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Date of Birth: December 31, 1970

Employment

April 2013-	Professor of Chemistry, University of Oxford
Jan. 2007-13	University Lecturer, University of Oxford
Jan. 2007-	Fellow of Lincoln College, University of Oxford
Oct. 2005-10	EPSRC Advanced Research Fellow
2004-07	Senior Lecturer in Organic Chemistry, University of Bath
1997-2004	Lecturer in Organic Chemistry, University of Bath
1995-1997	NATO / Royal Society Postdoctoral Fellow, Department of Chemistry, Harvard University, Cambridge, MA, USA. With Prof. D. A. Evans.

Education

1992-95	Ph.D., Organic Chemistry, University of Cambridge. With Prof. S. V. Ley.
1989-92	Imperial College of Science, Technology and Medicine, University of London B.Sc. (Hons), first class, Chemistry; Associateship of the Royal College of Science.

Professional Membership and External Professional Activities

2015-	Member of the editorial board for Topics in Organometallic Chemistry
2014-	Consultant, UCB Pharma
2006-09	Executive committee of the Organic Division of the Royal Society of Chemistry
2006-11	Consultant, Pfizer Chemical Research and Development, Sandwich, UK
2005-17	Committee member, Fine Chemicals Group, Society of Chemical Industry
2002-05	Chair, Young Chemists Panel of the Fine Chemicals Group of the Society of Chemical Industry
1996-	American Chemical Society, Member
1995-	Royal Society of Chemistry, FRSC (C.Chem). FRSC from 2012.

Awards and Scholarships

2015	Pfizer, AstraZeneca, Syngenta 2015 Process Chemistry Research Award
2014	Royal Society of Chemistry Catalysis in Organic Chemistry Award
2011	*Organic and Biomolecular Chemistry* Lecture Award
2008	AstraZeneca Award in Synthetic Organic Chemistry
2008	Thieme Journal Prize
1995-96	Royal Society / NATO Postdoctoral Research Fellow, with Prof. David A. Evans, Harvard University, USA
1995	Stothart Bye-Fellow, Magdalene College, Cambridge

Publications (>6400 citations, h = 48 (WoS))

(140) "Modular sulfondiimine synthesis using a stable sulfinylamine reagent", Ze-Xin Zhang, Thomas Q. Davies and Michael C. Willis, *J. Am. Chem. Soc.* **2019**, *141*, 13022−13027. (doi: 10.1021/jacs.9b06831)

(139) "New catalytic reactions using sulfur dioxide", Michael. C. Willis, *Phosphorus Sulfur Silicon Relat. Elem.* **2019** *194*, 654-657. (doi: 10.1080/10426507.2019.1602623)

(138) "A rhodium-catalysed Sonogashira-type coupling exploiting C-S functionalisation: Orthogonality with palladium-catalysed variants", Milan Arambasic, Manjeet K. Majhail, Robert N. Straker, James D. Neuhaus and Michael C. Willis, *Chem. Commun.* **2019**, *55*, 2757–2760. (doi: 10.1039/c9cc00092e)

(137) "Rhodium(I)-catalyzed hydroacylation", Maitane Fernández and Michael C. Willis, in *Rhodium catalysis in organic synthesis: Methods and reactions*, edited by Ken Tanaka, Wiley-VCH, **2019**, p63–84. (doi: 10.1002/9783527811908.ch4)

(136) "Heterocyclic allylsulfones as latent heteroaryl nucleophiles in palladium-catalyzed cross-coupling reactions", Tim Markovic, Philip R. D. Murray, Benjamin N. Rocke, Andre Shavnya, David C. Blakemore and Michael C. Willis, *J. Am. Chem. Soc.*, **2018**, *140*, 15916–15923. (doi: 10.1021/jacs.8b09595). Highighted in *SynFacts* **2019**, *15*, 112.

(135) "Copper-catalysed synthesis of alkylidene 2-pyrrolinone derivatives from the combination of α-keto amides and alkynes", Qian Wen Tan, Praful Chovatia and Michael C. Willis, *Org. Biomol. Chem.* **2018**, *16*, 7797–7800. (doi: 10.1039/c8ob02205)

(134) "Copper-catalyzed synthesis of activated sulfonate esters from boronic acids, DABSO and pentafluorophenol", Vincent Vedovato, Eric P. A. Talbot and Michael C. Willis, *Org. Lett.* **2018**, *20*, 5493–5496. (doi: 10.1021/acs.orglett.8b02445).

(133) "Direct Copper-Catalyzed Three-Component Synthesis of Sulfonamides", Yiding Chen, Philip R. D. Murray, Alyn T. Davies and Michael C. Willis, *J. Am. Chem. Soc.* **2018**, *140*, 8781−8787. (doi: 10.1021/jacs.8b04532).

(132) "Rh(DPEPhos)-Catalyzed alkyne hydroacylation using β-carbonyl substituted aldehydes. Mechanistic insight leads to low catalyst loadings that enables selective catalysis on gram-scale.", James Barwick-Silk, Simon Hardy, Michael C. Willis and Andrew S. Weller*, *J. Am. Chem. Soc.* **2018**, *140*, 7347–7357. (doi: 10.1021/jacs.8b04086).

(131) "An enamine controlling group for rhodium-catalyzed intermolecular hydroacylation", Robert N. Straker, Michele Formica, James D. Lupton, Jingze Niu, and Michael C. Willis, *Tetrahedron*, **2018**, *74*, 5408–5414. (doi: 10.1016/j.tet.2018.04.068). Contribution to the Sir Derek Barton Centenary issue.

(130) "DABCO-*bis*(sulfur dioxide), DABSO, as a source of sulfur dioxide in transition metal-catalyzed reactions", Michael C. Willis, *TCI Mail*, **2018**, 2–12.

(129) "Oxidative β-C–H sulfonylation of cyclic amines", Robert J. Griffiths, Wei Chung Kong, Steven A. Richards, Glenn A. Burley, Michael C. Willis* and Eric P. A. Talbot*, *Chem. Sci.* **2018**, *9*, 2295–2300. (doi: 10.1039/C7SC04900E)

(128) "Direct sulfonylation of anilines mediated by visible light", Tarn C. Johnson, Bryony L. Elbert, Alistair J. M. Farley, Timothy W. Gorman, Christophe Genicot, Bénédicte Lallemand, Patrick Pasau, Jakub Flasz, José L. Castro, Malcolm MacCoss, Darren J. Dixon, Robert S. Paton, Christopher J. Schofield, Martin D. Smith and Michael C. Willis, *Chem. Sci.* **2018**, *9*, 629–633. (doi: 10.1039/C7SC03891G)

(127) "Catalyst selection facilitates the use of heterocyclic sulfinates as general nucleophilic coupling partners in palladium-catalyzed coupling reactions", Tim Markovic, Benjamin N. Rocke, David C. Blakemore, Vincent Mascitti and Michael C. Willis, *Org. Lett.* **2017**, *19*, 6033–6035. (doi: 10.1021/acs.orglett.7b02944). See correction: doi: 10.1021/acs.orglett.8b01120.

(126) "Exploiting rhodium-catalysed ynamide hydroacylation as a platform for divergent heterocycle synthesis", Robert N. Straker, Manjeet K. Majhail and Michael C. Willis, *Chem. Sci.* **2017**, *8*. 7963-7968. (doi: 10.1039/C7SC03795C)

(125) "One-pot, three-component sulfonimidamide synthesis exploiting the sulfinylamine reagent *N*-sulfinyltritylamine, TrNSO", Thomas Q. Davies, Adrian Hall and Michael C. Willis, *Angew. Chemie. Int. Ed.* **2017**, *56*, 14937–14941. (doi: 10.1002/anie.201708590)

(124) "A C-H cyanation of 6-ring *N*-containing heteroaromatics", Bryony L. Elbert, Alistair J. M. Farley, Timothy W. Gorman, Tarn C. Johnson, Christophe Genicot, Bénédicte Lallemand, Patrick Pasau, Jakub Flasz, José L. Castro, Malcolm MacCoss, Robert S. Paton, Christopher J. Schofield, Martin D. Smith, Michael C. Willis and Darren J. Dixon, *Chem. Eur. J.* **2017**, *23*, 14733–14737. (doi. 10.1002/chem.201703931).

(123) "A copper(I)-catalyzed addition/annulation sequence for the two-component synthesis of γ-ylidenebutenolides", Sangwon Seo and Michael C. Willis, *Org. Lett.* **2017**, *19*, 4556–4559. (doi: 10.1021/acs.orglett.7b02151)

(122) "Exploiting carbonyl groups to control intermolecular rhodium-catalyzed alkene and alkyne hydroacylation", Thomas J. Coxon, Maitane Fernández, James Barwick-Silk, Alasdair I. McKay, Louisa E. Britton, Andrew S. Weller and Michael C. Willis, *J. Am. Chem. Soc.* **2017**, *139*, 10142–10149. (doi: 10.1021/jacs.7b05713)

(121) "Enantioselective three-component assembly of β'-aryl-enones using a rhodium-catalyzed alkyne hydroacylation/aryl boronic acid conjugate addition sequence", Ming Gao and Michael C. Willis, *Org. Lett.* **2017**, *19*, 2734–2737. (doi: 10.1021/acs.orglett.7b01087)

(120) "Pyridine sulfinates as general nucleophilic coupling partners in palladium-catalyzed cross-coupling reactions with aryl halides", Tim Markovic, Benjamin N. Rocke, David C. Blakemore, Vincent Mascitti and Michael C. Willis, *Chem. Sci.* **2017**, *8,* 4437– 4442. (doi: 10.1039/C7SC00675F). See *Synfact* highlight: *Synfacts*, **2017**, *13*, 739. See OPRD highlight: *Org. Process Res. Dev.* **2017**.

(119) "Copper(I)-catalyzed sulfonylative Suzuki-Miyaura cross-coupling", Yiding Chen and Michael C. Willis, *Chem. Sci.* **2017**, *8*, 3249–3253. (doi: 10.1039/c6sc05483h)

(118) "Toolbox study for application of hydrogen peroxide as a versatile, safe and industrially-relevant green oxidant in continuous flow mode ", Benjamin Martin,* Joerg Sedelmeier, Anaïs Bouisseau, Patricia Fernandez-Rodriguez, Julien Haber, Florian Kleinbeck, Sonja Kamptmann, Flavien Susanne, Pascale Hoehn, Marian Lanz, Laurent Pellegatti, Francesco Venturoni, Jeremy Robertson, Michael C. Willis and Berthold Schenkel, *Green Chem.* **2017**, *19*, 1439–1448. (doi: 10.1039/C6GC02899C).

(117) "One-pot palladium-catalyzed synthesis of sulfonyl fluorides from aryl bromides", Alyn T. Davies, John M. Curto, Scott W. Bagley and Michael C. Willis, *Chem. Sci.* **2017**, *8*, 1233–1237. (doi: 10.1039/C6SC03924C).

(116) "Sequential catalysis: Exploiting a single rhodium(I) catalyst to promote an alkyne hydroacylation–aryl boronic acid conjugate addition sequence" Maitane Fernández, Matthias Castaing and Michael C. Willis, *Chem. Sci.* **2017**, *8*, 536–540. (doi: 10.1039/c6sc03066a)

(115) "Two-component assembly of thiochroman-4-ones and tetrahydrothiopyran-4-ones using a rhodium-catalyzed alkyne hydroacylation/thio-conjugate-addition sequence", Anaïs Bouisseau, John Glancy and Michael C. Willis, *Org. Lett.* **2016**, *18*, 5676–5679. (doi: 10.1021/acs.orglett.6b02909)

(114) "Traceless rhodium-catalyzed hydroacylation using alkyl aldehydes: The enantioselective synthesis of β-aryl ketones", Anaïs Bouisseau, Ming Gao and Michael C. Willis, *Chem. Eur. J.* **2016**, *22*, 15624–15628. (doi: 10.1002/chem.201604035)

(113) "Homogeneous rhodium(I)-catalysis in *de novo* heterocycle syntheses", James D. Neuhaus and Michael C. Willis, *Org. Biomol. Chem.* **2016**, *14*, 4986–5000. (doi: 10.1039/C6OB00835F)

(112) "Direct synthesis of highly substituted pyrroles and dihydropyrroles using linear selective hydroacylation reactions", Manjeet K. Majhail, Paul M. Ylioja and Michael C. Willis, *Chem. Eur. J.* **2016**, *22*, 7879–7884. (doi: 10.1002/chem.201600311)

(111) "1,4-Disulfino-1,4-diazabicyclo [2.2.2]octane, *bis*(inner salt)", Alex. S. Deeming and Michael C. Willis, eEROS, *Encyclopedia of Reagents for Organic Synthesis*, Wiley, 2016. (doi: 10.1002/047084289X.rn01912)

(110) "One-pot sulfoxide synthesis exploiting a sulfinyl-dication equivalent generated from a DABSO/trimethylsilyl chloride sequence", Danny C. Lenstra, Vincent Vedovato,

Emmanuel Ferrer Flegeau, Jonathan Maydom and Michael C. Willis, *Org. Lett.* **2016,** *18*, 2086–2089. (doi: 10.1021/acs.orglett.6b00712). See *Synfact* article: *Synfacts*, **2016**, *12*, 0728.

(109) "Heterocycle-derived β–*S*-enals as bifunctional linchpins for the catalytic synthesis of saturated heterocycles", Jingze Niu and Michael C. Willis, *Org. Chem. Front.* **2016**, *3*, 625–629. (doi: 10.1039/c6qo00057f).

(108) "Diversely substituted quinolines via rhodium-catalyzed alkyne hydroacylation", James D. Neuhaus, Sarah M. Morrow, Michael Brunavs, Michael C. Willis, *Org. Lett.* **2016**, *18*, 1562–1565. (doi: 10.1021/acs.orglett.6b00390).

(107) "α–Amino aldehydes as readily available chiral aldehydes for Rh-catalyzed alkyne hydroacylation", Joel F. Hooper, Sangwon Seo, Fiona R. Truscott, James D. Neuhaus and Michael C. Willis, *J. Am Chem. Soc.* **2016**, *138*, 1630–1634. (doi: 10.1021/jacs.5b11892)

(106) "Palladium(II)-catalyzed synthesis of sulfinates from boronic acids and DABSO: A redox-neutral, phosphine-free transformation", Alex S. Deeming, Claire J. Russell and Michael C. Willis, *Angew. Chemie. Int. Ed.* **2016**, *55*, 747–750. (doi: 10.1002/anie.201508370R2)

(105) "One-pot sulfonamide synthesis exploiting the palladium-catalyzed sulfination of aryl iodides", Emmanuel Ferrer Flegeau, Jack M. Harrison and Michael C. Willis, *Synlett*, **2016**, *27*, 101–105. (doi: 10.1055/s-0035-1560578). Contribution to the Professor Steven Ley 70th Birthday issue.

(104) "An aryne-based route to substituted benzoisothiazoles", Yiding Chen and Michael C. Willis, *Org. Lett.* **2015**, *17*, 4786–4789. (doi: 10.1021/acs.orglett.5b02347)

(103) "Well-defined and robust rhodium catalysts for the hydroacylation of terminal and internal alkenes", Amparo Prades, Maitane Fernández, Sebastian D. Pike, Michael C. Willis* and Andrew S. Weller*, *Angew. Chemie. Int. Ed.* **2015**, *54*, 8520–8524. (doi: 10.1002/anie.201503208)

(102) "The development and application of sulfur dioxide surrogates in synthetic organic chemistry", Edward J. Emmett and Michael C. Willis, *Asian J. Org. Chem.* **2015**, *4*, 602–611. (doi: 10.1002/ajoc.201500103)

(101) "Rh–POP pincer xantphos complexes for C–S and C–H activation. Implications for carbothiolation catalysis", Peng Ren, Sebastian D. Pike, Indrek Pernik, Andrew S. Weller* and Michael C. Willis, *Organometallics* **2015**, *34*, 711–723. (doi: 10.1021/om500984y). See also correction: *Organometallics* **2015**, 34, 1137.

(100) "The first stereoselective synthesis of a dithiane derivative of the C18 β-diketodiene system proposed for an active compound isolated from *Cantharellus cibarius* (Chanterelle)", Jacek Grodner, W. Marek Gołębiewski,* Michael C. Willis, James D.

Osborne and Mirosław Gucma, *Synthesis* **2015**, *47*, 1181–1189. (doi: 10.1055/s-0034-1379984)

(99) "Combining organometallic reagents, the sulfur dioxide surrogate DABSO and amines: A one-pot preparation of sulfonamides, amenable to array synthesis", Alex S. Deeming, Claire J. Russell and Michael C. Willis, *Angew. Chemie. Int. Ed.* **2015**, *54*, 1168–1171. (doi: 10.1002/anie.201409283)

(98) "Rediscovering the chemistry of sulfur dioxide: New developments in synthesis and catalysis", Alex S. Deeming, Edward J. Emmett, Charlotte S. Richards-Taylor and Michael C. Willis, *Synthesis* **2014**, *46*, 2701–2710. (doi: 10.1055/s-0034-1379042)

(97) "Palladium-catalyzed synthesis of ammonium sulfinates from aryl halides and a sulfur dioxide-surrogate: A gas and reductant free process", Edward J. Emmett, Barry R. Hayter and Michael C. Willis, *Angew. Chemie. Int. Ed.* **2014**, *53*, 10204–10208. (doi: 10.1002/anie.201404527)

(96) "DABCO-*bis*(sulfur dioxide), DABSO, as an easy-to-handle source of SO_2: Sulfonamide preparation", Edward J. Emmett, *Org. Syn.* **2014**, *91*, 125–136. (doi:0.15227/orgsyn.091.0125)

(95) Michael C. Willis, *Hydroacylation of alkenes, alkynes and allenes*. In: Gary A. Molander and Paul Knochel (eds.), Comprehensive Organic Synthesis, 2nd Edition, Vol 4, Oxford: Elsevier; 2014, pp. 961- 994. (doi: 10.1016/B978-0-08-097742-3.00423-7)

(94) "DABSO-based, three-component, one-pot sulfone synthesis", Alex S. Deeming, Claire J. Russell, Alan J. Hennessy and Michael C. Willis, *Org. Lett* **2014**, *16*, 150–153. (doi: 10.1021/ol403122a)

(93) "2-Aminobenzaldehydes as versatile substrates for rhodium-catalyzed alkyne hydroacylation: Application to dihydroquinolone synthesis", Matthias Castaing, Sacha L. Wason, Beatriz Estepa, Joel F. Hooper and Michael C. Willis, *Angew. Chemie. Int. Ed.* **2013**, *52*, 13280–13283. (doi: 10.1002/anie.201308127)

(92) "One-pot three-component sulfone synthesis exploiting palladium-catalysed aryl halide aminosulfonylation", Charlotte S. Richards-Taylor, David C. Blakemore and Michael C. Willis, *Chem. Sci.* **2014**, *5*, 222–228. (doi: 10.1039/C3SC52332B)

(91) "Palladium-catalyzed three-component diaryl sulfone synthesis exploiting the sulfur dioxide surrogate DABSO", Edward J. Emmett, Barry R. Hayter and Michael C. Willis, *Angew. Chemie. Int. Ed.* **2013**, *52*, 12679–12683. (doi: 10.1002/anie.201305369). Highlighted in *SynFacts* **2014**, *10*, 117.

(90) "Activating group recycling in action: A rhodium-catalyzed carbothiolation route to substituted isoquinolines", Milan Arambasic, Joel F. Hooper and Michael C. Willis, *Org. Lett* **2013**, *15*, 5162–5165. (doi: 10.1021/ol402650q)

(89) "Synthesis of aromatic benzo-fused five- and six-membered heterocycles via palladium- and copper-catalysed C-X bond forming reactions", Catherine J. Ball and Michael C. Willis, in *Transition-Metal-Mediated Aromatic Ring Construction*, Ken Tanaka, Editor, Wiley, 2013. (ISBN: 978-1-118-14892-1)

(88) "3-(Methylthio)propionaldehyde/Methional", Fiona Truscott and Michael C. Willis, in *Encyclopedia of Reagents for Organic Synthesis [Online]*, 2013, John Wiley & Sons Ltd. (doi: 10.1002/047084289X.rn01527)

(87) "Carbon-carbon bond construction using boronic acids and aryl methyl sulfides: Orthogonal reactivity in Suzuki-type couplings", Joel F. Hooper, Rowan D. Young, Indrek Pernik, Andrew S. Weller and Michael C. Willis, *Chem. Sci.* 2013, *4*, 1568 – 1572. (doi: 10.1039/C3SC00052D). Highlighted in *SynFacts* 2013, *9*, 495.

(86) "Traceless chelation-controlled rhodium-catalyzed intermolecular alkene and alkyne hydroacylation", Joel F. Hooper, Rowan D. Young, Andrew S. Weller and Michael C. Willis, *Chem. – Eur. J.* 2013, *19*, 3125 – 3130. (doi: 10.1002/chem.201204056)

(85) "Cascade palladium- and copper-catalyzed aromatic heterocycle synthesis: the emergence of general precursors", Catherine J. Ball and Michael C. Willis, *Eur. J. Org. Chem.* 2013, 425 – 441. (doi: 10.1002/ejoc.201201386)

(84) "Catalytic enantioselective desymmetrization as a tool for the synthesis of hodgkinsine and hodgkinsine B", Robert H. Snell, Matthew J. Durbin, Robert L. Woodward and Michael C. Willis, *Chem. – Eur. J.* 2012, *18*, 16754 – 16764. (doi:10.1002/chem. 201203150)

(83) "Exploring small bite–angle ligands for the rhodium–catalyzed intermolecular hydroacylation of β–*S*–substituted aldehydes with 1–octene and 1–octyne", Indrek Pernik, Joel F. Hooper, Adrian B. Chaplin, Andrew S. Weller* and Michael C. Willis, *ACS Catalysis*, 2012, *2*, 2779 - 2786. (doi: 10.1021/cs300541m)

(82) "Tandem *inverse*-electron-demand *hetero*/*retro* Diels-Alder reactions for aromatic nitrogen heterocycle synthesis", Radleigh A. A. Foster and Michael C. Willis, *Chem. Soc. Rev.* 2013, *42*, 63 – 76. (doi: 10.1039/C2CS35316D)

(81) "Palladium-catalyzed synthesis of benzimidazoles and quinazolinones from common precursors", Jessie E. R. Sadig, Radleigh Foster, Florian Wakenhut and Michael C. Willis, *J. Org. Chem.* 2012, *77*, 9473 – 9486. (doi: 10.1021/jo301805d). Selected as a "Feature Article".

(80) "Intermolecular alkyne hydroacylation. Mechanistic insight from the Isolation of the vinyl intermediate that precedes reductive elimination", Rebekah Pawley, Miguel Huertos, Guy Lloyd–Jones, Andrew S. Weller*, Michael C. Willis, *Organometallics* 2012, *31*, 5650 – 5659. (doi: 10.1021/om300647n)

(79) "Rhodium-catalysed linear-selective alkyne hydroacylation", Sarah-Jane Poingdestre, Jonathan D. Goodacre, Andrew S. Weller and Michael C. Willis, *Chem. Commun*. **2012**, *48*, 6354-6356. (doi: 10.1039/c2cc32713a)

(78) "Copper-catalyzed tandem C-N bond formation: An efficient annulative synthesis of functionalised cinnolines", Catherine J. Ball, Jeremy Gilmore and Michael C. Willis, *Angew. Chemie. Int. Ed.* **2012**, 5718 – 5722. (doi: 10.1002/anie.201201529)

(77) "Palladium-Catalysed Aminosulfonylation of Aryl-, Alkenyl- and Heteroaryl Halides: Scope of the Three-Component Synthesis of *N*-Aminosulfonamides", Edward J. Emmett, Charlotte S. Richards-Taylor, Bao Nguyen, Alfonso Garcia-Rubia, Barry R. Hayter and Michael C. Willis, *Org. Biomol. Chem.* **2012**, *10*, 4007 – 4014. (doi; 10.1039/C2OB0 7034K)

(76) "Intermolecular hydroacylation: High Activity Rhodium Catalysts Containing Small Bite Angle Diphosphine Ligands", Adrian B. Chaplin, Joel F. Hooper, Andrew S. Weller and Michael C. Willis, *J. Am. Chem. Soc.* **2012**, *134*, 4885 – 4897. (doi: 10.1021/ja211649a)

(75) "Palladium-Catalyzed Direct Functionalization of Benzoxazoles with Alkenyl Iodides", Maria Gerelle, Anne J. Dalencon and Michael C. Willis, *Tetrahedron Lett.* **2012**, *53*, 1954 – 1957. (doi: 10.1016/j.tetlet.2012.02.014)

(74) "Aryl Methyl Sulfides as Substrates for Rhodium-Catalyzed Alkyne Carbothiolation: Arene Functionalization with Activating Group Recycling", Joel F. Hooper, Adrian B. Chaplin, Carlos González-Rodríguez, Amber L. Thompson, Andrew S. Weller and Michael C. Willis, *J. Am. Chem. Soc.* **2012**, *134*, 2906 – 2909. (doi: 10.1021/ja2108992)

(73) "Author Profile", *Angew. Chem. Int. Ed.* **2012**, *51*, 1304. (doi: 10.1002/anie.201107516).

(72) "Exploring $(Ph_2PCH_2CH_2)_2E$ Ligand Space (E = O, S, PPh) in Rh(I) Alkene Complexes as Potential Hydroacylation Catalysts", S. D. Pike, R. J. Pawley, A. B. Chaplin, A. L. Thompson, J. A. Hooper, M. C. Willis and A.S. Weller* *Eur. J. Inorg. Chem.* **2011**, 5558 – 5565. (doi: 10.1002/ejic.201100958).

(71) "An Alkyne Hydroacylation Route to Highly Substituted Furans", Philip Lenden, David A. Entwistle and Michael C. Willis, *Angew. Chem. Int. Ed.* **2011**, *50*, 10657–10660. (doi: 10.1002/anie.201105795).

(70) "DABCO-*bis*-(Sulfur Dioxide), DABSO, as a Convenient Source of Sulfur Dioxide for Organic Synthesis: Utility in Sulfonamide and Sulfamide Preparation", Holly Woolven, Carlos González-Rodríguez, Isabel Marco, Amber L. Thompson and Michael C. Willis, *Org. Lett.* **2011**, *13*, 4876–4878. (doi: 10.1021/ol201957n)

(69) "Catalytic Enantioselective Total Synthesis of Hodgkinsine B", Robert H. Snell, Robert L. Woodward and Michael C. Willis, *Angew. Chem. Int. Ed.* **2011**, *50*, 9116–9119. (doi: 10.1002/anie.201103864)

(68) "Replacing Dichloroethane as a Solvent for Rhodium-Catalysed Intermolecular Alkyne Hydroacylation Reactions: The Utility of Propylene Carbonate", Philip Lenden, Paul M. Ylioja, Carlos González-Rodríguez, David A. Entwistle and Michael C. Willis, *Green Chem.* **2011**, *13*, 1980–1982. (doi: 10.1039/C1GC15293A)

(67) "Rhodium-Catalyzed Branched-Selective Alkyne Hydroacylation: A Ligand Controlled Regioselectivity Switch", Carlos González-Rodríguez, Rebekah J. Pawley, Adrian B. Chaplin, Amber L. Thompson, Andrew S. Weller and Michael C. Willis, *Angew Chem. Int. Ed.* **2011**, *50*, 5134 –5138. (doi: 10.1002/anie.201100956)

(66) "*O*-Substituted Alkyl Aldehydes for Rhodium-Catalyzed Intermolecular Alkyne Hydroacylation: The Utility of Methylthiomethyl-Ethers", Scott R. Parsons, Joel F. Hooper and Michael C. Willis, *Org. Lett.* **2011**, *13*, 998–1000. (doi: 10.1021/ol1030662)

(65) "Rhodium-Catalyzed Enantioselective Intermolecular Hydroacylation Reactions", Carlos González-Rodríguez, Michael C. Willis, *Pure and Applied Chem.* **2011**, *83*, 577–585. (doi: 10.1351/PAC-CON-10-09-23)

(64) "Palladium-Catalyzed Aminosulfonylation of Aryl Halides", Bao Nguyen, Edward J. Emmett and Michael C. Willis, *J. Am. Chem. Soc.* **2010**, *132*, 16372–16373. (doi: 10.1021/ja1081124)

(63) "Palladium- and Copper-Catalyzed Aryl Halide Amination, Etherification and Thioetherification Reactions in the Synthesis of Aromatic Heterocycles", Jessie E. R. Sadig and Michael C. Willis, *Synthesis* **2011**, 1–22. (doi: 10.1055/s-0030-1258294)

(62) "Cascade Palladium-Catalyzed Direct Intramolecular Arylation/Alkene Isomerization Sequences: Application to Indole and Benzofuran Synthesis", Myriam Yagoubi, Ana C. F. Cruz, Paula L. Nichols, Richard L. Elliott and Michael C. Willis, *Angew. Chem. Int. Ed.* **2010**, *49*, 7958 – 7962. (doi: 10.1002/anie.201004097)

(61) "Rhodium-Catalyzed Intermolecular Alkyne Hydroacylation: The Enantioselective Synthesis of α– and β–Substituted Ketones *via* Kinetic Resolution", Carlos González-Rodríguez, Scott R. Parsons, Amber L. Thompson and Michael C. Willis, *Chem. Eur. J.* **2010**, *16*, 10950 – 10954. (doi: 10.1002/chem.201001748)

(60) "Palladium Catalyzed Tandem Alkenyl- and Aryl-C-N Bond Formation: A Cascade *N*-Annulation Route to 4-, 5-, 6- and 7-Chloro-Indoles" Luke C. Henderson, Matthew J. Lindon and Michael C. Willis, *Tetrahedron* **2010**, *66*, 6632-6638. (doi: 10.1016/ j.tet2010.05.046) [Invited contribution to Symposium-in-Print in honour or Prof. S. V. Ley receiving the 2010 Tetrahedron prize]

(59) "Catalytic Intramolecular Ketone Hydroacylation: Enantioselective Phthalide Synthesis" (Highlight article), Michael C. Willis, *Angew. Chem. Int. Ed.* **2010**, *49*, 6026-6027. (doi: 10.1002/anie.201000159)

(58) "Controlling Selectivity in Intermolecular Alkene or Aldehyde Hydroacylation Reactions Catalysed by $\{Rh(L_2)\}^+$ Fragments", Rebekah J. Pawley, Gemma L. Moxham, Romaeo Dallanegra, Adrian B. Chaplin, Simon K. Brayshaw, Andrew S. Weller* and Michael C. Willis, *Organometallics* **2010**, *29*, 1717–1728. (doi: 10.1021/om9011104)

(57) "Enantioselective Desymmetrizing Palladium Catalyzed Carbonylation Reactions: The Catalytic Asymmetric Synthesis of Quaternary Carbon Center Containing 1,3-Dienes", Simon J. Byrne, Anthony J. Fletcher, Paul Hebeisen and Michael C. Willis, *Org. Biomol. Chem.* **2010**, *8*, 758-760. (doi: 10.1039/b923186b)

(56) "Transition Metal Catalyzed Alkene and Alkyne Hydroacylation", Michael C. Willis, *Chem. Rev.* **2010**, *110*, 725-748. (doi: 10.1021/cr900096x)

(55) "Palladium-Catalyzed Aryl-Carbonylation – Intramolecular *O*-Enolate Acylation: Efficient Isocoumarin Synthesis", Andrew C. Tadd, Mark R. Fielding and Michael C. Willis, *Chem. Commun.* **2009**, 6744–6746. (doi: 10.1039/b917839b)

(54) "Modern Applications of Transition Metal Catalysis in Heterocycle Synthesis", Michael C. Willis, *Tetrahedron* **2009**, *65*, 8907. Editorial for *Tetrahedron-Symposium-in-Print*.

(53) "Palladium Catalyzed Tandem Alkenyl- and Aryl-C-N Bond Formation: A Cascade *N*-Annulation Route to 1-Functionalised 7-Azaindoles", Roy C. Hodgkinson, Jurgen Schulz and Michael C. Willis, *Tetrahedron* **2009**, *65*, 8940-8949. [Invited contribution to Symposium-in-Print on *Modern Applications of Transition Metal Catalysis in Heterocycle Synthesis*]

(52) "Changing the Local Coordination Environment in Mono- and Bi- Nuclear Lanthanide Complexes through Click Chemistry", Maite Jauregui, William S. Perry, Clémence Allain, Lewis R. Vidler, Michael C. Willis, Alan M. Kenwright, John S. Snaith, Graeme J. Stasiuk, Mark P. Lowe and Stephen Faulkner, *Dalton Trans.* **2009**, 6283-6285.

(51) "Intermolecular Rhodium Catalyzed Hydroacylation of Allenes: The Regioselective Synthesis of β,γ–Unaturated Ketones", Helen E. Randell-Sly, James D. Osborne, Robert L. Woodward, Gordon S. Currie and Michael C. Willis, *Tetrahedron* **2009**, *65*, 5110–5117. [Invited contribution to Prof. M. Krische's Tetrahedron young investigator award issue]

(50) "Direct Catalytic Diastereoselective Mannich Reactions: The Synthesis of Protected α–Hydroxy-β–Aminoketones", Nikki E. Stainforth, Gary A. Cutting, Matthew P. John and Michael C. Willis, *Tetrahedron: Asymmetry* **2009**, *20*, 741-743. [Invited contribution to Prof. G. W. Fleet celebratory 65th birthday issue]

(49) "Total Synthesis of Rapamycin", Steven V. Ley, Miles N. Tackett, Matthew L. Maddess, James C. Anderson, Paul E. Brennan, Michael W. Cappi, Jag P. Heer, Coline Helgen,

Masakuni Kori, Cyrille Kouklovsky, Stephen P. Marsden, Joanne Norman, David P. Osborn, María Palomero, John B. J. Pavey, Catherine Pinel, Lesley A. Robinson, Jürgen Schnaubelt, James S. Scott, Christopher D. Spilling, Hidenori Watanabe, Kieron E. Wesson, and Michael C. Willis, *Chem. Eur. J.* **2009**, *15*, 2874 – 2914.

(48) "Cascade Palladium-Catalyzed Alkenyl Aminocarbonylation/ Intramolecular Aryl Amidation: An Annulative Synthesis of 2-Quinolones", A. C. Tadd, A. Matsuno, M. R. Fielding and M. C. Willis, *Org. Lett.* **2009**, *11*, 583–586. [Highlighted in Synfacts; *Synfacts* **2009**, *5*, 482.]

(47) "Tandem Copper-Catalysed Aryl and Alkenyl Amination Reactions: The Synthesis of *N*-Functionalised Indoles", R. C. Hodgkinson, J. Schulz and M. C. Willis, *Org. Biomol. Chem.* **2009**, *7*, 432-434.

(46) "Catalytic Enantioselective Intermolecular Hydroacylation: Rhodium-Catalyzed Combination of β-*S*-Aldehydes and 1,3-Disubstituted Allenes", J.D. Osborne, H. E. Randell-Sly, G. S. Currie, A. R. Cowley M. C. Willis, *J. Am. Chem. Soc.* **2008**, *130*, 17232–17233. [Highlighted in Synfacts; *Synfacts* **2009**, *3*, 289.]

(45) "Rhodium-Catalysed Hydroacylation or Reductive Aldol Reactions: A Ligand Dependent Switch of Reactivity", J. D. Osborne and M. C. Willis, *Chem. Commun.* **2008**, 5025-5027.

(44) "Intermolecular Alkene Hydroacylation using β–*S*-Substituted Aldehydes. Mechanistic Insight into the Role of a Hemilabile P-O-P Ligand", G. L. Moxham, H. Randell-Sly, S. K. Brayshaw, A. S. Weller and M. C. Willis, *Chem. Eur. J.*, **2008**, *14*, 8383-839. (doi: 10.1002/chem.200800738)

(43) "Palladium-Catalyzed α-Arylation of Oxindoles", M. J. Durbin and M. C. Willis, *Org. Lett.* **2008**, *10*, 1413-1415. [Highlighted in Synfacts; *Synfacts* **2008**, *6*, 632.]

(42) "Intramolecular Palladium-Catalyzed Direct Arylation of Alkenyl Triflates", A. C. F. Cruz, N. D. Miller and M. C. Willis, *Org. Lett.* **2007**, *9*, 4391-4393. (doi: 10.1021/ol702044z)

(41) "Palladium-Catalysed *N*-Annulation Routes to Indoles: The Synthesis of Indoles with Sterically Demanding *N*-Substituents, Including Demethylasterriquinone A1", A. J. Fletcher, M. N. Bax and M. C. Willis, *Chem. Commun.* **2007**, 4764 - 4766.

(40) "Copper-Catalysed Benzofuran Synthesis: Developing Aryl Bromide-Alkenyl Triflates as General Heterocycle Precursors", A. C. Tadd, M. R. Fielding and M. C. Willis, *Tetrahedron Lett.* **2007**, *48*, 7578-7581.

(39) "Site-Selective Modification Of Peptides Using Rhodium and Palladium Catalysis: Complementary Electrophilic and Nucleophilic Arylation", C. J. Chapmam, A. Matsuno, C. G. Frost and M. C. Willis, *Chem. Commun.* **2007**, 3903-3905.

(38) "Direct Catalytic Enantioselective Mannich Reactions: Synthesis of Protected *Anti*-α,β-Diamino Acids", G. A. Cutting, N. E. Stainforth, M. P. John, G. Kociok-Köhn and M. C. Willis, *J. Am. Chem. Soc.* **2007**, *129*, 10632-10633.

(37) "Palladium catalysed couplings of ammonia and hydroxide with aryl halides: The direct synthesis of primary anilines and phenols", M. C. Willis, *Angew. Chem. Int. Ed.* **2007**, *46*, 3402-3404.

(36) "A Second Generation Catalyst for Intermolecular Alkene and Alkyne Hydroacylation using β-*S*-Substituted Aldehydes: The Role of a Hemilabile P-O-P Ligand", G. L. Moxham, H. E. Randell-Sly, S. K. Brayshaw, R. L. Woodward, A. S. Weller, M. C. Willis, *Angew. Chem. Int. Ed.* **2006**, *45*, 7618.

(35) "Tandem Palladium Catalysed Urea Arylation – Intramolecular Ester Amidation: Regioselective Synthesis of 3-Alkylated 2,4-Quinazolinediones", M. C. Willis, R. H. Snell, A. J. Fletcher and R. L. Woodward, *Org. Lett.* **2006**, *8*, 5089-5091.

(34) "Chelating Phosphine Boranes as Hemilabile Ligands. Synthesis of $[Mn(CO)_3(\eta^2\text{-}H_3B{\cdot}dppm)][BAr^F{}_4]$ and $[Mn(CO)_4(\eta^1\text{-}H_3B{\cdot}dppm)][BAr^F{}_4]$", N. Merle, C. G. Frost, G. Kociok-Köhn, M. C. Willis and A. S. Weller, *Eur. J. Inorg. Chem.* **2006**, 4068-4073.

(33) "Rhodium Catalysed Intermolecular Chelation Controlled Alkene and Alkyne Hydroacylation: Synthetic Scope of β-*S*-Substituted Aldehyde Substrates", M. C. Willis, H. E. Randell-Sly, R. L. Woodward, S. J. McNally and G. S. Currie, *J. Org. Chem.* **2006**, *71*, 5291-5297.

(32) "Palladium Catalysed Intramolecular Enolate *O*-Arylation and Thio-enolate *S*-Arylation: Synthesis of Benzo[*b*]furans and Benzo[*b*]thiophenes", M. C. Willis, D. Taylor and A. T. Gillmore, *Tetrahedron* **2006**, *62*, 11513-11520. (invited contribution; Young Investigator Prize, Symposium-in-Print).

(31) "Aryl-Alkenyl-Dihalides as Substrates for Palladium Catalysed Tandem C-N Bond Formation: Efficient Synthesis of 1-Functionalised Indoles", M. C. Willis, G. N. Brace, T. J. K. Findlay and I. P. Holmes, *Adv. Syn. Catal.* **2006**, *348*, 851-856.

(30) "Rhodium-Catalyzed Reductive Aldol Reactions Using Aldehydes as the Stoichiometric Reductants", M. C. Willis and R. L. Woodward, *J. Am. Chem. Soc.* **2005**, *127*, 18012-18013.

(29) "Efficient Palladium-Catalysed Enamide Synthesis From Enol Triflates and Enol Tosylates", M. C. Willis, G. N. Brace and I. P. Holmes, *Synthesis*, **2005**, 3229-3234.

(28) "A New Reactivity Pattern for Vinyl Bromides; *Cine*-Substitution *via* Palladium Catalysed C-N Coupling/Michael Addition Reactions", M. C. Willis, J. Chauhan and W. G. Whittingham, *Org. Biomol. Chem.* **2005**, *3*, 3094-3095.

(27) "Ruthenium(II) Complexes of the Chelating Phosphine Borane $H_2ClB{\cdot}dppm$", N. Merle, C. G. Frost, G. Kociok Köhn, M. C. Willis and A. S. Weller, *J. Organometallic Chem.* 2005, *690*, 2829-2834.

(26) "Chelation Controlled Intermolecular Alkene and Alkyne Hydroacylation: The Utility of β-Thioacetal Aldehydes", M. C. Willis, H. E. Randell-Sly, R. L. Woodward and G. S. Currie, *Org. Lett.* 2005, *7*, 2249-2251.

(25) "The Direct Catalytic Enantioselective Synthesis of Protected Aryl β-Hydroxy-α-Amino Acids", M. C. Willis, G. A. Cutting, V. J.-D. Piccio, M. J. Durbin and M. P. John, *Angew. Chem. Int. Ed.* 2005, *44.* 1543-1545.

(24) "Palladium Catalysed Tandem Alkenyl- and Aryl-C-N Bond Formation: A Cascade *N*-Annulation Route to 1-Functionalised Indoles", M. C. Willis, G. N. Brace and I. P. Holmes, *Angew. Chem. Int. Ed.* 2005, *44,* 403-406.

(23) "Palladium Catalysed Intramolecular *O*-Arylation of Enolates: Application to Benzo[*b*]furan Synthesis", M. C. Willis, D. Taylor and A. T. Gillmore, *Org. Lett.* 2004, *6*, 4755-4757.

(22) "Transition Metal Complexes of the Chelating Phosphine Borane Ligand $Ph_2PCH_2Ph_2P{\cdot}BH_3$", N. Merle, G. Koicok-Köhn, M. F. Mahon, C. G. Frost, G. D. Ruggerio, A. S. Weller and M. C. Willis, *J. Chem. Soc., Dalton Trans.* 2004, 3883-3892.

(21) "A Direct Catalytic and Diastereoselective Aldol Route to Protected α,β–Dihydroxy-Ketones", M. C. Willis, G. A. Cutting and M. P. John, *Synlett* 2004, 1195-1198.

(20) "Automated Structure Elucidation of two Unexpected Products in a Reaction of an α,β–Unsaturated pyruvate", G. J. Sharman, I. C. Jones, M. P. Parnell, M. C. Willis, M. F. Mahon, D. V. Carlson, A. Williams, M. Elyashberg, K. Blinov and S. G. Molodstov, *J. Magn. Reson. Chem.* 2004, *42*, 567-572.

(19) "Enantioselective Suzuki Reactions: The Catalytic Asymmetric Synthesis of Compounds Containing Quaternary Carbon Centers", M. C. Willis, L. H. W. Powell, C. K. Claverie and S. J. Watson, *Angew. Chem. Int. Ed.* 2004, *42,* 1249-1251.

(18) "Chelation Controlled Intermolecular Hydroacylation: The Direct Addition of Alkyl Aldehydes to Functionalised Alkenes", M. C. Willis, S. J. McNally and P. J. Beswick, *Angew. Chem. Int. Ed.* 2004, *42,* 340-343.

(17) "Palladium Catalysed Aryl Enol Ether Synthesis from Vinyl Triflates", M. C. Willis, D. Taylor and A. T. Gillmore, *Chem. Commun.* 2003, 2222-2223.

(16) "One-Pot Synthesis of Perhydrofuro[2,3-*b*]pyran Derivatives", M. C. Willis and S. E. Flower, *Synlett* 2003, 1491-1493.

(15) "Diphosphine Mono-Sulfides: Readily Available Chiral Monophosphines", C. J. Chapman, C. G. Frost, M. P. Gill-Carey, G. Kociok-Köhn, M. F. Mahon, A. S. Weller and M. C. Willis, *Tetrahedron: Asym.* **2003**, *14*, 705-710.

(14) "Palladium Catalysed Enamine Synthesis from Vinyl Triflates", M. C. Willis and G. N. Brace, *Tetrahedron Lett.* **2002**, *43*, 9085-9088.

(13) "A Direct Catalytic Aldol Route to Protected β–Hydroxy–α–Amino Acids" M. C. Willis and V. J.-D. Piccio, *Synlett* **2002**, 1625-1628.

(12) "Tandem Intermolecular Suzuki Coupling, Intramolecular Vinyl Triflate–Arene Coupling", M. C. Willis, C. K. Claverie and M. F. Mahon, *Chem. Commun.* **2002**, 832-833.

(11) "Intermolecular Hydroacylation of Acrylate Esters: A New Route to 1,4-Dicarbonyls", M. C. Willis and S. Sapmaz, *Chem. Commun.* **2001**, 2558-2559.

(10) "The Preparation and Suzuki Coupling Reactivity of Cyclic 1,3-Dione Derived Mono- and Ditriflates", M. C. Willis and C. K. Claverie, *Tetrahedron Lett.* **2001**, *42*, 5105-5107.

(9) "Chelating Mono-Borane Phosphines: Rational and High-Yield Synthesis of $[(COD)Rh-\{(\eta_2BH_3)Ph_2PCH_2PPh_2\}][PF_6]$", M. Ingleson, N. J. Patmore, G. D. Ruggiero, C. G. Frost, M. F. Mahon, M. C. Willis and A. S. Weller, *Organometallics* **2001**, *21*, 4434-4436.

(8) "Enantioselective Cycloaddition Reactions" in Rodd's Chemistry of Carbon Compounds: Topical Volumes, Asymmetric Catalysis, M. Sainsbury, Ed., Elsevier, Oxford, **2001**.

(7) "Enantioselective and Diastereoselective Mukaiyama-Michael Reactions Catalysed by Bis(oxazoline) Copper(II) Complexes", D. A. Evans, K. A. Scheidt, J. S. Johnston and M. C. Willis, *J. Am. Chem. Soc.* **2001**, *123*, 4480-4491.

(6) "Organic Aspects of Organometallic Chemistry", M. C. Willis and Christopher G. Frost, Organometallic Chemistry Specialist Periodical Report **1999**, Volume 29, M. Green, Ed., Royal Society of Chemistry.

(5) "Catalytic Enantioselective Michael Additions to Unsaturated Ester Derivatives Using Chiral Copper(II) Lewis Acid Complexes", D. A. Evans, M. C. Willis and J. S. Johnston, *Org. Lett.* **1999**, *1*, 865-868.

(4) "Enantioselective Desymmetrisation", M. C. Willis, *J. Chem Soc., Perkin Trans. 1* **1999**, 1765-1784.

(3) "Organic Aspects of Organometallic Chemistry", M. C. Willis and Christopher G. Frost, Organometallic Chemistry Specialist Periodical Report **1998**, Volume 28, M. Green, Ed., Royal Society of Chemistry.

(2) "(Phenylsulfonyl)-trimethylsilylmethane", Steven V. Ley, M. C. Willis, in "Encyclopedia of Reagents for Organic Synthesis", L. Paquette, Ed, J. Wiley: Chichester, **1995**, Vol. 6, 4061.

(1) "An Improved Procedure for the *N*-Formylation of Secondary Amines Using Chlorotrimethylsilane-Imidazole-*N,N*-Dimethylformamide"; M. B. Berry, J. Blagg, D. Craig, M. C. Willis, *Synlett* **1992**, 659-660.

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