Biography

Professor Hideo Ohno, currently President of Tohoku University, received B. S., M. S. and Ph.D. from the University of Tokyo in 1977, 1979, and 1982, respectively. He reported first InAlAs/InGaAs FET when he was a visiting graduate student at Cornell University in 1980. He synthesized a magnetic version of the III-V compound, (In,Mn)As, during his stay at the IBM T. J. Watson Research Center as a visiting scientist from 1988 to 1990. Since he joined Tohoku University in 1994 as a professor, he synthesized and studied magnetic and transport properties of (Ga,Mn)As, a prototypical ferromagnetic semiconductor. He demonstrated the electric-field control of ferromagnetism in (In,Mn)As, the first manipulation of ferromagnetic phase transition by external means, which he later extended to metallic systems to investigate electric-field manipulation of magnetic anisotropy, switching, and magnetic damping. He developed the current *de facto* standard perpendicular CoFeB/MgO magnetic tunnel junction (MTJ) and showed the scaling of those MTJs down below 3 nm. Using this CoFeB/MgO MTJ, he played a leading role in prototyping MTJ-CMOS integration on 300 mm wafers, which led to VLSIs with two-orders-of-magnitude reduction of power consumption compared to those without MTJs. He has published over 600 papers in the fields of spintronics and semiconductor science and technology with citations exceeding 56,000 (h-index 92). He has led the Funding Program for World-leading Innovative R&D on Science and Technology (FIRST), “Research and Development of Ultra-low Power Spintronics-based VLSIs” from 2010 to 2014. Prof Ohno received many international distinctions; the IBM Japan Science Award (1998), the IUPAP Magnetism Prize (2003), the Japan Academy Prize (2005), the 2005 Agilent Technologies Europhysics Prize (2005), the IEEE Magnetics Society Distinguished Lecturer for 2009 (2008), the Thomson Reuters Citation Laureate (2011), the JSAP Outstanding Achievement Award (2012), the IEEE David Sarnoff Award (2012), the JSAP Compound Semiconductor Electronics Achievement Award (2015), the Leo Esaki Prize (2016), the C&C Prize (2016), the MEXT Commendation for Science and Technology (2017), the ISCS Welker Award (2019), and the IEEE Magnetics Society’s Achievement Award (2021). He is a fellow of the Institute of Physics (IOP), the Japan Society of Applied Physics (JSAP), the American Physical Society (APS), and the Institute of Electrical and Electronics Engineers (IEEE).

Factuel: What are your relations with the University of Lorraine and in particular the lab concerned?

My first time in Nancy was in 2006; I was invited by Professor Stephane Mangin to give a talk at the International Workshop on Spin Transfer. Since then I have visited Nancy more or less regularly on occasions like workshops on spintronics and World Materials Forum, an annual gathering in Nancy. Because Stephane's team and mine are working on spintronics but have complementary skill sets, we naturally started collaborating, first by sending samples and later by exchanging students and postdocs. After becoming president of Tohoku University, I realized that Lorraine and Tohoku are collaborating on many other fronts. Given the wonderful record of collaboration, President Mutzenhardt and I together with colleagues from both sides almost instantly agreed to fund several joint teams to further enhance and enrich the ties between the two universities. My former Ph.D. student is now working in Stephane's group and we are expecting students from his group to visit Tohoku for some time very soon.

Factuel: What does the title of Doctor Honoris Causa of the University of Lorraine mean to you?

This title of Doctor Honoris Causa of the University of Lorraine is a huge honor to me. It also comes with the responsibility of further enriching the specific research field I am working in together with colleagues from Lorraine, strengthening the tie between the two universities and the two countries, France and Japan, and ultimately working for a better world, which is desperately in need today.

Factuel: What are your research projects and in particular those that you are developing with the laboratory concerned?

In our world of spintronics, we plan to pursue various means of magnetization reversal in nanoscale magnetic structures, which constitutes a building block of future low-power information processing.