

Danila A. Barskiy, PhD

Sofja Kovalevskaja Research Group Leader, Helmholtz-Institut Mainz, Johannes Gutenberg-Universität Mainz

Contact Information

Address: Staudingerweg 18, 55128 Mainz
Helmholtz-Institut Mainz and Johannes Gutenberg-Universität Mainz (Germany)

Phone: +49(0)6131-39 29 631
E-mail: dbarskiy@uni-mainz.de
Website: danilabarskiy.com, [Google Scholar](#)

Research Interests

Hyperpolarization techniques for enhanced nuclear magnetic resonance (NMR) spectroscopy and imaging (MRI); zero- and ultralow-field (ZULF) NMR and MRI; long-lived nuclear spin states; development of portable analytical devices for chemical, materials, and biomedical applications; understanding the interplay between nuclear spin dynamics and chemical kinetics.

Education

2012 – 2015	PhD, Physical Chemistry, Novosibirsk State University (NSU) , Russia
2010 – 2012	Department of Catalysis and Adsorption, Boreskov Institute of Catalysis , Russia
2007 – 2012	Specialist in Chemistry (equivalent to B.S. plus M.S. degree) <i>summa cum laude</i> , Faculty of Natural Sciences (Chemistry Department), NSU, Russia

Research Experience

Oct 2020 – present	Sofja Kovalevskaja Research Group Leader, Helmholtz-Institut Mainz Johannes Gutenberg-Universität Mainz, Germany
Apr 2017 – Sep 2020	Postdoctoral Associate, University of California – Berkeley , USA Advisor: Alexander Pines , Glenn Seaborg Professor of Chemistry
Oct 2015 – Mar 2017	Postdoctoral Fellow, Vanderbilt University Institute of Imaging Science , USA Advisor: Eduard Chekmenev , Associate Professor
Sep 2010 – May 2015	Graduate Student Researcher, International Tomography Center , Russia Advisors: Dr. Kirill Kovtunov , Professor Igor Koptyug <i>Thesis title:</i> Parahydrogen-based nuclear spin hyperpolarization and its application in NMR spectroscopy and imaging (in Russian)
Winter 2015	Internship at the Haldor Topsoe catalysis company, Kongens Lyngby, Denmark Visited the R&D laboratories, worked on equipment, was introduced to the industrial catalysis research workflow
Summer 2013	Visiting scientist at Vanderbilt University , USA
2010–2012	<i>Specialist thesis:</i> Investigation of mechanisms of heterogeneous hydrogenation of 1,3-butadiene and 1-butyne over supported metal catalysts (In Russian)
2007–2010	Undergraduate Student Researcher: Institute of Inorganic Chemistry , Institute of Organic Chemistry , Boreskov Institute of Catalysis , Russia

Awards

- Sofja Kovalevskaja Award of the Alexander von Humboldt Foundation (2020);
- Berkeley Postdoctoral Association Postdoctoral Development Award (2018);
- Medal of the Russian Academy of Sciences for outstanding work conducted by young scientists (2015);
- Haldor Topsoe company scholarship (2013–2015);
- Schlumberger company scholarship (2010–2011, 2011–2012, 2014–2015);
- Kirill Zamaraev Foundation scholarship (2015);
- BP company scholarship (2013–2014);
- Winner of innovation competition UMNİK. (2013) for discoveries having promising practical applications (2013);
- Vladimir Potanin Foundation scholarship (2009, 2010, 2011, 2012).

Professional Service

- Reviewer – *Nature Communications*, *Science Advances*, *Chemical Science*, *Chemical Communications*, *Journal of Physical Chemistry Letters*, *Journal of Magnetic Resonance*, *Journal of Chemical Physics*, and others
- Reviewer – DFG (German Research Foundation)
- Member of the editorial board – *Molecules* (2018–present)
- Member of *The American Chemical Society* (2016–present)
- Member of *The American Association for the Advancement of Science* (2016–present)
- Consulting, *MEL Science* – visualization of chemical reactions (2015)
- Jury – *Mendeleev Chemical Student Conference-Competition* (Kazan-2013, Tomsk-2015)

Publications

Publications under review:

1. P. Put, S. Pustelny, D. Budker, E. Druga, T. Sjolander, A. Pines, **D. Barskiy***. Zero- to Ultralow-Field NMR Spectroscopy of Small Biomolecules. *ChemRxiv*, **2020**, DOI: [10.26434/chemrxiv.13203884.v1](https://doi.org/10.26434/chemrxiv.13203884.v1).
2. **D. Barskiy***, J. W. Blanchard, M. Reh, T. Sjolander, A. Pines, D. Budker. Zero-field *J*-spectroscopy of Quadrupolar Nuclei. *ArXiv*, **2020**, <https://arxiv.org/abs/2011.05618>.
3. S. Knecht, J. W. Blanchard, **D. Barskiy**, et al. Rapid Hyperpolarization and Purification of the Metabolite Fumarate in Aqueous Solution. *ChemRxiv*, **2020**, DOI: [10.26434/chemrxiv.12909989.v1](https://doi.org/10.26434/chemrxiv.12909989.v1).

Refereed book chapters and reviews:

1. **D. A. Barskiy**, S. Knecht, A. V. Yurkovskaya, K. L. Ivanov. *SABRE: Chemical Kinetics and Spin Dynamics of the Formation of Hyperpolarization*. *Prog. Nucl. Magn. Reson. Spectrosc.*, **2019**, 114, 33-70.
2. K. Kovtunov, E. Pokochueva, O. Salnikov, S. Cousin, D. Kurzbach, B. Vuichoud, S. Jannin, E. Chekmenev, B. Goodson, **D. Barskiy**, I. Koptuyug. *Hyperpolarized NMR Spectroscopy: d-DNP, PHIP, and SABRE Techniques*. *Chem. Asian J.*, **2018**, 13 (15), 1857-1871.
3. **D. A. Barskiy**, A. M. Coffey, P. Nikolaou, D. M. Mikhaylov, B. M. Goodson, R. T. Branca, G. J. Lu, M. G. Shapiro, V.-V. Telkki, V. V. Zhivonitko, et al. *NMR Hyperpolarization Techniques of Gases*. *Chem. Eur. J.*, **2017**, 23 (4), 725–751.
4. V. V. Zhivonitko, K. V. Kovtunov, I. V. Skovpin, **D. A. Barskiy**, O. G. Salnikov, I. V. Koptuyug. *Catalytically Enhanced NMR of Heterogeneously Catalyzed Hydrogenations* / In: *Understanding Organometallic Reaction Mechanisms and Catalysis Experimental and Computational Tools*, Ch. 7, Ed. Ananikov, Valentine P.; Wiley-VCH, Weinheim, **2014**.
5. K. V. Kovtunov, V. V. Zhivonitko, I. V. Skovpin, **D. A. Barskiy**, I. V. Koptuyug. *Parahydrogen-Induced Polarization in Heterogeneous Catalytic Processes* / In: *Hyperpolarization Methods in NMR Spectroscopy*. *Topics in Current Chemistry*, Ch. 5, Ed. Kuhn, Lars T.; Springer Berlin Heidelberg, **2013**.

Publications in refereed journals:

4. S. Knecht, **D. A. Barskiy**, G. Buntkowsky, K. L. Ivanov. *Theoretical description of hyperpolarization formation in the SABRE-relay method*. *J. Chem. Phys.*, **2020**, 153, 164106.
5. **D. A. Barskiy***, M. C. D. Tayler, I. Marco-Rius, J. Kurhanewicz, D. B. Vigneron, S. Cikrikci, A. Aydogdu, M. Reh, A. N. Pravdivtsev, J.-B. Hövener, J. W. Blanchard, T. Wu, D. Budker, A. Pines. *Zero-field Nuclear Magnetic Resonance of Chemically Exchanging Systems*. *Nat. Commun.*, **2019**, 10 (1), 3002.
6. S. Knecht, S. Hadjiali, **D. A. Barskiy**, A. Pines, G. Sauer, A. S. Kiryutin, K. L. Ivanov, A. V. Yurkovskaya, G. Buntkowsky. *Indirect Detection of Short-lived Hydride Intermediates of Iridium N-Heterocyclic Carbene Complexes via Chemical Exchange Saturation Transfer (CEST) Spectroscopy*. *J. Phys. Chem. C*, **2019**, 123 (26), 16288-16293.
7. **D. A. Barskiy***, L. A. Ke, X. Li, V. Stevenson, N. Widarman, H. Zhang, A. Truxal, A. Pines. *Rapid Catalyst Capture Enables Metal-Free para-Hydrogen-Based Hyperpolarized Contrast Agents*. *J. Phys. Chem. Lett.*, **2018**, 9, 2721–2724.
8. D. B. Burueva, K. V. Kovtunov, V. I. Bukhtiyarov, A. V. Bukhtiyarov, **D. A. Barskiy**, I. P. Prosvirin, I. S. Mashkovsky, G. N. Baeva, A. Y. Stakheev, I. V. Koptuyug. *Selective Single-Site Pd-In Hydrogenation Catalyst for Production of Enhanced Magnetic Resonance Signals using Parahydrogen*. *Chem. Eur. J.*, **2018**, 24 (11), 2547–2553.
9. **D. A. Barskiy**, R. V. Shchepin, C. P. Tanner, J. F. Colell, B. M. Goodson, T. Theis, W. S. Warren, E. Y. Chekmenev. *The Absence of Quadrupolar Nuclei Facilitates Efficient ¹³C Hyperpolarization via Reversible Exchange with Parahydrogen*. *ChemPhysChem*, **2017**, 18 (12), 1493–1498.
10. **D. A. Barskiy**, K. V. Kovtunov, E. Y. Gerasimov, et al. *2D Mapping of NMR Signal Enhancement and Relaxation for Heterogeneously Hyperpolarized Propane Gas*. *J. Phys. Chem. C*, **2017**, 121 (18), 10038–10046.
11. Z. Zhou, J. Yu, J. F. P. Colell, R. Laasne, A. Logan, **D. A. Barskiy**, R. V. Shchepin, E. Y. Chekmenev, V. Blum,

- W. S. Warren, T. Theis. Long-Lived $^{13}\text{C}_2$ Nuclear Spin States Hyperpolarized by Parahydrogen in Reversible Exchange at Microtesla Fields. *J. Phys. Chem. Lett.*, **2017**, 8 (13), 3008–3014.
12. D. A. Barskiy*, O. G. Salnikov, A. S. Romanov, M. A. Feldman, A. M. Coffey, K. V. Kovtunov, I. V. Koptug, E. Y. Chekmenev. NMR Spin-Lock Induced Crossing (SLIC) dispersion and long-lived spin states of gaseous propane at low magnetic field (0.05 T). *J. Magn. Reson.*, **2017**, 276, 78–85.
 13. R. V. Shchepin, D. A. Barskiy, A. M. Coffey, M. A. Feldman, L. M. Kovtunova, V. I. Bukhtiyarov, K. V. Kovtunov, B. M. Goodson, I. V. Koptug, E. Y. Chekmenev. Robust Imidazole- $^{15}\text{N}_2$ Synthesis for High-Resolution Low-Field (0.05 T) ^{15}N Hyperpolarized NMR Spectroscopy. *ChemistrySelect*, **2017**, 2 (16), 4478–4483.
 14. L. B. Bales, K. V. Kovtunov, D. A. Barskiy, R. V. Shchepin, A. M. Coffey, L. M. Kovtunova, A. V. Bukhtiyarov, M. A. Feldman, V. I. Bukhtiyarov, E. Y. Chekmenev, I. V. Koptug, B. M. Goodson. Aqueous, Heterogeneous para-Hydrogen-Induced ^{15}N Polarization. *J. Phys. Chem. C*, **2017**, 121 (28), 15304–15309.
 15. J. Colell, A. Logan, Z. Zhou, R. V. Shchepin, D. A. Barskiy, G. X. Ortiz Jr., Q. Wang, S. J. Malcolmson, E. Y. Chekmenev, W. S. Warren, T. Theis. Generalizing, Extending, and Maximizing Nitrogen-15 Hyperpolarization induced by Parahydrogen in Reversible Exchange. *J. Phys. Chem. C.*, **2017**, 121 (12), 6626–6634.
 16. A. M. Coffey, M. A. Feldman, R. V. Shchepin, D. A. Barskiy, M. L. Truong, W. Pham, E. Y. Chekmenev. High-resolution hyperpolarized in vivo metabolic ^{13}C spectroscopy at low magnetic field (48.7 mT) following murine tail-vein injection. *J. Magn. Reson.*, **2017**, 281, 246–252.
 17. D. B. Burueva, A. S. Romanov, O. G. Salnikov, V. V. Zhivonitko, Y.-W. Chen, D. A. Barskiy, E. Y. Chekmenev, D. W. Hwang, K. V. Kovtunov, I. V. Koptug. Extending the Lifetime of Hyperpolarized Propane Gas through Reversible Dissolution. *J. Phys. Chem. C.*, **2017**, 212 (8), 4481–4487.
 18. O. G. Salnikov, D. B. Burueva, E. Y. Gerasimov, A. V. Bukhtiyarov, A. K. Khudorozhkov, I. P. Prosvirin, L. M. Kovtunova, D. A. Barskiy, V. I. Bukhtiyarov, K. V. Kovtunov, I. V. Koptug. The effect of oxidative and reductive treatments of titania-supported metal catalysts on the pairwise hydrogen addition to unsaturated hydrocarbons. *Catal. Today*, **2017**, 283, 82–88.
 19. D. A. Barskiy, R. V. Shchepin, A. M. Coffey, T. Theis, W. S. Warren, B. M. Goodson, E. Y. Chekmenev. Over 20% ^{15}N Hyperpolarization in Under One Minute for Metronidazole, an Antibiotic and Hypoxia Probe. *J. Am. Chem. Soc.*, **2016**, 138 (26), 8080–8083.
 20. D. A. Barskiy*, O. G. Salnikov, R. V. Shchepin, M. Feldman, A. M. Coffey, K. V. Kovtunov, I. V. Koptug, E. Y. Chekmenev. NMR SLIC Sensing of Hydrogenation Reactions Using Parahydrogen in Low Magnetic Fields. *J. Phys. Chem. C*, **2016**, 120 (51), 29098–29106.
 21. D. A. Barskiy*, A. N. Pravdivtsev, K. L. Ivanov, K. V. Kovtunov, I. V. Koptug. A simple analytical model for signal amplification by reversible exchange (SABRE) process. *Phys. Chem. Chem. Phys.*, **2016**, 119 (6), 996–1006.
 22. O. G. Salnikov, D. A. Barskiy, A. M. Coffey, K. V. Kovtunov, I. V. Koptug, E. Y. Chekmenev. Efficient Batch-Mode Parahydrogen-Induced Polarization of Propane. *ChemPhysChem*, **2016**, 17 (21), 3395–3398.
 23. R. V. Shchepin, D. A. Barskiy, A. M. Coffey, B. M. Goodson, E. Y. Chekmenev. NMR Signal Amplification by Reversible Exchange of Sulfur-Heterocyclic Compounds Found in Petroleum. *ChemistrySelect*, **2016**, 1 (10), 2552–2555.
 24. K. V. Kovtunov, D. A. Barskiy, O. G. Salnikov, R. V. Shchepin, A. M. Coffey, L. Kovtunova, V. I. Bukhtiyarov, I. V. Koptug, E. Y. Chekmenev. Toward Production of Pure ^{13}C -Hyperpolarized Metabolites Using Heterogeneous PHIP of Ethyl $[1-^{13}\text{C}]$ acetate. *RSC Adv.*, **2016**, 6, 69728–69732.
 25. R. V. Shchepin, D. A. Barskiy, A. M. Coffey, T. Theis, F. Shi, W. S. Warren, B. M. Goodson, E. Y. Chekmenev. ^{15}N Hyperpolarization of Imidazole- $^{15}\text{N}_2$ for Magnetic Resonance pH Sensing Via SABRE-SHEATH. *ACS Sensors*, **2016**, 1 (6), 640–644.
 26. R. V. Shchepin, D. A. Barskiy, A. M. Coffey, I. V. Manzanera Esteve, E. Y. Chekmenev. Efficient Synthesis of Molecular Precursors for Para-Hydrogen-Induced Polarization of Ethyl Acetate- $1-^{13}\text{C}$ and Beyond. *Angew. Chem. Int. Ed.*, **2016**, 55 (20), 6071–6074.
 27. K. V. Kovtunov, A. S. Romanov, O. G. Salnikov, D. A. Barskiy, E. Y. Chekmenev, I. V. Koptug. Gas Phase UTE MRI of Propane and Propene. *Tomography*, **2016**, 2 (1), 49–55.
 28. R. V. Shchepin, D. A. Barskiy, D. M. Mikhaylov, E. Y. Chekmenev. Efficient Synthesis of Nicotinamide- $1-^{15}\text{N}$ for Ultrafast NMR Hyperpolarization Using Parahydrogen. *Bioconjugate Chem.*, **2016**, 27 (4), 878–882.
 29. D. A. Barskiy, O. G. Salnikov, K. V. Kovtunov, I. V. Koptug. NMR Signal Enhancement for Hyperpolarized Fluids Continuously Generated in Hydrogenation Reactions with Parahydrogen. *J. Chem. Phys. A*, **2015**, 119 (6), 996–1006.
 30. A. Corma, O. G. Salnikov, D. A. Barskiy, K. V. Kovtunov, I. V. Koptug. Single-Atom Gold Catalysis in the Context of Developments in Parahydrogen-Induced Polarization. *Chem. Eur. J.*, **2015**, 21 (19), 7012–7015.
 31. K. V. Kovtunov, D. A. Barskiy, O. G. Salnikov, D. B. Burueva, A. K. Khudorozhkov, A. V. Bukhtiyarov, I. P. Prosvirin, E. Y. Gerasimov, V. I. Bukhtiyarov, I. V. Koptug. Strong Metal-Support Interactions for Palladium Supported on TiO_2 Catalysts in the Heterogeneous Hydrogenation with Parahydrogen. *ChemCatChem*, **2015**, 7 (17), 2581–2584.
 32. O. G. Salnikov, D. B. Burueva, D. A. Barskiy, G. A. Bukhtiyarova, K. V. Kovtunov, I. V. Koptug. A Mechanistic Study of Thiophene Hydrodesulfurization by the Parahydrogen-Induced Polarization Technique. *ChemCatChem*, **2015**, 7 (21), 3508–3512.
 33. D. A. Barskiy, K. V. Kovtunov, I. V. Koptug, P. He, K. A. Groome, Q. A. Best, F. Shi, B. M. Goodson, R. V. Shchepin, A. M. Coffey, K. W. Waddell, E. Y. Chekmenev. The feasibility of formation and kinetics of NMR

- Signal Amplification by Reversible Exchange (SABRE) at high magnetic field (9.4 T). *J. Am. Chem. Soc.*, **2014**, 136 (9), 3322–3325.
34. A. M. Coffey, K. V. Kovtunov, **D. A. Barskiy**, I. V. Koptug, R. V. Shchepin, K. W. Waddell, P. He, K. A. Groome, Q. A. Best, F. Shi, B. M. Goodson, E. Y. Chekmenev. [High-Resolution Low-Field Molecular Magnetic Resonance Imaging of Hyperpolarized Liquids](#). *Anal. Chem.*, **2014**, 86(18), 9042–9049.
 35. **D. A. Barskiy**, K. V. Kovtunov, I. V. Koptug, P. He, K. A. Groome, Q. A. Best, F. Shi, B. M. Goodson, R. V. Shchepin, M. L. Truong, A. M. Coffey, K. W. Waddell, E. Y. Chekmenev. [In situ and Ex situ Low-field NMR and MRI Endowed by SABRE Hyperpolarization](#). *ChemPhysChem*, **2014**, 15, 4100–4107.
 36. M. L. Truong, F. Shi, P. He, B. Yuan, K. N. Plunkett, A. M. Coffey, R. V. Shchepin, **D. A. Barskiy**, K. V. Kovtunov, I. V. Koptug, K. W. Waddell, B. M. Goodson, E. Y. Chekmenev. [Irreversible Catalyst Activation Enables Hyperpolarization and Water Solubility for NMR Signal Amplification by Reversible Exchange](#). *J. Phys. Chem. B.*, **2014**, 118 (48), 13882–13889.
 37. K. V. Kovtunov, M. L. Truong, **D. A. Barskiy**, O. G. Salnikov, V. I. Bukhtiyarov, A. M. Coffey, K. W. Waddell, I. V. Koptug, E. Y. Chekmenev. [Propane-d₆ Heterogeneously Hyperpolarized by Parahydrogen](#). *J. Phys. Chem. C.*, **2014**, 118 (48), 28234–28243.
 38. O. G. Salnikov, K. V. Kovtunov, **D. A. Barskiy**, A. K. Khudorozhkov, E. I. Inozemtseva, I. P. Prosvirin, V. I. Bukhtiyarov, I. V. Koptug. [Evaluation of the mechanism of heterogeneous hydrogenation of \$\alpha,\beta\$ -unsaturated carbonyl compounds via pairwise hydrogen addition](#). *ACS Catalysis*, **2014**, 4, 2022–2028.
 39. O. G. Salnikov, **D. A. Barskiy**, D. B. Burueva, Y. K. Gulyaeva, B. S. Balzhinimaev, K. V. Kovtunov, I. V. Koptug. [Evaluation of Activation Energies for Pairwise and Non-Pairwise Hydrogen Addition to Propyne Over Pd/Aluminosilicate Fiberglass Catalyst by PHIP](#). *Appl. Magn. Reson.*, **2014**, 45, 1051–1061.
 40. K. V. Kovtunov, M. L. Truong, **D. A. Barskiy**, I. V. Koptug, A. M. Coffey, K. W. Waddell, E. Y. Chekmenev. [Long-Lived Spin States for Low-field Hyperpolarized Gas MRI](#). *Chem. Eur. J.*, **2014**, 20 (45), 14629–14632.
 41. K. V. Kovtunov, **D. A. Barskiy**, A. M. Coffey, M. L. Truong, O. G. Salnikov, A. K. Khudorozhkov, E. I. Inozemtseva, I. P. Prosvirin, V. I. Bukhtiyarov, K. W. Waddell, E. Y. Chekmenev, I. V. Koptug. [High-resolution 3D Proton Hyperpolarized Gas MRI Enabled by Parahydrogen and Rh/TiO₂ Heterogeneous Catalyst](#). *Chem. Eur. J.*, **2014**, 20 (37), 11636–11639.
 42. K. V. Kovtunov, **D. A. Barskiy**, R. V. Shchepin, A. M. Coffey, K. W. Waddell, I. V. Koptug, E. Y. Chekmenev. [Demonstration of Heterogeneous Parahydrogen Induced Polarization Using Hyperpolarized Agent Migration from Dissolved Rh \(I\) Complex to Gas Phase](#). *Anal. Chem.*, **2014**, 86 (13), 6192–6196.
 43. K. V. Kovtunov, **D. A. Barskiy**, O. G. Salnikov, A. K. Khudorozhkov, V. I. Bukhtiyarov, I. P. Prosvirin, I. V. Koptug. [Parahydrogen-Induced Polarization \(PHIP\) in heterogeneous hydrogenation over bulk metals and metal oxides](#). *Chem. Commun.*, **2014**, 50, 875–878.
 44. K. V. Kovtunov, V. V. Zhivonitko, I. V. Skovpin, **D. A. Barskiy**, O. G. Salnikov, I. V. Koptug. [Toward Continuous Production of Catalyst-Free Hyperpolarized Fluids Based on Biphasic and Heterogeneous Hydrogenations with Parahydrogen](#). *J. Phys. Chem. C.*, **2013**, 117 (44), 22887–22893.
 45. **D. A. Barskiy**, K. V. Kovtunov, A. Primo, A. Corma, R. Kaptein; I. V. Koptug. [Selective Hydrogenation of 1,3-Butadiene and 1-Butyne over a Rh/Chitosan Catalyst](#). *ChemCatChem*, **2012**, 4 (12), 2031–2035.
 46. K. V. Kovtunov, I. E. Beck, V. V. Zhivonitko, **D. A. Barskiy**, V. I. Bukhtiyarov, I. V. Koptug. [Heterogeneous addition of H₂ to double and triple bonds over supported Pd catalysts](#). *Phys. Chem. Chem. Phys.*, **2012**, 14, 11008–11014.

Selected presentations

- **D. A. Barskiy**. [High-resolution NMR Chemo-sensing Using Portable Zero-field Spectrometer](#) // 1st Conference on Zero and Ultra-Low Field NMR, <https://conference.zulf.eu>, 3.09.2020 (oral talk)
- **D. A. Barskiy**. [Chemical Kinetics of Hyperpolarized Species: Estimating the Influence of Chemical Parameters in PHIP/SABRE Experiments](#) // 1st Parahydrogen Enhanced Resonance Meeting (PERM), <https://www.perm-conference.org>, 27.07.2020 (invited lecture)
- **D. A. Barskiy**. [Nuclear Spin Engineering for Advanced Chemo- and Bio-sensing](#) // Microwave Seminar at The Department of Physics & Engineering, ITMO, 11.05.2020 (invited lecture)
- **D. A. Barskiy**. [Metal-Free Hyperpolarized Metabolites Produced via Rapid Catalyst Capture](#) // 5th International Workshop on Metabolic Imaging, 18.10.2018, Philadelphia, USA (oral talk).
- **D. A. Barskiy**. [Nuclear Spin Hyperpolarization: A Heterogeneous Approach](#) // 14th Conference “Magnetic Resonance in Porous Media”, 20.02.2018, Gainesville, USA (lecture).
- **D. A. Barskiy**. [Parahydrogen-fueled RASER: a missing link between chemistry and quantum electrodynamics](#) // 26.05.2017, UC Berkeley (invited talk).
- **D. A. Barskiy**. [Quantum mechanical tricks for magnetic resonance: hyperpolarization and long-lived nuclear spin states](#) // 14.10.2016, Vanderbilt University (invited lecture).
- **D. A. Barskiy**, et al. [Parahydrogen polarized propane: dependence on the reactant flow rate using heterogeneous catalyst and demonstration of fast high-resolution ¹H 3D MRI](#) // 3rd meeting "European Network for Hyperpolarization Physics and Methodology in NMR and MRI", Zurich (Switzerland), 27.07.2014 (oral talk).

Patents

1. E. Y. Chekmenev, **D. A. Barskiy**, R. V. Shchepin, W. S. Warren, T. Theis, B. Goodson. [Method for creating hyperpolarization at microtesla magnetic fields](#). International Patent (Application WO2018209334A1, publication date - 15.11.2018).
2. E. Y. Chekmenev, **D. A. Barskiy**, R. V. Shchepin, W. S. Warren, T. Theis, B. Goodson. Efficient and Direct ¹³C Hyperpolarization via Reversible Exchange with Parahydrogen. US provisional patent filed on 15.3.2017.
3. **D. A. Barskiy**, E. Chekmenev, B. Goodson, et al. Removal of Homogeneous Catalysts from NMR/MRI Agents Hyperpolarized via SABRE or PHIP (Application filed, BK-2018-114-3).

Teaching

2010–2015 Chemistry lecturer, volunteer project "[Science for kids](#)"
2012–2014 Structure of compounds, Chemical thermodynamics — seminars for 3rd year students at Novosibirsk State University, Russia

Student Mentoring

I have mentored 17+ students at UC Berkeley and Vanderbilt University. See the list of student below:

2019–present Erik Van Dyke
2018–2020 Sean Littleton, Bea Bliemel, Jorelle Klawitter, Todd Chaney, Sulaiman Alvi, Maksim Tsukanov
2017–2018 Lucia Ke, Hao Zhang, Hubert Situ, Elizabeth Chyn, Hyun Park, Dario Gelevski, Vincent Stevenson, Xingyang Li, Nevin Widarman
2017–2017 Patricia Buenbrazo
2016–2016 Anthony Phipps

NSF grant

References

Alexander Pines

Postdoc Advisor
 E-mail: pines@berkeley.edu
 Glenn Seaborg Professor of Chemistry
 University of California - Berkeley
 208C Stanley Hall,
 Berkeley CA, 94720-3220 (USA)

Eduard Chekmenev

Postdoc Advisor
 E-mail: chekmenev@wayne.edu
 Associate Professor of Chemistry
 Wayne State University
 5101 Cass Ave,
 Detroit, MI 48202 (USA)

Igor V. Koptug

PhD Advisor
 E-mail: koptug@tomo.nsc.ru
 Professor, vice-director of the
 International Tomography Center
 3A Institutskaya St.
 Novosibirsk, 630090 (Russia)

Dmitry Budker

Collaborator
 E-mail: budker@berkeley.edu
 Professor of Physics
 University of California - Berkeley
 203 Birge Hall,
 Berkeley CA, 94720-3220 (USA)

Konstantin L. Ivanov

Collaborator
 E-mail: ivanov@tomo.nsc.ru
 Professor, Director of the
 International Tomography Center
 3A Institutskaya St.
 Novosibirsk, 630090 (Russia)

Boyd Goodson

Collaborator
 E-mail: bgoodson@chem.siu.edu
 Professor and Dean, Department of
 Chemistry and Biochemistry
 Southern Illinois University
 Carbondale IL, 62901 (USA)