

Curriculum vitæ

October 8, 2021

Antoine Ducros.

Date of birth : 03/11/1972 in Avignon (France). French citizenship.

Full professor at Sorbonne Université (formerly Université Paris 6); the french precise title is *Professeur des Universités de classe exceptionnelle*. I am also on part-time secondment to the DMA at the École normale supérieure.

Former Junior member of the *Institut universitaire de France* (October 2012- September 2017).

1 Education and employment

- September 2018 – August 2021: part-time secondment to the *Département de mathématiques et applications* at the *École normale supérieure*.
- September 2016: I was promoted *Professeur de classe exceptionnelle*.
- April 19 -July 18, 2015: stay at Weizmann Institute in Rehovot (Israël) as a Varon visiting professor (I was invited by Vladimir Berkovich).
- January, 20th - May, 23rd, 2014: research member at MSRI (Berkeley, California) for te semester *Model Theory, Arithmetic Geometry and Number Theory*.
- October 1st, 2012: I became a junior member of the *Institut universitaire de France* (it means that I have a reduced teaching duty for 5 years).
- September 1st, 2012: I became first-class full professor (*Professeur de première classe* in french).
- First semester 2010-2011: teaching-free semester.
- September 2009: full professor position at the university Paris 6, where I joined the scientific team *Topologie et géométrie algébriques* at the *Institut de mathématiques de Jussieu*.
- January 15, 2009 - march 14, 2009: stay at Weizmann Institute in Rehovot (Israël) as a Varon visiting professor (I was invited by Vladimir Berkovich).

- Second semester 2007-2008: teaching-free semester; I was invited in the Academia Sinica (Taipei, Taiwan) between April, 20 and May, 3.
- September 2006: full professor position at the Laboratoire Dieudonné (university of Nice) ; I joined the scientific team *Géométrie algébrique*.
- December 2005 : defense of my habilitation's thesis in Rennes ; the title was *Conséquences algébriques de certaines propriétés transcendantes des variétés réelles et p -adiques*. Composition of the commission: Yves André, Antoine Chambert-Loir, Jean-Louis Colliot-Thélène, Michel Coste, Michel Raynaud and Alexei Skorobogatov ; the scientific reports were written by Yves André, Vladimir Berkovich and Claus Scheiderer.
- Second semester 2003-2004: teaching-free semester ; I was invited for one month (in may) at Weizmann institute in Rehovot.
- September 1998: assistant professor position at the IRMAR (University of Rennes 1); I joined the scientific team *Géométrie algébrique réelle, calcul formel et complexité*.
- September 1997-june 1998: military service as a mathematics teacher at the *Prytanée Nationale Militaire* (a military high school) in La Flèche; I gave lectures to high school students and to officers.
- June 1997: defense of my Ph. D's thesis at the Université Paris-Sud (Orsay); the adviser was Jean-Louis Colliot-Thélène ; its title was *Principe local-global sur le corps des fonctions d'une courbe réelle : espaces principaux homogènes et surfaces rationnelles*; composition of the commission : Jean-Louis Colliot-Thélène, Jean-Jacques Sansuc, Laurent Clozel, Michel Coste, Louis Mahé and Michel Raynaud; the scientific reports were written by Michel Coste and Claus Scheiderer.
- November 1993-june 1997: Ph. D's thesis at the Université Paris-Sud, first of all as a student at the École normale supérieure (till september 1995), then with a grant of the french government (with 4 hours teaching a week during one semester every year).
- July 1993: *agrégation de mathématiques* (special exam to be high school teacher); rank : 2.
- July 1991: I passed the exam to enter the École normale supérieure in Paris; rank : 15.

2 Invitations abroad

- I was invited by Vadimir Berkovich for a stay at Weizmann Institute (Rehovot) from April 15 til July 14, 2021, with funding by an *Ema and Jakob Michael visiting professorship*. This was canceled due to travel restrictions, but I am allowed to postpone it and plan to go there in Fall 2022.
- In March 2019 I have been invited at the Hebrew University in Jerusalem for three weeks (by Michael Temkin).

- I have attended the semester *Model Theory, Arithmetic Geometry and Number Theory* at the MSRI, from January, 19th till May, 24rd 2014 (support: *Research membership* of the MSRI, and IUF).
- I have been invited three times at Weizmann Institute (Rehovot, Israël): one month in 2004, two months in 2009, three months in 2015 (in 2009 and 2015 I benefited from a Rosi and Max Varon Professorship).
- In May 2013 I have been invited invited for two weeks by the *Laboratoire Poncelet* of the CNRS in Moscow.
- In February-March 2013 I have been invited at the Hebrew University in Jerusalem for three weeks (by Ehud Hrushovski).
- In April 2008 I have been invited for two weeks at Academia Sinica (Taipei, Taiwan).

3 Participation to scientific projects

- I am a member of the ANR project (ANR is the *Agence nationale de la recherche*) DEFIGEO (*Définissabilité en géométrie non archimédienne*), 2015-2019.
- I am a member of the ANR project VALCOMO (*Valuations, combinatoires, et théorie des modèles*), 2014-2017.
- I was the leader of the project BERKO (*Espaces de Berkovich*), 2007-2012.

4 Scientific responsibilities

- In 2018-2019 and 2019-2020: I am the head of the hiring comitee for the IMJ-PRG (departments of pure mathematics of Sorbonne-Université).
- September 2012-August 2016: I was a member of the so-called *Comité national de la recherche scientifique*, for the next four years. This committee is in charge of hiring and promoting people for the french CNRS (which offers teaching-free permanent research positions).
- I've been deputy-director (september 2010 - january 2012) and director (january 2012- november 2013) of the scientific team *Topologie et géométrie algébriques* of the *Institut de mathématiques de Jussieu*.
- I've been in charge of the colloquium of the *Institut de mathématiques de Jussieu* from september 2010 till september 2012.
- I have been a member (2010-2014) of the committee of the french mathematical society which supervises the organization of the so-called *États de la recherche*.

5 PhD students, PhD defenses committees

- Students.
 - ◊ Mathieu Daylies (fourth year of his PhD).
 - ◊ Sylvain Gaulhiac: he defended his PhD at Sorbonne Université in September 2021.
 - ◊ Marc Chapuis: he defended his PhD at Paris 6 in December 2017.
 - ◊ Thibaut Lemanissier: he defended his PhD at Paris 6 in December 2015.
 - ◊ Florent Martin (with Jean-François Dat as co-adviser): he defended his PhD thesis at Paris 6 in October 2013.
 - ◊ Jérôme Poineau (with Antoine Chambert-Loir as co-adviser) : he defended his PhD at Rennes in November 2007.
- PhD defense committee (apart those of my own students).
 - ◊ Forthcoming: Rémi Triboulet (advisers S. Boucksom and C. Maclean, defense expected in Grenoble in December 2021).
 - ◊ Milan Perera (advisers S. Boucksom and G. Freixas, defense at Sorbonne-Université, July 2021).
 - ◊ Charles Arnal (adviser I. Itenberg, defense at Sorbonne-Université, September 2020).
 - ◊ Thomas Blomme (adviser I. Itenberg, defense at the ENS, July 2020).
 - ◊ Vlerë Mehmeti (adviser J. Poineau, the defense will take place in Caen in December 2019).
 - ◊ Amina Azzouz (adviser J. Poineau, defense at Grenoble in June 2018).
 - ◊ Johannes Josi (adviser I. Itenberg, defense at Sorbonne Université in February 2018).
 - ◊ Arthur Forey (adviser F. Loeser, defense at Paris 6 in December 2017).
 - ◊ Mattia Galeotti (adviser A. Chiodo, defense at Paris 6 in November 2017).
 - ◊ Quang Hoa Tran (adviser M. Chardin, defense at Paris 6 in November 2017).
 - ◊ A. Jaramillo (adviser I. Itenberg, defense at Paris 6 in September 2017).
 - ◊ L. Heuberger (adviser A. HÖring, defenses at Paris 6 in June 2016).
 - ◊ Velibor Bojkovic (advisers F. Baldassarri and D. Benois, defense in Padova in October 2015). *I wrote a report.*
 - ◊ Daniele Turchetti (adviser A. Mézard, defense in Versailles in October 2014).
 - ◊ Lorenzo Fantini (adviser J. Nicaise, defense in Leuven in October 2014).

- ◇ Bertrand Duma (adviser D. Rössler, defense at Paris 7 in September 2012).
 - ◇ Charles de Clercq (adviser N. Karpenko, defense at Paris 6 in November 2011).
 - ◇ Benjamin Colas (adviser P. Lochak, defense at Paris 6 in September 2011).
 - ◇ Olivier Haution (adviser N. Karpenko, defense at Paris 6 in December 2009).
 - ◇ Fares Maalouf (adviser F. Delon, defenses at Paris 7 in December 2008).
 - ◇ Amaury Thuillier (adviser A. Chambert-Loir, defense in Rennes in October 2005).
- PhD reports without participation to the defense committee.
 - Adina Cohen (Hebrew University of Jerusalem, 2016).
 - Michael Temkin (Hebrew University of Jérusalem, 2006).
 - Participation to habilitation defense committees.
 - ◇ Jérôme Poineau (Strasbourg, 24/10/2013).
 - ◇ Matthieu Romagny (Paris 6, 18/11/11).
 - ◇ Samuel Boissière (Nice, 11/10/2010).
 - ◇ Johannes Nicaise (Lille, le 02/12/08 à Lille). *I also wrote a report.*

6 Course notes

- Affine geometry for 3rd year students, 65 pages:
<http://webusers.imj-prg.fr/~antoine.ducros/Coursgeoaff.pdf>
- Permutation and isometry groups for 2nd year students, 53 pages:
<http://webusers.imj-prg.fr/~antoine.ducros/Polygroupes.pdf>
- Finite groups and representations for 4th year students, 113 pages:
<http://webusers.imj-prg.fr/~antoine.ducros/GroupRep.pdf>
- Algebra for first year students of the École normale supérieure (this is an extended version of the notes above on finite groups and representation; it is currently under writing, and the final version should be online at the beginning of January 2020):
<http://webusers.imj-prg.fr/~antoine.ducros/Algebre-1.pdf>
- Slightly extended version of an introductory course in scheme theory, 310 pages:
<http://webusers.imj-prg.fr/~antoine.ducros//Cours-schemas.pdf>

7 Organisation of conferences

- June 2020: I am a member of the scientific comitee for the conference *Model Theory: from geometric stability to tame geometry* to be hold in Luminy. Due to the pandemic, it was canceled and repalced by an hybrid event to hold in Toronto, December 2021.
- July 2018: I organize with J. Poineau (Caen) and M. Temkin (Jerusalem) a conference at IHP (Paris) whose title is *Berkovich spaces: 30 years*.
- June 2012: I organized with Antoine Chambert-Loir the conference *Pinceaux, formules et champs* for Laurent Moret-Bailly's 60th birthday.
- June 2012: I organized with Charles Favre a workshop on non-Archimedean analysis in Paris 6.
- June 2011: I organized with Charles Favre a workshop on non-Archimedean dynamics in Bordeaux.
- July 2010: I organized with Charles Favre the summer school of our ANR project.
- April 2007: I organized in Nice a workshop on the applications of Berkovich's geometry.

8 Editorial boards

- I am a member of the editorial board of the *Annales de l'École normale supérieure* since septembre 2018.
- I was a member of the editorial board of *Mathematische Zeitschrift* since from July 2013 to May 2020.

9 Seminars, workshops, conferences... (since 2005)

- **Seminar talks**
 - ◊ In France: seminar or colloquium talks in Paris, Lyon, Grenoble, Strasbourg, Chambéry, Caen, Lille, Université de Rennes 1, ENS-Rennes.
 - ◊ Seminar talks given while staying abroad.
 - * 2019 : seminar talk at the Hebrew University in Jerusalem and at the Ben-Gurion University in Beer Sheva.
 - * 2018: seminar talk at Oxford.
 - * 2016 : seminar talk at *Tokyo institute of technology*.
 - * 2015 : seminar talk at Weizmann Insitute, seminar and colloquium talk at Beer-Sheva University.
 - * 2014 : seminar talk at MSRI, and at U-Michigan (Ann Arbor).

- * 2013 : seminar and colloquium talk at the Hebrew university in Jérusalem; seminar talk at Weizmann Institute; mini-courses and talks at Institut Poncelet (CNRS) in Moscow.
- * 2009 : seminar talk at Weizmann Institute.
- * 2008 : talks at Academia Sinica (Taipei) ; seminar talk at National Central University of Taiwan.

- **Participation to conferences**

- ◇ April 2018 : *Workshop on tropical varieties and amoebas in higher dimension* in Stockholm (this activity is part of the tropical semester at Mittag-Leffler institute).
- ◇ December 2017 : mini-workshop in Florence for the 70th birthday of Jean-Louis Colliot-Thélène.
- ◇ May 2017 : *Simons Symposium* in Schloß-Elm (Germany), on *Nonarchimedean and tropical geometry*.
- ◇ March 2017 : Workshop *P-adic Analytic Geometry and Differential Equations* at CIRM (Marseille).

- **Talks in conferences, workshops...**

- ◇ February 2022: I'm invited at the conference *Non-Archimedean Geometry and Applications*, in Oberwolfach.
- ◇ September 2020: I was invited to the mini-workshop *Non-Archimedean and tropical geometry* in Frankfurt, which was finally turned into several small online sessions in Fall 2021.
- ◇ October 2019: *Regensburg days on non-archimedean geometry*.
- ◇ July 2019: *Workshop on Recent Applications of Model Theory*, Toronto.
- ◇ June 2019: *Model Theory of Valued Fields and Applications*, Münster.
- ◇ February 2019: *Non-Archimedean Geometry and Applications*, Oberwolfach.
- ◇ May 2018: conference for François Loeser's 60th birthday in Banyuls sur mer (France).
- ◇ January 2018: I gave a mini-course at the CIRM during the *Research School Model Theory, Combinatorics and Valued Fields*.
- ◇ July 2017: *Berkovich spaces, tropical geometry and model theory* in Bogota.
- ◇ June 2017: *Non-archimedean geometry, motives and vanishing cycles*, Mittag-Leffler institute.
- ◇ December 2016: *The 10th Conference on Arithmetic and Algebraic Geometry*, Tokyo University.
- ◇ July 2016: *Regensburg days on non-archimedean geometry*.
- ◇ March 2016: *Tropical Geometry and Related Topics*, Kyoto.
- ◇ December 2015: *Non-Archimedean geometry and applications*, Oberwolfach.

- ◇ August 2015: *Non-archimedean analytic geometry: theory and practice*, Papeete (Tahiti).
- ◇ End of june-beginning of July 2015: mini-course in a summer school at BICMR, Beijing.
- ◇ February 2015: Simons Symposium *Non-Archimedean and Tropical Geometry* in Porto-Rico.
- ◇ November 2014: *Valuation theory and its applications*, Oberwolfach.
- ◇ September 2014: first conference of the research project *Higher invariants*, Regensburg,
- ◇ October 2013: *Regensburg days on non-Archimedean geometry*.
- ◇ April 2013 : Simons Symposium *Non-Archimedean and Tropical Geometry* in St John (American Virgin Islands).
- ◇ Janvier 2013 : *Trends in Arithmetic geometry*, Leiden.
- ◇ November 2012 : *Non-Archimedean Analytic Geometry*, Oberwolfach.
- ◇ June 2012 : *Interactions of Model Theory with Number Theory and Algebraic Geometry*, Bonn.
- ◇ June 2012: *Analyse non archimédienne*, Jussieu.
- ◇ June 2012 : Bourbaki seminar on Hrushovski-Loeser's work about the homotopy type of Berkovich spaces.
- ◇ July 2011 : mini-course during the Second International conference on valuation theory in Segovia and El Escorial.
- ◇ May 2011 : *Tropical and Non-Archimedean Geometry*, Barbados.
- ◇ July 2010 : mini-course in the summer school on Berkovich spaces, Jussieu.
- ◇ September 2009 : *P-adic analysis and applications*, Trieste.
- ◇ January 2009: annual conference in complex algebraic geometry, Luminy.
- ◇ May 2008: *Motivic Integration and its Interactions with Model Theory and Non-Archimedean Geometry*, Édimbourg.
- ◇ February 2008: *Arithmetic applications of p-adic analysis and rigid spaces*, Regensburg.
- ◇ January 21-st February 1st 2008: mini-course in the winter school *Ultrametric dynamical days*, Santiago, Chile.
- ◇ March 2006: Bourbaki seminar on Berkovich theory.
- ◇ February 2005: *p-adic differential equations*, Münster.

10 Publications

Survey papers

1. «About Hrushovski and Loeser's work on the homotopy type of Berkovich spaces», notes of two talks given during the *Simons Symposium* d'avril 2013, à

St-John (American Virgin Islands), in *Non-Archimedean and Tropical geometry*, Simons Symposia, Springer (2016).

2. «Étale cohomology of schemes and analytic spaces», *Berkovich spaces and applications*, 67–118, Lecture Notes in Math. **2119**, Springer, Cham, 2015 (notes of the mini-course I gave during the summer school on Berkovich spaces in Pairs, in July 2010).
3. «Les espaces de Berkovich sont modérés, (d’après E. Hrushovski et F. Loeser)», exposé numéro **1056** du séminaire Bourbaki (juin 2012), in *Astérisque* **352** (2013), 459-507.
4. «Géométrie analytique p -adique : la théorie de Berkovich», *Gaz. Math.* **111** (2007), 12–27.
5. «Espaces analytiques p -adiques au sens de Berkovich», exposé numéro **958** du séminaire Bourbaki (mars 2006), in *Astérisque* **311** (2007) 137-176.

Research papers, published or to be published

6. «Réduction en famille d’espaces affinoïdes», 51 pages, arXiv: 1903.00942, to appear in *Bulletin de la société mathématique de France*.
7. «Dévisser, découper, éclater et aplatir les espaces de Berkovich», *Compositio Mathematica* **157** (2021), pp. 236-302.
8. «Families of Berkovich spaces», *Astérisque* **2018**, no. 400, vii+262 pp.
9. «Cohomological finiteness of proper morphisms in algebraic geometry: a purely transcendental proof, without projective tools», *Berkovich spaces and applications*, 135–140, Lecture Notes in Math. **2119**, Springer, Cham, 2015.
10. «Espaces de Berkovich, polytopes, squelettes et théorie des modèles», *Confluentes Math.* **4** (2012), no. 4, 1250007, 57 pp.
- 8 *bis*. Erratum de l’article [8], *Confluentes Math.*, 5 no. 2 (2013), p. 43-44.
11. «Toute forme modérément ramifiée d’un polydisque ouvert est triviale», *Math. Z.* **273** (2013), no. 1-2, 331–353.
12. «Les espaces de Berkovich sont excellents», *Ann. Inst. Fourier.* **59** (2009), no. 4, 1407-1516.
13. «Triangulations et cohomologie étale sur une courbe analytique p -adique», *J. Algebraic Geom.* **17** (2008), no. 3, 503-575.
14. «Variation de la dimension relative en géométrie analytique p -adique», *Compositio Math.* **143**, (2007), no. 6, 1511–1532.
15. «Image réciproque du squelette par un morphisme entre espaces de Berkovich de même dimension», *Bull. Soc. Math. France* **131** (2003), no. 4, 483–506.
16. «Parties semi-algébriques d’une variété algébrique p -adique», *Manuscripta Math.* **111** (2003), no. 4, 513–528.
17. «Cohomologie non ramifiée sur une courbe p -adique lisse», *Compositio Math.* **130** (2002), no. 1, 89–117.

- 18.** «Points rationnels sur la fibre spéciale d'un schéma au-dessus d'un anneau de valuation», *Math. Z.* **238** (2001), no. 1, 177–185.
- 19.** «Torseurs sous une variété abélienne sur $\mathbb{R}((t))$ », *Manuscripta Math.* **105** (2001), no. 3, 311–321.
- 20.** «L'obstruction de réciprocity à l'existence de points rationnels pour certaines variétés sur le corps des fonctions d'une courbe réelle», *J. Reine Angew. Math.* **504** (1998), 73–114.
- 21.** «Fibrations en variétés de Severi-Brauer au-dessus de la droite projective sur le corps des fonctions d'une courbe réelle», *C. R. Acad. Sci. Paris Sér. I Math.* **327** (1998), no. 1, 71–75.
- 22.** «Dimension cohomologique et points rationnels sur les courbes», *J. Algebra* **203** (1998), no. 2, 349–354.
- 23.** «Principe de Hasse pour les espaces principaux homogènes sous les groupes classiques sur un corps de dimension cohomologique virtuelle au plus 1», *Manuscripta Math.* **89** (1996), no. 3, 335–354.

Submitted preprints

Available preprints not (yet) submitted

- 24.** «Formes différentielles et courants sur les espaces de Berkovich», (avec ANTOINE CHAMBERT-LOIR), arXiv 1204.6277.
We are currently working on the second version with Antoine Chambert-Loir.
- 25.** «La structure des courbes analytiques», 356 pages now – the current version is located at the URL
<http://www.imj-prg.fr/~antoine.ducros/trirss.pdf>

Works in progress

- 26.** «Non-archimedean integrals as limits of complex integrals», with Ehud Hrushovski and François Loeser, arXiv 1912.09162; a revised version is currently under report.

Scientific edition

- 27.** (Avec CHARLES FAVRE et JOHANNES NICAISE) «Berkovich spaces and applications», Lecture Notes in Mathematics **2119**, Springer, Cham (2015).