

Curriculum Vitae

NIELS FELD ^{*†‡}

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1 Curriculum Vitae

1.1 Contact Information

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1.2 Research Interests

Arithmetic and algebraic geometry, Noncommutative/derived geometry, Motives, $\mathbb{A}^1$ -homotopy theory, Intersection theory, Milnor-Witt K-theory and Hermitian K-theory, Chow-Witt groups, Cycle modules, Homotopy sheaves, Birational geometry

1.3 Employment

2023 - ... **IRMAR, University of Rennes**

Maître de conférences (permanent position similar to Assistant Professor)
Research group "Geometry and singularities"

2021 - 2023 **Toulouse Mathematics Institute**

Postdoctoral researcher, (grant: LabEX CIMI)
Research group "Homotopy Theory" (Bertrand Toën)

1.4 Education

2018-2021 **Institut Fourier, Grenoble-Alpes University, Grenoble**

PhD, Mathematics (PhD defense: January 7, 2021)

- Dissertation Topic: Milnor-Witt sheaves and modules
- Advisors: Jean Fasel et Frédéric Déglise
- Jury : Marc Levine (reporter), Paul Arne Østvær (reporter), Bertrand Toën, Philippe Gille, Emmanuel Peyre, Annette Huber

2014-2018 **Ecole Normale Supérieure de Lyon, Lyon**

Elève normalien (student/paid civil servant)

- Licence in Mathematics
- Master in Mathematics (Arithmetic and algebraic geometry)

2011-2014 **Lycée public Henri IV, Paris**

Classes préparatoires, MPSI-MP*

2010-2011 **Lycée public Léonce Vieljeux, La Rochelle**

Baccalauréat, Highschool diploma in science (with highest honors)

1.5 Publications

1. Feld, Niels *Milnor-Witt cycle modules*.
J. Pure Appl. Algebra 224, No. 7, Article ID 106298, 44 p. (2020)
2. Feld, Niels *Morel homotopy modules and Milnor-Witt cycle modules*
Doc. Math. Journal Profile 26, 617-659 (2021)
3. Feld, Niels *MW-homotopy sheaves and Morel generalized transfers*
Adv. Math. 393, Article ID 108094, 46 p. (2021)
4. Feld, Niels *Transfers on Milnor-Witt K-theory*
Tohoku Mathematical Journal, Vol. 75, No. 1 (March, 2023)

1.6 Preprints

1. Feld, Niels *A vanishing theorem for quadratic intersection multiplicities*
arXiv:2112.05200 [math.AG], 10 pages
2. Feld, Niels *Birational invariance of the Chow-Witt group of zero-cycles*
arXiv:2210.03995 [math.AG], 20 pages
3. Déglise, Frédéric ; Feld, Niels ; Jin, Fangzhou *Perverse homotopy heart and MW-modules*
arXiv:2210.14832 [math.AG], 81 pages
4. Déglise, Frédéric ; Feld, Niels ; Jin, Fangzhou *Moving lemmas and the homotopy coniveau tower*
arXiv:2303.15906 [math.AG], 15 pages

1.7 Student

2024 2027 Yuna Herledan (PhD student, co-direction with
Christophe Mourougane and Jean Fasel)

2024 Sem2 Antonin Milesi (First year master student, Subject: *Poincaré duality*)

1.8 Invited talks

2025 Oct. Rencontre ANR DAG-ARTS, University of Angers, France

2025 Jun. BIMSA AG Seminar (online), Beijing, China

2024 Sept. Workshop *Motivic homotopy theory*, Projet ANR-21-CE40-0015, University of Angers, France

2024 May *3 lectures on perverse sheaves and D-modules*, Workshop in Hodge Theory, Rennes

2024 May *Perverse homotopy heart*, Geometry seminar, University of Wuppertal, Germany

2023 Nov. *From motivic homotopy theory to birational geometry*, Geometry and singularities seminar, University of Rennes, France

2023 July *Motivic homotopy theory and birational geometry, Motivic and non-commutative aspects of enumerative geometry* conference, University of Nijmegen, Netherlands

2023 June *Quadratic trace formulas*, Algebraic geometry seminar, University of Amsterdam, Netherlands

2023 June *Orientations*, 2 talks for the Workshop on Fukaya categories, IMT, Toulouse, France

2023 June *An introduction to motivic homotopy theory*, Arithmetic geometry seminar, University of Rennes, France

2023 May *Birational invariance of the Chow-Witt groups*, Workshop on Motivic and Equivariant Topology, Swansea University, Wales

2023 Mar. *An introduction to motivic homotopy theory*, Physic and algebraic topology seminar, LAREMA (Laboratoire Angevin de REcherche en MATHématiques), France

2023 Mar. *Birational invariance of the Chow-Witt groups*, Rational Varieties Seminar, Jussieu, Sorbonne Université, Paris, France

2023 Jan. *Birational invariance of the Chow-Witt groups*, Algebraic geometry Seminar, Institut Fourier, Grenoble, France

- 2022 Dec. *Birational invariance of the Chow-Witt groups*, Number Theory Seminar, Séminaire de théorie des nombres, ENS de Lyon, France
- 2022 Nov. *About the Chow-Witt groups*, Number Theory Seminar, Duke University, North Carolina, USA
- 2022 Sept. *Quadratic refinements in motivic homotopy theory*, Colloquium (ANR HQDIAG), ENS de Lyon, France
- 2022 May *On a theorem of Bachmann*, Workshop *Real geometry, motives and $\mathbb{A}^1$ -homotopy*, (ANR HQDIAG), ENS de Lyon, France
- 2022 April *Additivity in K-theory, additive functor, computations of the higher Grothendieck-Witt groups*, 4 lectures for the workshop *Hermitian K-theory for stable ∞ -categories*, Toulouse Mathematics Institute, France
- 2022 Mar. *Quadratic refinements in motivic homotopy theory and noncommutative geometry*, ALPE Seminar, IMAG (Institut Montpellierain Alexander Grothendieck), Montpellier, France
- 2022 Jan. *Introductory talks for the workshop Hermitian K-theory for stable ∞ -categories*, Toulouse Mathematics Institute, France
- 2021 Dec. *Transfers in motivic homotopy theory*, Arithmetic and algebraic geometry seminar, IRMA (Institut de Recherche Mathématique Avancée), Strasbourg, France
- 2021 Oct. *Homotopy theory of algebras*, Workshop *Operads and deformations*, Toulouse Mathematics Institute, France
- 2021 Oct. *Bass-Tate transfer maps for the Milnor-Witt K-theory*, Homotopy Theory Seminar, Toulouse Mathematics Institute, France
- 2021 Apr. *Applications of the theory of Milnor-Witt cycle modules*, Physic and algebraic topology seminar, LAREMA (Laboratoire Angevin de REcherche en MATHématiques), France
- 2021 Apr. *4 lectures in motivic homotopy theory*, Workshop *Variations sur un thème de Rost*, ENS de Lyon, France
- 2021 Feb. *Milnor-Witt sheaves and modules*, Seminar on $\mathbb{A}^1$ -homotopy, motives and K-theory, Saint Petersburg, Russia
- 2020 Dec. *Milnor-Witt sheaves and modules*, Topology seminar, Laboratoire Paul Painlevé, Lille, France

2020	Dec.	<i>MW-homotopy sheaves and Morel generalized transfers</i> , Motivic Geometry Seminar, Center for advanced study (CAS), Oslo, Norway
2019	Dec.	<i>Unramified Milnor-Witt K-theory, Part II</i> , Workshop on A1-homotopy theory, Dijon University, France
2019	Dec.	<i>Unramified Milnor-Witt K-theory, Part I</i> , Workshop on A1-homotopy theory, Dijon University, France
2019	Oct.	<i>Recollections on Morel and Voevodsky A1-homotopy theory</i> , Workshop on A1-homotopy theory, Dijon University, France
2019	Oct.	<i>An elementary introduction to Milnor-Witt K-theory</i> , PhD students day, Grenoble-Alpes University, France
2019	Apr.	<i>Motivic cell structures: stable case</i> , Clopen Seminar, Dijon University, France
2019	Mar.	<i>Motivic cell structures: unstable case</i> , Clopen Seminar, Dijon University, France
2018	Dec.	<i>Unstable and stable homotopy infinity-categories</i> , Autumn school on infinity-categories, Dijon University, France
2018	Dec.	<i>From Model categories to infinity-categories</i> , Autumn school on infinity-categories, Dijon University, France
2018	Feb.	<i>Rost cycle modules</i> , Winter school on A1-homotopy theory, Freiburg Institute for Advanced Studies (FRIAS), Germany
2017	June	<i>Model categories</i> , Workshop on homological algebra, Dijon University, France
2017	June	<i>Grothendieck categories</i> , Workshop on homological algebra, Dijon University, France

1.9 Attended Conferences

2025	July	Real Motivic Geometry, Le Croisic, France
2024	Nov.	Motivic homotopy in interaction, Projet ANR-21-CE40-0015, CIRM, Marseille, France
2024	Apr.	Workshop <i>Milnor fibrations</i> followed by <i>Journées de géométries Angers-Poitiers</i> , Poitiers, France

2023	Oct.	Categories and stacks in algebraic geometry and algebraic topology CATS 7 (Bertrand Toën's 50th birthday), CIRM, Marseille, France
2023	July	IHES Summer school on K-theory, Paris, France
2023	June	ALPE seminar, IMT, Toulouse, France
2023	Mar.	ALPE seminar, , IMAG (Institut Montpellierain Alexander Grothendieck), Montpellier, France
2022	Oct.	<i>Donaldson-Thomas Theory</i> , Workshop (ERC DerSymApp and ANR CatAg), Centre Paul Langevin, Aussois, France
2022	June	ALPE Seminar, Institut de Mathématiques de Toulouse, France
2022	June	<i>CATS-60</i> , Summer School , Conference in honor of Carlos Simpson's 60th birthday, Institut de Mathématiques de Toulouse, France
2022	June	<i>Motives and arithmetic groups</i> Summer School , IRMA (Institut de Recherche Mathématique Avancée), Strasbourg, France
2022	May	<i>Invariants in Algebraic Geometry</i> , Summer School, Dijon University, France
2022	May	<i>Lean in Lyon</i> , Workshop, Institut Camille Jordan, Lyon, France
2021	Nov.	<i>Motivic cohomology and homotopical methods</i> , Dijon University, France
2020	July	<i>Motivic, Equivariant and Non-commutative Homotopy Theory</i> , Summer school, IHES, France
2019	Sep.	<i>Computations in motivic homotopy theory</i> , Autumn school, Regensburg University, Germany
2019	May	<i>Affine Algebraic Geometry and Transformation Groups</i> , Conference, Dijon University, France
2019	Jan.	<i>Besançon-Dijon Meeting</i> , Conference, Besançon University, France
2018	Dec.	<i>Infinity-categories and A1-homotopy theory</i> , Autumn school, Dijon University, France
2018	Oct.	<i>Dijon-Bâle-EPFL Seminar</i> , Conference, Dijon University, France
2018	May	<i>Motivic homotopy theory and refined enumerative geometry</i> , Spring School, Essen University, Germany
2018	May	<i>Dijon-Lausanne-EPFL Seminar</i> , Conference, Lausanne University, Switzerland
2018	Apr.	<i>Sino-French conference in Algebraic and Complex Geometry</i> , Conference, Lyon 1 University, France

2018	Jan.	<i>A1-Homotopy Theory</i> , Winter School, Freiburg Institute for Advanced Studies (FRIAS), Germany
2018	Jan.	<i>Cohomology Methods in Geometry</i> , Conference, Freiburg Institute for Advanced Studies (FRIAS), Germany
2017	Nov.	<i>Dijon-Bâle-Lausanne Seminar</i> , Conference, Basel University, Switzerland
2017	Oct.	<i>Dijon-Bâle Seminar</i> , Conference, Dijon University, France
2017	July	<i>Current Topics in the Theory of Algebraic Groups</i> , Summer school, Dijon University, France

1.10 Teaching Experience

2026	June	Member of the examination board for the orals exams of the PASS competition
2025-2026	Sem1 and 2	Research group on mathematics didactics (high school level) "Introduction à la topologie par le dessin" (18h)
2025-2026	Sem2	Courses on <i>Social and Ecological Transition</i> , second year licence/undergraduate level, 36h, University of Rennes, France
2024-2025	Sem2	CMP1/CMP2, First year licence/undergraduate level, 72h, University of Rennes, France
2024-2025	Sem1	PPA1, Second year licence/undergraduate level, 42h, University of Rennes, France
2024-2025	Sem1	Elliptic curve in cryptography, Second year master level, 23.25h, University of Rennes, France
2025	June	Member of the examination board for the orals exams of the PASS competition
2024-2025	Sem1 and 2	Research group on mathematics didactics (high school level) "Introduction à la topologie par le dessin" (18h)
2024-2025	Sem2	CPES, First year licence/undergraduate level, 60h, University of Rennes, France
2024-2025	Sem2	CMP1/CMP2, First year licence/undergraduate level, 72h, University of Rennes, France
2024-2025	Sem1	PPA1, Second year licence/undergraduate level, 42h, University of Rennes, France
2024-2025	Sem1	Elliptic curve in cryptography, Second year master level, 23.25h, University of Rennes, France
2024	June	Member of the examination board for the orals exams of the PASS competition
2023-2024	Sem2	CPES, First year licence/undergraduate level, 30h, University of Rennes, France

2023- 2024	Sem2	CMP1/CMP2, First year licence/undergraduate level, 75h, University of Rennes, France
2023- 2024	Sem1	PPA1, Second year licence/undergraduate level, 16.5h, University of Rennes, France
2023- 2024	Sem1	Elliptic curve in cryptography, Second year master level, 23.25h, University of Rennes, France
2021 16/07	12-	Teaching Assistant, IAS/PCMI Graduate Summer School
2020- 2021	Fall	<i>Calculus I (Math103)</i> 64h, Grenoble University, France
2019- 2020	Fall	<i>Calculus I (Math103)</i> 64h, Grenoble University, France
2018- 2019	Spring	<i>Calculus II (Math233)</i> 64h, Grenoble University, France

1.11 Administrative responsibilities

2025	2026	Member of the <i>Centre Henri Lebesgue</i> (CHL) scientific committee
2024	2026	Organizer of the <i>Geometry and singularities</i> research group seminar
2024	2025	Coordinator for the implementation of courses on Social and Ecological Transition at the Department of Mathematics (~ 60 hours)
2023	2026	Member of the examination board for the PASS and MMOPR competitions (~ 30 hours per year)

1.12 Funding

2024	2029	Funding from ANR DAG-ARTS , coordinated by Mauro Porta, in collaboration with colleagues from Toulouse and Strasbourg, 390,000 EUR
2024	2026	Funding from AIS (Scientific Start-up Grant), 10,000 EUR
2023	2024	Funding from Défi scientifique (in collaboration with Christophe Mourougane) for the organization of a working group on Hodge theory during the week of May 27, 4,300 EUR

2021 2023 Funding from LabEX CIMI, 2,000 EUR

1.13 Outreach

2025	Jan.	"Evaluation avec un barème pro-honnêteté : les QCM bayésiens", Talk to the seminar "Nos pratiques enseignantes" at Rennes university
2024	Jan.	Outreach for middle-school students on internship

During my postdoc in Toulouse, I volunteered for *Les Maths en Scènes* and *Les Maths en Jeans* which are two mathematics outreach associations :

2022	2023	Coordinator of two schools in Villefranche de Rouergue and Cajarc (weekly research sessions for students + 4 joint seminars during the year)
2022	24/11	<i>The mathematics of voting systems</i> , talk in the <i>Ph.D. students' seminar</i> , Institut de Mathématiques de Toulouse
2022	07/10	High school Louis Vicat, Souillac
2022	29/06	Responsible for the day <i>Journée Jeunes Talents Mathématiques 2022</i> , INSA, Toulouse
2022	25/03	Middle school Joseph Delteil, Limoux
2022	23/03	Middle school Jacques Prévert, Saint-Orens-de-Gameville

1.14 Refereeing for mathematical journals

- Compositio Mathematica
- Cambridge Journal of Mathematics
- Zentralblatt MATH

1.15 Internship and Extended Professional Travel

2018	Spring	<i>Milnor-Witt cycle modules</i> , Advisor: Frédéric Déglise, Dijon University, France
2018	Winter	<i>A1-homotopy theory</i> , Advisor: Frédéric Déglise, Freiburg Institute for Advanced Studies (FRIAS), Germany
2017	Fall	<i>Rost cycle modules</i> , Advisor: Frédéric Déglise, Dijon University, France

- 2017 Spring *The motive of a Pfister form*, Advisor: Frédéric Déglise, Dijon University, France
- 2016 Spring *Topos theory in logic*, Advisor: Laurent Regnier, Marseille University (Luminy), France
- 2015 Spring *Central simple algebras and Brauer groups*, Advisor: Grégory Berhuy, Grenoble University, France

1.16 Relevant Skills

Languages: French (mother tongue), English (C2 level), German (B1 level)
CS: OCaml, Python, Sage, Lean (basics)