

**Title:**

Scalable bio-mimicked human leg architecture for future NuBot platform

**Supervisors:**

Joel Ferguson

**Background:**

The NUbots robocup team competes in the teen size division of the Robocup humanoid league.

The scope of this project is to design and implement a scalable, bio-mimicked leg architecture for a future NuBots platform. This includes the development of a quasi-static hopping routine and a dynamic hopping gait routine.

The development of this leg architecture will result in a more capable, and human like robot for future robocup competitions. The project will require system identification, control and optimization tools.

**Aim:**

Develop leg architecture and algorithms for use in a new NuBot platform

**Objectives:**

1. Perform a literature review of existing leg architectures and propose a suitable architecture for a single legged hopping robot.
2. Develop a numerical simulation for the hopping robot.
3. Using the numerical simulation, determine suitable component parameters for construction. Using these reference values, construct the system.
4. Perform system ID to determine the CoM of each of the leg-ature, and parameters of individual actuators.
5. Design and implement controller to regulate the hopping and transition between standing / hopping.
6. Utilise the hip mass/inertia to extend the region of stability of the hopping gait.

**Links:**