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MILLION DOLLAR PHD

HOW TO MAKE MORE THAN MINIMUM WAGE WITH GRADUATE SCHOLARSHIPS IN CANADA

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1 This book in one minute

HERE ARE THE SIMPLE but rarely applied guidelines to increase your graduate funding:

1. Ask for money. Sometimes a single email to your department can be worth thousands of dollars. Graduate students rarely negotiate because academics are weird about money.
2. Apply for the usual governmental scholarships. Find other potential funders by seeing who has supported your colleagues and professors. Check their CVs, read funding acknowledgements in papers and presentations, and ask around.
3. Ask yourself: Who would benefit from my research? Consider partnerships with organisations or companies. Check award lists and databases occasionally, but focus on little-known (and less competitive) funders. You can also write grants with your professor.
4. Prioritise awards that: have a high expected value (attainable awards worth a lot), award multiple times, enable other awards, provide feedback, require reusable work, and "stack" atop other awards. Avoid most essay contests and all awards with an application fee.
5. Find examples of successful applications and copy their structure. Since award evaluations are mostly random noise, apply and re-apply to different organisations until your projects are funded and you reach a reasonable income. This may be higher than you expect.

2 Introduction

MY GRADUATE STUDENT LIFE was atypical. When I started at McGill University in 2013, neither my lab nor department guaranteed funding; I needed a continuous stream of external awards to stay in grad school. One of my colleagues was in the same position, so we decided to seek as many awards as possible to maximise the probability of staying in the program. We applied for every viable scholarship we came across and even cold-called CEOs to discuss industry–university scholarships. Most of our early efforts ended in rejection, but we eventually learned enough about the process to fund our Master's degrees, PhDs, and later our postdocs.

In the last half of my PhD, my university hired me to run workshops titled *Making more than minimum wage in grad school*. Attendees would later email me about how they used this information to earn tens or hundreds of thousands of dollars in additional funding. Several of my other colleagues followed a similar path and doubled their stipends to improve their living conditions and escape student debt.

By the time I completed grad school, I had been offered over a million dollars from 30 scholarships, grants, and financial awards. I accepted most of these, which provided ample scholarship income as well as grant funding to support four other grad students, hire a dozen research assistants, and present my research at conferences around the world. I learned a lot about the funding process, the inner workings of academia, writing budgets, estimating timelines, dealing with occasional successes and repeated failures — all things that gave me a peek at what life is

like for principal investigators. This atypical setup made my graduate experience as close to ideal as one could expect.

In contrast, graduate students in Canada are typically paid around $20,000 per year. Factoring in tuition and work hours,[1] this works out to less than minimum wage. Other students receive no funding at all throughout their program and have to pay their tuition and expenses from loans.

This low funding means that some students need to work additional jobs during their degrees, further reducing their free time. Others use more risky methods for income; some students in my department participate in corporate pharmaceutical trials, trading side effects for a few extra grand. Other students from lower-income backgrounds, or those who support family members, may be unable to afford to enter grad school at all. Indeed, recent calls for more diversity and inclusion in academia often overlook students disadvantaged by a low family income.[2]

2.1 Student debt and mental health

Naturally, many students graduate in debt. The total student debt is over $28 billion in Canada, with an average of $20,000 after a Bachelor's or Master's degree and $25,000 after a PhD.[3] This debt often persists for over

[1] Chris Woolston, "PhDs: The Tortuous Truth," *Nature* 575, no. 7782 (November 2019): 403–6, https://doi.org/10.1038/d41586-019-03459-7.

[2] Paul Ingram, "The Forgotten Dimension of Diversity," *Harvard Business Review* 99, no. 1 (2021): 58–67, https://hbr.org/2021/01/the-forgotten-dimension-of-diversity.

[3] Diane Galarneau and Laura Gibson, "Trends in Student Debt of Postsecondary Graduates in Canada: Results from the National Graduates Survey, 2018," *Statistics Canada*, 2020, https://www150.statcan.gc.ca/n1/pub/75-006-x/2020001/article/00005-eng.htm.

a decade[4] and takes its toll; some people even report considering suicide because of it.[5] Some of my former colleagues, funded only by student loans, broke down from the stress and ended up leaving academia.

Around 40% of graduate students in a worldwide survey met the criteria for moderate to severe depression and a similar number for moderate to severe anxiety.[6] These rates are six times higher than in the general population, and the impact of financial instability on graduate mental health "cannot be overstated."[7] Considering work–life imbalance, high competition, low job availabilities, and "publish or perish" realities, grad students already have enough to worry about. As Sarnecka writes:

> When one person has asthma, that person should see a doctor. But when 40% of people have asthma, and 80–90% of people have breathing problems, something is wrong with the air.[8]

While this book won't fix the broader systemic issues, we can at least tackle the burden of individual financial stress.

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[4] Statistics Canada, "Canada Student Loans Program — Annual Report 2018–2019," 2020, https://www.canada.ca/en/employment-social-development/programs/canada-student-loans-grants/reports/cslp-annual-2018-2019.html.

[5] Melanie Lockert, "Mental Health Survey: 1 in 15 High Student Debt Borrowers Considered Suicide," *Student Loan Planner*, 2019, https://www.studentloanplanner.com/mental-health-awareness-survey/.

[6] Teresa M Evans et al., "Evidence for a Mental Health Crisis in Graduate Education," *Nature Biotechnology* 36, no. 3 (March 2018): 282–84, https://doi.org/10.1038/nbt.4089.

[7] Nadine S. Bekkouche, Richard F. Schmid, and Saul Carliner, " 'Simmering Pressure': How Systemic Stress Impacts Graduate Student Mental Health," *Performance Improvement Quarterly*, June 2021, https://doi.org/10.1002/piq.21365.

[8] Barbara W Sarnecka, *The Writing Workshop: Write More, Write Better, Be Happier in Academia*, 2019, https://osf.io/z4n3t/.

2.2 Who this book is for

This book is for current and prospective graduate students in research-based programs in Canada. Perhaps you're starting your Master's degree but don't want a decade of student debt under your graduation cap. Perhaps you're seeing friends buy condos and you're wondering if you'll ever do the same. Or perhaps you're an older PhD student who has been receiving industry-level salaries and you're worried about the reduced income during your degree.

The feasibility of the strategies presented here will depend on your situation and should be adapted to suit you and your professor. If you have a flexible supervisor, you can apply for more project-based awards. Or, if you have a micro-manager, apply to more traditional student scholarships. Some departments have stipend caps, meaning that the department takes any money you receive beyond a certain limit. Funding will generally be easier in the hard sciences or for research considered more practical. But the field doesn't determine everything: one of the highest paid students who read this book came from the underfunded field of social work.

Effective funding is simple, but not easy. Beyond applying for the usual provincial and federal awards, the process of graduate funding becomes vague: where do you find scholarships and which ones do you apply for? This uncertainty promotes avoidance and procrastination. And I know the feeling: throughout my undergraduate degree I never applied for any scholarships that required more than ticking a box on a website. This book gives enough structure that "I don't know how" will no longer serve as a viable excuse to procrastinate funding. The many stories and examples presented here are not intended as prototypes of an immaculate application process but rather to provide rough successful templates in order to get you started.

2.3 What this book is not

This book is *not* for you if you're looking for a long list of potential scholarships and grants. As I'll argue later, focusing on public award lists will bias you towards high-competition and low-value awards — the least valuable ones to seek.

Further, to manage expectations, few people get rich in grad school. Being offered a million dollars in scholarships and grants does not necessarily make you a millionaire: some awards you decline, and some of the budget goes to study expenses, such as equipment, conference travel, or research assistant salaries. My colleagues and I have used the guidelines in this book to move beyond the standard $20,000 stipend to an average anywhere between $25,000 and $75,000 per year, with a lot of variability. Where you fall in this broad range depends on controllable factors, such as how often you apply, but also uncontrollable ones, such as departmental caps and your professor's supervisory style. In my case, the initial lack of a guaranteed income provided strong motivation to master the funding process. I was also fortunate to work with a supervisor who encouraged us to seek alternative funding sources and explore a range of projects. The guidelines in this book may not make you rich, but they could help provide enough funding to escape student debt, put a down payment on a house, or at least lead to a significant improvement in your quality of life.

2.4 Issues with academic funding

Before we dive into the guidelines in the next chapter, let's consider three issues.

2.4.1 Funding is noisy

The most important point in this book is that a large proportion of award evaluations is simply random noise. One study of 4,000 grant proposals found low agreement between reviewers (r = .2).[9] Another study found essentially no agreement among researchers reviewing 25 previously funded grant applications.[10] The researchers concluded that who happens to review the application is far more important than what it contains.

Here's an evaluation from one of my unsuccessful provincial award attempts:

Area (/6)	Review 1	Review 2	Review 3
Problem	6	4	2
Objectives	5	6	2
Methods	5	6	3
Feasibility	6	6	4
Originality	5	3	2
Total	27/30	25/30	13/30
Percent	**90%**	**83%**	**43%**

One reviewer gave the best possible rating for the research problem; another scored it 2 out of 6. One total score was half the others. Can you imagine if this was acceptable variation when marking exams? Depending on your grader, you could get an A, a B, or a failing grade.

[9] John Jerrim and Robert de Vries, "Are Peer-Reviews of Grant Proposals Reliable? An Analysis of Economic and Social Research Council (ESRC) Funding Applications," *The Social Science Journal*, March 2020, 1–19, https://doi.org/10.1080/03623319.2020.1728506.

[10] Elizabeth L. Pier et al., "Low Agreement Among Reviewers Evaluating the Same NIH Grant Applications," *Proceedings of the National Academy of Sciences* 115, no. 12 (March 2018): 2952–7, https://doi.org/10.1073/pnas.1714379115.

On one of our other project grants, one reviewer gave a score of 100% and wrote:

> I give a "perfect score" because the application is optimally fitted to the criteria for [the award], and it would be inappropriate for me ... to point out minor "fine-tuning" that would improve it yet further. ... [T]his kind of work is the backbone of science.

Another reviewer read this very same A+ "backbone of science" proposal and gave it 70%, equivalent to a B–.

Similarly, during my PhD, I applied for a federal award and was rated in the bottom 50% of the applicants. I was surprised; everyone who read my application was certain it would be funded. I re-applied the following year with no major changes. Re-submitting the same application was of course a dumb idea, but I was willing to bet that the rejection was simply noise and a reversal of the decision would make a good story for some future book on the insanity of graduate funding. And here we are: the next year it was funded and received a supplement for being one of the top applications. We'll take a look at that application later on, and you can decide whether it is below average, top quality, or both of these depending on who reviews it.

The only way to deal with this noise is to completely accept it: "love fate" and leverage the noise in your favour by applying to different agencies. The random noise will sometimes penalise your stronger applications and sometimes boost your weaker ones. Ultimately, what matters is the absolute number of awards you receive; nobody cares about your rejections. Some scientists have even proposed the "anti-CV" which curates your personal failures to highlight the relative rarity of success.[11] My funding anti-CV would proudly be longer than most; while I was

[11] Melanie Stefan, "A CV of Failures," *Nature* 468, no. 7322 (November 2010): 467–67, https://doi.org/10.1038/nj7322-467a.

offered over a million in awards, I was rejected from far more. To oversimplify: I was awarded five times more than the average graduate student because I applied for ten times more.

The number of awards you apply for is likely the biggest, simplest, and most controllable factor contributing to funding success. One student we'll hear from later pulled in over $50,000 per year with an imperfect GPA and zero publications during most of the award decisions. An uncomfortable but perhaps motivating realisation is that someone with fewer accomplishments than you is getting paid more than you, simply by applying a lot.

Applying for many awards does not need to take much time. On my end, tracking the last 4 years of my PhD during which I received most of my awards, I spent under 2 hours per week on the whole funding process: searching for grants, applying, submitting expense reports, and writing progress updates. The applications themselves took from 6 to 22 hours. Realistically, you only need two or three scholarships to make more than minimum wage, and while this can take time, it is a worthwhile investment.

2.4.2 Funding is not fair

Graduate funding, like most of the modern world, is a "rich-get-richer" game. The *Matthew Effect* describes how receiving awards early in your academic career makes it more likely you will obtain more later.[12] One study compared academics whose applications scored *just above* the score threshold required to receive funding versus those who missed it by a single point. Although the small distinction between these scores is well within the range of random variation, those who scored

[12] R. K. Merton, "The Matthew Effect in Science: The Reward and Communication Systems of Science Are Considered," *Science* 159, no. 3810 (January 1968): 56–63, https://doi.org/10.1126/science.159.3810.56.

above the threshold ended up receiving considerably more funding in future competitions.[13] Part of this subsequent funding gap was because applicants were less likely to apply to other competitions after being rejected once. Another study showed that those who persist after scoring just below the funding threshold end up receiving even more funding in the future.[14] So if you get funded, great: you trigger the rich-get-richer cycle. If you get rejected, also great: learn from the failure, keep applying, and you might get more funding overall. The only way to cement this failure, if you're staying in academia, is to stop applying.

This means that the first award is always the hardest. One of my early awards was declined in part because a reviewer questioned whether a mere Master's student could handle a project with a $50,000 budget. After I was awarded a five-figure grant from another funder, I re-applied to the original funder and said that I had led similar-sized projects; this time, the application was successful. Indeed, reviewers for competitive awards often evaluate your previous funding and awards when choosing whether to fund you. This ensures that the successful students become more and more successful — whether due to merit, grit, noise, having the right connections, being part of a strong team, or simply applying the ideas in this book.

Since the first award is the hardest, each subsequent award becomes easier; this accounts for why many students have few awards while others have dozens. The gap between these students seems larger than it is, since going from the 29th to the 30th award is much easier than going from the 1st to the 2nd.

Such discrepancies can cause students to feel guilty about winning many

[13] Thijs Bol, Mathijs de Vaan, and Arnout van de Rijt, "The Matthew Effect in Science Funding," *Proceedings of the National Academy of Sciences* 115, no. 19 (April 2018): 4887–90, https://doi.org/10.1073/pnas.1719557115.

[14] Yang Wang, Benjamin F. Jones, and Dashun Wang, "Early-Career Setback and Future Career Impact," *Nature Communications* 10, no. 1 (October 2019), https://doi.org/10.1038/s41467-019-12189-3.

awards. In most award competitions, you getting funded means another student will not. This is a general pattern in academia: you getting accepted into graduate school means that someone else didn't, and being published in a competitive journal means another article isn't published in its place. In this way, feeling guilty about funding may be no different from feeling guilty about any other kind of competitive success, whether within academia or not.

In some cases, though, effective funding does not mean that you are taking money from other students. As we'll see, a mind-boggling amount of money is left "on the table" without ever being applied for. Other sources of funding, such as some industry–university grants, do not have enough people applying for them so almost every application is funded. If you feel guilty about taking money from other students, share your successful applications with them and teach them what you did. Or spread the wealth more directly by hiring them as paid research assistants to help with your project. (I'm sure many students would happily accept some of your extra money to alleviate your guilt!)

2.4.3 Academics are weird about money

Finally, academics are weird about money. Economist Burton G. Malkiel at Princeton University notes that:

> . . . it is a peculiarity of the academic world that a professor is not supposed to make money. A professor may inherit lots of money, marry lots of money, and spend lots of money, but he or she is never, never supposed to earn lots of money; it's unacademic. Anyway, teachers are supposed to be "dedicated," or so politicians and administrators often say — especially when trying to justify the low academic pay scales. Academics

> are supposed to be seekers of knowledge, not of financial reward.[15]

This peculiarity also applies to graduate students. Expect to be asked, "Don't you already have funding?" (translation: "Aren't you already making less than minimum wage?"). Expect some students to become jealous or envious. And expect that specific numbers will rarely be discussed; you may have no idea how much your professor makes and it is considered rude to ask, despite this being the position many grad students invest a decade of their lives seeking. The lack of transparency reinforces some of the illusions grad students have about the market, such as their probability of landing a position as a professor and the amount of income that entails. (Under 10% of grad students become professors, and wages range from around a graduate stipend for some temporary adjunct positions, depending on the number of courses taught, to over $100,000–$200,000 for full professors,[16] with a lot of variability. Professor salaries across disciplines can be found in public databases, such as those for BC and Ontario.)

Overcoming the money taboo in academia requires transparency. Discuss stipend rates and departmental caps with your colleagues. Share which funding strategies worked in your field and which didn't. If we must compete in academia, let's try to make the required information for success more available and transparent. I hope this book contributes a small part of this solution.

[15] Burton G Malkiel, *A Random Walk down Wall Street: The Time-Tested Strategy for Sucessful Investing* (New York: WW Norton & Company, 2015).

[16] Statistics Canada, "Number and Salaries of Full-Time Teaching Staff at Canadian Universities," 2021, https://doi.org/https://doi.org/10.25318/3710010801-eng.

3 Buy the book

The full book is available to download for $10 as a PDF and EPUB. It includes the online content plus three examples of successful project proposals for federal and provincial awards. The e-book has 24,000 words for a reading time around 2 hours.