The 2017 C17 Ewing Sarcoma Grant Competition was both exciting and encouraging. Three strong grants were submitted for consideration. All three focussed on approaches for treatment modification or finding effective targets for new treatment development for aggressive and hard-to-treat tumours. We would have been excited to fund more than one grant, but look forward to seeing the two unfunded grants in the next competition.

We know that there are other sarcoma researchers with proposals in development that were not summited this past grant round, so we anticipate another exciting competition this winter/spring. The growing number of competitive and relevant grants submitted to the C17 Ewing Sarcoma Grant Competition is evidence that ECFC funding is fostering the growth of Ewing sarcoma research programs in Canada!

The next grant competition kicks-off on December 14, with grants due in April 2018. We are excited to announce that the Ewing sarcoma grant competition will be run within the newly established 100% Fund grant competition.

Congratulations to Dr. Livia Garzia—Recipient of the 2017 C17 Ewing Sarcoma Grant

Livia Garzia is one of Canada’s newest pediatric sarcoma researchers. Livia’s research program at McGill University aims at unraveling the genetic basis of cancer recurrence and spread in pediatric cancers such as bone sarcomas and brain tumours. She is focused on understanding how the function of genes changes during the process of cancer spread. Livia’s position at McGill was the first hire as part of a $4M research fund established by François Angers, in memory of his sister Nicole, targeted at finding cures for sarcoma. The commitment of McGill to focus on sarcoma research puts Livia in an excellent environment to work towards her research goals and to spotlight Ewing sarcoma. We are thrilled to welcome Livia to the ECFC family!

Livia’s ECFC-funded research will be performed in partnership with co-Investigator (and 2012 ECFC grant co-recipient) Poul Sorenson from the University of British Columbia. Livia will use genetic manipulation to create human Ewing sarcoma tumour cells that can survive when transplanted into mice. When the human tumors grow in recipient mice, Livia and will treat the mice with mouse adapted surgery that mimics patients’ treatment. As is the case for patients, some mouse-implanted tumors will grow back and metastasize (spread) to other areas of the mouse body. Livia will then harvest the metastatic tumours and Poul will compare them to the original tumours using DNA sequencing techniques.

By comparing the pre-treatment tumour with the post-treatment metastatic tumour, Livia and Poul will start to address the question of what changes occur in Ewing sarcoma cells that makes these cells aggressive and able to spread. By figuring out why and how Ewing sarcoma resists treatment and spreads, Livia aims to find underlying biological mechanisms that can be targeted and shut-down.

Of the almost 30% of Ewing sarcoma patients that succumb to their disease, most die from the aggressive tumour cells that spread to other parts of the body, not the original tumour. Research that targets metastatic Ewing sarcoma holds the potential to deliver better treatment options to these patients. Of the four C17 Ewing Sarcoma Grants funded since 2012, all four focus on targeting metastatic disease.
Biography: Dr. Livia Garzia completed her Master’s in medical biotechnology in Italy at the University of Naples. Set to pursue an academic career she enrolled in the PhD program of the Open University (Cambridge, UK). During her PhD training, she developed a keen interest for developmental biology and its relationship with pediatric cancers and was awarded her PhD in Life Science for her research conducted at the Telethon Institute for Genetics and Medicine in Naples.

Dr. Garzia then moved to Canada to advance her training in cancer genetics with a post-doctoral fellowship granted by the American Brain Tumor Association, under the supervision of Dr. Michael D. Taylor. As a Post-Doctoral fellow in the Taylor lab she led the lab efforts toward the understanding of how developmental mechanisms are altered during tumorigenesis of pediatric brain tumors, with the goal of designing new therapeutic strategies for this disease. During her post-doctoral years in Dr. Taylor lab she gained extensive training in mouse and human genomics, which she applied to design innovative and unique mouse models, focusing on two understudied aspects of cancer progression, resistance to therapy and metastasis. To this extent, Dr. Garzia developed the first preclinical model to study medulloblastoma recurrence, which is the major cause of mortality in this patient population.

Dr. Garzia joined the McGill University Research Institute in January 2017, as Assistant Professor in the Cancer Research Program and the Department of Orthopedic Surgery. Dr. Garzia is focusing now on developing a basic research Ewing sarcoma program, to tackle the challenge of metastasis and therapy resistance.

Checking-in with 2016 C17 Ewing Sarcoma Grant Recipient Dr. Jason Berman

Dr. Jason Berman is using zebrafish help him understand the genetics behind the spread of Ewing sarcoma.

In addition to being small and transparent, zebrafish have enough genetic similarities to humans to be a good research tool. Transparency is important because it allows one to see inside the zebrafish using common research equipment.

As part of their grant, Jason’s research team has modified Ewing sarcoma cells so that they have a fluorescent tag. Next, they worked out a method of transplanting these tagged cells into zebrafish. The fluorescent tag, together with the transparent nature of the zebrafish, allows his research team to measure accurately the growth and movement of the Ewing sarcoma cells transplanted into the zebrafish.

Recently, the loss of a protein called stromal antigen 2 (STAG2) was found to be connected with poor outcome and disease spread in Ewing sarcoma. Jason and his graduate student, Melissa Richardson, have used gene-editing techniques to remove the STAG2 gene from a Ewing sarcoma cell line. They have been transplanting fluorescently-tagged versions these cells into zebrafish, and monitoring their spread. Melissa will be comparing these two Ewing sarcoma cells lines (one with STAG2 and one without STAG2) to try and figure out if STAG2 is promoting tumour spread directly or if STAG2 is required for the proper function of partner-proteins that promote tumour spread. Jason’s hope is that his research will reveal a new treatment target that will allow for the prevention of metastatic Ewing sarcoma.

“This project has been a great opportunity for me to further my education and enter into the field of cancer research, a career goal I’ve had since childhood. In addition to contributing to my career path, studying Ewing sarcoma has also been a rewarding experience. My project addresses a key clinical problem in Ewing sarcoma – what factors contribute to the spread of Ewing sarcoma cells and impact the poorer prognosis in metastatic disease. Ultimately, this work will guide new treatments to improve the outcome in Ewing sarcoma.”

Melissa Richardson
M.Sc. Candidate in the laboratory of Jason Berman
Did you know that your funding dollars can have a sustained impact on advancing pediatric cancer research and treatment options for kids with cancer for years after the grant money has been spent?

The impact of a research grant is like the ripples in a pond. There is an intense 2-3 years of research, or longer in the case of a clinical trial, followed by sharing of the research results. Next comes the waves of research and follow-up grants that are a direct consequence of the initial grant. Other impacts include changes to clinical practice, a new tool for testing patients, or new resources that can be used by other research teams. Running parallel to these impacts are the trainees that are behind most research programs—graduate students, medical residents, and undergraduates. Many trainees will take their knowledge to other research groups, into clinical practice, or to their own research program.

The Impact of 2014 C17 Ewing Sarcoma Grant Awarded to Dr. Adam Shlien and Co-Investigator Dr. David Malkin

Adam’s research at The Hospital for Sick Children focussed on a very sophisticated genetic approach that allowed him to paint a complete genetic picture of Ewing sarcoma. Adam has shared recently that this approach, in combination with the expertise gained performing his ECFC-funded research, has been used outside of the research lab to solve Ewing sarcoma diagnostic mysteries.

In one case, a child’s tumour looked like a Ewing sarcoma under the microscope, but it was missing the major genetic change used to diagnose Ewing sarcoma. This lead to a complicated and longer than usual diagnosis. By apply his research sequencing approach to this child’s tumour, Adam discovered that the diagnostic genetic change was present in the child’s DNA, but that it was just different enough that it could not be detected by standard methods.

In addition, Adam and his lab have combined their sequencing approach with an algorithm they developed, and used it to test over 100 children with hard-to-treat cancer. In many cases they found ‘actionable’ genetic changes—that is a genetic change that can be targeted by specific drugs—giving these patients a new treatment option.

ECFC Joins forces with The 100% Fund

Nearly one in five children diagnosed with cancer will not survive. For children with rare and hard to treat cancers, the odds can be far worse. The 100% Fund has been created to challenge these odds.

In recognition of its 30th anniversary, Childhood Cancer Canada (CCC) is proud to partner with The Ewings Cancer Foundation of Canada, Phoebe Rose Rocks Foundation, Fight Like Mason Foundation, Team Naomi, and Team Finn to help fund research for children who do not, yet, have their cure.

The time is now.

We have seen so many recent medical advancements, such as the ability to map the whole genome of tumours, the discovery of mutations that may be driving tumours, and new targeted drugs. These offer renewed hope for children who have not responded to current therapies.
By building on new and exciting research initiatives in Canada and around the world, The 100% Fund will pave the way for collaborative research into cutting-edge therapies for tumours that have not responded to currently available treatments.

CCC will partner with the C17 Council and its C17 Research Network to administer the grants. As a national research organization representing leading pediatric oncology programs across Canada, the experts at C17 know the priorities of children and their families that have been impacted by childhood cancer.

**What does this mean for ECFC-funded research?** ECFC will join forces with other like-minded organizations to spotlight the fact that 1 in 5 children/teens with cancer do not survive, and that innovative and effective treatments are required to increase the survival rates for the cancer types in this category, such as Ewing sarcoma. Administratively, the ECFC-funded competition will not see any notable changes. The grant competition will still be run, with the same high standards, through the C17 Council and its C17 Research Network, but the matching funds will come from The 100% Fund, instead of coming from the CCC budget for discovery research, allowing for the initiative to grow at its own pace. The 100% Fund is only a few months old, but is quickly gaining momentum; it is expected that being part of The 100% Fund will help increase Ewing sarcoma awareness.

The inaugural round of The 100% Fund grant competition was initiated this fall, with the first grants to be awarded in June 2018. All proposed research must be aimed at delivering a treatment intervention. The goal is to fund research with the potential to deliver improved treatment and increased survival rates. For the 2017/18 competition, the following three cancer types have been targeted.

- **Ewing Sarcoma**—funding partner Ewings Cancer Foundation of Canada
- **Infant ALL**—funding partner Phoebe Rose Rocks
- **Rhabdomyosarcoma**—funding partners Fight Like Mason, Team Naomi, and Team Finn

You can find out more about The 100% Fund and its partners by visiting www.the100pfund.ca.

Because every child deserves a cure.

*C17 strives to improve health outcomes and quality of life for children and adolescents in Canada with cancer and blood disorders, and to eliminate disparities in care and outcomes wherever they occur.*