

RS BATH

RUGBY SCIENCE

Annual Report 2012-2013



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Annual Report 2012-13

Mission Statement

Our aim is to generate academically robust rugby science research with an applied focus that will improve player wellbeing and performance.

2012-13 Review

The 2012-13 season was a busy one for the RS@Bath group, including conference presentations, a number of original research articles published, some key projects completed, and some new and exciting research projects commenced.

The group has published a total of 10 full research articles in the current session in a variety of topics relating to the science and medicine of rugby. These articles have appeared in high-impact international journals and have covered a broad spectrum of research methodologies, from injury epidemiology, to lab-based studies, to field-based approaches. Some key projects were completed and reported on; these included the 'CRISP' project – a RFU funded injury surveillance study of community-level Men's rugby in England which ran from 2008-2013, and the 'Biomechanics of the Rugby Scrum' project - an IRB-funded project which ran from 2010-2013 and has informed recent global changes to scrum laws in rugby union. Also in this year a number of new research projects have come on-stream, these include 'CRISP2' (2012-2015) funded by the RFU Injured Players Foundation, 'RFU Catastrophic Injuries Database & Analysis' (2012-2015) funded by the RFU, 'Cervical Spine Injury Mechanisms in Rugby' (2013-2014) funded by the RFU Injured Players Foundation, and 'FMC: Rugby' (2013-2016), an injury surveillance and performance monitoring study in youth rugby funded by the RFU Community, Education and Professional Rugby departments. Along with various invited talks at rugby-related conferences, RS@Bath also had a large presence at the ECSS2013 Congress in Barcelona with a total of 11 oral presentations being delivered across a range of topics.

The core of the RS@Bath research group currently consists of 5 full-time members of academic staff, 2 external academics, 3 postdoctoral researchers on rugby-specific projects, 5 on-site postgraduates working towards PhD degrees, 1 external PhD student, and a part-time research technician. The group will be joined by a further full-time PhD student and full-time MPhil student in August 2013.

We would like to thank all clubs, organisations and individuals who have supported our work throughout the last year. In particular, we would like to thank those individuals who returned training and match exposure forms and injury forms. We would not be able to do any of this work without your efforts and we appreciate your hard work. Every single form is of great value to us.

Contact us via:  @RSatBath

People

<p>Alexandra.Ataack@smuc.ac.uk</p> 	<p>Alex Atack</p> <p>Background: BSc Sport & Exercise Science Current Position - PhD student @ St Mary's University College</p> <p>Rugby Projects: Biomechanics of rugby goal kicking</p> <p>Research Techniques / Other Relevant Info: 3D motion analysis Force data analysis</p>
 <p>bezodisn@smuc.ac.uk</p> 	<p>Neil Bezodis</p> <p>Background: BSc Sport & Exercise Science PhD in Biomechanics ("Biomechanical investigations of sprint start technique and performance") Current Position – Senior Lecturer in Biomechanics, St Mary's University College Other research interests: biomechanics of sprinting, muscle-tendon interactions</p> <p>Rugby Projects: Biomechanics of rugby goal kicking</p> <p>Research Techniques / Other Relevant Info: Experimental methods (biomechanics) Inverse dynamics modelling. Computer simulation of movement. Provided applied biomechanical support to UK Athletics, London Wasps, RFU.</p>
 <p>d.cazzola@bath.ac.uk</p>	<p>Dario Cazzola</p> <p>Background: Laurea degree (BSc+MSc) Biomedical Engineering. PhD in Human Physiology ("Investigating the metabolic profile of run-up races and the mechanics of the wobbling visceral mass in vertical jumps"). Current Position –Research Officer in Biomechanics. Other research interests: biomechanics and energetics of human locomotion; sport biomechanics (race walking - volleyball); soft tissue biomechanics; locomotor/respiratory coupling.</p> <p>Rugby Projects: Biomechanics of the rugby scrum.</p> <p>Research Techniques / Other Relevant Info: Experimental methods (biomechanics/physiology). Biomech-related technologies (e.g. force, pressure, kinematics, IMU). Motion analysis (2D/3D – Vicon, BTS). Physiology-related tech (e.g. spirometry, oxygen consumption). Data processing and modelling (Matlab, Labview, Xcode, OpenSim).</p>



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Christian Cook

Background:

BSc Physiology

MSc Physiology

PhD in Paediatrics ("The development of neurophysiological function in the sheep fetus in utero").

Current Position – Honorary Research Fellow

Rugby Projects:

Interactions between hormones and performance.



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Sarah Churchill

Background:

BSc Sport and Exercise Science with associated Biological Science.

PhD in Biomechanics ("Biomechanical investigations of bend running technique in athletic sprint events").

Current Position – Teaching Fellow in Biomechanics.

Other research interests: Sprinting technique, gait analysis.

Rugby Projects:

Biomechanics of the rugby scrum.

Research Techniques / Other Relevant Info:

Experimental methods (biomechanics)

Motion analysis (2D/3D – Vicon, CODA).



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Matt Cross

Background

BSc Sport and Exercise Science

MSc Sport and Exercise Medicine

Strength and Conditioning Coach

Current Position – PhD in Injury Epidemiology

Rugby Projects

RFU Professional English Rugby Union Injury Surveillance Project

Pitch Side Concussion Assessment Tool (PSCA) Evaluation Project

Concussion Outcomes and Risk Project

Research Techniques/Other Info

Descriptive Epidemiology

Ex professional player



n.gabb@bath.ac.uk

Niki Gabb

Background

BSc Physiotherapy (Oxford Brookes University)
BSc PE & Sport Science (Loughborough University)
Royal Air Force – Commissioned Officer (1997 – 2006)
Current Position: MPhil/PhD Student

Rugby Projects:

RFU Women's Rugby Premiership and England Injury and Training Surveillance Study

Research Techniques/Other Info

Descriptive Epidemiology
Systematic Reviews
Functional Movement Screening



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Ed Gannon

Background:

BSc Sport & Exercise Science
Placement year at London Wasps RFC
Current position – Part-time PhD student

Rugby Projects:

Strength & power development in rugby: Application of complex training

Research Techniques / Other Relevant Info:

Full-time fitness coach at Leicester Tigers RFC
Physical performance testing
Hormone analysis
Study design in applied environments



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 [@pollymcguigan](https://twitter.com/pollymcguigan)

Polly McGuigan

Background:

BSc Zoology (University of Bristol)
PhD in Anatomy and Biomechanics "The scope for adjustment in compliance in the distal limb of the horse" (Royal Veterinary College, University of London).

Current Position – Lecturer in Biomechanics.

Other research interests: muscle-tendon interaction, muscle and tendon injury, healing and rehabilitation, trips/fall biomechanics, comparative biomechanics, objective assessment of gait and lameness.

Rugby Projects:

Motor unit recruitment patterns: risk factors for injury and consequences for training
Muscle-tendon interaction during training exercises and functional activities

Research Techniques / Other Relevant Info:

In vivo measurement of muscle and tendon mechanics (ultrasound, EMG)
Inverse dynamics modelling (Visual3D)
In vitro muscle mechanics (many years ago!)



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Oly Perkin

Background:

BSc Sport and Exercise Science (University of Bath).
Placement at Army Recruiting and Training Division, Occupational
Medicine Research Department
Current position - Research Assistant

Rugby Projects:

Community Rugby Injury Surveillance Project

Research Techniques / Other Relevant Info:

Descriptive epidemiology
Functional movement screening



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 @iszio

Ezio Preatoni

Background:

Laurea degree (BSc+MSc) Biomedical Engineering.
PhD in Bioengineering ("Innovative methods for the analysis of sports
movements and for the longitudinal monitoring of individual motor
skills").

Current Position – Lecturer in Biomechanics and Motor Control.

Other research interests: movement/coordination variability; skills
learning/adaptation; biomechanics of (sports) movements; footwear
biomechanics; health technologies; ergonomics.

Rugby Projects:

Biomechanics of the rugby scrum.

Cervical Spine Injury Mechanism in Rugby (CeSIMeR)

Research Techniques / Other Relevant Info:

Experimental methods (biomechanics).
Biomech-related technologies (e.g. force, pressure, kinematics, IMU).
Motion analysis (2D/3D – Vicon, BTS).
Data processing and modelling (Matlab, Labview).



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Simon Roberts

Background:

Bsc PE and Sports Science
MSc Exercise Physiology
PhD in Match demands of elite English rugby union and nutritional
interventions for performance and recovery
Current position: Research Officer

Rugby Projects:

Injury surveillance - Community rugby injury surveillance project

Research Techniques / Other Relevant Info:

Time-motion analysis in rugby union
Functional movement screening
Descriptive epidemiology



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Gavin Shaddick

Background:

PhD in Statistics and Epidemiology
Current Position: Reader in Statistics

Rugby Projects:

Community rugby injury surveillance project



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[@drkeithstokes](https://twitter.com/drkeithstokes)

Keith Stokes

Background:

BSc Geography and PE and Sports Science
PhD in Physiology (Human growth hormone responses to sprinting)
Current Position: Senior Lecturer in Physiology
Other research interests: ageing muscle; nutrition and performance

Rugby Projects:

Injury surveillance / risk factors for injury (youth, women's, community, professional).

Biomechanics of the rugby scrum.

Cervical Spine Injury Mechanism in Rugby (CeSiMeR)

Physical demands of rugby union.

Research Techniques / Other Relevant Info:

Experimental methods and study design (physiology)

Descriptive epidemiology

Hormone measurement



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Grant Trewartha

Background:

BSc Sport Science.

PhD in Biomechanics ("Marker-free tracking of human movement").

Current Position – Senior Lecturer in Biomechanics.

Other research interests: trips/fall biomechanics, athletic sprinting technique, muscle-tendon mechanics, human balance control.

Rugby Projects:

Biomechanics of the rugby scrum.

Cervical Spine Injury Mechanism in Rugby (CeSiMeR)

Lower limb loading during evasive running.

Injury surveillance / risk factors for injury (youth, women's, community, professional).

Injury mechanism analysis in rugby.

Technique analysis (e.g. line-out throwing, goal kicking).

Research Techniques / Other Relevant Info:

Experimental methods (biomechanics).

Inverse dynamics modelling.

Computer simulation of movement.

Descriptive epidemiology.

Andreas Wallbaum



a.wallbaum@bath.ac.uk

Background:

Rugby Projects:

Biomechanics of the rugby scrum.
Injury mechanism analysis in rugby.

Research Techniques / Other Relevant Info:

Instrumentation
Design and fabrication of test rigs
Electronic processors

Sean Williams



s.williams@bath.ac.uk

Background:

BSc Sport and Exercise Science (University of Bath).
Placement year spent at Sports Performance Research Institute of New Zealand.

Current Position – MPhil/PhD student.

Rugby Projects:

Investigating risk factors for injury in elite rugby through the application of frailty models.

Allianz Park artificial surface evaluation.

Research Techniques / Other Relevant Info:

Statistical modelling.
Meta-analyses.
Descriptive epidemiology.

Current Key Projects

Biomechanics of the Rugby Scrum (2010-2013)

Funder: International Rugby Board

Aim: To provide the rugby community with objective data regarding the biomechanical demands of rugby scrummaging with a view to establishing safe scrummaging techniques.

Summary: Two phases of experimental trials (machine scrummaging then live scrummaging) collected on a game-wide basis from school age to senior international teams assessed the biomechanical loading imposed on front row players during different scrum engagement techniques. The second phase of the study investigated a pre-bind engagement technique which was shown to reduce the loading experienced by players during the initial engagement phase by approximately 20% whilst maintaining scrum stability and performance, and this technique is the basis for the global scrum law amendments for 2013-2014.

Title: The RFU English Professional Rugby Union Injury Surveillance Project

Funder: The Rugby Football Union

Aim: The aim of this study is to determine the incidence, types and causes of time-loss injuries and sustained by elite Premiership rugby union players in training and match play.

Summary: Match and training exposure for each club and data pertaining to injuries sustained during matches and training that resulted in more than 1 days absence is recorded by premiership club strength and conditioning staff and medical staff respectively. This data allows the identification of key factors such as injury type, causation and incidence in order to investigate risk factors for injury and to establish and best practice guidelines for injury management.

Title: A Perspective Investigation of Outcomes Following Concussive Injury in Elite Rugby Union

Funder: The Rugby Football Union

Aim The aim of this study is to investigate concussion risk management in elite rugby union with reference to time course of symptom resolution and specificity of the PSCA for use within this playing population.

Summary: During the pre-season period of the 2012-2013 season players were asked to undertake a baseline test for a concussion management and assessment tools. Players that sustained a concussion during match play in the season underwent a PSCA at the time of injury and after-injury concussion tests that could be compared to those taken at baseline, while additional information on concussion history, return to play information and player performance statistics were used to investigate the use of the PSCA and changes in player performance pre- and post- concussive injury.

Risk of Injury Associated with Playing Elite Rugby Union on Artificial Turf

Funder: Rugby Football Union

Aim: To compare the incidence and nature of time-loss, non-time-loss and abrasion injuries between elite Rugby Union matches played on artificial turf and natural grass.

Summary: Saracens RFC are the first elite professional Rugby Union team to play matches on an artificial surface. Following an initial pilot study conducted during the 2012/13 season, surveillance will continue throughout the 2013/14 season in order to elucidate the role that playing surface has on injury risk in this population.

Previous Injury and Match Load as Risk Factors for Injury in Elite Rugby Union Players – Application of a Frailty Model for Recurrent Events

Funder: Rugby Football Union

Aim: This study aims to assess the role that previous injury and match loads may have upon injury risk in elite professional Rugby Union players, through the application of a frailty model for recurrent events.

Summary: Rugby Union injuries are often recurrent, with subsequent injuries influenced by previous occurrences and hence the correlation between events needs to be taken into account when analysing such data. The frailty model has been identified as the most appropriate statistical model for recurrent sports injury data, and so will be used to assess the role that a player's previous injury and match load has on current injury risk.

Community Rugby Injury Surveillance Project - CRISP (2008-20017)

Funder: Rugby Football Union (Injured Players Foundation)

Aim: To understand the incidence and nature of match play injuries within English community rugby union and to explore player lifestyle, functional movement and physical fitness characteristics attributes as potential risk factors for injury.

Summary: The English community rugby population is one of the largest playing populations in the world, yet little is known about injuries at this level of rugby union. The first phase of the CRISP project involved gaining epidemiological data to understand more about match play injuries in community clubs of levels 3-9 with further work investigating the possible risk factors for injury such as a lifestyle, functional movement and fitness characteristics.

Epidemiology of Match Injuries in Elite English Women's Rugby Union

Funder: Rugby Football Union

Aim: To describe the incidence, type and severity of injuries sustained by elite Women's Rugby Players

Summary: Over 200,000 women are currently playing rugby in over 100 countries (IRB 2011), despite this, relatively little evidence exists from the women's game as to the incidence's, causes or severity of injuries incurred during both match play and practice. This study sees the establishment of an annual Injury Surveillance study in women's rugby union and thus provides the platform from which to describe the size of the injury problem to this specific population.

Injury Surveillance Study of an International 7s Squad: A Case study

Funder: Rugby Football Union

Aim: To describe the incidence, type and severity of injuries sustained by an International Women's World Cup Seven's Squad.

Summary: Despite the popularity worldwide of women's rugby sevens there is relatively little published literature regarding injury risk associated with Rugby Sevens and no previously published information regarding the injury risk in women's rugby sevens. This surveillance study will follow an International women's sevens squad across a six month period in the build up to the IRB World Cup.

Cervical Spine Injury Mechanism in Rugby (CeSiMeR) - (2013-2014)

Funder: Rugby Football Union Injured Players Foundation

Aim: To investigate the mechanisms of cervical spine injury during rugby specific events, with a view to generating an initial dataset from which to exploit future research opportunities in the field of spinal-injury biomechanics in sports.

Summary: The precise mechanisms of cervical spine injury are not still well elucidated, and a multiscaled and multidisciplinary method will provide a comprehensive understanding of cervical spine injury mechanism during rugby scrummaging and tackles. Such multi-scale research will include both experimental and modelling research techniques for the estimation of internal and external stresses acting on the cervical spine, and the assessment of injuries thresholds.

FMC: Rugby – Using functional movement control principles to reduce injury and enhance performance in youth rugby players (2013-2016)

Funder: Rugby Football Union

Aim: To evaluate whether integrating the principles of functional movement control as part of the warm-up and training programmes of youth rugby players can enhance performance metrics and reduce the risk of injury.

Summary: A 3-season study (2013/14-2015/16) will investigate the role that functional movement control has on injury risk and performance potential in youth rugby players. The project will develop normative values of physical, psychosocial and functional movement characteristics of school-age rugby players and will assess whether exercise interventions to improve functional movement can reduce injury risk and improve physical performance.



Our Outputs

Stakeholder Reports

Roberts SP, Trewartha G, Stokes KA & England M. *RFU Community Rugby Injury Surveillance Project (CRISP) Four-year Report: 2008-2012*.

Roberts SP, Trewartha G, Stokes KA & England M. *RFU Community Rugby Injury Surveillance Project (CRISP), 2011-2012 Season Report*, December 2012.

Gabb N, Trewartha G & Stokes KA. *England Women's Rugby: Premiership and England Injury and Training Audit, 2011-12 Season Report*, September 2012.

Trewartha G, Preatoni E, Cazzola D, Stokes KA & England M. *Biomechanics of the Rugby Scrum – Phase 2 Interim Report (20 teams) – Biomechanics of Live Scrummaging*, 28 Feb 2013.

Trewartha G, Preatoni E, Cazzola D, Stokes KA & England M. *Biomechanics of the Rugby Scrum – Phase 2 Final Report – Biomechanics of Live Scrummaging*, 30 May 2013.

Williams S, Trewartha G, Kemp SPT & Stokes KA. *Allianz Park Artificial Surface Evaluation – An Epidemiological Pilot Study*, 16 May 2013.

Book Sections

Ward H, Toledano MB, Shaddick G, Davies B & Elliott P. (2012) *Oxford Handbook of Epidemiology for Clinicians*. Oxford: Oxford University Press.

Journal Articles

Williams S, Trewartha G, Kemp SPT & Stokes KA. (2013) A meta-analysis of injuries in senior men's professional Rugby Union. *Sports Medicine*, Forthcoming.

Suarez-Arrones L, Portillo LJ, García JM, Calvo-Lluch A, Roberts SP & Mendez-Villanueva A. (2013) Running demands and heart rate responses in rugby union referees. *Journal of Strength and Conditioning Research*, Feb; Epub.

Preatoni E, Stokes K A, England M & Trewartha G. (2013) The influence of playing level on the biomechanical demands experienced by rugby union forwards during machine scrummaging. *Scandinavian Journal of Medicine & Science in Sports* 23:178-184.

Palmer-Green D S, Stokes KA, Fuller C W, England M, Kemp SPT & Trewartha G. (2013) Match injuries in English youth academy and schools rugby union: an epidemiological study. *The American Journal of Sports Medicine* 41:749-755.

Smith AA, Toone RJ, Peacock O, Drawer S, Stokes KA & Cook C J (2013) Dihydrotestosterone is elevated following sprint exercise in healthy young men. *Journal of Applied Physiology* 114:1435-1440.

Crewther BT, Sanctuary CE, Kilduff LP, Carruthers JS, Gaviglio CM & Cook CJ. (2013) The workout responses of salivary-free testosterone and cortisol concentrations and their association with the subsequent competition outcomes in professional rugby league. *Journal of Strength and Conditioning Research* 27:471-476.

Cook C J & Beaven CM. (2013) Individual perception of recovery is related to subsequent sprint performance. *British Journal of Sports Medicine*, Forthcoming.

Kilduff LP, West DJ, Williams N & Cook CJ. (2013) The influence of passive heat maintenance on lower body power output and repeated sprint performance in professional rugby league players. *Journal of Science and Medicine in Sport*, Forthcoming.

Cook C J & Crewther BT. (2012) The effects of different pre-game motivational interventions on athlete free hormonal state and subsequent performance in professional rugby union matches. *Physiology and Behavior* 106:683-688.

Preatoni E, Wallbaum A, Gathercole N, Coombes S, Stokes KA & Trewartha G. (2012) An integrated measurement system for analysing impact biomechanics in the rugby scrum. *Proceedings of the Institution of Mechanical Engineers, Part P: Journal of Sports Engineering and Technology* 226:266-273.

Invited Conference Presentations

Trewartha G, Stokes KA, Preatoni E, England M & Cazzola D. IRB Scrum Forces Project. *WRU Medical Conference*, Cardiff, 20 May 2013.

Preatoni E, Cazzola D, Stokes KA, England M & Trewartha G. Tough but not rough: what does biomechanics feed into the rugby scrum?. *31st Conference of the International Society of Biomechanics in Sports*, Taipei, 7-11 July 2013.

Academic Conference Presentations

Trewartha G, Preatoni E, England M, Stokes, KA. Movement patterns of rugby union players performing scrums against a scrum machine: The effect of playing level and engagement condition. *18th Annual Congress of the European College of Sport Science*, Barcelona, 26-29 June 2013.

Preatoni E, Stokes KA, England M, Trewartha G. The effect of playing level and engagement method on forces generated in rugby scrummaging. *18th Annual Congress of the European College of Sport Science*, Barcelona, 26-29 June 2013.

Brett AN, McGuigan MP. Do elite rugby players with repeatedly injured hamstrings demonstrate altered gluteal-hamstring recruitment patterns when sprinting? *18th Annual Congress of the European College of Sport Science*, Barcelona, 26-29 June 2013.

Perkins OJ, Roberts SP, Trewartha G, England M, Stokes KA. Anthropometry and lifestyle characteristics of English community level rugby union players. *18th Annual Congress of the European College of Sport Science*, Barcelona, 26-29 June 2013.

Churchill SM, Preatoni E, Stokes KA, England M, Trewartha G. The relationship between player technique and forces generated in rugby scrummaging. *18th Annual Congress of the European College of Sport Science*, Barcelona, 26-29 June 2013.

Cross MJ, Trewartha G, Williams S, Kemp SPT, Stokes KA. The epidemiology of concussion in elite rugby union players: An 8-season review. *18th Annual Congress of the European College of Sport Science*, Barcelona, 26-29 June 2013.

Williams S, Trewartha G, Kemp SPT, Stokes KA. A meta-analysis of injuries in senior men's professional rugby union. *18th Annual Congress of the European College of Sport Science*, Barcelona, 26-29 June 2013.

Gabb N, Trewartha G, Collins HF, Kemp SPT, Stokes KA. Epidemiology of match injuries in elite English women's rugby union – initial findings. *18th Annual Congress of the European College of Sport Science*, Barcelona, 26-29 June 2013.

Roberts SP, Trewartha G, England M, Shaddick G, Stokes KA. The epidemiology of time-loss injuries in English community rugby union. *18th Annual Congress of the European College of Sport Science*, Barcelona, 26-29 June 2013.

Cazzola D, Preatoni E, Stokes KA, England M, Trewartha, G. Biomechanics of rugby scrummaging: Kinematic and kinetic analysis across engagement conditions. *18th Annual Congress of the European College of Sport Science*, Barcelona 26-29 June 2013.

Stokes KA, Roberts SP, England M, Trewartha G. Propensity of contact injuries to cause injury in rugby union. *18th Annual Congress of the European College of Sport Science*, Barcelona, 26-29 June 2013.

Stakeholder presentations

Trewartha G, Stokes KA, Preatoni E, England M. Forces in the rugby scrum: What does it mean? *RFU/Premiership Rugby Medical Conference*, Twickenham, 4 July 2012.

Stokes KA. The RFU English Professional Rugby Injury Surveillance Project. *Premiership Rugby Medical Managers Meeting*, Tewkesbury, 12 July 2012.

Stokes KA, Mellalieu S. Introduction to the IRB Rugby Science Network. *IRB Medical Conference*, Dublin, 26-28 November 2012.

Trewartha G, Stokes KA, Preatoni E, England M. Biomechanics of the Rugby Scrum. *IRB Medical Conference*, Dublin, 26-28 November 2012.

Trewartha G, Stokes KA, Preatoni E, England M, Cazzola D. Scrum Forces Project. *IRBCoach Education Conference*, Dublin, 12-14 February 2013.

Gabb N. The RFUW Injury Surveillance Project: Challenge of Injury Surveillance in Amateur Sport. *West Midlands Regional Sports Medicine Education Day*, Birmingham, 13 June 2013.

Knowledge Exchange & Public Engagement

IRB Rugby Science Network

<http://www.irbsciencenetwork.com/>

In November 2012, IRB Rugby Science Network was launched. Grant Trewartha and Keith Stokes are co-founders and network editors along with Stephen Mellalieu (Swansea University). As of June 2013 the network has over 500 active members and nearly 2000 followers on Twitter.

The IRB Rugby Science Network is a global network of researchers who are interested in the study of the Rugby Football codes. The aim is to provide a forum which brings together the expertise of academics and professionals working in the Game. By sharing good Rugby science practice and discussing future directions, we can enhance the scientific study of the Game and work to ensure that Rugby science becomes Rugby practice where possible.

The aim of this network is to:

1. Promote the scientific study of the game and the transfer of scientific knowledge into professional practice through international collaboration.
2. Provide an international forum for the interaction between people interested in the science and practice of Rugby Football.
3. Work towards the establishment of a periodical conference and publication for academics and practitioners interested in Rugby Football.

Media

BBC Radio Wales interview with Grant Trewartha (January 2013) focussing on extent of injuries in elite rugby union prior to RBS 6Nations 2013.

Il giro della mischia ordinata... in tre puntate! Parte prima: gli studi scientifici (Ezio Preatoni, Interviewee). onrugby.it, 9 Jan 2013, <http://www.onrugby.it/2013/01/09/il-giro-della-mischia-ordinata-in-tre-puntate-parte-prima-gli-studi-scientifici/>

Crouch, touch, filosofia! Perché ci sono più cose in una mischia... (Ezio Preatoni, Interviewee). onrugby.it, 17 Jan 2013, <http://www.onrugby.it/2013/01/17/crouch-touch-filosofia-perche-ci-sono-piu-cose-in-una-mischia/>

Dentro la mischia: tutti i numeri di un'arte (Ezio Preatoni, Interviewee). onrugby.it, 24 Jan 2013, <http://www.onrugby.it/2013/01/24/dentro-la-mischia-tutti-i-numeri-di-unarte/>

Visitors to the University

In June we hosted Dr Sharief Hendricks from the University of Cape Town for a short visit to the University. The purpose of his visit was to discuss avenues for injury prevention in rugby.

Postgraduate training

Ed Gannon (part-time PhD student) successfully completed the MPhil to PhD transfer process for his research to date on a thesis entitled 'Acute and long-term effects of post-activation potential strategies for strength and power development in the applied sport setting'.

Jo Larkin (MSc Sport & Exercise Medicine) completed a dissertation entitled 'England Women's Rugby Football Union Injury Audit: The incidence and characteristics of rugby injuries in Elite RFU female players during one rugby season (2011/2)'.

Francesca Martin (MSc Sport & Exercise Medicine) completed a dissertation entitled 'The Management Of Suspected Concussion in Community Rugby Union'.

Becky Davison (MSc Sport Physiotherapy) completed a dissertation entitled 'The Effect of Fatigue on Shoulder Joint Position Sense (JPS) in the Tackle Position for Rugby Players'.

Our Plans for 2013-14

Out in the Rugby Community: As part of our existing and new injury surveillance/prevention projects with the RFU at Community, Women and Youth levels, our team will be spending a considerable amount of time in the coming year travelling to rugby clubs to put players through a variety of physical screening tests to accompany the injury surveillance data already being collected – all designed to help establish which factors are associated with injury in each of these rugby populations.

Fostering international links: The RS@Bath group will continue to engage with the IRB Rugby Science Network as Network Editors, Section Editors, and via contributions to the discussion forums. RS@Bath will also continue to foster our relationship with the Exercise Science and Sports Medicine research group at the University of Cape Town in South Africa. Our respective groups have many shared interests and projects in relation to injury prevention in rugby union and we shared some healthy exchanges of ideas and information around rugby science and medicine in 2012/13 via virtual meetings and face-to-face visits, and we look forward to more of the same in 2013/14.

Web exposure: RS@Bath will be looking to enhance our web presence in 2013/14, primarily with the aim of disseminating information and exchanging knowledge from our research projects that should be of interest to the rugby community.

Social Media: @RSatBath has recently been established as our group's twitter tag and we are aiming to make sure that this twitter account gets active and provides interesting and important chunk-sized gems of rugby science information out into the wider world at regular intervals.

IOC congress: From a formal scientific dissemination perspective, our group's main focus for 2013/14 will be to submit and present a number of key studies to the IOC World Conference on Prevention of Injury and Illness in Sport in April 2014.

Publishing research: The RS@Bath group continue to disseminate our original research through traditional peer-reviewed scientific outlets. Our group has a healthy number of research articles already in the review cycle and close to submission. These articles are mainly in the topic of injury epidemiology in relation to Community rugby and the scrum, the biomechanics of scrummaging, power development in rugby union, and longitudinal risk factor analysis for injury in elite rugby players.

A selection of our research articles that have or are about to enter the peer review cycle include:

Roberts SP, Trewartha G, England M, Shaddick G & Stokes KA. Epidemiology of time-loss injuries in English community level rugby union.

Taylor A, Kemp SPT, Trewartha G & Stokes KA. Scrum injury risk in professional rugby union.

Cazzola D, Trewartha G & Preatoni E. Time-based calibrations of pressure sensors improve the estimation of force signals containing impulsive events.

Roberts SP, Trewartha G, England M & Stokes KA. Propensity of contact events to cause injury in community rugby union: a focus on collapsed scrums and collision tackles.

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