



## Joe Harris Interview

*Conducted by Laure Flapan*

*Communicated by Alexander Diaz-Lopez*



Joe Harris is Higgins Professor of Mathematics at Harvard University. Harris' main research area is algebraic geometry. In addition to his more than 100 published research papers, Harris is a co-author of many popular textbooks, such as *Algebraic Geometry, 3264 & All That*, and *Representation Theory*, among others.

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**Flapan:** When did you know you wanted to be a mathematician?

**Harris:** Around age 5 or 6—long before I had any real idea of what mathematicians do. Probably this was influenced by my parents—my father had wanted to be a mathematician, but because of quotas on the number of Jews in academia (yes, they really had those in the 30s) he pursued an MD instead.

**Flapan:** Who encouraged or inspired you?

**Harris:** My parents, of course, and also an older cousin, Dan Sankowski, who was a Berkeley math PhD.

**Flapan:** How would you describe your research to a graduate student?

**Harris:** I work on the classical side of algebraic geometry, dealing with questions about the geometry of varieties in projective space and their moduli or parameter spaces.

**Flapan:** What theorem are you most proud of and what was the most important idea that led to this breakthrough?

**Harris:** Probably that would be either the joint theorem with David Mumford that the moduli space of curves of large genus is of general type, or the theorem that the Severi varieties (parametrizing plane curves of given degree and genus) are irreducible, or the Brill-Noether theorem. Basically, I was just lucky to be in the right place at the right time: Grothendieck and others revolutionized the subject of algebraic geometry in the 1960s, introducing many new ideas and techniques. Those new developments made it possible to resolve a lot of outstanding open problems from the classical era, and I was fortunate to be in the first generation to grow up with these ideas.

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# THE GRADUATE STUDENT SECTION

**Flapan:** According to the Math Genealogy Project, you have had 50 students and 176 total descendants. How has your involvement with so many students and young mathematicians shaped your own mathematical experience?

**Harris:** It's kept me constantly aware of the need to explain what I do to other people, which has had the effect of keeping my work relatively concrete and example-driven.

**Flapan:** How do you think the experience of graduate students today differs from when you first started advising students?

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**Harris:** I think students are better prepared now than when I was young—they start learning abstract math earlier, and have a pretty good idea of what mathematical research is about by the time they hit grad school.

**Flapan:** Which of the books you've written is your favorite and why?

**Harris:** That would probably be either *Representation Theory* with Bill Fulton or *3264 & All That* with David Eisenbud. Or maybe *Moduli of Curves* with Ian Morrison, or

*Geometry of Schemes* with David Eisenbud, or *Principles of Algebraic Geometry* with Phil Griffiths... It's hard to stop.

**Flapan:** All mathematicians feel discouraged occasionally. How do you deal with discouragement?

**Harris:** Teach!

**Flapan:** What advice do you have for current graduate students in math?

**Harris:** One perennial piece of advice I give grad students is not to be in too much of a rush. In grad school, the push is always to focus on a narrow area, so you can write a thesis, but it's also important to take the time to get a broad overview of the field you're working in.

**Flapan:** Any final comments or advice?

**Harris:** Pursuing a career in academic mathematics is a pretty daunting prospect at present, but I would urge students, if they feel they have a calling, to persevere. We are members of a unique and wonderful community; they're unlikely to find one like it elsewhere. A good example of this is the Grothendieck revolution I mentioned earlier: Grothendieck, who was then in his 30s, came along and informed the algebraic geometers of the time that "they were doing it wrong." And, rather than burn him at the stake, they listened to what he had to say, saw that he was right, and set about rewriting the foundations of the

subject—then almost 200 years old!—from scratch. I don't think that would happen in too many fields.

## Photo Credits

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Photo of Laure Flapan courtesy of Simons Center for Geometry and Physics.



Laure Flapan

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## ABOUT THE INTERVIEWER

**Laure Flapan** is a postdoc at Northeastern University, working in algebraic geometry, particularly Hodge theory. Her email address is [l.flapan@northeastern.edu](mailto:l.flapan@northeastern.edu).