



### **Olivier Kahn International Award**

The European Institute of Molecular Magnetism, the Chairman and the members of the Olivier Kahn Award International Jury are pleased to announce that the laureate of the seventh Olivier Kahn International Award is Dr. Nicholas Chilton, Research Fellow at the Department of Chemistry of Manchester University, United Kingdom.

Olivier Kahn was a pioneer in molecular magnetism, a brilliant scientist and teacher, and deeply committed to the promotion of talented young scientists. The European Institute of Molecular Magnetism follows the tradition of the MAGMANet European Network of Excellence that created a prestigious award bearing his name, the Olivier Kahn International Award, to honour a young scientist who has received his/her Ph. D. within the last 10 years. The award, an “Olivier Kahn Medal”, designed by “La Monnaie de Paris”, is accompanied by a prize of 3 000 Euros, to help the laureate to develop his/her research and to participate in major international conferences.

The 2019 laureate, Dr. Nicholas Chilton, has made original contributions in the field of molecular nanomagnets to understand and then to enhance their memory effects. Among his major achievements, he provided a foundation for modelling the electronic structure of paramagnetic complexes, toward a rigorous understanding of factors governing magnetic anisotropy and slow magnetic relaxation of single molecule magnets (SMM), which led to the discovery of a dysprosocenium complex that exhibits a magnetic blocking temperature of greater than 50 K—much higher than had been observed previously for a SMM, approaching the so-called “liquid nitrogen ceiling”, when applications become feasible.



The laureate is now working in the School of Chemistry of the University of Manchester as a Presidential Fellow, after a PhD thesis in the same University, a Bachelor of Sciences with Honours and a Master Degree at the School of Chemistry, Monash University, Melbourne, Australia. He leads his own research group, with many collaborations in Manchester and worldwide.

The jury was impressed by the extensive knowledge of the laureate in quantum chemistry, in Electron Paramagnetic Resonance, in optical spectroscopies and in the synthetic chemistry of lanthanoids compounds. Dr. Chilton's expertise in quantum and computational chemistry, in tandem with his broad experience in synthetic coordination chemistry, led him to a key personal contribution in the early stages of his career with the creation of a simple theoretical model that describes the electronic structure of lanthanoids complexes on electrostatic grounds and allows to predict magnetic anisotropy and magnetic relaxation dynamics and then by co-authoring the program PHI, a userfriendly and versatile freely accessible software to simulate and fit the magnetic properties of molecules, now widely used.

The laureate expanded and refined in an original way existing models for spin-lattice relaxation, a venerable area of theoretical research, by emphasizing the importance of properly accounting for the nature and coupling of vibrational modes involved in the relaxation process of single molecule magnets (SMM). His work inspired new design strategies, appropriate geometry and symmetry for the targeted compounds. An astounding outcome was the preparation of new lanthanoid complexes with exceptionally high operating temperatures. This impressive breakthrough has captivated the entire molecular magnetism community, changed the course of research in the field, fuelled further research and had a strong impact on the community.

The results and the endeavours of the laureate (design of high-temperature SMMs, role of spin-phonon coupling and magnetic exchange in the relaxation dynamics of lanthanoid-based SMMs), lie at the forefront of current research in molecular magnetism. New discoveries to solve fundamental questions concerning the chemistry of actinides, to design new magnetic resonance imaging contrast reagents and to develop accordingly useful user-friendly *ab initio* codes can be expected in a near future.

Presenting the social importance of his work, Nicholas Chilton writes:

*«Today's society expects faster, more energy efficient devices in smaller packages, year-on-year. As manufacturing processes shrink to the nanoscale, the ultimate limit for miniaturisation is the use of single molecules, up to 100,000 times smaller than the diameter of a human hair, in devices for information processing. Molecules are ideally suited for this purpose because they are cheap, highly reproducible, and can be tuned with chemistry.»*

The international jury delivering the Award selected the laureate among young outstanding scientists having contributed actively to the development of molecular magnetism in Europe and having provided the international community with remarkable scientific results. The members of the jury were deeply impressed by the very high standard of the candidates. They wish to the laureate and to the candidates, full success in the development of their remarkable but challenging projects.

The Award will be presented on the occasion of the European Conference on Molecular Magnetism, ECMM 2019, to be held in Firenze, Italy on September 15-18. The laureate will present an invited lecture on this occasion, on the afternoon of September 15<sup>th</sup>.

The European Institute of Molecular Magnetism (EIMM)

Dante Gatteschi, President, Emeritus Professor, Università degli Studi di Firenze, Florence, Italy

The members of the Olivier Kahn International Jury

Guihéry Nathalie, Professor, University of Toulouse 3, France

Cornia Andrea, Professor, University of Modena, Italy

Luis Vitalla Fernando, CSIC Researcher, Instituto de Ciencia de Materiales de Aragon, Spain

Timco Grigore, Research Fellow, School of Chemistry, University of Manchester, United Kingdom

Van Slageren Joris, Professor, University of Stuttgart, Germany.

Firenze, July 1<sup>st</sup>, 2019

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