

Undergraduate Summer Research Internship Scheme 2014

Project Titles: The intern will be involved in two projects:

1. Examining the effect of 'movement control' based exercise rehabilitation on athletic groin injury
2. Developing novel ways of assessing movement technique (e.g. inertia sensors, Microsoft Kinect).

Principal Investigator: Dr Kieran Moran

School/Research Centre: School of Health and Human Performance

Project Description

Athletic groin pain is a common injury in sports involving repetitive twisting, kicking and turning movements which occur in many sports including soccer, football and tennis (Quinn, 2010). In soccer for example it accounts for 8–18% of all injuries (Ekstrand & Hilding, 1999).

As in many musculoskeletal injuries, groin injury is predominantly caused by biomechanical factors related to inappropriate movement techniques, which place excessive loading on the tissues. While several reviews (Machotka 2009) including a Cochrane meta-analysis (Almeida et al 2013) have concluded that exercise therapy can be beneficial in groin rehabilitation, the quality of evidence is generally low and the rehabilitation programmes predominantly focus on strength training. Recently, we developed a battery of movement tests that identified several biomechanical variables discriminative of patients with athletic groin pain (Marshall et al 2013), suggesting that it may be more appropriate to focus on 'movement control' rather than traditional strength training. We are undertaking the first ever prospective, randomly controlled, 'movement control' rehabilitation programme. Results from this study will also have significant implications for many other neuro-musculoskeletal injuries where 'movement control' rehabilitation may be warranted.

Most university based research into injury is undertaken within the university itself, which creates a real challenge in locating and engaging patients. The groin injury project is relatively unique in that not only is it being completed in conjunction with an industrial partner, the Sports Surgery Clinic, (which is a local private hospital), but the project is embedded fully within the hospital. This promises to provide a unique research experience for the intern. The proposed internship will involve working directly with patients and a multidisciplinary research team consisting of: clinical biomechanists, physiotherapists, sports physicians and surgeons, as well as two PhDs and two Postdoctoral Researchers (which testify to the scale of this research). The intern will be exposed to all elements of the research project, but will focus on the collection, processing and analysis of patient data using a state-of-the-art motion capture and analysis system within the hospital. There are only around eight such systems in the country. Even

though the intern will not collect enough data for a full study, he/she will collect enough to undertake a statistical analysis to write up a conference poster/paper.

The biomechanical based rehabilitation project and the development of motion analysis technology are central components of the research group's targeted focus on movement analysis in the Connected Health domain which is a research priority within DCU, Ireland (SFI) and Europe (H2020).

The intern will be mentored in the hospital by a Postdoctoral Researcher Dr. Marshall (who is based there full-time and leading the groin injury study) and in DCU by a second Postdoctoral Researcher Dr. Ahmadi (RePlay FP7). The Principal Investigator has research meetings with both groups weekly, which the intern will attend. The intern will gain interpersonal skills in working within a mixed research and patient care team environment, as well as hands on experience with patients. He/she will gain biomechanical knowledge and extensive experience with motion capture technologies which are the foundation of movement analysis.

Internship Descriptor/Specification

Applicants should be highly motivated undergraduate students who want a future career in biomechanics based research. The position will be of interest to individuals with an interest in either health or sports based biomechanics.

If successful the intern will be involved in two projects. Approximately 80% of the time will be devoted to a project examining the effect of 'movement control' based exercise rehabilitation on athletic groin injury, and 20% devoted to a multidisciplinary project developing novel ways of assessing movement technique (e.g. inertia sensors, Microsoft Kinect). The 'movement control' based project will involve working directly with patients and a multidisciplinary research team consisting of: clinical biomechanists, physiotherapists, sports physicians and surgeons. The intern will be exposed to all elements of the research project, but will focus on the collection, processing and analysis of patient data using state-of-the-art motion capture and analysis technology within a local private hospital (Sport Surgery Clinic, Santry) which is our industrial partner.

It is expected that this internship will help the intern develop interpersonal skills in working within a mixed research and patient care team environment, provide hands on experience with patients and gain biomechanical knowledge and extensive experience with motion capture technologies, which are the foundation of movement analysis.

This unique research internship is being overseen by Dr Kieran Moran, Head of Biomechanics Research within the School of Health and Human Performance and both a Funded Investigator and a Targeted Project Leader in Insight Centre for Data Analytics (the largest ever SFI funded research centre).

We are looking for a highly motivated and high achieving undergraduate, with good interpersonal skills, able to work as part of a team and a willingness to work hard. Ideally the intern will have completed at least one biomechanics based module, and can demonstrate a passion for both biomechanics and research.

Informal enquiries in relation to applications can be made to Dr Kieran Moran, email: kieran.moran@dcu.ie or tel: 7008011.