

# Rebecca Willcocks

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## Education

- 2011**      **PhD, School of Sport and Health Sciences, University of Exeter, Exeter, UK**  
Supervisors: Associate Professor Craig Williams; Professor Neil Armstrong  
*Investigation of metabolic responses to exercise in adolescents and adults during high intensity exercise and recovery.*
- 2007**      **MSc (distinction), University of Exeter, Exeter, UK**  
Paediatric Exercise Physiology  
*Metabolic responses to heavy exercise in boys measured using 31-phosphorus magnetic resonance spectroscopy*
- 2006**      **BSc (distinction), University of Victoria, Victoria, BC, Canada**  
Kinesiology
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## Positions

- 2017-present**      **Research Assistant Professor, Department of Physical Therapy, University of Florida, Gainesville, Florida, USA**
- 2015-present**      **Adjunct Assistant Scientist, Department of Physical Therapy, University of Florida, Gainesville, Florida, USA**
- 2011-2015**      **Postdoctoral Associate, Department of Physical Therapy, University of Florida, Gainesville, Florida, USA**  
Advisors – Krista Vandeborne, PT, PhD and Glenn Walter, PhD
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## Research Support

MDA Development Grant                                      Willcocks (PI)                                      8/1/2015-7/31/2018  
"MRI, MRS, and functional characterization of the arm in DMD"  
The goal of this project is to develop noninvasive MR biomarkers in the arms of nonambulatory individuals with Duchenne muscular dystrophy.

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## Publications

- 2017      **Willcocks RJ**, Triplett WT, Forbes SC, Arora H, Senesac CR, Lott DJ, Nicholson TR, Rooney WD, Walter GA, Vandeborne K. Magnetic resonance imaging of the proximal upper extremity musculature in boys with Duchenne muscular dystrophy. *J Neurol* 264: 64-71
- 2016      **Willcocks RJ**, Rooney WD, Triplett WT, Forbes SC, Lott DJ, Senesac CR, Daniels MJ, Wang DJ, Harrington AT, Tennekoon GI, Russman BS, Finanger EL, Byrne BJ, Finkel RS, Walter GA, Sweeney HL, Vandeborne K. Multicenter prospective longitudinal study of magnetic resonance biomarkers in a large Duchenne muscular dystrophy cohort. *Ann Neurol* 79: 535-547.
- 2016      Fobes SC, **Willcocks RJ**, Rooney WD, Walter GA, Vandeborne K. MRI quantifies neuromuscular disease progression. *Lancet Neurol* 15: 26-28.

- 2014 **Willcocks RJ**. Global T2 versus water T2 in NMR imaging of fatty infiltrated muscles: Different methodology, different information, and different implications. *Neuromuscul Disord* 24: 1120.
- 2014 **Willcocks RJ**, Arpan IA, Forbes SC, Lott DJ, Senesac CR, Senesac E, Deol J, Triplett WT, Baligand C, Daniels MJ, Sweeney HL, Walter GA, and Vandeborne K. Longitudinal measurements of MRI-T2 in boys with Duchenne muscular dystrophy: effects of age and disease progression. *Neuromuscul Disord* 24: 393-401.
- 2014 **Willcocks RJ**, Fulford J, Armstrong N, Barker AR, and Williams CA. Muscle metabolism during fatiguing isometric quadriceps exercise in adolescents and adults. *Appl Physiol Nutr Metab* 39: 439-445.
- 2014 **Willcocks RJ**, Fulford J, Barker AR, Armstrong N, and Williams CA. Two protocols to measure mitochondrial capacity in women and adolescent girls: a 31P-MRS preliminary study. *Pediatr Exerc Sci* 26: 210-217.
- 2014 Arpan I, **Willcocks RJ**, Forbes SC, Finkel RS, Lott DJ, Rooney WD, Triplett WT, Senesac CR, Daniels MJ, Byrne BJ, Finanger EL, Russman BS, Wang DJ, Tennekoon GI, Walter GA, Sweeney HL, and Vandeborne K. Examination of effects of corticosteroids on skeletal muscles of boys with DMD using MRI and MRS. *Neurology* 83: 974-980.
- 2014 Forbes SC, **Willcocks RJ**, Triplett WT, Rooney WD, Lott DJ, Wang DJ, Pollaro J, Senesac CR, Daniels MJ, Finkel RS, Russman BS, Byrne BJ, Finanger EL, Tennekoon GI, Walter GA, Sweeney HL, and Vandeborne K. Magnetic resonance imaging and spectroscopy assessment of lower extremity skeletal muscles in boys with Duchenne muscular dystrophy: a multicenter cross sectional study. *PLoS One* 9: e106435.
- 2014 Triplett WT, Baligand C, Forbes SC, **Willcocks RJ**, Lott DJ, DeVos S, Pollaro J, Rooney WD, Sweeney HL, Bönnemann CG, Wang DJ, Vandeborne K, and Walter GA. Chemical shift-based MRI to measure fat fractions in dystrophic skeletal muscle. *Magn Reson Med* 72: 8-19.
- 2013 Forbes SC, Walter GA, Rooney WD, Wang DJ, DeVos S, Pollaro J, Triplett W, Lott DJ, **Willcocks RJ**, Senesac C, Daniels MJ, Byrne BJ, Russman B, Finkel RS, Meyer JS, Sweeney HL, and Vandeborne K. Skeletal muscles of ambulant children with Duchenne muscular dystrophy: validation of multicenter study of evaluation with MR imaging and MR spectroscopy. *Radiology* 269: 198-207.
- 2010 Barker AR, Breese BC, **Willcocks RJ**, Williams CA, and Armstrong N. Commentaries on Viewpoint: Do oxidative and anaerobic energy production in exercising muscle change throughout growth and maturation? The importance of exercise intensity when studying developmental energy metabolism. *J Appl Physiol* 109: 1565-1566.
- 2010 **Willcocks RJ**, Williams CA, Barker AR, Fulford J, and Armstrong N. Age- and sex-related differences in muscle phosphocreatine and oxygenation kinetics during high-intensity exercise in adolescents and adults. *NMR Biomed* 23: 569-577.

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### **Published Abstracts**

- 2015 **Willcocks RJ**, Triplett WT, Lott DJ, Forbes SC, Dastgir J, Bonnemann C, Vandeborne K, Walter GA. Quantitative MRI and MRS detect alterations in muscle quality in both congenital muscular dystrophy and Duchenne muscular dystrophy. *Neuromuscul Disord* 25: S296
- 2015 **Willcocks RJ**, Forbes SC, Triplett WT, Lott DJ, Senesac CS, Nicholson T, Arora H, Walter GA, Vandeborne K. Magnetic resonance imaging of the arm and shoulder in boys with DMD. *Neuromuscul Disord* 25: S198
- 2015 Barnard AM, de Mello Sa SR, **Willcocks RJ**, Senesac CR, Finkel RS, Forbes SC, Sweeney HL, Tennekoon GI, Triplett WT, Lott DJ, Wang DJ, Byrne BJ, Hammers D,

- Pham J, Rooney WR, Finanger EL, Russman B, Walter GA, Vandeborne K. Genetic polymorphisms modify intramuscular fat infiltration in Duchenne muscular dystrophy. *Neuromuscul Disord* 25: S254-S255.
- 2014 **Willcocks RJ**, Forbes SC, Finanger EL, Russman BS, Lott DJ, Senesac CR, Triplett WT, Arpan I, Daniels MJ, Byrne BJ, Finkel RS, Tennekoon GI, Rooney WD, Walter GA, Sweeney HL, and Vandeborne K. Magnetic resonance imaging and spectroscopy detect changes with age, corticosteroid treatment, and functional progression in DMD. *Neuromuscul Disord* 23: 810.
- 2014 Arpan I, **Willcocks RJ**, Forbes SC, Lott DJ, Senesac CS, Triplett WT, Daniels MJ, Byrne BJ, Finanger EL, Finkel RS, Russman BS, Rooney WD, Tennekoon GI, Walter GA, Sweeney HL, and Vandeborne K. MR supports the therapeutic effect of corticosteroids in 5-7 year old boys with DMD. *Proc Intl Soc Magn Reson Med* 22: 4008.
- 2014 Sweeney HL, **Willcocks RJ**, Forbes SC, Rooney WD, Arpan I, Triplett WT, Daniels MJ, Lott DJ, Senesac C, Finkel RS, Byrne BJ, Finanger EL, Russman BS, Wang DJ, Tennekoon GI, Walter GA, and Vandeborne K. Emerging results from the ImagingDMD study. *Neuromuscul Disord* 24: S5.
- 2014 Rooney WD, Forbes SC, Triplett WT, Pollaro J, Wang DJ, De Vos S, Meyer J, **Willcocks RJ**, Byrne BJ, Finkel R, Russman B, Finanger E, Daniels M, Sweeney L, Walter GA, and Vandeborne K. Tracking disease progression in Duchenne muscular dystrophy: Longitudinal changes in quantitative MR measures. *Proc Intl Soc Magn Reson Med* 22.
- 2014 Forbes SC, Walter GA, Rooney WD, Wang DJ, Triplett WT, **Willcocks RJ**, Pollaro J, Byrne BJ, Finkel RS, Russman BS, Finanger EL, Sweeney HL, and Vandeborne K. T2 mapping and single voxel 1H-MRS detect skeletal muscle involvement in young boys with Duchenne muscular dystrophy. *Proc Intl Soc Magn Reson Med* 22: 4007.
- 2013 Rooney WD, Forbes SC, Triplett WT, Wang DJ, De Vos S, Pollaro J, Meyer JS, **Willcocks RJ**, Byrne BJ, Finkel RS, Russman BS, Sweeney HL, Walter GA, and Vandeborne K. Soleus water muscle T2 values in Duchenne muscular dystrophy: Associations with age and corticosteroid treatment. *Proc Intl Soc Magn Reson Med* 21: 689.
- 2013 Baligand C, Triplett WT, Forbes SC, **Willcocks RJ**, Lott DJ, de Vos S, Pollaro J, Rooney W, Sweeney HL, Bönnemann C, Vandeborne K, and Walter GA. Chemical shift-based imaging to measure fat fractions in dystrophic skeletal muscle. *Proc Intl Soc Magn Reson Med* 21: 3519.
- 2013 Forbes SC, Walter GA, Rooney WD, Wang DJ, De Vos S, Pollaro J, Triplett WT, Lott DJ, **Willcocks RJ**, Senesac C, Daniels MJ, Byrne BJ, Russman BS, Finkel RS, Meyer JS, Sweeney HL, and Vandeborne K. Reproducibility of skeletal muscle MR measures in Children: A multi-center study of Duchenne muscular dystrophy. *Proc Intl Soc Magn Reson Med* 21: 1633.
- 2012 Rooney WD, Forbes SC, Pollaro J, Wang DJ, De Vos S, Triplett WT, Meyer J, **Willcocks RJ**, Byrne BJ, Finkel RS, Russman BS, Sweeney HL, Walter GA, and Vandeborne K. Water T2 Values are elevated in Duchenne muscular dystrophy independent of fat infiltration. *Proc Intl Soc Magn Reson Med* 20: 447.
- 2011 **Willcocks RJ**, Fulford J, Barker A, and Williams CA. Recovery from brief isometric calf exercise in young and adult females measured with 31P-MRS. In: *Children and Exercise XXV*, edited by Baquet G, and Berthoin S. Abingdon, Oxon, UK: Routledge.
- 2011 Forbes SC, Walter GA, Rooney WD, Wang DJ, DeVos S, Pollaro J, Triplett W, Lott DJ, Senesac C, Daniels MJ, **Willcocks RJ**, Byrne B, Russman B, Finkel R, Sweeney HL, and Vandeborne K. Design of a multi-center study to examine skeletal muscles of children with Duchenne muscular dystrophy using MRI/MRS. *Neuromuscul Disord* 21: 653-654.

- 2009 Williams CA, **Willcocks RJ**, Barker AR, Fulford J, and Armstrong N. Muscle phosphocreatine kinetics in children and adults during high-intensity exercise. *Med Sci Sports Exerc* 41: 177.
- 2008 **Willcocks RJ**, Barker AR, Fulford J, Welford D, Welsman JR, Armstrong N, and Williams CA. Kinetics of phosphocreatine and deoxyhaemoglobin in children and adults during high-intensity exercise. *Med Sci Sports Exerc* 40: S20.
- 2008 Williams CA, **Willcocks RJ**, Barker AR, Fulford J, Welford D, Welsman JR, and Armstrong N. Recovery of muscle oxygenation and phosphocreatine in children and adults following high-intensity quadriceps exercise. *Med Sci Sports Exerc* 40: 177.

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### **Conference Presentations**

- 2017 Magnetic Resonance Imaging and Spectroscopy in LAMA2. International Conference on LAMA2 CMD in Washington, DC
- 2017 MR biomarkers capture disease in both progressed and preserved muscles in the upper extremity of nonambulatory boys with DMD. Muscular Dystrophy Association Scientific Conference in Washington, DC
- 2017 Development of a Computable Phenotype for Duchenne Muscular Dystrophy. OneFlorida Annual Stakeholders Meeting in Gainesville, Florida
- 2016 Fractures, Supplements, and Bisphosphonates: A retrospective review of boys with Duchenne muscular dystrophy enrolled in ImagingDMD. Parent Project Muscular Dystrophy Connect Conference in Orlando, FL
- 2015 MRI biomarkers are responsive to disease progression and predictive of functional decline in Duchenne muscular dystrophy. Annual Neuromuscular Plasticity Symposium in Gainesville, FL
- 2014 Magnetic resonance measures of muscle size and quality are altered in the upper extremity of 7-16 year old boys with DMD. New Directions in Skeletal Muscle Biology in Health and Disease in Chicago, IL
- 2014 Arm muscle involvement in Duchenne muscular dystrophy: A quantitative MRI and MRS study. Advances in Skeletal Muscle Biology in Health & Disease meeting in Gainesville FL.
- 2013 Magnetic resonance measures of muscle physiology significantly predict functional performance in boys with Duchenne Muscular Dystrophy. MDA's Scientific Conference 2013 in Washington DC.
- 2013 Magnetic resonance imaging and spectroscopy detect changes with age, corticosteroid treatment, and functional progression in DMD. World Muscle Society annual meeting in Asilomar, CA.
- 2013 Magnetic resonance measures of muscle physiology significantly predict functional performance in boys with Duchenne Muscular Dystrophy. Annual Neuromuscular Plasticity Symposium in Gainesville, FL
- 2012 Longitudinal changes in MRI transverse relaxation time in boys with Duchenne muscular dystrophy. New Directions in Biology and Disease of Skeletal Muscle meeting in New Orleans, LA.
- 2012 Longitudinal changes in measures of T<sub>2</sub> heterogeneity in boys with DMD. Neuromuscular Plasticity Symposium in Gainesville, Florida.
- 2012 Longitudinal changes in skeletal muscle MRI T<sub>2</sub> relaxation time in boys with Duchenne Muscular Dystrophy. 12<sup>th</sup> biennial Advances in Skeletal Muscle Biology in Health and Disease conference in Gainesville, Florida.
- 2010 Metabolic and oxygenation parameters associated with muscle fatigue in adolescent boys and men. Annual Congress of the European College of Sport Science in Antalya, Turkey, received Young Investigator Award.

- 2009 Recovery from brief isometric calf exercise in young and adult females measured using <sup>31</sup>P-MRS. Paediatric Work Physiology Meeting in Lille, France.
  - 2009 Advances in paediatric exercise science: Lessons from the past. BASES fellow symposium at the British Association of Sport and Exercise Sciences Annual Conference in Leeds, UK.
  - 2008 Kinetics of phosphocreatine and deoxyhaemoglobin in children and adults during high-intensity exercise. ACSM Annual Meeting in Indianapolis, IA, USA.
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### **Workshop Sessions**

- 2016 Preconference meeting with MDStarnet, DuchenneConnect, and OneFlorida on development of a computable phenotype for Duchenne muscular dystrophy
  - 2016 Parent Project Muscular Dystrophy Bone Health and Osteoporosis in Duchenne Muscular Dystrophy meeting
  - 2014 MRI and Relationships Between MRI and Clinical Outcomes sessions in Parent Project Muscular Dystrophy preconference on the standardization of outcome measures
  - 2008 Magnetic Resonance Spectroscopy session in British Association of Sport and Exercise Sciences workshop on Advanced Techniques in Paediatric Exercise Science
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### **Scholarships and Awards**

- 2013 and 2015 World Muscle Society fellowship funding
  - 2010 Young Investigator Award, European College of Sport Science Annual Meeting (Joint 5<sup>th</sup> in poster competition)
  - 2010 International Society for Magnetic Resonance in Medicine New Entrant Award
  - 2007-2010 Exeter Research Scholarship for international postgraduate students
  - 2007-2010 School of Sport and Health Sciences Award
  - 2006 Andrew Stratton Scholarship
  - 2006 School of Sport and Health Sciences Scholarship
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### **Teaching Experience**

- 2015-2016 DPT Physiology  
Delivered three lectures annually about the physiology of the renal system
- 2014 and 2016 RSD Art of Scientific Dissemination  
Co-instructor
- 2013 DPT Basic Skills 2  
Laboratory session on use of the Biodex Isokinetic Dynamometer in clinical practice and research
- 2012-2013 DPT Pediatrics  
Guest lecture – Duchenne muscular dystrophy, clinical trials, and MRI
- 2012 DPT Physiology  
Delivered two lectures about the physiology of the endocrine system
- 2009 MSc Research Methods  
Teaching assistant – assisted during lectures and led tutorials

2009	<u>BSc Sports Nutrition</u> Teaching assistant – delivered lectures, led seminars, and led labs
2008	<u>BSc exercise physiology</u> Teaching assistant – Led labs
2005	<u>BSc systemic physiology and BSc exercise physiology</u> Undergraduate lab assistant – assisted with lab preparation and teaching, marked pre-lab assignments.

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### **Outreach and Service**

2017	Presenter, Parent Project Muscular Dystrophy's Every Single One tour
2015-2016	Ad hoc manuscript reviewer: Journal of Neurology, Neurosurgery, and Psychiatry; PLOS One; European Journal of Neurology, Muscle and Nerve
2011-2015	Mentor to undergraduate students undertaking internships and research volunteer experience
2014	Ad hoc grant reviewer – Association Francaise contre les Myopathies
2012-2013	Speaker, University of Florida NeuroNoons seminar series
2012	Speaker, University of Florida Muscle Biology/Physiology seminar series
2012-2013	Speaker, Minority Association of Pre-Health Students Research Forum
2012	Speaker, National Junior Honor Society, Fort Clarke Middle School
2011-2013	Laboratory host, University of Florida Student Science Training Program
2006-2009	University of Exeter Student-Staff Liaison Committee

#### *School of Sport and Health Sciences Annual Student Conference, University of Exeter*

2009	Oral presentation
2008	Organizing committee, session chair, oral presentation
2007	Organizing committee, session chair, oral presentation

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### **Training, Qualifications and Society Memberships**

2016	Power and Sample Size for Longitudinal and Multilevel Study Designs short course, University of Florida
2013-2014	Member, World Muscle Society
2013	IFAS Grantsmanship training workshop
2012	University of Florida postdoctoral association development workshops
2012	Nationwide Children's Hospital/Wellstone/Ohio State University Myology Course
2007-2010	Member, American College of Sports Medicine Noninvasive neuromuscular interest group member
2010-2011	Member, International Society for Magnetic Resonance in Medicine
2010	Member, European College of Sport Science
2008	Completed Learning and Teaching in Higher Education course and assignment to earn the title Associate of the Higher Education Academy.
2007-2009	University of Exeter Effective Researcher Development Program