Yuri Tschinkel

Dr. Yuri Tschinkel received his PhD from the Massachusetts Institute of Technology in 1992. From 1992 to 1995, he was Junior Fellow of the Harvard Society of Fellows, and from 1995 to 1996 he was a Leibniz Fellow at the École Normale Supérieure in Paris. Prior to joining the Simons Foundation in 2012, Tschinkel was a faculty member at the University of Illinois at Chicago, a visiting associate professor at Princeton University, the Gauss chair of mathematics at the University of Göttingen, and professor and chair of the mathematics department at the Courant Institute, New York University. He is currently the director of Mathematics and Physical Sciences of the Simons Foundation. His research is at the interface of algebraic geometry and number theory.

Tschinkel is a Fellow of the American Mathematical Society and of the American Association for the Advancement of Science. He is a member of Leopoldina, the German National Academy of Sciences. He was also an invited speaker at the International Congress of Mathematicians in Madrid in 2006.

It is a pleasure and privilege to congratulate Prof. Yau on his 70th birthday!

I met Prof. Yau in the early 1990s, at Harvard. His mathematical and organizational powers were already legendary. His seminar met every day, all morning. The range of his interests and topics discussed at the seminar was phenomenal. He was learning new subjects at great speed, collaborating with many visitors, while at the same time devoting boundless energy to “infrastructure”: International Press, Mathematics institutes, Current Developments in Mathematics.

Prof. Yau made a tremendous impact on mathematics, on his many students and collaborators. I would like to use this occasion to give several examples, perhaps yet unknown to him, of his influence on my work.

A major open problem in arithmetic geometry is to prove density of rational points on Calabi-Yau varieties defined over fields of arithmetic interest, e.g., number fields or function fields of curves. The motivation for this problem stems from the Lang-Vojta conjecture, linking arithmetic properties to the global geometry of the variety. The expected Zariski density, over some finite extension of the ground field, is an open problem already in dimension two, for K3 surfaces. Bogomolov and I proved it for elliptic K3 surfaces, but could not find suitable approaches in the general case. Hassett, who was a graduate student at Harvard when we met, and I remembered the passage to symmetric powers of K3 surfaces, used by Yau and Zaslow in their “virtual count” of rational curves on K3 surfaces, exhibiting abelian fibrations on a suitable symmetric power. This can be viewed as a “hidden fibration structure” on the original K3 surface. The result was a theorem, showing potential density of rational points on symmetric powers of arbitrary K3 surfaces. We then got interested in the study of punctural Hilbert schemes of K3 surfaces and were led to a conjecture on the structure of ample cones of these varieties, recently proved in full generality in joint work with Arend. In another paper, we were able to prove potential density on general K3 pencils and higher-dimensional Calabi-Yau varieties over function fields of curves, using deformation theory and comb techniques. Thinking about these issues, we realized that the “virtual count” does not actually establish the existence of infinitely many rational curves on K3 surfaces. This led to another paper, with Bogomolov and Hassett, showing this in special cases; our approach was generalized by Li and Liedtke.

And all of this can be traced to just one paper of Prof. Yau!

I admire his mathematics, his enthusiasm, his force, his vision! I wish him many years of activity and success!