CURRICULUM VITAE

MISHA VERBITSKY

Born: June 20, 1969, Moscow, USSR

Citizenship: Russia

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Education:

- 1990 B.A. Moscow State University
- 1995 Ph.D. Harvard University

Positions Held:

- 1990-91 Visiting Scholar, MIT
- 1991-95 Graduate Student, Harvard University

Papers:

- 1988 Verbitsky M. On the action of a Lie algebra SO(5) on the cohomology of a hyperkaehler manifold. // Func. Analysis and Appl. 24(2) p 70-71 (1990).
- 1991 Kazhdan D., Verbitsky M., Cohomology of restricted quantized universal enveloping algebras.// Quantum Deformations of Algebras and Their Representations, vol. 7 of Isr. Math. Conf. Proc. (1993)

- 1992 Verbitsky M., Hyperholomorphic bundles over the hyperkaehler manifolds. // Electronic preprint alg-geom 9307008 (1993), 43 pp, LaTeX (accepted by J. of Alg. Geom.)
- 1993 Verbitsky M., Hyperkaehler and holomorphic symplectic geometry I. // Electronic preprint alg-geom 9307009 (1993) 14 pp, LaTeX// also published in: Journ. of Alg. Geom., vol. 5 no. 3 pp. 401-415 (1996).
- 1994 Verbitsky, M., Hyperkähler embeddings and holomorphic symplectic geometry II. // alg-geom electronic preprint 9403006, 14 pages, LaTeX. // also published in: GAFA vol. 5 no. 1 (1995) pp. 92-104
- 1994 Verbitsky M., Cohomology of compact hyperkaehler manifolds. // Electronic preprint alg-geom 9501001 (1995), 85 pp, LaTeX.
- 1995 Verbitsky M., Cohomology of compact hyperkaehler manifolds and its applications // alg-geom electronic preprint 9511009, 12 pages, LaTeX.// also published in: GAFA vol. 6 no. 4 pp. 601–612 (1996)
- 1995 Verbitsky M., Mirror Symmetry for hyperkaehler manifolds, alg-geom 9512195.
- These papers are available from Harvard Math. department World Wide Web server,

  `http://www.math.harvard.edu:/~verbit`

Research interests: Algebraic geometry, differential geometry, perverse sheaves, Mirror Symmetry, cohomological methods in contact and symplectic geometry, Yang–Mills theory.

Brief résumé of research experience:

- 1986-88 Studied the algebraic structure of the cohomology ring $H^*(M)$ of a compact hyperkaehler manifold. Proved that a Lie group $Spin(1,4)$ acts naturally on $H^*(M)$. Tried to prove Bogomolov's theorem of decomposition for Ricci-flat manifolds (with no knowledge of Bogomolov's work).

- 1990-91 Studied Yand-Mills theory. Obtained a different proof of Mukai's results about stable bundles over a K3-surface.
- 1991-92 Generalized results of Mukai to an arbitrary compact hyperkaehler manifolds M. Computed obstructions to the deformation of a stable holomorphic bundle over M. Proved that the deformation spaces of such bundles are hyperkaehler.
- 1992-93 Worked in Quantum groups. Computed cohomology of the restricted Quantum Universal Enveloping algebra, defined by Lusztig. Extensively worked with cohomology of non-commutative algebras.
- 1993 Worked with holomorphic symplectic geometry. Let M be a compact holomorphically symplectic manifold which is generic in it's deformation class. I proved that all closed complex subvarieties of M are even-dimensional and (outside of the singular locus) holomorphically symplectic.
- 1994 In the situation above, let H be a hyperkaehler structure on M which is compatible with the holomorphic symplectic structure. I proved that all closed complex subvarieties are complex analytic with respect to any of the complex structures induced by H.
- 1994 Using the results above, I constructed a theory of coherent perverse sheaves over M. The "hyperkaehler" analogues of Weil conjectures were stated in this situation, and proved in low-dimensional case. The complete version of this theory (non-existing, yet) should solve most of the present problems pertaining to coherent sheaves on M.
- 1994 Proved structure theorems about cohomology of compact hyperkaehler manifolds. Explicitly computed the ring structure of the H^2-generated part.
- 1995 Tried to prove similar results for a desingularization of a compact, singular hyperkaehler manifold. Obtained the action of $SU(2)$ on its second cohomology.
- 1995 Using the structure theorem for cohomology of a compact holomorphically symplectic manifold M, proved Mirror Conjecture for M. A compact holomorphically symplectic manifold is Mirror Dual to itself.

- 1995 Worked with non-unitarian Yang-Mills instantons and the twistor spaces. Established 1-1 correspondence between a certain component S of a space of rational curves on a twistor space for a compact hyperkaehler manifold and a space of non-unitarian Yang-Mills instantons on a Mukai dual hyperkaehler manifold. Proved that S admits a natural pluri-subharmonic function. Conjecturally, S is Stein.

Family status: I am married, with two children, Sima and Alesha, 4 and 3 years old. My wife, Yulya Fridman, born in 1970, B. Sc. in physics, works as a translator from French to Russian.

Extracurricular interests: Surrealism, dadaism, avangarde music, writings by F. Kafka, W. S. Burroughs, Ph. K. Dick, Aleister Crowley, R. A. Wilson, Clive Barker, films by R. Polansky, Monty Python's Flying Circus, Sci-Fi, horror, free masonry, Qaballah, occult, politics.