

Opportunities in Nanobiomagnetism and Healthcare Monitoring

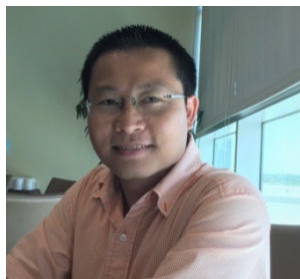
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Materials science is considered the backbone of modern technologies. Materials are key components in many electronic devices, whose applications range from electric transformers to computer hard-disk drives, mobile phones, sensors, motors, generators, refrigerators, medical devices, and home appliances. Nanomaterials with superparamagnetic properties are promising candidates for biomedical applications ranging from hyperthermia therapy to targeted drug delivery, magnetic resonance imaging, and biodetection. In this lecture, I will discuss emerging opportunities and technical challenges in this interdisciplinary research field, as well as propose new strategies to overcome the challenges. I will also highlight our recent development of a novel, non-invasive, and contactless magnetic sensing platform for real-time tracking and diagnosis of COVID-19 and other respiratory-associated diseases by harnessing magnetism and machine learning. Our technology can be deployed in healthcare facilities and community settings for onsite and remote patient monitoring, which has the potential to improve the overall healthcare system and facilitate more effective public health measures to curb the spread of COVID-19 and its variants.

Biography:



Dr. Manh-Huong Phan is a Full Professor of Physics at the University of South Florida. He received a Ph.D. degree from Bristol University in 2006, a M.S. degree from Chungbuk National University in 2003, and a B.S. degree from Vietnam National University – Hanoi in 2000. He is a world-leading expert in the development of advanced magnetocaloric and magnetoimpedance materials for energy-efficient magnetic refrigeration and smart sensor technologies, respectively. Recently, his group discovered light-tunable room-temperature ferromagnetism in atomically thin van der Waals materials that have the potential to transform the fields of spintronics, opto-spin-caloritronics, valleytronics, and quantum computation. He has published more than 350 peer-reviewed ISI journal papers (over 15,000 citations, h-index: 61 from [Google Scholar](#)), 10 review papers, 8 book chapters, and 1 textbook. He is Managing Editor & Founding Member of the Journal of Science: Advanced Materials and Devices (IF = 8.0), the Editor for Applied Sciences (IF = 2.838), and the Editorial Board Member of Scientific Reports (IF = 4.379). He was awarded an Honorary Doctorate Degree by Vietnam National University - Hanoi (2021), the recipient of The USF Outstanding Faculty Research Achievement Awards (2017, 2019, 2021), the recipient of The USF Outstanding Graduate Faculty Mentor Award (2018, HM), and the recipient of The Honorary Medal by Vietnam National University - Hanoi (2018). He has been featured in the list of the World's Top 2 Percent Scientists (2019, 2020, 2021, 2022). He has delivered plenary, keynote and invited talks at professional meetings on Magnetism and Magnetic Materials (MMM, ICM, APS, MRS, INTERMAG, TMS, etc.) and organized numerous international conferences on Magnetism, Nanomaterials, and Nanotechnology.