

Cameron CALK

Current employment

Postdoctoral researcher : Laboratoire d'Informatique et Systèmes (UMR 7020)

Institution : Aix-Marseille Université

Project : ANR [DUCAT](#)

Previous employment and education

- 2022-2023 **Postdoctoral researcher**, *Université Aix-Marseille*, Laboratoire d'Informatique et des Systèmes (LIS) UMR 7020, Luminy, in the ANR [LambdaComb](#) project.
with Luigi Santocanale
- 2019-2022 **Doctorate**, *École Polytechnique*, Laboratoire d'Informatique de l'École Polytechnique (LIX) UMR 7161, Paris-Saclay, "*Homotopy of directed calculation*" with jury's felicitations.
Advisor : Eric Goubault, Co-advisor : Philippe Malbos.
- 2017-2018 **Master in advanced mathematics**, *ENS de Lyon & Université Claude Bernard Lyon 1*
Geometry specialization, Cum Laude.
- 2016-2017 **Master 1 in advanced mathematics**, *ENS de Lyon & Université Claude Bernard Lyon 1*, Cum Laude
- 2015-2016 **Bachelors in advanced mathematics**, *ENS de Lyon & Université Claude Bernard Lyon 1*
- 2015-2019 **Normalien**, *ENS de Lyon*
2015 **Second concours**, *ENS de Lyon*, Admitted, Ranked 2nd out of 12.
- 2013-2015 **Preparation for Magistère and Concours in Physics (PMCP)**, 1st and 2nd years of bachelors, Paris-Sud, Orsay
- 2011 **A-levels**, *Advanced mathematics, Mathematics, Philosophy and Physics*, Magdalen College School, Oxford, England
AA*AA
- 2010 **AS-level**, *Chemistry*, Magdalen College School, Oxford, Angleterre
A

Internships

- Feb - July 2019 **Research internship**, *Projet long de recherche (PLR)*, at Laboratoire d'informatique de l'École Polytechnique (LIX) UMR 7161, Paris Saclay, "*Homotopy of globular CW complexes and their realization as polygraphs*"
Supervisor : Eric Goubault.
- Sept. - Dec. 2018 **Research internship**, *PLR*, at l'Institut Camille Jordan (ICJ) UMR 5208, Lyon, "*Higher-dimensional rewriting and Kleene algebras*"
Supervisor : Philippe Malbos.
- March - July 2018 **Research internship**, *Master*, at Laboratoire d'informatique de l'École Polytechnique (LIX) UMR 7161, Paris Saclay, "*Directed homotopy and time-reversal*"
Supervisor : Eric Goubault

Mai - Juillet 2016 **Research internship**, Bachelor, at Laboratoire de l'Informatique du Parallelisme (LIP) UMR 5668, Lyon, "*The extension of Boolean logic to graphs*"
Supervisors : Olivier Laurent et Anumpam Das

Prizes

2022 **Best Thesis Prize**, of the departement Informatique, Data et Intelligence Artificielle (IDIA), at Institut Polytechnique de Paris (IPP), Runner-up

Publications

2022 ***Algebraic coherent confluence and higher-dimensional globular Kleene algebras***, with E. Goubault, P. Malbos and G. Struth, Logical Methods in Computer Science, [Volume 18, Issue 4](#)

2021 ***Abstract strategies and coherence***, with E. Goubault and P. Malbos, RAMICS 2021, LNCS proceedings, [Volume 13027](#)

2021 ***lr-Multisemigroups, modal quantales and the origin of locality***, with U. Fahrenberg, C. Johansen, G. Struth and K. Ziemanski, RAMICS 2021, LNCS proceedings, [Volume 13027](#)

2020 ***Time-reversal homotopical properties of concurrent systems***, with E. Goubault and P. Malbos, Homology, Homotopy and Applications, [Volume 22, Number 2](#)

Pre-publications

2023 ***Persistent homology of directed spaces***, with E. Goubault and P. Malbos, Submitted to the Journal of Applied and Computational Topology, [arXiv:2305.03357](#)

2023 ***Higher Catoids, Higher Quantales and their Correspondences***, with P. Malbos, D. Pous and G. Struth, Submitted to Logical Methods in Computer Science, [arXiv:2307.09253](#)

2020 ***Beyond formulas-as-cographs : an extension of Boolean logic to arbitrary graphs***, with A. Das and T. Waring, [arXiv:2004.12941](#)

Diffusion

14 Jan. ***Algebraic Rewriting Seminar***, Bi-weekly, Virtual, [Website](#)
2021- Co-organizer

Talks

25 Jan. ***From rewriting to quantales, and on to directed topology***, Séminaire PPS, 2024 IRIF, Université Paris Cité, Paris

23 Jan. ***Binomial lattice quotients and flat dihomotopy types***, LambdaComb Days, 2024 Université Paris Sorbonne, Paris

18 Jan. ***From rewriting to quantales, and on to directed topology***, Séminaire LoVe, 2024 LIPN, Université Paris-Nord, Villetaneuse

15 Dec. ***Lattices of paths and flat dihomotopy types***, Computational Logic and Applications, 2023 Jagiellonian University, Kraków

26 Nov. ***Coherence via rewriting in higher Kleene algebras***, Demi-journée du Pole Calcul, LIS, Université Aix-Marseille, Luminy

5 Dec. ***Coherence and strategic rewriting in higher Kleene algebras***, Séminaire LIRICA, LIS, Université Aix-Marseille, Luminy

25 Fev. ***Abstract strategies and coherence***, Logic in Higher Structures, Centre international de rencontres mathématiques (CIRM), Marseille

- 3 Nov. 2021 **Abstract strategies and coherence**, RAMICS '21, Centre international de rencontres mathématiques (CIRM), Marseille
- 18 Juin 2021 **Abstract strategies and coherence**, GT ALGA, Université de Bordeaux, Virtual
- 18 Fev. 2021 **Strategies and resolutions**, Algebraic Rewriting Seminar, Virtual
- 5 Fev. 2021 **Geometric realisation of constructible polygraphs**, Journées LHC (GDR CNRS), Virtual
- 14 Jan. 2021 **Abstract rewriting**, Algebraic Rewriting Seminar, Virtual
- 30 Juin 2020 **Coherent confluence in modal n -Kleene algebras**, International Workshop on Confluences 2020, Paris
- 8 Mai 2020 **Coherent confluence in modal n -Kleene algebras**, Séminaire Catégories à l'IRIF (Paris 7), Paris
- 18 Juin 2019 **Time-reversal homotopical properties in concurrency**, Topology, Algebra and Categories in Logic (TACL'19), Université de Nice
- 2 Fev. 2019 **Time-reversal homotopical properties of concurrent systems**, Algebra Seminar(NMSU), Las Cruces, N.M., U.S.A.
- 14 Dec. 2018 **L'homotopie dirigée et l'inversion temporelle**, Séminaire Catégories à l'IRIF (Paris 7), Paris
- 18 Oct. 2018 **Time-reversal homotopical properties of concurrent systems**, Journées inaugurales LHC (GDR CNRS), Marseille

Participation in conferences, schools and workshops

- 22-24 Jan. 2024 **LambdaComb days**, Jussieu, Sorbonne Université, Paris
Speaker
- 14-15 Dec. 2023 **17th Computational Logic and Applications**, Jagiellonian University, Cracovie
Speaker
- 21-25 Fev. 2022 **Logic in Higher Structures**, Centre international de rencontres mathématiques (CIRM), Marseille
Speaker
- 2-5 Nov. 2021 **RAMICS '21**, Centre international de rencontres mathématiques (CIRM), Marseille
Speaker
- 16-18 Juin 2021 **GT ALGA**, Université de Bordeaux, Virtual
Speaker
- 5 Fev. 2021 **Journées LHC 2021**, Virtual
Speaker
- 30 Juin 2020 **International Workshop on Confluence**, Paris, Virtual
Speaker
- 12-16 Avril 2020 **Midlands Graduate School in the Foundations of Computing Science (MGS)**, University of Sheffield, Virtual
Participant
- 17 - 21 Juin 2019 **Topology, Algebra, and Categories in Logic (TACL)**, Université de Nice, Nice
Speaker
- 10 - 15 Juin 2019 **TACL summer school**, Ile de Porquerolles
Participant
- 17- 19 Oct. 2018 **Journées inaugurales LHC**, (GDR CNRS), Marseille
Speaker

- 8 - 19 Jan. **Advanced school and workshop "Entropies and Soficity"**, *dans le cadre du M2*,
2017 Université Claude Bernard Lyon 1, Lyon
Participant
- 4 - 10 Juillet **Logic in Computer Science (LICS)**, *Columbia University*, New York City
2016 Student volunteer

Teaching

- 2021-2022 **CSE305 : Concurrent and Distributed Computing**, *Acitivité complémentaire d'enseignement (ACE)*, 12h, Bachelor program of École Polytechnique
- 2021-2022 **Chargé de TD INF361 : Introduction à Java**, *ACE*, 20h, École Polytechnique
- 2019-2022 **Chargé de TD MAA306 : Topics in Differential Geometry**, *ACE*, 54h, Bachelor program of École Polytechnique
- 2020 **Chargé de TD MAA206 : Quadratic Forms and Applications**, *ACE*, 16h, Bachelor program of École Polytechnique
- 2019-2021 **Chargé de TD CSE103 : Introduction to Algorithms**, *dans le cadre du ACE*, 64h, Bachelor program of École Polytechnique
- 2019-2021 **Tutorat MAT361**, *dans le cadre du ACE*, 8h, École Polytechnique
- 2017 **Observation and teaching**, *M1 internship*, 32h, Lycée Branly

Languages

- English**, *Mother tongue*
- Danish**, *Mother tongue*
- French**, *Fluent*