

Rémi Jaoui

Curriculum vitæ

Personal details

Name : Remi Jaoui

Date of birth : October 20th, 1989

Citizenship : French

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Professional experiences

2019– present **Visiting assistant professor**, in the Department of Mathematics of the University of Notre Dame, Indiana, United States.

Supervisor : Anand Pillay

2017– 2019 **Post-doctoral fellow**, in the Department of Pure Mathematics of the University of Waterloo, Ontario, Canada.

Supervisor : Rahim Moosa

Education

2014–2017 **PhD. in Mathematics**, Université Paris-Saclay, Orsay.

Supervisors : Jean-Benoît Bost (Orsay) and Martin Hils (Münster)

Thesis title : *Geodesic flows and model theory of differential fields*

2012–2014 **Master**, Université Paris VI, Master de Mathématiques Fondamentales.

Supervisors : Jean-Benoît Bost and Martin Hils

Master's thesis title : *Geometry of differential equations and Mordell-Lang conjecture for function fields*

2011–2012 **Research internship**, Université Paris VII.

Supervisor : Elisabeth Bouscaren (CNRS - Orsay)

Topic : *Groups definable in local fields and pseudo-finite fields*

2009–2014 **Student at the Ecole Normale Supérieure**, Paris.

Awards

2007 **Third price in the Concours général of Mathematics.**

2007 **Member of French National Team**, in the *International Mathematical Olympiads*, Hanoi, Vietnam.

Research activities

PhD thesis

- 2014–2017 **PhD. in Mathematics**, in the *Département de mathématiques de l'université d'Orsay*, (Equipe Arithmétique et Géométrie Algébrique).
Supervisors : Jean-Benoît Bost (Orsay) et Martin Hils (Münster)
Title : Flots géodésiques et théorie des modèles des corps différentiels
External examiners for the manuscript :
Ehud Hrushovski (Oxford University) External examiner
David Marker (University of Illinois) External examiner
Jury of the oral presentation :
Zoe Chatzidakis (Ecole Normale Supérieure) President of the jury
Jean-Benoît Bost (Orsay) PhD supervisor
Elisabeth Bouscaren (Orsay) Internal examiner
Charlotte Hardouin (Toulouse) External examiner
Martin Hils (Münster) PhD supervisor
Martin Ziegler (Freiburg) External examiner

Publications

- 2019 **Differential fields and Geodesic flows II : Geodesic flows of pseudo-Riemannian algebraic varieties.**
Israel J. Math. 230 (2019), no. 2, 527–561.
- 2020 **Corps différentiels et Flots géodésiques I : Orthogonalité aux constantes pour les équations différentielles autonomes,** .
Bulletin de la Société Mathématique de France, Tome 158 (2020), 529-595
- 2020 **Rational factors, invariant foliations and algebraic disintegration of compact mixing Anosov flows of dimension 3,** arXiv :1803.088011 (2018).
accepted by Confluentes Mathematici

Preprints

- 2019 **Generic planar algebraic vector fields are strongly minimal and disintegrated,** arXiv :1905.09429.
- 2020 **On relative internality and definable fibrations,** (with L. Jimenez and A. Pillay), arXiv :1905.09429.

Invited lectures

- Dec 2020 **Equations Fonctionnelles et Interactions (EFI) Webseminar,** (online).
Title : Analyse semi-minimale des équations différentielles algébriques
- Nov 2020 **Model theory seminar,** University of Notre Dame (online).
Title : Galois groups of non-standard curves in *CCM*
- Aug 2020 **Model theory seminar,** University of Notre Dame (online).
Title : A model-theoretic invitation to web geometry
- July 2020 **Manchester logic seminar,** The University of Manchester (online).
- Jun 2020 **Model Theory of Differential Equations, Algebraic Geometry, and their Applications to Modeling,** BIRS Workshop (online).
- May 2020 **Virtual School Geometry and Dynamics of Foliations,** CIRM (online).

- March 2020 **Logic seminar**, University of Notre Dame (online).
Title : On uniform relative internality and orthogonality to the constants
- Feb 2020 **Differential Algebra and Related Topics X**, City University of New York.
Title : On the solutions of planar algebraic vector fields
- Oct 2019 **Algebraic Geometry and Commutative Algebra Seminar**, University of Notre Dame.
- Sept 2019 **Model Theory Seminar**, University of Notre Dame.
- July 2019 **Workshop on Recent Applications of Model Theory**, Fields institute.
Title : Disintegration of autonomous algebraic differential equations
- March 2019 **Kolchin Seminar in Differential Algebra**, City University of New York.
- Fev 2019 **Geometry and Model Theory Seminar**, Fields institute.
- Sept 2018 **Model Theory Seminar**, University of Waterloo, Waterloo, Canada.
Title : Disintegration phenomena for planar algebraic vector fields
- July 2018 **DART IX**, University of Leeds, England.
- March 2018 **Conference Model Theory and Applications**, Institut Henri Poincaré, Paris.
Title : Disintegrated differential equations and mixing Anosov flows
- Dec 2017 **2017 CMS Winter meeting, Model Theory session**, Waterloo, Canada.
Title : On the model theory of geodesic differential equations
- Sept 2017 **Model Theory Seminar**, University of Waterloo, Waterloo, Canada.
- Nov 2016 **Oberseminar Modelltheorie, Geometrie und Gruppentheorie**, Universität Münster, Münster.
- Sept 2016 **Séminaire de Théorie des modèles et Groupes**, Université Paris VII, Paris.
- May 2016 **Model Theory Month in Münster - Conference**, Universität Münster, Münster.
Title : New examples of types in DCF_0 orthogonal to the constants
- Apr 2016 **Séminaire d'Arithmétique et de Géométrie Algébrique**, *Journée des doctorants*, Université Paris-Sud, Orsay.
- Nov 2015 **Réseau des Étudiants de Géométrie Algébrique**, Institut Henri Poincaré, Paris.

Other research activities

- Fall 2018 **Organization of a biweekly reading group**, *joint between the University of Waterloo and the University of McMaster*.
Subject : Instances of Zilber's trichotomy for pseudo-finite sets and dimensions
- Spring 2018 **Participation to the trimester : Model theory, combinatorics and valued fields**, *in the Institut Henri Poincaré*, Paris.

Teaching activities

Teaching assistant in Orsay University

- 2014-2017 **Linear algebra for second year students (L2)**, Paris-Sud University.
Weekly teaching load : two hours and a half per week during one semester
Around 20 students
- 2014-2017 **Algebra for third year students (L3)**, Paris-Sud University.
Weekly teaching load : two hours and a half per week during one semester
Around 30 students

Instructor in the University of Waterloo

- Fall 2017 **MATH135 : Algebra for honours mathematics.**
Weekly teaching load : four hours per week
Around 50 students
Topics : Introduction to proofs (quantifiers, induction, contradiction), moduli arithmetic, polynomials over the complex numbers.
- Spring 2018 **MATH207 : Calculus 3 (non-specialist level).**
Weekly teaching load : three hours per week
Around 20 students
Topics : smooth space curves, partial derivatives, line integrals, multiple integrals, vector fields, Stoke's phenomena.
- Fall 2018 **PMATH330 : Introduction to mathematical logic.**
Weekly teaching load : three hours per week
Around 60 students
Topics : Propositional logic (tableaux, Soundness and Completeness theorems) and introduction to predicate logic (structures, tableaux, Completeness theorem).

Instructor in the University of Notre Dame

- Fall 2019 **M10350 : Calculus A, for the Life and Social Sciences.**
Weekly teaching load : three hours per week
Around 60 students
Topics : derivation and integration of functions of one variable, computation of limits, applications to graphing.
- Spring 2020 **M10360 : Calculus B, for the Life and Social Sciences.**
Weekly teaching load : three hours per week
Around 60 students
Topics : partial derivatives, multiple integrals, infinitesimal calculus, differential equations and Lagrange multipliers.
- Fall 2020 **M10360 : Calculus B, for the Life and Social Sciences.**
Weekly teaching load : three hours per week
Around 50 students
Topics : partial derivatives, multiple integrals, infinitesimal calculus, differential equations and Lagrange multipliers.