Undergraduate Summer Research Workshop

Western Undergraduate Research Journal: Health and Natural Sciences
http://ir.lib.uwo.ca/wurjhsns/
Outline

- Introductions: WURJHNS team, Speaker Dr. Heit

- Why do research?

- What are the typical duties of an undergraduate research assistant?

- An appropriate timeline for applications

- Where to start looking for research positions
Outline

- Contacting potential supervisors
- Transcripts
- Resumes/Cover Letters
- What if you don't get the research position
The WURJHNS Team

- **Editors-in-Chief**
  - Anson Li, Faculty of Science
  - Prabhpreet Hundal, Faculty of Health Sciences

- **Managing Editor**
  - Andrea Lee, Schulich School of Medicine and Dentistry

- **Associate Editors**
  - Jessica Chin, Faculty of Health Sciences
  - Noren Khamis, Schulich School of Medicine and Dentistry

- **Editorial Review Board**
  - Rushi Gandhi, Schulich School of Medicine and Dentistry
  - Daniel Li, Schulich School of Medicine and Dentistry
  - Joyce Liu, Faculty of Science
  - Courtney Po, Faculty of Science
  - Shreya Podder, Schulich School of Medicine and Dentistry
  - Tarandeep Sidiura, Faculty of Science
  - Milani Sivapragasam, Schulich School of Medicine and Dentistry
The WURJHNS Team

- Production Manager
  - Himanshu Gupta, Faculty of Science
- Graphic Designer
  - Himanshu Gupta, Faculty of Science
  - Warren Kong, Richard Ivey School of Business
- Academic Affairs Coordinators
  - Eva Huang, Faculty of Science
  - Suzy Kim, Faculty of Science
- Academic Affairs Committee
  - Masih Barat, Schulich School of Medicine and Dentistry
  - Alice Tan, Faculty of Science
  - Anthony Wong, Schulich School of Medicine and Dentistry
- First Year Representatives
  - Christina Carfagnini, Faculty of Science
  - Janis Chang, Faculty of Science
  - Kevin Lam, Faculty of Science
Guest Speaker

Dr. Bryan Heit

- Assistant Professor at Western University
- Department of Microbiology & Immunology
Why do Research?

- You can potentially earn $4500 or more during one summer of work

- It provides great experiences within an academic setting
  - At times you can gain experience working with patients
  - Good preparation for thesis projects in future
  - Relevance to coursework

- Networking
  - Reference letters for professional/graduate school
  - Connecting with people of similar interests
What are the Typical Responsibilities?

- Clinical Research Student
  - Pulling research articles
  - Learning via reading many papers
  - Data collection, entry and analysis

- Completing odd lab jobs
  - Performing physiological manoeuvres sometimes
  - Working in the clinic can perform simple tasks such as taking vitals
  - Attending rounds with your supervisor and residents
  - Completing a small personal project
  - Writing small sections of a manuscript
  - Completing ethics proposals
What are the Typical Responsibilities?

- Basic Sciences research student
  - Optimizing and performing lab techniques (histological stains, immunostains)
  - Obtaining ideas for methodology from literature
  - Completing odd lab jobs
  - Literature search
  - Performing experiments and interpreting data for various assigned projects
  - Attending lab meetings
  - Collaborating with technicians in your lab or experts from other labs
  - Contributing to manuscripts
Research Student Expectations

- Work independently
  - Keep yourself busy (not told what to do)

- Team environment
  - Get along with staff and be respectful

- Lots of information to take in
  - Publications, terminology, lab techniques

- Manage time effectively
  - Deadlines, multi-tasking

- Seminars, posters, presentations
There are two ways to apply to research positions:

- Through a central board that processes applications
- Directly to the supervisor

When applying to a central board, the timeline and due dates have already been set.

However, when applying to the supervisor directly, a due date is not provided. In this case, an appropriate timeline is necessary.
An Appropriate Timeline

- An appropriate timeline → if you must apply directly to the supervisor
  - The key point here is that you are not the only student applying

  - Typically, supervisors have selected the students they want to interview by mid – late January

  - Once this selection is complete, other emails are generally not considered

  - Responses are not always immediate!
Where to Find Research Positions

- Good places to start looking for research positions:
  - Go to your respective faculties
  - Contact your health practitioner
  - If you are looking for positions outside of the university (i.e. in London hospitals, or in other cities) the internet is the best place to start
  - If this is your first time looking for research positions some keywords to search in Google are:
    - Summer Student Program + (insert city name)
    - Undergraduate Summer Research + (insert city name)
NSERC Grant

- Offered by the Canadian Government for undergraduate students doing research
- Duration of 16 weeks
- Minimum of $5625.00 (at UWO)
- Heavily based on Academic standing (marks)

NSERC at UWO

- Deadline for Schulich School of Medicine and Dentistry: TBA
  - Check out the Schulich Research Office Website

- Health Sciences Deadline: TBA

- For more information, please visit your academic counselor
Work Study at UWO

- Funding available to students who demonstrate financial need
- Rate of pay: $10.25/hour
- Number of hours:
  - For school year: 200 hours for 8 months
  - For summer months: 100/200/300 for 4 months
- Apply via Student Services – Financial Aid Profile
List of Grants

- List of possible grants/research opportunities that you can apply for
  - Most are summer positions available to undergraduate students

- Has been put together by the members of our Academic Affairs Committee

- Can be found on our website
Contacting Potential Supervisors

What do you say when contacting a supervisor by email?

3 things to keep in mind:
  ◦ Understand the supervisor’s research description
  ◦ Be humble
  ◦ Avoid generic emails
Contacting Potential Supervisors

- Understand the supervisor’s research focus
  - Look for what type of research they do
  - Have a good understanding of their research focus
  - This will allow you to understand what they may be looking for in a student
  - You can then tailor your email according to how you can potentially fulfill that need
Appointments and Affiliations:
- Senior scientist, physical sciences - Odette Cancer Research Program, Sunnybrook Research Institute
- Associate professor, medical biophysics, U of Toronto

Research Summary:
Dr. M's group focuses on developing novel medical image analysis techniques with a focus on tools to provide diagnostic support to physicians and radiologists. In particular, Dr. M's group is developing a computer-aided detection and diagnosis (CAD) system for breast MRI, which will allow them to detect cancer earlier and with greater specificity
Appointments and Affiliations:
- Senior scientist, physical sciences - Odette Cancer Research Program, Sunnybrook Research Institute
- Associate professor, medical biophysics, U of Toronto

Research Summary:
Dr. M's group focuses on developing novel medical image analysis techniques with a focus on tools to provide diagnostic support to physicians and radiologists: in particular, Dr. M's group is developing a computer-aided detection and diagnosis (CAD) system for breast MRI, which will allow them to detect cancer earlier and with greater specificity
Contacting Potential Supervisors

- Be humble
  - students may have misconceptions about undergraduate research
  - E.g.- sending emails about the tasks they wish to achieve in the summer (without necessarily considering what their potential supervisor may need)
  - Also sending emails about their goals without realizing the limitations of their knowledge or the amount of time required to complete a project
Contacting Potential Supervisors

- Avoid generic emails
  - Avoiding generic emails can be accomplished by including information such as what you hope to get out of the research position
Dear Dr. ____,

My name is ___ and I am an undergraduate student at the University of Western Ontario. I found your research description on the SHSC website very intriguing. I also took the time to _____.

I would greatly appreciate the opportunity to work as your summer student and contribute to any aspect of your research.

(Include how you can potentially fulfill a need in their lab and what you would like to get out of the research position)

Attached are my cover letter, resume, and transcript. Thank you for your consideration and I hope to hear from you soon.

Sincerely,

________

Contacting Potential Supervisors
Contacting Potential Supervisors

- In addition to your email, you should attach your:
  - Unofficial transcript
  - Resume (concise and relevant)
  - Cover letter (optional)
Transcripts

- Are my grades high enough?
  - If applying for a university based NSERC research position: marks are important
  - If applying to a supervisor in a lab/ hospital: grades are not the only factor

- A copy of your unofficial transcript can be found on the student center website
Resume

- Include relevant course work or skills obtained (such as computer skills)

- Avoid abbreviations

- Everything in your resume does not have to pertain directly to research but be concise

- There are online resources available
  - Go to [https://careercentral.uwo.ca](https://careercentral.uwo.ca) to find workshops
After Applying

- Will I get a reply right away?
  - If you have applied early enough, you will likely get replies
  - However, not always the case
After Applying

- If you do not receive an interview, there are many other options
  - Part-time research positions
  - Volunteer positions in a lab
  - Taking courses and participating in activities that can increase your qualifications for a research position
After Applying

If you are offered an interview and get the research position:

◦ Great, we would love to hear about it!

◦ After obtaining research experience, consider getting your work published
Getting Your Work Published by WURJ

- WURJ publishes:
  - Research articles
  - Students in the Field reports
  - Mini-review articles
  - Briefing notes
  - Short Communications
  - Letters to the Editor
Getting Your Work Published in WURJ

- We accept submissions in various fields of science
- Submission of quality papers for review is strongly encouraged
- Interested authors: read the submission guidelines first
Getting Your Work Published in WURJ

- All articles will be reviewed in a double blinded process by the WURJHNS editorial review board

- We accept articles on a rolling submissions basis

- For more information, contact wurjhns@uwo.ca
Original Research Article:
Effect of Plantar Flexor Muscle Fatigue on Postural Control

Tyler Grey, Daren Redguard, Rebecca Wengle, Peter Wegscheider
School of Kinesiology, The University of Western Ontario, London, Ontario, Canada

Abstract

Objective. Previous studies have demonstrated that various factors alter postural stability. Our aim was to examine the effect of plantar flexor fatigue on postural stability in quiet standing.

Methods. Fifteen healthy male university students (age, 21.3 ± 1.7y; height, 1.83 ± 0.06m; weight, 81.6 ± 9.4kg) were instructed to stand on a force plate before and after calf fatiguing exercise. The sensory systems were controlled by blindfolding subjects and having them stand on a flat firm surface, without moving their head. Fatigue was achieved through repetitive weighted plantar-flexor exercise. Standing balance was assessed by using a force plate to calculate Center of Pressure (CoP) displacement.

Results. Plantar flexor fatigue led to significant (p<0.05) postural control impairments in the frontal and sagittal planes compared to non-fatigue (control). Fatigue led to significant changes in M/L (1.56 ± 0.85mm and 3.30 ± 1.24mm for control and fatigue, respectively) and A/P (4.48 ± 1.70mm and 8.89 ± 3.74 for control and fatigue, respectively) CoP variance.

Interpretation. Lower limb fatigue led to significant postural control impairments. Interestingly fatigue in the plantar fl exors, primary responsible for control in A/P directions, led to significant postural sway in the M/L directions. Therefore, it is possible that other muscle groups (i.e. hip and knee fl exors and extensors) are used to correct posture, as the plantar fl exors are not at full functioning capacity. It can be concluded that under a sensory controlled environment, postural control is significantly impaired by lower limb fatigue, and can possibly be supported by other muscle groups.

Introduction

Postural sway can be described as the displacement of the Center of Mass (CoM) in relation to the Base of Support (BoS), and is directly related to postural stability control and balance (1). Postural sway is increased (indicating diminished stability) by many factors, including both muscular fatigue and impaired vision (2-4).

Muscular fatigue is a complex phenomenon and has been defined as a reduction in the force-generating capacity, regardless of the performed task (1). Lower limb muscle fatigue is speculated to be a leading factor in ankle joint athletic injuries since many of these injuries occur at the end of an activity when the athlete is fatigued (2). There are two main fatigue-related mechanisms that can contribute to the diminished force-generating capacity: somatosensory activity and muscular strength. During fatigue, somatosensory activity (afferent and efferent signals) is less successful in transmitting neural signals and as a result the muscle is stimulated to a lesser extent (1). This will lead to reduced motor control and therefore decreased stability. Strength is also diminished during fatigue as the proprioceptive and kinesthetic properties of the joints are altered through increased threshold of muscle spindle discharge, disrupting afferent feedback, and consequently limiting the muscle’s ability to control the joint (3). Therefore, fatigue of postural musculature, such as the gastrocnemius and soleus, has led to diminished postural control and increased difficulty to stabilize balance (5).

Fatigue may also lead to a loss of postural muscular control due to diminished use of sensory information (1,3,4,6,7). It is understood that visual
Students in the Field:
Hippotherapy: A holistic approach to rehabilitation

Natasha Lepore, Lawrence Yau
Basic Medical Sciences Undergraduate Education (BMSUE), Schulich School of Medicine and Dentistry, The University of Western Ontario, London, Ontario, Canada N6A 3K7

Background
My name is Natasha Lepore and I am a 4th year student in the Honours Specialization in Medical Sciences program. I started volunteering at SARI Therapeutic Riding six years ago. I got involved with this organization because of my desire to make a difference in the community. SARI is a therapeutic horse riding centre whose mission is to improve the physical, social, and emotional well-being of children and youth with special needs. My experiences with SARI has complemented my understanding of various diseases and disabilities that I have learned about in university. However, SARI has also shown me the importance of approaching the treatment of certain diseases in a more holistic fashion. Specifically, my experiences at SARI have demonstrated that Hippotherapy is an effective approach to improving the quality of life of children with disabilities.

In Canada, 3.7% of children live with some form of disability that affects their quality of life. For this reason, it is very likely that many people interact with individuals with some form of disability on a regular basis. These disabilities include a vast array of problems pertaining to physical, emotional, and/or mental health, behaviour, and development. Some examples include Down syndrome, autism, communication disorders, and attention deficit disorder. The impact of these disabilities on patients' quality of life can range from minimal to extreme. Children with severe disabilities often require full-time support. Therapy programs are instrumental in improving the quality of life of these individuals and promoting inclusion in the community. Some individuals prefer a holistic approach to treatment and opt to seek treatment in a more natural setting outside of a clinical environment. This form of treatment often promotes compliance in patients and makes their therapy more enjoyable. Among these holistic approaches is hippotherapy, a unique form of alternative therapy which uses horseback riding as its means of treatment. Horseback riding incorporates physical, occupational, and speech therapy into its treatment regime.

As a student in the Honours Specialization of Medical Sciences program at the University of Western University, I have gained knowledge of these disabilities through various science and psychology classes. I have learned about the genetics, physiology, anatomy, biochemistry, and pathology behind some of these disabilities. In addition to learning about the biological aspects of these disorders, psychology classes have taught me additional information about the social, emotional, and mental aspects of these disabilities and how they can negatively impact an individual's quality of life. While these classes have enhanced my knowledge and understanding of numerous disabilities, I could not achieve a true understanding until I was submerged into an environment where I would have direct exposure to individuals with disabilities. An understanding of disabilities involves more than what can just be taught in a lecture or read from a textbook. Firsthand experience is essential to gaining a comprehensive understanding of a disability's effect on one's quality of life, and the struggles faced by individuals with disabilities. For the past six years, I have been fortunate to have the opportunity to get this firsthand experience by being part of the team of volunteers at SARI Therapeutic Riding, located in Arva, Ontario.
Research offers valuable experience and insight

Consider from the perspective of the researcher, be humble, realistic, avoid generic emails, and apply early!

Many options are available if you do not get the job

If you do get the research position and are interested in having your work published, contact WURJ!
Contact Information

wurjhnsw@uwo.ca
THANK YOU!