Think big
Now think bigger

When Conrad Hewitt says "I'm doing research in mathematical cosmology," it sounds simple enough. But when the new faculty member in the Math department starts to elaborate, you begin to get a sense of the scope of his work.

"Rather than modelling something like water flowing through a pipe," he explains, "I'm trying to model the large-scale structure of the universe. I don't care about a particular black hole, the earth going around the sun, those kinds of things. I'm more concerned with the actual spatial structure. Why are there galaxies? How are the galaxies distributed relative to each other? Roughly, on a large scale, what's happening at the moment?"

He admits that the equations involved in such modelling are very complicated, and that you have to make many assumptions to make any progress. But cosmologists are making progress. "At the moment," he reports, "the universe appears to be expanding, so the question is can we develop simple mathematical models in which the universe is expanding? And in these models, does the universe expand forever, or does it collapse on itself?

"Many people think that the universe should re-collapse. They have philosophical reasons for thinking that's a neat solution. We appear to have come from a 'big bang,' some kind of initial singularity, and we seem to be expanding away. Many people believe that the universe should re-collapse, a 'big crunch,' if you will. But at the moment, there doesn't seem to be enough matter around to do that."

But Hewitt is more interested in actual spatial structure, in how the galaxies are distributed, than in the evolution of the universe. "If you were to freeze time right now and move around the universe, would you find the galaxies distributed evenly? I'm interested in evolution as well, but I'm also interested in the homogeneity of the universe, in the kinds of models that allow you to look at that."

After completing his MSc at the University of Aberdeen in Scotland, Hewitt came to Canada to do his PhD with John Wainwright, a world-renowned cosmologist in the Department of Applied Mathematics at Waterloo. "I didn't particularly intend to stay," he admits, but he married a fellow graduate student and settled in Waterloo, where he and his wife live with their two small children.

Since graduating, Hewitt has been teaching at the University of Waterloo, first as a post-doctoral fellow then as an assistant professor. He was instrumental in developing a tutorial centre in the Faculty of Mathematics, staffed by graduate students and senior undergraduates who provide assistance to first- and second-year students.

"Part of the reason for setting up this centre was to try to remedy some of the problems that were arising due to teaching large classes," he explains. "It allowed students to get one-on-one help, which just isn't feasible to expect from a professor who is teaching 120 students."

Asked whether plans are in the works to establish such a centre at St. Jerome's, Hewitt replies, "I don't think there's a need for it here. Classes are smaller here, and we're dealing with just 80 students rather than 120. If students need help in mathematics, there are three of us here, and one of us is usually around."

Though research and teaching-related activities take up most of Hewitt's time, he still manages to find time for one of his favourite hobbies: English literature. "I'll find an author I like and I'll read as much as I can. For a while, I was reading Dickens, then there was a period when I was reading Thomas Hardy. I do enjoy reading," he says. "I read to relax."

Not a bad thing to do when you have the entire universe on your mind.

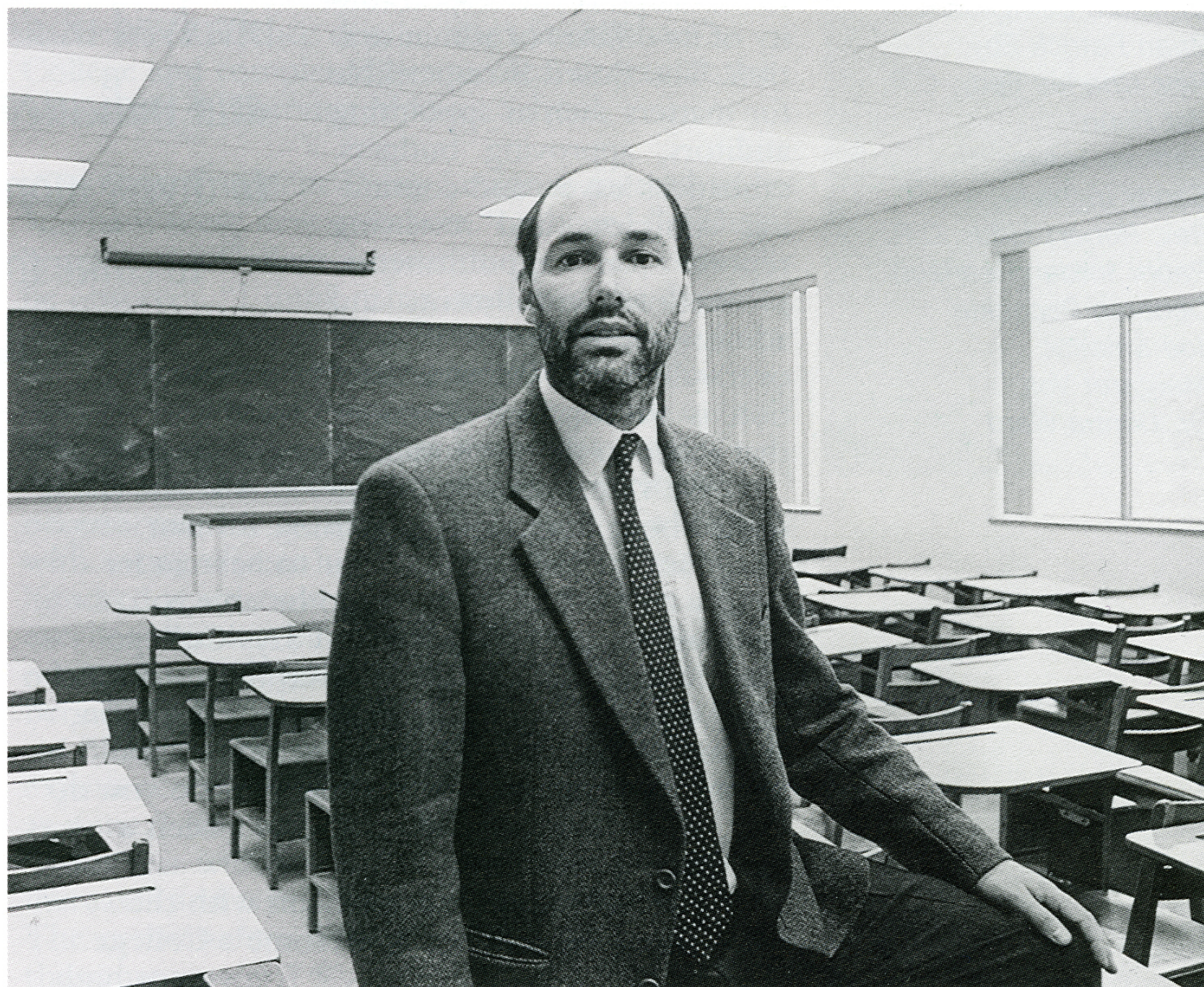*Conrad Hewitt, the new faculty member in the Mathematics department at St. Jerome's, isn't interested in small things like the earth orbiting the sun.*