CURRICULUM VITAE

Alexander SHEN

Born: December 31, 1958 in Moscow.

Education

In 1974 graduated from math. school #2, Moscow, entered Math. Department of Moscow State University (1974–1979). Since 1976 worked under supervision of Prof. V.A.Uspensky (Logic and Algorithms division). Master Thesis "Priority method and separation problems" defended in 1979. Graduate student of Logic and Algorithms Division (thesis advisor — V.A.Uspensky), 1979-1982, Thesis "Algorithmic variants of entropy" defended in 1985 (degree is called "kandidat fiziko-matematicheskikh nauk" in Russian)

Research and teachnig

Since October 2005: Directeur de Recherche (DR2), CNRS (attached to LIF, Marseille; to LIRMM, Montpellier, since 2011)

Since 1982 have a research position at the Institute of Problems of Information Transmission (since October 2005 – on leave)

Teaching: 91th Moscow Math School (1978–1980, being a teacher of Maxim Kontsevich), 57th school (1982–86, with V.A. Ginzburg, L.S. Levitov, 1988-2002, with A. Vaintrob, M. Finkelberg, a.o.)

Since 1979 running a undergraduate seminar at the Moscow State University (with N.K. Vereshchagin). Since 1982 running Kolmogorov seminar at the Moscow State University (started by A.N. Kolmogorov, with A.L. Semenov, N.K. Vereshchagin). Instructor of Applied Mathematics, MIT (1991, spring term).

Lecturer at Moscow State University and Independent University of Moscow (see the list of courses below)

In 1985–1987 was a member of a team responsible for the Computer Literacy course in the USSR high schools (under A.P. Ershov guidance)

Visiting scientist at LABRI, Bordeaux University (for a month), Bonn university (several times), Rutgers University (working with I.M.Gelfand on mathematics textbooks), Ecole Normale Superiore de Lyon (1998,1999), University of Provence (2000–2005), Penn State University (2010)

STINT invited professor at Upssala University, Sweden (during 2000–2002), teaching courses on Kolmogorov complexity and algorithmic problem solving).

Member of the Council of the Math College of Independent university of Moscow (1993-2003).

Research interests

- Recursion theory (axiomatic approach to recursion theory, general scheme for priority method and its applications)

- Kolmogorov complexity (Unified approoach to different version of Kolmogorov complexity, the notion of (α, β)-stochastic sequence, inequalities for Kolmogorov complexities and their applications, applications to realizability, relations to combinatorics and classical information theory, multisource algorithmic information theory, independent strings, combinatorial and game-theoretic arguments)

- Tilings: complexity of tilings, everywhere complex sequences, self-similarity, subshifts and their simulation, fixed-point constructions.

- Algorithmic randomness (different algorithmic definitions of randomness and their non-equivalence, frequency approach to randomness, relations to complexity, ergodic properties)

- Interactive proofs (simplified proof of IP=PSPACE, multilinearity testing)

More practical things include a book where I tried to present efficient algorithms together with the proof of correctness (Algorithms and Programming: Problems and Solutions, Birkhauser; 2 ed., Springer) and a device for checking wiring on printed boards (patented together with coauthors, later sold to German company AEG).

Coursees taught; textbooks written

University courses I taught included following topics:

- Kolmogorov complexity and randomness

- Complexity theory

- Finite automata and their applications

- Nonstandard analysis

- Design and analysis of algorithms (together with Vereshchagin)

- Programming

- Mathematical Logic and Theory of Algorithms (together with Vereshchagin)

- Algorithmic Algebra

- Calculus

- Probability theory

I also taught mathematics, computer science, physics in different mathematics classes at high school level for several years.

Since 1981 I was running a mathematics contest (by correspondence) for children of age 11-13 (several hundred participants a year) (together with some friends of mine)

I am a coauthor of Israel Gelfand in a textbook on school algebra (printed by Birkhauser). I was a coauthor and editor of several books on programming for high school children in Russia, an editor of a book on nonstandard analysis (written by V.A.Uspensky), translator of a book (Uspensky and Semenov were its authors) for Kluwer, editor of the russian translation of "Introduction to Algorithms" (Cormen, Leiserson, Rivest). With Vereshchagin) we have prepared lecture notes of our courses for publication. (Three parts are published in Russian, two of them are translated by American Mathematical Society.)