



Dr Simon Choppin
Centre for Sports Engineering Research





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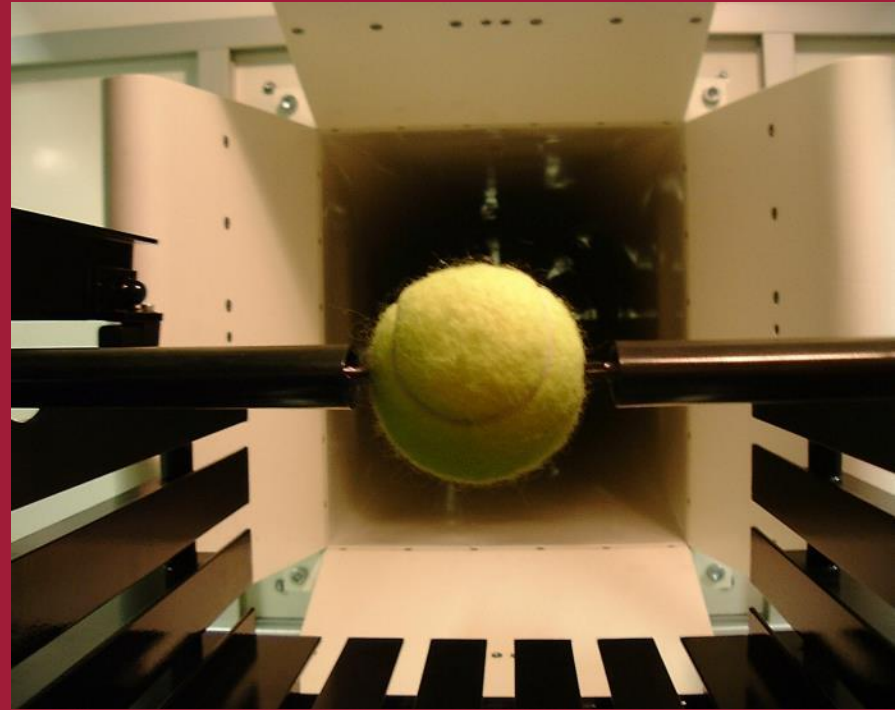
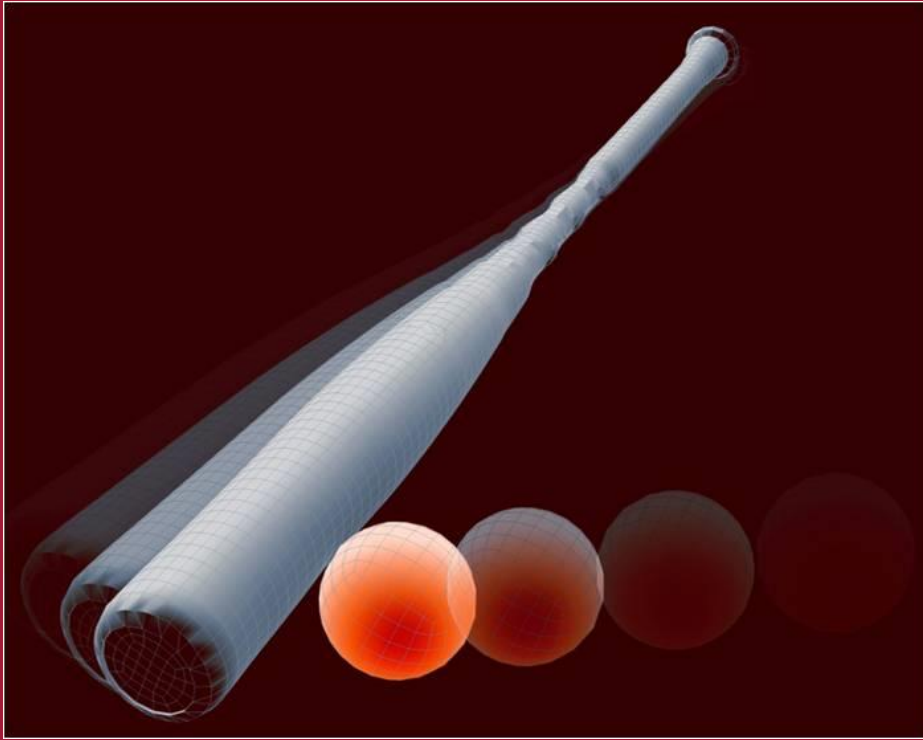
Engineering

Retrieved from Wikipedia 11-09-2014

Engineering (from Latin *ingenium*, meaning "cleverness" and *ingeniare*, meaning "to contrive, devise") is the application of scientific, economic, social, and practical knowledge in order to invent, design, build, maintain, and improve structures, machines, devices, systems, materials and processes.

How can we apply this to sport?





Sports Engineering



OFFICIAL SUPPORTER GRAND DÉPART 2014

categorization of sports technology

sporting goods
materials for sporting goods

sport equipment
(including the mobile equipment of sport facilities)

hardware for sport information systems

sport garment / apparel

sport foot wear & sport surfaces

personal protection gear

Sports Engineering

Information-technology (IT) based
applications & services in sport

IT procedures for training-, game-
and competition analysis

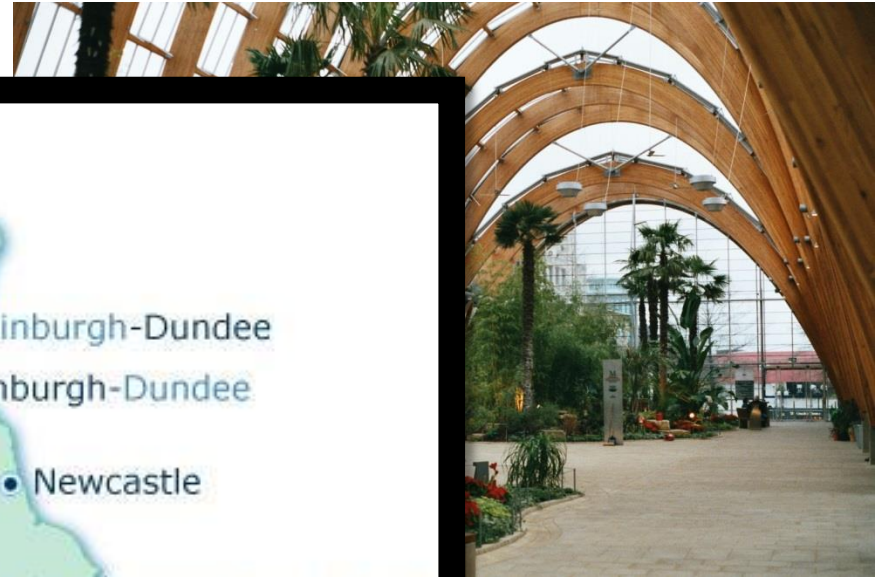
software for sport information systems

IT procedures for motion analysis

IT procedures for performance prediction

Computer Science in Sports

Sheffield and Hallam University



A brief history of Sports Engineering in Sheffield



- ISEA established in 1996 through a conference hosted by Steve Haake in Sheffield.
- Under his leadership the **Sports Engineering Research Group** was started in 1998
- In 2006 the group moved Universities, later becoming **The Centre for Sports Engineering Research**
- The centre currently contains:
 - 18 full-time researchers
 - 16 PhD students
 - 14 MSc students

| Our partners...



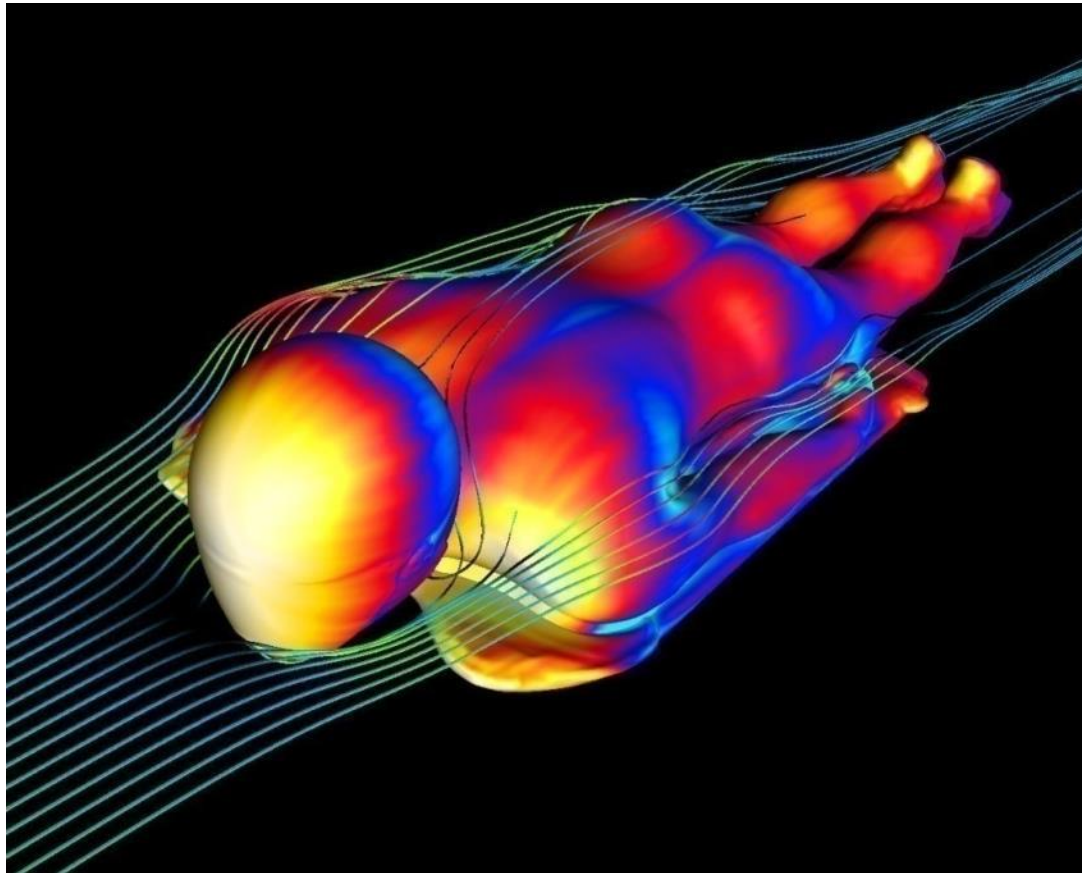
| Olympic partners...



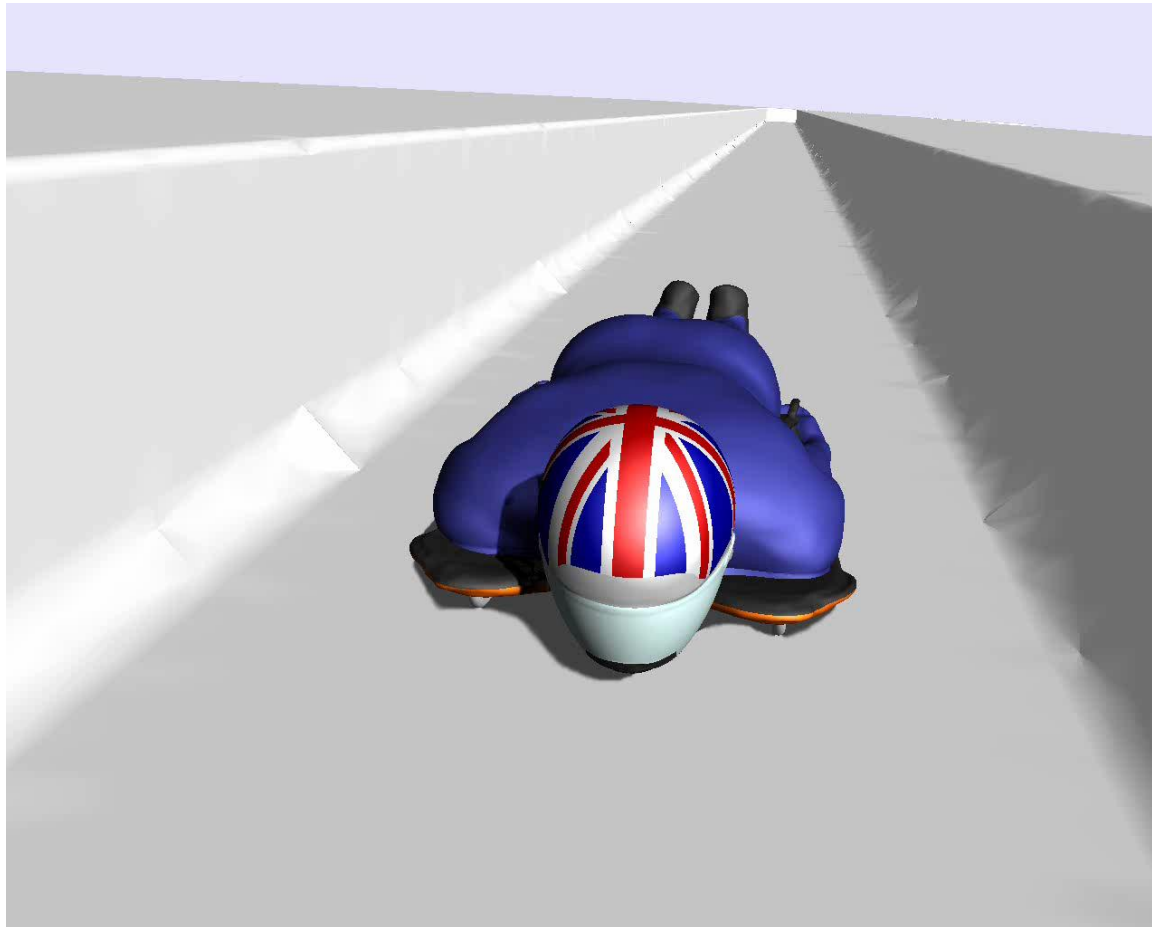
| Our skills



| Skeleton bobsled



| Skeleton bobsled



| Skeleton bobsled



Team GB

Amy Williams Olympic Gold 2010



Team GB

Lizzy Yarnold Olympic Gold 2010

| World's fastest sledge with Guy Martin



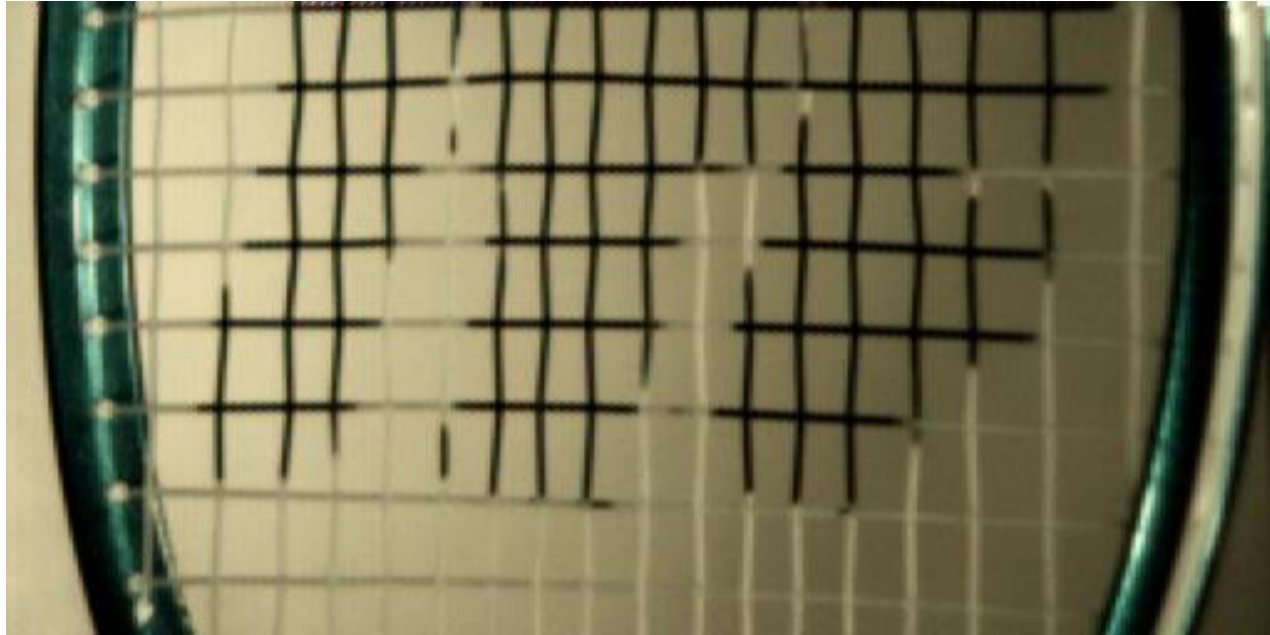
| World's fastest sledge with Guy Martin



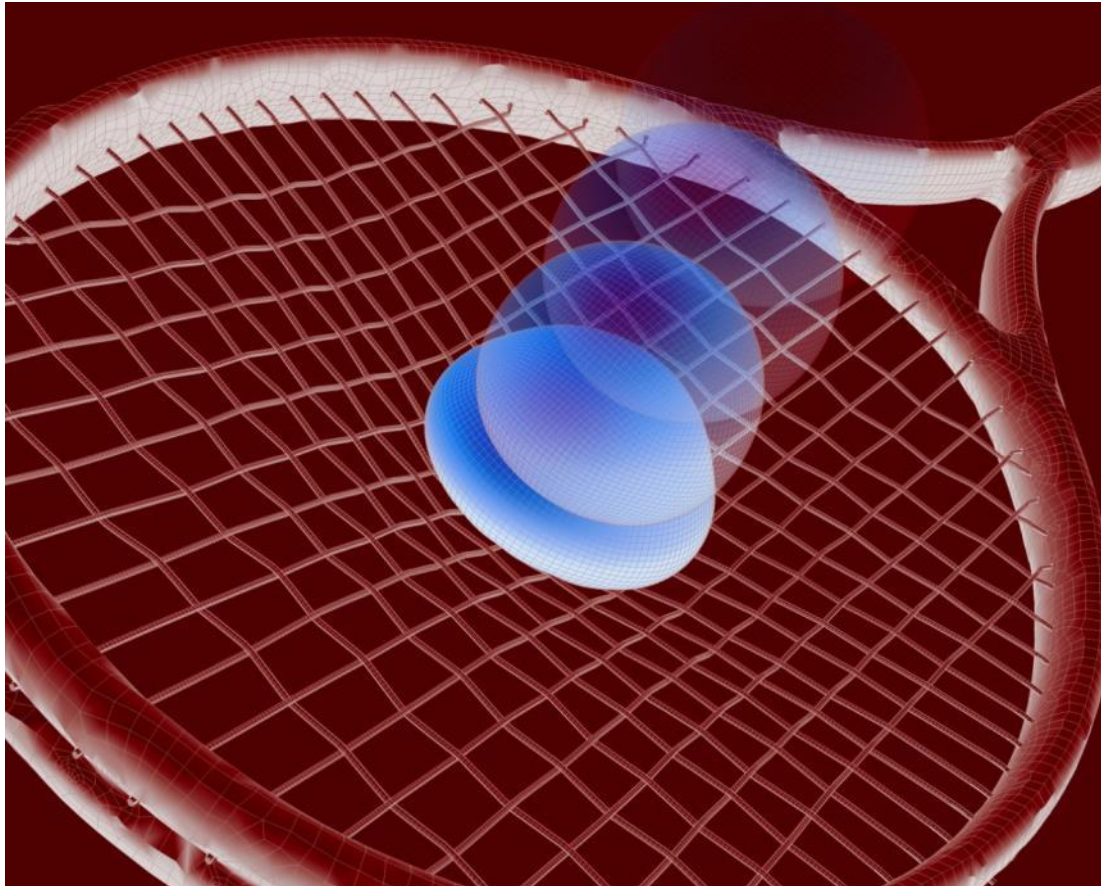


85.6 mph
137.8 km/h

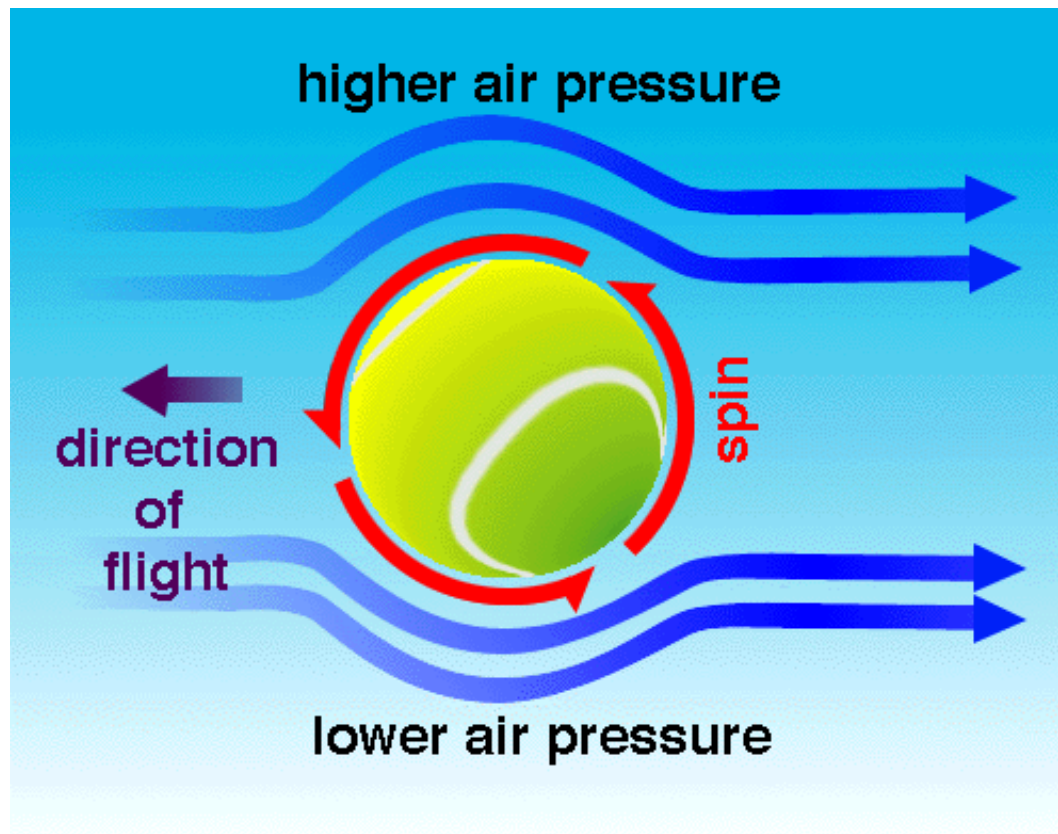
| Tennis



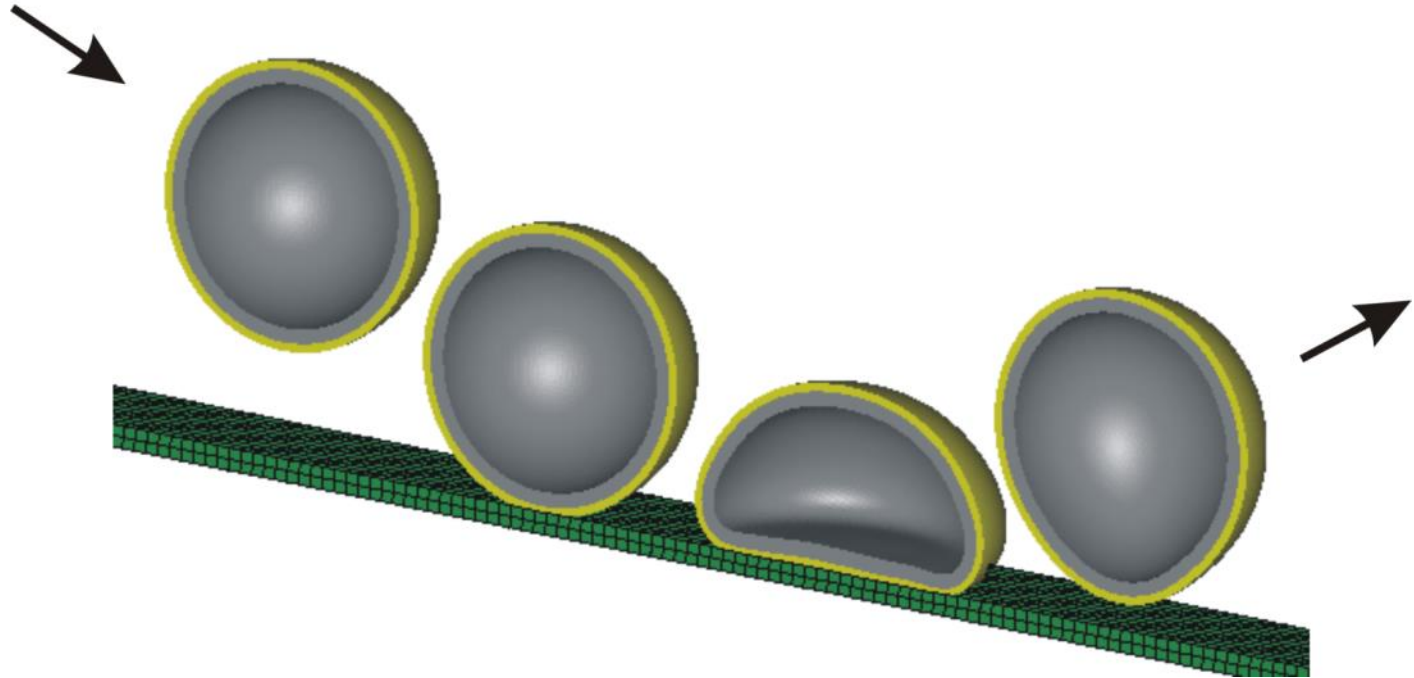
| Impact modelling



| Ball aerodynamics / trajectory modelling



| Impact modelling



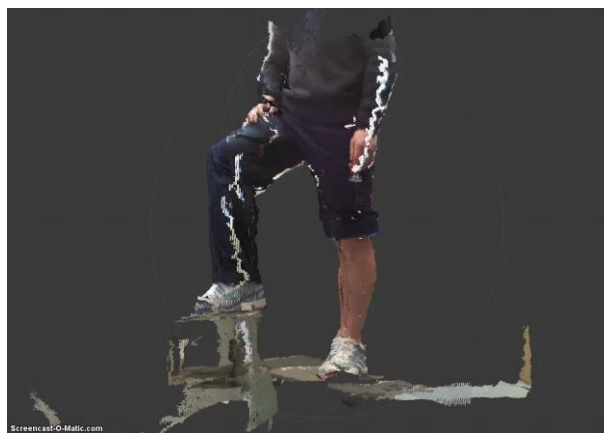
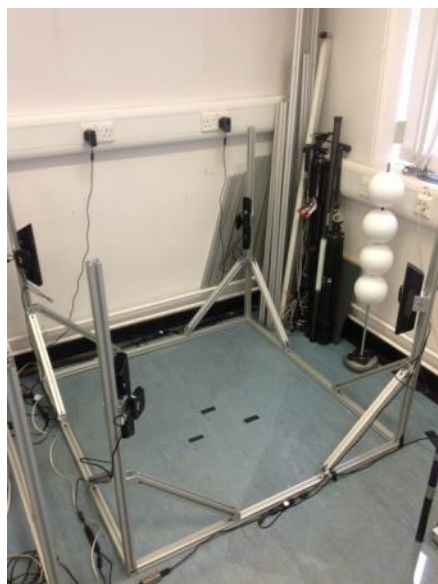
Tennis GUT



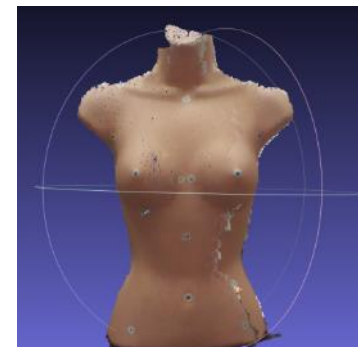
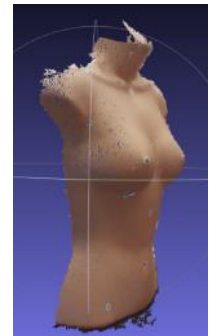
| Mobile digital technologies



Scanning with depth cameras



Elite Sport



Derby Hospitals **NHS**
NHS Foundation Trust

health enterprise **east**
IDEAS FOR HEALTH

Health



INTERNATIONAL SPORTS ENGINEERING ASSOCIATION

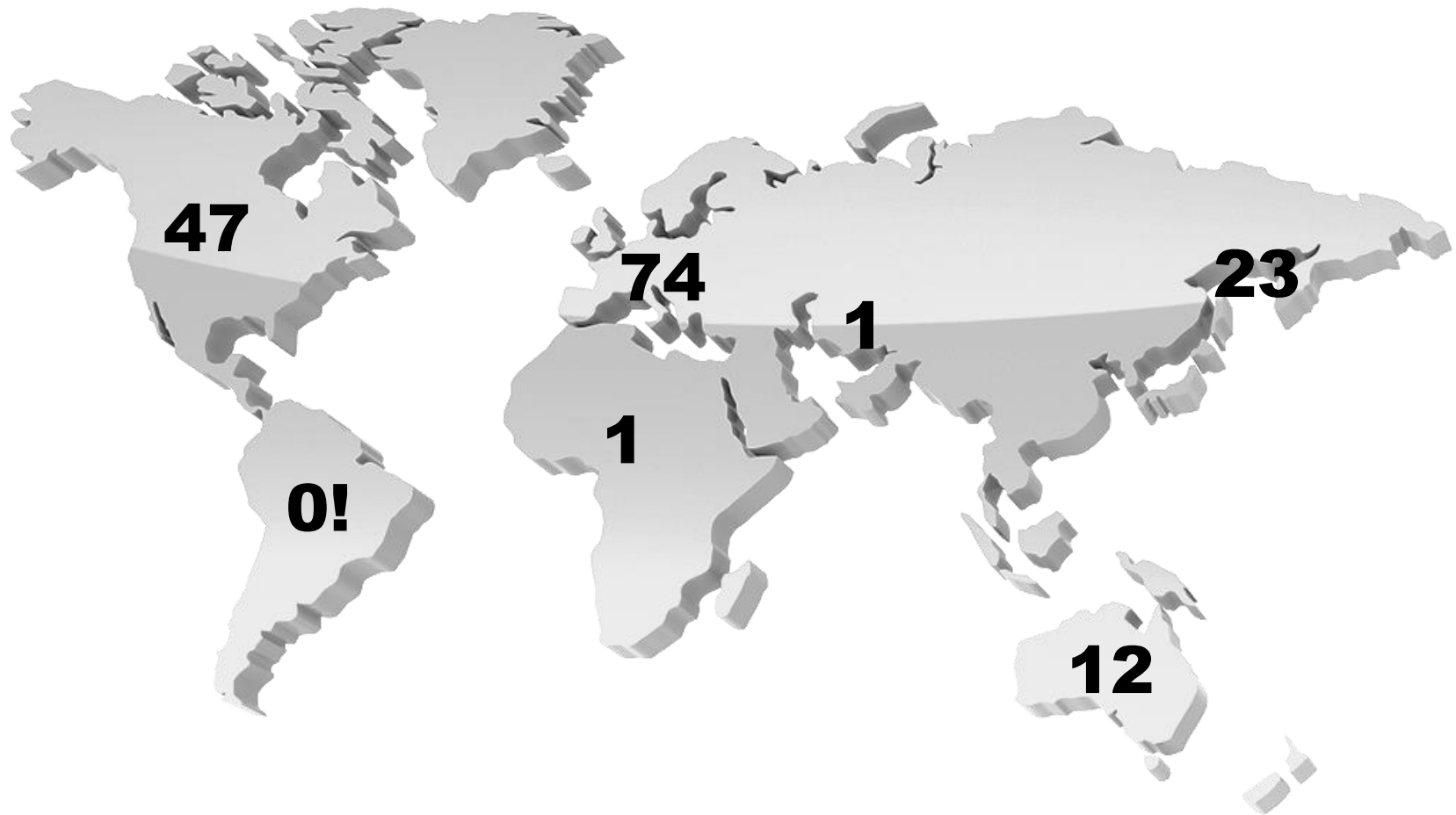
What it is...

About the ISEA

- 1998 Professor Steve Haake set up the International Sports Engineering Association.
- ISEA serves the growing community of sports engineering academics and industries.
- Promotes the field through sharing information between members, publication of a journal, support of the biennial conference and support of educational activities.

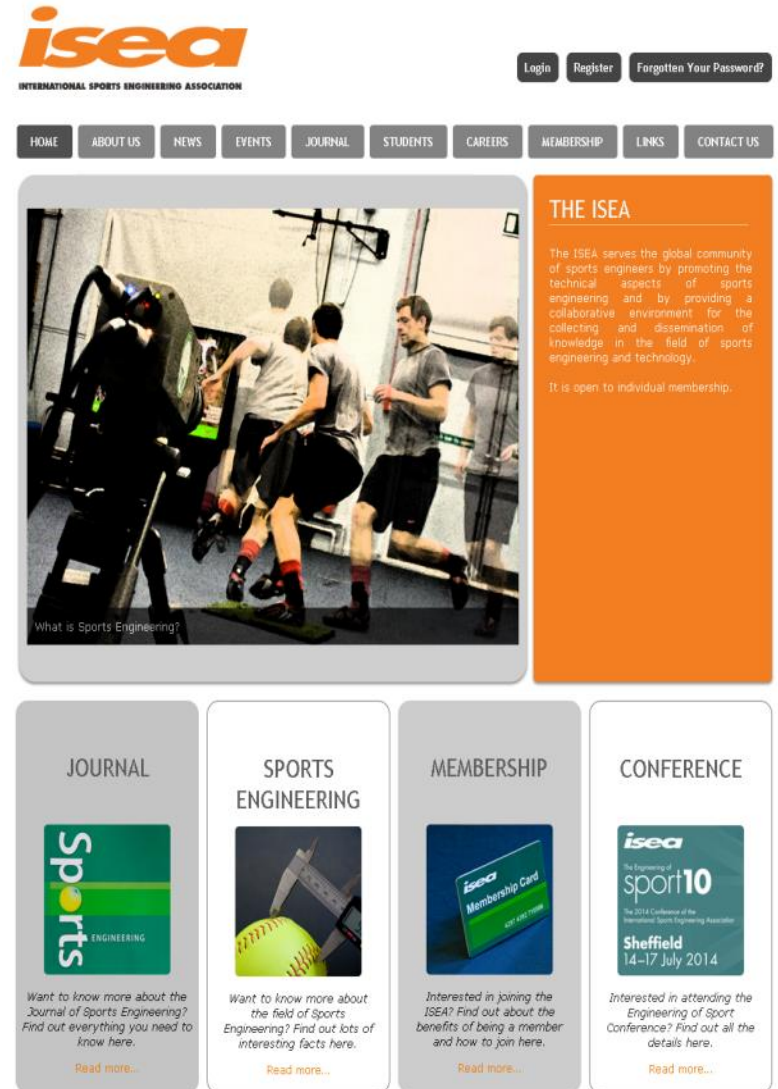


ISEA Membership



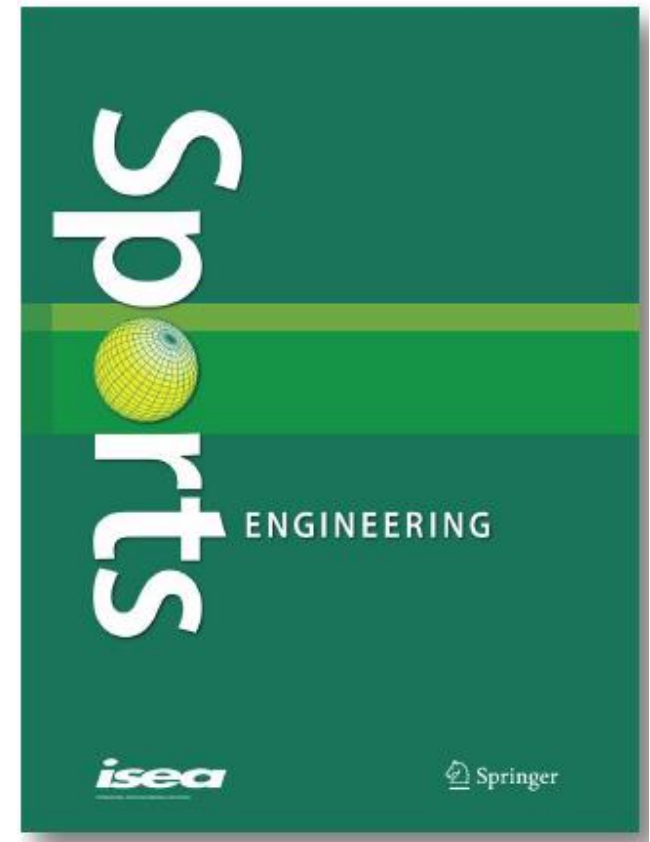
Website: www.sportsengineering.org

- Online membership
- Information for students and industry
- Members only area
- Forum (coming soon)
- Quarterly newsletter
- Access to journal papers
- News and events



Journal

- Founded in 1998
- Longest running journal in field of Sports Engineering and Technology
- Editor: Lloyd Smith
- Associate editors:
 - Tom Allen
 - Simon Choppin
- 4 issues per year
- Guest edited special issues
- ISI application expected by end of 2014





Standout papers (more than 20 total citations)

Cross, R. (1998) *The sweet spots of a tennis racket*.
38 citations

Fleisig, G.S., Zheng, N., Stodden, D.E & Andrews, J.R. (2002)
Relationship between bat mass properties and bat velocity. **64 citations**

Carré, M.J., Asai, T., Akatsuka, T. & Haake, S.J. (2002) The curve kick of a football, II: flight through the air. **90 citations**

Asai T, Seo K, Kobayashi O, Sakashita R (2007) Fundamental aerodynamics of the soccer ball. **63 citations**

Mackenzie SJ, Sprigings EJ (2009) Understanding the role of shaft stiffness in the golf swing. **28 citations**

Evan Stuart Walsh, Philippe Rousseau, Thomas Blaine Hoshizaki (2011) The influence of impact location and angle on the dynamic impact response of a Hybrid III headform. **20 citations**

Summer and Winter Schools

- Summer school 2009: Chemnitz
- Winter school 2011, 2012, 2013 and 2014: San Vito di Cadore (Cortina, Italy)



Conferences

- ISEA has administrated a biennial conference since 1996.
- Truly international with host institutions from Sheffield, Sydney, Kyoto, California, Munich, Biarritz, Vienna and Lowell.
- 2016 conference will be hosted by Delft University of Technology in Netherlands



Opportunities in Sports Engineering



World course database



INTERNATIONAL SPORTS ENGINEERING ASSOCIATION

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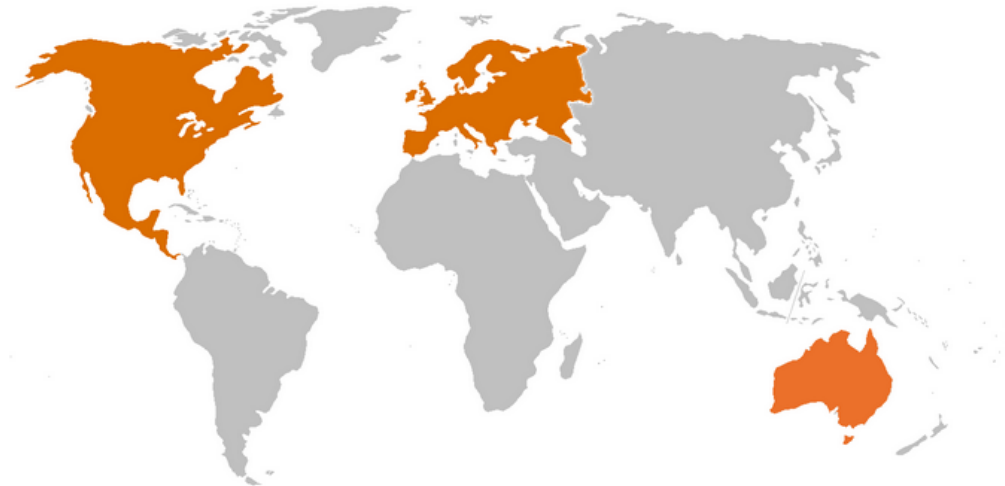
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[New Executive Committee](#)

Latest Jobs

**PhD Studentship in
Canoeing Performance**
University of Lincoln

Assistant Researcher
Politecnico di Milano

<http://www.sportsengineering.org/students/university-courses/>

International Sports Engineering Association careers

isea
INTERNATIONAL SPORTS ENGINEERING ASSOCIATION

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| | | |
|--|------------------------|---------------------------|
| PhD Studentship in Canoeing Performance University of Lincoln | Nottingham & Lincoln | PhDs 20 days ago |
| Assistant Researcher Politecnico di Milano | Milan, Italy | Full Time 48 days ago |
| Research & Development Manager Speedo | Nottingham | Full Time 130 days ago |
| Senior Database Architect UK Sport | London | Full Time 180 days ago |
| Senior Business Analyst UK Sport | London | Full Time 180 days ago |
| PhD Studentship - Three-dimensional motion analysis of a tennis racket using a camera Sheffield Hallam University | Sheffield | PhDs 208 days ago |
| PhD Studentship - Application of azeotropic materials to sports equipment design Sheffield Hallam University | Sheffield | PhDs 208 days ago |
| PhD Studentship Dynamic Balance in Sport Centre for Sports Engineering Research, SHEU | Sheffield | PhDs 242 days ago |
| PhD Studentship - The efficacy of snowboard wrist protectors Centre for Sports Engineering Research, SHEU | Sheffield | PhDs 270 days ago |
| Head of Research & Innovation English Institute of Sport | SSS Blenheim Abbey, UK | Full Time 319 days ago |

Latest News

- ISEA Image Competition Winners Announced
- Sports Technology Design Award Launches
- ISEA 2016 - The Engineering of Sport 11
- ISEA Fellow
- New Executive Committee

Latest Jobs

- PhD Studentship in Canoeing Performance
University of Lincoln
- Assistant Researcher
Politecnico di Milano
- Research & Development Manager
Speedo
- Senior Database Architect
UK Sport

MSc Sports Engineering

Full-time, Part-time

Location • Collegiate Campus
Subject area • Sport and active lifestyles
Related subjects • Engineering

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At a glance

Study at the cutting edge of sports engineering and learn how to apply advanced engineering techniques to the research and development of sports technologies. This course is taught by the [Centre for Sports Engineering Research](#), one of the largest hubs of sports engineering research in the world.

Key points

- Gain the skills need to enter a £200 billion industry driven by innovation and research.
- Enhance your engineering knowledge with an understanding of athlete biomechanics and physiology.
- Study with CSER, one of the world's largest centres for sports engineering research.
- Complete a major research project with an industrial partner such as Adidas, Ping or Prince Sports.

About this course

If you are a high-achieving graduate in engineering and the physical sciences, learn to develop and apply your technical knowledge to the world of sport. The course gives you the skills and knowledge to work at the cutting edge of research and development in the sports equipment industry.

More than ever, the world of sport is intimately connected to new technologies. The global sports equipment industry is valued at £200 billion annually and is driven by new research and innovation. In addition, many national teams are increasingly reliant on technological solutions to monitor and assess the performance of their elite athletes.

Throughout this course you enhance your technical, problem solving and engineering skills and learn to apply them to the sporting environment. You also develop a biomechanical and physiological understanding of athletes, enabling you to analyse the athlete-equipment interactions in sport.

Towards the end of your course, you complete a major research project with an industrial partner. This increases your practical understanding of sports engineering, and provides you with the vital real world experience improve your employability. Recent student projects have been partnered to organisations such as • Adidas • Ping • Prince Sports • Mitre • Gunn and Moore • Eley • GB Diving and GB Boxing.

The course is delivered by the [Centre for Sports Engineering Research](#) an internationally renowned centre of excellence for research and consultancy with over 160 years of cumulative experience. The Centre for Sports Engineering Research has 30 research staff and PhD students making it one of the world's largest centres for sports engineering research. The group has close ties to many different sports companies and organisations and works extensively to enhance elite performance across many sports through its role as a UK Sport Innovation Partner.

The course is led by Dr David James, a leading sports engineer, expert science communicator and editor-in-chief of the [2014 International Sports Engineering Association conference](#).

Sheffield Hallam are a Skills Development Partner of the [Chartered Institute for Managing Sport and Physical Activity](#)

We offer at least a **£1,000 discount** to international students for this course

[Transform Yourself >](#)

Discover Tomorrow's You
Real student stories, information and inspiration

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Attendance

Full-time – one year
Part-time – two years
The part-time route is only available to home and EU students
Starts September

How to apply

[Fees – home and EU students](#)
[Fees – international students](#)
[Assessment](#)
[Course enquiries](#)



of skeleton bobbed

MSc Sports Engineering at Sheffield Hallam University

Semester 1 modules (all 15 credits)

Research methods

Computer
simulation in
sport

Mechanics of
sports
equipment

Numerical
programming in
sports engineering

Measurement
techniques in
sports engineering
and biomechanics

Semester 2 modules (all 15 credits)

Data analysis

Human factors in
sports
engineering

Physiology in sport
and exercise

Innovation and enterprise in sports
engineering

Year long modules...

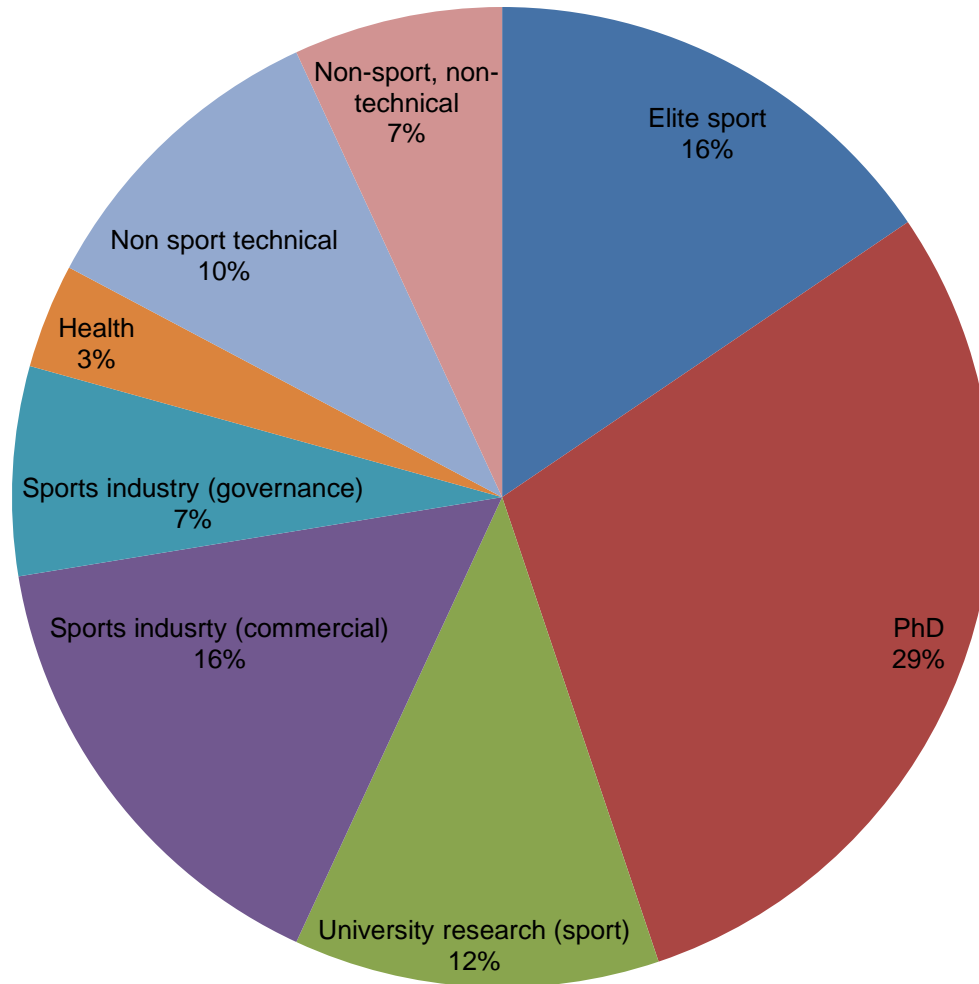
45 credit project (industry linked)
End of year conference

Plus...

Personal tutor (focusing on academic and career development)

2 * CSER 6 month paid internship for top students at graduation

Career destinations from MSc Sports Engineering (n = 58)



PhD Opportunities



- Brazilian Science without Borders scheme
 - Provides financial support for Post-graduate, PhD study around the world.
 - Sheffield Hallam University is a participating University

The Centre for Sports Engineering Research is looking for PhD students

Example projects:

- 3D scanning for sport and health applications
- Tennis racket tracking with cameras for coaching and equipment testing
- Wearable sensor technologies for training and injury prevention



Thank you for listening

- If you would like more information about
 - MSc course
 - PhD opportunities
- Contact me: (Dr Simon Choppin) at:

s.choppin@shu.ac.uk