

Caroline Taylor, a bioenergy analyst at the EBI. That is up from \$410 million during the recession in 2009. (Total investment spiked at \$900 million in 2008, up from \$300 million in 2007.) These numbers do not include the hundreds of millions of dollars spent each year by large companies such as DuPont, ExxonMobil and the Brazilian energy giant Petrobras.

NEW DIRECTIONS

Emerging business models could buffer bio-fuels companies financially, helping to lure investors and foster job opportunities. Last December, the trade journal *Biofuels Digest* ranked the leading bioenergy companies for 2010–11, and reported that 11 of the top 25 also had plans in place to produce high-value industrial chemicals. At the top of the list was Amyris of Emeryville, California, which opened its first industrial-scale facility in April, in Piracicaba, Brazil. The plant will turn sugar-cane syrup into farnesene, an industrial chemical that can be used to make cosmetics, perfumes and industrial lubricants. Farnesene is currently derived mainly from petroleum, and sells for around \$265 per litre, according to a spokeswoman from Amyris, or seven times that for small quantities. The company is now hiring dozens of people, from computational scientists to fermentation specialists.

The ultimate vision for some of these companies is to build a 'biorefinery' to produce a range of products, from fuel to high-value, small-volume chemicals. Even if the technology does mature to the point at which such facilities can be built routinely, opportunities for scientists will continue to emerge, assuming that companies in the area maintain research and development units in the same way that the petroleum industry continues to innovate today, says McMillan.

Experts advise researchers entering the field to do their homework — many companies over-hype their technology or suffer from poor management, warns McMillan. Applicants who can network with established researchers in the field, and understand the scene outside their own immediate areas of training, will be well placed to assess opportunities in a rapidly changing field. "If we are going to build up this industry, we are going to have to move a phenomenal amount of biomass around," says Dale. "In ten years, this field is going to look a lot different."

A desire to make a difference may be the defining feature of biofuels researchers as the field evolves. Many practitioners believe that they can help to wean the world off oil, and aid the environment and society in the process. "We are motivated by this big vision to get renewable energy on board," says Ren. "I dream about my work at night." ■

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COLUMN

Oh, Canada ...

A tax-law change has dealt a heavy blow to Canadian postdocs, argues **Lucie Low**.

As a newly appointed postdoc, I was excited, nervous and enthusiastic about moving to Canada last July. I had just completed a PhD, which is no small task in itself. I had applied for, and been awarded, an international scholarship to move from Britain to Canada and work in a world-renowned brain-imaging laboratory. The salary would apparently be tax-free. "Wow," I breathed to myself, "this is actually happening, this really is my dream come true!"

Fast-forward 11 months, and how things have changed. Postdoc salaries are no longer tax-free and I have learnt that the status of postdocs in Canada is generally 'undefined' (see *Nature* doi:10.1038/news.2010.429; 2010). All because last year's budget clarified the rules for tax credits, removing the 'student' loophole that gave some postdocs tax-free salaries.

Cue a hefty pay cut (I suppose I'll pay back my student loan when I win the lottery), mounting frustration over the paucity of resources and respect given to postdocs and a growing disillusionment with the whole situation. Oh, Canada! Country of maple syrup, lumberjacks and mounties! You could have got it so right. But you didn't.

Taxes are fine if they mean you get certain benefits — annual leave, for example. Then there's access to a pension scheme and maternity pay. Unfortunately, Canadian postdocs now find themselves paying full staff taxes, but still ineligible for these benefits. In many Canadian institutions, postdocs are classed as 'trainees', which seems to be a catch-all to describe being neither a student nor a staff member. This means that we are easily ignorable, often dealt with by departments more tailored to graduate-student issues — departments without the time, energy or resources to work out the complexities of postdoctoral status (be it 'student', 'trainee' or 'staff').

In an April 2010 letter to the Canadian Association of Postdoctoral Scholars (CAPS), the Canada Revenue Agency justified the use of 'trainee' as a term by arguing that postdocs are similar to "apprentices, articling students,



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and medical residents". (CAPS had requested clarification on the tax laws.) This would be fine if postdocs were getting the same salaries as, say, articling students (as newly qualified lawyers are called in Canada).

But we're not. And, with the recently added tax burden, some postdocs are finding themselves in the bizarre situation of earning less than the graduate students in their labs. Taking into account that the average age of a postdoc in Canada is 33 (according to a CAPS poll) and that 48% of postdocs have dependents, this pay cut places a heavy burden on those with mortgages, children and other responsibilities. Now there's an incentive to complete your thesis.

I realize that few people become scientists for the money. Those keen on big salaries usually seek to become lawyers or surgeons. I'm also aware that postdocs aren't all equitable elsewhere. But if this inequitable treatment of Canadian postdocs continues, Canada will lose some of its brightest minds. My advice for now? Weigh up the pitfalls and limitations of your situation before considering a Canadian postdoc.

Still, all is not doom and gloom. There are countless opportunities to help improve the situation — by setting up institutional postdoc associations, working with CAPS or liaising with your institution to make it aware of the problems — which is exactly what I'm doing. *Vive la révolution!*

So I do see the benefits of my move, and of living and working in Canada. And for now, I am learning to ice skate and enjoying Canada's maple syrup. I'm also, I'm afraid, educating myself about the nuances of Canadian tax laws. ■

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