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**ΟΜΙΛΗΤΗΣ:** **Dr. Θεοχάρης Σταματάτος**  
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**ΘΕΜΑ:** **New classes of molecular materials from the exclusive use of inorganic bridging ligands: A foundation to hybrid magnetic systems with implications in quantum technologies**

**ΤΟΠΟΣ:** Αίθουσα σεμιναρίων ITE/IECHM

**ΗΜΕΡΟΜΗΝΙΑ:** **Δευτέρα, 11 Νοεμβρίου 2019**

**ΩΡΑ:** **12:30**

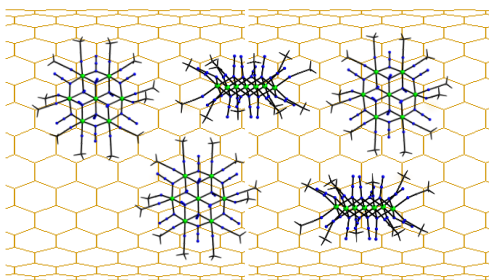
## ΠΕΡΙΛΗΨΗ

In this presentation, we shall highlight the feasibility of a new, recently developed approach towards the synthesis of polynuclear high-spin molecules and single-molecule magnets (SMMs), as well as the preparation of multidimensional (1-D and 2-D) coordination polymers with interesting motifs and magnetic properties. The key to the synthesis of such molecular compounds is the organic azide precursor,  $\text{Me}_3\text{SiN}_3$ , which fosters the formation of 3d-metal azido clusters and coordination polymers without requiring the assistance of any organic chelating/bridging group. All the isolated compounds contain metallic cores which are surrounded by end-on bridging  $\text{N}_3$ -groups. Consequently, the reported molecular materials exhibit ferromagnetic exchange interactions between the spin carriers, resulting in the stabilization of the maximum possible spin ground states. The additional presence of magnetic



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anisotropy, depending on the 3d-metal ion used, gives rise to SMM properties with interesting and rare features. In addition, we will discuss our first research endeavours towards the preparation of hybrid magnetic materials comprising of SMMs and functional substrates (i.e., graphene, carbon nanotubes, etc.), as a means of studying the interactions (covalent and non-covalent) and properties of molecular magnetic compounds with conductive nano-surfaces.



## Relevant references:

1. D. I. Alexandropoulos, K. R. Vignesh, Th. C. Stamatatos, K. R. Dunbar, "Rare "Janus"-Faced {FeII7} Single-Molecule Magnet Exhibiting Intramolecular Ferromagnetic Interactions", *Chemical Science*, 10, 1626, 2019.
2. Th. C. Stamatatos, E. Rentschler, "Organic Chelate-free and Azido-rich Metal Clusters and Coordination Polymers from the Use of Me<sub>3</sub>SiN<sub>3</sub>: A New Synthetic Route to Complexes with Beautiful Structures and Diverse Magnetic Properties", *Chemical Communications*, 55, 11, 2019.
3. J. Krause, D. I. Alexandropoulos, L. M. Carrella, E. Rentschler, Th. C. Stamatatos, "Increasing the Nuclearity and Spin Ground State in a New Family of Ferromagnetically-coupled {Ni<sub>10</sub>} Disk-like Complexes Bearing Exclusively End-on Bridging Azido Ligands", *Chemical Communications*, 54, 12499, 2018.
4. D. I. Alexandropoulos, L. Cunha-Silva, A. Escuer, Th. C. Stamatatos, "New classes of ferromagnetic materials with exclusively end-on azido bridges: From single-molecule magnets to 2D molecule-based magnets", *Chemistry - A European Journal*, 20, 13860, 2014.

## Βιογραφικό σημείωμα

**Dr. Theocharis C. Stamatatos**, was born in Patras on November 20<sup>th</sup>, 1980. He obtained his B.Sc. in Chemistry (in 2003) and his Ph.D. in Inorganic Chemistry (in 2006) from the University of Patras under the supervision of Prof. Spyros P. Perlepes. During his Ph.D., he took the opportunity to visit various research groups (U of Cyprus; Profs. A. J. Tasiopoulos and C. Patrickios, U of Manchester; Prof. R. E. P. Winpenny, U of Florida, USA; Prof. G. Christou) and work as a research exchange scholar, thus broadening his research horizons and gaining new knowledge and hands-on training from some of the world-leaders on the synthesis and characterization of nanoscale molecular magnetic materials.



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His early research accomplishments and contributions to the field of high-spin molecules and SMMs were acknowledged by the European molecular magnetism community through the “**ADocMolMag Award - An European Award on Molecular Magnetism Doctoral Thesis**” for one of the best Ph.D. theses in Molecular Magnetism and related fields. He then moved to the U of Florida as a postdoctoral fellow with Prof. G. Christou (2006-2008) to work on a variety of research projects, spanning the areas of molecular magnetism, bioinorganic chemistry and metallosupramolecular chemistry. His innovative and top-level work was recognized by the **American Chemical Society** in 2007 through the “**Young Investigator Award**” (provided by the Division of Inorganic Chemistry). After a 2-years return to Greece to work as temporary lecturer in Chemistry and Materials Science Departments of the U of Patras, Dr. Stamatatos accepted the offer from Brock U (Ontario, Canada) and he joined the Chemistry Department as a tenure-track Assistant Professor in July 2012. He was early promoted to the permanent position of Associate Professor in July 2016 as a result of his productivity and proficiency in both research (**160 published papers**, over **60 publications as a corresponding author**, including papers in *JACS*, *Chem. Sci.*, *Chem. Eur. J.*, *Chem. Commun.*, *Inorg. Chem.*, etc.) and teaching (i.e., excellent annual student evaluation reports for his lectured courses, and successful supervision of several undergraduate, M.Sc. and Ph.D. theses). Dr. Stamatatos is internationally recognized as a top-standing scientist in the field of molecular magnetic materials, as evidenced by the following three academic awards and distinctions: (i) **Chancellor’s Chair for Research Excellence**; offered by Brock U (2016-2018) to recognize the excellence of the scholarship of a faculty member who has made exceptional contributions in her/his field, (ii) **Ontario Early Researcher Award** (offered by the Ontario Ministry of Research and Innovation; 2015-2018), and (iii) **Humboldt Research Fellowship for Experienced Researchers** (awarded by the Alexander von Humboldt Foundation, Germany; 2015-2018). Very recently, Dr. Stamatatos took the decision to re-integrate to EU and accept the offer from the U of Patras (January 1<sup>st</sup>, 2019), where he is currently holding a permanent faculty position as an Associate Professor of Inorganic Chemistry. His work has been **hetero-cited over 4.400 times** affording an **h-index of 40**. He is a constant **reviewer of over 60 peer-reviewed journals**, as well as several **prestigious funding organizations**. He has also **secured external funding of over 0.5 M €** from several organizations (i.e., NSERC-DG, NSERC-RTI, CFI, Embassy of France in Canada, GSRT, etc.) for his research program in molecule-based magnetic materials. Further evidence of the impact of his work is reflected in a large number of **invited presentations and talks at international conferences and Universities**.