**SYMPOSIUM ED12**

Quantum Sensing, Metrology and Devices  
April 18 - April 21, 2017

**Symposium Organizers**  
David Awschalom, University of Chicago  
Fedor Jelezko, University Ulm  
Milos Nesladek, IMEC vzw.  
Dmitry Budlker, Johannes Gutenberg University

**Proceedings Statement**  
All authors are invited to submit articles based on their 2017 MRS Spring Meeting presentations to the journals in the MRS portfolio (www.mrs.org/publications-news). Papers submitted and accepted for publication in MRS Advances (www.mrs.org/mrs-advances) will be available as symposium collections. Visit the MRS/Cambridge University Press Publications Booth #100 in the Exhibit Hall to learn more, including MRS Advances print options available at special rates during the meeting week only.

* Invited Paper

**SESSION ED12.1/ED1.1: Joint Session I: Solid-State Quantum Matter I**  
Session Chair: Joerg Wrachtrup  
Tuesday Morning, April 18, 2017  
PCC North, 100 Level, Room 132 A

10:30 AM **ED12.1.01/ED1.1.01**  
Creating Quantum Technologies with Spins in Semiconductors David Awschalom, University of Chicago, United States.

11:00 AM **ED12.1.02/ED1.1.02**  
Single Photon Emitters—Diamond and Beyond Igor Aharonovich, University of Technology Sydney, Australia.

11:30 AM **ED12.1.03/ED1.1.03**  
Single Photon Sources in Silicon Carbide Brett Johnson, University of Melbourne, Australia.

**SESSION ED12.2/ED1.2: Joint Session II: Advanced Spin Control for Quantum Technology**  
Session Chair: Vladimir Dyakonov  
Tuesday Afternoon, April 18, 2017  
PCC North, 100 Level, Room 132 A

1:30 PM **ED12.2.01/ED1.2.01**  
Color Centers Coupled to Nanobeam Cavities in 4H Silicon Carbide—Beyond “Simple” Resonant Enhancement Evelyn L. Hu, Harvard University, United States.

2:00 PM **ED12.2.02/ED1.2.02**  
Theory of Dynamic Nuclear Polarization through Hybrid Registers in Diamond and SiC Viktor Ivady 1,2; 1Linköping University, Sweden; 2Wigner Research Centre for Physics, Hungary.

2:30 PM **ED12.2.03/ED1.2.03**  
Silicon Vacancies in Silicon Carbide as a Novel Quantum System Sang-Yun Lee 1,2; 1University of Stuttgart and Stuttgart Research Center of Photonic Engineering (SCoPE) and IQST, Germany; 2Korea Institute of Science and Technology, Korea (the Republic of).

3:00 PM BREAK

**SESSION ED12.3/ED1.3: Joint Session III: Spintronics and Optomechanics**  
Session Chairs: Brett Johnson and Ren-Bao Liu  
Tuesday Afternoon, April 18, 2017  
PCC North, 100 Level, Room 132 A

3:30 PM **ED12.3.01/ED1.3.01**  
Nanomechanical Sensing Using Spins in Diamond Marcus W. Doherty, Australian National University, Australia.

4:00 PM **ED12.3.02/ED1.3.02**  
Nuclear Spintronics in Silicon Carbide Abram Falk 1,2; 1IBM T.J. Watson Research Center, United States; 2University of Chicago, United States.

4:30 PM **ED12.3.03/ED1.3.03**  
Tunneling-Mediated Charge Transfer between Nitrogen-Vacancy Centers and Nitrogen Impurities in Type-1b Diamond Carlos A. Mériles, City College of New York, United States.

**SESSION ED12.4/ED1.4: Joint Session IV: Solid-State Quantum Matter II**  
Session Chair: Evelyn Hu  
Wednesday Morning, April 19, 2017  
PCC North, 100 Level, Room 132 A

8:00 AM **ED12.4.01/ED1.4.01**  
Engineering Single-Photon Sources in Hexagonal Boron Nitride Lee Bassett, University of Pennsylvania, United States.

8:30 AM **ED12.4.02/ED1.4.02**  
Engineering of Highly Coherent Spin Defects in Silicon Carbide Vladimir Dyakonov, University of Wuerzburg, Germany.

9:00 AM **ED12.4.03/ED1.4.03**  
Spins in Silicon Carbide for Quantum Technologies Paul V. Klimov, University of Chicago, United States.

9:30 AM **ED12.4.04/ED1.4.04**  

10:00 AM BREAK

**SESSION ED12.5/ED1.5: Joint Session V: Advanced Spin Control for Sensing**  
Session Chair: Martin Plenio  
Wednesday Morning, April 19, 2017  
PCC North, 100 Level, Room 132 A

10:30 AM **ED12.5.01/ED1.5.01**  
Advanced Spin Control for Enhanced Sensing Using NV Centers in Diamond Nir Bar-Gill, Hebrew University, Israel.

11:00 AM **ED12.5.02/ED1.5.02**  
Novel Sensing Schemes for Frequency Tracking and Resolution Alex Brezger, Racah Institute of Physics, Israel.

11:30 AM **ED12.5.03/ED1.5.03**  
Nitrogen-Vacancy Diamond Sensor—Novel Diamond Surfaces and Interaction with Spins Adam Gal1,2,1Hungarian Academy of Sciences, Hungary; 2Budapest University of Technology and Economics, Hungary.

**SESSION ED12.6/ED1.6: Joint Session VI: Sensing of Single Spins**  
Session Chairs: Patrick Maletinsky and Jean-Francois Roch  
Wednesday Afternoon, April 19, 2017  
PCC North, 100 Level, Room 132 A

1:30 PM **ED12.6.01/ED1.6.01**  
Sensing Single Molecular Spins Joerg Wrachtrup 1,2; 1University of Stuttgart, Germany; 2Institute for Quantum Science and Technology, IQST, Germany.
**SESSION ED12.7: Poster Session**

**ED12.7.01**  
A Silicon Carbide Based Quantum Vector Magnetometer **Matthias Niethammer**, University of Stuttgart, Germany.

**ED12.7.02**  
Comparisons and Common Ground in Flying Qubits **Kan Xie**, Michigan State University, United States.

**ED12.7.03**  
Photoelectric Nitrogen-Vacancy Electron Spin Magnetometry **Michal Gulka**; 1, 2; 'Czech Technical University in Prague, Czech Republic; 'Czech Academy of Sciences, Czech Republic, 'Hasselt University, Belgium.

**ED12.7.04**  
Ultra-Sensitive Probing of the Local Electronic Structure Based on State-of-the-Art Transition-Edge Sensor (TES) Technology and Soft X-Ray Spectroscopy **Sang Jun Lee**;1, 2; 1SLAC, United States; 2Stanford University, United States.

**SESSION ED12.8/ED1.8: Joint Session VII: Qubit Arrays and Spin Device Principles**

**SESSION ED12.9: Technology and Techniques for Sensing and Imaging**

**SESSION ED12.10: Nanoscale NMR Imaging**

**SESSION ED12.11: Spin Magnetometry Imaging and Spectroscopy I**

**SESSION ED12.12: Quantum Information and Quantum Sensing Device Applications**

**SESSION ED12.13: Spin Magnetometry Imaging and Spectroscopy II**

**SESSION ED12.14: Nanoscale NMR Imaging**

**SESSION ED12.15: Spin Magnetometry Imaging and Spectroscopy III**
SESSION ED12.12: Nanodiamonds for Quantum Technology and Sensing
Session Chair: Liam McGuinness
Friday Morning, April 21, 2017
PCC North, 100 Level, Room 132 A

8:00 AM *ED12.12.01
Imaging Magnetism at the Nanoscale with a Single Spin Microscope Waseem Akhtar; Université de Montpellier and CNRS, France.

8:30 AM *ED12.12.02
On Approaches to Mass Production of Nanodiamonds with Nitrogen-Vacancy Color Centers Petr Cigler; IOCB AS CR VV, Czech Republic.

9:00 AM *ED12.12.03
Intraneuronal Transport Abnormalities Revealed by Fluorescent Nanodiamonds Tracking François Trussart1, 2, 3; 1Ecole Normale Supérieure Paris-Saclay, France; 2CNRS, France; 3Université Paris Sud, France.

9:30 AM ED12.12.04
Nanodiamond-Hydrogel-Magnetic Nanoparticle Sensors Tina Zhang; The Chinese University of Hong Kong, Hong Kong.

9:45 AM ED12.12.05
Developments in Nanodiamond Particle Functionalization for Enabling Advancements in Conjugation to Surfaces and Sensing Zachary Kennedy; Pacific Northwest National Lab, United States.

10:00 AM BREAK

10:30 AM *ED12.12.06
Hybrid Nano-Sensors Composed of a Nanodiamond and a Magnetic Nanoparticle Ren-Bao Liu1, 2, 3; 1The Chinese University of Hong Kong, China; 2The Chinese University of Hong Kong, China; 3The Chinese University of Hong Kong Shenzhen Research Institute, China.

11:00 AM *ED12.12.07
Hyperpolarised MR Imaging via Diamond Technologies Martin B. Plenio; Ulm University, Germany.

11:30 AM ED12.12.08
Criticality-Enhanced Hybrid Nanodiamond-Thermometer Ning Wang; The Chinese University of Hong Kong, China.

11:45 AM ED12.12.09
Correlating Transmission Electron Microscopy and Nanomagnetometry Xi Feng; The Chinese University of Hong Kong, Hong Kong.

SESSION ED12.13: Spin Magnetometry Imaging and Spectroscopy II
Session Chair: Jean-Philippe Tetienne
Friday Afternoon, April 21, 2017
PCC North, 100 Level, Room 132 A

1:30 PM ED12.13.01
Microwave-Free Nanoscale Magnetic Resonance Spectroscopy with the NV Center James Wood1, 2; 1Universitat Basel, Switzerland; 2University of Melbourne, Australia.

1:45 PM ED12.13.02
Direct Measurement of Topological Numbers with Spins in Diamond Fei Kong1, 2; 1University of Science and Technology of China, China; 2University of Science and Technology of China, China.

2:00 PM ED12.13.03
Electron Spin Resonance Imaging with Nitrogen Vacancy Centres in Diamond David A. Simpson1, 2; 1University of Melbourne, Australia; 2University of Melbourne, Australia.

2:15 PM ED12.13.04
High Spatial Resolution Optical Far-Field Microscopy for Local Field Sensing with Nitrogen Vacancy Center Fang-Wen Sun; University of Science and Technology of China, China.

2:30 PM ED12.13.05
Optically Narrowing of Nitrogen-Vacancy Center Spin Ensembles in Nanodiamonds Gang-Qin Liu; Department of Physics, The Chinese University of Hong Kong, China.