Elie Studnia

Born on September, 5th 1998
Email : e.n.g.studnia@math.leidenuniv.nl

Employment

From Oct. 2024 :   Postdoctoral researcher at the Mathematical Institute of Leiden
University, with Prof. Dr. Jan Vonk.

Education

Sep. 2021–Aug. 2024 :   PhD at Université Paris Cité (IMJ-PRG), *L-functions and rational points of Galois twists of modular curves*, supervised by Prof. Loïc Merel, Referees: Pierre Parent, Henri Darmon.
Defended on Nov. 6th 2024.

Sep. 2018–July 2020 :   Master's degree in Pure Mathematics (Sorbonne Université)
Master's thesis supervised by Prof. Loïc Merel:
The Chabauty-Kim method for modular curves, after Dogra-Le Fourn

Sep. 2018–Sep. 2019 :   Master's degree, MVA (ENS Paris-Saclay):
Computer vision, deep learning, topological data analysis...

Sep. 2016–Aug. 2021 :   Student at the École Normale Supérieure (Ulm) :
Bachelor's thesis (in French) : *Towards the Weil conjectures*, with C. Gachet, Y. Qin, supervised by Cyril Demarche

Sep. 2014–June 2016 :   "Classe préparatoire" MPSI-MP (Louis-le-Grand, Paris)

Other research experience

Mar. 2020 :   Project group in Arizona Winter School (Nonabelian Chabauty),
Project assistant: L. Alexander Betts

Apr.–Sep. 2019 :   Research internship at Atos
MVA Master's thesis : *Graph Neural Networks and Cybersecurity Applications*

Feb.–Jun. 2018 :   Research internship at UC Berkeley, supervised by Maciej Zworski,

Work and publications

Congruences modulo 23 to $y^2=x^3-23$ are trivial, preprint arXiv:2507.20801, submitted.

Compactified moduli spaces and Hecke correspondences for elliptic curves with a prescribed N-torsion scheme, preprint arXiv:2504.06855, submitted.

L-functions and rational points for Galois twists of modular curves, PhD thesis.

On obstructions to the Euler system method for Rankin-Selberg convolutions, accepted at *Research in Number Theory*.

Selmer equations for the thrice-punctured line in depth two, with A. J. Best, L. A. Betts, T. Kumpitsch, M. Lüdtke, A. W. McAndrew, L. Qian and Y. Xu, *Math. Comp.* 93 (2024), published electronically 2023. Continuation of the 2020 AWS group project.

Quantum Ergodicity for pseudo-Laplacians, *J. Spectr. Theory* 11 (2021), no. 4, pp. 1599–1626. Results found during the Berkeley internship.

Quantum Limits for Harmonic Oscillator, preprint arXiv:1905.07763. Results found during the Berkeley internship.

Teaching/Supervision, Service, Outreach

2024-2026:   Teaching at Leiden University:
- 2024-2025: co-lecturer for *Linear Algebra for Computer Scientists 1* and *2* (with O. Lukina)
- March-June *2025* : Co-supervision (with Jan Vonk) of Sjors Verduin's bachelor thesis *Perfectoid Fields*. Final grade: 93/100
- 2025-2026: co-lecturer for *Linear Algebra for Computer Scientists* (with O. Lukina)

Oct. 2022, 2023 :   Volunteer for the "fête de la science" : organization of mathematical activities in primary school classrooms.

2022-2024:   Co-organizer of the "Bourbakette" (weekly seminar for pure mathematics PhD students at Université Paris Cité)

2021-2024:   Teaching assistant/Tutor at Université Paris Cité (all in French)
- Spring 2024: Probability (L2 Math)
- Fall 2023 : Algebra (M1 Math-Info-Crypto)
- Fall 2022 : Algorithms and programs (L2 Math), tutoring (L1-L3 Math)
- Spring 2022 : Elementary algebra and analysis (L1 Info), tutoring (L1-L3 Math)

Since 2021 :   Volunteer for the French Mathematical Olympiad organization team : lecturing, tutoring, making problem sheets, grading...

2016–2018 :   Interrogator for weekly mock oral exams ("colles") for undergraduates in Lycée Louis-le-Grand, Paris.

Selected talks

Research talks

July 2025:   *Congruences modulo 23 to $y^2=x^3-23$ are trivial*
(Contributed talk to the *Journées Arithmétiques* 2025, Belval)

June 2025:   *Elliptic curves congruent modulo 23 to $y^2=x^3-23$*
(in French, SAGA, Orsay)

Apr. 2025:   *(Twisted) modular curves and congruences of elliptic curves*
(AGNT Seminar, Leyde)

Jan. 2025 :   *Twisted modular curves and congruent elliptic curves*
(Algebra seminar, Groningen)

Dec. 2024:   *Twisted modular curves and congruences of elliptic curves*
(in French, Number theory seminar, Lille)

Nov. 2024:   *On elliptic curves congruent modulo 23 to $y^2=x^3-23$*
(Fall 2024 DIAMANT Symposium, Contributed talk)

Oct. 2024:   *On mod p congruences to the elliptic curve $y^2=x^3-p$*
(Intercity Number Theory Seminar, Leiden)

June 2024:   *Congruent elliptic curves and twists of modular curves*
(Junior Number Theory Seminar, King's College)

Apr. 2024 :   *On the image of the tensor product of Galois representations attached to
two modular forms* (IMJ-PRG PhD preprint seminar)

Mar. 2024 :   *Twisted modular curves and congruences of elliptic curves*
(in French, Seminar of the Number Theory team of IMJ-PRG)

Dec. 2023 :   *(Anti-)symplectic congruences of elliptic curves modulo 7*
(Contributed talk at *Modular Curves and their Arithmetic*, Warwick)

Working groups

May 2025 :   *Galois sections and p-adic period mappings, after Betts-Stix,*
(PANCakeS seminar organized by D. Lilienfeldt and Y. Dutta)

May 2025 :   *Eisenstein descent over number fields, after Mazur*
(In French, Hybrid working group *The Eisenstein ideal and Artin motives*,
organized by L. Merel and E. Lecouturier)

Sep. 2023 :   *Proof of Kolyvagin's theorem*
(online Euler Systems Seminar, organized by A. Sheth)

Mar. 2023 :   *Constructing the p-adic action of the motivic cohomology group on the
cohomology of Bianchi varieties, after Venkatesh*
(in French, in two parts – working group on Venkatesh's conjectures)

Jan. 2022 :   *The Pila-Zannier strategy for the André-Oort Conjecture : the product of
two modular curves, after Pila* (in French, with H. Liu – working group on
the André-Oort Conjecture)

Nov. 2020 :   *The uniformity bound follows from a height inequality in the universal
abelian variety, after Dimitrov-Habegger-Gao,*
(in French – working group on Rational points and uniformity)

Awards

2017, 2018 :	Second prize for at the SMF Junior contest
2016 :	First place at the ENS Ulm entrance competitive exam
2014 :	Second prize at the Concours Général of Mathematics
2014 :	IMO Bronze Medal