

Jonathan K. Watts

BSc, PhD, MRSC, FHEA

RNA Therapeutics Institute

UMass Medical School

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Experience

- 2015- **Associate Professor**, RNA Therapeutics Institute
(secondary appointment in Biochemistry and Molecular Pharmacology)
University of Massachusetts Medical School, Worcester, MA
- 2015 **Associate Professor of Chemical Biology**
2012-2015 **Lecturer (Assistant Professor) of Chemical Biology**
Department of Chemistry and Institute for Life Sciences
University of Southampton, Highfield, Southampton, UK
- 2008-2012 **Postdoctoral Fellow**, Departments of Pharmacology and Biochemistry,
University of Texas Southwestern Medical Center, Dallas, TX

Education

- 2013-2015 Postgraduate Certificate in Academic Practice, University of Southampton, UK
This qualification confers Fellowship of the Higher Education Academy (FHEA)
- 2002-2008 **PhD** in Bioorganic Chemistry, McGill University, Montreal, QC
Supervisor: Masad J. Damha
Thesis title: Chemistry for Gene Silencing: 4'-Modified and 2'-Fluorinated
Nucleosides and Oligonucleotides
Thesis defended June 6, 2008, and degree granted November 14, 2008
- 1997-2001 **BSc (Honours)** in Chemistry, Dalhousie University, Halifax, NS, with distinction
Honors supervisor: T. Bruce Grindley

Honours and Awards

- Aug. 2017 – Breakthrough Science Initiative Award, Ono Pharmaceutical Foundation
- July 2015 – Vice-Chancellor's Award for Teaching, University of Southampton
- Oct. 2013 – Young Investigator Award, Oligonucleotide Therapeutics Society
- Dec. 2012 – Marie Curie "Career Integration Grant" from the European Commission
- April, 2010 – NSERC postdoctoral fellowship (\$40,000 annually, July 2010–2012).
- June, 2007 – FQRNT postdoctoral fellowship (\$30,000 annually, July 2008–June 2010)
- April, 2007 – Pall Dissertation Award for excellence in the final year of PhD studies (\$2000)
- April, 2006 – Montreal CSC 2001 Award for excellence in research (\$1000 travel grant)
– Organic Division Oral Presentation Award, Canadian Society for Chemistry
(CSC) conference (third prize, \$50)
- May, 2005 – NSERC Canada Graduate Scholarship (\$35,000 annually for two years)
- May, 2004 – Organic Division Oral Presentation Award, CSC Conference (\$200)

- May, 2003 – T. Sterry Hunt Award for teaching excellence in undergraduate labs (\$400)
 – NSERC Post-Graduate Scholarship A (\$17,400 annually for two years)
- May, 2002 – Tomlinson Fellowship for top-level graduate students entering McGill
 (\$20,000 annually for three years)
- May, 2001 – Best undergraduate bio/medicinal presentation, Atlantic Student Chemistry
 Conference (\$150 + Merck Index)
- April, 2001 – University Medal in Chemistry, Dalhousie University
 – Society of Chemical Industry Merit Award
 – John Carstairs Arnell Award for best honors research & presentation (\$350)
 – Award of excellence in the French course “Approaches to Literary Texts.”
- April, 2000 – CSC Silver Medal: Highest standing, 3rd year chemistry at Dalhousie
 – Walter J. Schute Prize (\$1000), Belle Crowe Scholarship in Chemistry
 (\$700), and E. Walter Todd Scholarship.
- May, 1999 – Knop Prize in Inorganic Chemistry;
 – NSERC Undergraduate Summer Research Fellowship

Original Research Publications

- 26) K.S. Ghanta, G.A. Dokshin, A. Mir, P.M. Krishnamurthy, A. Edraki, H. Gneid, **J.K. Watts***, E.J. Sontheimer*, C.C. Mello*. “5' Modifications Improve Potency, Efficacy and Tolerability of DNA Donors for Precision Genome Editing,” submitted.
- 25) V.K. Sharma, M.F. Osborn, M. Hassler; D. Echeverria, S. Ly, E. Ulashchik, Y. Martynenko-Makaev, V. Shmanai, T. Zatsepin, A. Khvorova*, **J.K. Watts***, “Novel cluster and monomer-based GalNAc structures induce effective uptake of siRNAs in vitro and in vivo,” *Bioconjugate Chemistry*, under revision.
- 24) A. Mir, J.F. Alterman, M.R. Hassler, A.J. Debacker, E. Hudgens, D. Echeverria, M.H. Brodsky, A. Khvorova*, **J.K. Watts***, E.J. Sontheimer*. “Heavily and Fully Modified RNAs Guide Efficient SpyCas9-Mediated Genome Editing,” *Nature Communications*, in press.
- 23) A.K. Hedger, M. Oomen, V. Liu, M.P. Moazami, N. Rhind, J. Dekker, **J.K. Watts*** “Progress toward an amplifiable metabolic label for DNA: Conversion of 4-thiothymidine (4sT) to 5-methylcytidine and synthesis of a 4sT phosphorodiamidate prodrug,” *Canadian Journal of Chemistry*, in press. DOI: 10.1139/cjc-2017-0732.
- 22) L. Li, X. Shen, Z. Liu, M. Norrbom, T.P. Prakash, D. O'Reilly, V.K. Sharma, M.J. Damha, **J.K. Watts**, F. Rigo, D.R. Corey, “Activation of Frataxin Protein Expression by Antisense Oligonucleotides Targeting the Mutant Expanded Repeat,” *Nucleic Acid Therapeutics*, **28**: 23-33, 2018.
- 21) M.F. Osborn, A.H. Coles, D. Golebiowski, D. Echeverria, M. Moazami, **J.K. Watts**, M. Sena-Esteves, A. Khvorova, “Efficient gene silencing in brain tumors with hydrophobically modified siRNAs,” *Molecular Cancer Therapeutics*, **17**: 1251-1258, 2018.
- 20) J. Hu, Z. Rong, X. Gong, Z. Zhou, V.K. Sharma, C. Xing, **J.K. Watts**, D.R. Corey, V. Mootha, “Oligonucleotides Targeting TCF4 Triplet Repeat Expansion Inhibit RNA Foci and Mis-splicing in Fuchs' Dystrophy,” *Human Molecular Genetics*, **27**: 1015-1026, 2018.
- 19) V.K. Sharma, S.K. Singh, P.M. Krishnamurthy, J.F. Alterman, R.A. Haraszti, A. Khvorova, A.K. Prasad, **J.K. Watts***, “Synthesis and biological properties of triazole-linked locked nucleic acid,” *Chemical Communications*, **53**: 8906-8909, 2017.

- 18) H.M. Pendergraff, P.M. Krishnamurthy, A.J. Debacker, M. Moazami, V.K. Sharma, L. Niitsoo, Y. Yu, Y.N. Tan, H.M. Haitchi, **J.K. Watts***, "Locked Nucleic Acid (LNA) gapmers and conjugates induce potent silencing of ADAM33, an asthma-associated metalloprotease with nuclear-localized mRNA," *Molecular Therapy – Nucleic Acids*, **8**: 158-168, 2017. **Highlighted as a hot paper by the OTS.**
- 17) H.M. Pendergraff, A.J. Debacker, **J.K. Watts***, "Single-stranded siRNAs: Hit rate and chemical modification," *Nucleic Acid Therapeutics*, **26**: 216-222, 2016. **Highlighted as a hot paper by the OTS.**
- 16) H. Brambhatt, A. Poma, H.M. Pendergraff, **J.K. Watts**, N.W. Turner, "Improvement of DNA recognition through molecular imprinting: hybrid oligomer imprinted polymeric nanoparticles (oligoMIP NPs)," *Biomaterials Science*, **4**: 281-287, 2016.
- 15) A. Poma, H. Brahmbhatt, H.M. Pendergraff, **J.K. Watts**, N.W. Turner, "Generation of Novel Hybrid Aptamer Molecularly Imprinted Polymeric Nanoparticles (AptaMIP NPs)," *Advanced Materials*, **27**: 750-758, 2015.
- 14) A. Poma, H. Brahmbhatt, **J.K. Watts**, N.W. Turner, "Nucleoside-tailored Molecularly-Imprinted Polymeric Nanoparticles (MIP-NPs)," *Macromolecules*, **47**: 6322-6330, 2014.
- 13) K. Schaukowitch, J.-Y. Joo, Xihui Liu, **J.K. Watts**, C. Martinez, and T.-K. Kim, "Enhancer RNA facilitates NELF release from immediate early genes," *Molecular Cell*, **56**: 29-42, 2014. **Highlighted in a preview by B. Plotzky (Mol. Cell, 56: 3-4, 2014).**
- 12) K.T. Gagnon, **J.K. Watts***, H.M. Pendergraff, C. Montallier, D. Thai, P. Potier, and D.R. Corey*, "Antisense and Antigene Inhibition of Gene Expression by Cell-Permeable Oligonucleotide-Oligospermine Conjugates," *Journal of the American Chemical Society*, **133**: 8404-8407, 2011. **corresponding authors.*
- 11) M. Yahyaee, **J.K. Watts***, N.R. Alla, A.W. Nicholson and M.J. Damha*; "Energetically Important C-H...F-C Pseudohydrogen Bonding in Water: Evidence and Application to Rational Design of Oligonucleotides with High Binding Affinity," *Journal of the American Chemical Society*, **133**: 728-731, 2011. **Highlighted in Faculty of 1000 (Biology).** **corresponding authors.*
- 10) J. Hu, K.T. Gagnon, J. Liu, **J.K. Watts**, J. Syeda-Nawaz, C.F. Bennett, E.E. Swayze, J. Randolph, J. Chattopadhyaya and D.R. Corey*; "Allele-selective inhibition of ataxin-3 (ATX3) expression by antisense oligomers and duplex RNAs," *Biological Chemistry*, **392**: 315-325, 2011.
- 9) **J.K. Watts**, D. Yu, K. Charisse, C. Montallier, P. Potier, M. Manoharan and D.R. Corey; "Effect of chemical modifications on modulation of gene expression by duplex antigene RNAs that are complementary to non-coding transcripts at gene promoters," *Nucleic Acids Research*, **38**: 5242-5259, 2010.
- 8) G.F. Deleavey[†], **J.K. Watts[†]**, T. Alain, F. Robert, A. Kalota, V. Aishwarya, J. Pelletier, A.M. Gewirtz, N. Sonenberg and M.J. Damha, Synergistic effects between analogs of DNA and RNA improve the potency of siRNA-mediated gene silencing, *Nucleic Acids Research*, **38**: 4547-4557, 2010. *[†]equal contributors*
- 7) **J.K. Watts**, N. Martín-Pintado, I. Gómez-Pinto, J. Schwartzenruber, G. Portella, M. Orozco, C. González and M.J. Damha, "Differential stability of 2'F-ANA•RNA and ANA•RNA hybrid duplexes: roles of structure, pseudohydrogen bonding, hydration, ion uptake and flexibility," *Nucleic Acids Research*, **38**: 2498-2511, 2010. **Highlighted in Faculty of 1000 (Biology).**

- 6) **J.K. Watts**, A. Katolik, J. Viladoms and M.J. Damha; "Studies on the hydrolytic stability of 2'-fluoroarabinonucleic acid (2'F-ANA)," *Organic and Biomolecular Chemistry*, **7**: 1904-1910, 2009.
- 5) **J.K. Watts**, B.D. Johnston, K. Jayakanthan, A.S. Wahba, B.M. Pinto, and M.J. Damha, "Synthesis and biophysical characterization of oligonucleotides containing a 4'-selenonucleotide," *Journal of the American Chemical Society*, **130**: 8578-8579, 2008.
- 4) **J.K. Watts**, N. Choubdar, K. Sadalapure, F. Robert, A.S. Wahba, J. Pelletier, B.M. Pinto and M.J. Damha; "2'-Fluoro-4'-thioarabino-modified oligonucleotides: Conformational switches linked to siRNA activity," *Nucleic Acids Research*, **35**: 1441-1451, 2007.
- 3) M.L. Trapp, **J.K. Watts**, N. Weinberg, and B.M. Pinto; "Component analysis of the X-C-Y anomeric effect (X = O, S; Y = F, OMe, NHMe) by DFT molecular orbital calculations and natural bond orbital analysis," *Canadian Journal of Chemistry*, **84**: 692-701, 2006.
- 2) **J.K. Watts**, K. Sadalapure, N. Choubdar, B.M. Pinto and M.J. Damha; "Synthesis and conformational analysis of 2'-fluoro-5-methyl-4'-thioarabinouridine (4'S-FMAU)," *Journal of Organic Chemistry*, **71**: 921-925, 2006.
- 1) **J.K. Watts**, J. Jimenez-Barbero, A. Poveda and T.B. Grindley; "Control of disaccharide conformation through π -stacking," *Canadian Journal of Chemistry*, **81**: 364-375, 2003.

Reviews and Book Chapters

- 10) **J.K. Watts**, "The Medicinal Chemistry of Antisense Oligonucleotides," in N. Ferrari and R. Seguin, eds., *Antisense-based Drugs and Therapeutics – Preclinical and Clinical Considerations for Development*, John Wiley and Sons, in press (estimated publication date Q2 2018.)
- 9) A. Khvorova and **J.K. Watts**, "The chemical evolution of oligonucleotide therapies of clinical utility," *Nature Biotechnology*, **35**: 238-248, 2017.
- 8) V.K. Sharma and **J.K. Watts**, "Oligonucleotide Therapeutics: Chemistry, Delivery and Clinical Progress," *Future Medicinal Chemistry*, **7**: 2221-2242, 2016.
- 7) K.T. Gagnon and **J.K. Watts**, "The 10th Annual Meeting of the Oligonucleotide Therapeutics Society" [Meeting Report], *Nucleic Acid Therapeutics*, **24**: 428-434, 2014.
- 6) **J.K. Watts**, "Locked Nucleic Acid: Tighter is Different," *Chemical Communications*, **49**: 5618-5620, 2013.
- 5) **J.K. Watts** and D.R. Corey, "Silencing disease genes in the laboratory and in the clinic," *Journal of Pathology*, **226**: 365-379, 2012.
- 4) **J.K. Watts** and D.R. Corey, "Clinical status of duplex RNA," *Bioorganic and Medicinal Chemistry Letters*, **20**: 3203-3207, 2010.
- 3) G.F. Deleavey, **J.K. Watts** and M.J. Damha; "Chemical modification of siRNA," *Current Protocols in Nucleic Acid Chemistry*, Unit **16.3**, 2009.
- 2) **J.K. Watts**, G.F. Deleavey and M.J. Damha; "Chemically modified siRNA: Tools and applications," *Drug Discovery Today*, **13**: 842-855, 2008. **Cited over 300 times.**
- 1) **J.K. Watts** and M.J. Damha; "2'F-Arabinonucleic acids (2'F-ANA): History, properties and new frontiers," *Canadian Journal of Chemistry*, **86**: 641-656, 2008.

Education & Philosophy of Science Publications

- 2) D. Read, **J.K. Watts**, T.J. Wilson, "Partial flipping to support learning in lectures," in *The Flipped Classroom, Volume 2: Results from Practice*. J.L. Muzyka and C.S. Luker, eds, Washington, DC: ACS Symposium Series, pp. 55-79, 2016.
- 1) **J.K. Watts**, "Biological information, molecular structure and the origins debate," *Perspectives on Science and Christian Faith*, **63**: 231-239, 2011.

Patents Filed

K. Ghanta, G. Doshkin, A. Mir, E.J. Sontheimer, C. Mello, J.K. Watts, "Compositions and methods for improved gene editing," US Provisional Patent 62/658,368, filed April 16, 2018.

A. Mir, J. Alterman, M. Hassler, A.J. Debacker, M. Brodsky, E.J. Sontheimer, A. Khvorova, J.K. Watts, "Modified Guide RNAs for CRISPR Genome Editing," US Provisional Patent 62/644,944, filed March 19, 2018.

V.V. Mootha, D.R. Corey, **J.K. Watts** and J. Hu, "Treatment of Fuchs' Endothelial Corneal Dystrophy," US Provisional Patent 62/560,472, filed September 19, 2017.

J.K. Watts, H.M. Haitchi, and H.M. Pendergraff, "Anti-ADAM33 Oligonucleotides and Related Methods," US Provisional Patent 62/516,315, filed June 7, 2017.

M.J. Damha, **J.K. Watts** and G.F. Deleavey, "Oligonucleotide Duplexes Comprising DNA-like and RNA-like Nucleotides and Uses Thereof," US patent 9090649 B2 (grant). International Patent Application PCT/CA2009/000789 filed June 4, 2009 (claiming priority of US Provisional Patent 61/059,186, filed June 5, 2008).

This IP was licensed by Labopharm, Inc (Paladin Labs), in the spring of 2011.

M.J. Damha, **J.K. Watts** and B.M. Pinto, "Thioarabinonucleotide-Containing Oligonucleotides, Compounds and Methods for Their Preparation and Uses Thereof," International Patent Application PCT/CA2006/002035, filed December 14, 2006 (claiming priority of US Provisional Patent 60/750,838, filed December 16, 2005).

Invited Academic and Industrial Seminars

Southern Illinois University, Departments of Chemistry and Biochemistry, (Carbondale, IL, USA), August 2018

UMass Medical School, Department of Biochemistry and Molecular Pharmacology (Worcester, MA, USA), December 2015

University of Durham, Department of Chemistry (Durham, UK), April 2015

Peakdale Webinar on Modified Nucleosides and Nucleotides for Oligonucleotide Therapeutics (Webinar), February 2015

University of Massachusetts Medical School, RNA Therapeutics Institute (Worcester, MA, USA), February 2015

Nanyang Technical University (Singapore), January 2015

A*STAR (Singapore), January 2015

Xiamen University, Department of Chemistry (Xiamen, China), January 2015

Dalhousie University, Department of Chemistry (Halifax, NS, Canada), July 2014

University of Westminster, Department of Molecular and Applied Biosciences (London, UK),
July 2014
Open University, Biomedical Research Network (Milton Keynes, UK), May 2013
Actelion Pharmaceuticals (Basel, Switzerland), April 2013 and December 2013
Defense Science and Technology Laboratory (Porton Down, UK), April 2013

Conference Organisation

13th Annual Meeting of the Oligonucleotide Therapeutics Society
Bordeaux, 24-27 September 2017
Organizing Committee Member and Speaker
11th Annual Meeting of the Oligonucleotide Therapeutics Society
Leiden, 11-14 October 2015
Organizing Committee Member and Session Co-Chair
Nucleosides and Nucleotides: Synthetic and Biological Chemistry (London, 17 April 2015)
Symposium Co-Chair
Oligomer Oxford 2015 (Oxford, 30 March 2015)
Symposium Chair
10th Annual Meeting of the Oligonucleotide Therapeutics Society
San Diego, 12-15 October 2014
Organizing Committee Member and Session Co-Chair

Conference Presentations (oral)

I was the presenting author of the talks below. In addition, I have been a presenting or contributing author on over 30 other oral or poster presentations.

“Heavily modified guides for SpyCas9-mediated genome editing,” **J.K. Watts**, to be presented at the Ono Pharma Foundation Symposium 2018 (Menlo Park, CA, July 9, 2018)

“Heavily modified guides for SpyCas9-mediated genome editing,” **J.K. Watts**, presented at TIDES 2018 (Boston, MA, May 8-10, 2018)

“Modification and multimerization of therapeutic oligonucleotides,” **J.K.Watts**, presented at The RNA Summit: Research, Diagnostics & Therapeutics (Boston, MA, November 2017).

“Modification and multimerization of therapeutic oligonucleotides,” **J.K.Watts**, presented at the 13th Annual Meeting of the Oligonucleotide Therapeutics Society (Bordeaux, France, September 2017).

“Silencing Disease Genes Using Chemically Modified Oligonucleotides,” **J.K.Watts**, presented at the 3rd Annual Meeting of the Japanese Nucleic Acid Therapeutics Society (Sapporo, Japan, July 14, 2017).

“Silencing Disease Genes Using Chemically Modified Oligonucleotides,” **J.K.Watts**, presented at the UMass Research Retreat (Amherst, MA, October 27, 2016).

“Chemically modified single-stranded oligonucleotides for therapeutic applications,” **J.K.Watts**, presented at Oligomer Oxford 2015 (Oxford, UK, March 2015).

“2'-Fluorinated oligonucleotides: Conformational control and high binding affinity,” **J.K. Watts**, presented at the RSC Organic Division Southwest Regional Meeting (Oxford, UK, February 2014).

“2'-Fluorinated oligonucleotides: High binding affinity and novel applications,” **J.K. Watts**, presented at EuroTIDES 2013 (Prague, November 2013).

“Increased binding affinity by fluorinated oligonucleotides: Origins and implications,” **J.K. Watts**, presented at RNAiOxford 2013 (Oxford, UK, March 2013).

“Expanding the scope of gene silencing oligonucleotides: Selective inhibition of mutant *Huntingtin* expression by targeting the expanded CAG repeat,” **J.K. Watts**, J. Hu, K.T. Gagnon, J. Liu, M. Matsui and D.R. Corey, presented at the Gordon Research Conference on Bioorganic Chemistry (Andover, NH, June 2011).

“RNA-mediated gene activation,” **J.K. Watts** and D.R. Corey, presented at the 10th annual EuroTides conference (Amsterdam, Netherlands, December 2-3, 2009).

“Impact of 2'-F vs 2'-OH on the stability of arabinonucleic acid/RNA hybrids. Why such a large difference?” **J.K. Watts** and M.J. Damha, presented at the Gordon Research Conference on Nucleosides, Nucleotides and Oligonucleotides (Newport, RI, July 2007).

“Analyse des composants de l'effet anomère X-C-Y (X=O, S; Y=F, OMe, NHMe) par calculs DFT des orbitales moléculaires et analyses des orbitales naturelles de liaisons (« NBO »),” **J.K. Watts**, M.L. Trapp, N. Weinberg and B.M. Pinto, presented at the 74th conference of the Association Francophone pour le Savoir (Montreal, QC, May 2006).

“Component analysis of the X-C-Y anomeric effect (X=O, S; Y=F, OMe, NHMe) by DFT molecular orbital calculations and NBO analysis,” **J.K. Watts**, M.L. Trapp, N. Weinberg and B.M. Pinto, presented (oral) at the 231st American Chemical Society National Meeting (Atlanta, GA, March 2006), at the 89th Canadian Chemistry Conference (Halifax, NS, May 2006), and at the XXIIIrd International Carbohydrate Symposium (Whistler, BC, July 2006).

“Conformational analysis of 2'-fluoroarabino- and 2'-fluoro-4'-thioarabinonucleosides,” **J.K. Watts**, K. Sadalapure, N. Choubdar, B.M. Pinto and M.J. Damha, presented at the 87th Canadian Chemistry Conference (London, ON, May 2004).

“Synthesis of a trisaccharide found in mammalian zona pellucida,” **J.K. Watts** and T.B. Grindley, presented at the Atlantic Student Chemistry Conference (Halifax, NS, May 2001).

Research Funding

Summary: >\$2.5M USD of external research funding to my group on grants totaling >\$5M USD, including funding from two UK research councils (BBSRC, EPSRC), the Defense Science and Technology Laboratory, the European Commission, industry and private foundations.

Friedrich's Ataxia Research Alliance – Principal Investigator

“Activating frataxin expression in animals using chemically modified oligonucleotides”

(\$347K over 2 years, 2018-2020)

Ono Pharmaceuticals Foundation – Principal Investigator

“Optimizing the potency of inhaled oligonucleotides for therapeutic applications, by tuning structure, hydrophobicity and stability”

(\$1.03M over 3 years, 2017-2020)

Worcester Foundation for Biomedical Research – Principal Investigator
 “‘T to C’ conversion for amplifiable metabolic labeling of DNA at single base resolution”
 \$40K over 1 year, 2017-2018

Sponsored Research Agreement with Idera Pharmaceuticals – Principal Investigator
 “Elucidating the Mechanism of Dimeric GSO Oligonucleotides”
 (\$479K over 2 years, 2016-2018)

BBSRC Equipment Grant (BB/M025624/1) – Co-Investigator
 “Next Generation DNA Synthesis”
 (£2.2M equipment grant of which £470K goes to my group, 2015-16)

EPSRC New Investigator Grant (EP/M003973/1) – Principal investigator
 “Novel Antisense Oligonucleotides to Improve Invasion and Cleavage of Structured RNAs”
 (£100,000 over 1 year, 2014-2015)

EPSRC iCASE award (with Philip Ireland of DSTL, Porton Down) – Principal investigator
 “The Medicinal Chemistry of External Guide Sequence Oligonucleotides”
 (£85,000 over 3.5 years, 2014-2018)

Marie Curie “Career Integration Grant” from the European Commission – Principal investigator
 “NonCoDown: Optimising Antisense Oligonucleotides for Efficient and Specific Knockdown of Nuclear Noncoding RNA”
 (€100,000 over four years, 2013-2016)

Southampton Research Stimulus Fund – Principal Investigator
 “Imaging Oligonucleotide Melt-Arrays to Profile Bacterial Populations”
 Co-investigator: Sumeet Mahajan, Chemistry
 (£18,000 over six months, 2013)

Southampton Institute for Life Sciences Bridging the Gap pilot grant – Co-Investigator
 “Novel Oligonucleotides and Conjugates for Asthma Research and Therapy”
 Principal investigator: Hans Michael Haitchi, Faculty of Medicine
 (£9,658 over six months, 2012-2013)

Teaching Experience

Courses Taught at the University of Massachusetts Medical School, 2016–present:

Foundations of Biomedical Research

Small RNAs module, contributing lecturer

Gene and oligonucleotide therapies for ALS, discussion leader

RNA Biology

Current approaches in antisense oligonucleotides, lecturer

Chemical Biology

Chemical Biology of Nucleic Acids, lecturer

Courses Taught at the University of Southampton, 2012–2015:

CHEM 1002 – Chemistry for Biological Scientists

CHEM 1018 – Introductory Organic Chemistry
CHEM 3002 – Medicinal Chemistry
CHEM 3046 – Advanced Practical Chemistry (Chemical Biology practical)
CHEM 6109 – Advanced Bioorganic Chemistry

Additional roles in tutorials and laboratory demonstration for first and second year undergraduates.

Average student feedback score of 4.65 / 5 in the 2014-15 academic year, nominated for four teaching awards and won the Vice-Chancellor's award for teaching in 2014-15.

Research Supervision

2012- Direct an independent research group (currently 2 postdoctoral fellows, 3 PhD students and 1 technician).
Total number of students and postdocs supervised to date = 21
Total number of PhD students supervised to completion = 3

2011-2006 **Supervised** six junior PhD students and several undergraduates as they began their research, McGill University and UT Southwestern Medical Center

One of my undergraduate project students (M. Moazami) won "Best Year 4 project in Organic Chemistry" in the 2013-14 academic year; another (J. Prince) was runner up at the Year 4 poster day in the 2014-15 academic year. PhD student Alexandre Debacker won a poster prize at the 2015 OTS conference in Leiden, the Netherlands.

Refereeing Experience

Ad hoc grants reviewer for the UK Medical Research Council (2015), BBSRC (2014), and the Romanian National Authority for Scientific Research (2011, 2013).

I have been invited to review papers for journals including Accounts of Chemical Research, ACS Chemical Biology, ACS Nano, Central European Journal of Biology, ChemComm, Chemistry: a European Journal, Drug Discovery Letters, Drug Discovery Today, Journal of the American Chemical Society, Molecular Therapy, Molecular Therapy – Nucleic Acids, Nanoscale, Nature Biotechnology, Nature Medicine, Nucleic Acids Research, Nucleic Acid Therapeutics, Organic and Biomolecular Chemistry, Organic Letters, Pharmaceutical Patent Analyst, PLoS One, RNA, Scientific Reports, and Virus Research.

Editorial Boards

Member of the Editorial Board of *Nucleic Acid Therapeutics*, the official journal of the Oligonucleotide Therapeutics Society, since 2014.

Professional Societies

Oligonucleotide Therapeutics Society

Secretary, Board of Directors, Jan 2015 – Dec 2018

Member of the Scientific Advisory Council, Jan 2013 – Dec 2014

Royal Society of Chemistry

Member of the Bioorganic and Medicinal Chemistry Sector Committee 2013–15

American Society for Gene and Cell Therapy

Member

Languages

English and French