

Rémi MOLINIER

remi.molinier@univ-Grenoble Alpes.fr
<https://www-fourier.ujf-grenoble.fr/~molinier/>

Office 221
Institut Fourier
100, rue des maths
38610 Gières
France

Positions and Education

2018 – ...	PRAG, Institut Fourier (Université Grenoble Alpes).
2017 – 2018	ATER, Institut Fourier (Université Grenoble Alpes).
2015 – 2017	Visiting Assistant Professor, Kansas State University.
2015	PhD degree, LAGA (Université Paris 13), supervised by Bob Oliver on <i>The cohomology with twisted coefficients of the classifying space of a fusion system</i> .
2012	Master 2 MFPI, Université Paris 13 (<i>first class honours</i>). Magistère de Mathématiques, Université Paris-Sud 11.
2011	Master 2 Formation des Enseignants (<i>with the highest honours and congratulation of the jury</i>), ENS de Cachan. Agrégation externe de Mathématiques, rank 4 th .
2010	Master 1 de Mathématiques Fondamentales et Appliquées (<i>with honours</i>), Université Paris-Sud 11. Senior thesis on " <i>Differential Galois theory</i> ", Université Paris-Sud 11. Entrance at the ENS de Cachan with the concours 3A, rank 16 th .
2009	Licence de Mathématiques Fondamentales et Appliquées (<i>first class honours</i>), Université Paris-Sud 11.

Research interests

My interests include algebraic topology, group theory and the links between the two. My research studies the **interactions between group theory and homotopy theory** through the notion of classifying spaces. More precisely, I am interested in **p -local structure of groups** and their classifying spaces. Some recent projects lead me to **topological data analysis**. Finally, I am also playing with partial group structure (such as pregroup and partial groups) and even dice on my spare time.

Preprints and submitted papers

Partial groups, pregroups and realisability of fusion systems,
With Nicolas Lemoine, 2021.
arXiv:2303.05157

Path partial groups,
With Antonio Diaz Ramos and Antonio Viruel, 2021.
arXiv:2107.14084

Published and accepted papers

Centric linking systems of locally finite groups.
Topology and its Applications 312 (2022), 1–18.
<https://doi.org/10.1016/j.topol.2022.108082>
arXiv:1702.03995

Comparing n -dice fixing the sum of the faces.
Bulletin of the ICA, vol. 90, 2020, pp. 39–49.
arXiv:1912.04031

Control of fixed points over discrete p -toral groups, and existence and uniqueness of linking systems,
Journal of Algebra, vol. 499, 2018, pp.43–73.
<https://doi.org/10.1016/j.jalgebra.2017.11.035>
arXiv:1511.04291

Alperin's Fusion Theorem for localities,
Communications in Algebra, vol. 46(6), 2017, pp.2615–2619.
<https://doi.org/10.1080/00927872.2017.1392537>
arXiv:1603.02599

Cohomology of linking systems with twisted coefficients by a p -solvable action,
Homology, Homotopy and Applications, vol. 19(2), 2017, pp.61–82.
<http://dx.doi.org/10.4310/HHA.2017.v19.n2.a4>
arXiv:1507.02401

Cohomology with twisted coefficients of the classifying space of a fusion system,
Topology and its Applications 212 (2016), 1–18.
<http://dx.doi.org/10.1016/j.topol.2016.09.001>
arXiv:1504.03191

Papers in didactic and science education

Instrumentation de l'association de registres sémiotiques dans un assistant de preuve
With Martin Bodin and Emmanuel Beffara,
EIAH 2023.
<https://hal.science/hal-04096240/>

Activité - Courtoisie de cambrioleurs
Petit x - n° 115 et n° 116, 2021.
https://irem.univ-grenoble-alpes.fr/medias/fichier/115x5_1641389944197-pdf
https://irem.univ-grenoble-alpes.fr/medias/fichier/116x7_1661436031264-pdf

Situation de recherche pour la classe : Pac-Man contre les fantôme,
With Camille Antoine, Emmanuel Beffara, Florence Paulin and Iulia Tunaru,
Actes de la CORFEM 2021
https://corfem2022.sciencesconf.org/data/pages/Actes_CORFEM_2021.pdf

Papers in material sciences (multidisciplinary project)

Unsupervised topological learning for atomic structures identification,
Physical Review E 105 (2022).

With Sebastien Becker, Emilie Devivjer and Noel Jakse.

<https://doi.org/10.1103/PhysRevE.105.045304>

arXiv:2109.08126

Unsupervised topological learning approach of crystal nucleation,
Scientific Reports volume 12 (2022).

With Sebastien Becker, Emilie Devivjer and Noel Jakse.

<https://doi.org/10.1038/s41598-022-06963-5>

arXiv:2109.06797

other involvement in the scientific community

Several reviews

- * For *Forum of Mathematics, Sigma*, 2022.
- * For *Journal of Pure and Applied Algebra*, 2019.
- * For *Bulletin of the London Mathematical Society*, 2018.
- * For *Science China, Mathematics*, 2016.

Organisation of events

- * In the organisation committee of the conference DEMIMES,2022.

University Teaching

- Spring 2023 Lectures and tutorials in general maths (Tronc Commun), Polytech Grenoble.
PeiP-D, Polytech Grenoble.
UE *Modélisation* in M1 MEEF, Université Grenoble Alpes.
Lectures on algebraic topology, Magistère de mathématiques de Grenoble, Université Grenoble Alpes.
Lectures in MAT 401, Université Grenoble Alpes.
ETC *Jeux combinatoires et raisonnements mathématiques*, Université Grenoble Alpes.
- Fall 2022 Lectures and tutorials in general maths (Tronc Commun), Polytech Grenoble.
PeiP-D, Polytech Grenoble.
Remise à niveau IESE-3, Polytech Grenoble.
Tutorials in *Algebra* in M1 Math Général, Université Grenoble Alpes.
- Spring 2022 Lectures and tutorials in general maths (Tronc Commun), Polytech Grenoble.
PeiP-D, Polytech Grenoble.
UE *Modélisation* in M1 MEEF, Université Grenoble Alpes.
Lectures on algebraic topology, Magistère de mathématiques de Grenoble, Université Grenoble Alpes.
Lectures in MAT 401, Université Grenoble Alpes.
Tutorials in MAT 401, Université Grenoble Alpes.
- Fall 2021 Lectures and tutorials in general maths (Tronc Commun), Polytech Grenoble.
PeiP-D, Polytech Grenoble.
Remise à niveau IESE-3, Polytech Grenoble.
Lectures in *Préparation au concours de l'agrégation externe de mathématiques*, Université Grenoble Alpes.
Tutorials in *Algebra* in M1 Math Général, Université Grenoble Alpes.
ETC *Jeux combinatoires et raisonnements mathématiques*, Université Grenoble Alpes.
- Spring 2021 Lectures and tutorials in general maths (Math Filières), Polytech Grenoble.
PeiP-D, Polytech Grenoble.
UE *Modélisation* in M1 MEEF, Université Grenoble Alpes.
Tutorials in MAT 401, Université Grenoble Alpes.
ETC *Jeux combinatoires et raisonnements mathématiques*, Université Grenoble Alpes.
- Fall 2020 Lectures and tutorials in general maths (Tronc Commun), Polytech Grenoble.
PeiP-D, Polytech Grenoble.
Remise à niveau IESE-3, Polytech Grenoble.
Lectures in *Préparation au concours de l'agrégation externe de mathématiques*, Université Grenoble Alpes.
Tutorials in *Topology* in L3A, Université Grenoble Alpes.
- Spring 2020 Tutorials in general maths (Math Filières), Polytech Grenoble.
- Fall 2019 Lectures and tutorials in general maths (Tronc Commun), Polytech Grenoble.
Lectures in *Préparation au concours de l'agrégation externe de mathématiques*, Université Grenoble Alpes.
Tutorials in *Topology* in L3A, Université Grenoble Alpes.
- Spring 2019 Lectures and tutorials in general maths (Math Filières), Polytech Grenoble.
Lectures/Tutorials MAT 432 (course in english), Université Grenoble Alpes.
Lectures in L0, Université Grenoble Alpes.
- Fall 2018 Lectures and tutorials in general maths (Tronc Commun), Polytech Grenoble.
Complex analysis, Polytech Grenoble.
Lectures in *Préparation au concours de l'agrégation externe de mathématiques*, Université Grenoble Alpes.
Tutorials in *Topology* in L3A, Université Grenoble Alpes.
- Spring 2018 Lectures on multivariable calculus, Polytech Grenoble.
Tutorials MAT 203, Université Grenoble Alpes.
Tutorials MAT 402, Université Grenoble Alpes.
- Fall 2017 Lecture/Tutorials Math 104, Université Grenoble Alpes.
Tutorials MAT 309, Université Grenoble Alpes.
- Spring 2017 *Applied Matrix Theory*, Kansas State University.
Discrete Mathematics, Kansas State University.

Fall 2016	<i>Introduction to Contemporary Mathematics</i> , Kansas State University.
July 2016	<i>Introduction to Algebraic Topology</i> , Summer School, Prishtina University (Kosovo).
Summer 2016	<i>Applied Matrix Theory</i> , Kansas State University.
Spring 2016	<i>Applied Matrix Theory</i> , Kansas State University.
Dec. 2015	<i>Introduction to Graph Theory</i> , Animath Winter School, Prishtina University (Kosovo).
Fall 2015	<i>General Calculus and Linear Algebra</i> , Kansas State University.
2014 – 2015	Tutorials in Licence 2, Université Paris 13. Lectures in <i>Préparation au concours de l'agrégation externe de mathématiques</i> , Université Paris 13.
2013 – 2014	Tutorials in Licence ATS, Université Paris 13. Lectures in <i>Préparation au concours de l'agrégation externe de mathématiques</i> , Université Paris 13. Khôlles second year Sup Galilée, Université Paris 13.
2012 – 2013	Tutorial in Licence 1, Université Paris 13. Tutorials in second year of IUT Informatique, Université Paris 13.

Students

graduate student

- Nascimo Fournier, 1st year Master student (TER), 2023.
- Kévin Spartaro, 1st year Master student (TER), 2023.
- Joachim Montoussé, Master student, (supervised with Noel Jakse) 2022.
- Benjamin Marin, 1st year Master student (TER), 2022.
- Alleysson Mathis, 1st year Master student (TER), 2022.
- Quentin Marreau, Magistère student, 2021.
- Edwin Kitaeff, Magistère student, 2020.
- Nicolas Lemoine, PhD student, (supervised with Jean Baptiste Meilhan and Radu Stancu) 2020 – ...
- Nicolas Lemoine, student in M2, 2020.
- Sebastien Becker, PhD student, (supervised with Emilie Devijver and Noel Jakse) 2019 – 2022.
- Anand Ballou, student in M2, (supervision with Massih-Resa Amini and Emilie Devijver) 2019.

Etudiants de licence

- Lyna Safar-Remali, student in L2 (*stage d'excellence*), 2022.
- Thibaut Bogaert, student in L2 (*stage d'excellence*), 2021.
- Etienne Delahaye, student in 1st year in *INSA de Lyon*, (supervision with Emilie Devijver and Massih Resa Amini), 2018.
- Yann Soukoussian, student in L1 (*stage d'excellence*), 2018.
- Romain Colson, student in L2, 2018.
- Estelle Colomb, student in L1 (*stage d'excellence*), 2018

Project in which I am (was) involved

- 2019 – ... Chaire *Machine Learning for Materials Design and Efficient Systems* in the MIAI.
2018 PEPS STATOPO, with Emilie Devijver and Mélina Galopin.

Talks

- Jun. 2022 *Hey G , what is your automorphism group ?*
Algebra seminar, University of the Basque Country, Bilbao.
- Oct. 2021 *Est-ce que tout groupe est le groupe d'automorphismes d'un groupe ?*
Séminaire de topologie, Institut Fourier, Grenoble.
- Nov. 2017 *How to compute topological feature ?*
Séminaire de l'équipe AMA, LIG, Grenoble.
- Oct. 2017 *Cohomology with twisted coefficients of the classifying space of a fusion system*
Colloque 2017 du GDR 2875, Paris.
- Oct. 2017 *Introduction à la théorie homotopique des système de fusion,*
Séminaire de topologie, Institut Fourier, Grenoble.
- Jan. 2017 *Localités arboricoles*
Séminaire de Théorie des Groupes, Amiens.
- Jan. 2017 *Localités arboricoles*
Séminaire de physique mathématique et de topologie algébrique, Angers.
- Jan. 2017 *Localités arboricoles*
Séminaire de Topologie, Lille.
- Jan. 2017 *Localités arboricoles*
Séminaire de l'équipe topologie algébrique, Paris 13.
- Nov. 2016 *Cohomology with twisted coefficients of linking systems*
Workshop Fusion systems and equivariant algebraic topology, Hausdorff Research Institute for Mathematics.
- Nov. 2016 *Fusion systems and their classifying spaces*
Departmental Colloquium Mathematics, KU Leuven.
- Apr. 2016 *The p -completion of classifying spaces of finite groups*
Topology Seminar, Kansas State University.
- Jan. 2016 *Existence et unicité des systèmes de liaison*
Equipe Théorie des groupes seminar, Amiens.
- Jan. 2016 *Existence et unicité des systèmes de liaison*
Equipe Topologie Algébrique seminar, Paris 13.
- Sep. 2015 *Fusion systems and linking systems*
Centric linking systems and classifying spaces of saturated fusion systems
Cohomology with twisted coefficients of linking systems and stable elements
3 talks, Algebra Seminar, Kansas State University.
- July 2015 *Classifying spaces of saturated fusion systems and their cohomology*
Young Topologist Meeting, Lausanne.
- Fev. 2015 *Cohomology with twisted coefficients of the geometric realization of a linking system*
Equipe Topologie Algébrique seminar, Paris 13.

Conferences and Workshops Attended

- Apr. 2022 *DEMIMES*, Autrans.
- Sep. 2021 *Burnside and Mackey functors revisited*, online (hosted in Lille).
- July 2021 *Workshop on Homotopy Theory and Group Theory*, Barcelona (attended online).
- Feb. 2020 *Topology and Málaga Meeting and Jibiri Seminar*, Málaga.
- Jun. 2019 *Méthodes catégoriques et homotopiques en théorie des représentations*, Amiens.
- Jan. 2019 *Topology and Málaga Meeting*, Málaga.
- Mar. 2018 *Topology and Málaga Meeting*, Málaga.
- Oct. 2017 *Colloque 2017 du GDR 2875*, Paris.
- jun. 2017 *Algebraic Topology and Representation Theory*, Lille.
- Nov. 2016 *Workshop : Fusion systems and equivariant algebraic topology*, Hausdorff Research Institute for Mathematics. **(invited)**
- Aug. 2016 *PIMS Summer School on Geometric and Topological Aspects of the Representation Theory of Finite Groups*, University of British Columbia.
- Feb. 2016 *Midwest Topology Seminar*, Northwestern University.
- July 2015 *Young Topologist Meeting*, Lausanne.
- Jun. 2015 *Conference in honour of Dave Benson's 60th birthday*, Skye.
- Feb. 2015 *CoGrAl2015*, Jena.
- Oct. 2014 *Rencontre annuelle du GDR 2875*, Clermont-Ferrand.
- July 2014 *Journées de théorie de l'homotopie en l'honneur de Jean Lannes et Bob Oliver*, Paris.
- Jun. 2014 *Young algebraists' conference 2014*, Lausanne.
- Oct. 2013 *The theory of p-local compact groups*, Copenhagen.
Classifying spaces, loop spaces and finiteness, Copenhagen.
- July 2013 *Young topologist meeting*, Lausanne.
- Jun. 2013 *Classification Problems in Groups and Fusion Systems*, Copenhagen.
- May 2013 *Conference in Algebra and Topology*, Nantes.
- Oct. 2012 *Rencontre annuelle du GDR 2875*, Lille.
- May 2012 *Journées « Popularisation des mathématiques »*, Orléans.
- Apr. 2012 *Foncteurs 2012*, Nantes.

Visits to Collaborators and Invitations

- Jul. 2022 Invitation of Antonio Diaz Ramos and Oihana Garaialde for a week at Institut Fourier.
- May 2022 A week at the University of the Basque Country, Bilbao (to work with Antonio Diaz Ramos and Oihana Garaialde).
- Mar. 2019 Invitation of Antonio Diaz Ramos and Oihana Garaialde for a week at Institut Fourier.
- Feb. 2019 Invitation of Antonio Diaz Ramos for a week at Institut Fourier.
- Jan. 2019 Invitation of Sune Precht Reeh for a week at Institut Fourier.
- Jun. 2018 A week at the UAB, Barcelona (contact : Sune Precht Reeh and Natalia Castellana).
- Jan. 2017 Three days at the LAMFA, Amiens (contact : Radu Stancu).
- May 2015 Two days at the LAMFA, Amiens (contact : Radu Stancu).
- Oct. 2014 One month at the *Centre for Symmetry and Deformation*, Copenhagen University (contact : Jesper Grodal and Jesper Michael Møller).
- Sep. 2014 Two days at the LAMFA, Amiens (contact : Radu Stancu).
- Oct. 2013 One month at the *Centre for Symmetry and Deformation*, Copenhagen University (contact : Jesper Grodal).

Responsibilities and Work Experiences

2018 – ...	Member of the concil of the IREM de Grenoble.
2019 – 2023	Member of the concil of the UFR IM2AG.
2013 – 2015	Member of the library commission, LAGA.
2012 – 2015	Member of the council of the LAGA (mathematics department). Member of the PhD school council, Institut Galilée (division of science).
2010	Senior thesis on " <i>Differential Galois theory</i> ", Université Paris-Sud 11.
2009 – 2010	Work at the secretarial office of L3 and Master of Mathematics, Université Paris-Sud 11.
2007 – 2008	Seasonal jobs of educator among disabled persons with personality disorders and/or neurological disorders, ADAPEI de la Loire.

Popular Science and Involvements in science education

Involvement with *IREM de Grenoble*

- Groupe *Raisonnement, logique, Situations de recherche pour la classe*, 2019-...
 - ★ *Tangente Éducation numéro 55 : Les situations de recherche pour la classe*, Dec. 2020.
 - ★ Stage MathC2+, june 2019, 2022.
- Groupe *Géométrie pratique avec instruments de mesure anciens*, 2018-2019.
 - ★ Stage "*Math en Manipulant, instruments anciens*", 2019.
 - ★ "Mesurons, arpentons : expériences de géométrie pratique sur le terrain" in actes du colloque : des mathématiques dans notre environnement, 2019.
 - ★ Stage "*Les mathématiques au service de la course d'orientation*", 2019.
 - ★ Stage "*Math en Manipulant, instruments anciens*", 2018.
 - ★ Stage MathC2+, june 2018.
- Club de Math, 2018-...
 - ★ *Activité - Courtoisie de cambrioleurs*, numéro 115 de Petit x, 2021.
 - ★ *Tangente Éducation numéro 55 : Les situations de recherche pour la classe*, Dec. 2020.
 - ★ Lab Junior, 2020, 2021 and 2022.
 - ★ Stage MathC2+, june 2019, 2020, 2021.

Involvement with *Math à modeler*

- Stall for *Remue méninge*, Grenoble, June 2022.
- Stall for *Remue méninge*, Echirolles, November 2021.
- Research activity with a middle school class, Grenoble, spring 2019
- Stall for *Remue méninge*, Echirolles, April 2019.
- Research activity with an elementary school class, Poisat, Spring 2018.
- Stall for *Remue méninge*, Echirolles, April 2018.
- Stall for the *fête de la science*, Saint Hilaire du Touvet, October 2017.

Involvements with the association *Animath*

- I am involved in the scientific program of a TV show on Télé Ecole (Senegal).
- "Sénémath" : coordination of several math clubs in Senegal, 2019-...
 - ★ Spring School for high school students, Dakar (Senegal), March 2019.
- Coordination of a math club in Kosovo, 2015-2016.
 - ★ Summer school for university students, Prishtina (Kosovo), July 2016.
 - ★ Winter school for university students, Prishtina (Kosovo), December 2015.
 - ★ Spring School for high school students, Prishtina (Kosovo), April 2015.
- Tutoring organized by Farouk Boucekkine, Lycée Henry IV, 2013.

Involvement in the *Salon de la culture et des jeux mathématiques*

- Stalls Math à modeler the 20th edition, May 2019.
- Stalls Math à modeler the 19th edition, May 2018.
- Stalls INSMI/IHP/CNRS and Science Ouverte at the 16th edition, May 2015.
- Stalls INSMI/IHP/CNRS and Science Ouverte at the 15th edition, May 2014.
- Stall INSMI/IHP/CNRS at the 13th edition, May 2012.

Involvement with the association *MATH.en.JEANS*

- Congrès Math.en.JEANS, Université Grenoble Alpes, 2019.
- Reviewer, since 2013.
- Congrès MATH.en.JEANS, Université Paris Sud 11, 2013.

Involvement at Kansas State University (2015-2017)

- Navajo Math Circles.
- *Math Club* of the Mathematics Department.
- *Thomas Parker Mathematical Competition* Committee member.
- *Math Modeling Seminar*.

Involvement with the association *Science Ouverte*

- Conference at the *Atlanta Science Festival*, Atlanta, March 2016.
- Université d'été *Science ouverte à Paris 13*, Université Paris 13, June 2015.
- Stall at the *forum des mathématiques vivantes*, 104 (Paris), March 2015
- Stage *Olympic' Maths*, IHP, February 2015.
- Stage *Aux frontières du chaos*, IHP, October 2014.
- Université d'été *Science ouverte à Paris 13*, Université Paris 13, June 2014.
- Stage *La mesure, en long en large et en travers!*, IHP, April 2014.
- Université d'été *Science ouverte à Paris 13*, Université Paris 13, June 2013.
- Tutoring, since 2012.

Involvement with the website *Images des Maths* (<http://images.math.cnrs.fr/>)

- Reviewer since a while.
- Article on Seifert surfaces and crochet : *Crochet, objets mathématiques et surfaces de Seifert*.

Involvement with some popular science events organized by people from Université Paris 13

- Exhibition *Les mathématiques dans la nature* organized by Gwenola Madec, several participations starting in 2013.
- Exhibition *Regard dans les Espaces* organized by Pierre Berger, 2013.

Talks at PhD seminars or student seminars

- talk at Prishtina University, 01/05/2015.
- PhD seminar LAGA, 05/05/2014.
- PhD seminar ENS Lyon, 17/03/2014.
- PhD seminar LAGA, 13/12/2013.
- PhD seminar LAGA, 18/01/2013.
- Student seminar ENS Cachan, 09/05/2012.

Others

- Co-author of the *calendrier mathématique 2023*.
- Prix de concours de création d'énigme (section curiosité) pour le numéro 200 de Tangente, 2021.
- Blog : <https://galoiseries.wordpress.com>.
- Khôlles (ECS1 and ECS2), lycée Chaptal (Paris), 2011 - 2012.
- Private lessons (CM2, 6^{ième}, 3^{ième}, seconde, 1^{ère}S, ECS1, ECS2, L1, L2 and L3).
- Tutoring in the first year of Licence PCST, Université Paris-Sud 11, 2010.

Languages

French.
English.
Spanish.
Gap, Maple, Mupad, Matlab, Scilab, R.

Other hobbies

Backpacker traveler (*more than 30 countries visited*).

Sports : handball, hiking, climbing.

Crochet : *mathematical objects (see picture on my webpage) and others.*

Music, guitar (*self-educated*).