

CURRICULUM VITAE

Dr. Mikhail Filatov

Lecturer

Technological University Dublin
School of Chemical and Biopharmaceutical Sciences

Contact Information

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• Professional Experience

- 10/2017–current Lecturer in Organic Chemistry
School of Chemical and Biopharmaceutical Sciences, Technological University Dublin, Ireland
- 09/2015 – 09/2017 Marie Curie Research Fellow (IF)
School of Chemistry, Trinity College Dublin, Ireland
- 04/2014 – 07/2015 Researcher in EU project POLINNOVA
Institute of Polymers, Bulgarian Academy of Sciences, Sofia, Bulgaria
- 02/2010 – 03/2014 Postdoctoral Researcher
Max Planck Institute for Polymer Research, Mainz, Germany
- 12/2008 – 12/2009 CNRS Postdoctoral Researcher
Institute of Molecular Chemistry, University of Burgundy, Dijon, France
- 06/2008 – 07/2008 Visiting Researcher
Department of Biochemistry and Biophysics, University of Pennsylvania, Philadelphia, USA
- 08/2005 – 10/2008 Managing Director
Esterkem Ltd., private chemical company, Moscow, Russia

• Education

- 01/2020 – 06/2020 Postgraduate Certificate in University Learning and Teaching
Learning, Teaching and Technology Centre (LTTC), TU Dublin, Ireland
- 10/2005 – 11/2008 PhD in Organic Chemistry
Department of Chemistry, Moscow State University, Moscow, Russia
Thesis title: "General synthetic approach to porphyrins and dipyrroles with π -extended system". Supervisors: I.P. Beletskaya and A.V. Chepurkov
- 09/2000 – 07/2005 Diploma of Chemist (with honours)
Department of Chemistry, Moscow State University, Moscow, Russia

• Research Interests and Expertise

Organic chemistry. Multistep organic synthesis of functional dyes: π -extended porphyrins, metal dipyrroles, boron dipyrromethenes (BODIPY). Synthesis and chemical modification of photoactive materials: metal-organic frameworks, sol-gels, functionalized biopolymers (chitosan, cellulose acetate).

Photochemistry. Singlet oxygen: generation, sensing and application in organic synthesis. Photoinduced electron transfer (PET) in donor-acceptor molecules. Spin-orbit charge-transfer intersystem crossing (SOCT-ISC) dyes and their application as sensitizers in photodynamic therapy, photon upconversion and photopolymerization.

• Research Funding/Awards

2022 – current	Science Foundation Ireland Frontiers for the Future Award (Principal Investigator) Project: “Dyes with Switchable Intersystem Crossing for Photonics”
2020 – 2024	TU Dublin Research Scholarship (Principal Investigator) Project: “Heavy-Atom-Free Photosensitizing Materials”
2015 – 2017	European Commission, Horizon 2020 Programme Grant (Principal Investigator) Project: “Controlled Singlet Oxygen Release Sensitizer in Photodynamic Therapy”
2010 – 2014	Max Planck Society Scholarship Project: “New Functional Dyes for NIR to Visible Light Upconversion”
2005 – 2006	Russian Foundation for Assistance to Small Innovative Enterprises (spin-off) Project: “Development of Technology of 24-Epibrassinolide Production”

• Teaching Experience

Currently taught modules

CHEM1007 – Introduction to Chemistry
CHEM2008 – Organic Chemistry
CHEM2022 – Spectroscopy
CHEM2024 – Pharmaceutical & Bioorganic Chemistry
CHEM2025 – Medicinal Chemistry & Pharmchem Processes
CHEM3011 – Organic Chemistry & Stereochemistry
CHEM4008 – Topics in Medicinal Chemistry

Previously taught modules:

CHEM1002 – Introduction to Chemistry
CHEM2009 – Principles of Drug Action
CHEM2023 – Organic Chemistry
CHEM3003 – Organic Chemistry & Stereochemistry
CHEM4004 – Advanced Organic Chemistry

Departmental admin roles:

Year coordinator for DT261-2 group (2nd year BSc in Medicinal Chemistry & Pharmaceutical Sciences)
Module coordinator for CHEM3011 - Organic Chemistry & Stereochemistry

• Reviewer Activities

Journal articles reviewed (230)

Acted as a referee and adjudicative referee for 33 academic journals.

Chemical Communications (69), *The Journal of Organic Chemistry* (27), *ChemistrySelect* (25), *Angewandte Chemie International Edition* (14), *Physical Chemistry Chemical Physics* (14), *Chemistry – A European Journal* (12), *Journal of Materials Chemistry C* (11), *Photochemical and Photobiological Sciences* (6), *Dyes and Pigments* (6), *Journal of Physical Chemistry* (6), *ACS Materials Letters* (5), *Journal of the American Chemical Society* (4), *Chemical Science* (4), *New Journal of Chemistry* (3), *RSC Advances* (3), *JACS Au* (2), *Chemistry and Biodiversity* (2), *European Journal of Inorganic Chemistry* (2), *Small* (2), *Accounts of Chemical Research* (1), *Electroanalysis* (1), *Chemistry – An Asian Journal* (1), *Journal of Physical Chemistry Letters* (1), *ChemPhotoChem* (1), *ChemPhysChem* (1), *Organic Letters* (1), *ACS Central Science* (1), *Photochemistry & Photobiology* (1), *Japanese Journal of Applied Physics* (1), *Advanced Optical Materials* (1), *Applied Research* (1), *Photochemical & Photobiological Sciences* (1), *Nature Communications* (1).

Reviewer Identifier: <https://www.webofscience.com/wos/author/record/A-2266-2013>

Funding applications reviewed (29)

Acted as a referee for the following funding agencies: European Commission H2020 – Marie Curie IEFs, ANR (Agence nationale de la recherche), Polish National Science Centre.

• Patents

1. Long-term stable composition, such as phosphorescent composition or TTA-photon upconversion composition, EP 2 851 407 A1, US 2016/0222286 A1, WO 2015/044129 A1, **2015**
2. Method of Synthesis of 5,5'-Disubstituted π -extended Dipyrromethenes and Their Use as Analytical Reagents for Metal Ions and Fluorescent Imaging Probes, US 2011/0144351 A1, **2009**
3. Method of Reduction of Unsaturated Ketones into Saturated Ketones, RU 2 293 720 C1, **2007**
4. Method of Synthesis of 24-Epibrassinolide, RU 2 272 044 C1, **2006**

• Publications

Summary: 38 scientific papers published (16 as a corresponding author), 1 book chapter, 4 patents.
h index = 23 (Google Scholar), > 1800 citations
<https://scholar.google.bg/citations?user=g1IdjV4AAAAJ&hl=ru>
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Peer-review articles

(* corresponding author)

1. A. Sheehan, T. Mikulchyk, S. Karuthedath, C. De Castro, S. Karuthedath, W. Althobaiti, M. Dvoracek, Sabad-e- Gul, H.J. Byrne, F. Laquai, I. Naydenova, M.A. Filatov*, Diethoxycarbonyl-BODIPYs as heavy-atom-free photosensitizers for holographic recording in cellulose acetate photopolymer, *J. Mater. Chem. C*, **2023**, 11, 15084-15096.
2. J. Isokuortti, T. Griebenow, J.-S. von Glasenapp, T. Raeker, M.A. Filatov, T. Laaksonen, R. Herges, N.A. Durandin, Triplet sensitization enables bidirectional isomerization of diazocine with 130 nm redshift in excitation wavelengths, *Chem. Sci.*, **2023**, 14, 9161-9166.
3. T. Mikulchyk, S. Karuthedath, C. De Castro, A.A. Buglak, A. Sheehan, A. Wieder, F. Laquai, I. Naydenova, M.A. Filatov*, Charge Transfer Mediated Triplet Excited State Formation in Donor-Acceptor-Donor BODIPY: Application for Recording of Holographic Structures in Photopolymerizable Glass, *J. Mater. Chem. C*, **2022**, 10, 11588-11597. **Highlighted on the back cover.**
4. G.V. Morozkov, A.S. Abel, M.A. Filatov, S.E. Nefedov, V.A. Roznyatovsky, A.V. Cheprakov, A.Yu. Mitrofanov, I.S. Ziankou, A. Averin, I.P. Beletskaya, J. Michalak, C. Bucher, L. Bonneviot, A. Bessmertnykh-Lemeune, Ruthenium(II) complexes with phosphonate-substituted 1,10-phenanthroline ligands: synthesis, characterization and use in organic photocatalysis, *Dalton Trans.*, **2022**, 51, 13612-13630. **Highlighted on the front cover.**
5. N. Kiseleva, M.A. Filatov, J.C. Fischer, M. Kaiser, M. Jakoby, D. Busko, I.A. Howard, B.S. Richards, A. Turshatov* BODIPY-pyrene donor-acceptor sensitizers for triplet-triplet annihilation upconversion: the impact of the BODIPY-core on upconversion efficiency. *Phys. Chem. Chem. Phys.*, **2022**, 24, 3568-3578.
6. A.A. Buglak, A. Charisiadis, A. Sheehan, C.J. Kingsbury, M.O. Senge, M.A. Filatov* Quantitative Structure-Property Relationship Modelling for the Prediction of Singlet Oxygen Generation by Heavy-atom-free BODIPY Photosensitizers. *Chem. Eur. J.*, **2021**, 27, 9934-9947.
7. J. Isokuortti, K. Kuntze, M. Virkki, Z. Ahmed, E. Vuorimaa-Laukkanen, M.A. Filatov, A. Turshatov, T. Laaksonen, A. Priimagi, N. Durandin, Expanding Azobenzene Photoswitching into Near-Infrared via Endothermic Triplet Energy Transfer. *Chem. Sci.*, **2021**, 12, 7504-7509.
8. N. Kiseleva, D. Busko, B.S. Richards, M.A. Filatov*, A. Turshatov, Determination of Upconversion Quantum Yields Using Charge-Transfer State Fluorescence of Heavy-Atom-Free Sensitizer as a Self-Reference. *J. Phys. Chem. Lett.*, **2020**, 11, 6560-6566.
9. A. A. Buglak, M.A. Filatov, M.A. Hussain, M. Sugimoto, Singlet Oxygen Generation by Porphyrins and Metalloporphyrins Revisited: a Quantitative Structure-Property Relationship (QSPR) Study. *J. Photochem. Photobiol. A*, **2020**, 43, 112833.
10. M.A. Filatov* Heavy-atom-free BODIPY Photosensitizers with Intersystem Crossing Mediated by Intramolecular Photoinduced Electron Transfer. *Org. Biomol. Chem.*, **2020**, 18, 10-27.

11. S. Callaghan, M.A. Filatov, H. Savoie, R.W. Boyle, M.O. Senge, In vitro cytotoxicity of a library of BODIPY-anthracene and -pyrene dyads for application in photodynamic therapy. *Photochem. Photobiol. Sci.*, **2019**, *18*, 495-504.
12. M.A. Filatov*, S. Karuthedath, P.M. Polestshuk, S. Callaghan, K. Flanagan, T. Wiesner, F. Laquai, M.O. Senge, BODIPY-Pyrene and Perylene Dyads as Heavy-Atom-Free Singlet Oxygen Sensitizers. *ChemPhotoChem*, **2018**, *2*, 606-615. **Top downloaded paper 2018-2019.**
13. M.A. Filatov*, S. Karuthedath, P.M. Polestshuk, S. Callaghan, K. Flanagan, M. Telitchko, T. Wiesner, F. Laquai, M.O. Senge, Control of triplet state generation in heavy atom-free BODIPY-anthracene dyads by media polarity and structural factors. *Phys. Chem. Chem. Phys.*, **2018**, *20*, 8016-8031. **PCCP 2018 Hot Articles Collection.**
14. N. Kiseleva, M.A. Filatov*, M. Oldenburg, D. Busko, M. Jakoby, I.A. Howard, B.S. Richards, M.O. Senge, S.M. Borisov, A. Turshatov, The Janus-Faced Chromophore: A Donor-Acceptor Dyad with Dual Performance in Photon Up-conversion. *Chem. Commun.*, **2018**, *54*, 1607-1610.
15. M.A. Filatov*, S. Karuthedath, P.M. Polestshuk, H.Savoie, K.J. Flanagan, C. Sy, E. Sitte, M. Telitchko, F. Laquai, R.W. Boyle, M.O. Senge, Generation of Triplet Excited States via Photoinduced Electron Transfer in *meso*-anthra-BODIPY: Fluorogenic Response toward Singlet Oxygen in Solution and *in Vitro*. *J. Am. Chem. Soc.*, **2017**, *139*, 6282–6285.
16. S. Callaghan, M.A. Filatov*, E. Sitte, H. Savoie, R.W. Boyle, K.J. Flanagan, and M.O. Senge, Delayed release singlet oxygen sensitizers based on pyridone-appended porphyrins. *Photochem. Photobiol. Sci.*, **2017**, *16*, 1371-1374. **Highlighted on the front cover.**
17. M.A. Filatov*, M.O. Senge, Molecular devices based on reversible singlet oxygen binding in optical and photomedical applications. *Mol. Syst. Des. Eng.*, **2016**, *1*, 258-272. **Highlighted on the front cover.**
18. M.A. Filatov*, S. Balushev, K. Landfester, Protection of Densely Populated Excited Triplet State Ensembles Against Deactivation by Molecular Oxygen. *Chem. Soc. Rev.*, **2016**, *45*, 4668-4689. **Highlighted on the front cover.**
19. T.G.B. de Souza, M.G. Vivas, C.R. Mendonça, S. Plunkett, M.A. Filatov, M.O. Senge, L. De Boni, Studying the intersystem crossing rate and triplet quantum yield of *meso*-substituted porphyrins by means of pulse train fluorescence technique. *J. Porphyrins Phthalocyanines*, **2016**, *20*, 1–10.
20. M.A. Filatov*, F. Etzold, D. Gehrig, F. Laquai, D. Busko, K. Landfester, S. Balushev, Interplay between singlet and triplet excited states in a conformationally locked donor–acceptor dyad. *Dalton Trans.*, **2015**, *44*, 19207-19217.
21. M.A. Filatov*, E. Heinrich, K. Landfester, S. Balushev, *meso*-Tetraphenylporphyrin with a pi-system extended by fusion with anthraquinone. *Org. Biomol. Chem.*, **2015**, *13*, 6977-6983.
22. M.A. Filatov*, E. Heinrich, D. Busko, I.Z. Ilieva, K. Landfester, S. Balushev, Reversible Oxygen Addition on a Triplet Sensitizer Molecule: Protection from Excited States Depopulation. *Phys. Chem. Chem. Phys.*, **2015**, *17*, 6501-6510.
23. M.A. Filatov, S. Ritz, I. Ilieva, V. Mailander, K. Landfester, S. Balushev, Extending the infrared limit of oxygenic photosynthesis. *SPIE Newsroom*, **2014**, doi: 10.1117/2.1201403.005378.
24. C. Wohnhaas, V. Mailänder, M. Dröge, M.A. Filatov, D. Busko, Y. Avlasevich, Stanislav Balushev, T. Miteva, K. Landfester, A. Turshatov, Fabrication of low-power upconverting nanocapsules for bioimaging in red and far-red spectral regions. *Macromolecular Bioscience*, **2013**, *13*, 1422–1430.
25. M.A. Filatov*, S. Balushev, I.Z. Ilieva, V. Enkelmann, T. Miteva, K. Landfester, S. Aleshchenkov, A.V. Cheprakov, Tetraanthraporphyrins: synthesis, structure and optical properties. *J. Org. Chem.*, **2012**, *77*, 11119–11131.
26. P.D. Harvey, A. Langlois, M.A. Filatov, D. Fortin, K. Ohkubo, S. Fukuzumi, R. Guillard, Decoupling the Artificial Special Pair to Slow Down the Rate of Singlet Energy Transfer. *J. Porphyrins Phthalocyanines*, **2012**, *16*, 8-10.

27. E.R. Ranyuk, M.A. Filatov, A.D. Averin, A.V. Cheprakov, I.P. Beletskaya, The Synthesis of Highly Basic π -Extended Porphyrins by Palladium Catalyzed Amination. *Synthesis*, **2012**, 3, 393-398.
28. S. Thyagarajan, B. Ghosh, M.A. Filatov, A.V. Moore, A.V. Cheprakov, S.A. Vinogradov, Near infrared dipyrin-based fluorogenic chelators for metal ions. *Proc. SPIE*, **2011**, 7910, 79100Z.
29. P.D. Harvey, M.A. Filatov, R. Guillard, Bis- and Trisporphyrin Bio-Inspired Models for Bacterial Antennas and Photosystems. *J. Porphyrins Phthalocyanines*, **2011**, 15, 1-22.
30. M.A. Filatov, A.V. Cheprakov, The Synthesis of New Tetrabenzo- and Tetranaphthoporphyrins via the Addition Reactions of 4,7-Dihydroisindole. *Tetrahedron*, **2011**, 3559-3566.
31. M.A. Filatov, F. Laquai, D. Fortin, R. Guillard, P.D. Harvey, Strong Donor-Acceptor Couplings in a Special Pair-Antenna Model. *Chem. Comm.*, **2010**, 46, 9176-9178.
32. M.A. Filatov, A. Y. Lebedev, S.N. Mukhin, S. A. Vinogradov and A. V. Cheprakov, π -Extended Dipyrins Capable of Highly Fluorogenic Complexation with Metal Ions. *J. Am. Chem. Soc.*, **2010**, 132, 9552-9554.
33. M.A. Filatov, R. Guillard, P. Harvey, Selective Stepwise Suzuki Cross-coupling Reaction for the Modelling of Photosynthetic Donor-Acceptor Systems. *Org. Lett.*, **2010**, 12, 196-199.
34. A.V. Cheprakov, M.A. Filatov, The Dihydroisindole Approach to π -Extended Porphyrins. *J. Porphyrins and Phthalocyanines*, **2009**, 13, 291-303.
35. A.Y. Lebedev, M.A. Filatov, A.V. Cheprakov, S.A. Vinogradov, Effects of Structural Deformations on Optical Properties of Tetrabenzoporphyrins: Free-bases and Pd Complexes. *J. Phys. Chem. A*, **2008**, 112, 7723-7733.
36. M.A. Filatov, A.Y. Lebedev, S.A. Vinogradov, A.V. Cheprakov, Synthesis of 5,15-Diaryltetrabenzoporphyrins. *J. Org. Chem.*, **2008**, 73, 4175-4185.
37. M.A. Filatov, A.V. Cheprakov, I.P. Beletskaya, A Facile and Reliable Method for the Synthesis of Tetrabenzoporphyrins from 4,7-Dihydroisindole. *Eur. J. Org. Chem.*, **2007**, 3468-3475.
38. O.S. Finikova, A.V. Cheprakov, S.Y. Chernov, M.A. Filatov, S.A. Vinogradov, I.P. Beletskaya. Novel Synthesis of Substituted Tetraaryltetrabenzoporphyrins. *Doklady Chemistry*, **2003**, 391, 222-224.

Book chapters

M.A. Filatov, Protection of triplet excited state materials from oxygen quenching and photooxidation in optical sensing applications in *Applications of Quenched Phosphorescence Detection of Molecular Oxygen in Life Sciences*, ed. D. B. Papkovsky and R. I. Dmitriev, Royal Society of Chemistry, Cambridge, **2018**, pp. 91-116, ISBN: 978-1-78801-175-4.