CAREERS

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Some universities operate food banks, which can help graduate students and postdocs who are struggling to meet their living costs.

FINANCES

Going for broke

Smart money management eases the financial worries that can affect academic success.

BY ELIZABETH DEVITT

Peter Rios thought his finances were under control when he joined a biomedical engineering lab in 2011 as a graduate student. He had a three-year fellowship and two years of university funding for his five-year programme, as well as savings from a consulting job. He didn't foresee trouble with meeting living expenses or debt from a car loan, and he had deferred thousands of dollars in loans from his undergraduate studies.

Still, he tried to live frugally because the cost of living in Chicago — near the campus of Northwestern University in Illinois where he is studying — isn't cheap. His fellowship stipend rose from US$30,000 a year to $34,000 by 2015, and he applied for supplemental scholarships, which helped to pay off his car loan and boost his savings.

But he's struggling now. Last October, his fiancée moved to the east coast for a job, and without someone to contribute to the bills, rent and utilities eat nearly 40% of his monthly stipend. He can't move because he's nearly finished his programme, his studio apartment is too small to share and his fellowship bars him from taking outside work unrelated to his PhD programme. He couldn't help his parents much with the cost of their visit this month for his thesis defence, and he can't save for his wedding in a couple of years. "I had never thought in a million years that I'd be living off this amount of money — especially coming from industry pay," he says. "When we start school, we have a seminar about rent in different areas. But no one really teaches you how to manage your money."

Rios' financial laments are hardly rare. A 2012 survey by Inceptia, a division of the US National Student Loan Program, found that finance-related issues account for 80% of the top causes of stress for US graduate and ▶

undergraduate students. And many graduate students said that those worries negatively affected their grades and the time it took to complete their programmes.

Indeed, financial management is no simple thing for junior scientists whose income is both limited and spotty. Although many students are now more financially savvy than previous generations — financial-management plans and resources are easily accessible online, and student debt is all over media feeds and the headlines — many, like Rios, find that it is hard to save when they can barely afford to pay bills and expenses. Graduate students and postdocs who hope to avoid disaster must watch their spending carefully, seek ways to economize and educate themselves on taxed income and services. In some cases, it may be worth judiciously considering jobs outside the lab.

Trainees should consider calculating their monthly and quarterly bills and expenses (see 'Follow the money') and looking for ways to cut these outlays. Ruth Howe, who is in her fourth-year of a predoctoral fellowship in cell biology at Albert Einstein College of Medicine in New York City, says that she tracks everyday expenses in her head, but works out more complicated matters, such as undergraduate-loan payment plans and income-tax deductions and reimbursements, on paper. She uses her bank's online calculator to determine how much she needs to save each month for retirement and for a nest egg to help her parents.

To do all of that, Howe stretches her annual $33,000 fellowship (about $2,360 per month after taxes, paid fortnightly) by conserving money where possible. She lives in a university-subsidized studio for $830 a month, which includes rent, utilities, parking and mandatory renter's insurance. She registers her car in her home state of Virginia because it is less expensive than doing so in New York. To indulge in her favourite pastimes of reading and growing flowers, she buys used books and trades them with other students, and grows plants and flowers from discounted cuttings or seeds.

Students who have loans should sign up for automatic monthly payments, recommends Mark Kantrowitz, a financial-aid expert in Skokie, Illinois. These avoid missing payments — and thus late fees — and may also save on interest. Some financial institutions will knock off 0.25% of a loan's interest rate if the borrower has such a plan.

He also advises consulting with loan-consolidation companies, which may consider where you went to university, your savings or work history in addition to your credit rating, when calculating net loan-interest rates. "The key with loans is not how you avoid them, but how you minimize them," says Kantrowitz. He adds that graduate students and postdocs should take a financial-literacy course or read a book on personal finance to learn more about handling loans and making sound financial decisions.

MANAGING INCOME

Follow the money

The best way to avoid being caught out by expensive surprises is to build a budget, says Laura Shin, a financial journalist based in California. She suggests doing the following:

- Calculate your monthly take-home income — the amount after all taxes and insurance deductions.
- List your basic monthly expenses: housing (rent or mortgage), utilities (gas, electricity, water, telephone and Internet), groceries, transport (car loan, petrol or public transport) and childcare. For variable expenses such as groceries, commit to an amount and record it. Restaurant and takeaway meals are luxuries and should not be included here.
- If these expenses total more than 50% of your take-home pay, aim to reduce them by getting a roommate or finding less-costly services, such as for your mobile-phone plan. To track budget leaks, use free online money-management services. Mint.com is available in Canada and the United States, and Buxfer.com worldwide.
- About 20% of take-home pay should go towards reducing debt and building up savings. Unexpected outlays such as medical expenses or car breakdown should not become credit-card debt.
- The remaining 30% should cover things such as clothing, travel and entertainment.
- Graduate students can check out the budget calculator at GradSense.org, which is designed for them by the Council of Graduate Schools in Washington DC. E.D.

Trainees should also take care not to miss monthly bills for services such as mobile phones because late-payment fees can be significant, warns Laura Shin, a personal-finance journalist based in California. Weeding out unnecessary extras such as subscriptions to magazines and film-streaming sites is useful, as is finding the best deals for necessary services — Howe has stayed on her family's mobile-phone plan, which is cheaper than having her own contract.

UNEXPECTED EXPENSES

But some money leaks cannot easily be plugged. To avoid unpleasant surprises, junior scientists need to find out if their stipends, fellowships or wages are taxable, especially if they move abroad for a PhD or postdoc — where they may be taxed for services that are free in their home nation.

"I had never thought in a million years that I'd be living off this amount of money."

After Tracy Ballinger completed her PhD in the United States, she took a postdoc position at the University of Edinburgh, UK, where she was looking forward to a bit more income. But the reality of paying the 20% tax rate on her annual earnings of £31,000 (US$45,611) meant that she could put away less than she had expected. "I was hoping to save for a house down payment," says Ballinger, who has watched her friends in non-research careers buy their first homes. "But that's going to take longer than I thought." She was also surprised by the annual television licence fee (she has no TV, but she must pay the tax if she watches live programmes on any device while they are also on TV) and her monthly £100 council tax, a variable fee on property levied by local governments for services such as rubbish collection.

Taxes will also erode Dagmar Walter's bottom line. Now in her second year of a second postdoc at Albert Einstein College of Medicine, the German citizen has not had to pay taxes on her departmental stipend, in accordance with international tax treaties. But she expects to start paying the US federal government about 30% of her annual income next January. "I am trying to save more money right now," she says, to hedge against lower-income days ahead.

Health and medical insurance is another expense that many graduate students and postdocs do not take into account. Rios' medical insurance is covered by his department, but his dental cover costs him $150 per year, an expense that some university departments will reimburse. Ballinger has funds deducted from her wages for UK National Insurance (which, among other benefits, is used to pay for the National Health Service), but to obtain her visa, she also had to pay a £200-a-year (£600 for her 3-year programme) health-care surcharge.

A closely balanced budget can easily be derailed by unexpected expenses. This happened to Rios when his car needed new brakes. A similarly unwelcome outlay befell Annalaura Vacca, a doctoral student from Italy who works in the same Edinburgh lab as Ballinger. She moved to a new flat and didn't get her security deposit back from her former landlord in time to pay the new deposit.

An emergency account is ideal for such situations, says Shin. She recommends setting aside about $1,000 to keep unexpected expenditures from ending up as credit-card debt. She advises having an online account that allows for the creation of sub-accounts. Account holders can create as many separate stashes as they please to build an emergency fund consisting of at least 3 months' living expenses or to save for expenses

such as quarterly tax payments, conference travel or summer transition periods.

INCOME BOOST

Sometimes the only way to get breathing room is to find ways to earn more. That could come from leveraging your skills, applying them elsewhere or bargaining for more money.

When Rios arrived at Northwestern with an US National Science Foundation (NSF) fellowship, which would fund him for 3 years within a 5-year period, he put off using it for the first year and took the department stipend of $26,400. But because his fellowship relieved his department of paying that stipend for 3 years, he negotiated an additional $2,000 per year from the department. He used the money to offset relocation expenses.

Howe picks up extra cash in several ways. Between August and October, she works as a medical histology lab instructor at Albert Einstein for $8,400 and takes other small jobs. She's been an online writing tutor for non-US medical students, produced medical illustrations and earned up to $1,000 playing her violin at university gigs and weddings.

The downside of part-time work outside the lab, she acknowledges, is that it may come at a cost to research productivity. "Not only do you lose the allocated time," she says, "but you don't do your best work when you're consistently overextended." Rios' NSF fellowship prohibits him from picking up jobs unrelated to his studies. Still, he found opportunities to earn money (and to build his network) by earning up to $250 per event to attend conferences, such as those of the Society of Hispanic Professional Engineers or the Society for Advancement of Chicanos/Hispanics and Native Americans in Science. At these meetings, for the stipend, he recruited undergraduates for master's and doctoral programmes in science and engineering at Northwestern.

For some trainees, a sideline to studies can help to pay their way in a pinch. Conservation researcher Jonathan Kolby has almost finished his doctoral programme at James Cook University in Townsville, Australia. But he's struggling, thanks to three grant rejections and dwindling savings. Now, he's selling photographs of wildlife such as frogs and reptiles that he took during his travels to field sites in Africa and North and South America. He hopes that earnings will help to pay the bills.

"Each person will find a different balance that works for them," says Howe. "Something is going to take time away from your science: a relationship, another interest. That doesn't mean you shouldn't do it. Your degree might not be the only thing that you need to do, in order to get yourself to the place you want to be with your science and with yourself as a person." ■

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TURNING POINT
Plant pioneer

Mary-Dell Chilton was the first person to show that bacteria could genetically modify plants. Shortly after her landmark work in 1977, the plant biotechnologist moved from academia to what is now Syngenta in Research Triangle Park, North Carolina, where she continues her research. In April, she was named a US National Academy of Inventors Fellow.

SYNGENTA

When did you decide to work with bacteria?
As an organic-chemistry graduate student learning about microbiology, I became entranced by the seeming intelligence of DNA — how pure DNA could correct a mutation in a bacterium, but only if the DNA came from the same bacterium. I pursued a PhD on the topic after I met Benjamin Hall, a chemist working on DNA. I wanted to explore how DNA could change the genetics of bacteria. I followed Hall to the University of Washington in Seattle, where I showed that naked, single-stranded DNA — not only double-stranded DNA, as was thought — could correct mutations.

What was the response to your paper showing that bacteria can transfer DNA to plants?
It was hard to publish our work because our conclusion — that *Agrobacterium* is a natural genetic engineer — was so wildly unexpected. We went to *Cell* because there wasn't a proper journal for this subject. Two referees couldn't see anything wrong with our conclusions, but they weren't comfortable publishing it, so they sent us back for more data. In the end, it took about six months to get the paper out (M.-D. Chilton *et al. Cell* **11,** 263–271; 1977). Once it was out, there was wide interest.

What prompted your move to St Louis, Missouri — now an agricultural-technical hub?
I did not have a faculty appointment at the University of Washington. I'm not sure why. I'm pretty sure I was qualified. After 16 years — from PhD student to independent scientist — it was time to go, and I got a position at Washington University in St. Louis. It was hard on my husband's career — he had a good tenure-track appointment in the chemistry department in Seattle. But he became a visiting professor, got a nice research lab and did some good work. My advice, if you can possibly do it, is to find a husband made of solid gold.

Was it difficult being a woman in science?
I never thought about being a woman in science. I thought of myself as a scientist. Maybe that's the way to do it: be what you are and don't think about it.

What was your first achievement as a faculty member?
I worked with others to make the first genetically modified plant. We put a yeast gene that makes alcohol dehydrogenase into a tobacco plant, and showed that it could be passed on, intact, to the plant's children and grandchildren. It was clear that all the technical pieces had come together to make genetically modified plants, but we were naive. It wasn't easy.

You then moved to industry. What was the biggest challenge?
I knew how to modify a tobacco plant, but not a field crop such as maize (corn) or wheat, which are not susceptible to *Agrobacterium*. We had no idea that it would take about a decade to find a way to transfer genes in maize.

Did you anticipate the backlash to gene-modification technology?
Goodness, no. I was very surprised. This was a natural process that we learned from *Agrobacterium*. I thought that the public wouldn't bat an eye. This technology is a tool; there is nothing intrinsically dangerous about it. Tools can be used for good or not so good. My hope is that the technology will be accepted. We need it to feed a hungry world.

What are you excited about now?
I'm working on gene targeting: the ability to put the transgene where you want it in the plant genome. Knowing exactly where it will be placed will help genetically modified crops to obtain regulatory approval. ■

INTERVIEW BY VIRGINIA GEWIN

This interview has been edited for length and clarity.

CORRECTION

The Careers feature 'Going for broke' (*Nature* **534,** 579–581; 2016) conflated the ideas of an emergency account and an emergency fund. The emergency fund would include an emergency account, as well as other subaccounts for unexpected expenses.