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# Advancing precision health through research and innovation

As a result of advances in genomics, imaging and data analyses, there has been a transformation in the way we diagnose and treat disease. At the Cumming School of Medicine (CSM), we aim to provide access to individualized prevention and treatment plans that mean better outcomes with fewer risks – bringing the future of medicine to Alberta.

Combining research with technology hubs, the CSM's core platforms provide the foundation for this transformation, empowering the most brilliant minds from across the University of Calgary to share their knowledge and expertise. Understanding every individual's specific condition – what they have and why they have it – this work will help match people to the therapy that offers their best chance for improved health.

Precision medicine and precision public health is integral to the CSM and to the health of our community. Support from that community is essential to us moving forward together to ensure Albertans receive the right medical care at the right time.

## Technology hubs to power life-changing exploration

### UNLEASHING THE POWER OF GENOMICS

An organism's complete set of DNA is called its genome. We have the capacity to read genetic information to develop a deeper knowledge and understanding of the genome and its environment, which plays a critical role in precision health. From reading human genomes, analysing the microbiome or the genomic makeup of even a single tumor cell, advances in genomics are unleashing advances in our understanding and treatment of diseases.

For example, Madden was a young boy admitted to Alberta Children's Hospital with serious immune system issues. Unable to digest food properly, he was losing weight rapidly while developing life-threatening infections. Gene sequencing found a single letter that changed in his genome and he was diagnosed with a rare condition called Ipex Syndrome. To save his life, Madden needed a bone marrow transplant. He now has a rebuilt immune system that is healing his body.

The **Centre for Health Genomics and Informatics (CHGI)** at CSM is a core facility offering DNA sequencing services and bioinformatics support to researchers across UCalgary, allowing investigators to contribute to happy endings like Madden's.

### CENTRE FOR ADVANCED TECHNOLOGY

Considered the umbrella of the Cumming School of Medicine's core facilities, the Centre for Advanced Technologies (CAT) houses essential technologies that support biomedical research across the spectrum, from the study of the genome to cellular and medical imaging. With nine sub-specialty tentacles – the Biomedical Technical Support Centre, Central Sanitation and Sterilization, Centre for Genome Engineering, Experimental Imaging Centre, Flow Cytometry Facility, Health Sciences Animal Resources Centre, Micro CT Laboratory, Southern Alberta Mass Spectrometry Facility and University Core DNA Services – the CAT is helping create the future of health by elevating research projects across the UCalgary campus and partners across the city of Calgary through the use of their technology and talent.

### CLINICAL RESEARCH UNIT

A go-to hub for investigators looking for comprehensive data, research management and analytics, the Clinical Research Unit (CRU) plays an integral role in precision medicine through capacity building, statistical support and custom software. Developing tools and software that engages patients and/or research participants in their homes, the CRU helps to connect research with patients. A recent collaboration with the Department of Emergency Medicine informed best practices around pulmonary medicine imaging, and they have supported large database projects. The CRU has also created research platforms for major trials in stroke, multiple sclerosis, cardiac disease and child health that are changing the way patients are treated.

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### **CENTRE FOR HEALTH INFORMATICS**

In Alberta's unique one-healthcare organization, with a single Electronic Medical Records system, the Centre for Health Informatics brings together provincial population-based big data to foster collaboration among investigators, support grant development, recruit faculty and students, develop cutting-edge analytics, and build capacity in data science and machine-learning. The newest UCalgary research and innovation centre within the CSM advances precision health through timely data access and analytics, informing research trials and clinical decisions.

### **INTERNATIONAL MICROBIOME CENTRE**

A translational research centre designed to investigate the microbiome of humans, plants, animals and the physical environment, the International Microbiome Centre brings together world-class microbiome researchers and advanced technologies to spark ground-breaking discoveries. Studying the microbiome – the community of trillions of bacteria, parasites, viruses and fungi that live in and around our bodies – helps shape and educate our immune systems. Every person has a unique microbiome, which plays an instrumental role in health and wellness.

## Funding to fuel transformational research

### **TRANSLATIONAL THERAPY FUND**

Many obstacles can prevent innovative medical research discoveries from becoming new therapies, or even making it to clinical trial. Support is needed to overcome what is known as the Valley of Death in drug development – to take scientific discoveries from the lab to a stage where they can form the basis for a solid business venture.

### **CATALYST FUND – MATCHING FUNDS**

Some federal funding programs and competitions require matching funds to be eligible. A researcher's chance of success is enhanced because the applicant pool is smaller, but with short timelines, it can be difficult for investigators to get these funds together. Because of this, our strongest applications to these competitions aren't necessarily the ones submitted. A pool of funds that is available will enhance our chances at success in these high-profile competitions, delivering high-quality research.

### **CLINICAL RESEARCH FUND**

The CSM and Alberta Health Services (AHS) have partnered to create a new funding opportunity for UCalgary investigators, intended to increase high impact clinical research and ultimately improve the Alberta health system and the health of Albertans. Supporting planning and pilot work will help launch more clinical studies that influence clinical practice and health-care delivery, facilitate more leveraged funding and enable important partnerships with industry and the community.

### **IMPACT**

Supporting start-up ventures in the life sciences and biomedical industries, with a focus on commercialization of health-related inventions, the IMPACT program gives life to innovation by helping these ventures through the clinical trial and regulatory approval processes. IMPACT Venture Navigators connect visionaries with researchers and help design, support, execute, and report on clinical trials. Located at the Life Sciences Innovation Hub in partnership with the Creative Destruction Lab, IMPACT also offers unparalleled access to research space, entrepreneurial and business development programming, mentorship, and connections to local experts, facilities and resources.

## Help us create the future of precision health

Your support for research funds and technology hubs at UCalgary can help push personalized medicine forward, creating a future in which we can determine the exact nature of an individual's illness and how to ensure the best possible outcome.

For more information, please contact:

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