

Masaki Maruyama (1944–2009) and his mathematics

Masaki Maruyama was a major figure in the field of algebraic geometry. He played a pioneering role in the study of moduli spaces of sheaves. His celebrated construction of coarse moduli schemes, for what are now known as Gieseker–Maruyama semistable sheaves, on higher-dimensional projective varieties was an outstanding achievement. (These schemes had been constructed earlier by Mumford and Seshadri in the case of smooth curves and by Gieseker in the case of algebraic surfaces.) Maruyama introduced and exploited several novel ideas and techniques in their construction, and these have served as a model for much of the later work on moduli constructions.

In an influential work, done with K. Yokogawa, he gave a subtle generalization of the notion of parabolic bundles and their semistability to the case of projective varieties of arbitrary dimension and constructed their moduli schemes.

In addition, his work spanned several other important aspects of moduli problems. He proved the boundedness of semistable sheaves (with a given Hilbert polynomial) in characteristic zero and also for low ranks and dimension in positive characteristics. Some other well-known contributions are:

- existence and nonexistence of Poincaré families of vector bundles;
- the rationality question for moduli spaces of rank two vector bundles on the projective plane;
- a general study of elementary transformations of sheaves (already in his master's and doctoral theses he studied this question in connection with the construction of bundles over bases of dimension less than or equal to three);
- a study of the Donaldson compactification of instantons (with G. Trautmann).

Maruyama contributed significantly to the development of algebraic geometry in Japan. He has inspired and guided several mathematicians and was a mentor to many famous Japanese mathematicians. He built up an excellent relationship with the international mathematical community. He was also involved with organizational and administrative responsibilities of the university at a high level.

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