

Milan M. Fowkes

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Education

- 2016–present** **DPhil Musculoskeletal Sciences, University of Oxford (Oxford, England)**
- Thesis: *“Designing selective ADAMTS-5 substrates to detect and image proteinase activity in vivo”*
 - Supervisors: Ngee H. Lim, Tonia L. Vincent, Paul E. Brennan, Morten Meldal
- 2012–2014** **MSc Chemistry (Molecular Imaging), Western University (London, Canada)**
- Thesis: *“Peptidomimetic GHS-R1a agonists as PET imaging agents for prostate cancer”*
 - Supervisor: Leonard G. Luyt
 - Courses: mechanistic organic chemistry (90%), molecular imaging (95%) and departmental seminar (94%)
- 2007–2011** **MChem Chemistry (1st), University of Warwick (Coventry, England)**
- Thesis: *“Bond rotation and radical cyclisation studies of N-alkenyl-N-2-bromobenzyl acetamides”*
 - Supervisor: Andrew J. Clark
- 1994–2007** **European Baccalaureate (84%), European School (Culham, England)**
- Subjects: Chemistry (85%), Biology (79%), Lab Biology/Chemistry (79%), Mathematics (80%), History* (96%), Geography* (98%), Philosophy (91%), English (84%), German (76%), Music (88%) and Physical Education (81%)
- *Taught and examined in German

DPhil research experience

- 2019–present** **Peptide chemistry and enzyme kinetics (University of Oxford, England)**
- Analysed MALDI and MS/MS spectra of peptides using Bruker Compass DataAnalysis software
 - Synthesised an amino acid building block for peptide synthesis
- 2018–2019 (7 m)** **Computation and library synthesis (University of Copenhagen, Denmark)**
- Modelled peptides into the active site of enzymes using molecular operating environment (MOE) software
 - Synthesised fluorogenic peptides through manual Fmoc-based solid-phase peptide synthesis (Fmoc-SPPS)
 - Synthesised a combinatorial peptide library using “split-mix” synthesis
 - Monitored enzyme-mediated peptide cleavage on-resin and off-resin using a fluorescent microscope and spectrofluorometer
 - Prepared, ran and analysed samples by MALDI mass spectrometry

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- 2016–2018 (24 m) Cell culture and protein purification (University of Oxford, England)**
- Cultured and purified mammalian metalloproteinases (MMP-2, ADAMTS-4,-5)
 - Characterised metalloproteinases by Western blotting, Silver/Coomassie staining (MMP-2, ADAMTS-4,-5) and zymography (MMP-2)
 - Performed active-site titrations using endogenous and small-molecule metalloproteinase inhibitors
 - Carried out reaction kinetics of matrix metalloproteinases (MMP-1,-2,-3,-7,-9,-12,-13,-14), ADAMs (ADAM-17) and ADAMTSs (ADAMTS-1,-4,-5)
 - Determined inhibition constants (K_i) of small molecule inhibitors

Additional research experience

- 2015–2016 (18 m) Research Assistant, University of Oxford (Oxford, England)**
- Synthesised and purified radiopaque peptides using automated Fmoc-SPPS (CEM Liberty Blue)
 - Characterised peptides by HPLC and $^1\text{H-NMR}$ (COSY, TOCSY, ROESY)
 - Synthesised and purified macro-cyclic DOTAM scaffolds
 - Maintained the peptide synthesiser and laboratory supplies
- 2012–2014 (24 m) MSc, Western University (London, Canada)**
- Synthesised peptidomimetics using both manual and automated Fmoc-SPPS (Biotage SyroWave)
 - Characterised peptides through $^1\text{H-NMR}$ (COSY, TOCSY, NOESY, ROESY)
 - Performed analytical and preparative runs on HPLC-MS and UPLC-MS systems
 - Carried out receptor-ligand binding assays using competitive radio-ligands
 - Conducted manual ^{18}F -prosthetic group radiolabelling of peptides
 - Presented a full departmental seminar on “mixing in microfluidics”
- 2010–2011 (5 m) MChem, University of Warwick (Coventry, England)**
- Synthesised and fully characterised a series of *N*-alkenyl-*N*-2-bromobenzyl acetamides ($^1\text{H-NMR}$, $^{13}\text{C-NMR}$, COSY, NOE, NOESY, LRMS, HRMS)
 - Performed radical cyclisations of final compounds using the $\text{Bu}_3\text{SnH/ACN}$ radical mediating system

Supervision experience

- 2019 (8 w) Peptide chemistry, University of Oxford (Oxford, England)**
- Second year undergraduate biomedical sciences student (~10 h/week)
 - Taught Fmoc-SPPS, peptide purification
- 2017 (8 w) Peptide chemistry, University of Oxford (Oxford, England)**
- Second year undergraduate medical sciences student (~10 h/week)
 - Taught Fmoc-SPPS, hydrogel synthesis, peptide purification and characterisation

Teaching experience

- 2012-2014** **Teaching assistant, Organic chemistry, Western University (London, Canada)**
- Prepared and delivered weekly pre-laboratory talks
 - Demonstrated classes of 18-24 with a second teaching assistant
 - Marked laboratory reports and invigilated examinations
- ↳ **2014 (140 h)** **Organic chemistry II: mechanisms and reactivity**
- Second year organic chemistry for chemists (6 h/week)
 - Marked examination papers for the final exam
 - Selected topics: additions, eliminations and substitutions
- ↳ **2013 (70 h)** **Organic chemistry I: structure and spectroscopy**
- Second year organic chemistry for chemists (3 h/week)
 - Selected topics: chromatography, recrystallisation and spectroscopy
- ↳ **2012–13 (210 h)** **Organic chemistry for life sciences**
- First year organic chemistry course for non-chemists (3-6 h/week)
 - Selected topics: extraction, recrystallisation and tests for alkenes

Administration experience

- 2019 Established combinatorial chemistry facilities at the Kennedy Institute (Oxford, England)
- 2017 Chaired a session at the Kennedy Institute Student Symposium (Oxford, England)
- 2015 Wrote risk assessments and standard operating procedures for peptide synthesis (Oxford, England)

Relevant training

- Presentation skills (half-day, 2017)
- Writing skills-thesis and papers (1 day, 2017)
- Image perception, processing and analysis (Fiji and Cellprofiler, half-day, 2017)
- Research skills toolkit (EndNote, RefWorks, GIMP, Audacity, Lynda, Scopus, journal impact factors and journal citation reports, 2 h, 2016)
- Preparing for learning and teaching (1 day, 2016)
- Data analysis-designing clinical research and biostatistics (SPSS, 2 days, 2016)

Publications

- **Fowkes, M.M.**; Lim, N.H.; “Purification and activity determination of ADAMTS-4 and ADAMTS-5 and their domain deleted mutants” *Methods Mol. Biol.* **2020**, 2043, 75-91.
- **Fowkes, M.M.**; Lalonde, T.; Yu, L.; Dhanvantari, S.; Kovacs, M.S.; Luyt, L.G. “Peptidomimetic growth hormone secretagogue derivatives for positron emission tomography imaging of the ghrelin receptor” *Eur. J. Med. Chem.* **2018**, 157, 1500-1511.
- Hou, J.; Charron, C.; **Fowkes, M.M.**; Luyt, L.G. “Bridging computational modeling with amino acid replacements to investigate GHS-R1a-peptidomimetic recognition” *Eur. J. Med. Chem.* **2016**, 123, 822-833.
- **Fowkes, M.M.** “Peptidomimetic GHS-R1a agonists as PET imaging agents for prostate cancer” (2014) *University of Western Ontario-Electronic Thesis and Dissertation Repository Paper 1972* [master’s thesis].

Conference abstracts

- Fowkes, M.M.; Vincent, T.L.; Brennan, P.E.; Meldal, M.; Lim, N.H. *Developing selective ADAMTS-5 substrates to survey cartilage degradation in osteoarthritis*, Cutting Edge Osteoarthritis Meeting, Oxford, United Kingdom, 24th-25th June 2019 [**poster presentation**].
- Fowkes, M.M.; Vincent, T.L.; Brennan, P.E.; Meldal, M.; Lim, N.H. *Screening method for obtaining selective ADAMTS-5 substrates to track proteinase activity in vivo*, 36th Winter School on Proteinases and their Inhibitors, Tiers am Rosengarten, Italy, March 13th-March 17th 2019 [**oral presentation**].
- Fowkes, M.M.; Meldal, M.P.; Vincent, T.L.; Lim, N.H. *Screening for selective aggrecanase substrates to detect early proteolytic events in cartilage degradation*, Osteoarthritis Research Society International (OARSI) World Congress on Osteoarthritis, Liverpool, United Kingdom, April 26-29th 2018 [**poster presentation**].
- Fowkes, M.M.; Meldal, M.P.; Vincent, T.L.; Lim, N.H. *Screening for ADAMTS-4 and ADAMTS-5-selective substrates to detect and monitor proteinase activity in vivo*, 35th Winter School on Proteinases and their Inhibitors, Tiers am Rosengarten, Italy, February 28th-March 4th 2018 [**oral presentation**].
- Fowkes, M.M.; Das Neves Borges, P.; Brennan, P.E.; Vincent, T.L.; Lim, N.H. *Di-iodotyrosinated peptides as targeted radio-contrast agents*, 25th American Peptide Symposium (APS), Whistler, B.C., Canada, June 17th-22nd 2017 [**poster presentation**].
- Fowkes, M.M.; Das Neves Borges, P.; Brennan, P.E.; Vincent, T.L.; Lim, N.H. *Di-iodotyrosinated Peptide Imaging of Cartilage (DIPIC)*, 11th Chemistry and Biology of Peptides Meeting, Oxford, United Kingdom, November 9th 2016 [**oral presentation**].
- Fowkes, M.M.; Das Neves Borges, P.; Brennan, P.E.; Vincent, T.L.; Lim, N.H. *Di-iodotyrosinated Peptide Imaging of Cartilage (DIPIC)*, Oxford Biomedical Imaging Festival, Oxford, United Kingdom, October 18th 2016 [**poster presentation**].

Conference abstracts (continued)

- Fowkes, M.M.; Dhanvantari, S.; Kovacs, M.; Luyt, L.G. *Peptidomimetic GHS-R1a Agonists as PET Imaging Agents for Prostate Cancer*, 97th Canadian Chemistry Conference and Exhibition (CSC), Vancouver, B.C., Canada, June 1-5th 2014 [**oral presentation**].
- Fowkes, M.M.; McGirr, R.; Dhanvantari, S.; Luyt, L.G. *Peptidomimetic GHS-R1a Agonists as PET Imaging Agents for Prostate Cancer*, CIHR-STP in Cancer Research & Technology Transfer Research and Education Day, London, ON, Canada, June 21st 2013 [**poster presentation**].

Patents

- Lim N.H.; **Fowkes M.M.** Radiopaque compound containing diiodotyrosine, WO Patent 2018/020262 A1, February 1st 2018.
- Luyt, L.G.; **Fowkes, M.M.** Peptidomimetics for imaging the ghrelin receptor, US Patent 2018/0155395 A1, WO Patent WO2016/191865 A1, July 6th 2018 and December 8th 2016.

Awards, nominations and funding

- 2019 Best speaker award in activity-based probes session (36th Winter School)
- 2018 Researcher Mobility Grant (£4000, Royal Society of Chemistry)
- 2017 Wolfson College Travel Grant (£200, Wolfson College, University of Oxford)
- 2016-2020 Kennedy Trust Prize Studentship (£22000 p.a., University of Oxford)
- 2014 Top-ranked chemistry faculty master's candidate for Governor General's Gold Medal (Western University)
- 2014 Molecular Imaging Program Travel Award (\$300 CAD, Western University)
- 2013 Nominated for a Graduate Student Teaching Assistant Award (Western University)
- 2013 Western Graduate Research Scholarship (\$3750 CAD, Western University)
- 2012-2014 International Graduate Tuition Scholarship (\$7500 CAD p.a., Western University)
- 2012-2014 Graduate Student Stipend (\$20500 CAD p.a., Western University)
- 2007 German Embassy Prize for Excellence in German

Professional memberships

- 2019 Member of the British Society for Matrix Biology
- 2019 Member of the European Peptide Society
- 2017 Member of the American Peptide Society
- 2017 Associate Member of the Royal Society of Chemistry (AMRSC)

Linguistic skills

English (native), Czech (fluent), German (fluent), Italian (intermediate) and Korean (beginner)