

FLORIAN FÜRNSINN



CONTACT INFO

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ABOUT ME

I am a PhD student at the University of Vienna at the Faculty of Mathematics, funded by my own DOC Fellowship awarded by the Austrian Academy of Sciences. My supervisors are Alin Bostan (Inria Paris-Saclay) and Christian Krattenthaler (University of Vienna). I am working on the algebraic study of differential equations in characteristic zero as well as in positive characteristic. In particular, I am interested in work regarding the algebraicity of solutions of differential equations, (differential) Galois groups, the Tannakian formalism, hypergeometric functions, and work related to the Grothendieck p -curvature conjecture. Moreover, I have a strong interest in combinatorics.

POSITIONS

PREDOCTORAL RESEARCHER **2021-**
University of Vienna | *Vienna, Austria*

- DOC Scholarship "Differential Equations in Positive Characteristic" awarded by the Austrian Academy of Sciences
- Research Project P 31338 "Artin approximation, Arc-spaces, resolutions of singularities" by the Austrian Science Fund FWF, PI: Herwig Hauser
- Research Project P 34765 "Algebraic solutions of Fuchsian differential equations" by the Austrian Science Fund FWF, PI: Herwig Hauser

INTERNSHIP **2018, 2019**
Austrian Institute of Technology | *Vienna, Austria*
(Center for Mobility Systems)

- Predicting motorcycle accidents from dynamic data collected at motorcycle rides

EDUCATION

PHD STUDIES IN MATHEMATICS

2022-

University of Vienna | Vienna, Austria

- Topic: "Differential equations in positive characteristic"
- Supervisors: Alin Bostan, Christian Krattenthaler

MSc IN MATHEMATICS

2020-2022

University of Vienna | Vienna, Austria

- Specialisation in algebra, number theory and discrete mathematics
- Graduated with distinction
- Weighted average grade: 1,00 (on a scale from 5 (fail) to 1 (best))
- Thesis: "A normal form theorem for regular singular differential operators in positive characteristic", under the supervision of H. Hauser, available at <https://phaidra.univie.ac.at/open/o:1602690>

BSc IN MATHEMATICS

2017-2020

University of Vienna | Vienna, Austria

- Graduated with distinction
- Weighted average grade: 1,13 (on a scale from 5 (fail) to 1 (best))
- Thesis topic: "The Kakeya problem"

ACHIEVEMENTS

Awards

- Early student award 2019 awarded by the Austrian mathematical society to the best undergraduate students
- Hans-Riegel Fachpreis 2016: Second best mathematical high school final project in Vienna

Scholarships

- DOC Fellowship of the Austrian Academy of Sciences 2024-2026
- Performance scholarship at the University of Vienna 2017-2022

Competitions

- International Mathematical Competition in Blagoevgrad 2019 (silver medal), 2020 and 2021 (gold medal)
- Vojtěch Jarník International Mathematical Competition in Ostrava 2018 (medal), 2019 and 2022 (5th place, medal)
- International Mathematical Olympiad 2015 and 2016 (honorable mention)
- Austrian Mathematical Olympiad 2012-2016, awarded a silver medal in 2015 and a gold medal in 2016
- Kangaroo of Mathematics 2008-2016, first place in Austria in 2008, 2012, and 2016, further top placements

PUBLICATIONS

Articles

Fürnsinn, Florian and Yurkevich, Sergey (2024). "Algebraicity of Hypergeometric Functions with Arbitrary Parameters". In: *Bulletin of the London Mathematical Society*, pp. 1-23. doi: 10.1112/blms.13103.

Hula, A., Fürnsinn, F., Schwieger, C., Saleh, P., Neumann, M., and Ecker, H. (2021). "Deriving a joint risk estimate from dynamic data collected at motorcycle rides". In: *Accident Analysis and Prevention* 159, p. 106297. doi: 10.1016/j.aap.2021.106297.

SCIENTIFIC ACTIVITIES

Preprints

Fürnsinn, F., Hauser, H., and Kawanoue, H. (2024). "On Abel's Problem about Logarithmic Integrals in Positive Characteristic". submitted. DOI: 10.48550/arXiv.2401.14154.

Fürnsinn, F. and Hauser, H. (2023). "Fuchs' theorem on linear differential equations in arbitrary characteristic". submitted. DOI: 10.48550/arXiv.2307.01712.

Talks

- November 12, 2024, TBA, *Séminaire Différentiel*, Versailles, France.
- May 17, 2024, "Fuchs' Theorem, an Exponential Function, and Abel's Problem in Positive Characteristic", *MATHEXP-Polsys Seminar*, Paris-Saclay, France.
- March 26, 2024, "Algebraicity of Hypergeometric Functions with Arbitrary Parameters", *Functional Equations in LIMoges: FELIM 2024*, Limoges, France.
- February 15, 2024, "Fuchs' Theorem, an Exponential Function, and Abel's Problem in Positive Characteristic", *Workshop "Fuchsian Differential Equations in Zero and Positive Characteristic"*, Lisbon, Portugal.
- January 23, 2024, "Algebraicity of Hypergeometric Functions with Arbitrary Parameters", *Arbeitsgemeinschaft Diskrete Mathematik*, University of Vienna, Austria.
- November 9, 2023, "Fuchs' Theorem and an Exponential Function in Positive Characteristic", *Séminaire Calcul Formel*, XLIM, Université de Limoges, France.
- November 6, 2023, "Algebraicity of Hypergeometric Functions with Arbitrary Parameter", *Séminaire de l'équipe combinatoire et interactions*, LaBRI, Université de Bordeaux, France.
- October 18, 2023, "An Exponential Function in Characteristic p ", *Seminar Commutative Algebra & Differential Equations*, University of Vienna, Austria.
- February 17, 2023, "An Exponential Function in Characteristic p ", *Workshop "Periods"*, Lisbon, Portugal.
- May 13, 2022, "The Fuchs-Frobenius Method in Characteristic p ", *Workshop "Fuchsian Differential Equations"*, Lisbon, Portugal.

Research Stays

- May 2024, *Inria Saclay*, France, one weeks
- March-April 2024, *IMB, Université de Bordeaux*, France, two weeks
- November 2023, *XLIM, Université de Limoges*, France, three days
- October-November 2023, *IMB, Université de Bordeaux*, France, one month
- November 2022, *IMB, Université de Bordeaux*, France, one week

Teaching

- Winter term 2024: Exercises on "Introduction to mathematical methodology", University of Vienna
- Summer term 2020 - winter term 2022: Tutorials for first year students on introduction to mathematical methodology, analysis, linear algebra and discrete mathematics at the University of Vienna

Other

- Winter term 2023 - summer term 2024: Co-organisation of the seminar *Commutative Algebra & Differential Equations*, University of Vienna
- Peer Reviewer for *ISSAC conference*

SKILLS



LaTeX



Python, Maple, SageMath



Wolfram Mathematica, R

Languages

- German (native)
- English (fluent in speaking and writing)
- French (intermediate)

REFERENCES

Alin Bostan

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