

# Christopher Mailer

## MSc Graduate - Mechatronics

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## Skills

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Legged Robot Design • Optimal Motion Control • Sensors & Actuators • Simulation • MATLAB • Simulink

## Education

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- Jun 2023      **MSc Electrical Engineering, University of Cape Town**  
Thesis on the mechanical design, manufacture, modelling, simulation, and optimal control of a planar legged robot which combines pneumatic and electric actuation for agile dynamic manoeuvres. Technical topics included design, manufacture, sensor fusion, actuation, simulation in Simulink, and nonlinear optimal control.  
**Advisors:** A/Prof. Amir Patel, Dr Reuben Govender
- First author and presenter of two robotics conference publications (See publications)
  - Awarded Harry Crossley Research Fellowship
- Jul 2021      **BSc Mechanical and Mechatronic Engineering, University of Cape Town**
- Top student in graduating class (82% GPA First Class Honours)
  - Awarded Class Medal, SASOL Product Design Prize and Deans Merit List
- Thesis on online gait controller adaptation of a hexapod robot using quality-diversity optimisation and rigid-body simulations executed on a high-performance cluster.  
*Top Courses:* Dynamics II, Control, Vibrations, System Design, Measurement & Actuators

## Conference Publications

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- May 2023      **Getting Air: Modelling and Control of a Hybrid Pneumatic-Electric Legged Robot,**  
*IEEE International Conference on Robotics and Automation (ICRA) - in press*  
**C. Mailer, S. Shield, R. Govender, and A. Patel**
- Jun 2021      **Evolving Gaits for Damage Control in a Hexapod Robot,**  
*Proceedings of the Genetic and Evolutionary Computation Conference (GECCO)*  
**C. Mailer, G. Nitschke, and L. Raw**

## Relevant Experience

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- Feb 2021 – present      **Mechatronics Lab Engineer, University of Cape Town - African Robotics Unit (Part-Time)**  
Designed, built and wrote software for two custom legged robots, an actuated linear radar motion calibration rig, and state sensor feedback boom for legged robots alongside MSc.
- High degree of autonomy with bimonthly meetings with lab director and researchers.
  - Conducted tests, experiments and performed data analysis in MATLAB.
- Nov 2019 – Dec 2019      **Mechatronics Lab Intern, University of Cape Town - African Robotics Unit**
- Dec 2018 – Jan 2019      **Ski Mountain Worker, Vail Resorts, CO United States**
- Nov 2017 – Dec 2017      **Software Intern, Prescient Investment Management**

## Courses

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- Nov 2018 – Dec 2018      **Practical Training Course, Cape Peninsula University of Technology**  
CNC programming & machining, precision metrology and measurement, electrical automation/robotics, pneumatics, welding, fitting, and turning in an 8-week course.

Volunteering

Sep 2021 – Dec 2021

High School Arduino Educational Outreach, *Instructor*

Co-facilitated an 8-week workshop introducing Portlands High School students to programming, electronics, soldering and additive manufacturing.

- Taught and assisted students in building a heart rate sensor, a motion alarm, and a sweet colour sorter.

Languages

English

Native tongue



Afrikaans

Six years in school



Interests

**Offshore Sailing** (Competed in Cape2Rio 2023), **Cycling** (6x Cape Town Cycle Tour), **Surfing**