Peter Zograf

Uniformization of Riemann Surfaces

Born in 1957 in Leningrad, USSR. Studied at the Mathematical Department of Leningrad State University. Since 1978 at the Steklov Mathematical Institute (Leningrad Department). Senior Research Fellow (1988); Ph. D. (1983) and D.Sc. (1989) degrees in Mathematics. — Address: Steklov Mathematical Institute, Academy of Sciences, Fontanka 27, 191 011 St. Petersburg, Russia.

The main purpose of my visit to the Wissenschaftskolleg was to participate in the common project "Geometry and Physics". Besides that, I had in mind to write a book on the uniformization of Riemann surfaces and the geometry of moduli space based on our common work with Leon Takhtajan (University of Colorado, Boulder), which was initiated by new ideas from modern Quantum Field Theory. I finished a draft of the main part of this book and my co-author Takhtajan is currently working on it.

At the same time, I continued to study the Weil-Petersson geometry of the classical moduli space, as well as families of elliptic operators parametrized by moduli spaces. This work appeared to be connected with the recent Witten's theory of two-dimensional gravity and therefore gained a new perspective — to understand Witten's results and conjectures from the point of view of differential geometry of moduli spaces.

Research papers:

1) "The Weil-Petersson volume of the moduli space of punctured spheres" (to appear in common proceedings of two conferences on the mapping class group and moduli space, *Lecture Notes in Mathematics,* Springer-Verlag)
2) "A local index theorem for families on the moduli space of vector bundles with parabolic structures" (preprint)

Books:

  Uniformization of Riemann surfaces and the geometry of moduli space
(with L. Takhtajan, in preparation)

Lectures, Conferences:

1) Colloquium lectures at the Universities of Göttingen (January 31, 1991), Münster (May 16, 1991), and Bielefeld (May 17, 1991).
2) Workshop on Mathematical Physics and Geometry, ICTP, Trieste, Italy (March 4-11, 1991).
3) Conference on Lattices, *Max-Planck-Institut für Mathematik,* Bonn (May 21-23, 1991)
4) *30. Arbeitstagung,* Bonn (June 14-21, 1991)
5) Workshop on the Mapping Class Group, Göttingen (June 24— 28, 1991).