

MODULI OF VARIETIES

Summer Graduate School, MSRI/SLMath, July 20 to 31, 2026

This summer graduate school is aimed towards students who have completed a standard one year introductory course in foundational algebraic geometry, or who have read through (the equivalent of) the first three chapters of

- [1] R. HARTSHORNE, *Algebraic geometry*, Graduate Texts in Mathematics **52**, Springer, New York, NY, 1977, 8th corrected printing 1997. ISBN 0-387-90244-9. [MR Zbl](#). (especially chapters II and III: scheme theory and cohomology). The problems in the chapter(section)s I (1–2), II (1–8), III (2–5 and 9) are especially relevant to the subject.

An alternative reference is (the much longer)

- [2] R. VAKIL, *The rising sea: foundations of algebraic geometry*, Princeton University Press, Princeton, NJ, 2025, ([prepublication PDF](#)). ISBN 978-0-691-26866-8; 978-0-691-26867-5; 978-0-691-26868-2. [MR Zbl](#). especially chapters 2, 3, 4, 11, 16, 21, and 24.

These references are intended to give an overview of the tools we will use and introduce in the school.

- [3] R. HARTSHORNE, *Algebraic geometry*, Graduate Texts in Mathematics **52**, Springer, New York, NY, 1977, 8th corrected printing 1997. ISBN 0-387-90244-9. [MR Zbl](#). Chapter IV, sections 1–3 and 5; Chapter V, sections 3, 5, and 6.
- [4] J. KOLLÁR and S. MORI, *Birational geometry of algebraic varieties*, Cambridge Tracts in Mathematics **134**, Cambridge University Press, Cambridge, England, 1998, ISBN 0-521-63277-3. [MR Zbl](#). Chapters 1 and 2.
- [5] J. ALPER, *Stacks and moduli*, Graduate Texts in Mathematics, Chapter 1, Springer, Cham, Switzerland, 2027, in press, ([prepublication PDF](#)).

We also have several additional survey articles on moduli of varieties linked below for those that wish to read ahead. We will cover this material in the different lecture series during the program.

- [6] K. DEVLEMING, *On moduli of Fano varieties: an introduction to K-stability and K-moduli*, preprint, University of California–San Diego, 2026. [arXiv](#)
- [7] K. DEVLEMING, *Moduli of varieties of general type and wall-crossing*, preprint, University of Maryland–College Park, 2025.
- [8] K. DEVLEMING, *A guide to wall crossing for moduli of varieties*, preprint, University of California–San Diego, 2026. [arXiv](#)