

Gareth Irwin, PhD, FISBS
Professor in Sports Biomechanics



Position:

Professor (Cardiff Metropolitan University)
Head of Biomechanics & Laboratory Director

Qualifications:

BSc (Hon) Sport & Exercise Sciences, (1997) *1st class* University of Wales

PhD Biomechanics, University of Bath, (2005)

Supervisor: Professor David G. Kerwin,

External Examiner: Professor Gert-Peter Brüggemann, Sports University of Cologne, Institute for Biomechanics and Orthopaedics, Germany

Philosophy:

My research philosophy is driven by a desire to understand and explain sporting performance using grounded scientific methods to address meaningful questions that inform researchers, coaches, performers and clinicians. There are two themes, which reflect this philosophy: *The coaching biomechanics interface* and *Sports medicine and injury*. The first theme examines research questions aimed at making training more effective and efficient, and ultimately embedding scientific rigour within the coaching environment. The second examines the role of the sports clinician and examines the underlying mechanisms associated with the aetiology of injury. In particular it seeks to explain how biological failures result from internal and external loading associated with abnormal segmental orientations. Ecological validity permeates my research. This facilitates and underpins the transfer of research findings into practical settings and applications.

My overall philosophy has attracted collaboration with like-minded academics locally, nationally and internationally. Measures of the success of this approach can be seen in the growth of the school's 'Sports Biomechanics Research Group', the securing of cherished research funding and my recognition at national and international levels through awards, invitations, outputs and international committee memberships.

Research publications:

Book contributions:

Irwin, G., Bezodis, I.N. and Kerwin, D.G. (2013). Chapter 9: Biomechanics and coaching. In: R. Jones, M. Hughes, K. Kingston, (ed.) *Sports Coaching, 2nd Edition*. London, UK: Routledge.

Irwin, G. (2011). Sports medicine and biomechanics. In: L. Micheli, (ed.), *Encyclopaedia of Sports Medicine*. USA: SAGE publications, 163-176.

Irwin, G. (2011). The sports biomechanist. In: L. Micheli, (ed.), *Encyclopaedia of Sports Medicine*. USA: SAGE publications, 1381-1382.

Irwin, G. and Kerwin, D.G. (2009). Advanced multidisciplinary application in technique analysis in elite sports – Example of SESAME Project. In: D. Hackfort (ed.) *New Approaches for Advancement in Elite Sports*. 2nd edition. Qatar, Doha: ASPIRE Sport Science Conference, 95-98.

Kerwin, D.G. and **Irwin, G.** (2008). Chapter 8: Biomechanics and coaching. In: R. Jones, M. Hughes, K. Kingston (ed.), *Sports Coaching*. London, UK: Routledge, 87-100.

Kerwin, D.G. and **Irwin, G.** (2006). Predicting high bar forces in the longswing. In: E. F. Moritz and S. Haake, (eds.) *The engineering of sport 6, Volume 1: Developments for sports*. New York, USA: Springer LLC, 189–194.

Irwin, G. and Kerwin, D.G. (2006). Musculoskeletal work in the longswing on high bar. In: E. F. Moritz and S. Haake, ed. *The Engineering of Sport 6, Volume 1: Developments for sports*. New York, USA: Springer LLC, 195 – 200.

Academic journal articles:

Farana, R., Jandacka, D., Uchytíl, J., Zahradník, D. and **Irwin, G.** (*in press*). A comparison of impact forces and elbow loading in different hand position during the round-off in female artistic gymnastics. *Sports Biomechanics*.

Gittoes, M.J.R., **Irwin, G.** and Kerwin, D.G. (2013). Landing strategy transference in fundamental backward rotating gymnastic dismounts. *Journal of Applied Biomechanics*. 29(3), 253-60.

Farana, R., Jandacka, D. and **Irwin, G.** (2013). Influence of different hand positions on impact forces and elbow loading during the round off in gymnastics: A case study. *Science of Gymnastics Journal*. 5(2) 5-14.

Gittoes, M.J.R. and **Irwin, G.** (2012). Biomechanical approaches to understanding the potentially injurious demands of gymnastic-style impact landings. *Sports, Medicine, Arthroscopy, Rehabilitation, Therapy & Technology*, 4(4), 1-12.

Exell, T., Gittoes, M.R.J., **Irwin, G.** and Kerwin, D.G. (2012). Considerations of force plate transitions on centre of pressure calculation for maximal velocity sprint running. *Sports Biomechanics*, 11(4), 532-541.

Exell, T., Gittoes, M.R.J., **Irwin, G.** and Kerwin, D.G. (2012). Gait asymmetry: composite scores for mechanical analyses of sprint running. *Journal of Biomechanics* 45(6), 1108-1111.

Exell, T., **Irwin, G.**, Gittoes, M.R.J. and Kerwin, D.G (2012). Implications of intra-limb variability on asymmetry analyses. *Journal of Sport Sciences*, 30(4), 403-409.

Williams, G., **Irwin, G.**, Kerwin, D.G. and Newell, K. M. (2012). Kinematic changes during learning the longswing on high bar. *Sports Biomechanics*, 11(1), 20-33.

Charalambous, L., Irwin, G., Bezodis, I. N. and Kerwin, D. (2012). Lower limb joint kinetics and ankle joint stiffness in the sprint start push-off. *Journal of Sports Sciences*, 30(1), 1-9.

Harle, R., Taherian, S., Pias, M., Coulouris, G., Hopper, A., Cameron, J., Lasenby, J., Kuntze, G., Bezodis, I., **Irwin, G.** and Kerwin D.G. (2012). Towards real-time profiling of sprints using wearable pressure sensors. *Computer Communications*, 33(6), 650-660.

Manning, M.L., **Irwin, G.**, Gittoes M.J.R. and Kerwin, D.G. (2011). Influence of longswing technique on the kinematics and key release parameters of the straddle Tkachev on uneven bars. *Sports Biomechanics*, 10(3), 161-173.

Gittoes, M.J.R., **Irwin, G.**, Kerwin, D.G. and Mullineaux, D.R. (2011). Variability of impact mechanics during forward and backward rotating dismounts from beam: implications for injury. *Journal of Sport Sciences*, 29(10), 1051-1058.

Gittoes, M.J.R., **Irwin, G.**, Mullineaux, D. and Kerwin, D.G. (2011). Whole-body and multi-joint kinematic control strategy variability during backward rotating dismounts from beam. *Journal of Sports Sciences*, 29(10), 1051-1058.

Kerwin, D.G. and **Irwin, G.** (2010). Musculoskeletal work preceding the outward and inward Tkachev on uneven bars in artistic gymnastics. *Sports Biomechanics*, 9(1), 16-28.

Taherian, S., Pias, M., Harle, R., Coulouris, G., Hay, S., Cameron, J., Lasenby, J., Kuntze, G., Bezodis, I., **Irwin, G.** and Kerwin, D. (2010). *Profiling sprints using on-*

body sensors. 8th IEEE International Conference on Pervasive Computing and Communications Workshops (PERCOM Workshops). Mannheim, Germany. 444-449.

Jones, P.L., Kerwin, D.G., **Irwin, G.** and Nokes, L.D.M. (2009). Three dimensional analysis of knee biomechanics when landing on natural turf and football turf. *Journal of Medical and Biological Engineering*, 29(4), 184-188.

Irwin, G. and Kerwin, D.G. (2009). The influence of the vaulting table on the handspring front somersault. *Sports Biomechanics*. 8(2), 114-128.

Irwin, G. and Kerwin, D.G. (2007). Musculoskeletal work of high bar progressions. *Sports Biomechanics*, 6(3), 360-373.

Irwin, G. and Kerwin, D.G. (2007). Inter-segmental co-ordination of high bar progressions. *Sports Biomechanics*, 6(2), 129-142.

Trewartha, G., Bezodis, N., Wilson, C. and **Irwin, G.** (2007). The control of rotation during rugby union goal kicking. *Sports Biomechanics*, 6(2), 171-186.

Robbins, M., Wheat, J., **Irwin, G.** and Bartlett, R. (2006). The changes in movement variability with shooting distance in basketball. *Human Movement Studies*, 50, 217-238.

Irwin, G., Hanton, S. and Kerwin, D.G. (2005). The conceptual process of progression development in artistic gymnastics. *Journal of Sports Sciences*, 23(10), 1089-1099.

Irwin, G. and Kerwin, D.G. (2005). Biomechanical similarities of progressions for the longswing on high bar. *Sports Biomechanics*, 4(2), 164-178.

Irwin, G. Hanton, S. and Kerwin, D.G. (2004). Reflective practice and the origins of elite coaching knowledge. *Reflective Practice*, 5(3), 425-442.

Academic journal abstracts:

Kerwin, D.G. and **Irwin, G.** (2011). Kinetic Analysis of toe-on Tkachev on uneven bars. *Portuguese Journal of Sports Sciences*, 11(S2), 283-286.

Irwin, G., Manning, M., and Kerwin, D.G. (2011). Kinematics and angular momentum contributions to the toe-on Tkachev on uneven bars in female gymnastics. *Portuguese Journal of Sports Sciences*, 11(S2), 271-274.

Williams, G., **Irwin, G.**, Kerwin, D.G. and Newell, K.M. (2011). The influence of experience on kinetic characteristics of the looped bar longswing. *Portuguese Journal of Sports Sciences*, 11(S2), 427-430.

Buzza, S.J., **Irwin, G.**, Bezodis, I.N, Kerwin, D.G. and Kwon, Y-H. (2011). Effects of trying to gain distance on golf driving technique. *Portuguese Journal of Sports Sciences*, 11(S2), 159-162.

Bezodis, I.N., **Irwin, G.**, Kuntze, G. and Kerwin, D.G. (2011) Changes in step characteristics between the maximum velocity and deceleration phases of 100 meter sprint run, *Portuguese Journal of Sports Sciences*, 11(S2), 455-458.

Exell, T., Kerwin, D.G., **Irwin, G.** and Gittoes, M.J.R. (2011). Calculating centre of pressure from multiple force plates for kinetic analysis of sprint running. *Portuguese Journal of Sports Sciences*, 11(S2), 875-878.

Exell, T., Kerwin, D.G., **Irwin, G.** and Gittoes, M.J.R. (2011). Lower-limb biomechanical asymmetry in maximal velocity sprint running. *Portuguese Journal of Sports Sciences*, 11(S2), 491-494.

Charalambous, L., Kerwin, D.G., **Irwin, G.**, Bezodis, I.N. and Hailes, S. (2011). Changes in step characteristics during sprint performance development. *Portuguese Journal of Sports Sciences*, 11(S2), 467-470.

Bezodis, I.N., Pias, M., **Irwin, G.**, Coulouris, G. and Kerwin D.G. (2008). Measurement of ground contact times in sprinting using in-shoe pressure sensors. *Journal of Sports Sciences*, 26(S2), 51.

Kerwin, D.G., **Irwin, G.** and Samuels, M. (2007). Angular momentum comparison of different Tkachevs. *Journal of Sports Sciences*, 25(S2), 50-51.

Irwin, G., Kerwin, D.G., Manning, M. and Brown, R. (2007). Biomechanics of the longswing preceding the Kovacs. *Journal of Sports Sciences*, 25(S2), 51-52.

Irwin, G., Kerwin, D.G., Manning, M. and Brown, R. (2007). The development of the Kovacs on high bar. *Journal of Sports Sciences*, 25(S2), 49-50.

Rosenblatt, B.A., **Irwin, G.**, Wiltshire, H.D. and Kerwin, D.G. (2007). Musculoskeletal loading during the power clean. *Journal of Strength and Conditioning Research*, 21(4), 16-17.

Robbins, M., Wheat, J., **Irwin, G.** and Bartlett, R. (2006). Evidence of compensatory variability preserving release parameters in basketball shooting. *Journal of Sports Sciences*, 23(11), 1159.

Robbins, M., Wheat, J., **Irwin, G.** and Bartlett, R. (2006). The effect of shooting distance on continuous coordination variability in basketball. *Journal of Sports Sciences*, 23(11), 1158.

Kaila, R., **Irwin, G.** and Kerwin, D.G. (2006). Side-step cutting using studded soccer boots affects knee rotational and valgus moments and injury potential. *Medicine & Science in Sports & Exercise*, 38(5), 41.

Kaila, R., **Irwin, G.** and Kerwin, D.G. (2006). Potential influence of studded and bladed football boots on non-contact anterior cruciate ligament injury when sidestep cutting on artificial turf. *Journal Bone & Joint Surgery*, 6, 22.

Irwin, G. and Kerwin, D.G. (2004). Inter-segmental co-ordination of high bar progressions. *Journal of Sports Sciences*, 22, 240-241.

Thornily, C. and **Irwin, G.** (2004). Influence of lane on the kinematics of indoor bend sprinting. *Journal of Sports Sciences*, 22, 240.

Irwin, G., Bown, R. and Thomas, E. (2004). Kinematic comparison of the handspring front somersault on the vaulting horse and new table. *Journal of Sports Sciences*, 22, 242.

Irwin, G., Glazier, P.S., Tong, R.J. and Radway, J. (2002). Changes in muscle activation characteristics during gymnastics rings routines. *Journal of sports sciences*, 20, 10-11.

Irwin, G., Hanton, S. and Kerwin, D.G. (2002). A model of the development of gymnastic skills. *Journal of sports sciences*, 20, 65.

International conference papers and abstracts:

Williams, G.K.R., **Irwin, G.**, Kerwin, D.G., Hamill, J. and Newell, K.M. (2013). Percentage accuracy in whole-body mass as predicted by an un-intrusive method of determining segment inertia parameters. *Proceedings of the 31st International Society of Biomechanics in Sport Conference*, Taipei, Taiwan, 2013. Submitted.

Ast, S., Kögel, J., Reh, J., Lieres und Wilkau, H.C., Charalambous, L. and **Irwin, G.** (2013). Identification of touchdown and toe-off in turf-sport specific movements using kinematic data. *Proceedings of the 31st International Society of Biomechanics in Sport Conference*, Taipei, Taiwan, 2013. Submitted.

Kögel, J., Charalambous, L. and **Irwin, G.** (2013). Player-surface interactions during a turning manoeuvre on artificial surfaces with different mechanical

characteristics. *Proceedings of the 31st International Society of Biomechanics in Sport Conference*, Taipei, Taiwan, 2013. Submitted.

Farana, R., Jandacka, D., Uchytíl, J., Zahradník, D. and **Irwin, G.** (2013). The effect of different hand position on impact forces and elbow loading during the round off in female gymnastics. *Proceedings of the 31st International Society of Biomechanics in Sport Conference*, Taipei, Taiwan, 2013. Submitted.

Strutzenberger, G., Moore, J., Griffiths, H., Schwameder, H. and **Irwin, G.** (2013). Effects of kinesio tape on fatigue in rugby players: pilot study. *Proceedings of the 31st International Society of Biomechanics in Sport Conference*, Taipei, Taiwan, 2013. Submitted.

Lieres und Wilkau, H.C., Charalambous, L. and **Irwin, G.** (2013). The effect of surface compliance on lower limb biomechanics during a two footed landing and acceleration, *18th annual Congress of the European College of Sport Science 2013*, Barcelona, Spain. Submitted.

Wdowski, M. M., Gittoes, M. J. R., **Irwin, G.** and Nokes, L. D. M. (2013). Short-term kinematic adaptation to unanticipated sprint running conditions in field sport, *18th annual Congress of the European College of Sport Science 2013*, Barcelona, Spain. Submitted.

Bezodis, I.N., Charalambous, L., Exell, T.A., Archer, M., Potthast, W. and **Irwin, G.** (2013). A case study of external kinetics following the sprint start in a unilateral transtibial amputee, *18th annual Congress of the European College of Sport Science 2013*, Barcelona, Spain. Submitted.

Exell, T.A., **Irwin, G.**, Godden, S. and Kerwin, D.G. (2012). Asymmetry analysis of the arm segments during forward handspring on floor. In: *Proceedings of the XXXth International Symposium on Biomechanics in Sports*, (Eds. E. Bradshaw, A. Burnett and P. Hume), Melbourne, Aus, 182-185.

Wdowski, M. M., Gittoes, M. J. R., **Irwin, G.**, Nokes, L. D. M. and Kerwin, D. K. (2012). Short-term biomechanical adaptation in a maximum velocity field sport sprinting protocol: pilot investigation. In: *Proceedings of the 30th International Symposium on Biomechanics in Sports*, (Eds. E. Bradshaw, A. Burnett and P. Hume), Melbourne, Aus, 190-194.

Irwin, G., Manning, M. and Kerwin, D.G. (2011). Kinematics and angular momentum contributions to the toe-on Tkachev on uneven bars in female gymnastics. In J.P. Vilas-Boas, L. Machado, Kim and Veloso (Eds.), *Proceedings of the 29th International Conference on Biomechanics in Sports*. University of Porto, Porto, Portugal, ISBS, 271-274.

Kerwin, D.G. and **Irwin, G.** (2011). Kinetic Analysis of toe-on Tkachev on uneven bars. In J.P. Vilas-Boas, L. Machado, Kim and Veloso (Eds.), *Proceedings of the 29th International Conference on Biomechanics in Sports*. University of Porto, Porto, Portugal, ISBS, 283-286.

Williams, G., **Irwin, G.**, Kerwin, D.G. and Newell, K.M. (2011). The influence of experience on kinetic characteristics of the looped bar longswing. In J.P. Vilas-Boas, L. Machado, Kim and Veloso (Eds.), *Proceedings of the 29th International Conference on Biomechanics in Sports*. University of Porto, Porto, Portugal, ISBS, 427-430.

Buzza, S.J., **Irwin, G.** Bezodis, I.N, Kerwin, D.G. and Kwon, Y-H. (2011). Effects of trying to gain distance on golf driving technique. In J.P. Vilas-Boas, L. Machado, Kim and Veloso (Eds.), *Proceedings of the 29th International Conference on Biomechanics in Sports*. University of Porto, Porto, Portugal, ISBS, 159-162.

Bezodis, I.N., **Irwin, G.**, Kuntze, G. and Kerwin, D.G. (2011) Changes in step characteristics between the maximum velocity and deceleration phases of 100 metre sprint run. In J.P. Vilas-Boas, L. Machado, Kim and Veloso (Eds.), *Proceedings of the 29th International Conference on Biomechanics in Sports*. University of Porto, Porto, Portugal, ISBS, 455-458.

Exell, T., Kerwin, D.G., **Irwin, G.** and Gittoes, M.J.R. (2011). Calculating centre of pressure from multiple force plates for kinetic analysis of sprint running. In J.P. Vilas-Boas, L. Machado, Kim and Veloso (Eds.), *Proceedings of the 29th International Conference on Biomechanics in Sports*. University of Porto, Porto, Portugal, ISBS, 875-878.

Exell, T., Kerwin, D.G., **Irwin, G.** and Gittoes, M.J.R. (2011). Lower-limb biomechanical asymmetry in maximal velocity sprint running. In J.P. Vilas-Boas, L. Machado, Kim and Veloso (Eds.), *Proceedings of the 29th International Conference on Biomechanics in Sports*. University of Porto, Porto, Portugal, ISBS, 491-494.

Charalambous, L., Kerwin, D.G., **Irwin, G.**, Bezodis, I.N., and Hailes, S. (2011). Changes in step characteristics during sprint performance development. In J.P. Vilas-Boas, L. Machado, Kim and Veloso (Eds.), *Proceedings of the 29th International Conference on Biomechanics in Sports*. University of Porto, Porto, Portugal, ISBS, 467-470.

Williams, G., **Irwin, G.** and Kerwin, D. G. (2010). Kinematic changes during learning the longswing on high bar. *Proceedings of the 28th International Society of Biomechanics in Sport Conference*, (Eds. R. Jensen, W. Ebben, E. Petushek, C. Richter, & K. Roemer.). Marquette, Michigan, USA.

Charalambous, L., Bezodis, I.N., **Irwin, G.**, Kerwin, D.G. and Harle, R. (2009). Lower limb joint kinetic in the sprint start push-off. In J.P. Vilas-Boas, L. Machado,

Kim and Veloso (Eds.), *Proceedings of the 29th International Conference on Biomechanics in Sports*. University of Porto, Porto, Portugal, ISBS, 715-718.

Charalambous, L., Bezodis, I.N., **Irwin, G.**, Kerwin, D.G. and Harle, R. (2009). Lower limb joint stiffness in the sprint start push-off. *In: Proceedings In: Proceedings of the 27th International Conference on Biomechanics in Sports*, (Eds. R. Anderson, D. Harrison and I. Kenny), University of Limerick, Castleroy, Limerick, Ireland, ISBS, 526-529.

Exell, T., Kerwin, D.G., **Irwin, G.** and Gittoes, M.R.J. (2009). Surface markers versus clusters for determining lower limb joint kinematics in sprint running. *In: Proceedings In: Proceedings of the 27th International Conference on Biomechanics in Sports*, (Eds. R. Anderson, D. Harrison and I. Kenny), University of Limerick, Castleroy, Limerick, Ireland, ISBS, 732-735.

Furlong, L-A.M., **Irwin, G.**, Wilson, C., Wiltshire, H.W. and Kerwin, D.G. (2009). Double knee bend in the power clean. *In: Proceedings of the 27th International Conference on Biomechanics in Sports*, (Eds. R. Anderson, D. Harrison and I. Kenny), University of Limerick, Castleroy, Limerick, Ireland, ISBS, 559.

Gittoes, M.J.R. **Irwin, G.**, Mullineaux, D. and Kerwin, D.G. (2009). Joint kinematic variability in the aerial and landings phases of backward rotating dismounts from beam. *In: Proceedings of the 27th International Conference on Biomechanics in Sports*, (Eds. R. Anderson, D. Harrison and I. Kenny), University of Limerick, Castleroy, Limerick, Ireland, ISBS, 494-497.

Gittoes, M.J.R., **Irwin, G.**, Mullineaux, D. and Kerwin, D.G. (2009). Landing strategy modulation in backward rotating piked and tucked somersault dismounts from beam. *In: Proceedings of the 27th International Conference on Biomechanics in Sports*, (Eds. R. Anderson, D. Harrison and I. Kenny), University of Limerick, Castleroy, Limerick, Ireland, ISBS, 489-492.

Jones, P., Kerwin, D.G., **Irwin, G.**, Nokes, L. and Kaila, R. (2009). Lower limb landing biomechanics on natural and football turf. *In: Proceedings of the 27th International Conference on Biomechanics in Sports*, (Eds. R. Anderson, D. Harrison and I. Kenny), University of Limerick, Castleroy, Limerick, Ireland, ISBS, 664-667.

Kuntze, G., Pias, M., Bezodis, I.N., Kerwin, D.G., Coulouris, G. and **Irwin, G.** (2009). Custom-built wireless pressure sensing insoles for determining contact-times in 60m maximal sprint running. *In: Proceedings of the 27th International Conference on Biomechanics in Sports*, (Eds. R. Anderson, D. Harrison and I. Kenny), University of Limerick, Castleroy, Limerick, Ireland, ISBS, 201-204.

Manning, M., **Irwin, G.**, Kerwin, D.G. and Gittoes, M.J.R. (2009). Preparatory longswings preceding Tkachevs on uneven bars. *In: Proceedings of the 27th International Conference on Biomechanics in Sports*, (Eds. R. Anderson, D. Harrison and I. Kenny), University of Limerick, Castleroy, Limerick, Ireland, ISBS, 627.

Samuels, M., **Irwin, G.**, Kerwin, D.G. and Gittoes, M.R.J. (2009). Trend analyses of complex release and re-grasp skills on the high bar. *In: Proceedings of the 27th International Conference on Biomechanics in Sports*, (Eds. R. Anderson, D. Harrison and I. Kenny), University of Limerick, Castleroy, Limerick, Ireland, ISBS, 507-510.

Tighe, D., **Irwin, G.**, Kerwin, D.G. and Gittoes, M.R.J. (2009). Preparatory longswing techniques for dismounts on uneven bars. *In: Proceedings of the 27th International Conference on Biomechanics in Sports*, (Eds. R. Anderson, D. Harrison and I. Kenny), University of Limerick, Castleroy, Limerick, Ireland, ISBS, 566-569.

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Irwin, G., Kerwin, D. G. and Robbins, M. (2008). Coordination analysis of landing strategies in beam dismounts. *In: Proceedings of the 26th International Symposium of Biomechanics in Sports*, (Eds. Y.H. Kwon, J. Shim, J.K. Shim and I-S. Shin), Seoul, South Korea, 705.

Manning, M. L., **Irwin, G.** and Kerwin, D. G. (2008). Biomechanics of longswings preceding Tkachev on uneven bars. *In: Proceedings of the 26th International Symposium of Biomechanics in Sports*, (Eds. Y.H. Kwon, J. Shim, J.K. Shim and I-S. Shin), Seoul, South Korea, 706-709.

Rosenblatt, B. A., **Irwin, G.**, Wiltshire, H. and Kerwin, D. G. (2007). An evaluation of the power clean as a sprint specific exercise. *NSCA Annual Conference*, Atlanta, Georgia, USA.

Irwin, G., Kerwin, D. G., Rosenblatt, B. A. and Wiltshire, H.W. (2007). Musculoskeletal Loading during the Power Clean. *In: Proceedings of the 25th*

International Symposium on Biomechanics in Sports, (Eds. H.J. Menzel, and M.H. Chagas), Ouro Preto, Brazil,

Irwin, G., Kerwin, D.G., Manning, M. and Brown, R. (2007). Developing the Kovacs on high bar. *In: Proceedings of the 25th International Symposium on Biomechanics in Sports*, (Eds. H.J. Menzel, and M.H. Chagas), Ouro Preto, Brazil, 349-352.

Kerwin, D.G., **Irwin, G.** and Exell, T. (2007). Straddle Tkachev on high bar and uneven parallel bars. *In: Proceedings of the 25th International Symposium on Biomechanics in Sports*, (Eds. H.J. Menzel, and M.H. Chagas), Ouro Preto, Brazil, 422-425.

Exell, T., **Irwin, G.** and Kerwin, D.G. (2007). Force comparison of backward longswings on high bar and uneven bars. *In: Proceedings of the 25th International Symposium on Biomechanics in Sports*, (Eds. H.J. Menzel, and M.H. Chagas), Ouro Preto, Brazil, 426.

Exell, T., **Irwin, G.** and Kerwin, D.G. (2007). Outward and inward Tkachevs on uneven parallel bars. *In: Proceedings of the 25th International Symposium on Biomechanics in Sports*, (Eds. H.J. Menzel, and M.H. Chagas), Ouro Preto, Brazil, 427-430.

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Irwin, G., Kerwin, D.G., Resenblatt, B. and Wiltshire, H. (2007). Evaluation of the power clean as a sprint specific exercise. *In: Proceedings of the 25th International Symposium on Biomechanics in Sports*, (Eds. H.J. Menzel, and M.H. Chagas), Ouro Preto, Brazil, 493-496.

Kerwin, D.G., **Irwin, G.**, and Bezodis, I. (2007). Reduced 3D marker set tracking of elite sprint training. *In: Proceedings of the 25th International Symposium on Biomechanics in Sports*, (Eds. H.J. Menzel, and M.H. Chagas), Ouro Preto, Brazil, 497-500.

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ground contact kinetics. *In: Proceedings of the 25th International Symposium on Biomechanics in Sports*, (Eds. H.J. Menzel, and M.H. Chagas), Ouro Preto, Brazil, 680-683.

Kalia, R., **Irwin, G.** and Kerwin, D.G. (2006). Side-step cutting using studded soccer boots affects rotational and valgus knee moments and injury potential. *American College of Sports Medicine*; 22-23.

Kaila, R., **Irwin, G.** and Kerwin, D.G. (2006). The influence of boot undersurface type on knee joint rotational moments and potential non contact ACL injury on the loading at the knee during cutting movements in soccer. *In: Proceedings of 24th International Symposium on Biomechanics in Sports*, (Eds. H. Schwameder, G. Strutzenberger, V. Fastenbauer, S. Lindinger, and E. Muller) Salzburg, Austria, 199–202.

Kerwin, D.G. and **Irwin, G.** (2006) Angular momentum in the straight Tkatchev on high bar. *In: Proceedings of 24th International Symposium on Biomechanics in Sports*, (Eds. H. Schwameder, G. Strutzenberger, V. Fastenbauer, S. Lindinger, and E. Muller) Salzburg, Austria, 263.

Irwin, G. and Kerwin, D.G. (2006). Musculoskeletal work of high bar progressions. *In: Proceedings of 24th International Symposium on Biomechanics in Sports*, (Eds. H. Schwameder, G. Strutzenberger, V. Fastenbauer, S. Lindinger, and E. Muller) Salzburg, Austria., 83–86.

Irwin, G. and Kerwin, D.G. (2006). Musculoskeletal work in the longswing on high bar. *In: E. F. Moritz and S. Haake, eds. The Engineering of Sport 6 Volume 1: Developments for sports*. New York, USA: Springer LLC, 195–200.

Kerwin, D.G. and **Irwin, G.** (2006). Predicting high bar forces in the longswing. *In: E. F. Moritz and S. Haake, eds. The Engineering of Sport 6 Volume 1: Developments for sports*. New York, USA: Springer LLC, 189–194.

Trewartha, G., Bezodis, N., Wilson. C. and **Irwin, G.** (2005). The influence of coordinated joint actions on the accuracy and variability of the rugby line-out throw. *In: Proceedings of 23th International Symposium on Biomechanics in Sports*, (Eds. M, Lamontagne, D.G.E. Robertson & H. Sveistrup) Beijing, China, 164.

Trewartha, G., Bezodis, N., Wilson. C. and **Irwin, G.** (2005). The control of rotation during rugby union goal kicking. *In: Proceedings of 23th International Symposium on Biomechanics in Sports*, (Eds. M, Lamontagne, D.G.E. Robertson & H. Sveistrup) Beijing, China, 334.

Irwin, G. and Mullineaux, D. (2004). Hip and shoulder co-ordination during the handspring front somersault on the vaulting ‘horse’ and ‘table’. *In: Proceedings of*

22th *International Symposium on Biomechanics in Sports*, (Eds. M, Lamontagne, D.G.E. Robertson & H. Sveistrup) Canada, Ottawa, 129-132.

Irwin, G. and Kerwin, D. G. (2004). Biomechanical similarities of high bar progressions. *In: Proceedings of 22th International Symposium on Biomechanics in Sports*, (Eds. M, Lamontagne, D.G.E. Robertson & H. Sveistrup) Canada, Ottawa, 602-605.

Glazier, P.S. and **Irwin, G.** (2001). Validity of stride length estimates obtained from optojump. *In: J. Blackwell, (ed.). Proceedings of poster presentations: 19th International Symposium on Biomechanics in Sports*. San Francisco, USA, 98-101.

Irwin, G. and Kerwin, D.G. (2001). Use of 2D-DLT for the analysis of longswings on high bar. *In: J. Blackwell, (ed.) Proceedings of Oral presentations: International Symposium on Biomechanics in Sports*. San Francisco, USA, 315-318.

National conference abstracts:

Moore, J., Strutzenberger, G., Griffiths, H., **Irwin, G.** and Schwameder, H. (2013). The effect of gluteal kinesio tape on performance and fatigue, *BASES Biomechanics Interest Group*, University of Wolverhampton, Wolverhampton, UK.

Farana, R., Jandacka, D. and **Irwin, G.** (2013). Kinematic and kinetic of elbow joint during round off in female artistic gymnastics, *BASES Biomechanics Interest Group*, University of Wolverhampton, Wolverhampton, UK.

Golding, M., **Irwin, G.**, Bezodis, I. and Kerwin, D. G. (2012). Research Proposal: Influence of biomechanical measurement on the evaluation of complex high bar skills. *Cardiff Metropolitan Annual Academic Associate Symposium*, Cardiff, UK.

Jones, P.L., **Irwin, G.**, Kerwin, D.G. and Nokes, L.D.M. (2012). Single Leg Movement Function in Professional Footballers: An Injury Case Study. *Cardiff Metropolitan Annual Academic Associate Symposium*, Cardiff, UK.

Wdowski, M. M., Gittoes, M. J. R., **Irwin, G.**, Nokes, L. D. M. and Kerwin, D. K. (2012). Performance outcome adaptation in field sport sprinting. *ICSEMIS 2012*, Glasgow, UK.

Wdowski, M. M., Gittoes, M. J. R., **Irwin, G.**, Nokes, L. D. M. and Kerwin, D. K. (2012). Short-term biomechanical adaptation in a maximum velocity field sport sprinting protocol. *BASES Biomechanics Interest Group*, University of Ulster, Northern Ireland, UK.

Wdowski, M. M., Gittoes, M. J. R., **Irwin, G.**, Nokes, L. D. M. and Kerwin, D. K. (2012). Short-term technique adaptation in a maximum velocity field sport sprinting protocol. *Speaking of Science Conference*, Cardiff University, Cardiff, UK.

Wdowski, M. M., Gittoes, M. J. R., **Irwin, G.**, Nokes, L. D. M. and Kerwin, D. K. (2012). Short-term technique adaptation in a maximum velocity field sport sprinting protocol. *Cardiff Metropolitan Annual Academic Associate Symposium*, Cardiff, UK.

Manning, M., **Irwin, G.**, Kerwin, D. and Gittoes, M. (2011). Predicting uneven bar forces during the female longswing. In: M. Lauder (Ed.) *Programme and Abstract book of the 26th British Association of Sports and Exercise Sciences Biomechanics Interest Group*. University of Chichester, UK, 15.

Jones, P.L., Kerwin, D.G., **Irwin, G.** and Nokes, L.D.M. (2011). Stance Leg Stability in Professional Footballers. *Cardiff Metropolitan Annual Academic Associate Symposium*, Cardiff, UK.

Wdowski, M. M., Gittoes, M. J. R., **Irwin, G.** and Kerwin, D. K. (2011). Research proposal: Short-term technique adaptation in field sport sprinting. *UWIC Annual Academic Associate Symposium*, Cardiff, UK.

Bezodis, I., Pias, M., **Irwin, G.**, Coulouris, G. and Kerwin, D.G. (2008). Measurement of ground contact times in sprinting using in-shoe pressure sensors. In: *Programme & Abstracts, Book of the Annual Conference of British Association of Sport and Exercise Sciences*. Brunell University, 12-14.

Kerwin, D.G., **Irwin, G.** and Samuels, M. (2008). Angular momentum comparison of different Tkachevs. In: D.G. Kerwin, I. Bezodis, and **G. Irwin**, eds. *BIG 2008: Proceeding of 24th Biomechanics Interest Group*. Cardiff, UK, 30.

Irwin, G., Kerwin, D.G. and Samuels, M. (2008). Biomechanics of the longswing preceding the Tkachev. In: D.G. Kerwin, I. Bezodis, and **G. Irwin**, eds. *BIG 2008: Proceeding of 24th Biomechanics Interest Group*. Cardiff, UK, 38.

Kerwin, D.G., **Irwin, G.** and Exell, T. (2008). Straddle Tkachev on high bar and uneven parallel bars. In: D.G. Kerwin, I. Bezodis, and **G. Irwin**, eds. *BIG 2008: Proceeding of 24th Biomechanics Interest Group*. Cardiff, UK, 28.

Irwin, G., Kerwin, D.G., Manning, M.L. and Brown, R. (2008). Kinematics of the longswing preceding the Kovacs. In: D.G. Kerwin, I. Bezodis, and **G. Irwin**, eds. *BIG 2008: Proceeding of 24th Biomechanics Interest Group*. Cardiff, UK, 27.

Irwin, G., Kerwin, D.G., Manning, M.L. and Brown, R. (2008). The development of the Kovacs on high bar. In: D.G. Kerwin, I. Bezodis, and **G. Irwin**, eds. *BIG 2008: Proceeding of 24th Biomechanics Interest Group*. Cardiff, UK, 35.

Irwin, G., Kerwin, D. G., Rosenblatt, B. A. and Wiltshire, H.W. (2007). An evaluation of the power clean as a sprint specific exercise. In: *Proceedings of the Biomechanics Interest Group meeting of the British Association of Sport and Exercise Sciences*, Cardiff, Wales

Irwin, G., Kerwin, D.G., Manning, M. and Brown, R. (2007). The development of the Kovacs on high bar. In: *Programme & Abstracts book of the Annual Conference of British Association of Sport and Exercise Sciences*. University of Bath, 120-121.

Kerwin, D.G., **Irwin, G.** and Samuels, M. (2007). Angular momentum comparison of different Tkachevs. In: *Programme & Abstracts book of the Annual Conference of British Association of Sport and Exercise Sciences*. University of Bath, 121-122.

Irwin, G., Kerwin, D.G., Manning, M. and Brown, R. (2007). Biomechanics of the longswing preceding the Kovacs. In: *Programme & Abstracts book of the Annual Conference of British Association of Sport and Exercise Sciences*. University of Bath, 123.

Francis, I.P, Kaila, R., **Irwin, G.** and Kerwin, D.G. (2006). Loading at the knee during cutting movements in soccer. *All Wales Sports and Exercise Science and Medicine Conference*, University of Wales Institute, Cardiff. UK, 15.

Irwin, G. and Kerwin, D.G. (2006). Musculoskeletal work of high bar progressions. *All Wales Sports and Exercise Science and Medicine Conference*, University of Wales Institute, Cardiff. UK, 16.

Kaila, R., **Irwin, G.**, Kerwin, D.G. and Fairclough, J. (2006). The influence of boot undersurface on the loading at the knee during cutting movements in soccer. *All Wales Sports and Exercise Science and Medicine Conference*, University of Wales Institute, Cardiff. UK, 17.

Kerwin, D.G. and **Irwin, G.** (2006). Angular momentum in the straight Tkatchev on high bar. *All Wales Sports and Exercise Science and Medicine Conference*, University of Wales Institute, Cardiff. UK, 18.

Thomas, G.D., **Irwin, G.** and Kerwin, D.G. (2006). Biomechanical effects of bilateral and unilateral ankle braces on stability and ground reaction forces in service personnel. *All Wales Sports and Exercise Science and Medicine Conference*, University of Wales Institute, Cardiff. UK, 20.

Thomson, A.D. Wilson, C., and **Irwin, G.** (2006). Specificity of approach run training in the long jump. *All Wales Sports and Exercise Science and Medicine Conference*, University of Wales Institute, Cardiff. UK, 21.

Tong, R., **Irwin, G.**, Glazier, P. and Radway, J. (2006). Changes in muscle activation characteristics during a gymnastic rings routine. *All Wales Sports and Exercise Science and Medicine Conference*, University of Wales Institute, Cardiff. UK, 36.

Irwin, G. and Kerwin, D.G. (2005). Biomechanical similarities of high bar progressions. *All Wales Sports and Exercise Science and Medicine Conference*, University of Wales Institute, Cardiff. UK, 37.

Irwin, G., and Kerwin, D.G. (2005). Inter-segmental co-ordination of high bar progressions. *All Wales Sports and Exercise Science and Medicine Conference*, University of Wales Institute, Cardiff. UK, 38.

Robbins, M., Wheat, J., **Irwin, G.**, and Bartlett, R. (2005). The effect of shooting distance on continuous coordination variability in basketball. *British Association of Sport and Exercise Sciences Annual Conference*, Loughborough, 10.

Robbins, M., Wheat, J., **Irwin, G.** and Bartlett, R. (2005). Evidence of compensatory variability preserving release parameters in basketball shooting. *British Association of Sport and Exercise Sciences Annual Conference*, Loughborough, 11.

Irwin, G. Bown, R. and Thomas, E. (2003). Kinematic comparison of the handspring front somersault on the vaulting horse and new table. *British Association of Sport and Exercise Sciences Annual Conference*, Sheffield, 2

Irwin, G. and Kerwin, D.G. (2003). Inter-segmental co-ordination of high bar progressions. *British Association of Sport and Exercise Sciences Annual Conference*, Sheffield, 4-5.

Thornily, C. and **Irwin, G.** (2003). Influence of lane on the kinematics of indoor bend sprinting. *British Association of Sport and Exercise Sciences Annual Conference*, Sheffield, 8.

Irwin, G., Hanton, S. and Kerwin, D. (2001). A model of the development of gymnastic skills. *British Association of Sport and Exercise Sciences Annual Conference*, Newport, 66- 67.

Irwin, G., Glazier, P.S., Tong, R.J. and Radway, J. (2001). Changes in muscle activation characteristics during gymnastics rings routines. Paper presented at the *British Association of Sport and Exercise Sciences Annual Conference*, Newport, 9-10.

Research awards:

International:

Awarded **Fellow of the International Society of Biomechanics in Sport (FISBS)**, International Society of Biomechanics in Sports, (2009).

Hans Gros New Investigator Award, International Society of Biomechanics in Sports, (2006). Awarded for the presentation and defence of a paper entitled '*Musculoskeletal work of high bar progressions*' in collaboration with Professor D.G. Kerwin.

National:

BASES Emerging Researcher Medal Competition, (2009): Sports Performance. This prestigious medal is a mid-career award developed to identify and recognise the 'stars' of sport and exercise science research.

Trustees of Headley Court (Defence Medical Rehabilitation Centre) Research Prize, (2007). Headley Court, England. Awarded for the presentation and defence of a paper entitled 'Effects of bilateral and unilateral semi-grid ankle orthoses on ankle stability and ground contact kinetics' in collaboration with Lt Col Gareth Thomas and Professor D.G. Kerwin.

Keynote and invited conference presentations:

International:

Irwin, G. (2013). *The evolution and development of complex skills in artistic gymnastics: A biomechanical approach*. International Science Conference: Human Movement, University of Ostrava, Czech Republic, June 2013. *Keynote*.

Irwin, G. (2012). *Biomechanics and gymnastics: Skill development, training and coaching applications*. 3rd Artistic and Rhythmic Gymnastics International Seminar, Brazil, Sao Paulo, September 2012. *Keynote*.

Irwin, G. (2012). *Multidisciplinary applications in technique analysis in elite sports: Examples from the SESAME project*. University of Sao Paulo Brazil, Sao Paulo, September 2012. *Invited presentation*.

Irwin, G. and Kerwin, D.G. (2011). *Multidisciplinary applications in technique analysis in elite sports: Examples from the SESAME project*. University of Alberta, Edmonton, Canada, May 2011. *Keynote*.

Irwin, G. and Kerwin, D.G. (2010). *Gymnastics and the coaching biomechanics interface*. Applied Symposium at the 28th International Biomechanics in Sports Conference, Michigan, USA, July 2010. *Invited presentation*.

Irwin, G. and Kerwin, D.G. (2010). *How biomechanics can help quantify the Code of Points*. Maximising Gymnastics Performance through Science and Medicine Conference held in conjunction with the 2010 Pacific Rim Championships, Melbourne, Australia April 2010. *Keynote*

Irwin, G. and Kerwin, D.G. (2010). *Mechanics of elite vaulting*. Maximising Gymnastics Performance through Science and Medicine Conference held in conjunction with the 2010 Pacific Rim Championships, Melbourne, April 2010. *Keynote*

Irwin, G. and Kerwin, D.G. (2009). *Biomechanics and performance: Insights from gymnastics and SESAME*. Invited public open lecture, University of Kentucky, USA December 2008. *Keynote*.

Irwin, G. and Kerwin, D.G. (2008). *Advanced multidisciplinary applications in technique analysis in elite sports: Example of the SESAME project*. 2nd ASPIRE Sport Science Conference, Doha, Qatar, January 2008. *Keynote*.

Irwin, G. and Kerwin, D.G. (2007). *Biomechanics and artistic gymnastics: How similar are the skills for male and female gymnasts?* Applied Symposium at the 25th International Symposium on Biomechanics in Sports, Ouro Preto, Brazil, August 2007. *Invited presentation*.

Irwin, G. and Kerwin, D.G. (2006). *Musculoskeletal work in the longswing on high bar*. 6th Biennial International Conferences on the Engineering of Sport, Munich, Germany, July 2006. *Invited presentation*.

Contributed to:

Kerwin, D.G., **Irwin, G.**, Gittoes, M. and Bezodis, I. (2011). *Real time monitoring of sports performance*. European College of Sports Sciences, Liverpool, UK, July 2011. *Invited presentation*

Kerwin, D.G., **Irwin, G.**, Gittoes, M., Bezodis, I.N. and Kuntze, G. (2011). *Trackside technology for developing athletics coaching and performance*. UK-Japan Sports Engineering Symposium, Loughborough University, May 2011. *Invited presentation*.

Kerwin, D.G., **Irwin, G.**, Gittoes, M., Bezodis, I.N. and Kuntze, G. (2011). *Trackside technology and the coaching-biomechanics interface*. Invited Public Lecture Hosted by Ulster Sports Academy, Sport and Exercise Sciences Research Institute, and Sport Northern Ireland. *June 2011. Invited presentation*.

Kerwin, D.G. and **Irwin, G.** (2007). *Biomechanical evaluation of the new Code of Points*. Federation of Internationale, International Gymnastics, Stuttgart, Germany, September 2007. *Keynote*.

Kerwin, D.G. and **Irwin, G.** (2006). *Predicting high bar forces in the longswing*. 6th Biennial International Conference on the Engineering of Sport, Munich, Germany, July 2006. *Invited presentation*.

National:

Irwin, G. (2012). *Biomechanics in elite sport*. Science and the Assembly, Royal Society of Chemistry, Senedd and Pierhead Building, Cardiff, UK, May 2012. *Keynote*.

Irwin, G. (2012). *Coaching biomechanics interface*. Welsh Coaching Workshop - Endurance Running, National Indoor Athletics Centre, Cardiff, UK. June 2012. *Invited presentation*.

Irwin, G. (2012). *Biomechanics and sports medicine: Research perspectives*. Cardiff Society of Sports Medicine, Cardiff University. UK, August 2012. *Keynote*.

Irwin, G. (2011). *A revolution in video: Advances in analysis in sports science and coaching. A research seminar on the technology, applications and innovations of video technology*, The Liberty Stadium, Swansea, UK, April 2011. *Keynote*.

Irwin, G. and Kerwin, D. (2011). *The coaching biomechanics interface: Insights from performance and advancements in technology*. British Association of Sport and Exercise Sciences: Annual Biomechanics Conference Meeting, University of Chichester, UK, April 2011. *Keynote*.

Irwin, G. (2009). *Biomechanics performance and injury*: Invited lecture for receiving the BASES Emerging Researcher Medal, British Association of Sport and Exercise Sciences: Annual Conference, Leeds Metropolitan University, UK, September 2009. *Invited presentation*.

Irwin, G. (2007). *The influence of boot under-surface on injury risk in football*. Royal College of Surgeons, Edinburgh, 19th Joint Conference on Sports Injury, Daventry, UK, July, 2007. *Keynote*.

Irwin, G. (2005). *The science of coaching*. A joint presentation with Professor Dan Gould (World Leading Sports Psychologist) at the British Association of Sport and Exercise Sciences: Annual Conference (Coaching Section), Loughborough, UK, September 2005. *Invited presentation*.

Irwin, G. (2004). *The role of sports biomechanics in reducing injury*. Meeting of the Chartered Society of Physiotherapy in Sport, Cardiff, October, 2004. *Invited presentation*.

Irwin, G. (2001). *Biomechanics of injury*. Meeting of the British Association of Sport and Exercise Medicine, Swansea, July, 2001. *Invited presentation*.

Contributed to:

Bezodis, I., Harle, R., **Irwin, G.** and Kerwin, D. (2012) *Using force sensitive resistors to monitor foot contact events in sprint running*. British Society for Strain Measurement, Loughborough, May 2012. *Invited presentation*.

Gittoes, M.A. and **Irwin, G.** (2008). *Motion analysis: Application in sport and exercise biomechanics*. CITER (Cardiff Institute of Tissue Engineering and Repair) Motion Capture & Analysis Workshop, Cardiff University, December 2008. *Invited presentation*.

Research degree examinations:

External Examiner (National:)

Yanjia Gu (2013), PhD: Limits to temporal synchronisation in fundamental finger actions, Student registered at Loughborough University, UK. Supervisor: Dr Mike Hiley

Sian Armstrong (2013), PhD: Use of technology in the assessment of rower physiology, Student registered at Cardiff University, UK. Supervisor: Professor Len Nokes.

Simon Fothergill (2012), PhD: Automatic assessment of kinaesthetic performance applied to rowing. Student registered at Jesus College, University of Cambridge, UK. Supervisor: Professor Andrew Hopper.

Tanya LaSage (2011), PhD: A wireless sensor system for monitoring the motion of swimmers. Student registered at Loughborough University, UK. Supervisor: Professor Andrew West.

External Examiner (International):

Lisa McDonnell (2013), PhD: The effect of stroke rate on performance in flat-water sprint kayaking. Student registered at Auckland University of Technology, Auckland, New Zealand. Supervisor: Professor Patria Hume.

Helen Crewe (2013), PhD: The biomechanics of lower back injury in cricket. Student registered at The University of Western Australia, Perth, Australia. Supervisor: Professor Jacqueline Alderson.

Ashley Pedler (2012), PhD: The biomechanics of drop punt: three-dimensional kinematics, variability and muscle activity. Student registered at University of Southern Adelaide, Adelaide, Australia. Supervisor: Professor Paul Grimshaw.

Toshiyuki Fujihara (2011), PhD: Biomechanical evaluation of circles with a suspended aid. Student registered at University of Alberta, Edmonton, Canada. Supervisor: Professor Pierre Gervais.

Nicholas Blackah (2011), MPhil: The effect of exercise induced muscle damage on shock dissipation during treadmill running. Student registered at the Australian Catholic University, Melbourne, Australia. Supervisor: Dr Elizabeth Bradshaw.

Internal Examiner

Ceri Diss (2011), PhD: The effects of age on the biomechanics of running gait in masters runners. Student registered at University of Wales Institute, Cardiff. Supervisory Team: Dr Marianne Gittoes, Professor David G Kerwin and Professor Richard Tong.

Invited and elected positions:

Invited as an assessment panel member for the Arts and Humanities Research Council, (2013 - to date).

Invited Chair of the Research and University Centre, for the European Synthetic Turf Organisation, (Sept 2011 – to date).

Elected Vice-President of the International Society of Biomechanics in Sport, (2009-2011, re-elected 2011-2013).

Elected member of the Board of Directors for the International Society of Biomechanics in Sport, (2006-2009).

Invited member of the Higher Education Academy “think – tank” for innovative methods of learning, (June 2007 – to date).

Invited editor of the International Society of Biomechanics in Sport research website, (June 2007 – 2010).

Invited member of the Welsh Rugby Union Research Advisory Board, (2007 - to date).

Academic reviewing:

Engineering and Physical Science Research Council (2008 – to date)

Scientific Committee Member:

International Society of Biomechanics (2013)

International Society of Biomechanics in Sports Conferences (2007 – to date)

European Society of Biomechanics (2010)

International Sports Engineering Association (2006)

Journal Reviewing (2000 – to date):

Journal of Biomechanics

Clinical Biomechanics

Sports Engineering

Journal of Sports Sciences

International Journal of Sports Medicine

British Journal of Sports Medicine

Scandinavian Journal of Medicine & Science in Sports

Sports Biomechanics

International Journal of Sports Science and Coaching

Research Quarterly for Exercise and Sport

Medicine & Science in Sports & Exercise

Science of Gymnastics Journal

European Journal of Sport & Exercise Sciences

Sensor

Technology

Editorial experience:

Academic Editor: British Journal of Applied Science & Technology (2013 – to date).

<http://www.sciencedomain.org/journal-home.php?id=5>

Editorial Advisory Board: Technologies, (2012 - to date).

<http://www.mdpi.com/journal/technologies/editors>

Editor in Chief Sports Biomechanics (Guest) Journal Special Edition: Biomechanics and the Olympics, (2012).

<http://www.tandfonline.com/action/aboutThisJournal?show=editorialBoard&journalCode=rspb20>

Editorial Advisory Board: Journal of Sports Sciences, (2011 – to date).

<http://www.tandfonline.com/action/aboutThisJournal?show=editorialBoard&journalCode=rjsp20>

Associate Editor: Sports Biomechanics Journal, (2011 – to date).

<http://www.tandfonline.com/action/aboutThisJournal?show=editorialBoard&journalCode=rspb20>

Editorial Advisory Board Member: Sports Biomechanics Journal, (2009 - 2011).

Reviewer and Editor of the Gymnastics content for the Coaching Information Service (<http://www.coachesinfo.com/>).

Co-Editor of the conference proceedings for the British Association of Sport and Exercise Sciences, Biomechanics Section Conference, (June 2008).

Co-Editor of the biomechanics submissions for the Welsh Institute of Sport Health and Exercise Sciences Conference, (June 2007).

Research funding:

External research contract and grant income:

Funding body	Project	Role	External Collaborators	Grant
Sports Council for Wales	Physical Preparation in Elite Athletes (2013)	PI	University of Bath	£40,000
Sports Council for Wales & Welsh Athletics	Biomechanical analysis of elite sprinting (2013)	PI	Welsh Athletics	£32,000
Fédération Internationale de Football Association (FIFA)	Perception and Biomechanics responses to field turf (2013)	PI	FIFA Cardiff University	€100,000
Post Doc Intern Ship Penn State University of Massachusetts	Post Doc Intern Ship In motor control; and Learning (2013-2014)	PI	Penn State University of Massachusetts	£30,000
CODA, Charnwood Dynamics	One Turf Project (2012-2013)	PI	Cardiff University	£30,000
International Rugby Board (IRB)	One Turf Concept (2012-2013)	PI	Cardiff University	£120,000 *
Sports Council for Wales	Spinal Loading (2012-2015)	PI	Harvard Medical School	£32,000
Fédération Internationale de Football Association (FIFA)	Surface and Fatigue Testing: <i>European field testing</i> (2009 – 2010)	CI	University of Cologne University of Valencia Liverpool John Moores	£250,000
Engineering and Physical Sciences Research Council	Sensing for Sport and Managed Exercise. Grant number EP/D076943 (2006-2010)	CI	University of Cambridge University College London Royal Veterinary College	£3.7M
Welsh Assembly Government	Welsh Medium PhD studentship	CI		£75,000

	(2006-2009)			
Higher Education Academy.	Production of Digital Learning Objects (2006 - 2007)	PI		£20,000

PI = Principle Investigator CI = Co-investigator *includes contributions from Charnwood dynamics

Internal research contract and grant income:

Funding body	Project	Role	External Collaborators	Grant
SEED Funding	One Turf (2013)	PI	Cardiff University FIFA IRB	£900
UWIC Foundation Award	One Turf (2012-2013)	PI	Cardiff University	£24,000
Research and Enterprise Investment Fund (REIF)	Development of a Functional Screening and Profiling Unit within the Cardiff Sport and Exercise Medicine Centre (2011)	CI		£90,000
Science Research Investment Fund (SRIF)	NIAC Integrated Biomechanics Research and Technical Analysis Laboratory (IBRATAL) (2006)	#		£260,000
Central Research and Enterprise Unit	Graduate Research and Teaching Assistant Studentship (2006-2009)	PI		£36,000
Central Research and Enterprise Unit	BARS PhD research programme (2008-2011)	CI	Cardiff University	£36,000
University of Wales	Bursary award for PhD students (2008)	CI	Cardiff University	£17,000
Central Research and Enterprise Unit	Gymnastics On-line diagnostics (GOLD) EPSRC project development (2008-2009)	PI	Penn State University of Cambridge GB Olympic Coach	£4,000
Central Research and Enterprise Unit	Vice Chancellor Doctorial Scholarship (2009-2012)	PI	Penn State University of Cambridge	£36,000
Central Research and Enterprise Unit	Vice Chancellor Doctorial Scholarship (2009-2012)	CI	UCL Penn State	£36,000
Learning and Teaching Development Unit	Call 13: Exploring Internationalisation within an undergraduate degree programme. (2010 – 2011)	CI		£3,400

= Proposal Consultant and Co- Presenter of Proposal.

Enterprise and consultancy activity income:

Funding body	Project	Role	External Collaborators	Grant
Sports Council for Wales	Biomechanics Support	PI		£5,000

	to Welsh 'Elite Cymru' athletes (2000 – 2004)			annually
Gloucester RFU	Biomechanics Support to first team hookers (2005 – 2006)	PI		£1,500*

*This exposure has led to a project in progress providing biomechanics support for the WRU 2011 potential squad. This was presented to the WRU Executive Committee in March 2007 and is part of an ongoing collaborative project with Mr Huw Wiltshire WRU (Head of Strength and Conditioning) income potential (**£60,000**).

My enterprise and consultancy has attracted global media attention, most significantly with Tomorrows World (2003) and the National Geographic Channel (2004). This resulted in UWIC receiving international visibility and promoting its reputation in Sport, Sports Science Consultancy and Research. In addition the SESAME project was included as a feature for the Discovery Channel in 2010.

Post Doc Researchers and Research Officers

Dr Robert Edmunds (2013 – 2014), FIFA, Perception & Biomechanics responses to field turf

Dr Gerda Strutzenger (2013 – 2014), FIFA, Perception & Biomechanics responses to field turf

Dr Genevieve Williams (2012 – 2014), Motor control & sports performance

Dr Laura Charalambous (2012 - 2013), IRB, One Turf Project

Dr Tim Exell (2010), Clinical biomechanics project

Dr Gregor Kunze (2009 – 2011), EPSRC, Sensing for Sport & Managed Exercise Project

Dr Ian Bezodis (2006 - 2011), EPSRC, Sensing for Sport & Managed Exercise Project

Completed postgraduate research students:

Mark Samuels, MPhil*: The biomechanics of advanced skill development on high bar in men's gymnastics. Student registered at University of Wales Institute, Cardiff. Co-supervised by Dr Marianne Gittoes and Professor David G Kerwin. Completed Summer 2011.

Tim Exell, PhD: The biomechanics of technique development in sprinting: The coaching-biomechanics interface. Student registered at University of Wales

Institute, Cardiff. Co-supervised by Dr Marianne Gittoes and Professor David G Kerwin. Completed November 2010 (EPSRC funded PhD studentship).

Laura Charalambous, PhD: Can wireless sensor enabled feedback be effective in enhancing athletic performance? Student registered at University of Wales Institute, Cardiff. Co-supervised by Dr Ian Bezodis, Professor David G Kerwin and Professor Steven Hailes (UCL). Completed October 2012.

Genevieve Williams, PhD*: The development of a graphical user interface for effective feedback in artistic gymnastics. Student registered at University of Wales Institute, Cardiff. Co-supervised by Professor David G Kerwin and Professor Karl Newell. Completed November 2012.

Philippa Jones, PhD: (under assessment) Musculoskeletal loading during football movements: An injury perspective. Student registered at University of Wales Institute, Cardiff. Co-supervised by Professor David G Kerwin and Professor Len Nokes (Cardiff University).

Supervision of postgraduate research students

Maximilian Wdowski, PhD: Short-term biomechanical adaptation in field sport sprinting. Student registered at Cardiff Metropolitan University. Co-supervised by Dr Marianne Gittoes, Professor Len Nokes (Cardiff University). Estimated completion date January 2014.

Ben Rosenblatt, PhD*: Biomechanical specificity of Olympic lifting for sprint training. Student registered at Cardiff Metropolitan University. Co-supervised by Dr Cassie Wilson and Professor David G Kerwin. Estimated completion date summer 2014.

Michelle Manning, PhD*: Factors influencing the performance of the Tkachev on uneven bars. Student registered at Cardiff Metropolitan University. Co-supervised by Dr Marianne Gittoes and Professor David G Kerwin. Estimated completion date summer 2014.

Abigail Ridge, MPhil: The role of social support in the coach-athlete dyad in female artistic gymnastics. Student registered at Cardiff Metropolitan University. Co-supervised by Dr Ian Mitchell and Dr Mikell Mellick. Estimated completion date September 2014.

Hannah Wyatt, PhD: Age-related spinal biomechanics of female gymnasts. Student registered at Cardiff Metropolitan University. Co-supervised by Dr Marianne Gittoes. Estimated completion date summer 2015.

Melanie Golding, PhD*: The influence of biomechanical methodology on the evaluation of release skills on high bar in men's artistic gymnastics. Student registered at Cardiff Metropolitan University. Co-supervised by Dr Ian Bezodis, advisor Professor David G Kerwin. Estimated completion date summer 2016.

Steven Buzza, PhD: The effect of task demands on kinematic and kinetic variables in golf driving performance. Student registered at Cardiff Metropolitan University. Co-supervised by Dr Ian Bezodis. Estimated completion date summer 2017.

Paulo Daniel Sabino Carrara, PhD: Biomechanical analysis of cross on training and competition rings. Student registered at University of Sao Paulo. Co-supervised by Professor Luis Mochizuki (University of Sao Paulo). Estimated completion date summer 2017.

Hans Christian von Lieres und Wilkau, PhD: Sprint Biomechanics. Student registered at Cardiff Metropolitan University. Co-supervised Dr Ian Bezodis. Estimated completion date summer 2017.

Laurie Needham, PhD: The influence of task constraints and training drills during the approach phase of pole vaulting. Student registered at Cardiff Metropolitan University. Co-supervised Dr Ian Bezodis. Estimated completion date summer 2017.

Adam Brazil, PhD: The influence of task constraints and training drills during the approach phase of pole vaulting. Student registered at Cardiff Metropolitan University. Co-supervised Dr Tim Exell and Dr Cassie Wilson (University of Bath). Estimated completion date summer 2017.

*Denotes director of study

Invited lectures:

Irwin, G. (2011). *Biomechanics of injury*. Cardiff University Department of Post Graduate Studies Physiotherapy, Cardiff.

Irwin, G. (2010). *The role of sports biomechanics in reducing injury*. University of Wales College of Medicine: Department of Post Graduate Studies Physiotherapy, Cardiff.

Irwin, G. (2009). *Sports biomechanics and gymnastics*. Nottingham Trent University.

Irwin, G. (2008). *The role of sports biomechanics and contemporary issues*. Cornwall College and Plymouth University.

Irwin, G. (2008). *Sports biomechanics defined. The influence of boot under-surface on injury risk in football*. Welsh Society of Sports Medicine, Vale of Glamorgan.

Irwin, G. (2007). *Sports biomechanics and performance*. Cornwall College and Plymouth University.

Irwin G. and Kerwin, D.G. (2006). *Biomechanics and gymnastics*. Department of Sports Science, University of Swansea.

Irwin, G. (2006). *The role of sports biomechanics in reducing injury*. University of Wales College of Medicine: Department of Post Graduate Studies Physiotherapy, Cardiff.

Irwin, G. (2006). *Sports biomechanics and coaching*. Cornwall College and Plymouth University.

Irwin, G. (2005). *The role of sports biomechanics in reducing injury and increasing performance*. University of Wales College of Medicine: Department of Post Graduate Studies Physiotherapy, Cardiff.

Irwin, G. (1997). *Biomechanics and gymnastics performance: Twisting somersaults*. Department of Sport and Exercise Sciences, Exeter University.

Contribution to conference organisation:

Invited to manage and develop a Pre-Olympic 2016 Science in Gymnastics Conference in Rio de Janeiro. Collaborating with Dr. Jean François Robin (INSEP – High Performance Training Center – Paris/France) and Professor Keith Russell (University of Saskatchewan/Canada and International Gymnastics Federation, Science Commission).

Invited member of the scientific committee for the International Society of Biomechanics conference 2013 (Brazil).

Invited member of the scientific committee for the International Congress on Sports Science Research and Technology Support - icSPORTS 2013 (Portugal).

Invited member of the scientific committee International Conference of Biomechanics in Sport Conferences ISBS 2007 (Brazil), 2008 (Korea), 2009 (Ireland), 2010 (USA), 2011 (Portugal), 2012 (Australia) and 2013 (Taiwan).

Invited member of the scientific committee, European Society of Biomechanics (2010).

Invited member of the scientific committee, International Sports Engineering Association (2006).

Member of the organising team of British Association of Sport and Exercise Sciences (BASES), Biomechanics section conference, June 2008, Cardiff School of Sport, University of Wales Institute Cardiff.

Co-editor of the conference proceedings British Association of Sport and Exercise Sciences (BASES), Biomechanics section conference, June 2008, Cardiff School of Sport, University of Wales Institute Cardiff.

Member of the Organising committee for the Welsh Institute Sport Health and Exercise Science (WISHES), UWIC, June 2006.

Teaching, learning, and academic management:

Academic leadership

Head of Biomechanics, (2000- to date)

Director of the Biomechanics Laboratory, (2000- to date)

Discipline Director, (2000- 2012)

Module Leader Level 6 Biomechanics (2000- to date)

(Previously been module leader for all biomechanics modules at levels 4, 5, 6, and M)

Current teaching profile:

Biomechanics of Sport – levels 4, 5, 6

Biomechanics of Injury and Sports Medicine - MSc

Theoretical and Experimental Biomechanics - MSc

Gymnastics – levels 4, 5, 6

I have also made a contribution to the following courses Physiology of Sport, Psychology, Skill Acquisition, Evaluation of Human performance, Sports Coaching, sports technology, Issues in Sport and Research Methods.

Programme management

I was appointed programme director for Sports Technology, and Sports Conditioning Rehabilitation and Massage (2005-2006).

School committee membership

Reader and Professors Committee

Learning and Teaching Committee

National advisory positions

I am an invited member of the Higher Education Academy “think – tank” for innovative methods of learning June 2007 – to date. This committee discusses and outlines strategies to develop and evaluate e-learning, virtual environments and other technology driven teaching strategies. My appointment to this committee stems from a successful HEA funded project (£20k) to develop digital learning objects for the Cardiff School of Sport.

Validation and periodic review events

At university level I have validated degree programmes and undertaken periodic reviews acting as a panel member and more recently as a chair, specifically:

Chair of Validation Event: BSc (Hons) Food Production Management 2011

Panel of Credit Framework Review Panel M.Sc./Pg.D/Pg.C Musculoskeletal Studies) 2006

Panel Member of Framework Review Panel: BA (Hons) Interior Architecture. 2005

Panel of Credit Framework Review Panel: BA (Hons) Fine Art. 2005

Panel of Credit Framework Review Panel: HNC Horticulture. 2004

At UK level I have acted as an external advisor validating degrees at the University of Plymouth (Management & Sport & Exercise Sciences: 2005) and University of Exeter (FdSc in Sports Coaching and Exercise, Health and Fitness: 2012).

External Examiner Positions

University of Portsmouth: BSc(Hons) Sport and Exercise Sciences, (2013-2017)

University of Lincoln: BSc(Hons) Sport and Exercise Sciences, (2012-2016)

University of Plymouth FdSc. Management & Sport & Exercise Sciences, (2005-2009), FdA. Sports Development, (2005-2009), FdA. Sport, Recreation and Facility Management, (2005-2009)

Sporting profile:

Coaching

Wales Men's Team Coach, (1998 – 2003)

GB Men's Team Coach, (2003); World University Games, Daegu, South Korea

GB Gymnastics Team Manager, (2003, 2005 and 2007); World University Games

Elected member of the British Universities Gymnastics Management team, (2005 – to date)

GB Gymnastics Tutor, (2000 – to date)

Performance

Men's Welsh Champion, (1993-1996)

International Men's Artistic Gymnast Wales, (1990-1998)

Commonwealth Games, (1994), Victoria, Canada

World University Games, (1995), Fukuoka, Japan

Commonwealth Games, (1998), Kuala Lumpur, Malaysia

World University Games, (1997), Sicily, Italy