



Arthur B. McDonald
Canadian Astroparticle Physics Research Institute

Status update on the McDonald Institute

Tony Noble

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Director, Queen's University

Funded through the Canada First Research Excellence Fund (CFREF)
Award of ~\$64 M\$

Hosted at Queen's University in partnership with the Canadian
community

- Queen's University
 - University of Alberta
 - University of British Columbia
 - Carleton University
 - Laurentian University
 - McGill University
 - Université de Montréal
 - University of Toronto
 - CIFAR
 - IPP
 - PI
 - TRIUMF
 - SNOLAB
- *Sherbrooke University

Vision:

“To be a globally recognized centre for research and learning, coalescing Canadian and international expertise in underground particle astrophysics and benefitting from the unique SNOLAB facility to deliver world-leading science focused on the big questions in particle astrophysics, cosmology and astronomy.”

Science

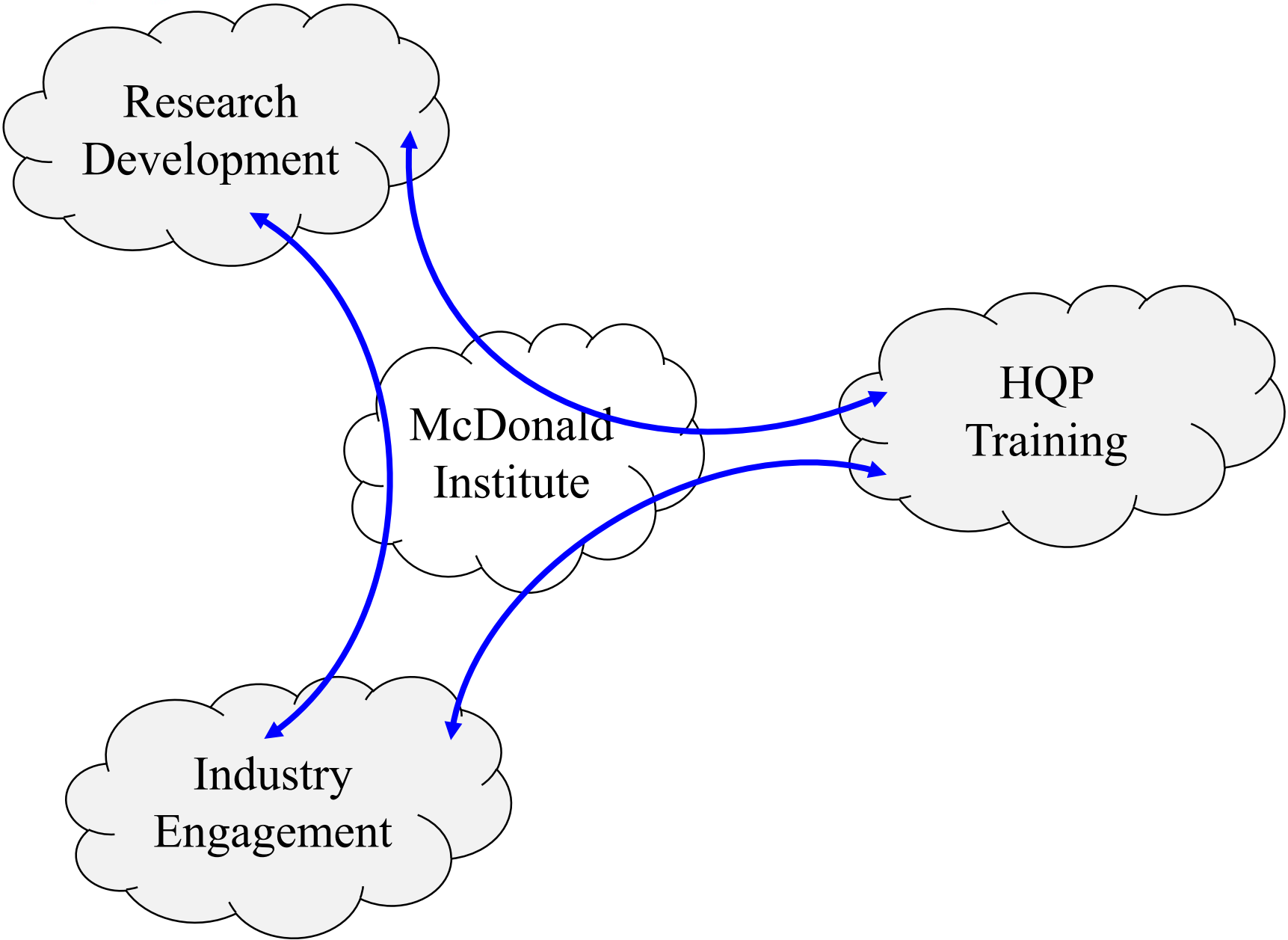
- build a powerful and integrated team working on all aspects of astroparticle physics
- create a research team with the critical mass and skills required to prepare and lead the next generation of increasingly challenging experiments.
- extract maximal scientific output from the current suite of SNOLAB experiments

Education and Outreach

- Provide training opportunities for students at all stages of their careers, developing experimental and foundational theory skills.
- Engage non-expert audiences, including the general public, high school students and teachers

Engagement with Industry

- Actively collaborate with industry to facilitate knowledge transfer and innovation.





Hiring of the team of faculty:

Particle Astrophysics Experiment:

1. Queen's University:	Guillaume Giroux	July 1, 2017
2. Queen's University: Joint w TRIUMF	Ken Clark	Sept 1, 2017
3. Université de Montréal	Alan Robinson	Nov 1, 2017
4. Carleton University	Simon Viel	Aug 1, 2017
5. University of Alberta	Marie Cecile Piro	Oct 1, 2017
6. University of Alberta	Juan Pablo Yanez Garza	June 1, 2018
7. Laurentian University	Caio Licciardi	Sept 1, 2017
8. TRIUMF	Wolfgang Rau	Sept 1, 2018
9. University of Toronto	Miriam Diamond	Jan 1, 2019

Astroparticle Physics Theory

10. Queen's University	Aaron Vincent	Jan 1, 2018
11. Queen's University	Joe Bramante	Sept 1, 2017
12. Carleton University	xxx	Sept 1, 2019

Isotope Research/Radiochemistry

13. Queen's University Geochemistry	Matthew Leybourne	Sept 1, 2017
14. Queen's University Chemistry	Peng Wang	June 15, 2018

Nuclear Materials

15. Queen's University Mech. Eng	Levente Balogh	Jan 1, 2018
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Research Areas for AP Experimentalists

Guillaume Giroux:	News-G / PICO	Dark Matter
Ken Clark:	PICO / SBC + ϵ	Dark Matter +
Alan Robinson:	SuperCDMS / PICO	Dark Matter
Simon Viel:	DEAP-3600 / LAr	Dark Matter
Marie Cecile Piro:	DEAP-3600 / PICO / News-G	Low Background / DM
Juan Pablo Yanez Garza:	SNO+ / Icecube/Pacific ν	Neutrino
Caio Licciardi:	nEXO / PICO	Neutrino / DM
Wolfgang Rau:	SuperCDMS	Dark Matter
Miriam Diamond	SuperCDMS	Dark Matter

Some new initiatives with strong leadership from new MI faculty/staff

- Scintillating bubble chambers
- Ultrapure crystal growth underground
- Monoenergetic neutron beams at Queen's as calibration tool
- Pacific neutrino initiative
- SiPM developments
- LOLA/LOLX
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Growth in the Theory Community into Astroparticle

Institution:	Researchers	IIA	Pooled Funding
Queen's	Bramante/Vincent	3 PDF 7 Grad	2 Grad
Carleton	xxx	1 PDF 2 Grad	
Carleton	Godfrey/Gregoire/ Logan/Stolarski		3 PDF 2 Grad
McGill	Cline		1 Grad
Toronto	Bovy		1 PDF
Victoria	Ritz		1 PDF

→ In Astroparticle Theory: MI is **currently supporting** (or **committed to**): 3 faculty, 9 PDF and 11 Grad students.

Research support people: Being revised as hires are made and directions are refined....100 positions originally anticipated over the period of the grant.

- 83 Research positions filled (of 100 planned)
 - Including 15 faculty positions filled (of 15 planned)
 - Remainder are HQP (PDF, PhD, MSc, UG) ~50
 - And Engineers, technical staff, ~ 20

Administration

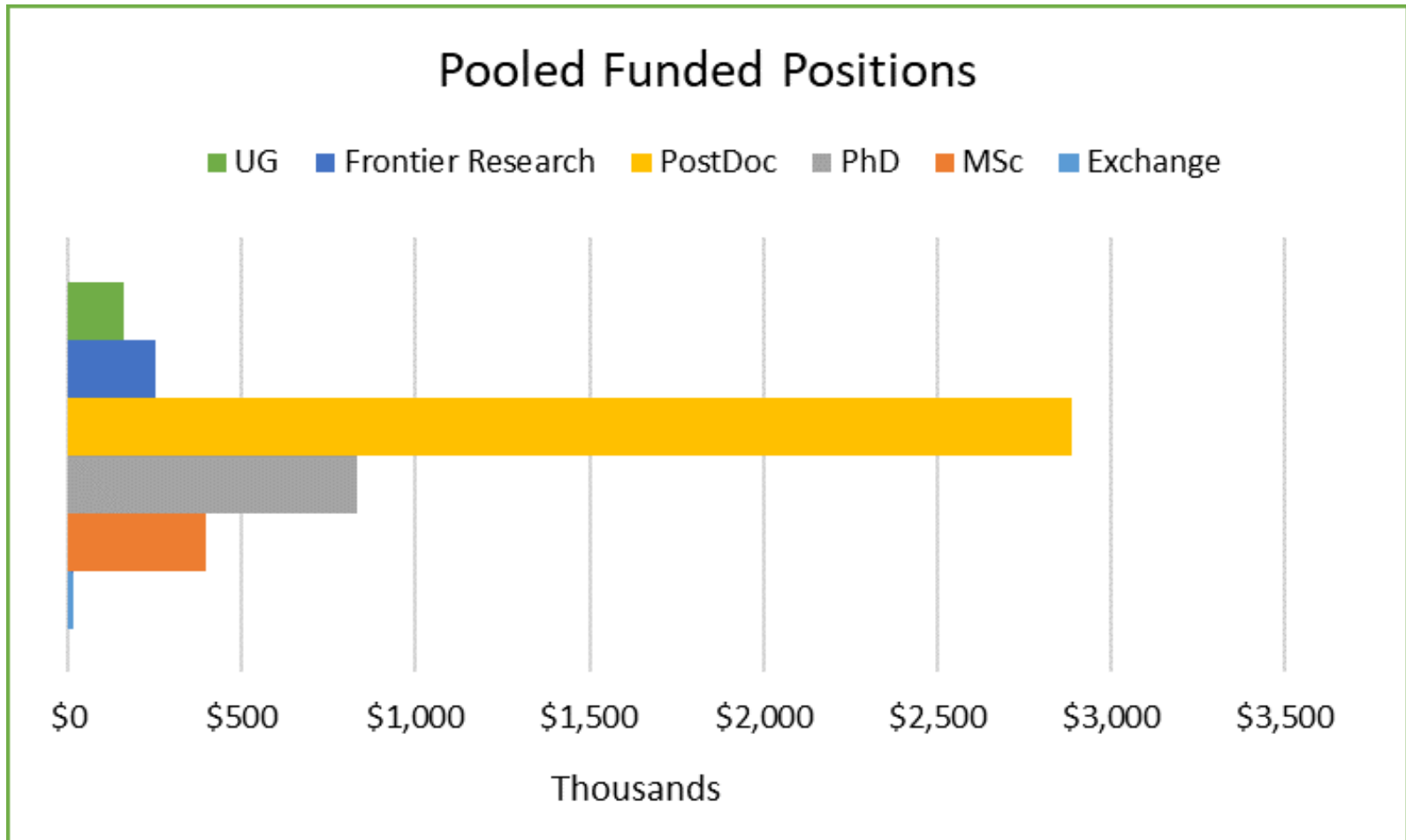
- 9 administrative positions filled (of 9 originally planned)

Recent Activities:

- All Faculty positions now in place. New faculty taking leadership positions on numerous experiments. Inter-institutional agreements signed, cash flowing to partners.
- All of the administrative team in place. Governance structures all in place.
- Building of the research teams (technical support, engineering, students, postdocs), well underway..... at most institutions
- Renovations completed to create a visitor centre, student offices and new lab space at Queen's.
- Education / Outreach activities:
 - Launch of the McDonald Institute
 - Visitor Centre Official Opening (May/18)
 - Undergraduate summer school CAPSS completed (May/18 & May/19)
 - Graduate summer school (GRIDS) 2018, and 2019 kicks of next week (June/19) (joint with TRIUMF)
 - Launch of the George and Maureen Ewan lecture series. Kick off with speakers Barry Barish, David Radford, Francis Halzin,
 - Dark Matter day – UG conferences – High school visits and event support....
- Launch of competitions for additional students/postdocs/PhD-exchanges...

“Pooled Resources” – Initially Unallocated

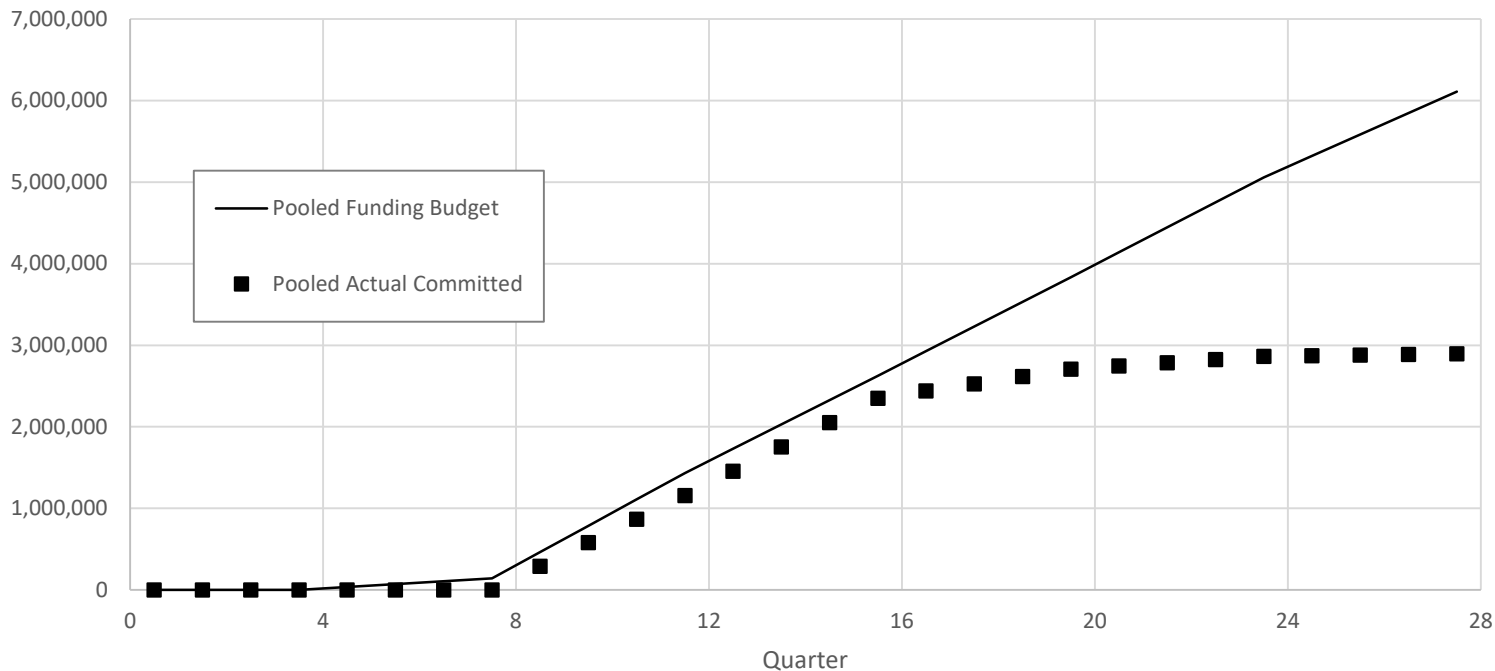
- Anybody with research that is aligned with the goals of the McDonald Institute can be a member of the Institute and access the resources.
- McDonald Institute members can compete for pooled resources which includes funding for:
 - Postdoctoral fellows
 - Graduate students
 - Frontier Research Venture Fund (140k\$/a to disburse)
 - Sabbatical Support
 - Travel support for collaboration building
 - PhD exchange program
 - Undergraduate research experience
- An Advisory Committee was established with a mandate to review applications for these resources. We have launched four competitions to date with commitments of over 4 M\$ in HQP support so far.



- Significant contributions through support of HQP (over 4 M\$ committed)
- Frontier Research Venture Fund has been awarded 3 times to date
- Several PHD exchanges, and pending sabbatical visit
- Other programs encouraging/supporting collaboration just being rolled out



Pooled Funding: Actual vs Budget To CY 2018



Pooled funding program quite mature. This is data as of December 2018 only. Committed funds (for multiyear awards) now plateauing at over 4 M\$

As an outcome of the McDonald Institute townhall scientific community meeting at Queen's in May, the McDonald Institute will be hosting a “**SNOMass**” event, planning the future of astroparticle physics in Canada.

We will try to find a date and location that works this autumn for the majority of the community to have the initial meeting.

Input will be sought from the entire community to determine our research priorities and to develop the best strategy for the field as experiments will become necessarily larger and more complex, and the world will only have the resources for a few very large, next generation detectors.

Status: Moving slowly:

- Astroparticle-Physics Community Planning Steering Committee has been established (with representation from IPP, CINP, TRIUMF, SNOLAB, PI, Astro, and MI) This committee has met, and is:
- Working on defining chairs for working groups.