Vladimir Pestov

Within a month of one another in early 1992 two outstanding mathematicians from different parts of the world arrived in Wellington to join the Department of Mathematics at Victoria University. One, Geoff Whittle, was the subject of Centrefold earlier this year. The other was Vladimir Pestov, whose departure in June this year to take up a chair of mathematics in the Department of Mathematics and Statistics at the University of Ottawa, brought to a close a remarkable 10 years' contribution to mathematics in New Zealand. Vladimir has been proud to describe himself as a "naturalized Kiwi of Siberian extraction" and we will continue to claim him as one of us. He remains an Honorary Research Associate at Victoria while his research student Aleksandar Stojmirovic completes his PhD.

Vladimir's appointment as a lecturer at Victoria was his first permanent position outside the fSU. Born in 1956, and brought up in Tomsk, he increasingly found life in the Soviet Union oppressive and became a strong anti-communist. This did not affect his admiration for the Russian system of mathematics education. While at school, Vladimir was involved in the All-Union Mathematics Olympiad. His father was an associate professor of mathematics at Tomsk State University, and following in his footsteps, Vladimir completed his BA Honours in mathematics there in 1978, followed by 18 months as a junior researcher. One can imagine that his early pleasure in problem-solving was something he wished to transmit to others---he rapidly established problem-solving classes in probablility for senior students.

His accomplishments enabled him to enrol for a PhD at Moscow State University, the most prestigious school in the country. His topic was topological groups and his supervisor, the famous topologist Professor A. V. Arkhangel'skii. He was already proving significant new theorems and had several publications to his name within 18 months of arriving in Moscow. His doctorate was awarded in 1983, after which he returned to Tomsk to a position in the Department of Mathematical Analysis, where by 1988 he had risen to the position of Dozent (roughly Associate Professor). During this time, he continued to prove significant and difficult results on topological groups.

Vladimir's wife, Irene (Irina), an outstanding student of applied mathematics in Tomsk, joined him in Moscow. Their children, Xenia and Slava were born in Tomsk either side of his PhD studies. Back in Siberia, Irene held a number of positions as a research scientist. Vladimir's interest in Australia and New Zealand also dates from this time. Increasingly frustrated by life in the Soviet Union, he listened to the BBC World Service and taught himself English. He tried to obtain travel visas to attend conferences outside the SU. In 1988 he took up a position at the Novosibirsk Science Centre as a visiting researcher in the Functional Analysis Laboratory.

Mathematically, Vladimir's interests developed in two new directions. He became interested in "supermathematics". The mathematics is motivated by quantum field theory in which fermionic degrees of freedom are coupled with the bosonic ones. This requires the incorporation of anti-commuting quantities, thus extending standard objects into "super" ones. But this gives rise to subtle mathematical questions about the nature of space and, for example, to consideration of "pointless" models of space. The other branch of his development was in the area of non-standard mathematics. Abraham Robinson's amazing construction of a rigorous basis for the idea of infinitesimals resolved a centuries old conundrum about the fundamentals of analysis. Rather than dealing simply with limits of superalgebras, one could construct directly from the Grassmann algebra $L(q)$ for q infinitely large, a nonstandard hull which would be an infinite-dimensional supermanifold with remarkable properties.

Finally, in 1990 and the era of *perestroika*, Vladimir was granted a visa to travel to Genoa, where he embarked on a longlasting and fruitful collaboration with Ugo Bruzzo. Mathematicians from the West were exposed to his ideas for

the first time at a conference on non-standard analysis at Oberwolfach. One of the world experts on superanalysis, Bryce DeWitt commented that “Pestov has a clearer grasp and broader knowledge of superanalysis than anyone else”. The also attested to his superb grasp of the English language! From Genoa, he obtained a temporary position at the University of Victoria in Canada, and from there at last to Wellington where he was joined by his family.

Vladimir made an immediate impact. His enthusiasm was infectious. Problem classes were established for students, research seminars for staff and graduates. He developed impeccable course notes in 2nd and 3rd year analysis and introduced over a number of years several new and innovative Honours courses. He can be justly proud of the quality of his teaching. Students find him motivating, challenging, witty and provocative (as do his colleagues!). He continued to produce an outstanding quality and quantity of research which in 1995 earned him the NZMS Award for Mathematical Research.

In 1997 Vladimir was awarded a Marsden Fund grant for a project entitled Foundations of Supergeometry, through which he attracted to Victoria two post-doctoral fellows, first Warren Moors (NZMS Research Award winner in 2001) and subsequently Finlay Thompson. During this period, his interests in topological dynamics and fixed points developed and he was able to solve a series of long-standing problems in that area and in the more familiar territory of Banach and enveloping algebras, two dating back to Stanislaw Mazur’s 1935 Scottish Book. He had also been promoted to reader, so re-attaining the seniority he had when he left the fSU.

Irene, having completed a PhD under Mark McGuinness and Graham Weir, had moved to Canberra where she was working at the Department of Agriculture, Fisheries and Forestry. Vladimir was able to spend some periods with her and was a Visiting Fellow in the Computer Sciences Laboratory at ANU. These various interests and influences led him again in a new direction, this time into finite, but high-dimensional structures where the strange “concentration of measure” phenomenon appears. This has been another instance where Vladimir has been able to bring together ideas from a diverse range of areas to make fundamental contributions.

Out of the apparent abstraction has grown a project with remarkable potential for application, namely the development of algorithms in data-mining with particular emphasis on proteomics. Here he has collaborated with Bill Jordan from the School of Biological Sciences and their joint PhD student Aleksandar Stojmirovic. The data live in a high-dimensional space and the understanding brought about by the measure-theoretic approach provides insights that will enable the fundamentally combinatoric algorithms that currently exist for extracting useful information about protein structure to be refined. Vladimir was awarded a second Marsden grant in 2001 to pursue these ideas, and also received a VUW Merit Award for Excellence in Research.

Vladimir once described himself as opinionated, independent-minded, sometimes difficult to deal with. He has a natural antipathy for authority. All these traits are very healthy in a society that is currently inclined towards conformity and bureaucracy. They will be missed by his colleagues at Victoria and throughout New Zealand. So too will his enormous breadth of knowledge, his inventiveness and humour. Just as his twin star, Geoff Whittle, was recently promoted to Professor, Vladimir too thoroughly deserves this accolade from Ottawa. We wish him and Irene well there and will welcome them home to Wellington whenever they are able to visit.

Peter Donelan