Dr Simon Choppin
Centre for Sports Engineering Research
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
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 footwear & 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
Impact modelling
Ball aerodynamics / trajectory modelling

- higher air pressure
- spin
- direction of flight
- lower air pressure
Impact modelling
Tennis GUT
Mobile digital technologies
Scanning with depth cameras
What it is...
• 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.
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)


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
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
UNIVERSITY COURSES

Click the map above to find university courses in your area.

Can’t see your university course? Please contact us to have your course added to our continually expanding list.

http://www.sportsengineering.org/students/university-courses/
International Sports Engineering Association careers

http://www.sportsengineering.org/careers/
MSc Sports Engineering

Full-time, Part-time
Location: Collegiate Campus
Subject area: Sport and active lifestyles
Related subjects: Engineering

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 Pringle 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 ideal real-world experience to improve your employability.

Recent student projects have been partnered to organisations such as Adidas, Ping, Pringle Sports, Nike, Pye, Moore, Ely, OS Diving and OS Boxing.

The course is delivered by the Centre for Sports Engineering Research, an internationally renowned centre of excellence for research and consultancy with over 150 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.

http://www.shu.ac.uk/prospectus/course/900/
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)

- Elite sport: 16%
- PhD: 29%
- University research (sport): 12%
- Sports industry (commercial): 16%
- Sports industry (governance): 7%
- Health: 3%
- Non-sport technical: 10%
- Non-sport, non-technical: 7%
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:
  
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