

CURRICULUM VITAE

Dr Mikhail A. Filatov

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• Professional Experience

- 10/2017–current Assistant Lecturer
School of Chemical and Pharmaceutical 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 Fellow
Max Planck Institute for Polymer Research, Mainz, Germany
- 12/2008– 12/2009 CNRS Postdoctoral Fellow
Institute of Molecular Chemistry, University of Burgundy, Dijon, France
- 06/2008– 07/2008 Visiting Scientist
Department of Biochemistry and Biophysics, University of Pennsylvania, Philadelphia, USA
- 10/2005– 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 π -extended system”. Supervisors: Prof. Irina Beletskaya, Dr. Andrei Cheprakov
- 09/2000– 07/2005 Diploma of Chemist (with honours)
Department of Chemistry, Moscow State University, Moscow, Russia

• Research Interests

Multistep organic synthesis (π -extended porphyrins, dipyrins, BODIPYs). Synthesis of materials (polymeric nanoparticles, biopolymers, graphene oxide, MOFs). Singlet oxygen (generation, sensing, reactivity). Photoinduced electron transfer. Intersystem crossing in heavy-atom-free molecules. Photodynamic therapy. Triplet-triplet annihilation photon upconversion. Photocatalysis.

• Funding and Support

- 2020 – current TU Dublin PG Scholarship Programme
Project: “Heavy-Atom-Free Photosensitizing Materials”
- 2015 – 2017 European Commission, Horizon 2020 program
Project: “Controlled Singlet Oxygen Release Sensitizer in Photodynamic Therapy”
- 2015 – 2014 Max Planck Society Scholarship
- 2007 – 2008 Scholarship of the President of Russian Federation for outstanding PhD students
- 2005 Russian Foundation for Assistance to Small Innovative Enterprises (spin-off)
Project: “Development of Technology of 24-Epibrassinolide Production”

• Teaching Experience

Current teaching responsibilities:

CHEM1007 – Introduction to Chemistry (24 lectures), CHEM2008 – Organic Chemistry (12 lectures), CHEM2022 – Spectroscopy (12 lectures), CHEM2024 - Pharmaceutical & Bioorganic Chemistry (12 lectures), CHEM2025 - Medicinal Chemistry & Pharmchem Processes (12 lectures), CHEM3011 - Organic Chemistry & Stereochemistry (12 lectures), CHEM4008 - Topics in Medicinal Chemistry (6 lectures)

Previously taught modules:

CHEM2009 - Principles of Drug Action (6 lectures), CHEM2023 - Organic Chemistry (12 lectures), CHEM3003 - Organic Chemistry & Stereochemistry (12 lectures), CHEM4004 - Advanced Organic Chemistry (12 lectures)

Departmental admin roles: year coordinator of DT261-2 group (BSc in Medicinal Chemistry and Pharmaceutical Sciences)

• Students Supervision

To date, designed and supervised 1 MSc, 10 BSc and 4 internship (Erasmus) student projects.

• Reviewer Activities

Journal articles (108):

Chemical Communications (40), *ChemistrySelect* (25), *The Journal of Organic Chemistry* (14), *Photochemical and Photobiological Sciences* (4), *Chemistry – A European Journal* (4), *New Journal of Chemistry* (3), *Physical Chemistry Chemical Physics* (3), *Angewandte Chemie International Edition* (2), *Chemistry and Biodiversity* (2), *Dyes and Pigments* (2), *RSC Advances* (3), *Electroanalysis* (1), *Chemistry – An Asian Journal* (1), *Journal of Physical Chemistry* (1), *ChemPhotoChem* (1), *ChemPhysChem* (1), *Chemical Science* (1)

Reviewer Identifier: publons.com/a/1546745/

Funding applications (13):

European Commission H2020, ANR (Agence nationale de la recherche), Polish National Science Centre

• Memberships in Professional Societies

American Chemical Society, Marie Curie Fellows Association, Marie Curie Alumni Association (Irish chapter)

• Publications

Summary: 30 scientific papers published (13 as a corresponding author), 1 book chapter, 4 patents.

h index = 16 (Google Scholar), > 900 citations

<https://scholar.google.bg/citations?user=g1ldjV4AAAAJ&hl=ru>

Orcid ID: orcid.org/0000-0002-1640-841X

Peer-review articles

(* corresponding author)

1. 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**, DOI: 10.1021/acs.jpcclett.0c01902

1. M.A. Filatov* Heavy-atom-free BODIPY Photosensitizers with Intersystem Crossing Mediated by Intramolecular Photoinduced Electron Transfer. *Org. Biomol. Chem.*, **2019**, 18, 10-27

2. 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.

3. 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.
4. 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.
5. 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.
6. 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.
7. 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.
8. 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.
9. 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.
10. 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.
11. 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.
12. 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.
13. 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.
14. 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.
15. 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.
16. 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.
17. 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.
18. 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.
19. 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.
20. 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.

21. 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.
22. 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.
23. 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.
24. 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.
25. A.V. Cheprakov, M.A. Filatov, The Dihydroisindole Approach to π -Extended Porphyrins. *J. Porphyrins and Phthalocyanines*, **2009**, 13, 291-303.
26. 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.
27. M.A. Filatov, A.Y. Lebedev, S.A. Vinogradov, A.V. Cheprakov, Synthesis of 5,15-Diaryltetrabenzoporphyrins. *J. Org. Chem.*, **2008**, 73, 4175-4185.
28. 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.
29. 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.

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**

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.

• Talks and Seminars (in the last 5 years)

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| 12/2018 | "Heavy atom-free donor-acceptor dyads with efficient and tunable intersystem crossing" | Invited talk |
| | 10th Asian Photochemistry Conference, Taipei, Taiwan | |
| 07/2018 | "Janus-faced chromophores: Dual performance of BODIPY in triplet-triplet annihilation photon upconversion" | Oral presentation |
| | 27th PhotoIUPAC, Dublin, Ireland | |
| 11/2017 | "Molecular oxygen shuttles for applications in energy conversion and biomedicine" | Invited talk |
| | 2 nd Silk Road International Symposium for Young Distinguished Scholars, Xian, China | |
| 07/2017 | "Heavy atom-free BODIPY donor-acceptor dyads as singlet oxygen sensitizers" | Oral presentation |
| | 28th International Conference on Photochemistry, Strasbourg, France | |

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| 04/2017 | "Interplay Between Singlet and Triplet Energy States of Organic Molecules and Oxygen: Applications in Energy Conversion and Biomedicine" ICMUB, University of Burgundy, Dijon, France | Research seminar |
| 12/2016 | "Protection of Triplet Excited State Materials Against Quenching by Oxygen" 9th Asian and Oceanian Conference on Photochemistry, Singapore | Oral presentation |
| 09/2016 | "Deactivation of Photon Upconversion Systems by Oxygen: Protection strategy" EMN Meeting on Photonics, Barcelona, Spain | Invited Talk |
| 04/2016 | "Controlled Singlet Oxygen Release Photosensitizers in Photodynamic Therapy" TBSI Postdoctoral Research Day, TCD, Dublin, Ireland | Oral presentation |
| 01/2016 | "New Molecular Devices for the Control of Singlet Oxygen Generation in Photonic and Biomedical Applications" Central European Conference on Photochemistry CECP, Bad Hofgastein, Austria | Oral presentation |
| 11/2016 | "Delayed Singlet Oxygen Release Materials for Photodynamic Therapy" TBSI Knowledge Exchange Seminar, TCD, Dublin, Ireland | Research seminar |
| 07/2015 | "Triplet-Triplet Annihilation Photon Upconversion: Extending the Infrared Limit of Oxygenic Photosynthesis" 27th International Conference on Photochemistry, Jeju, South Korea | Oral presentation |
| 07/2015 | "Polymeric Singlet Oxygen Generating Scaffolds" 27th International Conference on Photochemistry, Jeju, South Korea | Oral presentation |