

## A/Prof. Thor Besier, PhD

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Principal Investigator

Head of the ABI-Research Group on  
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Born on November 16, 1973 in Sydney (Australia)



### Scientific Career

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|-------------|---|
| Since 2014  | Associate Professor, Auckland Bioengineering Institute and Department of Engineering Science, University of Auckland, NZ. |
| 2014 - 2016 | Associate Director Research, Auckland Bioengineering Institute, University of Auckland, NZ.                               |
| 2011 - 2014 | Senior Research Fellow, Auckland Bioengineering Institute, University of Auckland, NZ                                     |
| 2006 - 2010 | Director Research, Human Performance Laboratory, Stanford University  |
| 2006 - 2010 | Assistant Professor, Department of Orthopaedics, Stanford University  |
| 2003 - 2006 | Postdoctoral Research Associate, Biomechanical Engineering, Stanford University, USA                                      |
| 2001 - 2003 | Research Associate, Department of Human Movement and Exercise Science, The University of Western Australia, Australia     |
| 2000        | PhD in Biomechanics, University of Western Australia, Australia   |
| 1992 - 1995 | Study of Kinesiology and Biomechanics at the University of Otago, NZ  |

### Scholarships, Awards and Faculty Functions

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| 2016 | Semifinalist for New Zealander of the Year: Innovator of the Year category         |
| 2015 | Winner, Samsung Springboard Challenge for “IMeasureU”                              |
| 2014 | Winner, NZ Innovators Award, ICT & Cloud Solutions for “IMeasureU”                 |
| 2013 | Marsden Fund full award, Royal Society of New Zealand                              |
| 2013 | Winner, Spark \$100k Challenge, University of Auckland Entrepreneurship Challenge  |
| 2011 | Editorial Board, Journal of Applied Biomechanics                                   |
| 2010 | Walter Wolf Award, Society of Nuclear Medicine                                     |
| 2009 | Clinical Biomechanics Award, American Society of Biomechanics                      |
| 2006 | Lauterbur Award, Society of Computed Body Tomography and Magnetic Resonance        |
| 2005 | Inaugural recipient of the Stanford Regenerative Medicine Postdoctoral Scholarship |

2001	Young Investigator Award, International Society of Biomechanics in Sport
1999	"Prince de Merode" Award, IOC Sport Science Congress
1999	Young Investigator Award, Sports Medicine Australia

#### Ten most important publications

\* Publications jointly together with UoA-researchers involved within this IRTG

§ Publications jointly together with USTUTT-researchers involved within this IRTG

#### A) Published in publication outlets with scientific quality assurance and book publications:

1. Pizzolato, C.; Lloyd, D. G.; Sartori, M.; Ceseracciu, E.; Besier, T. F.; Fregly, B. J.; Reggiani, M.: CEINMS: A toolbox to investigate the influence of different neural control solutions on the prediction of muscle excitation and joint moments during dynamic motor tasks. *J Biomech*, 48(14), p. 3929-3936, 2015.
2. Zhang, J.; Hislop-Jambrich, J.; Besier, T.F.: Predictive statistical models of baseline variations in 3-D femoral cortex morphology. *Medical Engineering and Physics*, 38(5), p. 450-457, 2016.
3. Shull, P.B.; Silder, A.; Shultz, R.; Dragoo, J.L.; Besier, T.F.; Delp, S.L.; Cutkosky, M.R.: Six-week gait retraining program reduces knee adduction moment, reduces pain, and improves function for individuals with medial compartment knee osteoarthritis. *J Orthop Res*, 31(7): p. 1020-1025, 2013.
4. Shull, P. B.; Shultz, R.; Silder, A.; Dragoo, J. L.; Besier, T. F.; Cutkosky, M. R.; Delp, S. L.: Toe-in gait reduces the first peak knee adduction moment in patients with medial compartment knee osteoarthritis. *J Biomech*, 46(1), p. 122-128, 2013.
5. Gerus, P.; Sartori, M.; Besier, T.F.; Fregly, B.J.; Delp, S.L.; Banks, S.A.; Pandy, M.G.; D'Lima, D.D.; Lloyd, D.G.: Subject-specific knee joint geometry improves predictions of medial tibiofemoral contact forces. *J Biomech*, 46(16), 2778-2786, 2013.
6. Fregly, B.J.; Besier, T.F.; Lloyd, D.G.; Delp, S.L.; Banks, S.A.; Pandy, M.G.; D'Lima, D.D.: Grand challenge competition to predict in vivo knee loads. *J Orthop Res*, 30(4), p. 503-513, 2012.
7. Besier, T. F.; Fredericson, M.; Gold, G. E.; Beaupre, G. S.; Delp, S. L.: Knee muscle forces during walking and running in patellofemoral pain patients and pain-free controls. *J Biomech*, 42(7), p, 898-905, 2009.
8. Besier, T. F.; Gold, G. E.; Delp, S. L.; Fredericson, M.; Beaupre, G. S.: The influence of femoral internal and external rotation on cartilage stresses within the patellofemoral joint. *J Orthop Res*, 26(12), p. 1627-1635, 2008.
9. Besier, T. F.; Gold, G. E.; Beaupre, G. S.; Delp, S. L.: A modeling framework to estimate patellofemoral joint cartilage stress in vivo. *Med Sci Sports Exerc*, 37(11), p. 1924-1930, 2005.
10. Lloyd, D.G.; Besier, T.F.: An EMG-driven musculoskeletal model to estimate muscle forces and knee joint moments in vivo. *J Biomech*, 36(6), p. 765-776, 2003.

#### B) Other publications

#### C) Patents

1. "Motion Coaching: Device and Method", United States of America, No. WO/2008/023250.
2. "Lower limb shock assessment system and methods", submitted June 20, 2014.

Supervised graduate students since graduation year 2011

No.	Last Name, First Name	Degree	Title of the dissertation	Duration of thesis
1	*Ortega-Auriel, Pablo	PhD	Muscle synergies of the upper limb in stroke patients	2015 -
2	Pauli, Thorben	PhD	EMG-driven controller of a robotic exoskeleton	2016 -
3	Carleton, Alex	ME	Modelling Slipped Capital Femoral Epiphysis	2015
4	*Yeung, Shasha	PhD	Estimating hip and knee joint loads using inertial sensors	2015 -
5	Liu, Andi	PhD	Surrogate modelling of skeletal muscles surrounding the hip	2015 -
6	Liley, Helen	PhD	Modelling cartilage degeneration in the equine metacarpophalangeal (fetlock) joint	2012 -
7	Schneider, Marco	PhD	Statistical shape modelling of the carpometacarpal (thumb) joint	2012 -
8	Kazemi, Mousa	PhD	Surrogate modelling of the tibiofemoral joint for real-time gait retraining	2012 -
9	Chen, Daniel	PhD	Dielectric elastomer sensors for haptic gait retraining	2012 -

\* co-supervision

#### Most important research grants since 2011

No.	Research Project	Funding Period	Name(s) of the principal investigator(s)	Funding source and reference number
1	Randomized controlled trial of hip arthroscopy for femoroacetabular impingement	11/2013 - 10/2017	Hunter, D. Besier, T. (PI, subcontract)	Australian National Health & Medical Research Council
2	The musculoskeletal atlas project	9/2013 - 8/2014	Besier, T.	US Food & Drug Administration
3	Virtual testing of orthopaedic devices as part of the design and development process: Strategies to account for patient and surgical variability	8/2013 - 7/2016	Taylor, M. Besier, T. (PI, subcontract)	Australian Research Council
4	Changing the way we move: A novel framework for movement retraining	03/2013 - 02/2016	Besier, T.	Royal Society of New Zealand (Marsden Fund)
5	Multiscale cartilage model for osteoarthritis risk prediction using reliability theory	01/2012 - 11/2015	Gardiner, B. Besier, T. (PI, subcontract)	Australian National Health & Medical Research Council
6	Human joint sensing and actuation in preventive	04/2015-03/2018	Besier, T. Hunter, P.	NZ Ministry of Business Innovation

	ergonomics and rehabilitation therapy & monitoring in an ageing society (ICON)			& Employment (MBIE)
7	Virtual clinical trials	10/2014-09/2016	Besier, T.	MBIE
8	Evaluation of in vivo knee load predictions using instrumented implants	07/2010 - 06/2014	Fregly, B.J. D'Lima, D. Besier, T.	US National Institutes of Health