

# 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 dipyrins with  $\pi$ -extended system". Supervisors: I.P. Beletskaya and A.V. Cheprakov
- 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:  $\pi$ -extended porphyrins, metal dipyrins, boron dipirromethenes (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 (2<sup>nd</sup> year BSc in Medicinal Chemistry & Pharmaceutical Sciences)  
Module coordinator for CHEM3011 - Organic Chemistry & Stereochemistry

## • Reviewer Activities

### Journal articles reviewed (239)

Acted as a referee and adjudicative referee for 37 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 (13), Journal of Materials Chemistry C (11), Photochemical and Photobiological Sciences (6), Dyes and Pigments (6), Journal of Physical Chemistry (6), Chemical Science (6), ACS Materials Letters (5), Journal of the American Chemical Society (4), RSC Advances (4), New Journal of Chemistry (3), JACS Au (2), Chemistry and Biodiversity (2), European Journal of Inorganic Chemistry (2), Small (2), Nanoscale (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), ACS Catalysis (1), ACS Omega (1), Nature Communications (1), Chemical Reviews (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  $\pi$ -extended Dipyrrromethenes 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), > 1900 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. Mailänder, 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. Guilard, 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  $\pi$ -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. Guilard, 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 Tetrabenz- and Tetranaphthoporphyrins via the Addition Reactions of 4,7-Dihydroisindole. *Tetrahedron*, **2011**, 3559-3566.
31. M.A. Filatov, F. Laquai, D. Fortin, R. Guilard, 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,  $\pi$ -Extended Dipyrins Capable of Highly Fluorogenic Complexation with Metal Ions. *J. Am. Chem. Soc.*, **2010**, *132*, 9552-9554.
33. M.A. Filatov, R. Guilard, 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  $\pi$ -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.