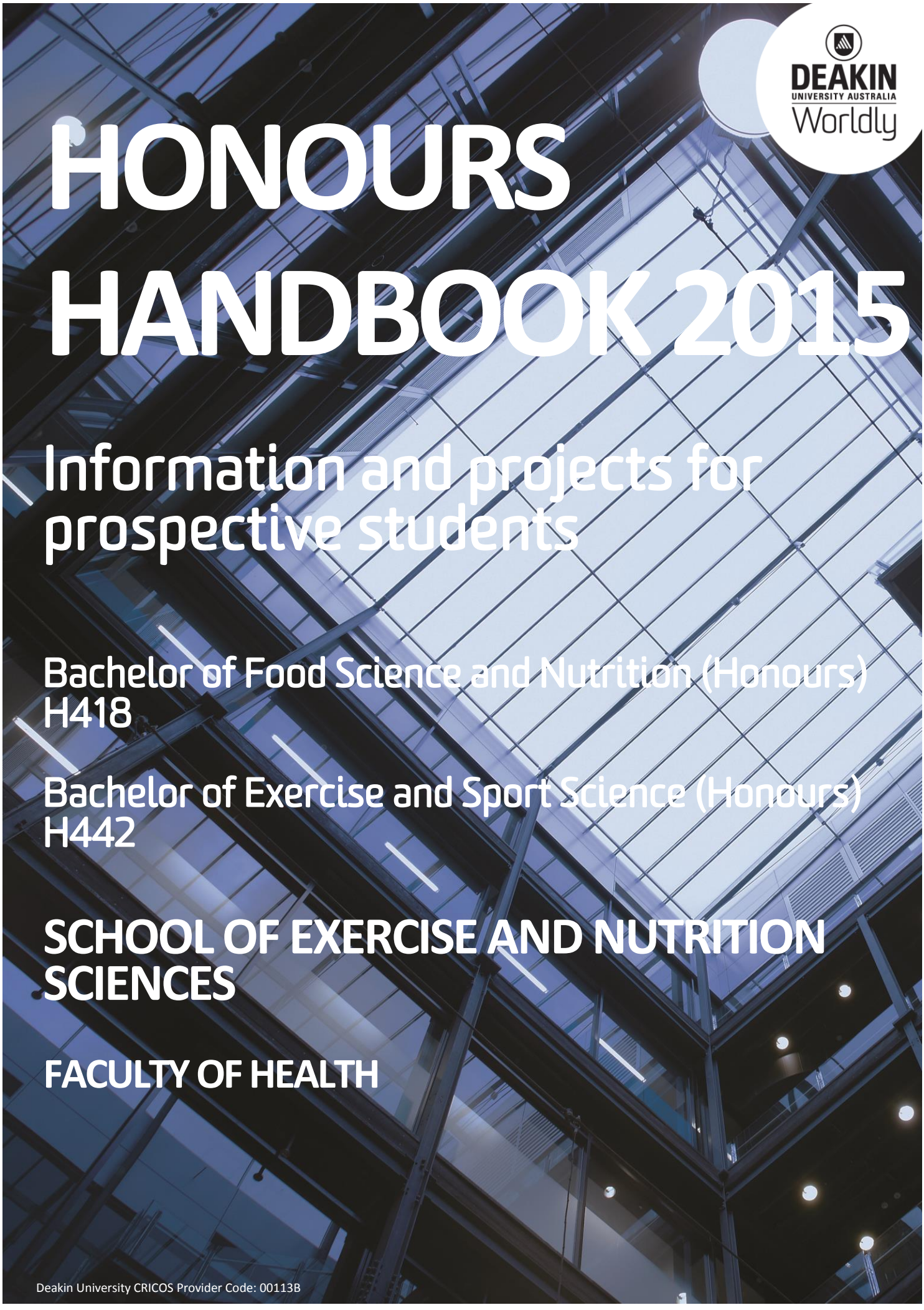

# HONOURS HANDBOOK 2015

## Information and projects for prospective students

Bachelor of Food Science and Nutrition (Honours) H418

Bachelor of Exercise and Sport Science (Honours) H442

## SCHOOL OF EXERCISE AND NUTRITION SCIENCES

## FACULTY OF HEALTH

Deakin University CRICOS Provider Code: 00113B

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## HONOURS OVERVIEW

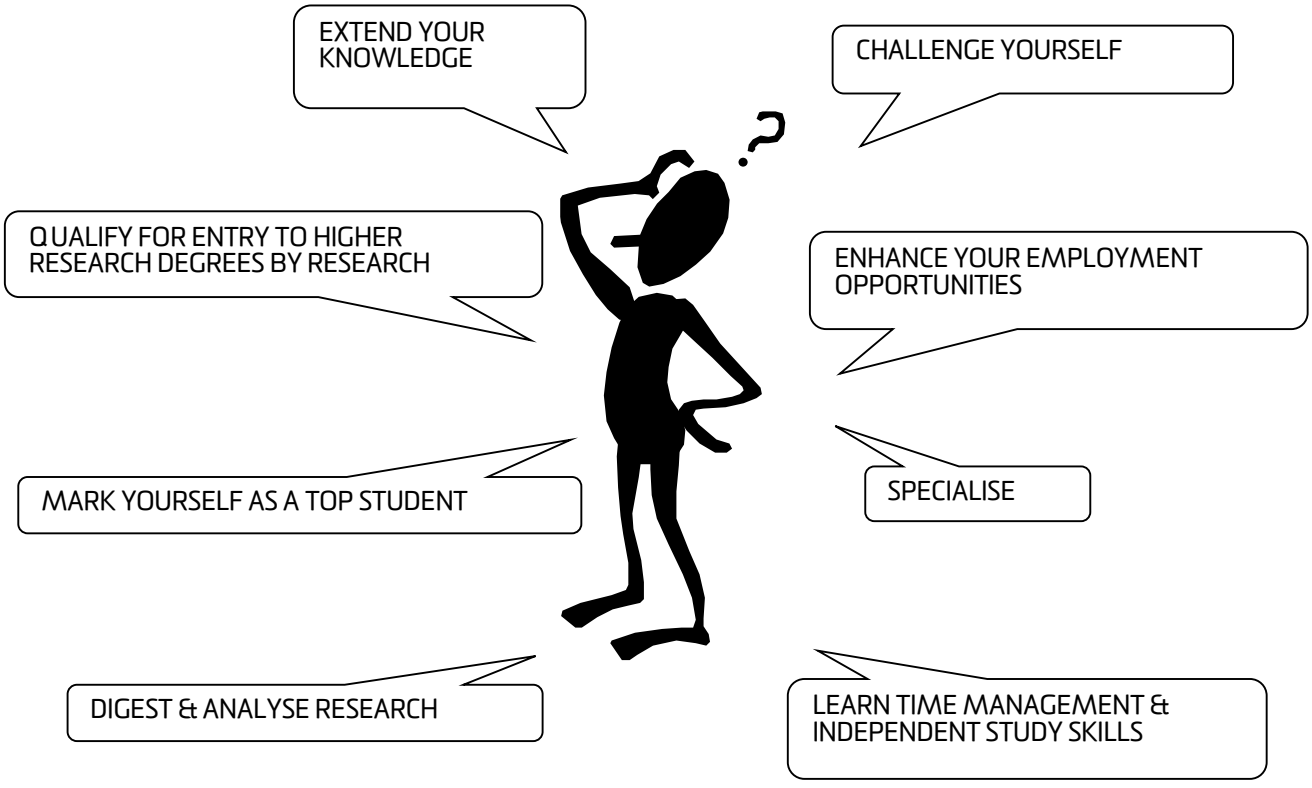
The honours program in the School of Exercise and Nutrition Sciences (SENS) builds upon the foundations provided by a three year undergraduate degree. The aim of the program is to provide students with the necessary knowledge and skills to enable them to undertake higher degree studies and advance their professional training.

The School offers the following Type A Honours degrees:

| | |
|---|---|
| Bachelor of Food Science and Nutrition (Honours) | H418 |
| Bachelor of Exercise and Sport Science (Honours) | H442 |

All honours programs in the School have common features, specifically:

- Coursework units and a written thesis
- Undertaken over one year full time
- Allocation of a supervisor and co-supervisor



## WHY DO HONOURS?

### *Extend your knowledge*

Honours allows you to broaden your understanding of university life and to understand the role of academic research. Students are encouraged to take part in research seminars and forums and to present their research at conferences.

### *Challenge yourself*

Undergraduate learning is not a lot different from high school; you have set concepts you need to know and these are assessed at the end of each unit. On the other hand honours, as in all research, requires you to go and find the answers to questions that are not always clear cut and then work out what you found and why. Not only that you then have to present it in written and oral forms for others to understand. It is a challenge that will not only help you learn more about your chosen field, but also more about yourself.

### *Qualify for entry to higher degrees by research (PhD and Masters Programs)*

Your honours year will provide you with training in all aspects of research; this will prepare you for further research degrees but also up skill you in understanding the complexities of research and its application to industry.

### *Enhance your employment opportunities*

Graduates with a four year degree are sought after in the industry because of their superior skills in research, analysis and communication. The honours degree also allows you to specialise more than your undergraduate degree; having specialist knowledge can be very attractive to potential employers.

### *Specialise*

There are a range of areas that you can specialise in. Your undergraduate degrees in Exercise and Sports Science or Food Science and Nutrition are broad degrees, covering a wide range of topic areas; however Honours lets you develop more specialist knowledge in an area of interest. In exercise and sports science you can investigate aspects of biomechanics, coaching, skill acquisition, motor control, physiology, physical activity and molecular biology. In nutrition and food sciences you can investigate aspects of nutrition, food choice, eating patterns, health effects, food policy and the composition of food.

### *Mark yourself as a top student*

The honours degree makes you different from other graduates: first you have to be a top student to get into the honours program; and second it stamps you as a person willing to pursue the challenges of research and shows that you can operate independently and at a high level of performance.

### *Digest and analyse research*

The skills that you acquire in honours will make you a consummate consumer of research in your area of work but also in general life. When the media quotes statistics and findings from research you will be able to critically evaluate it and draw your own conclusions about the research and to pass accurate information onto your family and work colleagues.

### *Learn time management and independent study skills*

In your honours year the major assessment task, your thesis, is not due for 10 months! As the thesis is worth 50% of your overall grade, a good thesis mark goes a long way to securing a good honours grade overall. Although the thesis is due in October, many critical tasks must be completed well before and often these tasks do not have formal deadlines to motivate you. Through your honours year you will learn the value of pre-planning, setting smaller 'deadlines' for yourself (your supervisor will help, but won't enforce deadlines) and being disciplined to set aside time to work on the important tasks, not just the urgent ones. Self-discipline to work independently is a skill highly sought after by all employers.

## WHAT ARE THE CAREER PATHWAYS AFTER HONOURS?

### *Entry into Research/Research Degrees*

Deakin University is interested in providing you with a fulfilling research experience in honours so that you will consider returning to complete a research masters or doctorate. These post-graduate research degrees allow you to further investigate in an area of interest to you and open up a range of career options; in academia, and as a leader in industry.

Students who complete honours also have the opportunity of undertaking research positions within the School or other universities. Such positions allow you to participate in research, including data collection and analysis, in paid employment without committing to a postgraduate research degree.

### *Careers*

There are a range of careers that you can follow after gaining research experience in an honours year. Aside from continuing to work in research as a research officer or assistant, you can gain employment in industry such as in physiology, nutrition, fitness, and in government posts. In sport, you can work in player and team management, sports administration and development, strength and conditioning, sports science, and in coaching. The honours degree allows you to gain some specialist knowledge in one of these areas and apply that knowledge.

**GREG CARSTAIRS**
Bachelor of Exercise and Sport Science (Honours) – graduated 2008

Human Performance Scientist, Australian Defence Force

*"I strongly believe that honours was the best thing I have done in my education and I wouldn't be where I am now without it"*

**REBECCA LEECH**

Bachelor of Food Science and Nutrition (Honours) – graduated 2010

Current role/position: PhD candidate (C-PAN); Australian Postgraduate Award (APA) Scholarship holder; casual research assistant (C-PAN)

*"Undertaking the honours program at Deakin was immensely satisfying. While the year was challenging, it provided me with a great opportunity to develop important skills that are highly relevant to many professions. For me, the Honours' program was invaluable in that it enabled me to make an original and important contribution to research and to develop ongoing professional relationships with my supervisors and other academic staff."*

**AARON D'ANTINO**
Bachelor of Exercise and Sport Science (Honours) – graduated 2013
Melbourne Victory Football Club Strength & Conditioning Coach

*"Completing an honours degree at Deakin University was perhaps the most challenging yet rewarding experience of my education to date. Constantly being challenged in a variety of areas within sports science and research has allowed me to develop skills that are fundamental and also vital within my chosen field of work."*

*I am now incredibly fortunate to be working at the biggest football club alongside the best football staff in the country, at Melbourne Victory FC, as head of Strength and Conditioning for the youth team whilst also assisting the Head of High Performance on a daily basis with the senior team. Developing skills in the areas of data analysis, critical literature reviews, thesis presentations and scientific writing have been priceless towards a smooth and successful transition from study into work at the elite level."*

**BRIANNA LARSEN**
Bachelor of Exercise and Sports Science (Honours) – graduated 2010
Current role/position: PhD Student

*"Undertaking/completing the honours program at Deakin was a huge challenge, but provided me with invaluable research experience. The support that I received from my supervisors and the school ultimately resulted in a truly rewarding experience. My honours year experience helped cement my goal to one day have a career in research.*

*My honours project investigated 'The effect of military body armour on performance, exertion, and thermal stress'. In this study, healthy males performed a circuit of simulated military work tasks while wearing various configurations of body armour. Work output, physiological and perceptual measures were taken to assess the degree to which body armour impaired participants. This honours project gave me my first insight into researching occupational work performance and physiology, which has now formed the basis of my PhD (which explores how firefighters' respond to working in the heat). "*

**JACQUELINE TRAN**
Course name: Bachelor of Exercise & Sports Science (Honours) – graduated 2008
Current role/position: Deakin & AIS PhD student

"*Completing the honours program at Deakin was eye-opening and challenging, and I am still learning lessons from what was a productive and rewarding experience. It was a unique opportunity to develop expertise in a specific topic area, and I acquired practical skills and work habits that continue to be useful in the work I do today.*

*I investigated the validity of an accelerometer for measuring impact events from team sport movements (e.g., running, jumping, landing, changes of direction). Wearable technology (e.g., GPS monitors integrated with accelerometers) are widely used in field team sports to monitor the physical loads experienced by athletes; this project explored whether these devices were accurate for use in this context. This project gave me the chance to work closely with various biomechanical measures, including motion capture, force plates, and wearable load monitoring devices (GPS monitors integrated with accelerometry). The project also opened up opportunities for further research, expanded my professional networks, and gave me the chance to present my work on an international stage at the International Society of Biomechanics in Sports conference (2010)."*

## WHAT TYPES OF HONOURS PROJECTS CAN I DO IN SENS?

### *Who supervises honours projects?*

Supervisors closely guide you through this first experience of research. They will assist you in planning your research, data collection and analysis and writing it in thesis format. In addition, they will offer you support in the planning and presentation of your oral assessments. All supervisors are experienced researchers who understand the rigours and requirements of your project and have knowledge of your topic area.

Exercise and sport science

Topic areas in exercise and sport science include: health and injury in work and sport; physical activity; obesity prevention; coaching practices; exercise physiology; women's health; behavioural aspects of sport; skill acquisition; motor control and motor learning; biomechanics and performance analysis; and strength and conditioning.

Food science and nutrition

Topic areas in food science and nutrition include: nutrition choices and eating patterns; salt, appetite control and blood pressure regulation; fatty acids, inflammation, cognition and blood pressure regulation; proteins, sport performance and muscle gain; nutrition and ageing; health effects of phytochemicals and minerals; nutrition and gut bacteria; food choice and perceptions; food policy and safety; and early childhood influences on eating.

### *How do I choose a topic?*

The School provides a list of projects for you to peruse and choose those that interest you. We then advise that you speak to supervisors of these projects to gauge your interest and then to nominate three projects on your preference sheet. We aim to provide you with one of your preferences.

### *Can I develop my own project?*

You are best to take a directed project in this first year of exposure to research, as it allows for the supervisor to direct the research in an area they know well. If you have a passion for something use that for a further degree; Honours is about basic research training.

*****Refer to the back of this handbook for next years' Honours projects*****

## WHAT HAPPENS IN THE HONOURS YEAR?

This intense year means that you should be able to commit 35 hours a week to your honours qualification. The honours degree is 50% course work and 50% research; both parts count towards your final mark and both are therefore important. The course work is directed towards giving you the necessary research skills to complete your research project, and provides you with research training. There is an emphasis both on writing and presenting your research. There are two units in trimester 1, Research Methods (unit code HBS400) and Developing Research Skills (HSE401). They have lectures and assignments to complete that incorporate aspects of your project. The research project is conducted in second trimester and this is where you complete your data collection, analyse the data and write a thesis (HSE402/HSN414). Aspects of these units are discussed below.

### *Course work*

Literature review and research proposal (HSE401)

You are asked to read and review the previously published research (i.e. the literature) in the area of your project, find aspects that have not been fully investigated and then propose your research that will answer a specific research question. This will provide you with a thorough understanding of your area of research, form the introduction to your thesis and allow you to understand how your research project fits within the current research literature. You will present your literature review and research proposal to your peers as an oral presentation.

Research methods (HBS400)

This unit examines the ethics of research, research design and statistics. Again it is directed towards your research and you can choose to take the quantitative, qualitative or lab-based stream. This unit is designed to help you develop the methods for your research project.

### *Research project*

Data collection and analysis

After you have planned your research and received ethics approval (if required), you are ready to collect your data.

Thesis (HSE402/HSN414)

The final step is to write your research in a thesis format. This 12 000 word document is set out in chapters and describes the existing research literature, your research methods, the results of your research and then discussion of your findings. You will then present your findings at the Faculty honours day at the end of the year.

## WHAT ARE THE ADMISSION REQUIREMENTS?

Students must have completed a Bachelor degree, have a mid-credit average (Weighted Average Mark (WAM) of 65) calculated in all the units taken in their degree and to have also completed a major in the discipline involved. Eligible students with degrees from other universities are welcome to complete their honours year at Deakin University.

## HOW DO I APPLY FOR HONOURS?

To apply for honours in the School of Exercise and Nutrition Sciences there are three steps:

### 1. Choose a project

You should carefully examine the list of honours research projects that the School is offering in 2015 (listed from page 20). For those projects in which you are interested, it is very important that you personally contact the named supervisor (contact details are provided with each project) to discuss the proposed project. This will allow you to determine whether the project meets your career goals and allows the supervisor to determine whether you have the appropriate academic background to complete the research project.

### 2. Complete the preference form

You must complete the preference form that appears at the back of this handbook and return it to Tin Partington in the School of Exercise and Nutrition Sciences (Building J3.07 or fax to 9244 6017) by **14 November 2014.**

### 3. Submit an online application

To apply for honours you will need to submit an online application at http://www.deakin.edu.au/future-students/applications-enrolments/applications/honours.php.
The closing date for timely applications is **28 November 2014.** When applying online you will be required to upload all supporting documents at the last step of the application process. If you are unable to upload your documents, certified hard-copies must be submitted by **5 December 2014.**
Note: Only students with degrees from institutions other than Deakin need to attach a copy of their academic transcripts.

## HOW ARE PROJECTS ALLOCATED?

Projects are allocated based on a combination of student project preferences, supervisor's student preferences and WAM. Students are advised that allocation to research projects is a competitive process and a student cannot be assured of being assigned to their choice of research project.

The list of available research projects reflects research being undertaken by Deakin staff and the availability of resources at the date of publication. It is the nature of research that projects acquire focus and direction over time and the final project therefore may not be exactly as described.

In rare cases, research staff and resources may become unavailable during the period when the project is being undertaken. If this occurs, the Faculty of Health will offer the student the best available alternative which will provide the opportunity to satisfy course requirements.

## WHEN DO I FIND OUT IF I HAVE BEEN ACCEPTED?

The closing date for timely applications is 14 November 2014. It is anticipated that successful candidates will be advised of their offer during December 2014.

Late applications will be considered depending on availability of appropriate supervisors, projects and places up until 28 November 2014.

## ADDITIONAL INFORMATION

### *Scholarships*

Continuing students may be eligible for a general Deakin Honours Scholarship if they have achieved outstanding academic results throughout their undergraduate studies. To be eligible you must be an Australian citizen, or holder of an Australian permanent humanitarian visa, and enrolled full time in an end-honours degree at Deakin. Students do not apply for these scholarships; rather they are selected by the Faculty based on your results in your undergraduate degree.

### *Timelines*

*February to October:* The year is short and intense, beginning with an orientation session in February and completing with your oral presentation of your research in October. In between, there is plenty to keep you busy.

## HOW DO I FIND OUT MORE ABOUT HONOURS FOR NEXT YEAR?

### *Website*

There is information on the Deakin University web site under the School of Exercise and Nutrition Sciences: http://www.deakin.edu.au/health/ens

### *Call for information*

The honours *supervisors* are happy to discuss any aspect of honours with you. Their contact details can be found under the relevant honours project at the end of this handbook.

You can also contact the Honours Directors on the contact details provided below:

Dr Glenn Wadley
(Honours Director)
Ph: (03) 9244 6018
Email: glenn.wadley@deakin.edu.au

Dr Karen Campbell
(Deputy Honours Director)
Ph: (03) 5227 8414
Email: karen.campbell@deakin.edu.au

## Bachelor of Exercise and Sport Science (Honours) (H442)

## Bachelor of Food Science and Nutrition (Honours) (H418)

### DEAKIN GRADUATE LEARNING OUTCOMES

#### Learning Outcomes

Deakin Graduate Learning Outcomes describe the knowledge and capabilities graduates have acquired and are able to apply and demonstrate at the completion of their course. They consist of outcomes specific to a particular discipline or profession as well as transferable generic outcomes that all graduates should have acquired irrespective of their discipline area. Learning outcomes are not confined to the knowledge and skills acquired within a course, but also incorporate those that students bring with them upon entry to the course consistent with the Australian Qualifications Framework pathways policy. Deakin's courses are designed to ensure that students develop systematic knowledge and understanding of their discipline or chosen profession appropriate to their level of study. Outcomes are specified at the course level, mapped to course components and are assessed. In professionally-accredited courses, discipline-specific learning outcomes may be defined in part by the relevant professional body.

### DEAKIN GRADUATE LEARNING OUTCOMES

1. **Discipline-specific knowledge and capabilities:** appropriate to the level of study related to a discipline or profession
2. **Communication:** using oral, written and interpersonal communication to inform, motivate and effect change
3. **Digital literacy:** using technologies to find, use and disseminate information
4. **Critical thinking:** evaluating information using critical and analytical thinking and judgment
5. **Problem solving:** creating solutions to authentic (real world and ill-defined) problems
6. **Self-management:** working and learning independently, and taking responsibility for personal actions

7. **Teamwork:** working and learning with others from different disciplines and backgrounds
8. **Global citizenship:** engaging ethically and productively in the professional context and with diverse communities and cultures in a global context

Deakin graduates will be able to evidence these capabilities as appropriate to the relevant level criteria of the Australian Qualifications Framework.

### The 'Deakin Difference'

Deakin's courses use a combination of cloud and located learning to provide accessible, media-rich, interactive educational experiences which integrate new-media literacy, experiential learning and interdisciplinary teamwork. Work-integrated learning and exposure to international perspectives prepare graduates for employment and life-long-learning in an ever-changing globalised world. These learning experiences and the development and evidencing of graduate learning outcomes create the 'Deakin Difference' — empowering learners for the jobs and skills of the future.

Deakin's professional coursework and research programs develop additional knowledge and capabilities which, depending on the level and professional context, may include leadership, management, independent research, entrepreneurship and personal resourcefulness.

* (Schedule A: Deakin Graduate Learning Outcomes); Approved by Academic Board 2013)

# INDEX OF HONOURS PROJECTS 2015

# EXERCISE AND SPORTS SCIENCE HONOURS PROJECTS 2015

## 1. DOES THE IPSILATERAL MOTOR CORTEX MODULATE THE CROSS-TRANSFER OF STRENGTH?

**Principal supervisor: Dr Dawson Kidgell**
**Contact details**: dawson.kidgell@deakin.edu.au
(03) 9251-7264

**Supervisor's profile:**

My research interests include using transcranial magnetic stimulation (TMS) to assess cortical plasticity following strength training in health and disease. I am particularly interested in the cross-transfer of strength and how it may be used in rehabilitation following immobilization from surgery or injury. I use electrophysiological and recording and analysis techniques to address these issues, which include transcranial magnetic stimulation, transcranial direct current stimulation, spinal cord reflex testing, surface electromyography and single motor unit recordings.

**Co-supervisors**

Dr Glyn Howatson

Professor Jonathan Farthing

**Project is based at:** Burwood

**Project description:**

It is well established that strength training of a single limb produces performance gains not only in the trained limb, but also in the untrained contralateral limb. This phenomenon, termed cross-education, has been observed in a range of muscle groups following various types of motor training, including heavy load strength training and ballistic motor tasks. Due to a lack of hypertrophy, along with reports of increased corticospinal excitability and voluntary activation accompanying strength gain in the untrained limb, cross-education is believed to occur as a result of neural adaptations. Two theoretical models have been presented that may modulate the cross-transfer of strength; the 'cross-activation' hypothesis, characterised by the presence of neural activity in both the contralateral M1 (cM1) and the ipsilateral M1 (iM1) during effortful unilateral movement, and the 'bilateral access' hypothesis, characterised by the development of motor engrams accessible by both the cM1 and iM1. One method to determine the role of the iM1 in mediating the cross-transfer effect would be to either up-regulate or down-regulate neuronal activity via the application of transcranial direct current stimulation. Stimulation protocols typically involve 1-2 mA of electrical current applied to the scalp via saline soaked electrodes for periods of 2-20 minutes. Anodal tDCS (a-tDCS) is believed to increase the resting membrane potential of the underlying cortical tissue, which increases the likelihood of depolarisation. Immediate increases in MEP amplitude have frequently been reported following a-tDCS in a range of muscle groups and current densities. Therefore the purpose of this study is to examine the effect of either cathodal or anodal tDCS over the iM1 in modulating the cross-transfer of strength. A secondary aim is to investigate the role of the brain derived neurotrophic factor polymorphism to characterise the nature of the induction of neural plasticity and the cross-transfer of strength.

**Methodological approach:**

1. Maximal strength testing of the upper limbs.
2. 3 weeks of heavy-load strength training timed to a metronome.
3. Motor cortical measures throughout training intervention, including, electromyography, brain stimulation and spinal cord reflex testing.

**Necessary skills/knowledge:**

Students should have a basic understanding of neurophysiology, functional anatomy and biomechanics. Word processing skills and data entry (use of excel and Prism) is desirable.

# 2. PROJECT TITLE: EFFECTS OF HIGH-DEFINITION TRANSCRANIAL DIRECT CURRENT STIMULATION ON CORTICAL EXCITABILITY AND INHIBITION OF THE CONTRALATERAL PRIMARY MOTOR CORTEX

**Principal supervisor: Dr Dawson Kidgell**
**Contact details:** dawson.kidgell@deakin.edu.au
(03) 9251 7264

**Supervisor's profile:**
My research interests include using transcranial magnetic stimulation (TMS) to assess cortical plasticity following strength training in health and disease. I am particularly interested in the cross-transfer of strength and how it may be used in rehabilitation following immobilization from surgery or injury. I use electrophysiological and recording and analysis techniques to address these issues, which include transcranial magnetic stimulation, transcranial direct current stimulation, spinal cord reflex testing, surface electromyography and single motor unit recordings.

**Co-supervisor**
Dr Wei-Peng Teo

**Project is based at:**
Burwood

**Project description:**
Transcranial direct current stimulation (tDCS) is a non-invasive brain stimulation technique that can transiently excite or suppress neuronal activity following a period of stimulation. Depending on the polarity of electrodes used, application of anodal (positive) tDCS can increase neuronal excitability while cathodal (negative) tDCS elicits an inhibitory effect. In this study, we aim to determine the effects of a newly developed direct current stimulator with current methods of tDCS. A recent study (Kuo et al., 2013) showed that the novel 'high-definition (HD)' tDCS induces a significantly greater and longer-lasting increase in neuronal excitability compared to conventional forms of tDCS after 10mins of stimulation. However, it is not known what haemodynamic effects of HD anodal tDCS have on the contralateral, unstimulated hemisphere. Therefore the aim of the proposed project is to characterise changes in neuronal excitability and inhibition using transcranial magnetic stimulation before, during and after conventional and HD tDCS in the contralateral primary motor cortex (M1). ***Should you partake in this project, you will learn different forms of brain stimulation techniques to measure brain activity and function, and more importantly, how it relates to motor control and skill acquisition.*** This project will be supervisored by Dr Wei-Peng Teo who specialises in various forms of non-invasive brain stimulation techniques, particularly in patients with neurological deficits (i.e. Stroke, Parkinson's and Alzheimer's disease). Dr Wei-Peng Teo is under the mentorship of Dr Dawson Kidgell, who for the purpose of this project, will be the principal supervisor.

**Methodological approach:**
Between 15-20 healthy participants will be recruited to participate in a randomised, sham-controlled crossover study. All participants will receive conventional, HD anodal and sham tDCS to the right M1, in a randomised order across 3 testing sessions, each separated by a 48hrs washout period. Conventional tDCS will be administered with a current intensity of 2mA for 20min by a constant current stimulator using a pair of saline-soaked surface sponge electrodes. The positive electrode (anode) will be placed over the right M1 representational area of the extensor carpi radialis (ECR) muscle, and the negative electrode (cathode) will be placed above the left supraorbital area. HD tDCS will be administered using the same duration and stimulus intensity parameters as conventional tDCS, with the exception of the electrode placements. HD tDCS

utilises a 4×1 electrode placement system whereby the central anode is placed above the representational area of the left ECR and surrounded by four cathodes 3.5 cm from the central anode. Neuronal excitability and inhibition of the contralateral left M1 will be measured by TMS immediately before, during (5th, 10th, 15th and 20th min) and after (post 10th and 20th min) tDCS to the contralateral right M1.

**Necessary skills/knowledge:**
Students should have a basic understanding of neurophysiology, functional anatomy and biomechanics. Word processing skills and data entry (use of excel and Prism) is desirable.

# 3. PROJECT TITLE: HAEMODYNAMIC RESPONSES OF HIGH-DEFINITION TRANSCRANIAL DIRECT CURRENT STIMULATION ON THE CONTRALATERAL PRIMARY MOTOR CORTEX

**Principal supervisor: Dr Dawson Kidgell**
**Contact details:** dawson.kidgell@deakin.edu.au
(03) 9251 7264

**Supervisor's profile:**
My research interests include using transcranial magnetic stimulation (TMS) to assess cortical plasticity following strength training in health and disease. I am particularly interested in the cross-transfer of strength and how it may be used in rehabilitation following immobilization from surgery or injury. I use electrophysiological and recording and analysis techniques to address these issues, which include transcranial magnetic stimulation, transcranial direct current stimulation, spinal cord reflex testing, surface electromyography and single motor unit recordings.

**Co-supervisors**
Dr Wei-Peng Teo
Dr Mark Muthalib

**Project is based at:**
Burwood

**Project description:**
Transcranial direct current stimulation (tDCS) is a non-invasive brain stimulation technique that can transiently excite or suppress neuronal activity following a period of stimulation. Depending on the polarity of electrodes used, application of anodal (positive) tDCS can increase neuronal excitability while cathodal (negative) tDCS elicits an inhibitory effect. In this study, we aim to determine the effects of a newly developed direct current stimulator with current methods of tDCS. A recent study (Kuo et al., 2013) showed that the novel 'high-definition (HD)' tDCS induces a significantly greater and longer-lasting increase in neuronal excitability compared to conventional forms of tDCS after 10mins of stimulation. However, it remains to be seen if HD or conventional forms of tDCS may elicit haemodynamic changes to the contralateral unstimulated hemisphere. Therefore the aim of the proposed project is to characterise the haemodynamic responses before, during and after conventional and HD anodal tDCS in the contralateral unstimulated primary motor cortex (M1) using near-infrared spectroscopy (NIRS). NIRS is a new neuroimaging technique that has gained significant popularity due to its portability and cost-effectiveness, and can measure cortical activation in different environmental setting. ***Should you partake in this project, you will learn a range of brain stimulation and neuroimaging techniques to measure brain activity and function.*** This project will be supervised by Dr Wei-Peng Teo who specialises in various forms of non-invasive brain stimulation techniques, particularly in patients with neurological deficits (i.e. Stroke, Parkinson's and Alzheimer's disease). Dr Wei-Peng Teo is under the mentorship of Dr Dawson Kidgell, who for the purpose of this project, will be the principal supervisor.

**Methodological approach:**
Between 15-20 healthy participants will be recruited to participate in a randomised, sham-controlled crossover study. All participants will receive conventional, HD anodal and sham tDCS to the right M1, in a randomised order across 3 testing sessions, each separated by a 48hrs washout period. Conventional tDCS will be administered with a current intensity of 2mA for 20min by a constant current stimulator using a pair of saline-soaked surface sponge electrodes. The positive electrode (anode) will be placed over the right M1 representational area of the extensor carpi

radialis (ECR) muscle, and the negative electrode (cathode) will be placed above the left supraorbital area. HD tDCS will be administered using the same duration and stimulus intensity parameters as conventional tDCS, with the exception of the electrode placements. HD tDCS utilises a 4×1 electrode placement system whereby the central anode is placed above the representational area of the left ECR and surrounded by four cathodes 3.5 cm from the central anode. Cortical activation of the contralateral left M1 will be measured by NIRS immediately before, during and after (up to 20 mins post) tDCS to the contralateral right M1.

**Necessary skills/knowledge:**
Students should have a basic understanding of neurophysiology, functional anatomy and biomechanics. Word processing skills and data entry (use of excel and Prism) is desirable.

# 4. PROJECT TITLE: THE OUTCOMES OF SHOULDER STABILISATION PROCEDURES ON PLAYER PERFORMANCE IN AUSTRALIAN RULES FOOTBALL

**Principal supervisor: Dr Jason Bonacci**
**Contact details:** Jason.bonacci@deakin.edu.au
(03) 5227 2634

**Supervisor's profile:**
Dr Jason Bonacci is a lecturer in Anatomy and Biomechanics in the School of Exercise and Nutrition Sciences. Dr Bonacci is a practicing physiotherapist and active researcher in the area of musculoskeletal mechanics. He has a particular interest in understanding the mechanisms of musculoskeletal injury and the evidence underpinning the management of such injuries.

**Co-supervisor**
Professor Richard Page (Orthopaedic Surgeon)

**Project is based at:** Geelong

**Project description:**
Shoulder injuries in elite Australian Rules Football players are frequent and commonly result in surgical management. Both open and athroscopic surgical techniques are used to treat shoulder instability. The outcome of these techniques on return to sport and player performance is largely unknown in Australian Rules Football. This project will seek to understand how the surgical approach and time to return to sport influence player performance.

**Methodological approach:**
All AFL clubs will be approached to identify players that have undergone a shoulder stabilisation procedure in the previous five years. Details of date of injury, injury mechanism and record of treatment will be collected. This information will be combined with player statistics both prior and subsequent to treatment to determine the influence of shoulder stabilisation on player performance.

**Necessary skills/knowledge:**
It is preferred that the candidate has a strong desire to progress research in the field of rehabilitation and injury management.

# 5. PROJECT TITLE: GAIT KINEMATICS IN INDIVIDUALS WITH PATELLOFEMORAL PAIN SYNDROME

**Principal supervisor: Dr Jason Bonacci**
**Contact details:** Jason.bonacci@deakin.edu.au
(03) 5227 2634

**Supervisor's profile:**
Dr Jason Bonacci is a lecturer in Anatomy and Biomechanics in the School of Exercise and Nutrition Sciences. Dr Bonacci is a practicing physiotherapist and active researcher in the area of musculoskeletal mechanics. He has a particular interest in understanding the mechanisms of musculoskeletal injury and the evidence underpinning the management of such injuries.

**Co-supervisor**
Associate Professor Reed Ferber
Dr Natalie Collins

**Project is based at:** Geelong

**Project description:**
PFPS syndrome (PFPS) is the most common musculoskeletal condition that presents to a Sports Medicine Clinic. The aetiology of PFPS syndrome is considered to be multifactorial, however abnormal gait characteristics are thought to contribute to pain development. PFPS syndrome can present acutely or persist as a chronic condition. The factors that contribute to chronicity are not well understood. It is possible that individuals with chronic PFPS exhibit different gait kinematics to those with acure PFPS. The aim of this research to identify if the gait kinematics of individuals with acute PFPS differ to those with chronic PFPS. This information is required to develop and optimise treatment and prevention strategies for PFPS.

**Methodological approach:**
Lower limb gait kinematics with be compared between individuals with acute PFPS and those with chronic PFPS. An existing database of 100 individuals presenting with either acute or chronic PFPS will be accessed to compare the gait kinematics. Where differences exist correlation analysis will be performed to identify if pain duration is related to specific gait kinematics.

**Necessary skills/knowledge:**
Advanced Biomechanics skills. It is preferred that the candidate has a strong desire to progress research in the field of rehabilitation and injury management.

# 6. PROJECT TITLE: THE ROLE OF ARTICULATED FOOT ORTHOSES IN THE MANAGEMENT OF NEUROLOGICAL GAIT IMPAIRMENTS.

**Principal supervisor: Dr Jason Bonacci**
**Contact details:** Jason.bonacci@deakin.edu.au
(03) 5227 2634

**Supervisor's profile:**
Dr Jason Bonacci is a lecturer in Anatomy and Biomechanics in the School of Exercise and Nutrition Sciences. Dr Bonacci is a practicing physiotherapist and active researcher in the area of musculoskeletal mechanics. He has a particular interest in understanding the mechanisms of musculoskeletal injury and the evidence underpinning the management of such injuries.

**Co-supervisors**
Anna Murphy
Corey Joseph

**Project is based at:** Geelong but co-hosted by Monash Health, Cheltenham

**Project description:**
The use of articulated foot orthoses (AFO) to control the ankle and knee joints is common in children with lower limb spasticity. This project aims to quantify and compare the gait kinematics and kinetics of children with neurological and developmental conditions with two different orthoses; a conventional AFO such as an articulated AFO or ground reaction force AFO and the adjustable dynamic response (ADR) ankle joint AFO. ADR AFOs eliminate limitations associated with conventional orthoses by customising the AFO to within the child's available range and allows for the ability to fine tune stance phase rockers. This prospective study will recruit 15 participants from the Victorian Paediatric Rehabilitation Service (VPRS) at Monash Health and OAPL. Patients will be assessed by the Clinical Gait Analysis Service (CGAS) on one occasion with the two different types of AFOs. Gait analysis provides a qualitative means to ascertain the benefits/outcomes of an intervention by identifying the probable cause of gait dysfunction.

**Methodological approach:**
This prospective observational study of gait dysfunction in children with neurological and developmental conditions will recruit participants that meet the inclusion criteria through VPRS and OAPL. They will attend the CGAS as part of normal clinical care on one occasion following the fitting of a new ADR AFO. They will be assessed with their usual AFO and the new ADR AFO. The gait analysis involves collecting clinical measurements of lower limb joint range or motion, muscle strength, muscle tone (using modified ashworth scale) and muscle spasticity (using the Tardieu scale). Demographic details include progression of illness, complete medical history and details of previous management and interventions relating to gait characteristics. A lower-body set of 18 reflective markers are placed on the skin of participants at specific locations. All participants will walk along a 10m walkway for each condition at their preferred speed as eight infrared cameras track the position of the markers in space. Force plate data for five walking trials for the right and left legs will be collected for each condition. Advanced modelling software is used to calculate kinematics (angles) and kinetics (moments and powers). Spatiotemporal measures, such as walking speed and step length, are also calculated.

**Necessary skills/knowledge:**
Advanced Biomechanics skills

# 7. PROJECT TITLE: EFFECT OF SODIUM CITRATE INGESTION PROTOCOL ON INDUCED ALKALOSIS, GASTROINTESTINAL SYMPTOMS, AND THE IMPLICATIONS FOR HIGH-INTENSITY EXERCISE PERFORMANCE

**Principal supervisor: Dr Dan Dwyer**
**Contact details:** dan.dwyer@deakin.edu.au
(03) 5227 3476
Building dd 2.112 Geelong – Waurn Ponds Campus

**Supervisor's profile:**
Dan's research interests centre on the adaptation of existing technology and exploiting emerging technology, to evaluate aspects of sports performance that provide new information that can be used to enhance performance. Dan has used this approach in a variety of ways with sports such as soccer, cycling and rowing. His primary interest is in cycling - monitoring load and modelling performance, and evaluating pedaling technique.

**Co-supervisor/s**
Dr Amelia Carr

**Co-supervisor's Profile:**
Amelia is a lecturer within the School of Exercise and Nutrition Sciences. Her PhD and previous work have focused on the applications of sport and exercise physiology, for athletes and Australian Defence Force personnel. Her primary research focus is in applied sports physiology, and the effects of nutritional ergogenic aids on high-intensity exercise, as well as the implications for sports performance.

**Project is based at:** Burwood

**Project description:**
Sodium citrate is a nutritional ergogenic aid that can increase blood alkalosis, and enhance performance in high-intensity exercise and events of 1-7 minutes' duration, such as 2000 m rowing, or middle-distance running events. A potential advantage of sodium citrate ingestion is that in comparison to similar nutritional ergogenic aids (e.g., sodium bicarbonate) there can be a reduction in gastrointestinal side effects, which can have detrimental effects on sports performance. Some studies have reported a performance enhancement after sodium citrate ingestion, however others have reported a lack of performance benefit. The negligible performance benefit reported may be due to an inappropriate ingestion protocol, a consideration that has received little attention in the research literature for sodium citrate supplementation. Examining the time course of induced alkalosis and corresponding gastrointestinal side effects after sodium citrate ingestion, could present a suitable sodium citrate ingestion protocol for use by athletes to enhance their performance in short-duration, high-intensity events.

**Methodological approach:**
The time course of responses to sodium citrate ingestion in participants will be quantified using capillary blood sampling to determine induced alkalosis (blood bicarbonate concentration and pH). Gastrointestinal symptoms at corresponding time points will also be analysed using a previously published questionnaire.

**Necessary skills/knowledge:**
Students will need a good understanding of exercise physiology. They should also have a keen interest in applied sport science. Please note that this project will run from the Burwood campus.

# 8. PROJECT TITLE: THE PHYSIOLOGY OF BLOOD FLOW RESTRICTION EXERCISE #1

**Principal supervisor: Dr Stuart Warmington**
**Contact details:** stuart.warmington@deakin.edu.au

**Supervisor's profile:**
My research focus is to better understand and apply exercise to benefit muscle health. The principal direction in this respect is to understand the mechanisms governing a blood flow restriction exercise (BFRE) as a model, and to develop this exercise method to improve muscle health and functional outcomes in populations where loss of muscle is highly prevalent. To this effect my research group has been working on a variety of projects from acute assessments of haemodynamic stress in both young and older adults as well as training studies to identify the effects of BFRE on muscle growth, strength and fatigue.

**Co-supervisor**
Timo Rantalainen

**Project is based at:** Burwood

**Project description:**
It's been shown that when low-load resistance exercise is performed under blood flow restriction (BFR), that the gains in muscle size and strength are similar to the gains achieved with high-resistance strength straining. This novel outcome is in contrast to the fact that the greatest gains in such indicators of muscle health are most commonly thought to be achieved only with high-resistance strength training. Given BFR exercise utilises only low-resistance, it may provide a substantial benefit to clinical groups where strength training proves beneficial, but where high-resistance strength training is not recommended due to the implied clinical risk.
However, BFR exercise, or KAATSU, has been little used outside Japan, and this project will build on current work in our lab that is proving BFR to be a revolution in training athletes, special populations and the community.
Therefore, this project will aim to examine the physiological responses to BFR training (possibly with a clinical focus), always with a view to more widespread prescription of this type of training in the community.

**Methodological approach:**
This project will involve recruitment and testing of healthy volunteers, and possibly clinical participants, to examine the physiological responses to BFR exercise or training. This will be done by examining controlled exercise under a variety of BFR conditions. Factors that may be assessed include metabolic and cardiac responses, oxygen consumption, HR, blood pressure, blood lactate and respiratory parameters, and importantly muscle strength and hypertrophy.

**Necessary skills/knowledge:**
This project would suit students interested in exercise physiology, clinical exercise, exercise performance assessment and strength and conditioning. The student should be enthusiastic towards exercise prescription and monitoring, as well as exercise as a clinical treatment. Testing procedures and data collection will utilise non-invasive techniques such as an advance metabolic cart to assess oxygen consumption and cardiac parameters, as well as blood pressure and typical risk factors associated with exercise.

# 9. PROJECT TITLE: THE PHYSIOLOGY OF BLOOD FLOW RESTRICTION EXERCISE #2

**Principal supervisor: Dr Stuart Warmington**
**Contact details:** stuart.warmington@deakin.edu.au

**Supervisor's profile:**
My research focus is to better understand and apply exercise to benefit muscle health. The principal direction in this respect is to understand the mechanisms governing a blood flow restriction exercise (BFRE) as a model, and to develop this exercise method to improve muscle health and functional outcomes in populations where loss of muscle is highly prevalent. To this effect my research group has been working on a variety of projects from acute assessments of haemodynamic stress in both young and older adults as well as training studies to identify the effects of BFRE on muscle growth, strength and fatigue.

**Co-supervisor**
Timo Rantalainen

**Project is based at:** Burwood

**Project description:**
It's been shown that when low-load resistance exercise is performed under blood flow restriction (BFR), that the gains in muscle size and strength are similar to the gains achieved with high-resistance strength straining. This novel outcome is in contrast to the fact that the greatest gains in such indicators of muscle health are most commonly thought to be achieved only with high-resistance strength training. Given BFR exercise utilises only low-resistance, it may provide a substantial benefit to clinical groups where strength training proves beneficial, but where high-resistance strength training is not recommended due to the implied clinical risk.
However, BFR exercise, or KAATSU, has been little used outside Japan, and this project will build on current work in our lab that is proving BFR to be a revolution in training athletes, special populations and the community.
Therefore, this project will aim to examine the physiological responses to BFR training (possibly with a clinical focus), always with a view to more widespread prescription of this type of training in the community.

**Methodological approach:**
This project will involve recruitment and testing of healthy volunteers, and possibly clinical participants, to examine the physiological responses to BFR exercise or training. This will be done by examining controlled exercise under a variety of BFR conditions. Factors that may be assessed include metabolic and cardiac responses, oxygen consumption, HR, blood pressure, blood lactate and respiratory parameters, and importantly muscle strength and hypertrophy.

**Necessary skills/knowledge:**
This project would suit students interested in exercise physiology, clinical exercise, exercise performance assessment and strength and conditioning. The student should be enthusiastic towards exercise prescription and monitoring, as well as exercise as a clinical treatment. Testing procedures and data collection will utilise non-invasive techniques such as an advance metabolic cart to assess oxygen consumption and cardiac parameters, as well as blood pressure and typical risk factors associated with exercise.

# 10. PROJECT TITLE: UNDERAGE SUPPLY OF ALCOHOL IN COMMUNITY SPORTS CLUBS.

**Principal supervisor: Dr Peter Kremer**
**Contact details:** peter.kremer@deakin.edu.au
(03) 52273396

**Supervisor's profile:**
I am a senior lecturer in sport behavior and motor learning with the School of Exercise and Nutrition Sciences based at the Waurn Ponds Campus. I have extensive research experience, broad knowledge and skills in academic and applied sport and exercise psychology and expert knowledge of both quantitative and qualitative research methods.

**Co-supervisor**
Dr Sam Robertson

**Project is based at:** Either at Waurn Ponds or Burwood

**Project description:** Alcohol consumption by adolescents is a serious problem in Australia, with a national prevalence study finding that 51% of secondary students aged 12-17 years old have consumed alcohol in the past year. This early initiation of alcohol consumption occurs despite the minimum legal purchase age being 18 years of age in Australia, suggesting that policies and practices around access and supply of alcohol to underage consumers need to be strengthened. The National Health and Medical Research Council (NHMRC) recommends that not drinking alcohol before the age of 18 years is the safest option. Early initiation of alcohol consumption has been shown to be linked with dependency later life as well as poor developmental outcomes. A significant number of Australians are involved in local sporting clubs, either as participants or spectators, and there is a growing body of evidence suggesting that this is a key environment in which the misuse of alcohol takes place. A recent report shows that nearly 70% of sporting clubs receive sponsorship from alcohol related sources and that for 60% of those clubs the benefit received is through cash payments of >$1000. Clubs reciprocate this sponsorship primarily through visual signage around the club and on the club website. It is suggested that the relationship between alcohol sponsorship and sporting clubs has created an environment that fosters the misuse of alcohol amongst members. Liquor licencing and Responsible Service of Alcohol (RSA) laws are an important environmental structure in sporting clubs that influence alcohol related behaviours. However studies have shown that both training and adherence to RSA laws are often lacklustre in sporting clubs. There is evidence that it is common for youth below the legal age of 18 to be supplied with alcohol in sporting clubs. Therefore community sporting clubs present an important avenue in which to reduce the supply of alcohol to underage youth.

**Methodological approach:**
This study will be conducted using a cross-sectional study design whereby alcohol sales monitoring will be conducted in community sporting clubs. Monitoring will be conducted using a randomised selection of (n=30) sporting clubs from across the Geelong, Colac and Ballarat regions (n.b.for Melbourne-based students it should be possible to adjust the survey region to a metropolitan area). Clubs will cover a range of sports but principally be larger sporting club environments having alcohol supply facilities (bar) – these will primarily include cricket clubs, Australian Rules football clubs, soccer clubs and rugby clubs as well as broader sporting clubs (i.e. clubs where multiple sports exist). Alcohol sale monitoring will be conducted using purchase surveys to investigate how easy it is for people under 18 years of age to purchase alcohol in local sporting clubs without the required age identification. This method is based on previously used procedures for alcohol sale monitoring in retail outlets. The alcohol purchase survey involves

sending a pseudo-underage purchaser (a young person) into a sporting club to attempt to purchase alcohol.

**Necessary skills/knowledge:**
No necessary skills/knowledge is required for this project. An interest in working within a sporting club context and around issues, particularly alcohol consumption, confronting young people would be beneficial.

# 11. PROJECT TITLE: CONTENT ANALYSIS OF SPORTING CLUB WEBSITES: THE PRESENCE AND PROMINENCE OF ALCOHOL-RELATED MEDIA.

**Principal supervisor: Dr Peter Kremer**
**Contact details:** peter.kremer@deakin.edu.au
(03) 52273396

**Supervisor's profile:**
I am a senior lecturer in sport behavior and motor learning with the School of Exercise and Nutrition Sciences based at the Waurn Ponds Campus. I have extensive research experience, broad knowledge and skills in academic and applied sport and exercise psychology and expert knowledge of both quantitative and qualitative research methods.

**Co-supervisor**
Dr Andrew Dawson

**Project is based at:** Either at Waurn Ponds or Burwood

**Project description:** Research suggests that within local and community sporting clubs there is often discord between the public face of the club and the actual behaviours occurring in the club with relation to alcohol use. Club websites and social media are often the primary vehicle for clubs to communicate to their member as well as to the general public and potential new members. The messages contained in club policies and statements portray a certain image of the club. However there is often a disconnect between these messages and other media on club websites as well as behaviours exhibited in the clubs themselves. Many clubs have mission statement espousing 'family friendly' and 'healthy' environments and have policies around the service and consumption of alcohol. However adherence to and knowledge of these policies is often lacking, and websites often contain media for alcohol related sponsors as well as images of club members consuming alcohol. While there are some regulations around the marketing of alcohol via traditional mass media, such as print and television advertising, online marketing and particularly the use of social media marketing at this point in time is unregulated. This means that the content displayed on club websites and club social media may be subjecting young club members to alcohol advertising and instilled alcohol-related club norms. Research has shown that alcohol advertising has particular effects on impressionable young people including the age they initiate their first consumption of alcohol as well as brand association and preference. Therefore analysis of club website content will build a greater understanding of the complex relationship between sporting clubs and alcohol and particularly the effect this has on young members' attitude and practices around alcohol.

**Methodological approach:**
Content analysis will be conducted on a random sample of ~60 sporting club websites from across the state of Victoria with particular focus on cricket, Australian Rules football, soccer and larger multi-sports clubs as well as a selection non-team based clubs (e.g.; Athletics/Cycling clubs) for comparison. Screen captures of relevant website pages will be saved to preserve content for analysis given the changeable nature of online content. This will included Homepage, Mission Statement/Presidents Message, Juniors page as well as photos contained on the site as well as the presence of links to or news feeds for social media sites such as Facebook and Twitter. Screen captures will be analysed using a content analysis protocol and a coding checklist to determine the presence or prominence to media relating to alcohol and alcohol consumption.

**Necessary skills/knowledge:**
No necessary skills/knowledge is required for this project. An interest in working within a sporting club context and around issues, particularly alcohol consumption, confronting young people would be beneficial.

# 12. PROJECT TITLE: THE HEALTH BELIEFS AND BEHAVIOURS OF AUSTRALIAN COMMUNITY SPORT COACHES

**Principal supervisor: Dr Andrew Dawson**
**Contact details**: andrew.dawson@deakin.edu.au
(03) 92517309

**Supervisor's profile:**
Dr Andrew Dawson is a Lecturer in the area of Exercise and Sport Science in the School of Exercise and Nutrition Sciences. He teaches Sport and Exercise Psychology and Sport Coaching. Andrew's research is primarily concerned with the coaches' role as health promoters across the sport participation spectrum. Andrew sport coaching research has informed sport policy and management regarding the professional, social and economic aspects of coach development.

**Co-supervisor**
Dr Peter Kremer

**Project is based at:** Either at Waurn Ponds or Burwood

**Project description:**
Community sport coaches are considered to be the backbone of Australia's sporting success (Australian Sports Commission, 2014) and their contribution to the development of Australian society through encouraging values such as "fair play" and "teamwork" have long been recognised (Bloomfield, 2004). There is, however, little understanding of the role community sport coaches play in the promotion of healthy behaviours of children and adolescents. This research project will provide the foundation for the development of a large scale population study on coach's attitudes and practices when promoting healthy behaviour in their community sport environments.

**Methodological approach:**
Conduct an in-depth survey of community sport coaches' health beliefs and behaviours using qualitative research methodologies such as coach interviews and focus groups.

# 13. PROJECT TITLE: THE EFFECT OF VARYING TRAINING LOAD ON THE RECOVERY STATUS OF AFL PLAYERS AT THE GEELONG FOOTBALL CLUB.

**Principal supervisor: Dr Dan Dwyer**
**Contact details:** dan.dwyer@deakin.edu.au
**(03) 5227 3476**

**Supervisor's profile:**
Dan's research interests centre on the adaptation of existing technology and exploiting emerging technology, to evaluate aspects of sports performance that provide new information that can be used to enhance performance. Dan has used this approach in a variety of ways with sports such as soccer, cycling and rowing. His primary interest is in cycling - monitoring load and modelling performance, and evaluating pedalling technique.
Dan also collaborates with a group of researchers who use machine learning to interrogate databases of sports results to reveal winning patterns of performance and to provide support when making strategic and tactical decisions.

**Co-supervisors:**
Dr Stuart Warmington, Mr Kris Hink (GFC), Mr Chris Spinks (GFC)

**Project is based at**: This project is based at the Geelong Waurn Ponds campus. Burwood based students are eligible to apply.

**Project description:**
Background
The training completed by AFL players is often high volume and incomplete recovery from this training can impair subsequent training and or match performance. Some of the methods that have been used to measure the recovery status of an athlete include those based on an analysis of heart rate at rest and during exercise. A simple heart rate based measure of recovery could be conveniently used to monitor apparent recovery status and influence decisions about the modification of training load. However, it is not known how modification of training load affects the recovery status in AFL players.

**Aims**
The present study seeks to

- Determine how the modification of training load affects the recovery status of AFL players
- Determine how recovery status changes across a season
- Determine the time course of change in recovery status between the end of a game and subsequent training sessions

**Methodological approach:**
Implement a heart rate based, recovery monitoring regime at the Geelong Football Club in the 2015 season
Analyse player load data
Modify the training load of player cohorts

**Necessary skills/knowledge:**
Preparedness to regularly attend training sessions at the Geelong Football Club during the period of data collection. Possess an interest in this topic and or sport and have a willingness to use software to analyse data.

# 14. PROJECT TITLE: PLAYER LOAD ASSOCIATIONS WITH TYPICAL MOVEMENTS IN ELITE NETBALL.

**Principal supervisor: Dr Dan Dwyer**
**Contact details:** dan.dwyer@deakin.edu.au
**(03) 5227 3476**

**Supervisor's profile:**
Dan's research interests centre on the adaptation of existing technology and exploiting emerging technology, to evaluate aspects of sports performance that provide new information that can be used to enhance performance. Dan has used this approach in a variety of ways with sports such as soccer, cycling and rowing. His primary interest is in cycling - monitoring load and modelling performance, and evaluating pedalling technique.
Dan also collaborates with a group of researchers who use machine learning to interrogate databases of sports results to reveal winning patterns of performance and to provide support when making strategic and tactical decisions.

**Co-supervisor:**
Associate Professor Paul Gastin

**Project is based at:** This project is based at the Geelong Waurn Ponds campus and would involve some meetings at the Victorian Institute of Sport. Burwood based students are eligible to apply.

**Project description:**
We have recently collected accelerometry data from all players in the Vixens netball team for an entire season. The data has been used to quantify player load and provide practically useful information about changes in load across a season, between playing positions and between matches and training sessions. We have discovered that although players in some positions do very little or no running, their load is almost as high as player in positions where there is more running. The present study proposes to identify the load associated with most of the typical movements performed by netballers in order to better understand the movement demands of each playing position. This information is of practical use for preparing athletes for competition and for better management of player load and recovery.

**Aims**
The present study seeks to

- Identify the player load associated with the most common movements in netball
- Determine how much of player load is due to vertical vs. horizontal movements

**Methodological approach:**

1. Analysis of an existing data set of accelerometry from Vixens players in the 2014 season
2. Analysis of video of matches form the 2014 season
3. Categorisation of common movements and calculation of the associated player load

**Necessary skills/knowledge:**

Nothing specific other than an interest in the topic and or sport and a willingness to use software to analyse data.

# 15. PROJECT TITLE: ATHLETE DEVELOPMENT IN SCHOOLS: TOWARDS AN UNDERSTANDING OF TIME COMMITMENTS, PHYSICAL LOADS AND OUTCOMES.

**Principal supervisor: Associate Professor Paul Gastin**
**Contact details:** paul.gastin@deakin.edu.au
(03) 9244 6334

**Supervisor's profile:**
Paul Gastin is a member of the Centre for Exercise and Sport Science Course and previous Course Director for the Bachelor of Exercise and Sport Science. Research interests relate to athlete performance management and training science, including athlete development, assessment of workload, monitoring of adaptation and recovery, and application of technology in the coaching process.

**Co-supervisor:**
Dr Sam Robertson

**Project is based at:** Burwood

**Project description:**
Sound long term athlete development principals are not well understood or adhered to in adolescent sport and within talent pathway programs. Adolescent athletes are particularly vulnerable to inappropriate physical loads (via excess excess/improper training and competition) and poor performance management that might predispose individuals to overtraining, injury, dropout and poor progression. Furthermore, differences in biological maturity are known to advantage some and disadvantage others. An increased national and international focus on sporting success has seen a proliferation of talent pathway programs within individual sports (at club, region and national levels), sports institutes and academies, and schools. Little is known about the management practices employed in these environments or the physical loads and pressures these adolescent athletes are exposed to. Outcomes related to sporting performance and progression, academic performance, health and wellbeing are also not well known, particularly in the vast majority of athletes that do not achieve their sporting ambitions.

This project is part of a broader, long-term research program focusing on adolescent athlete management in Australia and overseas. To this end, it is relevant to both community and elite sport, and will be used to guide policy and practice in schools and clubs, institutes and academies, and national sporting organisations.

**Aims**
The aim of this project is to investigate the physical loads (type, time, intensity) and time commitments (sport, education, other) of adolescent athletes.

**Research questions:**
Do differences exist between adolescent athletes and non-athletes, and those who are active and not/less active, in the time allocated to education and other activities?
Do differences exist in the time allocated to sport, education and other activities between sports schools, private schools and state schools?
Do moderating factors such as age, gender, sport, socio-economic background, country and culture influence the physical loads and time spent engaged in sport participation and education.
*(Note: this is likely a follow-up question beyond the Honours year).*

**Methodological approach:**
A survey and diary approach will be used to collect data. Data will be collected over a 7 day period on 2-3 occasions during the school year. Students from selected schools in Australia (and possibly overseas; e.g. Qatar, Singapore, India) will be surveyed. Participating schools will include sports schools, private schools and state schools, with an endeavour to match schools based on location. Measures of physical load will include frequency, type, duration and intensity (RPE). Time commitments will include school, study, meals, physical activity, sport, screen time, leisure time and sleep.

**Necessary skills/knowledge:**
This project would suit a student with an interest in athlete development and the benefits of physical activity and sport who would like to develop skills in research design, data analysis and project management. It has potential to extend beyond Honours and to link with other aspects of a broader research program focusing on athlete development in schools.

# 16. PROJECT TITLE: TRAINING LOAD COMPARISONS BETWEEN THREE PROFESSIONAL FOOTBALL CODES

**Principal supervisor: Associate Professor Paul Gastin**
**Contact details:** paul.gastin@deakin.edu.au
(03) 9244 6334

**Supervisor's profile:**
Paul Gastin is a member of the Centre for Exercise and Sport Science Course and previous Course Director for the Bachelor of Exercise and Sport Science. Research interests relate to athlete performance management and training science, including athlete development, assessment of workload, monitoring of adaptation and recovery, and application of technology in the coaching process.

**Co-supervisor**
Dr Sam Robertson

**Project is based at:** Burwood

**Project description:**
The prescription of training load is central to athlete management, given the known relationships between training stress, adaptation, recovery and performance. Team sports offer unique challenges as coaches must balance the needs of the team with those of each individual player. In the football codes, the demands of weekly competition further restricts training prescription and heightens the importance of preparation achieved in the pre-season period. While the game demands of soccer, rugby league and Australian football have been well described in the literature, less is known about the training demands (pre-season and in-season) of these field team sports. Furthermore, few direct comparisons have been made between the football codes. This project will analyse data from a professional team in each of the national football competitions (FFA A-League, NRL, and AFL).

This project is part of a broader, long-term research program that focuses on the science of football. It has potential for further study at a PhD level or lead to opportunities within the football codes.

**Aims**
The aim of this project is to describe and compare the on-field training demands of three professional football codes (soccer, rugby league, Australian football). Comparisons will be made between codes and between pre-season and in-season training phases.

**Research questions:**
Do on-field training demands differ between soccer, rugby league and Australian football?
Do on-field training demands differ between pre-season and in-season phases?

**Methodological approach:**
Data from three professional football teams will be analysed and compared. The data is derived from wearable sensor technologies and includes GPS time-motion data and accelerometer load data.

**Necessary skills/knowledge:**
This project would suit a student with an interest in football, data analysis and applied sport science. It has potential to extend beyond Honours and to link with other aspects of a broader research program focusing on the science of football.

# 17. PROJECT TITLE: PREDICTION OF ENERGY EXPENDITURE USING WEARABLE TECHNOLOGIES

**Principal supervisor: Associate Professor Paul Gastin**
**Contact details:** paul.gastin@deakin.edu.au
03 9244 6334

**Supervisor's profile:**
Paul Gastin is a member of the Centre for Exercise and Sport Science Course and previous Course Director for the Bachelor of Exercise and Sport Science. Research interests relate to athlete performance management and training science, including athlete development, assessment of workload, monitoring of adaptation and recovery, and application of technology in the coaching process.

**Co-supervisors:**
Dr Dan Dwyer
Dr Sam Robertson

**Project description:**
Background
The ability to accurately measure energy expenditure (EE) during training and competition in sport provides many benefits that relate to performance enhancement, including the management of training load. Furthermore, the estimation of energy expenditure during physical activity in free-living conditions has implications for health and health research.

Wearable technologies are increasingly being used to assess EE in the field. In a 2014 Honours project, we evaluated the validity of three wearable devices (one sport based, two physical activity based) during continuous (walk, jog, run) and intermittent circuit (team sport) exercise. Energy expenditure ($VO_2$) was measured directly from a wearable metabolic measurement system, and sensor data collected from wearable tracking devices that measure velocity, acceleration and heart rate. Preliminary findings suggest that these devices are less accurate at predicting energy expenditure during intermittent exercise. The proposed 2015 project will look to extend this work in one of several ways: 1) review and revise our methodological approach to the problem; 2) focus more directly on team sport movements (extended circuits and/or training); 3) focus more directly on physical activity in free-living conditions; 4) evaluate other wearable technologies; 5) use sensor data (GPS, accelerometer, heart rate) to develop algorithms to better predict EE or to classify movement.

The decision around the selection of which of the above research question / direction is chosen for the 2015 project will depend on several factors, including the findings from 2014, the recommendations of the research team and the interests of the student.

This project is part of a broader, long-term research program that focuses on the validity and application of wearable technologies. It has potential for further study at a PhD level or lead to opportunities within industry.

**Aims**
To determine the feasibility and accuracy of using wearable technology to measure energy expenditure in the field.

**Methodological approach:**

1. Collect EE ($VO_2$) and sensor (GPS, accelerometer, heart rate) data during physical activity, circuits and training.
2. Analyse both existing and collected EE and sensor data to address research questions focusing on the validity and application of wearable technologies in the field.

**Necessary skills/knowledge:**

This project would suit a student with an interest in applied exercise and sport science, including data collection, analysis and project management. It has potential to extend beyond Honours and to link with other aspects of a broader research program focusing on measurement, analytics and prediction in sport.

# PHYSICAL ACTIVITY AND HEALTH HONOURS PROJECTS 2015

## 18. PROJECT TITLE: CHALLENGES OF PROMOTING PHYSICAL ACTIVITY: DO CHILDREN NATURALLY REDUCE THEIR ACTIVITY LEVELS AFTER PARTICIPATION?

**Principal supervisor: Dr Nicky Ridgers**
**Contact details:** nicky.ridgers@deakin.edu.au
(03) 9244 6718

**Supervisor's profile**
Dr Nicky Ridgers is a Senior Research Fellow in the Centre for Physical Activity and Nutrition Research at Deakin University. Nicky's research primarily focuses on understanding children's physical activity and sedentary behaviour patterns. Using current cutting-edge monitoring technologies, her research examines when children are active or sedentary throughout the day in order to identify key times to intervene to increase children's overall physical activity levels.

**Co-supervisor**
Mrs Helen Brown

**Project is based at:** Burwood

**Project description:**
Physical activity is important for children's physical, social and mental health, yet less than half of Australian children aged 9-13 years meet the National Guidelines of at least one hour of activity every day. Most strategies to promote children's physical activity have failed to make substantial or sustained changes in behaviour. One possible hypothesis that has surprisingly not been tested is that children have a daily physical activity 'set point'; that is, if they increase their activity levels in one part of the day, they will decrease their activity levels in another part so as not to exceed this threshold. Proving or disproving this hypothesis has critical implications for the way in which physical activity intervention strategies are delivered in the future.

**Methodological approach:**
Secondary analyses will be conducted on data collected during the Reactivity to Activity Study. Children in Year 5 were randomly allocated to participate in one of three activities during school time. Prior to, during, and after the delivered activity session, children wore monitors that provide information concerning energy expenditure and physical activity intensity. This project will provide an opportunity to examine whether children's physical activity levels increased or decreased following the session, and identify where these changes occurred.

**Necessary skills/knowledge:**
This project will suit students with an interest in physical activity promotion or regulation. Good organisational and communication skills are required. It is desirable that students have completed HSE203. As this project will involve the management and analysis of data, some understanding of statistical techniques is desired, however training and support will be provided.

# 19. PROJECT TITLE: SPORTING CLUBS AND SCHOOLS: STRENGTHENING CONNECTIONS TO SUPPORT YOUNG PEOPLE TO BE ACTIVE.

**Principal supervisor: Helen Brown**
**Contact details:** hbrown@deakin.edu.au
(03) 92446327

**Supervisor's profile:**
I am a lecturer in the School of Exercise and Nutrition Sciences and lecture in the areas of sport coaching and children's physical activity. My main interest is investigating influences on children and youth's physical activity. I have been involved in several studies relating to this topic, including the development of a family based intervention to promote physical activity in children.

**Co-supervisors**
Dr Trina Hinkley
Dr Megan Teychenne

**Project is based at:** Burwood

**Project description:**
Physical activity (PA) is an essential component in the development and maintenance of health and wellbeing in youth, however evidence shows that many youth aged 12-16 years do not participate in sufficient levels of PA and fail to meet age-related PA recommendations to achieve health benefits. Sport provides an important opportunity for youth to be physically active on a regular basis and provides a variety of social, psychological and physical experiences which will influence future participation. One way in which to promote sport participation to youth is through schools linking with community sporting clubs to increase access and knowledge about sporting opportunities in the local area.

This project will therefore aim to gain a better understanding of ways in which schools and sports clubs currently link with each other and investigate possibilities to develop stronger and more robust connections so that they may better support young people to be active through sport.

**Methodological approach:**
This project will use quantitative (brief survey measure) and qualitative (interview) methods. The student will be involved in participant recruitment, data collection and analyses.

**Necessary skills/knowledge:**
This project would suit students interested in youth sport and development of strategies to promote participation. It would be desirable if students had completed HSE 313 or HSE 203 or a sport coaching unit.

# 20. PROJECT TITLE: EXPLAINING CHANGES IN CHILDHOOD OBESITY STATUS OVER THE PRESCHOOL TO PRIMARY SCHOOL TRANSITION.

**Principal supervisor: Dr Kylie Hesketh**
**Contact details:** kylie.hesketh@deakin.edu.au
(03) 9244 6812

**Supervisor's profile:**
Dr Kylie Hesketh is a behavioural epidemiologist within the Center for Physical Activity and Nutrition Research (C-PAN). Her research focuses on the prevention of childhood overweight and obesity and the promotion of healthy lifestyle behaviours including physical activity and reduced sedentary behaviours. She has an active program of research in this area including leading the Australian Research Council (ARC)-funded Healthy Active Preschool and Primary Years (HAPPY) Study.

**Co-supervisor**
Dr Alison Carver

**Project is based at:** Burwood

**Project description:** Childhood overweight and obesity are prevalent chronic conditions experienced by approximately 1 in 5 preschool-aged children in Australia. With the majority of overweight and obese children retaining their weight status throughout childhood, those children who change weight status (e.g. healthy weight children who become overweight and overweight children who become a healthy weight) may provide valuable information to understanding these conditions. By examining a variety of potentially contributing factors to characterise children who change weight status, this project will seek to extend the current understanding of the development and resolution of childhood overweight and obesity.

**Methodological approach:**
This project will be based within a larger ARC-funded longitudinal cohort study, the Healthy Active Preschool and Primary Years (HAPPY) Study. Currently in its third wave of data collection, the HAPPY Study originally recruited children aged 3-5 years, assessed them again at age 6-8 and in 2014-2015 (Wave 3) is assessing children at age 9-11 years. This project will involve secondary analyses of data already collected from Waves 1 and 2 of the study with the opportunity to gain additional research skills and experience by accompanying research staff on field visits in Wave 3 of the study.

**Necessary skills/knowledge:**
Willingness to learn statistical analysis skills and the analysis program Stata (training will be provided). Good written and verbal communication skills.

# 21. PROJECT TITLE: ARE CHILDREN MORE ACTIVE ON DAYS THEY PARTICIPATE IN ORGANISED SPORT?

**Principal supervisor: Dr Nicky Ridgers**
**Contact details:** nicky.ridgers@deakin.edu.au
(03) 9244 6718

**Supervisor's profile:**
Dr Nicky Ridgers is a Senior Research Fellow in the Centre for Physical Activity and Nutrition Research at Deakin University. Nicky's research primarily focuses on understanding children's physical activity and sedentary behaviour patterns. Using current cutting-edge monitoring technologies, her research examines when children are active or sedentary throughout the day in order to identify key times to intervene to increase children's overall physical activity levels.

**Co-supervisor**
A/Prof Anna Timperio

**Project is based at:** Burwood

**Project description:**
Physical activity is important for children's physical, social and mental health, yet less than half of Australian children aged 9-13 years meet the National Guidelines of at least one hour of activity every day. The promotion of structured sport may be one strategy to increase children's physical activity levels. However, it has not been thoroughly established whether children are more active on days they participate in organised sport compared to non-sport days, or whether they regulate their activity levels to compensate. In addition, research is needed to determine whether the timing of sports participation (e.g. during school, after school) affects overall daily physical activity levels.

**Methodological approach:**
Secondary analyses will be conducted on data collected within the Fitness, Activity and Skills Testing (FAST) study. Children in Years 4 and 5 wore activity monitors that measure energy expenditure (SenseWear) and physical activity participation (accelerometers) for up to 7 consecutive days. Children also completed surveys reporting structured sports participation on weekdays and weekend days.

**Necessary skills/knowledge:**
This project will suit students with an interest in physical activity promotion or energy expenditure regulation. Good organisational skills are required. As this project will involve the management and analysis of data, some understanding of statistical techniques is desired, however training and support will be provided.

# 22. PROJECT TITLE: GPS/ACCELEROMETER-BASED ASSESSMENT OF ATTRIBUTES OF WALKING/CYCLING ROUTES RELEVANT TO COGNITIVE FUNCTIONING

**Principal supervisor: Professor Ester Cerin**
**Contact details:** ester.cerin@deakin.edu.au
(03) 9244 6763

**Supervisor's profile:**
Professor Cerin is a behavioural scientist and statistician with expertise in determinants of physical activity behaviour and applications of advanced statistical modeling to behavioural research. She joined Deakin University in January 2013 and has been recently awarded an Australian Research Council Future Fellowship. She has a strong international network of collaborators and has been leading physical activity-related research projects in Hong Kong, the USA and Australia. She has published over 120 peer-reviewed papers in international scientific journals and has attracted over $16 million of external research funding.

**Co-supervisors**
Dr Lukar Thornton
Dr Anthony Barnett

**Project is based at:** Burwood

**Project description:**
There is evidence that cognitive functioning and decline in older adults are affected by physical activity, including active transportation (cycling and walking). There is also evidence that navigational activities, including walking/cycling for transportation purposes, can contribute to lowering the risk of cognitive decline in older adults. A combination of accelerometer and Global PositioningSystem (GPS) devices is increasingly being used in research to assess patterns of physical activity (duration; frequency; modes of transport) and record trip routes (navigational activities). Yet, we still do not know how to best quantify combined GPS/accelerometer data so that they provide useful information for studies on cognition. This project aims to develop and validate a protocol for the operationalization of GPS data to be used in studies on physical activity and cognitive functioning.

**Methodological approach**:
Data collection will be conducted two settings: controlled and natural/field. Data collectors will wear an accelerometer and carry two GPS units (QStarz BT 100XT) on a waist-mounted elastic belt. The GPS devices will be initialized to record data using two epochs. We will conduct controlled tests in various environments (urban, dense and open space) to assess the accuracy of estimation of active (cycling/walking) trips length and associated energy expenditure using GPS/accelerometry data processed via available algorithms. We will also conduct 4-day field data collection in the collectors' habitual environments. We will develop a protocol for the quantification of the difficulty and complexity of a trip route based on the number of turns taken; the number of route choices available; and the familiarity with the route. The estimates of trip mode, trip length and associated energy expenditure produced by the algorithms will be validated using information on the pre-defined experimental conditions and a record of the itineraries kept by the collectors (for both experimental and field settings). Estimates of route complexity will be validated against information on pre-defined experimental conditions, records of itineraries and perceived difficulty of the route.

**Necessary skills/knowledge:**
Ability to use a statistical package, such as SPSS or Stata and conduct basic data analyses.

# 23. PROJECT TITLE: DOES THE EFFECT OF SOCIAL SUPPORT FOR PHYSICAL ACTIVITY DEPEND ON GENDER AND THE NEIGHBOURHOOD ENVIRONMENT?

**Principal supervisor: Professor Ester Cerin**
**Contact details:** ester.cerin@deakin.edu.au
(03) 9244 6763

**Supervisor's profile:**
Professor Cerin is a behavioural scientist and statistician with expertise in determinants of physical activity behaviour and applications of advanced statistical modeling to behavioural research. She joined Deakin University in January 2013 and has been recently awarded an Australian Research Council Future Fellowship. She has a strong international network of collaborators and has been leading physical activity-related research projects in Hong Kong, the USA and Australia. She has published over 120 peer-reviewed papers in international scientific journals and has attracted over $16 million of external research funding.

**Co-supervisor**
Dr Jenny Veitch

**Project is based at:** Burwood

**Project description:**
Participation in moderate or vigorous exercise can reduce the risk of heart disease, diabetes, colon cancer, and high blood pressure. Research shows that more than half of the population of Hong Kong does not meet the recommended level of physical activity for health. Social support is one of the strongest determinants of physical activity behaviour. Previous research has shown that it is more important for women than it is for men. However, it is not known whether this holds for different domains of physical activity (transportation-related; walking for recreation; leisure-time moderate-to-vigorous physical activity). Additionally, it is not known whether the neighbourhood environment (socio-economic status and physical-activity friendliness) can moderate the effect of social support on regular participation in physical activity. The effects of social support under different neighbourhood environments and across genders is worth studying as it may inform the optimal strategy for using social support in physical activity interventions for women and men and for residents living in environments with different levels of socio-economic status and walkability. Moreover, this type of research has not been carried out in a Chinese population. This study can provide useful information for programmes aimed to increase physical activity levels in particular subgroups of the population.

**Methodological approach**:
This is a cross-sectional project that makes use of a survey to collect information among community members in selected areas of Hong Kong. Four hundred and eighty participants were recruited from 32 Hong Kong neighbourhoods varying in socio-economic status and walkability (household density, street connectivity and land use mix). Participants were asked to complete a survey on perceived social support for walking for recreation, walking for transport and moderate-to-vigorous leisure-time physical activity. They were also asked to report their habitual weekly amount of walking and other types of physical activity within and outside of the neighbourhood of residence (RESIDE's Neighbourhood Physical Activity Questionnaire); and their perceptions of the neighbourhood environment. Generalized linear mixed models will be used to examine associations of social support with physical activity outcomes and the moderating effects of gender and aspects of the neighbourhood environment deemed to facilitate engagement in physical activity

**Necessary skills/knowledge:**
Ability to use a statistical package, such as SPSS or Stata and conduct basic data analyses.

# 24. PROJECT TITLE: SOCIAL SUPPORT AND SELF-EFFICACY FOR PHYSICAL ACTIVITY AS MODERATORS OF INTERVENTION EFFECTIVENESS IN MIDDLE-SCHOOL CHILDREN

**Principal supervisor: Professorr Ester Cerin**
**Contact details:** ester.cerin@deakin.edu.au
(03) 9244 6763

**Supervisor's profile:**
Professor Cerin is a behavioural scientist and statistician with expertise in determinants of physical activity behaviour and applications of advanced statistical modeling to behavioural research. She joined Deakin University in January 2013 and has been recently awarded an Australian Research Council Future Fellowship. She has a strong international network of collaborators and has been leading physical activity-related research projects in Hong Kong, the USA and Australia. She has published over 120 peer-reviewed papers in international scientific journals and has attracted over $16 million of external research funding.

**Co-supervisor**
Dr Nicola Ridgers

**Project is based at:** Burwood

**Project description:** The percentage of youth accruing health enhancing-leveld of physical activity (PA) is low worldwide. PA intervention trials in youth have had only modest outcomes. One of the reasons for these disappointing results may be that the delivered interventions were not suited to the majority of the youth. It is possible that participants with different individual characteristics or living in different environments reacted to the intervention differently. For example, high pre-intervention social support and self-efficacy for PA may facilitate changes in PA following an intervention, while low levels of these variables may impede change in the behaviour. However, despite several recent calls for an analysis of moderators (i.e., pre-intervention characteristics) of PA intervention effectiveness, very few studies have thus far examined this issue. An identification of moderators of intervention effectiveness can greatly assist the tailoring of future more successful interventions in youth. This project proposes to assess the importance of pre-intervention social support for PA from friends and family and of pre-intervention self-efficacy for PA in determining a PA intervention outcome (how much a student increases his/her PA habitual level as a result of the intervention)

**Methodological approach**: Using an extant dataset from a school-based PA and dietary intake randomized controlled trial on 2840 Belgian middle-school students, generalized linear models will be used to examine the interactive effects of baseline social support from family and friends and self-efficacy for PA on intervention-induced changes on self-reported transport-related and leisure-time PA.

**Necessary skills/knowledge:**
Intermediate knowledge of multiple regression analyses and ability to use statistical package, such as SPSS or Stata.

# 25. PROJECT TITLE: VALIDATION IN THE AUSTRALIAN URBAN SETTING OF ALGORITHMS USING GLOBAL POSITIONING SYSTEM AND ACCELEROMETER DATA TO IDENTIFY TRAVEL MODES AND LOCATIONS WHERE PHYSICAL ACTIVITY OCCURS

**Principal supervisor: Dr Anthony Barnett**
**Contact details:** anthony.barnett@deakin.edu.au
(03) 9251 7236

**Supervisor's profile:**
My present research interests include the influence of the built environment on physical activity and measurement of physical activity, both of which are linked to this project. I am currently a co-investigator on projects involving the former topic and principal investigator on a physical activity measurement project. I joined Deakin as a Senior Lecturer of Sports Science at the beginning of 2013 from the University of Hong Kong.

**Co-supervisor**
Professor Ester Cerin

**Project is based at:** Burwood

**Project description:** The University of California (San Diego) has developed a working version of the Physical Activity Location Measurement System (PALMS) software aimed at processing global positioning system (GPS) and accelerometry data to identify travel modes and locations where physical activity occurs. Cross-validation of the derived algorithms in diverse geographical locations with varying urban forms is needed to determine the international usefulness of the PALMS system. Dr Barnett is a co-investigator on an ongoing project cross-validating the algorithms in Hong Kong. The aim of the current proposal is validation of the system in the Australian urban setting. This study will enable us to validate accelerometer plus GPS assessment of sedentary behaviour, vehicle travel, and active travel behaviour, as well as allow us to better predict travel mode under multiple conditions in Australian urban settings.

**Methodological approach:**
Data will be collected using GPS monitors and accelerometers to determine the sensitivity and specificity of PALMS in detecting personal-vehicle, public transport, bicycle, and walking trips and trip modes. The study will investigate travel mode recognition (specifically sensitivity to mode change), the influence of GPS recording data epoch, sensitivity to the influence of urban density, and GPS data quality in relation to availability of satellites. Data collection will involve the student planning multi-mode trip routes, and undertaking these trips collecting data using 6 GPS monitors and 3 accelerometers and a log of route and times associated with travel mode stages. Data will be analysed using the PALMS system and results compared to the trip log details. Discrepancies will be used to improve the PALMS predictive algorithms.

**Necessary skills/knowledge:**
Interest in physical activity measurement and in the devices used for this measurement. Understanding of the importance of physical activity in the public health setting and an interest in furthering research in this area. Intermediate knowledge of SPSS and/or ability to perform descriptive statistics.

# 26. PROJECT TITLE: VALIDITY OF GPS-BASED ESTIMATES OF MOTORIZED VERSUS ACTIVE TRAVEL BEHAVIOR IN HONG KONG

**Principal supervisor: Dr Anthony Barnett**
**Contact details:** anthony.barnett@deakin.edu.au
(03) 9251 7236

**Supervisor's profile:**
My present research interests include the influence of the built environment on physical activity and measurement of physical activity, both of which are linked to this project. I am currently a co-investigator on projects involving the former topic and principal investigator on a physical activity measurement project. I joined Deakin as a Senior Lecturer of Sports Science at the beginning of 2013 from the University of Hong Kong.

**Co-supervisor**
Professor Ester Cerin

**Project is based at:** Burwood

**Project description:** Global Positioning System (GPS) devices and analyses have been used by transportation researchers for several years and are becoming increasingly used in health-related research to assess physical activity behavior. However, insufficient attention has been devoted to validating data collected from GPS devices and considerable variation exists in the quality and reliability of GPS data depending upon which device is used. Moreover, once GPS data are collected they have utility only if they can help characterize the behavior it tracks in a meaningful way. For example, it is important that GPS data be able to answer questions such as 'What is the mode of travel that a person typically uses?' Our project aims at advancing the science of GPS data collection and analysis specifically to meet the needs of physical activity researchers. This study will help us to validate GPS assessment of vehicle travel and active travel behavior under different conditions in ultra-dense urban areas. Most importantly, this research will reduce the need for other physical activity researchers to spend time validating GPS or accelerometer data so that they can devote their time and effort to using the data in physical activity and studies.

**Methodological approach**: This study follows the research protocol used in a study conducted in San Diego (USA) with appropriate protocol alterations to reflect the idiosyncrasies of the Hong Kong urban environment. Data collectors wore an accelerometer and carried three GPS units (QStarz BT 100XT) in a small bag worn at the waist. The numerous GPS devices were to test the influence of GPS data recording epoch. The main condition that challenges the accuracy of GPS and thus specificity and sensitivity of the algorithms are urban canyons, e.g. areas with interference from large buildings that disrupt GPS-satellite communication. We conducted controlled tests in both urban canyons and open view areas to assess the specificity and sensitivity of an extant travel mode algorithm according to the changes in travel mode. A matrix of sensitivity and specificity will be computed for each environmental condition and each epoch. The gold standard against which the algorithms will be tested is the experimental condition combined with a record of the itenary kept by the collectors.

**Necessary skills/knowledge:** Ability to use a statistical package, such as SPSS or Stata.

# 27. PROJECT TITLE: PATTERNS OF PHYSICAL ACTIVITY AND SEDENTARY BEHAVIOUR IN CHINESE OLDER ADULTS LIVING IN MELBOURNE

**Principal supervisor: Dr Anthony Barnett**
**Contact details:** anthony.barnett@deakin.edu.au
(03) 9251 7236

**Supervisor's profile:**
My present research interests include the influence of the built environment on physical activity and measurement of physical activity, both of which are linked to this project. I am currently a co-investigator on projects involving the former topic and principal investigator on a physical activity measurement project. I joined Deakin as a Senior Lecturer of Sports Science at the beginning of 2013 from the University of Hong Kong.

**Co-supervisor**
Professor Ester Cerin

**Project is based at:** Burwood

**Project description:**
Chinese people are at an increased risk of diabetes. Physical activity has been shown to reduce the risk of a number of diseases, including diabetes, heart disease, osteoporosis, breast-, and colon-cancer. It also plays a positive role in mental and social health. In contrast, increased levels of sedentary behavior have been shown to increase risk of various diseases and plays a negative role in mental and social health. To best understand the role physical activity and sedentary behaviour play and how to encourage people to become more physically active and less sedentary, there is a need for accurate ways of measuring these behaviours in daily life and gain insight into the daily patterns of activity so that interventions can be more efficiently planned. In physical activity and sedentary behaviour research, small accelerometers worn at hip and/or thigh level are the standard devices for collecting estimates of physical activity and sedentary behaviour intensity information during daily activities. While we know how to analyse accelerometer data in younger adults, this has yet to be satisfactorily determined in older populations. This impacts on our ability to accurately identify how active older adults are. In this project we will be looking at accelerometer data during walking, the most common physical activity amongst over 60 year olds, and sedentary behaviours. Using calibration work done by us that permits better quantification of activity levels in Chinese older adults using accelerometers, this project aims to gain insight into their daily activity and sedentary patterns.

**Methodological approach**:
Forty Chinese older adults (>60 years) will be recruited from Melbourne via local media advertisements and flyer posted at community centres, clinics and other relevant facilities/services. Participants will be asked to complete two questionnaires and visit the School of Exercise and Nutrition Sciences facilities at Deakin University, Burwood Campus, on one occasion. On arrival, research staff will collect the signed written consent form and check the completed health-related questionnaire. If participants have no contraindications to participation, they will have their height and weight measured. Data will then be collected to determine participants' resting metabolic rate. Participants will be asked to wear devices during this period, namely: a face mask connected to a small portable system which will analyse their expired air and two small electronic devices called accelerometers that will assess physical activity movement (ActiGraph) and sedentary behaviour (activPAL). The ActiGraph will be affixed about the right hip on an elasticated belt. The activPAL will be attached on their right thigh (this accelerometer has a sticky-back). After the devices have been securely attached, participants will complete a Short Physical Performance Battery (SPPB). Following the resting and SPPB data collection period, participants will undertake a period of walking on a flat surface next to the University. More specifically, they will walk 100m at 1.6 $km \cdot hr^{-1}$

(3.8 min), 200 m at 2.2 km·hr$^{-1}$ (5.5 min), 200 m at 2.8 km·hr$^{-1}$ (4.3 min), 200 m at 2.4 km·hr$^{-1}$ (3.5 min), and 300 m at 4.0 km·hr$^{-1}$ (4.5 min). (Total walking distance will be one kilometre.) The research assistant, who will be walking beside the participant, will wear the expired air analysis system on their back whilst monitoring the walking speed. The accelerometers will then be worn for an additional three days following the appointment to obtain free-living data on physical activity and sedentary behaviour. The participants will be provided with a brief activity log for those two days that will detail periods of accelerometer non-wear. Participants will then be asked to post the devices back to Deakin University, Burwood Campus, for data analysis (a reply-paid package will be provided). If they are not received within a week after the end of the data collection, research staff will arrange a time and place to pick them up in person. For this project, daily patterns of different intensity levels of activity (sedentary, light, moderate and vigorous) will be established using data from the 3-day Actigraph and ActiPAL monitor wear. The link between activity-monitor data and activity intensity will be derived from the calibration component of the study conducted at Deakin (walking at specific speeds).

**Necessary skills/knowledge:**
Ability to use a statistical package, such as SPSS or Stata. Ability to speak Cantonese or Mandarin is desirable but not essential.

# 28. PROJECT TITLE: EVALUATING THE IMPACT OF A POPULATION-BASED INTERVENTION TO INCREASE PHYSICAL ACTIVITY AMONG SOCIO-ECONOMICALLY DISADVANTAGED WOMEN

**Principal supervisor: Dr Shannon Sahlqvist**

**Contact details** shannon.sahlqvist@deakin.edu.au
(03) 92517782

**Supervisor's profile:**

Dr Megan Teychenne is currently a Lecturer in Physical Activity and Health (Burwood) and has undertaken research in the area of women's health and epidemiology over the last five years. Her research focuses on investigating the associations between physical activity, sedentary behaviours and depression, particularly amongst women and socio-economically disadvantaged groups. She has also been involved in examining the intra-personal, social and physical-environmental influences on women's physical activity and sedentary behaviour and is particularly interested in the development of strategies to promote physical activity and reduce sedentary behaviours amongst 'at-risk' populations.

Dr Shannon Sahlqvist is a Lecturer in Physical Activity and Health (Geelong). Shannon's research focuses on developing and evaluating population based physical activity interventions, in particular those that promote active travel. She has led the development and evaluation of a website-delivered physical activity intervention targeted at middle-aged adults.

**Co-supervisor**

Dr Megan Teychenne

**Project is based at:** Burwood or Geelong

**Project description:**

Socio-economically disadvantaged women are more likely to be physically inactive and engage in higher levels of sedentary behaviour (e.g. television viewing) than less disadvantaged women. However, few successful strategies have been designed to increase physical activity and reduce sedentary behaviour in this target group. One possible approach is to utilise the use of a mediated intervention including print and web delivery.

To that end, women living in socio-economically disadvantaged areas of Melbourne were recruited and randomly allocated to receive either print and web materials or to a wait-list control group. At baseline and again following the three-month intervention all participants were instructed to wear an accelerometer (movement monitor) for one week to measure both physical activity and sedentary behaviour. At the same time, participants completed a questionnaire to further elucidate their physical activity and sedentary behaviour as well as important influences of these behaviours.

This Honours project **aims** to evaluate the effectiveness of the print and web-based materials at encouraging increases in physical activity and reductions in sedentary behaviour among women living in low socioeconomically disadvantage areas.

**Methodological approach:**
Accelerometer and survey data have already been collected from 50 women. These data will be analysed using appropriate techniques to determine any changes, both within and between groups, in physical activity and sedentary behaviour as well as key influences on these behaviours.

**Necessary skills/knowledge:**
HSE203 Exercise Behaviour – Essential
HSE212 Physical Activity Promotion and Evaluation/HSE316 Physical Activity and Health – Desirable

# 29. PROJECT TITLE: HOW DO ADULTS INTERACT WITH THEIR ENVIRONMENT? USING OBJECTIVE MEASURES TO EXPLORE PHYSICAL ACTIVITY BEHAVIOUR

**Principal supervisor: Dr Shannon Sahlqvist**
**Contact details:** shannon.sahlqvist@deakin.edu.au
(03) 9251 7782

**Supervisor's profile:**
Dr Shannon Sahlqvist is a Lecturer in Physical Activity and Health (Geelong). Shannon's research focuses on developing and evaluating population based physical activity interventions, in particular those that promote active travel. She has led the development and evaluation of a website-delivered physical activity intervention targeted at middle-aged adults.

**Co-supervisor:**
Dr Lukar Thornton

**Project is based at:** Geelong (or Burwood, however the student would need to travel to Geelong for data collection).

**Project description:**
While it is widely recognised that a supportive built environment is needed to promote enduring changes in physical activity, to date the findings from studies examining associations between the environment and physical activity are weak and mixed. This may be partly due to the use of self-report measures of physical activity and to the fact that the environment has been typically defined as the area within 800m of a participant's home. One way to overcome these challenges is through the combined use of Global Positioning System (GPS) receivers and accelerometers (physical activity monitor). When worn together these devices collect synchronous data on the location and intensity of activity and allow for a more precise exploration of where activity takes place.

The aim of this study is to utilise the use of GPS receivers and accelerometers to better elucidate how participants both define and interact with their neighbourhood, in particular where their physical activity takes place.

**Methodological approach:**
Using GPS receiver and accelerometer data already collected from a convenient sample of 15 - 20 participants, the student will use a bespoke program to produce maps detailing participants' movement through their neighbourhood. The participants will then be invited to an interview where copies of the maps will be used as prompts for discussion. A semi-structured topic guide based on open-ended questions will be developed to explore participant choices and the factors influencing these choices. Using appropriate qualitative data techniques these data will then be analysed to explore ways in which individuals interact with their environment.

**Necessary skills/knowledge:**
HSE203 Exercise Behaviour – Essential
HSE212 Physical Activity Promotion and Evaluation / HSE316 Physical Activity and Health – Desirable

# 30. PROJECT TITLE: FIREFIGHTERS' PHYSICAL ACTIVITY DURING NIGHT-TIME BUSHFIRE SUPPRESSION WORK

**Principal supervisor: Dr Brad Aisbett**
**Contact details:** brad.aisbett@deakin.edu.au
03 9244 6474

**Supervisor's profile:**
My research uses exercise science research to enable workplaces to promote and preserve the health and safety of workers in physically demanding occupations (e.g. civilian and military emergency services). In the past five years, I have worked with 15 Fire and Emergency Services agencies across eight Australian states and territories in the areas of job-specific fitness, hydration, and fatigue.

**Co-supervisor**
Dr Sally Ferguson (Central Queensland University)

**Project is based at:** Burwood

**Project description:**
Bushfires are an annual threat to many rural and regional communities worldwide. Safeguarding people and property from the yearly devastation of bushfire are millions of firefighters, mostly volunteers. When working to combat large-scale fires, firefighters work on a rotating 12-h schedule - day shift (7 am to 7 pm) or night shift (7 pm to 7 am). Despite night shifts comprising 50% of all fireground shifts, there is no published data on firefighters' physical work at night. There is also no objective information on firefighters' sleep between night-time shifts. Whilst research into other industries show workers typically sleep less during the day, than at night, there are no studies examining workers' physical work activity at night. The primary aim of the current project is, therefore, to quantify firefighters' physical activity when they are working at night to suppress bushfires. A secondary aim is to objectively record firefighters' sleep during the day periods before and after night-time fireground shifts. The information generated in this project may help rural fire agencies with their workforce planning such as the deployment numbers required for night- vs. day-time shifts.

**Methodological approach:**
The project will comprise secondary analyses of physical activity and sleep data collected during a four-week period for firefighters working to suppress bushfires in the 2012/2013, 2013/2014 and 2014-2015 summer fire seasons. Firefighters wore activity monitors (on their non-dominant wrist) continuously for a four-week period to capture their physical activity on and off the fireground and their sleep patterns at home and between bushfire suppression shifts. When deployed to a fire, firefighters also completed daily diaries, documenting their perceptions of their exertion on shift, the demands of the fire, their sleep and fatigue levels between work shifts. The student selected for this project will compare and contrast firefighters' physical activity between night- and day-shifts, and contextualise this information using firefighters' sleep records and the demands of the fire they were facing.

**Necessary skills/knowledge:**
It is desirable (but not essential) for the selected student to have
- An interest in applying exercise science knowledge to occupational settings;
- An interest in sleep physiology / circadian rhythms;
- Good communication and organisational skills; and
- Some understanding of statistical techniques.

# 31. PROJECT TITLE: FIREFIGHTERS' PHYSICAL ACTIVITY ACROSS CONSECUTIVE SHIFTS OF DAYTIME BUSHFIRE SUPPRESSION WORK.

**Principal supervisor: Dr Brad Aisbett**
**Contact details:** brad.aisbett@deakin.edu.au
(03) 9244 6474

**Supervisor's profile:**
My research uses exercise science research to enable workplaces to promote and preserve the health and safety of workers in physically demanding occupations (e.g. civilian and military emergency services). In the past five years, I have worked with 15 Fire and Emergency Services agencies across eight Australian states and territories in the areas of job-specific fitness, hydration, and fatigue.

**Co-supervisor**
Dr Nicky Ridgers

**Project is based at:** Burwood

**Project description:**
Bushfires are an annual threat to many rural and regional communities worldwide. In Australia, fire and land management agencies burn targeted areas of vegetation (during Spring and Autumn) to reduce the fuel load that could ignite during a summer bushfire. The control and suppression of these prescribed burns is a major duty for Australia's rural firefighters, but there is no published information on firefighters' physical activity profile during prescribed burn duties. Large-scale prescribed burns often require firefighters to work consecutive shifts, just as they do when fighting emergency bushfires. Despite the prevalence of consecutive shifts, there is no research exploring the physical work activity patterns that firefighters' adopt during and across multiple shifts or an understanding of how their between-shift behaviour (incl. sleep) may influence their work physical activity. The primary aim of the current project is, therefore, to quantify firefighters' physical activity during prescribed burn suppression duties. A secondary aim will be to compare and contrast their physical activity patterns across consecutive shifts. Sophisticated analyses of firefighters' physical activity during prescribed burn operations may help rural fire agencies with their workforce planning such as optimising work:rest guidelines and shift rotations.

**Methodological approach:**
The project will comprise secondary analyses of physical activity data collected during a large-scale prescribed burns during the autumn of 2012 and 2013. Firefighters wore activity monitors (on their non-dominant wrist) continuously for a four-week period to capture their physical activity on and off the fireground. Firefighters also completed daily diaries, documenting their perceptions of their exertion on shift, their work tasks and the intensity of the fire. The student selected for this project will analyse firefighters' physical activity across consecutive fireground shifts and contextualise this information using firefighters' sleep records between shifts and the operational requirements (e.g., specific roles, intensity of the fire, etc) of each shift they work.

**Necessary skills/knowledge:**
It is desirable (but not essential) for the selected student to have
- An interest in applying exercise science knowledge to occupational settings;
- An interest in sleep physiology / circadian rhythms;
- Good communication and organisational skills; and
- Some understanding of statistical techniques.

# 32. PROJECT TITLE: A HEART ATTACK AT 40 IS NOT SOMETHING TO WORRY ABOUT NOW! PARENTS' PERCEPTIONS OF THE HEALTH OUTCOMES OF THEIR YOUNG CHILDREN'S SCREEN TIME

**Principal supervisor: Dr Trina Hinkley**
**Contact details:** trina.hinkley@deakin.edu.au
(03) 9251 7723

**Supervisor's profile:**
I am a full-time researcher in early childhood physical activity and sedentary behaviours. I have worked and researched in the areas of child public health and epidemiology over the last nine years and am passionate about supporting healthy outcomes in children. My research focuses on physical activity and sedentary behaviours – particularly screen use – during the early childhood period (birth to five years). This includes influences on those behaviours, health outcomes, and identifying and implementing strategies to support healthy levels of those behaviours in our children. I am particularly interested in the influence of physical activity and screen use on children's well-being. Projects I am currently involved with include the HAPPY Study which follows 1000 children from their preschool years into early primary school, and Family@play, which targets reductions in the use of screens by two and three year old children.

**Co-supervisor**
Ms Helen Brown

**Project is based at:** Burwood

**Project description:**
We hear a lot about how it's really important to get a healthy start to life. Lots of pressure is put on parents of young children to make sure their children eat right, exercise right, sleep right … But no-one really knows how much knowledge parents have about their child's health behaviours, what parents think of all pressure and 'guidance' and whether or not their perceptions make a difference to what they do with their kids.

For instance, are parents of young children aware of the physical activity and screen time recommendations? And if so, do they know what they are? Do parents know the consequences of their child's behaviours in terms of health outcomes both during early childhood and in later life? And if they do, which outcomes matter the most to them? These types of questions are important for us to understand so that we can help target appropriate messages to parents of young children. If we are able to reach these families with messages that make sense to them and have some relevance, we may be able to play a role in supporting healthy behaviours in young children. This project will investigate parents' awareness and knowledge of the Australian physical activity and sedentary behaviour recommendations for young children (2-5 years), of the health outcomes of those behaviours during early childhood, and their perceptions of which outcomes are most relevant.

**Methodological approach:**
Recruitment and data collection for this project are complete and therefore this project will be using secondary data analysis. Recruitment and data collection were undertaken wholly online. You will be required to undertake quantitative data analysis to answer your research question. It is likely that there will be opportunity to experience some field work on a related project.

**Necessary skills/knowledge:**
This project would suit students interested in parenting and young children's health behaviours. You should have excellent communication and interpersonal skills. A large part of this project will involve analysis of data. Basic statistical knowledge is important.

## 33. PROJECT TITLE: TV, TWITTER AND TANTRUMS: ARE BABY COUCH POTATOES SOCIAL MISFITS?

**Principal supervisor: Dr Trina Hinkley**
**Contact details:** trina.hinkley@deakin.edu.au
(03) 9251 7723

**Supervisor's profile:**
I am a full-time researcher in early childhood physical activity and sedentary behaviours. I have worked and researched in the areas of child public health and epidemiology over the last nine years and am passionate about supporting healthy outcomes in children. My research focuses on physical activity and sedentary behaviours – particularly screen use – during the early childhood period (birth to five years). This includes influences on those behaviours, health outcomes, and identifying and implementing strategies to support healthy levels of those behaviours in our children. I am particularly interested in the influence of physical activity and screen use on children's well-being. Projects I am currently involved with include the HAPPY Study which follows 1000 children from their preschool years into early primary school, and Family@play, which targets reductions in the use of screens by two and three year old children.

**Co-supervisor**
Dr Megan Teychenne

**Project is based at:** Burwood

**Project description:**
Imagine you have a young child who has not yet started school. You want to give your child the best start to life you can. But there is so much conflicting advice out there that sometimes it's difficult to make sense of it all. For instance, some say that TV and computer are good for children while others say they should be banned. What should you do? This research project will help shed some light on the impact of TV & computer on young children's development.

Little is known about the influence of TV & computer on young children. For instance, does it help with their learning or social skills? Games promoters claim that it does, but generally have no evidence to support their assertions. Early childhood is a critical time for growth and development and understanding how children's behaviours, such as TV & computer, may influence longer term outcomes is essential. This unique project looks at how TV & computer use may influence children's social skills, a critical foundation for later mental health and academic success.

**Methodological approach:**
Recruitment and data collection for this project are complete and therefore this project will be using secondary data analysis. Recruitment and data collection were undertaken wholly online. You will be required to undertake quantitative data analysis to answer your research question. It is likely that there will be opportunity to experience some field work on a related project.

**Necessary skills/knowledge:**
This project would suit students interested in young children's health behaviours and health outcomes. You should have excellent communication and interpersonal skills. A large part of this project will involve analysis of data. Basic statistical knowledge is important.

# 34. PROJECT TITLE: CORRELATES OF TV VIEWING AMONG CHILDREN WITH AUTISM

**Principal supervisor: Associate Professor Anna Timperio**
**Contact details:** anna.timperio@deakin.edu.au
(03) 9251 7244

**Supervisor's profile:**
A/Prof Timperio's research is focused on understanding the range of influences on physical activity, eating behaviours and weight status, particularly among children and adolescents. She is involved in several longitudinal studies with children, adolescents and adults that examine individual, social and environmental influences on behaviour. A/Prof Timperio's other research interests include: physical activity measurement; measurement of the neighbourhood food and physical activity environments; the behavioural epidemiology of weight control; and evaluation of health promotion and public health interventions.

**Co-supervisor**
Dr Trina Hinkley

**Project is based at:** Burwood

**Project description:**
Television viewing is a common pastime among Australian children. Approximately 74% of four 2-4 year-olds and 59% of 5-8 year-olds in Australia exceed current screen-time guidelines. Given the adverse effects screen-time has on children's health and development, particularly cognitive and language development, it is essential to support families to decrease their child's screen-time. In order to develop strategies to reduce TV viewing, an understanding of the key influences on TV viewing is needed. While much is known about TV viewing habits and key correlates among typically developing children, very little is known about TV viewing among children with Autism Spectrum Disorder (ASD).

**Methodological approach:**
This project will be nested within the 'Active Lifestyles in Young Children with Autism' project, a collaborative study involving C-PAN, the School of Psychology and the School of Health & Social Development. In 2014, parents of young children with ASD will complete a survey that includes questions about their child's television viewing behaviours and a range of items about their parenting strategies around physical activity and TV viewing (eg. reinforcement of TV viewing), their child's activity preferences, and the availability of sedentary and physical activity equipment items in the home. The student will undertake secondary analyses to describe TV viewing in the sample and identify key correlates associated with TV viewing (choice of tests of association will depend on the final sample size).

**Necessary skills/knowledge:**
This project is based on secondary data analyses. Ideally students should have completed HSE203. Some experience in the analyses of data using SPSS or other statistical program is desirable, or a willingness and interest in acquiring these skills. Further training and support will be provided.

# 35. PROJECT TITLE: "CAN PARKS MAKE US HAPPY?" - THE ASSOCIATION BETWEEN VISITING PARKS AND DEPRESSIVE SYMPTOMS

**Principal supervisor: Helen Brown**
**Contact details:** hbrown@deakin.edu.au
(03) 92446327

**Supervisor's profile:**
Helen Brown is a Lecturer in the School of Exercise and Nutrition Sciences. She lectures in the areas of sport coaching and children's physical activity and her main interest is investigating influences on children and youth's physical activity. Helen has been involved in several studies relating to this topic, including the development of a family based intervention to promote physical activity in children.

**Co-supervisors**
Dr Jenny Veitch
Dr Megan Teychenne

**Project is based at:** Burwood

**Project description:**
Parks are located in most neighbourhoods, they are generally free to access, offer a variety of opportunities for physical activity and can serve diverse populations. There is evidence that physical activity undertaken in parks may have greater psychological and physiological benefits than activity in other settings. Little is known about how visitation to parks and specific features of parks may be associated with general well-being and depressive symptoms for different groups in the population.

This aim of this project is to examine associations between park usage, park features, and well-being and depressive symptoms among adults.

**Methodological approach:**
This project will be nested within the REVAMP study, which is a 3-year ARC Linkage funded study led by Dr Veitch, and will involve secondary analysis of existing baseline data collected in 2013. Self-reported survey data from approximately 1500 adults from two areas of Melbourne (low and high SES) will be analysed. The student will be required to select appropriate variables (i.e. park visitation, perceptions of neighbourhood parks, activity in parks, well-being, depressive symptoms) from the dataset, and conduct cross-sectional analyses on these data.

**Necessary skills/knowledge:**
Completion of HSE203 is a pre-requisite. Some experience in the analysis of data using SPSS or STATA is desirable, or a willingness and interest in acquiring these skills. Further training and support will be provided.

# 36. PROJECT TITLE: PARKS AND PLAYGROUNDS - HOW MUCH DO THEY CONTRIBUTE TO CHILDREN'S PHYSICAL ACTIVITY?

**Principal supervisor: Helen Brown**
**Contact details:** hbrown@deakin.edu.au
(03) 9244 6327

**Supervisor's profile:**
Helen Brown is a Lecturer in the School of Exercise and Nutrition Sciences. She lectures in the areas of sport coaching and children's physical activity and her main interest is investigating influences on children and youth's physical activity. Helen has been involved in several studies relating to this topic, including the development of a family based intervention to promote physical activity in children.

**Co-supervisor/s**
Dr Jenny Veitch
Associate Professor Anna Timperio

**Project is based at:** Burwood

**Project description:**
Parks and playgrounds offer significant opportunities for children of all ages to be active. This is important as many children are engaging in low levels of physical activity and are not meeting physical activity recommendations. Little is known about how active children are when playing at a playground or how different playground designs may encourage engagement in different levels of physical activity. This aim of this project is to objectively measure (i.e. using accelerometers) the activity levels of children (aged 2-15 years) in a variety of playground settings.

**Methodological approach:**
This project will be nested within the REVAMP study, which is a 3-year ARC Linkage funded study led by Dr Veitch. The student will gain skills in participant recruitment, data collection using accelerometers, and downloading, cleaning and analysing data.

**Necessary skills/knowledge:**
This project will involve data collection and data analyses. Ideally students should have completed HSE203. Some experience in the analysis of data using SPSS or STATA is desirable, or a willingness and interest in acquiring these skills. Further training and support will be provided.

# 37. PROJECT TITLE: BE ACTIVE IN PARKS: PROMPTS TO ENCOURAGE PARK-BASED PHYSICAL ACTIVITY

**Principal supervisor: Helen Brown**
**Contact details:** hbrown@deakin.edu.au
(03) 9244 6327

**Supervisor's profile:**
Helen Brown is a Lecturer in the School of Exercise and Nutrition Sciences. She lectures in the areas of sport coaching and children's physical activity and her main interest is investigating influences on children and youth's physical activity. Helen has been involved in several studies relating to this topic, including the development of a family based intervention to promote physical activity in children.

**Co-supervisors**
Dr Jenny Veitch
Associate Professor Anna Timperio

**Project is based at:** Burwood

**Project description:**
Parks and playgrounds provide important settings for people of all ages and of different socio-economic status (SES) to engage in physical activity. However, parks and playgrounds are often underutilised with many park visitors engaging in low levels of physical activity when in the park. Previous studies have investigated the effectiveness of environmental interventions (such as placing signs at stairwells) to encourage physical activity. The use of prompts such as signs in parks to encourage park users to be more active when visiting the park may be an effective, relatively inexpensive, simple, and sustainable way to increase activity levels in this setting; however, until now this has not been tested.

This aim of this project is to install signs in parks that prompt parks users to be active and then examine the impact of this signage on park usage and park-based activity among children and adults.

**Methodological approach:**
This project will be nested within the REVAMP study, which is a 3-year ARC Linkage funded study led by Dr Veitch. The student will gain skills in study design, data collection on park based physical activity via direct observation of park users and electronic monitoring of paths within the parks, and cleaning and analysing data.

**Necessary skills/knowledge:**
This project will involve data collection and data analyses. Ideally students should have completed HSE203. Some experience in the analyses of data using SPSS or STATA is desirable, or a willingness and interest in acquiring these skills. Further training and support will be provided.

# 38. PROJECT TITLE: SPORTING CLUBS AND SCHOOLS: STRENGTHENING CONNECTIONS TO SUPPORT YOUNG PEOPLE TO BE ACTIVE.

**Principal supervisor: Helen Brown**
**Contact details:** hbrown@deakin.edu.au
(03) 92446327

**Supervisor's profile:**
I am a lecturer in the School of Exercise and Nutrition Sciences and lecture in the areas of sport coaching and children's physical activity. My main interest is investigating influences on children and youth's physical activity. I have been involved in several studies relating to this topic, including the development of a family based intervention to promote physical activity in children.

**Co-supervisors**
Dr Trina Hinkley
Dr Megan Teychenne

**Project is based at:** Burwood

**Project description:**
Physical activity (PA) is an essential component in the development and maintenance of health and wellbeing in youth, however evidence shows that many youth aged 12-16 years do not participate in sufficient levels of PA and fail to meet age-related PA recommendations to achieve health benefits. Sport provides an important opportunity for youth to be physically active on a regular basis and provides a variety of social, psychological and physical experiences which will influence future participation. One way in which to promote sport participation to youth is through schools linking with community sporting clubs to increase access and knowledge about sporting opportunities in the local area.

This project will therefore aim to gain a better understanding of ways in which schools and sports clubs currently link with each other and investigate possibilities to develop stronger and more robust connections so that they may better support young people to be active through sport.

**Methodological approach:**
This project will use quantitative (brief survey measure) and qualitative (interview) methods. The student will be involved in participant recruitment, data collection and analyses.

**Necessary skills/knowledge:**
This project would suit students interested in youth sport and development of strategies to promote participation. It would be desirable if students had completed HSE 313 or HSE 203 or a sport coaching unit.

# 39. PROJECT TITLE: THE IMPACT OF EXERCISE TRAINING AND NUTRITIONAL SUPPLEMENTATION ON FITNESS AND FUNCTIONALITY IN PROSTATE CANCER SURVIVORS TREATED WITH ANDROGEN DEPRIVATION THERAPY

**Principal supervisor: Dr Steve Fraser**
**Contact details:** steve.fraser@deakin.edu.au
(03) 924 46012

**Supervisor's profile:**
Dr Fraser is interested in the role of accredited exercise physiologist led exercise programs for individuals with chronic disease such as diabetes, obesity, cancer, and chronic kidney disease. The primary aim of this body of research is to provide additional evidence for the incorporation of exercise to improve the usual care of individuals with chronic disease. This will likely improve their clinical status, fitness, function, and quality of life.

**Co-supervisor**
Professor Robin Daly

**Project is based at:** Burwood

**Project description:**
In Australia, prostate cancer is the most commonly diagnosed male cancer. Earlier detection and better treatment have resulted in improved cancer survivorship. One of the treatments, androgen deprivation therapy, is now commonly administered for all stages and grades of prostate cancer. It has been estimated that greater than 26,500 Australian men are currently receiving androgen deprivation therapy. Adverse effects of androgen deprivation therapy include negative alterations to musculoskeletal health, cardiometabolic risk and health-related quality of life. Exercise training has been shown to positively affect these adverse effects; however the role of nutritional supplementation in this population remains unknown. This honours project is part of a larger study and will investigate the changes in fitness and functionality outcomes after a six month exercise training and nutritional supplementation intervention.

**Methodological approach:**
This is a randomised controlled trial comprising of an exercise and nutritional supplementation group and a usual care group.
The project will involve:

- Recruitment of men living with prostate cancer treated with androgen deprivation therapy
- Performing fitness assessments (including 30 second sit-to-stand, four square step test, timed up and go, 400 metre walk and three-repetition maximum protocols)
- Training and/or coordinating the training of participants over a six months
- Data entry and analysis of fitness and functionality outcomes

**Necessary skills/knowledge:**
An interest in clinical exercise physiology, chronic disease/cancer, and performance analysis. The ability to work as part of a team; high level of independence and time management. Availability to perform testing and occasional training outside of normal working hours would be desirable but not essential. A strong understanding of Microsoft Excel is an advantage.

# 40. PROJECT TITLE: THE IMPACT OF RAPID WEIGHT LOSS ON $VO_2$MAX AND STRENGTH, WITH OR WITHOUT EXERCISE TRAINING

**Principal supervisor: Dr Steve Fraser**
**Contact details:** steve.fraser@deakin.edu.au
(03) 924 46012

**Supervisor's profile:**
Dr Fraser is interested in the role of accredited exercise physiologist led exercise programs for individuals with chronic disease such as diabetes, obesity, cancer, and chronic kidney disease. The primary aim of this body of research is to provide an additional evidence for the incorporation of exercise to improve the usual care of individuals with chronic disease. This will likely improve their clinical status, fitness, function, and quality of life.

**Co-supervisor**
Dr Clint Miller

**Project is based at:** Burwood

**Project description:**
Rapid weight loss results in improvement in health outcomes but less is known about the impact on aerobic power ($VO_2$max) and muscular strength. Lifestyle modification is considered to be a key strategy for the management of health in overweight, obese and severely obese individuals, yet many individuals fail to meet the minimum physical activity guidelines for general health, and even less meet the minimum target of exercise required for weight loss. There is a perception in the community that regular exercise is difficult to maintain during rapid weight loss (induced by a very low energy diet). In collaboration with the Baker IDI Heart and Diabetes Institute, this honours project will determine the effect of adding supervised exercise to obese adults undergoing rapid weight loss. The primary outcome measures will be aerobic fitness and muscular strength.

**Methodological approach:**
This is a randomised controlled trial comprising of a diet only control group and diet and exercise treatment group.
This project will involve:
Recruitment- women with a BMI above 35kg.m$^{-2}$ aged 18-50 years.
Testing - assisting with graded $VO_{2peak}$ treadmill test, 3RM strength tests, anthropometrics.
Training - overseeing some exercise training.
Analysis - comparing changes over time and between groups for aerobic fitness and muscular strength relative to lean and total body mass (body composition assessed via DEXA).

**Necessary skills/knowledge:**
An interest in clinical exercise physiology, chronic disease/obesity, and performance analysis. The ability to work as part of a team; high level of independence and time management. Availability to perform testing and occasional training outside of normal working hours would be desirable but not essential. A strong understanding of Microsoft Excel is an advantage.

# 41. PROJECT TITLE: THE EFFECTS OF EXERCISE TRAINING ON CARDIOVASCULAR RISK FACTORS FOR OBESE INDIVIDUALS UNDERGOING RAPID WEIGHT LOSS

**Principal supervisor: Dr Steve Fraser**
**Contact details:** steve.fraser@deakin.edu.au
(03) 924 46012

**Supervisor's profile:**
Dr Fraser is interested in the role of accredited exercise physiologist led exercise programs for individuals with chronic disease such as diabetes, obesity, cancer, and chronic kidney disease. The primary aim of this body of research is to provide an additional evidence for the incorporation of exercise to improve the usual care of individuals with chronic disease. This will likely improve their clinical status, fitness, function, and quality of life.

**Co-supervisor**
Dr Clint Miller

**Project is based at:** Burwood

**Project description:**
Around one quarter of Australian and one third of US adults are classified as obese. Further, there is evidence of an acceleration in prevalence of those approaching Class III obesity (body mass index, BMI ≥ 40 $kg \cdot m^{-2}$), compared to overweight and moderately obese individuals (BMI 25-34.9 $kg \cdot m^{-2}$). Those individuals are at a higher risk of developing metabolic and cardiovascular disease compared to those with overweight and grade I obesity. Lifestyle modification is considered to be a key strategy for the management of health in overweight, obese and severely obese individuals, yet surprisingly there is little known in regards to how those with severe obesity respond to a very low energy diet and an exercise physiologist led exercise training program. This Honours project is part of a larger study in collaboration with the Baker IDI Heart and Diabetes Institute and will investigate changes in cardiovascular risk factors during a very low energy diet alone and combined with exercise training.

**Methodological approach:**
This is a randomised controlled trial comprising of a diet only control group and diet and exercise treatment group
This project will involve:
Recruitment- women with a BMI above $35kg.m^2$ aged 18-50 years.
Testing - graded $VO2_{peak}$ treadmill test, 3RM strength tests, anthropometrics.
Training - overseeing the training over 3 months.
Analysis - results related to cardiovascular risk factors.

**Necessary skills/knowledge:**
An interest in clinical exercise physiology, chronic disease/obesity, and performance analysis. The ability to work as part of a team; high level of independence and time management. Availability to perform testing and occasional training outside of normal working hours would be desirable but not essential.

# 42. PROJECT TITLE: CAN WE MONITOR FIREFIGHTERS FATIGUE ON THE JOB IN THE SAME WAY WE MONITOR OUR ATHLETES?

**Principal supervisor: Dr Luana Main**
**Contact details:** luana.main@deakin.edu.au

**Supervisor's profile:**
Luana Main's research focus has been on the psycho-biological monitoring of overtraining in endurance athletes, with her work seeking to identify possible physiological mechanisms behind the development of fatigue in response to stress (physiological +/ psychological), and at the same time, identify ways to non-invasively monitor athletes health and well-being. Currently Luana is now exploring these same research questions in the context of Physically Demanding Occupations (i.e. firefighters, military, mining) with Dr Brad Aisbett with the view to assist industries to develop comprehensive policy, best practice guidelines, and training and educational materials to preserve the health and safety of their personnel on the job.

**Co-supervisor:**
Dr Brad Aisbett

**Project description:**
Each year, bushfire threatens people and property across Australia. Striving to safeguard Australians from the devastation and destruction of bushfire are our rural firefighters. On the fireground, firefighters face a number of physical and mental stressors including; working long hours during day and night shifts, often over consecutive days with little rest between shifts. On shift they must perform arduous physical labour and make complex decisions, amidst extremes in temperature and the personal suffering of others. Managing firefighters stress and fatigue levels during and between fireground shifts so that they are ready and able to perform their duties safely and productively is fundamental for firefighters, their agencies and the public they protect. This honours project represents a key step toward devising a well-validated, practical method to manage firefighters fatigue by evaluating the psycho-physiological impact of multi-day bushfire suppression deployments on firefighters, much like our elite athletes are monitored. The honours research is nested within a larger project investigating the operational readiness of rural firefighters during bushfire suppression under different conditions.

**Methodological approach:**
The data for this study has already been collected; however there will be additional opportunities for data collection experience during the honours year. The data was collected during a three- day simulated fire ground tour during which repeated bouts of physical and cognitive tasks were performed every two hours during wake/work periods. The simulation mimics a three-day bushfire „tour of duty where firefighters work three consecutive 14-hour shifts. Firefighters lived at the simulation site for four days (three nights). During day period firefighters performed physical and cognitive tasks that represented principal duties on the fireground. During day and night periods their physiological, psychological and subjective responses were repeatedly measured. The proposed honours project will explore the relationship between physical performance with physiological and psychological markers of stress and well-being. Through analyses of these relationships the project will strive to distil a discrete set of measures that fire agencies can use to monitor their workers' well-being during deployments.

**Necessary skills/knowledge:**
High levels of time management and initiative, and an interest in statistical data mining and data analyses.

# 43. PROJECT TITLE: CAN EXERCISE TYPE IMPACT ON INTERVERTEBRAL DISC HEALTH?

**Principal Supervisor: Dr Timo Rantalainen**
**Contact details:** d.belavy@deakin.edu.au,
(03) 9244 6606

**Supervisor's profile:**
Dr Timo Rantalainen joined Deakin in August 2013 as a lecturer in biomechanics from the Department of Health Sciences, University of Jyväskylä, Finland. He completed his PhD (2010) at The University of Jyväskylä, Finland. Since January 2014 Dr Rantalainen has worked on an Alfred Deakin Postdoctoral Research Fellowship on effects of dual-task training program on dual-task gait performance. His work has been mainly on estimating lower body skeletal loading with methods varying from examining cross-sectional associations to flexible multibody dynamics full-body modelling. During his PhD, and post-doctoral research he has acquired skills in implementing various image analysis methods, which will be applied in developing computer-assisted segmentation methods to be used in this honours project.

**Co-supervisor**
Associate Professor Daniel Belavy

A/Prof Daniel Belavy joined Deakin in July 2014 from the Center of Muscle and Bone Research at the Charité University Medical School in Berlin, Germany. He completed PhD (2007) at The University of Queensland. In 2007 he was awarded a 2-year post-doctoral fellowship from the Alexander von Humboldt Foundation in Germany to continue his work on the topic of bed-rest at the Charité in Berlin and was later head of "spaceflight physiology" within the Center of Muscle and Bone Research. His work in the last 10 years has focused on the impact of bed-rest (spaceflight simulation) and exercise on muscle, bone, neuromuscular function and the interverterbral disc. For his first projects at Deakin, he will be looking at exercise and the intervertebral disc.

**Project is based at:** Burwood

**Project description:**
Back pain is a major source of disability. Understanding the impact of exercise on the intervertebral disc (IVD) will help us advise the community on back health. There are animal and in vitro studies which can help to guide us. Ironically, however, there has been no study in humans on the impact of exercise on the IVD. Such studies have been around for decades for muscle and bone, so why not for the IVD? The reason for this is that quantifying the IVD can be difficult. Magnetic resonance imaging (MRI) offers a number of tools to investigate the IVD. The aim of this project is to, for the first time, conduct a cross-sectional study on the impact of different loading protocols (athletes in different sporting groups) on the IVD.

This honours project is to be conducted as part of a larger investigation by A/Prof Daniel Belavy on the IVD and exercise. Dr Rantalainen will be involved in the project overall and specifically in developing image analysis approaches.

**Methodological approach:**
A cross-sectional design is to be used, and three groups of people are to be evaluated: athletes from two specific sporting groups and a group of otherwise inactive sedentary people. The MR approaches used will include assessment of, but not be restricted to: T2-relaxation time, IVD response to passive spinal loading, IVD shape. The honours student will assist in subject recruitment, data collection, and will analyse a sub-section of the overall MR-data for their honours thesis.

# PHYSIOLOGY, METABOLISM AND MOLECULAR BIOLOGY HONOURS PROJECTS 2015

## 44. PROJECT TITLE: DOES A NOVEL OBJECTIVE MEASURE OF STRESS (HAIR CORTISOL) PREDICT 2-YEAR WEIGHT GAIN IN WOMEN AND/OR CHILDREN?

**Principal supervisor: Dr Anne Turner**
**Contact details:** anne.turner@deakin.edu.au
(03) 9244 6950

Dr Anne Turner is a Senior Lecturer in Human Physiology in the School of Exercise and Nutrition Sciences and a researcher in the Centre for Physical Activity and Nutrition Research (C-PAN). Her research interests are in the physiology and endocrinology of stress and its impact on human health. In particular, she is interested in modifiable lifestyle factors that influence cortisol, adrenaline, noradrenaline, heart rate and blood pressure responses to psychological stress and the consequences for human health.

**Co-supervisor**
Professor Kylie Ball

**Project is based at:** Burwood

**Project description:**
Prolonged or chronic exposure to stress or the stress hormone cortisol has been found to be associated with higher levels of overweight and obesity. Since cortisol is incorporated into hair as it grows, the recently developed technique of measuring cortisol concentrations in samples of hair collected from the scalp allows us to gain an understanding of a person's exposure to cortisol over the preceding 3-month period. This project will consider if concentrations of cortisol in hair predict weight gain in women and/or children 2 years after measurement of hair cortisol.

**Methodological approach:**
Hair samples from 86 women and 29 children (males and females) participating in the Resilience for Eating and Activity Despite Inequality (READI) study have been collected. These samples have been analysed for cortisol concentrations. As part of the READI study, data relating to the weight, body mass index (BMI) and eating and physical activity patterns of these women and children are also available at baseline (2007/2008) and at 3-year (2010/2011) and 5-year (2012/2013) follow-up. The 5-year (2012/2013) follow-up coincides with the cortisol measures. This project will involve contacting the women and mothers of the children who provided hair samples for cortisol measurement to undertake another survey of weight, BMI, eating and physical activity patterns to determine if hair cortisol concentrations predict weight gain after two additional years.

This project is part of a larger project which also involves other researchers.

**Necessary skills/knowledge:**
This project will suit a student who is well organised and has good communication skills.

# 45. PROJECT TITLE: RESPONSES TO STRESS IN WOMEN UNDERTAKING HIGH OR LOW LEVELS OF PHYSICAL ACTIVITY

**Principal supervisor: Dr Anne Turner**
**Contact details:** anne.turner@deakin.edu.au
(03) 9244 6950

**Supervisor's profile:**
Dr Anne Turner is a Senior Lecturer in Human Physiology in the School of Exercise and Nutrition Sciences and a researcher in the Centre for Physical Activity and Nutrition Research (C-PAN). Her research interests are in the physiology and endocrinology of stress and its impact on human health. In particular, she is interested in modifiable lifestyle factors that influence cortisol, adrenaline, noradrenaline, heart rate and blood pressure responses to psychological stress and the consequences for human health.

**Co-supervisor**
Mr Sisitha Jayasinghe

**Project is based at:** Burwood

**Project description:**
When a person's responses to psychological stress are excessive, they may be at increased risk of developing cardiovascular disease, type 2 diabetes, depression and anxiety. This program of research is considering factors that determine the magnitude of the response to stress in women who undertake high or low levels of physical activity. We expect to find that high levels of physical activity confer protection against excessive responses to stress. Such findings will be important for the prevention of stress-related chronic diseases.

**Methodological approach:**
Data and sample collection for this project are now complete but there are a number of possible projects still to be completed from the data and samples collected. Possible projects in this area include beat-to-beat cardiovascular system responses to stress, the cytokine response to stress, the genetic basis of differences in the magnitude of the stress response and the catecholamine response to food intake. Please feel free to make a time to meet with either principal supervisor (Anne Turner; anne.turner@deakin.edu.au) or co-supervisor (Sisitha Jayasinghe; suj@deakin.edu.au) to discuss the overall program of work and the projects that are possible in 2015. We would love to hear from you and we would love to work with you in our lab in 2015.

**Necessary skills/knowledge:**
This project will suit a student who is well organised and has good communication skills.

# 46. PROJECT TITLE: CAN EXERCISE RESTORE THE MUSCLE HEALTH OF OFFSPRING BORN TO MOTHERS FED A JUNK FOOD DIET DURING PREGNANCY?

**Principal supervisor: Dr Stéphanie Bayol**
**Contact details:** stephanie.bayol@deakin.edu.au
(03) 92446527

**Supervisor's profile:**
Dr Stéphanie Bayol is a molecular physiologist in the School of Exercise and Nutrition Sciences at Deakin University. Her main research interest is to examine how maternal nutrition during pregnancy and lactation influences offspring development, growth and health into adult life. This is done at the cell and molecular levels using animal models of maternal obesity. Her research has made important contributions to understanding how maternal nutrition contributes to obesity and related disorders in offspring.
Dr Bayol holds French and British qualifications in Biomedical Sciences, Biochemistry, Cell and Molecular Biology and Molecular Physiology.

**Co-supervisor**
Dr Glenn Wadley

**Project is based at:** Burwood

**Project description:**
Growing evidence indicates that maternal obesity during pregnancy and lactation promotes obesity and associated disorders, such as type 2 diabetes, in the offspring. However the cell and molecular mechanisms by which this is mediated are largely unknown. Establishing such mechanisms are crucial for the development of targeted interventions to prevent obesity from the early stages of life.
We have developed a rat model to study the effects of maternal obesity on the offspring. With this model, we have shown that offspring born to obese mothers overeat and develop and exacerbated preference for foods rich in fat, sugar and salt. This leads to the early onset of obesity. We have also shown that skeletal muscle development and function were impaired in these offspring.
The current project seeks to further establish the mechanisms by which skeletal muscle development is impaired and whether endurance exercise in early life can reverse some of these defects. This will be carried out using a range of cell, molecular and physiological measurements.

**Methodological approach:**
Pregnant and lactating rats are fed either a lean control diet or a cafeteria "junk food" diet that induces obesity. After weaning, some of their offspring undergo an endurance exercise intervention while their siblings remain sedentary. At the end of the exercise intervention, muscle force measurements are carried out. Tissue samples are also collected to measure any changes in gene expression that may explain why muscle function is impaired.

**Necessary skills/knowledge:**
A background in nutrition and/or exercise physiology are required. Students will be fully trained in the cell and molecular biology techniques required to complete the project.

# 47. PROJECT TITLE: ENDURANCE TRAINING ADAPTATIONS TO IMPROVE SKELETAL MUSCLE LIPID METABOLISM

**Principal supervisor: Dr Kirsten Howlett**
*Please note: Dr Chris Shaw, currently listed as co-supervisor, who commences in SENS on 1st November, 2014. Until this time Kristen will be the primary source of contact for the project.
**Contact details:** kirsten.howlett@deakin.edu.au
(03)5227 2563

**Supervisor's profile:**
Dr Kirsten Howlett is a Senior Lecturer in the School of Exercise and Nutrition Sciences. Her research program is focused on understanding the physiological and cellular responses to exercise with the aim of providing insight into the role of exercise in the maintenance of good health, and prevention and treatment of disease.

**Co-supervisor**
Dr Chris Shaw

**Project is based at:** Geelong

**Project description:**
Lipid stored in skeletal muscle provides an important fuel source during prolonged endurance-type exercise. Endurance training enhances the storage and also utilisation of muscle lipid stores during exercise, which contributes to improved endurance performance. In addition, this improvement in muscle lipid handling also protects against the development of metabolic diseases, such as insulin resistance and type 2 diabetes. The perilipin family of proteins are contained on the surface of lipid droplets and appear to regulate the storage and breakdown of muscle lipids. Differences in the expression and/or location of the perilipin proteins may underlie the adaptations in lipid metabolism following endurance training.

This project will apply fluorescence imaging techniques on freshly isolated single muscle fibres to investigate the effect of endurance training on intramuscular lipid droplets and associated proteins.

**Methodological approach:**
- Recruitment of trained and untrained sedentary individuals
- Maximum aerobic capacity determined by incremental workload test
- Oral glucose tolerance test (as measure of insulin sensitivity)
- Individual skeletal muscle fibers will be isolated from human muscle biopsy samples
- Use of immunofluorescence microscopy to measure lipid droplets and associated proteins

**Necessary skills/knowledge:**
An interest in the area of exercise physiology, muscle metabolism and/or biochemistry is required. Some experience with human exercise testing and analytical laboratory skills are desirable but not essential. All techniques will be taught as part of honours training.

# 48. PROJECT TITLE: ADAMTS AND TYPE 2 DIABETES: EFFECT OF EXERCISE AND HIGH FAT DIET

**Principal supervisor: Dr Kirsten Howlett**
**Contact details:** kirsten.howlett@deakin.edu.au
(03) 5227 2563

**Supervisor's profile:**
Dr Kirsten Howlett is a Senior Lecturer in the School of Exercise and Nutrition Sciences. Her research program is focused on understanding the physiological and cellular responses to exercise with the aim of providing insight into the role of exercise in the maintenance of good health, and prevention and treatment of disease.

**Co-supervisor**
Dr Sean McGee

**Project is based at:** Geelong

**Project description:**
Obesity and type 2 diabetes is a global health problem and a major economic burden in developed countries. Exercise and diet are an important therapy in both the treatment and prevention of these diseases. Recent studies carried out in the School of Medicine's Metabolic Research Unit (MRU) have identified several genes as being potentially important in the development of type 2 diabetes. Among those are genes encoding for extracellular remodelling enzymes called ADAMTS.

Using an ADAMTS deficient animal model the aim of this research project will be to determine their susceptibility to insulin resistance in response to exercise and high fat diet.

**Methodological approach:**
- High fat diet and exercise intervention in ADAMTS deficient and control mice
- Insulin resistance determined by glucose and insulin tolerance test
- Measurement of whole body energy expenditure; body composition; blood glucose, lipids and hormones; skeletal muscle metabolites
- Analysis of gene and protein expression

**Necessary skills/knowledge:**
An interest in the area of exercise physiology, muscle metabolism and/or biochemistry is required. Some experience with exercise testing and analytical laboratory skills are desirable but not essential. All techniques will be taught as part of honours training.

# 49. PROJECT TITLE: MITOCHONDRIAL RESPIRATION IN TRAINED AND UNTRAINED HUMAN SKELETAL MUSCLE

**Principal supervisor: Dr Kirsten Howlett**
**Contact details:** kirsten.howlett@deakin.edu.au
(03)5227 2563

**Supervisor's profile:**
Dr Kirsten Howlett is a Senior Lecturer in the School of Exercise and Nutrition Sciences. Her research program is focused on understanding the physiological and cellular responses to exercise with the aim of providing insight into the role of exercise in the maintenance of good health, and prevention and treatment of disease.

**Co-supervisor**
Dr Chris Shaw

**Project is based at:** Geelong

**Project description:**
Exercise training results in adaptations that lead to improvements in cellular metabolism and energetics. Assessing mitochondrial function in skeletal muscle is critical to understanding these exercise mediated adaptations, as well as their contribution to various health conditions. It is well established that deficiencies in mitochondrial function are critical to the development and progression of many chronic diseases such as insulin resistance and type 2 diabetes.

Several approaches have been used to determine mitochondrial function in skeletal muscle and each has limitations or disadvantages. In this study we aim to utilise a novel approach to measure mitochondrial respiration in individual muscle fibers isolated from trained and untrained human skeletal muscle biopsy samples.

**Methodological approach:**
- Recruitment of trained and untrained sedentary individuals
- Maximum aerobic capacity determined by incremental workload test
- Individual skeletal muscle fibers will be isolated from human muscle biopsy samples
- Mitochondrial respiration measured using Seahorse Bioscience system

**Necessary skills/knowledge:**
An interest in the area of exercise physiology, muscle metabolism and/or biochemistry is required. Some experience with human exercise testing and analytical laboratory skills are desirable but not essential. All techniques will be taught as part of honours training.

# 50. PROJECT TITLE: INVESTIGATING NEW MOLECULAR FACTORS IN SKELETAL MUSCLE REPAIR AND REGENERATION IN MICE

**Principal supervisor: Dr Victoria Foletta**
**Contact details:** victoria.foletta@deakin.edu.au

**Supervisor's profile:**
I am a Research Fellow in the Centre for Physical Activity and Nutrition Research (C-PAN) within the School of Exercise and Nutrition Sciences. I am a molecular and cell biologist and an active researcher interested in investigating the role of molecular factors regulating skeletal muscle growth, metabolism and function.

**Co-supervisor**
Professor Aaron Russell

**Project is based at:** Burwood

**Project description:** *Ndrg2* is a gene that contributes to the growth and metabolism of skeletal muscle cells grown in culture. Its physiological function *in vivo*, ie; in the skeletal muscle of mice, has not yet been well characterised. The aim of this project is to determine whether the overexpression or knockdown of *Ndrg2* expression in mouse skeletal muscle tissue following an acute injury will alter the ability of the muscle to repair and regenerate. This study will provide important proof of concept outcomes towards understanding more about the role and requirement for *Ndrg2* in skeletal muscle health and function.

**Methodological approach:**
The *tibialis anterior* (TA) muscles of 8 week old C57BL/6 mice will be injected with a recombinant associated-adenovirus encoding either mouse *Ndrg2* or a short hairpin (sh)RNA sequence to overexpress or knockdown *Ndrg2* expression levels *in vivo*, respectively. Control viruses will be delivered into the TA muscle of the opposite leg. An acute muscle injury will be introduced using a myotoxin. Ten days later following muscle repair, end-point measurements of the TA muscle including muscle force production, histology, and expression analyses of *Ndrg2* and genes associated with muscle repair and regeneration will be performed.

**Necessary skills/knowledge:**
Knowledge or interest in molecular and muscle biology and physiology and basic statistics.

# 51. PROJECT TITLE: EFFECT OF ELECTRICAL PULSE STIMULATION (EPS) ON HUMAN MUSCLE CELL GROWTH

**Principal supervisor: Dr Paul Della Gatta**
**Contact details:** pauldg@deakin.edu.au

Dr Della Gatta is a Project Manager in the School of Exercise and Nutrition Science. His research is focused on understanding the molecular factors regulating skeletal muscle growth, regeneration and function. Since finishing his PhD in 2011, Dr Della Gatta has worked on numerous projects within the school with roles including the coordination of a number of clinical and exercise trials, development of human skeletal muscle cells lines, experimental conception, design and troubleshooting, various molecular analyses of biological and tissue samples, protocol development and the co-supervision of 1 PhD student and 2 honours students.

**Co-supervisor**
Prof Aaron Russell

**Project is based at:** Burwood

**Project description:** Exercise elicits stimuli to promote positive skeletal muscle adaptations and is seen as one of the most potent interventions to maintain whole body health and maintain healthy muscle mass. However, our knowledge of how exercise promotes muscle growth is limited. One of the major limitations that has hampered our understanding of exercise-induced muscle growth is the absence of a suitable *in vitro* experimental model that mimics exercise. While correlative changes in molecular factors can be measured in human muscle after exercise, it is not possible to establish their precise roles in muscle health. The invasive nature of the muscle biopsy technique limits sampling opportunities. Also, the muscle biopsy itself may inadvertently be contaminated with blood and other cell types that reside within skeletal muscle tissue and may give rise to false positive observations. Growing human skeletal muscle cells in culture allows better control of experimental design and thus provides more valuable and accurate insights into skeletal muscle growth, regeneration, metabolism and atrophy. In recent years, several international research groups have adopted the use of electrical pulse stimulation (EPS) to contract rodent skeletal muscle cells in culture and thus developed the ability to simulate an exercise-like *in vitro* model. However, this work has limitations, as it was completed using rodent muscle cells and these cells may not be representing the responses that occur in human skeletal muscle tissue. Therefore, the aim of this project is to establish the effect of EPS on the growth and hypertrophy of human skeletal muscle cells in culture and establish the molecular mechanisms by which muscle contraction may induce muscle growth.

**Methodological approach:**
Human skeletal muscle cells will be grown, differentiated and subjected to different electrical pulse stimulation protocols. Following experimentation, cells will be harvested for gene and protein analysis (using polymerase chain reaction and western blotting, respectively). Immunocytochemistry will also be performed to visualise the development of structural and contractile proteins and to measure cell size.

**Necessary skills/knowledge:**
An understanding and interest in muscle physiology and function is desired. Laboratory skills will be taught during the year.

**Other details:** Human skeletal muscle cells have been isolated and are frozen down ready for experimentation. The project is ready to commence immediately. The skills obtained from this project are essential laboratory skills.

# 52. PROJECT TITLE: TARGETING MICRORNA'S TO TREAT MOTOR NEURONE DISEASE (MND)

**Principal supervisor: Professor Aaron Russell**
**Contact details:** aaron.russell@deakin.edu.au

**Supervisor's profile:**
I am a Professor in the School of Exercise and Nutrition Science. Over the past 13 years I have been investigating the molecular factors that control skeletal muscle adaptation to exercise, ageing and diseases such as muscular dystrophy and motor neurone disease. Specifically, I am interested in proteins regulating muscle contraction, growth and mitochondrial function. My research team uses various molecular tools to increase or decrease gene targets that might be regulating muscle function. My team uses human and rodent exercise models as well as muscle cell culture systems.

**Co-supervisor**
Dr Victoria Foletta

**Project is based at:** Burwood

**Project description:** MicroRNA's are small molecules that regulate signalling networks in our cells. We have identified a microRNA (miR-23a) that is elevated in the muscles of patients with motor neurone disease (MND) as well as a mouse model of motor neurone disease (MND). We have also identified that miR-23a inhibits a protein that is important for mitochondrial function and protection against muscle wasting. Therefore we believe that stoping the elevation of miR-23a may delay the disease on-set or severity of MND.

**Methodological approach**:
MND mice will be injected with an inhibitor that will stop the upregulation of miR-23a. We will look at the ability of the mice to exercise and the progression of the disease. Gene and protein analysis will be performed using polymerase chain reaction and western blotting respectively. Activity of mitochondrial enzymes will also be measured.

**Necessary skills/knowledge:**
An understanding and interest in muscle physiology and function is desired. Laboratory skills will be taught during the year.

**Other details:** Ethics has been approved and this tissues are collected. The project is ready to commence immediately. The skills obtained from this project are essential laboratory skills that can be transferred to future research projects and teams into the future.

# 53. PROJECT TITLE: ESTABLISHING THE ROLE OF THE STARS PROTEIN IN REGULATING MITOCHONDRIAL ENZYME ACTIVITY IN SKELETAL MUSCLE

**Principal supervisor: Professor Aaron Russell**
**Contact details:** aaron.russell@deakin.edu.au

**Supervisor's profile:**
I am a Professor in the School of Exercise and Nutrition Science. Over the past 13 years I have been investigating the molecular factors that control skeletal muscle adaptation to exercise, ageing and diseases such as muscular dystrophy and motor neuron disease. Specifically, I am interested in proteins regulating muscle contraction, growth and mitochondrial function. My research team uses various molecular tools to increase or decrease gene targets that might be regulating muscle function. My team uses human and rodent exercise models as well as muscle cell culture systems.

**Co-supervisor**
Dr Severine Lamon

**Project is based at:** Burwood

**Project description:** Our published work suggests that the STARS (striated muscle activator of Rho signalling) protein is required for muscle function and that one of its regulated mechanisms is mitochondrial biogenesis. Tissue samples have been collected from mice that have been bred with no STARS protein in their muscle, a small amount of STARS protein in their muscle or with normal amounts of STARS protein in their muscle. These mice have completed endurance training known to increase mitochondrial biogenesis. The tissue will be analysed to establish if the muscle requires the STARS protein to increase its mitochondrial number and function following endurance training.

**Methodological approach:**
Gene and protein analysis will be performed using polymerase chain reaction and western blotting respectively. Activity of mitochondrial enzymes will also be measured.

**Necessary skills/knowledge:**
An understanding and interest in muscle physiology and function is desired. Laboratory skills will be taught during the year.

**Other details:** Ethics has been approved and this tissues are collected. The project is ready to commence immediately. The skills obtained from this project are essential laboratory skills that can be transferred to future research projects and teams into the future.

# 54. PROJECT TITLE: UNDERSTANDING THE ROLE OF LIPID METABOLISM IN REGULATING SKELETAL MUSCLE FUNCTION.

**Principal supervisor: Dr Clinton Bruce**
**Contact details:** clinton.bruce@deakin.edu.au
(03) 9244 6684

**Supervisor's profile:**
Our research group is focused on understanding the regulation of carbohydrate and lipid metabolism in skeletal muscle and liver. Within this broad area, we have two themes: 1) understanding and defining the mechanisms which contribute to impaired glucose metabolism in obesity, insulin resistance and type 2 diabetes; and 2) examining the role of lipids in regulating skeletal muscle function.

**Co-supervisor**
Dr Gunveen Kaur

**Project is based at:** Burwood

**Project description:**
Skeletal muscle represents ~40% of total body mass, making it the largest organ in the body. Muscle is composed of different fibre types which vary in their contractile and metabolic properties. As muscle function is in part regulated by its fibre composition and size, it is critical to gain a better understanding of what controls these factors. Using mouse models, we have identified a lipid metabolic pathway that is involved in regulating muscle mass, mitochondrial content, oxidative capacity and muscle performance. Importantly we have shown this same pathway is altered in muscle from human patients with Duchenne muscular dystrophy, highlighting the clinical importance of this pathway in muscle pathology. To gain further insight into this pathway, key regulatory enzymes will be genetically modified (over-expressed and knocked out) to examine effects on muscle function, mitochondrial content and metabolic responses.

**Methodological approach:**
Undertaking this project will involve animal (in vivo) experiments. Our lab routinely uses advanced physiological, biochemical (metabolomics/lipidomics/flux analysis) and molecular biology techniques that involve metabolite, protein, RNA and DNA analysis. We also use a broad range of imaging/microscopy techniques as well as approaches to manipulate gene expression in skeletal muscle of mice.

**Necessary skills/knowledge:**
Course work in exercise physiology/metabolism, biochemistry and/or molecular biology. All laboratory techniques will be taught to the student as part of the honours training.

# 55. PROJECT TITLE: CHARACTERISING THE POSTPRANDIAL MOLECULAR AND METABOLIC RESPONSES IN SKELETAL MUSCLE AND ADIPOSE TISSUE.

**Principal supervisor: Dr Clinton Bruce**
**Contact details:** clinton.bruce@deakin.edu.au
(03) 9244 6684

**Supervisor's profile:**
Our research group is focused on understanding the regulation of carbohydrate and lipid metabolism in skeletal muscle and liver. Within this broad area, we have two themes: 1) understanding and defining the mechanisms which contribute to impaired glucose metabolism in obesity, insulin resistance and type 2 diabetes; and 2) examining the role of lipids in regulating skeletal muscle function.

**Co-supervisor**
Dr Greg Kowalski

**Project is based at:** Burwood

**Project description:**
In response to a meal, insulin is secreted from the pancreas which stimulates glucose clearance from the blood stream into tissues such as fat and skeletal muscle. The biological effects of insulin, including its metabolic actions, are regulated by binding to its receptor which leads to activation of numerous signalling events. However, these signalling events have not been thoroughly characterised in response to physiological changes in insulin which occur following a meal. Therefore, these studies will examine activation of the insulin signalling pathway in skeletal muscle and fat biopsies obtained from healthy humans at a number of time points following a meal. The biochemical profile of these tissue samples will also be determined so that the metabolic and signalling actions of insulin can be correlated. This project will provide important insights into physiologic regulation of postprandial glucose metabolism.

**Methodological approach:**
A meal feeding study will be undertaken in healthy humans which will involve tissue (muscle and fat) sampling at various time points following the meal. Advanced biochemical (metabolomics/flux analysis) and molecular biology techniques will be performed for metabolite, protein, RNA and DNA analysis.

**Necessary skills/knowledge:**
Course work in physiology (nutritional or exercise), metabolism and biochemistry. All laboratory techniques will be taught to the student as part of the honours training.

# 56. PROJECT TITLE: HOW DOES PHYSICAL ACTIVITY IN CHILDHOOD IMPROVE THE ADULT HEART?

**Principal supervisor: Dr Glenn Wadley**
**Contact details:** glenn.wadley@deakin.edu.au
(03) 92446018

**Supervisor's profile:**
Dr Wadley is a senior lecturer in the School of Exercise and Nutrition Sciences. A key focus of his research program is investigating the molecular mechanisms regulating skeletal and cardiac muscle adaptations following exercise. These topics have important implications for the treatment and prevention of Type 2 diabetes and cardiovascular disease. His current research projects utilize a range of approaches from human exercise trials down to animal and cell culture experiments to investigate these areas. Some of Dr Wadley's projects are currently funded by the National Health and Medical Research Council (NHMRC) of Australia, Deakin University and he has received substantial funding from the Heart Foundation.

**Co-supervisor**
Professor Aaron Russell

**Project is based at:** Burwood

**Project description:** We have found in rats that a few weeks of regular exercise during juvenile development (i.e. before adolescence), results in bigger hearts in adulthood. This is despite them being sedentary for their entire adult lives and long after the training effects should have worn off. It is possible one of the molecular mechanisms to explain these surprising findings could be due to exercise altering microRNA (miRNAs) levels during cardiac development. MiRNA's are small noncoding ribonucleic acids (RNAs) that are known to function by inhibiting protein translation or enhance messenger RNA degradation. Therefore, the aim of this project is to examine if mimicking the effect of endurance exercise by altering the hearts miRNA expression will lead to bigger hearts in these rats.

**Methodological approach:**
Laboratory techniques include protein extraction, RNA extraction, real-time PCR analysis, western blotting and enzymatic assays.

**Necessary skills/knowledge:**
Course work in exercise physiology/metabolism is required. Coursework in biochemistry and/or molecular biology is an advantage but not necessary. All laboratory techniques will be taught to the student as part of the Honours training.

# 57. PROJECT TITLE: HOW ARE MITOCHONDRIA SYNTHESISED FOLLOWING ENDURANCE EXERCISE?

**Principal supervisor: Dr Glenn Wadley**
**Contact details:** glenn.wadley@deakin.edu.au
(03) 92446018

**Supervisor's profile:**
Dr Wadley is a senior lecturer in the School of Exercise and Nutrition Sciences. A key focus of his research program is investigating the molecular mechanisms regulating skeletal and cardiac muscle adaptations following exercise. These topics have important implications for the treatment and prevention of Type 2 diabetes and cardiovascular disease. His current research projects utilize a range of approaches from human exercise trials down to animal and cell culture experiments to investigate these areas. Some of Dr Wadley's projects are currently funded by the National Health and Medical Research Council (NHMRC) of Australia, Deakin University and he has received substantial funding from the Heart Foundation.

**Co-supervisor**
Professor Aaron Russell

**Project is based at:** Burwood

**Project description:** Some of the major health benefits of regular exercise are increased mitochondrial content, antioxidant defences and insulin sensitivity and reduced oxidative stress in skeletal muscle. microRNA are small non-coding ribosomal nucleic acid (RNA) molecules that are expressed in skeletal muscle and are involved in regulating these adaptive responses of muscle to exercise training. Furthermore, we have shown that the expression levels of many microRNA's are increased following exercise in skeletal muscle of humans. There is now evidence in cell culture that microRNA translocate from the cytosol of the cell to the mitochondria. Therefore, studies are now required to examine if microRNA's translocate to the mitochondria in human skeletal muscle following endurance exercise. Healthy active participants will complete a bout of endurance exercise with muscle biopsies taken before and after exercise. The nuclear, cytosolic and mitochondria fractions of the muscle will be isolated and the microRNA levels measured. Thus, this project will provide important insights into the mechanisms that stimulate muscle to adapt to endurance exercise training.

**Methodological approach:**
Exercise screening and testing of healthy volunteers. Laboratory techniques include protein extraction, real-time PCR analysis, western blotting and enzymatic assays.

**Necessary skills/knowledge:**
Course work in exercise physiology/metabolism is required. Coursework in biochemistry and/or molecular biology is an advantage but not necessary. All laboratory techniques will be taught to the student as part of the Honours training.

# 58. PROJECT TITLE: THE EFFECTS OF SELENOPROTEIN S (SEPS1) ON SKELETAL MUSCLE AND SYSTEMIC INFLAMMATION AND ITS EFFECTS IN THE *MDX* DYSTROPHIC MOUSE.

**Principal supervisor: Dr Craig Wright**
**Contact details:** craig.wright@deakin.edu.au
(03) 95247 9266

**Supervisor's profile:**
Craig is a lecturer in the School of Exercise and Nutrition Sciences based at the Waurn Ponds Campus. A key focus of his research program is investigating the molecular mechanisms regulating skeletal muscle growth and regeneration in exercise and disease. These topics have important implications for skeletal muscle regeneration following trauma as well as the treatment of musculoskeletal diseases.

**Co-supervisor**
Nicole Stupka (MRU)

**Project is based at:** Geelong (Waurn Ponds)

**Project description:**
In humans, gene polymorphisms in Selenoprotein S are associated with inflammation. SEPS1 is highly expressed in skeletal muscle and is protective against inflammation, oxidative and ER stress. Excess inflammation and cellular stress are hallmarks of chronic muscle wasting diseases, including Duchenne Muscular Dystrophy (DMD), and lead to compromised repair and poor contractile function. Here, we propose to investigate the role of a reduction in SEPS1 expression in skeletal muscle inflammation, repair and muscle function in SEPS1 heterozygous knockout mdx dystrophic mice. The aims of this study are to investigate the role of SEPS1 in systemic and skeletal muscle inflammation in order to elucidate a role for SEPS1 in skeletal muscle repair and inflammation. This could lead to the development of novel therapeutic approaches for muscular dystrophy.

**Methodological approach:**
Prof Sof Adrinkopoulos (Austin Hospital, The University of Melbourne) has demonstrated that SEPS1 heterozygous knockout mice (SEPS1-/+) have reduced SEPS1 protein expression compared to wild-type litter-mates in peripheral tissues, including skeletal muscle. Therefore, cross breeding a SEPS1(-/+) with an mdx dystrophic mouse will produce male SEPS1-/+ mdx dystrophic pups and dystrophic litter mate controls. Specifically, body composition, metabolism and spontaneous physical activity, whole body strength and *ex vivo* contractile function testing on isolated hindlimb muscles. End point measures will include gene and protein anaylsis from peripheral tissues including skeletal muscle and bone marrow derived cells in cell culture using RT-PCR, western blotting, ELISA, tissue sectioning and H&E staining and immunofluorescent microscopy.

**Necessary skills/knowledge:**
Course work in exercise physiology, biochemistry and/or molecular biology would be advantageous. All laboratory techniques will be taught to the student as part of the honours training.

# FOOD SCIENCE AND NUTRITION HONOURS PROJECTS 2015

## 59. PROJECT TITLE: CHILDREN'S SENSORY SPECIFIC SATIETY, COMPARISON OF 3 OUTCOME MEASURES

**Principal supervisor: Dr Gie Liem**
**Contact details:** Gie.liem@deakin.edu.au
(03) 9244 6039

**Supervisor's profile:**
Gie is a senior lecturer in the school of exercise and nutrition sciences. He is co-leader of the sensory science group which delivers top quality research concerning sensory and consumer science. Sensory Specific Satiety is an ongoing research topic in the sensory science group.

**Co-supervisor:**
Dr Katie Lacy

**Project description:**
Liking is one of the most important determinants of children's food consumption. Unhealthy food patterns can affect children's health and track into adulthood resulting in a high risk for obesity and associated negative health outcomes such as diabetes and cardiovascular diseases. Currently little is known about how liking of foods changes while children are consuming food. This change in liking is also known as Sensory Specific Satiety. Some children develop Sensory Specific Satiety quicker than others. These differences might be associated with food choice behaviours such as picky eating and overconsumption.

*There are 3 ways to measure Sensory Specific Satiety 1) measure the change in liking, 2) measure the change in desire and 3) measure the change in consumption. To date it is unclear whether these 3 outcome measures are correlated when testing Sensory Specific Satiety in children. The current project will compare these 3 measurements in a group of children*.

**Methodological approach:**
In a cross-over experimental design children are invited to consume a variety of foods. You will measure changes in liking, desire and consumption. In addition parents are asked to fill out a questionnaire about children's eating behaviours.

**Necessary skills/knowledge:**
A general understanding of sensory science and the psychology of food choice.

# 60. PROJECT TITLE: SENSORY SPECIFIC SATIETY IN CHILDREN, THE ROLE OF FLAVOUR INTENSITY

**Principal supervisor: Dr Gie Liem**
**Contact details:** Gie.liem@deakin.edu.au
(03) 9244 6039

**Supervisor's profile:**
Gie is a senior lecturer in the school of exercise and nutrition sciences. He is co-leader of the sensory science group which delivers top quality research concerning sensory and consumer science. Sensory Specific Satiety is an ongoing research topic in the sensory science group.

**Co-supervisor:**
Dr Katie Lacy

**Project description:**
Liking is one of the most important determinants of children's food consumption. Unhealthy food patterns can affect children's health and track into adulthood resulting in a high risk for obesity and associated negative health outcomes such as diabetes and cardiovascular diseases. Currently little is known about how liking of foods changes while children are consuming food. This change in liking is also known as Sensory Specific Satiety. Some children develop Sensory Specific Satiety quicker than others. These differences might be associated with food choice behaviours such as picky eating and overconsumption.

*Research with adults clearly suggests that foods with a more intense flavour generate more Sensory Specific Satiety than similar foods with a less intense flavour. It remains to be investigated if this is also the case with children and if this potential difference in Sensory Specific Satiety is associated with children's food choice behavior.*

The present study investigates children's Sensory Specific Satiety for a variety of foods which differ in flavour intensity. The study aims to find a link between Sensory Specific Satiety and children's food choice behavior.

In this project you will be involved in all aspects of research (i.e. the design, recruitment, testing with children, data analyses and interpretation of the data you collected).

**Methodological approach:**
In a cross-over experimental design children are invited to consume a variety of foods. You will measure changes in liking and consumption. In addition parents are asked to fill out a questionnaire about children's eating behaviours.

**Necessary skills/knowledge:**
A general understanding of sensory science and the psychology of food choice.

# 61. PROJECT TITLE: SENSORY SPECIFIC SATIETY IN ADULTS

**Principal supervisor: Dr Gie Liem**
**Contact details:** Gie.liem@deakin.edu.au
(03) 9244 6039

**Supervisor's profile:**
Gie is a senior lecturer in the school of exercise and nutrition sciences. He is co-leader of the sensory science group which delivers top quality research concerning sensory and consumer science. Sensory Specific Satiety is an ongoing research topic in the sensory science group.

**Co-supervisor:**
TBA

**Project description:**

Liking is one of the most important determinants of children's food consumption. Unhealthy food patterns can affect children's health and track into adulthood resulting in a high risk for obesity and associated negative health outcomes such as diabetes and cardiovascular diseases. Currently little is known about how liking of foods changes while children are consuming food. This change in liking is also known as Sensory Specific Satiety. Some children develop Sensory Specific Satiety quicker than others. These differences might be associated with food choice behaviours, such as picky eating and overconsumption.

*We want to compare the development of sensory specific satiety in adults as well as children. In this Honours project you will measure the development of Sensory Specific Satiety in adults.*

**Methodological approach:**
In a cross-over experimental you will measure, with adult subjects, changes in liking and consumption of a variety of foods. In addition participants are asked to fill out a number of questionnaires about their food choice behavior.

**Necessary skills/knowledge:**
A general understanding of sensory science and the psychology of food choice.

# 62. PROJECT TITLE: SENSORY SPECIFIC SATIETY IN CHILDREN, THE ROLE OF PRODUCT CONSISTENCY

**Principal supervisor: Dr Gie Liem**
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**Supervisor's profile:**
Gie is a senior lecturer in the school of exercise and nutrition sciences. He is co-leader of the sensory science group which delivers top quality research concerning sensory and consumer science. Sensory Specific Satiety is an ongoing research topic in the sensory science group.

**Co-supervisor:**
TBA

**Project description:**
Liking is one of the most important determinants of children's food consumption. Unhealthy food patterns can affect children's health and track into adulthood resulting in a high risk for obesity and associated negative health outcomes such as diabetes and cardiovascular diseases. Currently little is known about how liking of foods changes while children are consuming food. This change in liking is also known as Sensory Specific Satiety. Some children develop Sensory Specific Satiety quicker than others. These differences might be associated with food choice behaviours, such as picky eating and overconsumption.

*Research with adults clearly suggests that the consistency of food (i.e. liquid, semi liquid, solids) generates different levels of Sensory Specific Satiety. Little is known if this is also the case with children and if this potential difference in Sensory Specific Satiety is associated with children's food choice behavior.*

The present study investigates children's Sensory Specific Satiety for a variety of foods which differ in consistency. The project aims to find a link between Sensory Specific Satiety and children's food choice behavior.

In this project you will be involved in all aspects of research (i.e. the design, recruitment, testing with children, data analyses and interpretation of the data you collected)

**Methodological approach:**
In a cross-over experimental design children are invited to consume a variety of foods. You will measure changes in liking and consumption. In addition parents are asked to fill out a questionnaire about children's eating behaviours.

**Necessary skills/knowledge:**
A general understanding of sensory science and the psychology of food choice.

# 63. PROJECT TITLE: THE EFFECT OF A 12 WEEK NUTRITIONAL INTERVENTION ON OVERWEIGHT AND OBESITY IN POST-LIVER TRANSPLANT PATIENTS AT AUSTIN HEALTH

**Principal supervisor: Associate Professor Tim Crowe**
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(03) 9251 7266

**Supervisor's profile:**
Tim is a nutrition academic and Accredited Practising Dietitian. He teaches across the undergraduate and postgraduate programs in nutrition dietetics in the areas of nutritional physiology and biochemistry as well as the applied role of nutrition in disease prevention and management, particularly obesity, diabetes and cancer. He is actively involved in several areas of nutrition research including specialised nutrition in the prevention of surgical complications; malnutrition identification; and nutrition support in wound healing.

**Co-supervisors**
Brooke Chapman
Gemma Collins

**Project is based at:** Burwood and Austin Health

**Project description:**
Improved survival after liver transplant (OLTx) and the increasing number of transplants performed have meant that the long-term consequences of OLTx are becoming more evident. These commonly include obesity, hyperlipidaemia, diabetes mellitus, renal dysfunction and bone disease. Excessive weight gain after OLTx has been widely reported, and local data from Austin Health demonstrates the prevalence of overweight and obesity in patients at 2 years post OLTx is 70%. The development of obesity after OLTx not only impacts on patient morbidity and quality of life, but can also affect viability of the transplant graft. This project will aim to assess whether a 12-week nutritional intervention can reduce the rate of overweight and obesity in the post-OLTx patient population at Austin Health.

**Methodological approach:**
Patients that are at least 6 months post-OLTx will be invited to participate in a 12-week weight loss program. Patients that agree to participate in the program will receive structured dietary and lifestyle advice in a group setting at baseline (week 0), week 6 and week 12. These patients will also receive regular communication via other modes, including email, and will record their food intake and physical activity data via smartphone app. Patients that are unable to attend the group program will act as a control group, and receive standard dietetic care and receive basic nutritional advice and a written education resource outlining healthy diet and lifestyle measures, which is current practice. All participants will be monitored for anthropometric and biochemical measures. This will include weight, BMI, waist circumference, total cholesterol and fractions, HbA1c, and liver function tests at baseline (week 0) and week 12.

**Necessary skills/knowledge:**
Dietary analysis skills, IT skills, understanding of the role of nutrition in disease, and the ability to work in a hospital environment as part of a medical research team. This work will be performed within the Nutrition and Dietetics Department, Austin Health.

# 64. PROJECT TITLE: CHANGES IN BODY COMPOSITION FOLLOWING ACUTE SPINAL CORD INJURY

**Principal supervisor: Associate Professor Tim Crowe**
**Contact details:** tim.crowe@deakin.edu.au
(03) 9251 7266

**Supervisor's profile:**
Tim is a nutrition academic and Accredited Practising Dietitian. He teaches across the undergraduate and postgraduate programs in nutrition dietetics in the areas of nutritional physiology and biochemistry as well as the applied role of nutrition in disease prevention and management, particularly obesity, diabetes and cancer. He is actively involved in several areas of nutrition research including specialised nutrition in the prevention of surgical complications; malnutrition identification; and nutrition support in wound healing.

**Co-supervisor**
Kate Desneves, Senior Clinician-Dietitian, Austin Health

**Project is based at:** Burwood & Austin Health, Austin Campus Heidelberg & Royal Talbot Rehabilitation Campus, Kew.

**Project description:** Acute spinal cord injury (SCI) can lead to malnutrition, with loss of lean body mass (LBM) as a result of an initial hypermetabolic response to the stress of injury as well as an abrupt decrease in activity because of paralysis. Conversely, throughout the rehabilitation phase weight gain is common due to SCI patients having lower fat free mass and therefore significantly decreased resting energy expenditure (Buchholz et al. 2003), as well as decreased activity levels. Retrospective studies show a high prevalence of overweight and obesity in this patient group (Gupta et al. 2006) and a higher incidence of lifestyle diseases than the general population (Wahman et al. 2010).

Assessment of nutritional needs in this population is challenging, with multiple factors affecting nutritional status, the unreliability of weight measurements and a lack of appropriate reference values. The aim of this study is to monitor body composition using bioelectrical impedance across a patient's journey from acute to rehabilitation. By measuring segmental body composition it is hoped that we may be able to determine the best marker of nutritional status and when to cease oral nutrition support and focus on prevention of weight gain.

**Methodological approach:**
This is an observational study of patients admitted to the Victorian Spinal Cord Service with a new spinal cord injury. Weight and body composition (using BIA ) and skinfold and circumference measures will be measured at fortnightly intervals until patients are discharged. Dietary Intake will also be assessed and compared to estimated energy, protein and fluid requirements.

**Necessary skills/knowledge:**
Dietary analysis, IT skills, understanding of the role of nutrition in disease, and the ability to work in a hospital environment as part of a medical research team. This work will be performed within the Nutrition and Dietetics Department, Austin Health.

**Other details:** Cross campus travel will be required. Training on the use of BIA will be provided.

# 65. PROJECT TITLE: THE EFFECT OF EXERCISE COMBINED WITH CALCIUM-VITAMIN D3 ENRICHED MILK ON HEALTH-RELATED QUALITY OF LIFE IN OLDER MEN AT RISK OF FALLING

**Principal supervisor: Dr Susan Torres**
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03 9244 6189

**Supervisors Profile**
Dr Susan Torres is an accredited practicing dietitian and senior lecturer in Nutrition and Dietetics in the School of Exercise and Nutrition Sciences. Her current research assesses the relationship between indicators of mental health and dietary intake. She has conducted intervention studies assessing the impact of dietary modifications and weight loss on mood, anxiety and blood pressure responses to stress. Recently, Dr Torres has been investigating how stress response differs in lean versus obese individuals and the impact of lifestyle interventions on quality of life.

**Co-supervisors**
Dr Stella O'Connell
Professor Caryl Nowson

**Project is based at:** Burwood

**Project description:**
The effect of exercise and calcium-vitamin D3 enriched milk on health-related quality of life in older men at risk of falling.

**Method**
In this 18-month randomised controlled trial, 180 men aged 50-79 years were randomised to four groups, two that included an exercise intervention: exercise plus calcium-vitamin D3 enriched milk and exercise alone (the exercise intervention group*) and two that did not: calcium-vitamin D3 enriched milk alone and a control group (the control group*). SF36 questionnaires were completed at baseline, 6 and 12 months to measure quality of life. Demographic details and anthropometric measurements, medical history, 3-day food diary, CHAMPS physical activity questionnaire were completed along with 25(OH)D and PTH serum levels.

**Hypothesis**
Health-related quality of life as measured by the SF36v1 subscales and the summary Mental Component Score will improve in older men who undergo a 12-month program of exercise and calcium/vitamin D supplementation administered separately and together.

**Necessary skills/knowledge:**
Good communication and organisational skills.

# 66. PROJECT TITLE: THE NUTRITIONAL QUALITY OF FOODS CONSUMED DURING SCHOOL HOURS IN A SAMPLE OF VICTORIAN PRIMARY SCHOOLCHILDREN

**Principal supervisor: Dr Carley Grimes**
**Contact details:** carley.grimes@deakin.edu.au
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Burwood Campus. Buidling J, Room J4.32

**Supervisor's profile:**
Dr Carley Grimes is a Heart Foundation supported Postdoctoral Research Fellow within the School of Exercise and Nutrition Sciences and is a member of the Centre for Physical Activity and Nutrition Research (C-PAN). Her research interests include dietary salt intake and cardiovascular health; children's dietary intake and obesity prevention.

**Co-supervisors**
Prof Caryl Nowson
Dr Katie Lacy

**Project is based at:** Geelong

**Project description:**
The diets of Australian schoolchildren are generally poor, characterised by low consumption of fruits and vegetables and high consumption of energy dense and salty foods. To improve children's diets it is important to understand what foods are consumed in key settings, such as the school environment. The aim of this project is to determine the types of foods (core vs. non-core) consumed during school hours by Victorian schoolchildren and the contribution of these foods to children's daily nutrient intakes. This information can be used to help guide healthy eating interventions targeted within the school environment.

**Methodological approach:**
Secondary analysis of data collected within the cross-sectional Salt and Other Nutrient Intakes in Children study (SONIC). The SONIC study included children (n=876) aged 5-13 years attending Victorian primary schools. To assess food and beverage intake a 24-hr dietary recall was completed. This dietary data has been entered into the food composition program FoodWorks. This data will be used to assess the nutritional quality of foods consumed during school hours.

**Necessary skills/knowledge:**
Strong written communication skills. Skills in data management and statistical analysis will be developed throughout the program.

# 67. PROJECT TITLE: ASSESSMENT OF THE SODIUM CONTENT OF FOOD PRODUCTS SOLD WITHIN SCHOOL CANTEENS


### Principal supervisor: Dr Carley Grimes

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**Supervisor's profile:**
Dr Carley Grimes is a Heart Foundation supported Postdoctoral Research Fellow within the School of Exercise and Nutrition Sciences and is a member of the Centre for Physical Activity and Nutrition Research (C-PAN). Her research interests include dietary salt intake and cardiovascular health; children's dietary intake and obesity prevention.

**Co-supervisor**
Professor Caryl Nowson

**Project is based at:** Burwood

**Project description:**
Victorian primary schoolchildren consume too much dietary salt, increasing their future risk of cardiovascular disease. To help lower exposure to dietary salt it is important that low salt foods are available and encouraged within children's food environments. One important setting is the school canteen. In Victoria, the School Canteens and Other School Food Services Policy specifies the types of foods that can be sold within school canteens. A traffic light system is used to classify foods into green, amber and red. In addition nutrient criteria cut-points for the sodium content of certain amber foods are specified. Recently, food manufacturers have started using this nutrient criteria to market snack foods as school canteen approved by placing front of pack 'lunchbox friendly' logos on food products. The aims of this project are to i) conduct an audit of food items sold within a sample of Victorian school canteens to determine the sodium levels of foods being provided on school canteen menus ii) determine the proportion of children's snack foods in the retail sector that contain 'lunchbox friendly' logos.

**Methodological approach:**
A cross-sectional audit of school canteen menus in a sample of Victorian primary schools. Canteen menus and ordering records will be used to identify branded foods sold to schoolchildren. The George Institute for Health branded food composition database will be used to calculate the sodium content of school canteen menus. A supermarket audit will be conducted to identify snack foods which contain the 'lunchbox friendly' logos.

**Necessary skills/knowledge:**
Strong written and verbal communication skills. Willingness to undertake fieldwork and familiarity with the program FoodWorks. Skills in data management and statistical analysis will be developed throughout the program.

# 68. PROJECT TITLE: ZINC INTAKES IN YOUNG AUSTRALIAN CHILDREN

**Principal supervisor: Dr Ewa Szymlek-Gay**
**Contact details:** ewa.szymlekgay@deakin.edu.au
sarah.mcnaughton@deakin.edu.au

**Supervisor's profile:**
Dr Ewa Szymlek-Gay is a Lecturer in Nutritional Science and Alfred Deakin Research Fellows in the School of Exercise and Nutrition Sciences and is a member of the Centre for Physical Activity and Nutrition Research (C-PAN). Her research focuses on iron and zinc nutrition in infants and young children.

**Co-supervisor**
Associate Professor Sarah McNaughton

**Project is based at:** Burwood

**Project description:**
Zinc is a key nutrient for optimal growth and development and inadequate intakes during childhood can lead to deficiency. Inadequate zinc status during the first years of life can compromise growth, sensory and immune development. To design effective strategies for the prevention of zinc deficiency in children, it is crucial to determine their intakes, identify dietary patterns associated with low intakes, and determine main contributors of zinc in their diets. Very little data exists on zinc intakes in children under two years of age in Australia. This project will examine intakes, food sources and potential determinants of zinc in infants and toddlers. It will also examine dietary factors that may influence zinc absorption (2).

**Methodological approach:**
This project will involve analysis of data from infants and toddlers who took part in the Melbourne Infant Feeding Activity and Nutrition Trial (InFANT) Program (1). The Melbourne InFANT Program was carried out in 2008-2010 and involved 542 infants living in Melbourne. Demographic, socio-economic, anthropometric, and dietary data were collected from each infant by questionnaire from when children were 3, 9 and 18 months of age and anthropometry was measured during home visits. Dietary intake was assessed by 3 x 24 hour recalls and this data will be used to determine intakes of zinc at 9 and 18 months of age and the major food sources of zinc in the diet. The demographic, socio-economic, anthropometric, and dietary data will be used to identify possible predictors of low zinc intakes in these young Australian children.

**References**
1. Campbell, K. J., et al. (2013). "A parent-focused intervention to reduce infant obesity risk behaviors: a randomized trial. Pediatrics 131(4): 652-660.
2. Lim, K. et al. Iron and zinc nutrition in the economically-developed world: a review. Nutrients 5, 3184-3211 (2013).

**Necessary skills/knowledge:**
Attention to detail and good organisational skills.
Experience with Microsoft Excel is required.
Some experience in the analysis of data is desirable or a willingness and interest in acquiring these skills. Further training and support will be provided.

# 69. PROJECT TITLE: WHOLEGRAIN FOODS IN THE AUSTRALIAN DIET

**Principal supervisor: Associate Professor Sarah McNaughton**
**Contact details:** sarah.mcnaughton@deakin.edu.au

**Supervisor's profile:**
Associate Professor McNaughton is a public health nutritionist and Accredited Advanced Practising Dietitian in the Centre for Physical Activity and Nutrition Research (C-PAN). Current research interests focus on the assessment of dietary patterns, diet quality and indicators of a healthy diet and the impact of specific dietary patterns on chronic disease outcomes, particularly cardiovascular disease and type 2 diabetes.

**Co-supervisor**
Ms Rebecca Leech

**Project is based at:** Burwood

**Project description:**
Research has shown that wholegrain cereals may be protective against a range of chronic disease including cardiovascular disease, diabetes and some cancers. The exact mechanisms surrounding this beneficial effect are not well understood but may relate to increased content of fibre, minerals such as iron, and zinc or a range of phytochemicals, or it may be related to the synergistic effects of these dietary constituents when consumed as the whole food. The Australian Dietary Guidelines and the Australia Guide to Healthy Eating recommend the consumption of whole-grain cereals, however intakes of these foods in Australia have not been systematically investigated.

Aims:
- To compare different approaches to quantifying wholegrain intakes in the population.
- To describe the intakes of wholegrain cereals and identify key indicator foods among the Australian population.
- To describe the characteristics of people with high intakes of whole-grains and those people meeting recommendations for whole-grain intakes.

This project will provide an understanding of the role of whole-grain foods in the Australian diet and will also inform the future development of population indicators of whole-grain intake and provide baseline data for monitoring the adherence of Australians to the dietary guidelines concerning cereal intakes.

This project will provide the opportunity to develop skills in dietary assessment, food composition, critical analysis and in analysing and interpreting population-based health data.

**Methodological approach:**
This project involves analysis of dietary data collected from the 2011-2013 National Health Survey. Initially it will involve working with a food composition database, classifying foods according to whether they are wholegrain and may involve calculation of wholegrain content of mixed dishes using recipes. Data analysis will involve basic statistics (mean, frequencies, cross-tabulations).

**Necessary skills/knowledge:**
This project is suited to someone with a basic knowledge of nutrition, and an interest and understanding of food and food products.
Experience with Microsoft Excel is required.
Attention to detail and good organisational skills.
Some experience in the analysis of data is desirable or a willingness and interest in acquiring these skills. Further training and support will be provided.

# 70. PROJECT TITLE: DIETARY INTAKE AND MENTAL HEALTH IN OLDER ADULTS

**Principal supervisor: Associate Professor Sarah McNaughton**
**Contact details:** sarah.mcnaughton@deakin.edu.au

**Supervisor's profile:**
Associate Professor McNaughton is a public health nutritionist and Accredited Advanced Practising Dietitian in the Centre for Physical Activity and Nutrition Research (C-PAN). Current research interests focus on the assessment of dietary patterns, diet quality and indicators of a healthy diet and the impact of specific dietary patterns on chronic disease outcomes, particularly cardiovascular disease and type 2 diabetes. She is also conducting research on the influences on dietary behaviours among older adults and is leading an Australian Research Council-funded cohort study in this area known as the Wellbeing, Eating and Exercise for a Long Life (WELL) study.

**Co-supervisor**
Dr Catherine Milte

**Project is based at:** Burwood

**Project description:**
Poor mental health is a leading cause of disease burden among older adults. Depression and cognitive decline are the two most common mental health problems in older age and are increasingly linked to lifestyle risk factors, including poor diet. There is some evidence that consumption of a healthy diet may reduce the risk of depression and cognitive decline in older age. However, large-scale studies of nutrition and mental health in older age in the Australian population are rare. This project will examine whether dietary intake is associated with mental health in older adults.

**Methodological approach:**
This project involves analysis of data collected from a study of older adults. The WELL study is a cohort study of 4082 adults aged 55-65 years living in urban and rural areas of Victoria in 2010 (1). Participants were randomly selected from the Australian electoral roll. Self-report questionnaires were used to collect information on food intake, physical activity and anthropometry. In 2014, participants completed a follow-up questionnaire to collect information on self-reported depression symptoms. A subgroup of participants also underwent an assessment of memory and cognitive function during a short telephone interview. For this project, you will investigate relationships between dietary intake, depression and cognitive function.

**References**
1. McNaughton SA et al. (2012). Understanding determinants of nutrition, physical activity and quality of life among older adults: The Wellbeing, Eating and Exercise for a Long Life (WELL) Study. Health and Quality of Life Outcomes, 2012 10:109. doi:10.1186/1477-7525-10-109.

**Necessary skills/knowledge:**
This project is suited to someone with a background in nutrition.
Attention to detail and good organisational skills.
Some experience in the analysis of data is desirable or a willingness and interest in acquiring these skills. Further training and support will be provided.

# 71. PROJECT TITLE: DOES A HEALTHY LIFESTYLE SCORE PREDICT CARDIOMETABOLIC RISK?

**Principal supervisor: Associate Professor Sarah McNaughton**
**Contact details:** sarah.mcnaughton@deakin.edu.au

**Supervisor's profile:**
Associate Professor McNaughton is a public health nutritionist and Accredited Advanced Practising Dietitian in the Centre for Physical Activity and Nutrition Research (C-PAN). Current research interests focus on the assessment of dietary patterns, diet quality and indicators of a healthy diet and the impact of specific dietary patterns on chronic disease outcomes, particularly cardiovascular disease and type 2 diabetes. She is also conducting research on the influences on dietary behaviours among older adults and is leading an Australian Research Council-funded cohort study in this area known as the Wellbeing, Eating and Exercise for a Long Life (WELL) study.

**Co-supervisor**
Dr Catherine Milte

**Project is based at:** Burwood

**Project description:**
Australia has an ageing population and this will have significant economic and social impacts. Obesity, physical inactivity and poor diet are major public health concerns and are significant determinants of chronic disease and quality of life among the ageing population. It is often suggested that lifestyle behaviours cluster within individuals and their combined effect is also shown to be more beneficial or detrimental to people's health.

During older adult life, there are a number of transitions that can lead to substantial lifestyle changes which may directly or indirectly impact on health and people at the age of retirement are potentially a key target group for interventions influencing health behaviour. However simple and practical tools for the rapid assessment of key aspects of a healthy lifestyle suitable for screening and intervention settings are required. This project will examine whether a simple healthy lifestyle score is associated cardiometabolic risk factors in older adults.

**Methodological approach:**
The WELL study is a cohort study of 4000 adults aged 55-65 years in Victoria and involves the collection of baseline data in 2010 and follow-up data in 2012 (1). Participants were randomly selected from the Australian electoral roll. Self-report questionnaires will be used to assess outcomes such as food intake, physical activity and anthropometry. In 2012, a subgroup of the WELL cohort had blood samples collected for assessment of cardiometabolic risk factors including cholesterol (total, HDL and LDL), triglycerides, glucose, insulin, HbA1C and C-reactive protein. Diet and other lifestyle behaviours will be examined using an established healthy lifestyle score (2, 3).

This project will provide the opportunity to develop an understanding of nutrition and physical activity behaviours in relation to cardiometabolic risk factors, gain experience with a large cohort study, and the opportunity to develop skills in critical analysis and in analysing and interpreting population-based health data.

**References**
2. McNaughton SA et al. (2012). Understanding determinants of nutrition, physical activity and quality of life among older adults: The Wellbeing, Eating and Exercise for a Long Life (WELL) Study. Health and Quality of Life Outcomes, 2012 10:109. doi:10.1186/1477-7525-10-109.

3. Spencer CA et al. A simple lifestyle score predicts survival in healthy elderly men. Prev Med. 2005;40(6):712-7.
4. Gall SL et al. Healthy lifestyles and cardiovascular risk profiles in young Australian adults: the Childhood Determinants of Adult Health Study. Eur J Cardiovasc Prev Rehabil. 2009;16(6):684-9.

**Necessary skills/knowledge:**
Attention to detail and good organisational skills are required in this project. Some experience in the analysis of data using SPSS or STATA is desirable or a willingness and interest in acquiring these skills. Training and support will be provided to the student. This project is suited to someone with knowledge of nutrition.

# 72. PROJECT TITLE: ASSESSING WHETHER YOUNG CHILDREN EAT DIFFERENTLY ON WEEKENDS COMPARED TO WEEKDAYS - INFORMING NUTRITION PROMOTION

**Principal supervisor: Dr Alison Spence**
**Contact details:** a.spence@deakin.edu.au,
(03) 9246 8280

**Supervisor's profile:**
Alison is a Lecturer in Nutrition and Population Health, with a passion for promoting the nutrition, health and wellbeing of young children and their families. She teaches into both undergraduate and postgraduate nutrition courses. Her research focusses on understanding children's dietary behaviours, and investigating practical strategies to promote and improve young children's diet quality, maternal modelling and feeding practices, and family meals.

**Co-supervisor**
Associate Professor Sarah McNaughton

**Project is based at:** Burwood

**Project description:**
As diets of young children are likely to influence their intakes and health throughout life, research into the eating habits of young children is vital. Understanding whether children eat less healthily on the weekends may help to inform nutrition messages for parents, and public health approaches to improve young children's nutrition. This project will examine whether the diets of young children differ between weekdays and weekend days.

This project will involve secondary analysis using data from the Melbourne InFANT Program (2008-2013) [1, 2]. This was a novel health promotion trial involving young children, and is the only Australian study with multiple 24 hour recall data available for children under two years of age.

[1] *Campbell, K. J., et al. (2013). "A parent-focused intervention to reduce infant obesity risk behaviors: a randomized trial." Pediatrics **131**(4): 652-660.*
[2] *Lioret, S., et al. (2013). "Tracking of dietary intakes in early childhood: the Melbourne InFANT Program." European Journal of Clinical Nutrition **67**: 275-281.*

**Methodological approach:**
Dietary data has been collected via multiple 24 hour recalls for 300-500 children at ages 9 months, 1.5 years, 3.5 years and 5 years. Data from one or more of these age groups will be analysed to determine whether intakes differ between weekdays and weekend days at each age. The analysis will focus on intakes of energy, discretionary foods, and the five food groups. Depending on the student's interests, analyses may also assess whether any differences are associated with factors such as socioeconomic position.

**Necessary skills/knowledge**:
This project is suited to a student interested in childhood nutrition. It will require good organisational skills, attention to detail and confidence with programs like excel. Previous experience in data analysis is desirable but not essential, though the student should understand basic statistics and be keen to learn about data analysis.

# 73. PROJECT TITLE: DEVELOPMENT OF LEGUME-BASED YOGHURTS CONTAINING PROBIOTICS AND SPICES.

**Principal supervisor: Dr Stuart Smith**
**Contact details:** stuart.smith@deakin.edu.au
(03) 9251 7260

**Supervisor's profile:**
My research focuses on gut health and interaction between dietary food components, and effects on the gut microbiome linked to health and disease, including the influence of food components on beneficial probiotic bacteria, and their microbial metabolic activities. The research encompasses expertise in a number of areas including food microbiology, food chemistry, molecular analysis of gut microbiota, gut models (tissue culture) and dietary intervention studies.

**Co-supervisor**
Dr Shirani Gamlath

**Project is based at:** Burwood

**Project description:**
Probiotics and dairy-based yoghurts are popular health-promoting foods. Non-dairy based foods such as legume-based extracts, which have nutritional and health properties, have not been examined to the same detail as dairy-based yoghurts. Our previous paper highlighted that probiotics and spices worked well together to enhance the antioxidant properties of the functional dairy-based food as well as flavour and palatability (Vijayalakshmi, Smith and Gamlath, 2014). Combining legumes, e.g. soy-based milk, with spices and probiotics may enhance the functional properties and flavour of these foods with a health focus. This study will focus on using different combinations of probiotics and spices in soy milk to develop functional legume-based yoghurts.

The aims of this study are:

- To compare different combinations of legume e.g. (soy-milk), spices and probiotics for identifying potential non-dairy-based products with a health focus.
- To investigate the physico-chemical, microbiological and organoleptic properties of the developed products.

**Hypothesis:**
Probiotics in combination with spices in soy milk-based products will have acceptable sensory and probiotic properties for health promoting properties based upon with probiotic counts, palatability and flavour acceptability.

**Methodological approach:**

- Develop legume-based yoghurts with added probiotic cultures and selected spices. The student will formulate yoghurts with different concentrations of selected spices and probiotics within soy-milk.
- Examine the physicochemical (viscosity, texture, colour, and pH), microbiological (total viable counts, specific probiotic organisms), organoleptic properties and antioxidant capacity of the novel yoghurts.

**Necessary skills/knowledge:**
The student will need good product-development skills, to be well organized and like working with other members of the Gut Health/Functional Foods group. All training will be undertaken by Dr Shirani Gamlath and Dr Stuart Smith but a basic knowledge of product development, laboratory skills and statistical analysis would be useful.

# 74. PROJECT TITLE: DOES DIET QUALITY MATTER IN WOMEN WHO HAVE HAD GESTATIONAL DIABETES?

**Principal supervisor: Dr Sharleen O'Reilly**
**Contact details:** sharleen.oreilly@deakin.edu.au
(03) 9244 6778
(Days of work: Monday to Thursday)

**Supervisor's profile:**
Dr Sharleen O'Reilly is a NHMRC TRIP Fellow, Accredited Practising Dietitian and Senior Lecturer in Nutrition and Dietetics. She teaches into the Master of Dietetics and supervises honours and PhD students. Sharleen's research area is chronic disease prevention, particularly heart disease and diabetes, through improved nutrition and lifestyle. Her current research focuses on translating diabetes prevention research into practice, particularly for women who have had gestational diabetes (diabetes that lasts only while pregnant).

**Co-supervisors**
Carol Wildey
Leanna Helquist

**Project is based at:** Burwood

**Project description:**
The MAGDA study (Mothers After Gestational Diabetes in Australia) is the largest behaviour change intervention done in this population – nearly 600 women - in Australia. Half the group will participate in a lifestyle change group education program and the rest receive 'usual care'. The women get tested for a variety of health markers at baseline and when they complete the study.

**Methodological approach:**
Food frequency questionnaires (FFQ), diabetes screening (oral glucose tolerance test), weight, blood cholesterol, blood pressure, physical activity and mental health scores from baseline testing will be used to measure how healthy this group of women are. The FFQ information will be converted into the Australian Recommended Food Score (ARQS) and will be used to explore whether better diet quality in this group is associated with factors that are linked with better health and closer adherence to diabetes prevention guidelines.

**Necessary skills/knowledge:**
Attention to detail and good organisational skills are required in this project. This project is suitable for someone with nutrition knowledge. Skills in statistical analysis will be developed during the honours program.

# 75. PROJECT TITLE: INFLUENCE OF HEALTH-PROMOTING FOOD COMPONENTS ON COLONIC MICROBIOTA

**Principal supervisor: Dr Stuart Smith**
Contact details: stuart.smith@deakin.edu.au
(03) 9251 7260

**Supervisor's profile:**
My research focuses on gut health and interaction between dietary food components and effects on the gut microbiome linked to health and disease, including the influence of food components on beneficial probiotic bacteria, and their microbial metabolic activities. The research encompasses expertise in a number of areas including food microbiology, food chemistry, molecular analysis of gut microbiota, gut models (tissue culture) and dietary intervention studies.

**Co-supervisor**
Dr Megan Thornton

**Project is based at**: Burwood

**Project description:**
Fruits are seen to be efficacious for producing novel phenolic bioactives that are both antioxidants and antimicrobial by nature. To capitalize on their functionality for food innovation, scientific analysis of the beneficial effects of these food components on changes within the gut and on gut microbiome must be undertaken before they can be considered of value in innovative food products. Gut bacteria can now be accredited with influencing human physiology, gut and body health but we know little of the effects of bioactives on overall gut health. In 2012, this project examined two commercially available Australian native bush foods (e.g. Davidson plum, Quandong) and determined their antioxidant activities and antimicrobial activities against colonic microbiota. We now wish to expand the information on the influence of fruit bioactives on colonic microbiota by monitoring changes in the gut mcirobioem including effecst on beneficial lactobacilli and bifidobacteria (considered probiotics).

**Hypothesis:**
We hypothesise that fruits that are powerful antioxidants/antimicrobials *in vitro* could regulate gut mcirobioat and intestinal metabolism linked to obesity and oteher metabolic effects. This information will provide a good understanding of the action of native phenolic bioactive action on gut microbiota, especially probiotic bacteria such as lactobacilli and bifidobacteria.

**Methodological approach:**
a) Examine the antimicrobial effect of fruits on colonic microbiota to determine their effect on gut health. Stool samples from healthy individuals will be collected and used in in viotro fementation vessels to assess their influence on the gut microbiota. QIAmp DNA Stool Mini Kit™ (Qiagen, Germany) will be used to isolate the total bacterial DNA and commercial pyroseqeuncing performed. Changes in levels of total bacteria, phyla and lactobacilli and bifidobacteria will be used to observe changes.
b) If time permits, using HPLC, to measure the levels of phenolic bioactives in fruits before and after in situ digestion and after colonic fermentation and link the changes in the gut microbiota to these levels

**Necessary skills/knowledge:**
The student will need good laboratory skills, to be well organized and like working with other members of the Gut Health/Functional Foods group. A basic knowledge of functional foods, microbiology, HPLC and molecular methods especially real time PCR, and statistical analysis would be useful.

# 76. PROJECT TITLE: SENSORY/CONSUMER PROJECT IN THAILAND OR SINGAPORE

**Principal supervisor: Professor Russell Keast**
**Contact details:** russell.keast@deakin.edu.au
(03) 9244 6944
Building J, Level 4, Office 41

**Supervisor's profile:**
Professor Keast is a Lecturer in the area of Sensory Science in the School of Exercise and Nutrition Sciences. He teaches at undergraduate level and also supervises higher degree students. Professor Keast is a member of the Centre for Physical Activity and Nutrition Research (C-PAN) and is an active researcher in sensory science, with particular emphasis on how individual differences in our chemical senses (taste, smell, chemical irritation) may influence health. In addition, Professor Keast is a qualified chef and his research and teaching interests overlap the emerging areas of Molecular Gastronomy and Culinology.

**Co-supervisor**
Dr Gie Liem

**Project is based at:** Half year at Burwood and half year overseas (Thailand or Singapore)

**Project description:**
Sensory/Consumer Project (to be determined)

**Methodological approach:**
If you are interested in gaining international experience and are interested in sensory/consumer field then this opportunity will suit you. The Australian government is promoting Australian graduates have the opportunity to experience and work in Asian countries. The Australian government have introduced The New Colombo Plan is which offers mobility grants to support Australian students to undertake Honours research. We will partner with one of our Asian collaborators to make this once-in-a-lifetime experience for a student.

**Necessary skills/knowledge:**
Must be an Australian citizen interested in sensory/consumer area.

# 77. PROJECT TITLE: FEASIBILITY OF A COMMUNITY FOOD AND NUTRITION NETWORK

**Principal supervisor: Dr Julie Woods**
**Contact details:** j.woods@deakin.edu.au

**Supervisor's Profile**
Julie is a Senior Lecturer in Public Health Nutrition at Deakin
University. She initially trained as a dietitian (at Deakin) before undertaking further studies in health promotion and public health. She has 25 years of experience working in food policy and regulation at local, state and national levels. Previously she was the Manager of Nutrition and Food Systems at VicHealth and a lecturer for 11 years in the Nutrition and Dietetics Department at Monash University. As the Co-convenor of the Food and Nutrition Special Interest Group of the Public Health Association of Australia, Julie is actively involved in public health nutrition advocacy and she has represented this group on numerous food regulation and policy committees. Her research interests include mapping the changing food supply, the framing of nutrition and food security by business and government and the influence of dietary choices on environmental sustainability. Julie is the Deputy Director of the Post Graduate Nutrition courses at Deakin.

**Co-supervisor**
Alex Salmon

**Project is based at:** Burwood

**Project description:**
This project will assess the feasibility of establishing a Community Food and Nutrition Network in the City of Whitehorse. Community Food and Nutrition Networks are relatively new in Australia but there are an emerging number being established both within Melbourne and across Australia. Many of these are based on the successful establishment of such networks in the US and UK. These networks consist of a range of stakeholders across the food system and are generally formed to enable multisectoral action to address food and nutrition related problems at the local level. There is no universal model for establishing and ensuring the success of a community food and nutrition network but their development depends on the types of organisations involved, the willingness of these groups and the level of community support – among other things. There is some research on the barriers to and enablers of the development of these networks and this will be used to guide the stakeholder consultation and assessment of the feasibility in this particular community.

**Methodological approach:**
A literature review will initially be completed to inform the development of the methodology for stakeholder selection and consultation. The methodological approach will be qualitative in nature and will involve conducting in-depth interviews and focus groups with selected stakeholder to investigate their interest in and ideas for the establishment of the network.

**Necessary skills/knowledge:**
Interest in community food and nutrition programs and qualitative methodology

# 78. PROJECT TITLE: PREDICTORS OF ENERGY DENSITY AMONG PRESCHOOL-AGED CHILDREN

**Principal supervisor: Dr Katie Lacy**
**Contact details:** katie.lacy@deakin.edu.au
(03) 5227 3477

**Supervisor's profile:**
Dr Katie Lacy holds the position of Lecturer in Nutritional Science and is a member of the Centre for Physical Activity and Nutrition Research (C-PAN) within the School of Exercise and Nutrition Sciences. Dr Lacy's primary research interests are children's eating behaviour, childhood obesity, child-feeding strategies and children's fruit and vegetable intakes.

**Co-supervisor**
Associate Professor Sarah McNaughton

**Project is based at:** Burwood or Geelong (negotiable)

**Project description:** Childhood obesity is a concern in Australia and strategies to prevent it are needed. One potential strategy that could help to prevent childhood obesity is to reduce dietary energy density. Dietary energy density is the concentration of energy in a portion of food and is usually expressed as kilojoules per gram or kilojoules per 100 grams. There is evidence that dietary energy density influences children's energy intake and is related to children's weight status.

What is not yet understood is what factors early in a child's life predict the energy density of their diet during the preschool years. Understanding the factors that influence the development of an energy-dense diet among preschool-aged children is vital for developing obesity prevention strategies to moderate dietary energy density among this age group. This project will examine the predictors of dietary energy density among children aged 3.5 years.

**Methodological approach:**
Secondary data analyses will be conducted using data from the Melbourne Infant Feeding, Activity and Nutrition Trial (InFANT) Program. Questionnaire data from when children were 3, 9 and 18 months of age will be used as predictors of energy density at ~3.5 years of age. Energy density will be calculated using data from two or three 24-hour dietary recalls collected from approximately 250 children. This project will provide the opportunity to develop an understanding of dietary intake among young children. Additionally, the student will learn skills in calculating energy density and using statistical software as well as analysing and interpreting dietary data from children.

**Necessary skills/knowledge:**
This project is suitable for someone with knowledge of nutrition and some familiarity with basic statistical analyses (including t-test, chi-square test, analysis of variance and regression) or a willingness and interest in acquiring these skills. Further training and support will be provided. Attention to detail and good organisational skills are necessary for this project.

# 79. PROJECT TITLE: SUSHI STORES AND SALAD BARS OR BURGERS AND BURRITOS? DO THE TYPES OF TAKEAWAY FOOD STORES IN MELBOURNE NEIGHBOURHOOD VARY BY SOCIOECONOMIC DISADVANTAGE?

**Principal supervisor: Dr Lukar Thornton**
**Contact details:** lukar.thornton@deakin.edu.au
(03) 924 45029

**Supervisor's profile:**
Dr Thornton is a Postdoctoral Research Fellow within the Centre of Physical Activity and Nutrition Research (C-PAN) at Deakin University, Australia. His expertise spans the disciplines of geography, behavioural epidemiology and public health. Dr Thornton's current program of research predominantly explores environmental exposures related to eating behaviours. He also conducts work that investigates socioeconomic predictors of eating behaviours and the role of built environment on other health behaviours (e.g. physical activity and alcohol consumption). The results of his research have been cited in key policies and programs aimed at the development of health-promoting built environments.

**Co-supervisor**
Dr Karen Lamb

**Project is based at:** Burwood

**Project description:**
The types of food store located within our neighbourhood play a role in our food purchasing decisions. Increasingly, research suggests that variations in food store availability by neighbourhood disadvantage contributes to socioeconomic inequalities in health. There have been a number of published studies which have examined differences in the number of food store types between neighbourhoods of varying levels of socioeconomic disadvantage, with most focusing on supermarkets and fast food chains. Studies that have considered takeaway food stores have tended to groups these into a single category without consideration of the different types of food stores that may exist. By exploring the types of takeaway food stores in neighbourhoods and how these differ by area-level socioeconomic disadvantage, this study will make a novel contribution to the food environment literature.

**Methodological approach:**
Using an audit tool developed by the supervisors, the student will be required to undertake audits of neighbourhoods to assess the number and type of takeaway outlets present. Neighbourhoods will be sampled from the least, mid and most socioeconomically disadvantaged areas of Melbourne. Data will be analysed to investigate whether socioeconomic differences exist.

**Necessary skills/knowledge:**
The prospective student will need to have the ability to work independently, problem-solve, undertake fieldwork, and have good attention to detail. Statistical training in appropriate analytical approaches will be provided.

# 80. PROJECT TITLE: WHAT'S ON YOUR PIZZA? AN ASSESSMENT OF THE SOCIOECONOMIC DIFFERENCE IN MENU OFFERINGS AND PRICES AT PIZZA STORES ACROSS MELBOURNE NEIGHBOURHOODS

**Principal supervisor: Dr Lukar Thornton**
**Contact details:** lukar.thornton@deakin.edu.au
(03) 924 45029

**Supervisor's profile:**
Dr Thornton is a Postdoctoral Research Fellow within the Centre of Physical Activity and Nutrition Research (C-PAN) at Deakin University, Australia. His expertise spans the disciplines of geography, behavioural epidemiology and public health. Dr Thornton's current program of research predominantly explores environmental exposures related to eating behaviours. He also conducts work that investigates socioeconomic predictors of eating behaviours and the role of built environment on other health behaviours (e.g. physical activity and alcohol consumption). The results of his research have been cited in key policies and programs aimed at the development of health-promoting built environments.

**Co-supervisor**
Dr Karen Lamb

**Project is based at:** Burwood

**Project description:**
The food choices that an individual makes are influenced by a number of within-store factors such as product availability, quality, promotions and price. Whilst there is a growing body of research exploring within-store food environments, these have mostly focussed on the supermarket environment and other stores that sell fresh produce. This project provides an opportunity to undertake a novel investigation into whether within-store factors (menu offerings and price) differ in pizza stores across Melbourne neighbourhoods that vary by area-level socioeconomic disadvantage. Findings will contribute to the growing body of literature on socioeconomic inequalities in food environments.

**Methodological approach:**
The student will be required to source hard copies of the menus from pizza stores in the least, mid and most disadvantaged neighbourhoods across Melbourne. Analysis will involve an assessment of the socioeconomic differences in the menu offerings (e.g. types of pizza toppings) and price of pizzas.

**Necessary skills/knowledge:**
The prospective student will need to have the ability to work independently, problem-solve, undertake fieldwork, and have good attention to detail. Statistical training in the appropriate analytical approaches will be provided.

# 81. PROJECT TITLE: CHEMICAL ANALYSIS OF VARIETIES OF STRAWBERRIES BY GC AND HPLC

**Principal supervisor: Professor Russell Keast**
**Contact details:** russell.keast@deakin.edu.au
(03) 9244 6944
Building J, Level 4, Office 41

**Supervisor's profile:**
Professor Keast is a Lecturer in the area of Sensory Science in the School of Exercise and Nutrition Sciences. He teaches at undergraduate and postgraduate level and also supervises higher degree students. Professor Keast is a member of the Centre for Physical Activity and Nutrition Research (C-PAN) and is an active researcher in sensory science, with particular emphasis on how individual differences in our chemical senses (taste, smell, chemical irritation) may influence health.

**Co-supervisor**
Dr Megan Thornton

**Project is based at:** Burwood

**Project description:**
Why are some strawberries so deliciously sweet, and others so sour? This project seeks to answer just that. You will analyse various varieties of strawberries (mmm, yum!) for their chemical content (including sugars, organic acids, and aroma compounds), to identify compounds that drive liking, as well as any differences that occur between varieties. Analysis will be conducted using High Performance Liquid Chromatography and Gas Chromatography, and results will be linked with sensory analysis being conducted by a current PhD student. This project is ideal for anyone looking for a future in food research or analysis, or in an analytical flavour laboratory.

**Methodological approach:**
Gas Chromatography and High Performance Liquid Chromatography Analysis

**Necessary skills/knowledge:**
A basic understanding of Chromatography (including GC and HPLC).

# 82. PROJECT TITLE: CONTRIBUTION OF SALT AND FAT IN SATIATION

**Principal supervisor: Professor Russell Keast**
**Contact details:** russell.keast@deakin.edu.au
(03) 92446944
Building J, Level 4, Office 41

**Supervisor's profile:**
Professor Keast is a Lecturer in the area of Sensory Science in the School of Exercise and Nutrition Sciences. He teaches at undergraduate level and also supervises higher degree students. Professor Keast is a member of the Centre for Physical Activity and Nutrition Research (C-PAN) and is an active researcher in sensory science, with particular emphasis on how individual differences in our chemical senses (taste, smell, chemical irritation) may influence health. In addition, Professor Keast is a qualified chef and his research and teaching interests overlap the emerging areas of Molecular Gastronomy and Culinology.

**Co-supervisor**
Dr Dieuwerke Bolhuis

**Project is based at:** Burwood

**Project description:**
This project is an exciting hands-on experience into the area of sensory science and eating behaviour. Fat consumption has long been an area of interest due to its appealing sensory properties and association with obesity. It is widely acknowledged that we perceive five tastes which include sweet, sour, salty, bitter and umami, however emerging evidence now suggests existence of a sixth taste, fat taste. Previous research at Deakin University has found links between fat taste sensitivity, dietary fat intake and obesity. Deakin is the world leading research group investigating fat taste.

Foods high in dietary fat are often salty; fat and salt both stimulate appetite and are therefore an attractive combination in food. Food intake increases when salt (sodium chloride) is added to foods. It is suggested that the combination of salt, fat, and sugar is used by the food industry to make hyper-palatable food that induces overeating. As far as we know, it has not been investigated how fat in combination with salt in foods affects energy intake. It is hypothesized that the appetitive nature of salt possibly overrides satiation and satiety responses from fat in foods, possibly dependent on one's sensitivity to taste fatty acids. If you are thinking of a going on to a PhD program, this is an excellent project to get you started.

**Methodological approach:**
You will be involved in the organization and management of an intervention study from recruitment of participants to data analysis. Participants will consume foods ad libitum varying in salt and fat contents. Measurements of satiation will be collected: ad libitum intake, hunger and fullness ratings, and eating rate. In addition, participants will be tested on taste sensitivity.

**Necessary skills/knowledge:**
Understand basic concepts of sensory testing, along with food and nutritional knowledge. Must have good work ethic and time management skills.

# 83. PROJECT TITLE: BUILDING THE CAPACITY OF COMMUNITY NUTRITION WORKERS IN DEVELOPING COUNTRIES THROUGH COMMUNITY EDUCATION COURSES.

**Principal supervisor: Sonia Brockington**
**Contact details:** sonia.brockington@deakin.edu.au
(03) 9244 5015
Room J5.52 Burwood Campus

**Supervisor's profile:**
Background of 10 years in clinical dietetics and clinical education prior to coming to Deakin in 2009 where I have been teaching into the Masters of Dietetics program, undergraduate and post graduate nutrition. Completed a Master of Public Health (International health) during 2012. I have undertaken work in a number of developing countries and seek to contribute to capacity building in these countries through combining education and nutrition.

**Co-supervisor**
Professor Tony Worsley
Associate Professor Colin Bell

**Project is based at:** Burwood

**Project description:**
Primary health care (PHC) is critical for health promotion, protection and equity in developing countries. With a burgeoning global epidemic of non-communicable disease, PHC needs to be strengthened and training of primary healthcare staff in community nutrition is an essential part of this. Anecdotal evidence suggests however that in many countries, community nutrition training programs are not offered or are outdated and that consequently, government community health workers (CHW) and volunteers from non-government organisations have little or no training in nutrition.

This project aims to map out the availability and quality (i.e. topics covered, modes of delivery, strengths and weaknesses) of community nutrition training programs in developing countries in the Pacific and describe the nutrition education needs of individuals and organisations working in PHC with a view to identifying how programs can be improved.

**Methodological approach:**
Nutrition training programs will be identified by a desktop literature review and quality assessed using best practice guidelines. Education needs will be described for non-government organisations (NGOs), health sectors and faith based organisations (FBOs) in Australia and overseas who have or support community nutrition programs in several Pacific countries selected by contacting key agencies and using a snow-balling sampling technique. Focus groups, interview and/or surveys will be used to gather identified needs from NGOs, FBOs is likely, to collect qualitative data and will be analysed using thematic analysis.

**Necessary skills/knowledge:**
Skills in literature reviewing and interest in international health/nutrition and development are important. Excellent written and verbal communication skills will be required; cross cultural awareness is essential; sound analytical skills; current driver license and access to transport will be of benefit.

# 84. PROJECT TITLE: PRODUCT DEVELOPMENT WITH LEGUMES AND HERBS: LOW FAT, HIGH FIBRE AND HIGH PROTEIN SNACKS

**Principal supervisor: Dr Shirani Gamlath**
**Contact details:** shirani.gamlath@deakin.edu.au
(03) 9251 7267

**Supervisor's profile:**
Dr Shirani Gamlath has actively established a research program on use of novel functional/healthful ingredients in product development and application of novel processing technologies such as extrusion technology and high Pressure processing to retain nutritional and bioactive components in foods. This field encompasses knowledge and expertise in a number of areas including product development, novel process technologies and product evaluation. Shirani has experience in product development with cereals, legumes and fruits and also product evaluation based on nutritional, physicochemical and sensory analysis.

**Co-supervisor**
Dr Megan Thornton

**Project description:**
In recent years there has been an increased focus on new food structures with reduced fat, salt and sodium contents. The snack food market continues to grow as it accommodates for the current food trends however, the snack food market mainly consists of unhealthy and energy dense food products. Previous studies indicate that legumes can be used to replace starchy cereals and potato flour that have been mostly used in existing snack products. Legumes contain both macronutrients and micronutrients. They are one of the highest plant sources of protein and essential amino acids and contain roughly double the amount of protein compared to cereal grains. Legumes are also good source of dietary fibre and resistant starch. Herbs are an important food group which contains essential oils, vitamins, antioxidants and many other plants derived nutrient substances. This project focuses on developing functional/heath promoting legume and herbs based snack products and understanding the product characteristics based on physical, chemical and nutritional composition.

**Methodological approach:**
- Develop snack products with selected legume and herb combinations. The student will conduct literature search and preliminary studies to identify suitable combinations of legumes and herbs to formulate savoury snack products.
- Determine the best processing condition to develop the product.
- Products will be evaluated based on physical (colour, texture, water solubility) characteristics and consumer acceptability.
- Select the best product from physical and consumer acceptability to analyse for nutritional (proximate) composition and antioxidant capacity

**Necessary skills/knowledge:**
The student will need to be confident in laboratory skills, to be well organised. All training will be undertaken by Dr Shirani Gamlath but a basic knowledge of product development, laboratory skills and statistical analysis would be useful.

# 85. PROJECT TITLE: SODIUM DENSITY AND OBESITY IN AUSTRALIAN ADULTS

**Principal supervisor: Claire Margerison**
**Contact details:** claire.margerison@deakin.edu.au
(03) 9251 7293
Building J, room 5.30

**Supervisor's profile:**
Claire Margerison is a Lecturer in Nutrition (Dietetics) in the School of Exercise and Nutrition Sciences. She is the Course Director of the Master of Dietetics. Claire has a strong interest in dietary research and has just completed her PhD on sodium intakes and the effect on disease risk.

**Co-supervisor**
Associate Professor Lynn Riddell

**Project is based at:** Burwood

**Project description:**
There is an overwhelming amount of evidence supporting a strong link between dietary sodium intake and blood pressure. A reduction in dietary sodium intake is an important strategy in decreasing the risk of cardiovascular disease (CVD). Obesity is also a known risk factor for hypertension and CVD. It is not known whether increased dietary sodium is associated with a greater energy intake thus leading to obesity, or whether sodium intake is an independent risk factor for obesity, regardless of energy consumption.
The aim of this study is to investigate the association between sodium intake and obesity risk and determine if the association is independent of total energy intake.

**Methodological approach:**
Data collected from 299 Australian adults (141 males and 158 females) will be used in this study. Participants have completed a single 24hr recall and several other demographics and lifestyle questionnaires. They have had their height and weight measured as well as their waist and hip circumference. The study will determine if there is any association between sodium intake (calculated from a single 24 hr recall) and measures of obesity (BMI, waist circumference, WHR). Whether any association is independent of energy intake will be explored by calculating the sodium density (mg Na per kcal energy).

**Necessary skills/knowledge:**
Data and statistical analysis skills will be developed throughout the program, as required.

# 86. PROJECT TITLE: INTEGRATING ENVIRONMENTAL SUSTAINABILITY INTO DIETARY GUIDELINES

**Principal supervisor: Professor Mark Lawrence**
**Contact details:** mark.lawrence@deakin.edu.au
(03) 9244 3789

**Supervisor's profile:**
Mark is a public health nutritionist with over 30 years experience in food policy. He is actively involved in public health nutrition research analysing the development of policies and programs, such as the Dietary Guidelines, designed to protect and promote the nutritional health of populations. He is particularly interested in food sustainability and food systems research. Mark has published over 70 scientific papers and currently is an investigator on 5 research projects totalling over $6million. He is an advisor to the WHO and FSANZ, a member of the Commonwealth Department of Health's NRV advisory committee, and a former member of the NHMRC's Dietary Guidelines working committee.

**Co-supervisor:**
TBA

**Project is based at:** Burwood

**Project description:**
Dietary Guidelines are evidence-based recommendations for healthy eating. They provide a reference standard for food policies and nutrition education programs. Historically they have focussed on promoting a healthy balanced diet and preventing dietary imbalances. Now, a priority public health consideration is the relationship between environmental sustainability and public health nutrition. In the 2010s the 'hot' agenda globally for the development of Dietary Guidelines is re-conceptualising them to take on board an environmental sustainability dimension. Several countries are in the process of moving in this direction with Brazil set to launch the 'gold standard' environmental Dietary Guidelines in late-2014 and several events underway in a number of other countries including the US with that country's Dietary Guideline revision scheduled to begin in 2015. The proposed project is an investigation into the issue of integrating environmental sustainability considerations into Dietary Guidelines.

Aims:

i) To review the evidence base for integrating sustainability into Dietary Guidelines
ii) To investigate the status of environmental Dietary Guideline developments internationally

**Methodological approach:**
The primary methodological approach is public health nutrition science and documentary analysis. There are two key steps in the investigation:

i) Reviewing the scientific evidence base for integrating environmental sustainability criteria into Dietary Guideline recommendations
ii) Profiling international developments related to the environmental Dietary Guideline agenda.

**Necessary skills/knowledge:**

1. Strong interest in public health nutrition and environmental sustainability – the project is especially relevant to those students who may be available and interested in undertaking a PhD as it is anticipated that the research has the potential to extend into a major PhD project in the future.
2. Strong knowledge of Dietary Guidelines
3. Good qualitative data collection, analysis and interpretation skills
4. Good writing and communication skills.

# 87. PROJECT TITLE: ESTABLISHING THE ROLE OF MIRNAS IN THE REGULATION OF MICE SKELETAL MUSCLE MASS

## Principal supervisor: Dr Severine Lamon

**Contact details:** severine.lamon@deakin.edu.au
(03) 92446527

**Supervisor's profile:**
I am a post-doctoral research fellow in the Centre for Physical Activity and Nutrition Research (C-PAN) within the School of Exercise and Nutrition Sciences. I am a molecular biologist and my focus of interest is the understanding of the molecular factors that regulate skeletal muscle structure, activity and function in response to exercise, ageing and disease. To achieve this goal, our research group uses human, animal and cell culture models.

**Co-supervisor:**
Aaron Russell

**Project is based at:** Burwood

**Project description:**
MicroRNAs (miRNAs) are recently discovered small RNA molecules regulating the genes and proteins required for skeletal muscle function. Our work suggests that, in a human model, some of these miRNAs play a specific role in the regulation of skeletal muscle mass. Numerous disease conditions as well as ageing are associated with a loss of skeletal muscle mass; therefore, it is essential to undersand the mechanisms underpinning its regulation. We are now interested to test if some of the miRNAs that we have identified can positively influence muscle growth in an animal model in vivo. A recombinant associated-adenovirus serotype 1 (AAV1) encoding miR-99b, a miRNA playing a putative role in muscle growth, or a control sequence, will be injected in the leg muscle of 8 week old C57BL/10 mice with the aim to increase miR-99b levels in muscle. This project consists of 1) establishing the conditions that will allow to successfully increase the levels of miR-99b levels in muscle and 2) completing preliminary gene and protein expression analyses to determine the potential effect of miR-99b on muscle mass regulation.

**Methodological approach:**
A dose-response study and a time-course study will be performed. For each virus dose and time point, the tibialis anterior (TA) muscle will be removed and muscle tissue weight and diameter will be recorded. Polymerase chain reaction (PCR) analysis will be conducted to assess the overexpression of miR-99b. PCR and western blots will then be performed to measure the expression of key genes and proteins known to be involved in the regulation of skeletal muscle mass.

**Necessary skills/knowledge:**
Knowledge or interest in molecular and muscle biology, biochemistry and basic statistics. Lab skills will be taught during the year.

## School of Exercise and Nutrition Sciences

# 2015 HONOURS PROJECT PREFERENCE FORM

Name: _____ Deakin student ID: _____

Address:_____P/C_____

Mobile: _____ Home: _____

Email: _____

Applicants are advised that allocation to research projects is a competitive process and an applicant cannot be assured of being assigned to their choice of research projects.

Please nominate below up to four preferences, in order of preference, for honours in 2014:

**1st preference - Project no**: _____**Supervisor:** _____

**Project title:**_____

**It is strongly encouraged that you speak to the supervisor of your first preference**

Have you personally spoken with the supervisor about the project? Yes ☐ No ☐

**2nd preference - Project no**: _____**Supervisor:** _____

**Project title:**_____

Have you personally spoken with the supervisor about the project? Yes ☐ No ☐

**3rd preference - Project no**: _____**Supervisor:** _____

**Project title:**_____

Have you personally spoken with the supervisor about the project? Yes ☐ No ☐

**4th preference - Project no**: _____**Supervisor:** _____

**Project title:**_____

Have you personally spoken with the supervisor about the project? Yes ☐ No ☐

If you are NOT offered one of the above projects would you consider an offer of an honours project in a related area?

Yes ☐ No ☐

**Please list any other projects you may consider if you are not offered your top 4:**

_____

_____

**Please return this form to Tin Partington tin.partington@deakin.edu.au at the School of Exercise and Nutrition Sciences (J3.07; phone: 9244 5032) by 14 November 2014 or fax to 9244 6017 for timely applications. Late applications will be considered depending on availability of appropriate supervisors, projects and places up until 28 November 2014.**