I'm not a bot



## Sue dejong math

Professor A.J. de Jong, Columbia university, Department of Mathematics. One might say: an explanation serves to remove or to avert a misunderstanding---one, that is, that would occur but for the explanation; not every one that I can imagine. This semester I am teaching the second semester of our core graduate course in Commutative Algebra and Algebraic Geometry. Here is the webpage. The algebraic geometry seminar at Columbia is currently organized by James Hotchkiss, Yoonjoo Kim, and Giulia Sacca. The Stacks project is an open source text book about algebraic stacks and the algebraic geometry that is needed to define them. It is a resource for algebraic geometers on foundational questions regarding schemes, topologies on schemes, algebraic spaces, algebraic stacks, and more. It is being written collaboratively and you can be part of it! Please visit its main page. Discussion of mathematical topics related to the stacks project and regular updates can be found on my Stacks Project Blog. Here is a graph representing the logical implications in the proof of the Cohen structure theorem for complete local rings. The alphanumeric codes refer to tags in the project, explained in the tags system. Here are two different visualizations of the same result: Here is the webpage for courses taught. Here is the webpage for previous graduate student algebraic geometry seminars. In the summer of 2012 I ran an REU. We write a wiki which you can find here. Take a look! In the summer of 2011 Jarod Alper, Brendan Hassett, Jason Starr, Michael Thaddeus, and I organized the conference ``Moduli spaces and moduli stacks''. In the summer of 2009 I organized a conference on Spaces of curves and their interaction with diophantine problems. Here is a link to the old web page for the conference. Here is the schedule of talks. Here is the list of abstracts. Frobenius matrix computation project: see Frobenius. There is the list of abstracts. Frobenius matrix computation project: see Frobenius. as ``filename'' in a directory, change mode to executable, type ``./filename'' on the command line. Enjoy. Three versions: Frobenius matrices of surfaces in weighted projective 3-spaces: executable Frobenius matrices of surfaces which are double covers of weighted projective 2-spaces branched along curves: executable Feel free to email me with questions/comments/etc. Here is a list of papers/projects with links to the .dvi files are not always identical with the published version (but they are very close), as in some cases editing was done after proof reading the proofs from the journal in question. A.J. de Jong, Th. de Jong, Th. de Jong, The virtual number of D-infinity points II, Topology, 29 (1990), pp. 185-188. A.J. de Jong, R. Noot, Jacobians with complex multiplications, In: Arithmetic Algebraic Geometry, Eds. G. van der Geer, F. Oort, J.H.M. Steenbrink, Progress in Mathematics, 89 (1991), Birkh\"auser, pp. 177-192. A.J. de Jong, J.H.M. Steenbrink, Picard numbers of surfaces in 3-dimensional weighted projective spaces, Mathematisches Zeitschrift, 206 (1991), pp. 341-344. A.J. de Jong, The moduli spaces of polarized abelian varieties, Mathematische Annalen, 295 (1993), pp. 485-503. papers/AGEE.dvi A.J. de Jong, The moduli spaces of principally polarized abelian varieties with \$\Gamma\_0(p)\$-level structure, Journal of Algebraic Geometry, 2 (1993), pp. 667-688. papers/SGEE.dvi A.J. de Jong, Finite locally free group schemes in characteristic \$p\$ and Dieudonn\'e modules, Inventiones mathematicae, 114 (1993), pp. 89-137. papers/DIEUDONNEE.dvi A.J. de Jong, Ample line bundles and intersection theory, In: Diophantine approximation and Abelian varieties, Eds. B. Edixhoven, J.-H. Evertse, Lecture Notes in Mathematics, 1566 (1993), Springer-Verlag, pp. 69-76. papers/SOESTERBERG.dvi A.J. de Jong, J.H.M. Steenbrink, Proof of a conjecture of W. Veys, Indagationes Mathematicae, N.S., 6 (1995), pp. 99-104. A.J. de Jong, M. van der Put, \'Etale cohomology of rigid spaces, Documenta Mathematica (electronic journal), 1 (1996), pp. 1--56. papers/RIGETALE.dvi A.J. de Jong, Crystalline Dieudonn\'e module theory via formal and rigid geometry, Publications Mathematiques I.H.E.S., 82 (1995), pp. 5-96. papers/FORMALRIGID.dvi Here is an erratum: /papers/erratum.dvi M. Pikaart, A.J. de Jong, Moduli of curves, Eds. R. Dijkgraaf, C. Faber, G. van der Geer, Progress in Mathematics, 129 (1995), Birkh\"auser, pp. 483-509. papers/MARTIN.dvi A.J. de Jong, W. Messing, Crystalline Dieudonn\'e theory over excellent schemes, Bull. Soc. Math. France 127, no. 2, 333--348 (1999). papers/MESSING.dvi A.J. de Jong, \'Etale fundamental groups of non-Archimedean analytic spaces, In: Special issue of Compositio in honour of Frans Oort, Compositio Mathematica, 97 (1995), 89-118. papers/ETALEFUN.dvi A.J. de Jong, F. Oort, On extending families of curves, Journal of Algebraic Geometry, 6 (1997), pp. 545--562. papers/EXTFAMCURVES.dvi A.J. de Jong, A result on formal linearity, Journal of Algebra 225, no. 2, pp. 936--942 (2000). papers/FORMALLINEAR.dvi A.J. de Jong, Smoothness, semi-stability and alterations, Publications Mathematiques I.H.E.S., 83(1996), pp. 51-93. papers/ALTERATIONS.dvi B. van Geemen, A.J. de Jong, On Hitchin's connection, Journal of the American Mathematical Society, 11 (1998), pp. 189--228. papers/BERT.dvi A.J. de Jong, Appendix to a paper by P. Berthelot on finiteness of rigid cohomology, Published as appendix to: P. Berthelot, Finitude et puret\'e cohomologique en cohomologie rigide, Inventiones Mathematicae, 128 (1997), 329--377. A.J. de Jong, Homomorphisms of Barsotti-Tate groups and crystals in positive characteristic, Inventiones Mathematicae, 134 (1998). papers/TATE.dvi Here is an erratum: papers/ErratumTate.dvi F. Oort, A.J. de Jong, Hyperelliptic curves in Abelian Varieties, Published in: "Manin's Festschrift", Journal of mathematical sciences, 82 (1997), pp. 141--166. papers/HYPERELL.dvi A.J. de Jong, Families of curves and alterations, Annales de l'institute Fourier, 47 (1997), pp. 599--621. papers/ALTCURVES.dvi D. Abramovich, A.J. de Jong, Smoothness, semi-stability and toroidal geometry, Journal of Algebraic Geometry, 6 (1997), pp. 789-801. arXiv A.J. de Jong, A conjecture on arithmetic fundamental groups, Israel Journal of Mathematics. {\bf 121}, 61--84 (2001). papers/ARITHFUN.dvi A.J. de Jong, An application of alterations to Dieudonn\'e modules, Resolution of singularities (Obergurgl, 1997), 375--380, Progr. Math., 181, Birkhauser, Basel, 2000. papers/OBERG.dvi A.J. de Jong, F. Oort, Purity of the stratification by Newton Polygons, J. Amer. Math. Soc. 13, no. 1, 209--241 (2000). papers/NEWTON.dvi A.J. de Jong, N.M. Katz, Monodromy and the Tate conjecture: Picard numbers and Mordell-Weil ranks in families, Israel J. Math. {\bf 120}, part A, 47--79 (2000). A.J. de Jong, J. Starr, Every rationally connected variety over the function field of a curve has a rational point, American Journal of Mathematics, {\bf 125}, 567--580 (2003). familyofcurves3.dvi Here is the ad hoc argument showing how to obtain reduced fibres after base change which was in theoriginal version of the preprint: alternative.dvi A.J. de Jong, The period-index problem for the Brauer group of an algebraic surface, Duke Mathematical Journal, 123, 71--94 (2004). perind.dvi A.J. de Jong, Counting elliptic surfaces over finite fields, Moscow Mathematical Journal, 2, 281--381 (2002). surfaces 2.dvi B. Conrad and A.J. de Jong, Approximation of versal deformations, Journal of Algebra, 255, no. 2, 489--515 (2002). approximation.dvi A.J. de Jong, J. Starr, Cubic fourfolds and spaces of rational curves, Illinois Journal of Mathematics, 48 (2004), pp. 415--430. A.J. de Jong, A result of Gabber, Preprint with missing references about Br=Br' on quasiprojective schemes. 2-gabber.dvi or 2-gabber.pdf J. Starr, A.J. de Jong, A remark on isotrivial families, Preprint with missing references, precursor of the next entry. JasonsTrick\_final.pdf J. Starr, A.J. de Jong, Almost proper GIT-stacks and discriminant avoidance, Preprint with missing references and misleading title. This paper also handles the period-index problem for Brauer groups of surfaces over any algebraically closed field. 5-torsor.pdf A.J. de Jong, Shioda cycles in families of surfaces, Preprint on work in progress: Shioda.dvi A.J. de Jong and N.M. Katz Counting the number of curves over a finite field. This unpublished note was written probably around the time I was in Princeton (1998-2000) since it resulted from discussions with Nick katz. It gives the trivial upper bound for the number of isomoprhism classes of genus g curves over F\_q. Here is a link: curves.dvi. A.J. de Jong, Xuhua He, and Jason Michael Starr, Families of rationally simply connected varieties over surfaces and torsors for semisimple groups, Publications Mathematiques de l'IHES, 2011. Online here. A.J. de Jong, On a result of Artin, preprint pdf | dvi. Bhargav Bhatt and A.J. de Jong, Crystalline cohomology, preprint pdf | dvi. I've had quite a few students work with me, but I still don't have a fixed recipe. The best thing to do is to come and find me in my office and start talking. For example, I like quick technical questions, especially if you've tried to work out what to do yourself. Please don't think your question "isn't worth asking". Of course, it works well if you attend the graduate student seminar I run or a course I give and we end up talking about math that way. What area of research will you be working on? It should have something to do with commutative algebra, algebraic geometry, or number theory. But the precise area depends completely on you. It would be wonderful if you have a suggestion for a problem and work hard, then something interesting will come out. So I think that in some sense the initial problem doesn't matter too much. What I have done a few times in the past is suggest three problems to students. Usually what ends up happening is that there is a natural tendency to gravitate towards one of them and that ends up being the topic of research. Anyway, the key is to find something that you find interesting. Each of these topics requires a kind of lengthy explanation. In fact one of the problems about being a graduate student is to overcome the initial fear of just starting to work on somethings my students have worked on. Counting rational curves on hypersurfaces over finite fields (Thibaut Pugin), Vector bundles on curves over finite fields (Yanhong Yang), Cristalline cohomology and jumps in Newton polygons (Yanhong Yang), Intersection theory on algebraic stacks (Zachary Maddock), Derived categories of smooth projective varieties (Alice Rizzardo), Rational curves on low degree hypersurfaces (Xuanyu Pan), Shimura curves and how to define them in characteristic p > 0 (Xia Jie), Modular forms (Alex Ghitza), Rational curves on Del Pezzo surfaces (Damiano Testa), Vector bundles + maps between P^1's (Brian Osserman), Curves over dvrs (Jongmin Lee), Foundations for higher algebraic stacks (Josh Nichols-Barre), Modular forms (Alex Ghitza), Vector bundles + maps between P^1's (Brian Osserman), Curves over dvrs (Jongmin Lee), Foundations for higher algebraic stacks (Josh Nichols-Barre), Modular forms (Alex Ghitza), Rational curves on Del Pezzo surfaces (Damiano Testa), Vector bundles + maps between P^1's (Brian Osserman), Curves over dvrs (Jongmin Lee), Foundations for higher algebraic stacks (Josh Nichols-Barre), Modular forms (Alex Ghitza), Rational curves over dvrs (Jongmin Lee), Foundations for higher algebraic stacks (Josh Nichols-Barre), Modular forms (Alex Ghitza), Rational curves over dvrs (Jongmin Lee), Foundations for higher algebraic stacks (Josh Nichols-Barre), Modular forms (Alex Ghitza), Rational curves over dvrs (Jongmin Lee), Foundations for higher algebraic stacks (Josh Nichols-Barre), Modular forms (Alex Ghitza), Rational curves over dvrs (Jongmin Lee), Foundations for higher algebraic stacks (Josh Nichols-Barre), Modular forms (Alex Ghitza), Rational curves over dvrs (Jongmin Lee), Foundations for higher algebraic stacks (Josh Nichols-Barre), Modular forms (Alex Ghitza), Rational curves over dvrs (Jongmin Lee), Foundations for higher algebraic stacks (Josh Nichols-Barre), Modular forms (Alex Ghitza), Rational curves over dvrs (Jongmin Lee), Foundations for higher algebraic stacks (Josh Nichols-Barre), Modular forms (Alex Ghitza), Rational curves over dvrs (Jongmin Lee), Foundations for higher algebraic stacks (Josh Nichols-Barre), Modular forms (Jongmin Lee), Foundations for higher algebraic stacks (Josh Nichols-Barre), Modular forms (Jongmin Lee), Foundations (Jongmin Lee), Found and derived Azumaya algebras (Max Liebliech), Deformations of group schemes (Zhaohui Zhang), Noncommutative polynomial algebras (Kiran Kedlaya), Lines on hypersurfaces (Roya Behesthi), When do maps exist between nonsingular hypersurfaces (David Sheppard), Specialization in the picard group of a surface over a curve (Yogishwar Maharaj), Chow varieties and a question of Barry Mazur (Joe Ross), Rational curves on cubic hypersurfaces in P^n for n>8 (Matt DeLand), Rational curves on Fano threefolds (Mingmin Shen), Rational curves on varieties in positive characteristic (Mingmin Shen), Derived direct summand conjecture (Bhargay Bhatt), As you can see, there is an emphasis on moduli of rational curves on varieties as well as algebraic geometry in (or near) characteristic p. But, I'd really love to have students who work on more arithmetic projects as well. My feeling is you can't. There is nothing in particular you can learn that will make you a successful PhD student. Of course, it goes without saying that a natural curiosity and willingness to read, understand, and work through new mathematical material is very helpful (especially in algebraic geometry and number theory). But what distinguishes PhD research from solving problems are creativity and an intuition for the right question, which are things that are hard to learn and teach. I encourage undergraduates and beginning graduate students to take those courses and work through they are going to enjoy the most. Developing a taste for a certain kind of mathematics (which forces you to think about the question "what is this kind of mathematics like") is very helpful when choosing an advisor. This is a long term project I maintain. But, to be sure, I don't expect my graduate students (or anybody for that matter) to work on this. Professor A.J. de Jong, Columbia university, Department of Mathematics. At MIT I started having a graduate student algebraic gometry seminar. I have decided to put up this page to archive the topics of previous seminars. However, I have only gone as far back as the first seminar I organized here at Columbia. --- PAST SEMINARS ---- In the Spring of 2022 the seminar was on hyperbolicity. Please see the webpage with information. --- In the Fall of 2021 the seminar was on deformation theory. Please see the webpage with information. ------- In the summer of 2020 the seminar was about derived categories of varieties leading up to the result that given a smooth proper variety over an algebraically closed field there are only a countable number of varieties derived equivalent to the given one. Here is the link to the webpage with information. -- In the Spring of 2020 the seminar was a "talk till you're stuck" experiment. It was cut short by the Covid-19 pandemic of 2020. Here is a link to the webpage with information. In the Fall of -- In the Fall of 2018 the 2019 the seminar was on de Rham cohomology in characteristic zero as a Weil cohomology theory. Please see the webpage with information. ----- In the Spring of 2019 the seminar was on Higgs bundles in positive characteristic. Please see the webpage with information. seminar was on Topologies and Descent. Please see the webpage with information. ------ In the Spring of 2018 the seminar was on local cohomology in algebraic geometry (following SGA2 and the exposition in the Stacks project). Please see the webpage with information. -- In the Fall of 2017 the seminar was a seminar on examples in algebraic geometry. Please see the webpage with information. - In the Spring of 2017 the topic of the seminar was on Yves Andre's proof of the direct summand conjecture. Please see the webpage with information. In the Fall of 2016 the topic of the seminar was the work of Bjorn Poonen. Please see the webpage with information. ------- In the Spring of 2016 the topic of the seminar was the stable rationality and the diagonal as discussed by Voisin, Totaro, culminating in a discussion of the recent paper by Hassett, Pirutka, and Tschinkel. Please see the old webpage and the actual ----- In the Fall of 2015 the topic of the seminar was the Tate conjecture for surfaces over finite fields as discussed in Milne's paper "On a conjecture of Artin and Tate". Please see the webpage here. ------- In the Spring of 2015 the topic of the smeinar was intersection theory and webpage with information. ------ In the Fall of 2014 the topic of the seminar was tropical geometry and in particular the proof of the Brill-Noether theorem using tropical geometry. It was a really fun topic to do! Here is the link to the webpage. -- In the Spring of 2014 I organized a motives. Here is the link to the webpage. ---------- In the Fall of 2013 I organized a graduate student seminar on derived categories. Take a look at the webpage. ---------- In the Spring of 2012 I organized a graduate student seminar on crystalline cohomology. Take a look at the literature seminar for graduate students. Here is the link to the webpage. ---webpage. See graduate student seminar in algebraic geometry for the original course listing. ------- During the Fall of 2011 I organized a graduate student seminar on Brauer groups in Algebraic Geometry. Take a look at its webpage for more information. See graduate student seminar in algebraic geometry for the original course - During the Spring of 2011 I organized a graduate student seminar on Derived Categories in Algebraic Geometry. Take a look at its webpage for more information. See graduate student seminar in algebraic geometry for the original course listing. - During the Fall of 2010 I organized a listing. graduate student seminar on Hodge Theory in Algebraic Geometry. Please find the original web-page with list of talks on this page. See graduate student algebraic geometry seminar for the original course listing. -------- During the Summer of 2010 I organized a graduate student seminar on Algebraic Geometry. The idea was for the students and I to come up with problems in algebraic geometry, to democratically choose a problem, and try to solve that problems are loosely speaking in the field of arithmetic algebraic geometry are easier than PhD problems and harder than most problems in Hartshorne, are not sub problems of a thesis problem anybody is working on. I moderated the discussion throughout. One goal of this format is to build communication skills, discover standard methods in algebraic geometry and to try to give an idea what it means to do something ``new''. We had biweekly meetings of about an hour. During the Spring of 2010 semester the graduate student algebraic geometry seminar was a literature seminar. Please look at this page for a list of papers. We met on Fridays from 3:30-4:30 (+/- 15 minutes) in Room 312 of the Mathematics Building. The first organizational meeting was a short meeting on Friday, January 22, 2010 where we divided --- During the Fall of 2009 the graduate student algebraic geometry seminar was on algebraic stacks. We met Fridays from 10:30-12:30 in Room 312 of the Mathematics Building. I gave the first two lectures to introduce the material, the first one on Friday, September up the talks. List of talks with names and topics is here. --11, 2009. After the first two lectures the graduate students gave lecture on examples of algebraic stacks, especially those which are relevant to moduli theory, and more generally arithmetic algebraic stacks, especially those which are relevant to moduli theory. Here is the (preliminary) list of topics for lectures by students: pdf | dvi | tex. List of talks (see file above for more details): Sept 25. Quotient stacks. Alice Rizzardo. Oct 2. Stacky Curves. Xue Hang. Oct 30. Coarse Moduli Spaces. Yi Zhu. Nov 6. GIT STacks. Alon Levy. Nov 13. No Seminar. Nov 20. Cohomology of stacks. Thibaut Pugin. Nov 27. No Seminar. Dec 4. Intersection theory stacks. Zachary Maddock. Dec 11. Algebraic Spaces. There is a guide to the literature, written by Jarod Alper, see stacks guide.pdf. This is now also a chapter of the stacks project. ------- In the summer of 2009 we had a graduate student algebraic geometry seminar on Intersection Theory, organized by Qi ---- In the Spring of 2009 the graduate student algebraic geometry seminar was organized by Maksym Fedorchuk and me. The topic was be Introduction to higher dimensional algebraic geometry. Here is some more You and myself. We worked through classical intersection theory including Grothendieck-Riemann-Roch. ------information: Please email me to get on the mailing list. Lectures will be Fridays 10:45 - 12:30 in Math 312. First organizational meeting: Friday January 30. List of talks: positivity.pdf Main reference: R. Lazarsfeld, Positivity in Algebraic Geometry, Ergebnisse der Mathematik, 3 Folge, Volume 48. Other reference: R. Hartshorne, Ample subvarieties of algebraic varieties, Lecture Notes in Mathematics 156. ------ In the Fall of 2008 the graduate student algebraic geometry seminar is organized by Frans Oort and me. The topic was ``Abelian Varieties over Finite Fields''. Main Literature Sources, with links: J. Tate, Classes d'isog\'enies de vari\'et\'es ab\'eliennes sur un corps fini (d'\`apres T. Honda), S\'em. Bourbaki 21 (1968/69), Exp. 352. Link. F. Oort, Abelian varieties over finite fields, In: Higher-dimensional geometry over finite fields, In: Higher-dimensional geometry over finite fields, Advanced Study Institute 2007 Proceedings (Editors: Y. Tschinkel and D. Kaledin). Link1 and Link2. J. Tate, Endomorphisms of abelian varieties over finite fields, Invent. Math. 2 (1966), 134-144. Link. Very detailed exposition of Complex Multiplication written up as notes for the 2005-05 VIGRE number theory working group. Organized by Brian Conrad and Chris Skinner. Link Other links: Homepage of Frans Oort at Utrecht University Link. List of talks and overview of the seminar: pdf-file or dvi-file o --- In the fall of 2008 the graduate student algebraic geometry seminar was about weighted projective spaces, quasi-smooth hypersurfaces in them, and how to compute their cohomology. Ostensibly the title was "Problems for graduate students". I gave all of the lectures myself. ----3.4.------ In the Summer of 2008 we had a graduate student seminar on A^1-homotopy theory where all the lecture were given by Bhargav Bhatt. ------ The Fall semester of 2007 we discussed motives in the graduate student algebraic geometry seminar. Here are some related documents: and a list of literature is here. A short discussion of intersection theory (as used in the seminar) is here. A short discussion of Weil cohomology theories (as used in the seminar) is here. A short discussion of algebraic de Rham cohomology as a Weil cohomology theory is here. -- In the summer of 2007 the graduate student algebraic geometry seminar was about GIT and Hodge theory. --- In the Spring of 2007 the topic of the graduate student algebraic geometry seminar was "Rational curves on higher dimensional algebraic varieties -- in particular low degree hypersurfaces". Jason Starr and I alternated giving the lectures, and we worked through the paper "Low degree complete intersections are rationally simply connected" available on Jason Starr's webpage. -------- Fall 2006: Topic was deformation theory. ---- Spring 2006: Topic was algebraic stacks.