

Curriculum Vitae - Demitry Farfurnik

Education

- 2019-present : Post-Doctoral Associate, University of Maryland
The Prof. Edo Waks Quantum Photonics Lab
CMNS-Inst for Research in Electronics & Applied Physics
- 2013-2019 : PhD. in Physics, The Hebrew University of Jerusalem
Under the supervision of Prof. Nir Bar-Gill
Thesis Topic: "Controlling the Quantum Dynamics of Nitrogen-Vacancy Centers in Diamond"
- 2011-2013 : Msc. in Physics, Tel-Aviv University
Under the supervision of Prof. Shimson Bar-Ad and Prof. Lev Vaidman
Thesis Topic: "Weak Value Analysis of an Optical Mach-Zehnder Interferometer", with distinction
- 2005-2008 : Bsc. in Physics and Mathematics, Tel-Aviv University

Professional Experience

- 2015-present : Referee for APS (PRL, PRApplied, PRA, PRB), AIP (APL Photonics) and ACS (ACS Photonics) journals
- 2018-2019 : Academic Supervisor, the Youth Center for Advanced Studies, The Hebrew University of Jerusalem
- 2013-2018 : Teaching Assistant, The Hebrew University of Jerusalem
- 2011-2013 : Teaching Assistant, Tel-Aviv University
- 2008-2011 : Army Service at the Israeli Ministry of Defense, Technological R&D
- 2007-2008 : Teaching Assistant, Tel-Aviv University
- 2008 : Research Assistant, the Particle Physics Department, Tel-Aviv University

Honors and Awards:

- 2019-present : The Israel Council for Higher Education Quantum Technology Postdoctoral Fellowship
- 2019-2020 : The Israel-US Fulbright Postdoctoral Fellowship
- 2019 : The Dimitris N. Chorafas Excellence Award for Applied Research
- 2018 : The Lipper Excellence Award for Innovative Engineering
- 2018 : The Racah Award for Excellent PhD research
- 2018 : The HUJI Nanoscience Award for Excellent PhD research
- 2013-2018 : The CAMBR Fellowship for Nanoscience and Nanotechnology
- 2017 : The Optical Society of America Chapter Travel Grant
- 2014 : The Rahamimoff BSF Travel Grant for Young Scientists

Publications

1. **D. Farfurnik**, R. M. Pettit, Z. Luo and E. Waks, "Single-shot readout of a solid-state spin in a decoherence-free subspace", [arXiv:2010.12140](https://arxiv.org/abs/2010.12140) (submitted)
2. **D. Farfurnik** and N. Bar-Gill, "Characterizing spin-bath parameters of solid-state spins using time-asymmetric Hahn-Echo sequences", [Phys. Rev. B 101, 104306 \(2020\)](https://doi.org/10.1103/PhysRevB.101.104306)
3. K. I. O. Ben `Attar, **D. Farfurnik** and N. Bar-Gill, "Hamiltonian Engineering of general two-body spin-1/2 interactions", [Phys. Rev. Research 2, 013061 \(2020\)](https://doi.org/10.1103/PhysRevResearch.2.013061)
4. J. Dziewior, L. Knips, **D. Farfurnik** et al., "Universality of local interactions and its application for interferometric alignment", [PNAS. 116 \(8\), 2881-2890 \(2019\)](https://doi.org/10.1073/pnas.116.8.2881)

5. **D. Farfurnik**, Y. Horowicz and N. Bar-Gill, "Identifying and decoupling many-body interactions in spin ensembles in diamond", [*Phys. Rev. A* **98**, 033409 \(2018\)](#)
6. N. Alfasi, S. Masis, R. Winik, **D. Farfurnik** et al., "Exploring the nonlinear regime of light-matter interaction using electronic spins in diamond", [*Phys. Rev. A* **97**, 063808 \(2018\)](#)
7. **D. Farfurnik**, A. Jarmola, D. Budker and N. Bar-Gill, "Spin ensemble-based AC magnetometry using concatenated dynamical decoupling at low temperatures", [*J. Opt.* **20** 024008 \(2018\)](#)
Published as an 'emerging leaders' issue
8. E. Farchi, Y. Ebert, **D. Farfurnik** et al., "Quantitative Vectorial Magnetic Imaging of Multi-Domain Rock Forming Minerals Using Nitrogen-Vacancy Centers in Diamond", [*SPIN* **07**, 1740015 \(2017\)](#)
9. **D. Farfurnik** et al., "Enhanced concentrations of nitrogen-vacancy centers in diamond through TEM irradiation", [*Appl. Phys. Lett.* **111**, 123101 \(2017\)](#), **Followed by a [press release](#)**
10. **D. Farfurnik** et al., "Experimental realization of time-dependent phase-modulated continuous dynamical decoupling", [*Phys. Rev. A* **96**, 013850 \(2017\)](#)
11. **D. Farfurnik** et al., "Optimizing a dynamical decoupling protocol for solid state electronic spin ensembles in diamond", [*Phys. Rev. B* **92**, 060301\(R\) \(2015\)](#)
12. A. Danan, **D. Farfurnik**, S. Bar-Ad and L. Vaidman., commentary: "asking photons where they have been – without telling them what to say", [*Front. Phys.* **3**, 48 \(2015\)](#)
13. A. Danan, **D. Farfurnik**, S. Bar-Ad and L. Vaidman., "Asking photons where they have been", [*Phys. Rev. Lett.* **111**, 240402 \(2013\)](#) , **PRL recommendation & [Physics Viewpoint](#)**

Scientific Talks

Oct. 2020: Physics Colloquium, Queens College of the City University of New York, New York, USA **(invited)**

Title: "Spin control of Quantum Dots toward quantum photonic applications"

Oct. 2020: JILA Condensed Matter Seminar, University of Colorado, Boulder, USA **(invited)**

Title: "Arbitrary, sequenced spin control of self-assembled Quantum Dots"

Sep. 2020: Frontiers in Optics conference, Washington DC, USA (contributed)

Title: "Arbitrary sequenced spin control of a Quantum Dot strongly coupled to a photonic crystal cavity"

July 2020: Joint Condensed Matter Seminar, University of Connecticut, Storrs, USA, and Nordita, Nordic Institute for Theoretical Physics, Stockholm, Sweden **(invited)**

Title: "Enhancing the coherence properties of quantum dots toward quantum photonic applications"

Aug. 2019: Joint Quantum Institute Seminar, University of Maryland, College Park, USA **(invited)**

Title: "Spin Dynamics, Depolarization, Decoherence and Dynamical Decoupling"

Apr. 2019: Quantum Information and Measurement Conference, Rome, Italy (contributed)

Title: "Spin ensembles in diamond for sensing and many-body Physics"

Mar. 2019: Optics Seminar, Bar-Ilan University, Ramat Gan, Israel **(invited)**

Title: "Spin ensembles in diamond for sensing and many-body Physics"

Mar. 2019: Atomic, Molecular and Optical Physics Seminar, Weizmann Institute of Science, Rehovot, Israel **(invited)**

Title: "Spin ensembles in diamond for sensing and many-body Physics"

Feb. 2019: Quantum Optics Seminar, Ben Gurion University of the Negev, Beersheba, Israel **(invited)**

Title: "Spin ensembles in diamond for sensing and many-body Physics"

Jan. 2019: JILA Public Seminar, University of Colorado, Boulder, USA **(invited)**

Title: "Pursuing many-body dynamics in spin ensembles in diamond"

Jan. 2019: Institute for Molecular Engineering Seminar, University of Chicago, Chicago, USA **(invited)**

Title: "Pursuing many-body dynamics in spin ensembles in diamond"

Jan. 2019: Joint Quantum Institute Seminar, University of Maryland, College Park, USA **(invited)**

Title: "Pursuing many-body dynamics in spin ensembles in diamond"

Oct. 2018: Taiwan-Israel workshop on spin manipulation and measurement in thin layer materials, The Hebrew University of Jerusalem, Jerusalem, Israel **(invited)**

Title: "Spin Ensembles in Diamond for Sensing and Many-Body Physics"

July 2018: The Quantum Engineering Technology Labs seminar, University of Bristol, Bristol, United Kingdom **(invited)**

Title: "Pursuing many-body dynamics in spin ensembles in diamond"

July 2018: The Quantum Information Science and Quantum Computation group seminar, University of Vienna, Vienna, Austria **(invited)**

Title: "Pursuing many-body dynamics in spin ensembles in diamond"

June 2018: The Institute for Quantum Optics Seminar, Ulm University, Ulm, Germany **(invited)**

Title: "Pursuing many-body dynamics in spin ensembles in diamond"

June 2018: Physikalisches Institut seminar, University of Stuttgart, Stuttgart, Germany **(invited)**

Title: "Pursuing many-body dynamics in spin ensembles in diamond"

May 2018: The Center of Quantum Information Science & Technology conference, Ben Gurion University of the Negev, Beersheba, Israel (contributed)

Title: "Spin ensembles in diamond for sensing and many-body physics"

Apr. 2018: The HUJI Racah Institute Colloquium, Jerusalem, Israel **(invited)**

Title: "Pursuing many-body dynamics in spin ensembles in diamond"

Apr. 2018: QDiamond 2018 – international workshop on quantum information using NV centers in Diamond, Tel-Aviv, Israel (contributed)

Title: "Identifying and decoupling many-body interactions of NV ensembles"

Mar. 2018: The HUJI Nano annual Conference, Dead Sea, Israel **(invited)**

Title: "Spin ensembles in diamond for sensing and many-body physics"

Dec. 2017: The Israel physical society annual meeting, Technion – Israel Institute of Technology, Haifa, Israel (contributed)

Title: "Identifying and decoupling many-body interactions in spin ensembles in diamond"

Sep. 2017: The Walsworth group seminar, Harvard University, Cambridge, Massachusetts, USA **(invited)**

Title: "Pursuing many-body dynamics in medium-density spin ensembles in diamond"

Sep. 2017: MIT-Harvard Center for Ultracold Atoms special seminar, Massachusetts Institute of Technology, Cambridge, Massachusetts, USA **(invited)**

Title: "Pursuing many-body dynamics in medium-density spin ensembles in diamond"

Feb. 2017: OASIS6 conference on Optics and Electro-Optics, Tel-Aviv, Israel (contributed)

Title: "Enhanced nitrogen-vacancy concentration in diamond through optimized electron irradiation"

Dec. 2016: The Israel physical society annual meeting, Tel-Aviv University, Tel-Aviv, Israel (contributed)

Title: "Enhanced nitrogen-vacancy concentration in diamond through optimized electron irradiation"

May 2016: DIADEMS summer school, diamonds and spins, Cargese, Corsica, France (contributed)

Title: "Improving the coherence properties of solid-state spin ensembles via optimized dynamical decoupling"

Apr. 2016: "SPIE Photonics Europe Conference", Quantum Technologies conference, Brussels, Belgium (contributed)

Title: "Improving the coherence properties of solid-state spin ensembles via optimized dynamical decoupling"

Dec. 2015: The Israel physical society annual meeting, Bar Ilan University, Ramat Gan, Israel (contributed)

Title: "Enhanced coherence properties and solid-state spin ensemble magnetometry using optimized dynamical decoupling"

June 2015: Condensed matter seminar, Nordita, Nordic Institute for Theoretical Physics, Stockholm, Sweden (**invited**)

Title: "Improving the Coherence Time of Electronic Spin Ensembles in Diamond"

May 2015: Condensed matter seminar, Tel-Aviv University, Tel-Aviv, Israel (**invited**)

Title: "Increasing the coherence time of electronic spins in diamond – toward improved magnetic sensing and quantum information"

Feb. 2015: Modern Electron Spin Resonance symposium, the Schulich Faculty of Chemistry, Technion – Israel Institute of Technology, Haifa, Israel (contributed)

Title: "Optimizing a Dynamical Decoupling Protocol for Nitrogen-Vacancy Center Ensembles"

Dec. 2013: Optical Society of America Nanophotonics and Optics Seminar, Hebrew University of Jerusalem, Jerusalem, Israel (**invited**)

Title: "Using weak measurements to improve interference contrast and investigate photon trajectories"