

Summer Studentship 2024

DATA COMPRESSION WORKFLOWS PROJECT



WHO IS THE CHILDREN'S CANCER INSTITUTE?

The Children's Cancer Institute is the only independent medical research in Australia dedicated to research into the causes, prevention, better treatments and ultimately a cure for childhood cancer. More than 40 years on, our vision remains unchanged – to save the lives of all children with cancer and improve their long-term health, through research. The Institute has now grown to employ nearly 350 researchers, operational staff and students, and has established a national and international reputation for scientific excellence. Our focus is on translational research, whereby we have an integrated team of laboratory researchers and clinician scientists who work together in partnership to discover new treatments which can be progressed from the lab bench to the beds of children on wards in our hospitals as quickly as possible.

The Institute has recently embarked on a remarkable adventure towards joining with our clinical colleagues at the Kids Cancer Centre, Sydney Children's Hospital, in a brand-new purpose built home, Australia's first Children's Comprehensive Cancer Centre, which when completed, will house up to 900 child cancer clinicians and scientists.

OUR SHARED VISION

Our shared vision for the Children's Comprehensive Cancer Centre is to be the leading children's comprehensive cancer centre world-wide, providing for the seamless integration of child cancer research, clinical care and education, with the goal of putting an end to childhood cancer.

WE BELIEVE THAT

- No child should die from cancer or suffer life-long side effects from their treatment.
- Medical research is fundamental to curing childhood cancer.
- It is the critical iterative relationship between translational research, research that moves laboratory findings into the clinic; and discovery research, bench to bedside and back again, that is bringing us closer to one day curing childhood cancer.
- It's not if. It's when.

OUR PURPOSE

Children's Cancer Institute exists solely to put an end to the devastating impact of childhood cancer. Every week in Australia, three children and adolescents die of cancer. Only when that three becomes zero, and when all the survivors can live a normal life, will our work be done.

Our purpose as the only independent medical research institute in Australia focused exclusively on childhood cancer, is to Translate and Discover, through world class research, new treatments that will cure cancer and reduce side effects in children and adolescents.

OUR STRATEGIC OBJECTIVES

Translate—Accelerate the integration of our translational research into clinical care, including delivery of the flagship Zero Childhood Cancer program.

Discover—To pursue world class discovery research, and to feed the translational pipeline through the depth, breadth and impact of our science.

OUR STRATEGIC ENABLERS

Empower—Attracting and developing the brightest minds in a vibrant collaborative high-performance culture that fosters diversity, innovation, and success.

Innovate—By providing our researchers and support teams with access to advanced technologies, infrastructure, and facilities, we will create a dynamic and cutting-edge environment for innovation.

Connect and engage—Partnering and collaborating with UNSW and Sydney Children's Hospitals Network together with national and international clinical and research leaders and organisations, governments, and industry to leverage and maximise the outputs and impact of our research.

Promote and fund—Sharing our beliefs, vision, and purpose with others to drive awareness, engagement and support for our cause that ensures we deliver our strategic objectives in a financially sustainable way.



YOUR ROLE

Team:	Computational Biology	Reports To:	Marie Wong-Erasmus
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YOUR PURPOSE

Cancer is the leading cause of disease-related death in children. Precision Medicine promises to substantially improve outcomes in children with cancer, through comprehensive molecular profiling of tumours.

At the Children’s Cancer Institute, patients are recruited to the Zero Childhood Cancer Program and samples taken for various molecular profiling experiments such as whole genome DNA sequencing, RNA sequencing and methylation profiling. Each of these experiments produces large quantities of data that need to be stored for analysis and archived for posterity. As new patients are profiled, data storage is becoming increasingly expensive.

The challenge is to reduce the data footprint to reduce cost and time taken to retrieve the data.

The scope of this project is to create a data compression tool in workflow language nextflow (<https://www.nextflow.io/>) by wrapping existing tools to later be incorporated into a larger workflow.

This project will require basic programming in unix shell skills. You will gain exposure to Nextflow workflow Language, application containerisation, CLIs & APIs for storage mechanisms such as S3. A stretch goal for this project would be to integrate the created apps to the existing downstream workflows. This project will be supervised by Dr Marie Wong (MWong-Erasmus@ccia.org.au), who has >15 years experience as a bioinformatics researcher & engineer. Co-supervising with Marie is Louise Cui (lcui@ccia.org.au) who graduated from this program and will bring her experience and know-how to the process.

YOUR KEY OUTPUTS AND ACTIVITIES

1. Connection to the Cause	<ul style="list-style-type: none"> You undertake other activities as directed to support the Institute’s vision and purpose.
2. Systems & Processes	<ul style="list-style-type: none"> This project will require basic programming in unix shell skills.
3. People & Teams	<ul style="list-style-type: none"> You foster a harmonious and collaborative team culture and support the REDI vision – respect, equity, diversity, and inclusion. You maintain and enhance your skills and knowledge through participation in education and the Institute’s Personal BEST performance and development program
4. Conduct & Safety	<ul style="list-style-type: none"> You role model behaviours that positively reflect the Institute’s Code of Conduct, Research Code of Conduct and all relevant WHS policies and procedures. You comply with all relevant Institute WHS policies and procedures. You take reasonable care to maintain your own health and safety and that of others. You actively participate in making the Institute a safe and healthy workplace through communication and consultation processes.

YOUR PROFILE

Skills/Qualifications	Capabilities
Essential: <ul style="list-style-type: none"> bioinformatics, computer scientist or biomedical engineering student 	<ul style="list-style-type: none"> Resilience – persist despite challenges, obstacles, and interruptions Creativity – innovative and apply resources in new ways Empathy – understand and consider other’s feelings, thoughts, and experiences Imagination – see through variety of lenses and challenge present assumptions Emotional intelligence – understand other’s emotions and experiences Teaming – collaborate effectively across organisational boundaries Critical thinking – analyse, evaluate, and reconstruct information

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| | <ul style="list-style-type: none">• Adaptive thinking – recognise new patterns and apply patterns in new contexts |
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*To submit your application, please send your CV to mwong-erasmus@ccia.org.au
subject: summer studentship*