

**Philip V. Toukach**

Born in 1976.

*Education:* Russian University of Chemical Technology, 1998

*Languages:* Russian (native), English (full professional)

*Academic degrees* (Zelinsky Institute of Organic Chemistry, Russ. Acad. Scis.):

PhD, 2001, in organic chemistry

thesis: "Computer-assisted NMR-spectroscopic structural studies of *Proteus* glycopolymers"

ScD, 2019, in bioorganic chemistry

thesis: "Information technologies in structural glycochemistry and glycobiology"

*Academic rank:* associate professor, 2010.

**Positions:**

2001-present: Zelinsky Institute of Organic Chemistry, Russian Academy of Sciences, *leading researcher*

2021-present: National Research University Higher School of Economics, *professor*

2002-2016: Lomonosov Moscow Academy of Fine Chemical Technology (Russia), *associate professor*

2012-2018: Lomonosov Moscow State University (Russia), *lecturer*

2002-2005: Borstel Forschungszentrum (Germany), *invited scientist*

2006-2009: Deutsches Krebsforschungszentrum (Germany), *invited scientist*

2003-2019: Moscow Chemical Lyceum, Russian Academy of Sciences (Russia), *IT specialist*

2000-present: freelancer, *studio photographer and polygraphy designer*

**Major activities:**

1. Leadership in a glycoinformatic software project (Carbohydrate Structure Database, <http://csdb.glycoscience.ru>)

2. Structural elucidation of natural glycopolymers and glycoconjugates by the NMR methods

3. The NMR course in the university and scientific supervision

**Major fields of research:**

1. Carbohydrate databases and general glycoinformatics;

2. Automated prediction of carbohydrate structure basing on the NMR data;

3. Theoretical modeling of the NMR observables of carbohydrates;

4. NMR elucidation of structure of natural carbohydrates;

**Publications, conferences, grants:**

92 articles in peer-reviewed referenced scientific journals;

3 book chapters and 7 educational textbooks (NMR);

44 attended international symposia;

Multiple grants by Russian Federation for Basic Research, International Soros Scientific & Educational Program, and other (ISTC, ISF, INTAS, Polish. Acad. Scis., Rus. President Grant, Russian Science Foundation)

*Publication and grant list:* <http://toukach.ru/publist.htm>

*Total citations:* ~3000 (of them, 1750 since 2016)

*Hirsh index:* 24 (total), 19 (since 2016)

**Lecturing** (own courses):

Moscow State University "NMR spectroscopy" (2014-2019)

Moscow Acad. Of Fine Chem. Technology "NMR spectroscopy in biochemical research" (2002-2016), "Digital photography and image processing" (2012-2015)

Higher Chemical College, Russ. Acad. Scis. "NMR spectroscopy for chemists" (1998-2003 and since 2014)

Russ. Univ. of Chem. Technology: "Personal computer usage and system administration" (2000-2002)

Web-programming (PHP, SQL, JS) (since 2010)

Photography (since 2010)

**Selected publications:** (5-year impact factors on the date of publication are in parentheses)

- Ph.V. Toukach, K.S. Egorova "New features of CSDB Linear, as compared to other carbohydrate notations" (*Journal of Chemical Information and Modeling*, 2020, 60(3):1276-1289, DOI [10.1021/acs.jcim.9b00744](https://doi.org/10.1021/acs.jcim.9b00744)) (4.5)
- V.S. Stroylov, M.P. Panova, Ph.V. Toukach "Comparison of methods for bulk automated simulation of glycosidic bond conformations" (*International Journal of Molecular Science*, 2020, 21(20):7626, DOI [10.3390/ijms21207626](https://doi.org/10.3390/ijms21207626)) (4.7)
- S.I. Scherbinina, Ph.V. Toukach "Three-dimensional structures of carbohydrates and where to find them" (*International Journal of Molecular Science*, 2020, 21(20): 7702, DOI [10.3390/ijms21207702](https://doi.org/10.3390/ijms21207702)) (4.7)
- K.S. Egorova, Ph.V. Toukach "Glycoinformatics: bridging isolated islands in the sea of data" (*Angewandte Chemie International Edition* 2018, 57:14986-14990, DOI [10.1002/anie.201803576](https://doi.org/10.1002/anie.201803576)) (12.0)
- R.R. Kapaev, Ph.V. Toukach "GRASS: semi-automated NMR-based structure elucidation of saccharides" (*Bioinformatics* 2018, 34(6):957-963, DOI [10.1093/bioinformatics/btx696](https://doi.org/10.1093/bioinformatics/btx696)) (7.3)
- I.Yu. Chernyshov, Ph.V. Toukach "REStLESS: automated translation of glycan sequences from residue-based notation to SMILES and atomic coordinates" (*Bioinformatics* 2018, 34(15):2679-2681, DOI [10.1093/bioinformatics/bty168](https://doi.org/10.1093/bioinformatics/bty168)) (7.3)
- Ph. Toukach, K. Egorova "Carbohydrate Structure Database (CSDB): examples of usage" (in "A Practical Guide to Using Glycomics Databases", ed: K.F. Aoki-Kinoshita, Springer Japan 2017, ch.5:75-113, ISBN 978-4-431-56452-2, DOI [10.1007/978-4-431-56454-6\\_5](https://doi.org/10.1007/978-4-431-56454-6_5))
- K.S. Egorova, Ph.V. Toukach "CSDB\_GT : a new curated database on glycosyltransferases" (*Glycobiology* 2017, 27(4):285-290, DOI [10.1093/glycob/cww137](https://doi.org/10.1093/glycob/cww137)) (3.5)
- Ph.V. Toukach, K.S. Egorova "Carbohydrate Structure Database merged from bacterial, archaeal, plant and fungal parts" (*Nucleic Acid Research* 2016, 44(D1):D1229-D1236, DOI [10.1093/nar/gkv840](https://doi.org/10.1093/nar/gkv840)) (10.2)
- K.S. Egorova, A.N. Kondakova, Ph.V. Toukach "Carbohydrate Structure Database: tools for statistical analysis of bacterial, plant and fungal glycomes" (*Database* 2015, bav073, DOI [10.1093/database/bav073](https://doi.org/10.1093/database/bav073)) (4.5)
- Ph. Toukach, K. Egorova "Bacterial, Plant, and Fungal Carbohydrate Structure Databases: daily usage" (in "Glycoinformatics", eds: T. Lütteke, M. Frank, series: Methods in Molecular Biology, v. 1273. Springer Berlin / Humana Press 2015, ch.5:55-85, ISBN 978-1-4939-2342-7, DOI [10.1007/978-1-4939-2343-4\\_5](https://doi.org/10.1007/978-1-4939-2343-4_5))
- R.R. Kapaev, Ph.V. Toukach "Improved carbohydrate structure generalization scheme for <sup>1</sup>H and <sup>13</sup>C NMR simulations" (*Analytical Chemistry* 2015, 87(14):7006–7010, DOI: [10.1021/acs.analchem.5b01413](https://doi.org/10.1021/acs.analchem.5b01413)) (5.8)
- R.R. Kapaev, K.S. Egorova, Ph.V. Toukach "Carbohydrate structure generalization scheme for database-driven simulation of experimental observables, such as NMR chemical shifts" (*Journal of Chemical Information and Modeling* 2014, 54(9):2594–2611, DOI [10.1021/ci500267u](https://doi.org/10.1021/ci500267u)) (4.1)
- F.V. Toukach, V.P. Ananikov "Recent advances in computational predictions of NMR parameters for structure elucidation of carbohydrates: methods and limitations" (*Chemical Society Reviews* 2013, 42:8376-8415, DOI [10.1039/C3CS60073D](https://doi.org/10.1039/C3CS60073D)) (30.2)
- Ph. Toukach "Bacterial Carbohydrate Structure Database 3: Principles and Realization" (*Journal of Chemical Information and Modeling* 2011, 51(1):159-170, DOI [10.1021/ci100150d](https://doi.org/10.1021/ci100150d)) (4.1)
- Ph. Toukach, H. Joshi, R. Ranzinger, Yu. Knirel, C.-W. von der Lieth "Sharing of worldwide distributed carbohydrate-related digital resources: online connection of the Bacterial Carbohydrate Structure DataBase and GLYCOSCIENCES.de" (*Nucleic Acid Research* 2007, 35:D280-D286, DOI [10.1093/nar/gkl883](https://doi.org/10.1093/nar/gkl883)) (8.9)
- B.A. Dmitriev, F.V. Toukach, S. Ehlers "Towards a comprehensive view of the bacterial cell wall" (*Trends in Microbiology* 2005, 13(12):569-574, DOI [10.1016/j.tim.2005.10.001](https://doi.org/10.1016/j.tim.2005.10.001)) (9.0)

**Hobbies:**

Autonomous motorized off-road expeditions to wild regions;

Photography (own studio) and image design;

**Contacts:**

Web site: <http://toukach.ru>

E-mail: [netbox@toukach.ru](mailto:netbox@toukach.ru)