of the Negev. He received his MSc degree (1982) in Semiconductor Materials Science and Ph. D. (1990) in solid state physics from the National University of Science and Technology “MISIS”, Moscow. His research interests include studies and development of a wide range of materials and devices for solar energy conversion such as organic and perovskite-based photovoltaics, concentrator solar cells operated at ultra-high solar concentration (up to 10,000 suns), as well as history of science. He has published 145 peer-reviewed papers on these topics (including those in *Nature Energy*, *Advanced Materials*, *Energy & Environmental Science*, etc.) as well as popular-scientific book and a number of articles on science history and fullerene-like structures in nanomaterials, living organisms, and architecture. Based on the latter activity he has developed and is

teaching an interdisciplinary course “Bridges between fine art and natural sciences: cases of fullerenes, polyhedra, symmetry”.

Prof. Katz was awarded the IAAM Medal (by the International Association of Advanced Materials) for outstanding research in the field of New Energy Materials & Technology.