Guillaume Brunerie

(last updated in October 2020)

(Academic) Curriculum Vitae

Personal info

Birth	13th December 1989, in Montpellier (France)
Citizenship	French
Email	`guillaume.brunerie@gmail.com`
Website	`https://guillaumebrunerie.github.io`
Languages	French (native), English (fluent), Swedish (advanced), Russian (intermediate), Portuguese, Polish, Finnish (beginner)

Education/Employment

2018–2020	**Postdoctoral researcher**, *Stockholm University*, Stockholm, Sweden.
2016–2018	**Postdoctoral member**, *Institute for Advanced Study*, Princeton, New Jersey, USA.
2013–2016	**PhD student**, *Université de Nice Sophia Antipolis*, Nice, France.
2012–2013	**Visiting student**, *Institute for Advanced Study*, Princeton, New Jersey, USA.
2009–2013	**Élève normalien**, *École Normale Supérieure de la rue d'Ulm*, Paris, France.
2007–2009	**Classes préparatoires MPSI/MP***, *Lycée Louis-le-Grand*, Paris, France.

Degrees

2016	PhD in mathematics at the university of Nice Sophia Antipolis
2012	Master 2 in mathematics at the ENS and Paris 7
2011	Master 1 in mathematics at the ENS
2010	Licence 3 in mathematics at the ENS

PhD Thesis

Title	*On the homotopy groups of spheres in homotopy type theory*
Institution	Université de Nice Sophia Antipolis, Laboratoire J.A. Dieudonné (mathematics)
Advisor	Carlos Simpson
Defense date	June 15th 2016

Other awards

2007 *Concours général des lycées*: First prize in mathematics and *mention* (regional award) in physics

2007 International Mathematics Olympiads: Member of the French delegation and recipient of a bronze medal (Hanoi, Vietnam)

Teaching experience

Spring 2020 Co-supervisor for two master theses in mathematical logic at Stockholm University

Fall 2019 Teacher for the advanced level course *Type theory* at Stockholm University (total 30 hours)

Spring 2019 Teacher for the bachelor-level course *Mathematics III – Logic* (second instance) at Stockholm University (total 30 hours)

Spring 2019 Teaching assistant for the bachelor-level course *Mathematics III – Logic* (first instance) at Stockholm University (total 15 hours)

Jun. 2017 Teaching assistant at a Mathematical Research Community (MRC) organized by the American Mathematical Society (AMS) in Snowbird, Utah (one week)

May 2015 Mini-course on homotopy type theory for PhD students in the PhD colloquium *Inter'Actions 2015*, Grenoble, France (7 hours)

2013–2016 Exercise sessions in linear algebra, discrete mathematics and calculus, and oral interrogations in linear algebra, for students in first year of university, Nice, France (total 192 hours)

Refereeing

2018–2020 Referee for two bachelor theses and two master theses, at Stockholm University

2013–2020 Referee for more than ten articles, in various journals and peer-reviewed conferences

Publications

2018 **The James construction and $\pi_4(\mathbb{S}^3)$ in homotopy type theory**, Guillaume Brunerie, *Journal of Automated Reasoning, Special Issue on Homotopy Type Theory and Univalent Foundations, Springer, doi:10.1007/s10817-018-9468-2*

2015 **A Cubical Approach to Synthetic Homotopy Theory**, Dan Licata and Guillaume Brunerie, *2015 30th Annual ACM/IEEE Symposium on Logic in Computer Science (LICS 2015), pages 92–103, IEEE, doi:10.1109/LICS.2015.19*

2013 **$\pi_n(\mathbf{S}^n)$ in Homotopy Type Theory**, Dan Licata and Guillaume Brunerie, *Certified Programs and Proofs (CPP 2013), volume 8307 of Lecture Notes in Computer Science (LNCS), pages 1–16, Springer, doi:10.1007/978-3-319-03545-1*

Preprints and other writings of interest

2017 **Cartesian Cubical Type Theory**, Carlo Angiuli, Guillaume Brunerie, Thierry Coquand, Kuen-Bang Hou (Favonia), Robert Harper, Daniel R. Licata, preprint

2013 **Homotopy Type Theory: Univalent Foundations of Mathematics**, The Univalent Foundations Program (collective book), Institute for Advanced Study, 2013, `http://homotopytypetheory.org/book/`

Invited talks at conferences

Aug. 2019 **Formalization in Agda**, *Homotopy Type Theory 2019 Summer School (minicourse, 4h)*, Carnegie Mellon University, Pittsburgh, Pennsylvania.

Jun. 2019 **La notion d'égalité en théorie des types homotopiques**, *École thématique du CNRS "Philosophie et mathématiques contemporaines"*, Paris, France.

Jan. 2018 **Experiments in cubical type theory**, *Joint Mathematics Meetings, AMS Special Session on Homotopy Type Theory (a Mathematics Research Communities Session)*, San Diego, California.

Jul. 2016 **Custom definitional equalities in Agda**, *International Congress on Mathematical Software 2016, Session on Univalent Foundations and Proof Assistants*, Berlin, Germany.

May 2016 **The fourth homotopy group of the three-dimensional sphere**, *Workshop on Homotopy Type Theory and Univalent Foundations of Mathematics*, Fields Institute, Toronto, Ontario, Canada.

May 2015 **Théorie des types dépendants et axiome d'univalence**, *Colloque Inter'Actions 2015*, Grenoble, France.
(minicourse of 7h)

Nov. 2014 **The fourth homotopy group of the three-sphere**, *Homotopy Type Theory Workshop*, University of Oxford, United Kingdom.

Sep. 2014 **Homotopy type theory**, *Conference on Homotopical Algebra, Operads and Grothendieck-Teichmüller groups*, Université de Nice Sophia Antipolis, Nice, France.

May 2014 **Cubical homotopy type theory**, *Formalization of mathematics in proof assistant*, Institut Henri Poincaré, Paris, France.

Jan. 2014 **Cubical homotopy type theory**, *Recent developments in Type Theory*, Lyon, France.

Jan. 2014 **Homotopy Type Theory**, *Journées francophones des languages applicatifs*, Fréjus, France.

Sep. 2013 **The Hopf Fibration**, *Conference on Type Theory, Homotopy Theory and Univalent Foundations*, Barcelona, Spain.

Jun. 2013 **An elementary definition of weak ∞-groupoids**, *Canadian Mathematical Society (CMS) Summer Meeting*, Halifax, Nova-Scotia, Canada.

May 2013 **A type-theoretic definition of weak ∞-groupoids**, *North American Annual Meeting of the Association for Symbolic Logic*, Waterloo, Ontario, Canada.

Contributed talks at conferences

Aug. 2019 **Computations in homotopy type theory**, *Mathematical Logic and Constructivity*, Stockholm, Sweden.

Aug. 2019 **A formalization of the initiality conjecture in Agda**, *Homotopy Type Theory 2019 Conference*, Carnegie Mellon University, Pittsburgh, Pennsylvania.

Jun. 2017 **The Steenrod squares in homotopy type theory**, *International Conference on Types for Proofs and Programs (TYPES 2017)*, Budapest, Hungary.

Jul. 2015 **A Cubical Approach to Synthetic Homotopy Theory**, *Annual ACM/IEEE Symposium on Logic in Computer Science (LICS 2015)*, Kyoto, Japan.

Talks at seminars and working groups

Sep. 2020 **Initiality for Martin-Löf type theory**, *HoTT Electronic Seminar Talks*.
(together with Peter Lumsdaine)

Mar. 2020 **A general class of dependent type theories**, *Mathematics and theoretical computing seminar*, Ljubljana, Slovenia.

Jun. 2019 $\pi_4(\mathbb{S}^3)$ **in homotopy type theory (part II)**, *Stockholm Logic Seminar*, Sweden.

May 2019 $\pi_4(\mathbb{S}^3)$ **in homotopy type theory (part I)**, *Stockholm Logic Seminar*, Sweden.

Dec. 2018 **An Agda formalization of the initiality conjecture**, *Stockholm–Göteborg type theory seminar*, Göteborg, Sweden.

Nov. 2018 **Computer-generated proofs for the monoidal structure of the smash product**, *HoTT Electronic Seminar Talks*.

Sep. 2018 **A proposal for the initiality conjecture**, *Stockholm Logic Seminar*, Sweden.

Aug. 2018 **Cubical type theory for beginners**, *Dagstuhl Seminar on Formalization of Mathematics in Type Theory*, Dagstuhl, Germany.

Mar. 2018 **Démonstrations générée par ordinateur pour le produit smash**, *Journées PIR2*, INRIA Team PIR2, Fontainebleau, France.

Mar. 2018 **Computer-generated proofs for the smash product**, *MURI Team Meeting*, Carnegie Mellon University, Pittsburgh, Pennsylvania.

Mar. 2018 **Synthetic homotopy theory: Going beyond set-level mathematics**, *Mathematical Conversations*, Institute for Advanced Study, Princeton, New Jersey.

Mar. 2018 **Introduction to synthetic homotopy theory**, *Algebraic topology seminar*, Princeton University, Princeton, New Jersey.

Nov. 2017 **The Steenrod squares in homotopy type theory**, *Topology Seminar*, Western University of Ontario, London, Ontario, Canada.

Sep. 2017 **Homotopy type theory: working invariantly in homotopy theory**, *Short talks by postdoctoral members*, School of Mathematics, IAS, Princeton, New Jersey.

Mar. 2017 **The Steenrod squares in homotopy type theory**, *MURI Team Meeting*, Carnegie Mellon University, Pittsburgh, Pennsylvania.

Mar. 2017 **Invariant homotopy theory in homotopy type theory**, *Topology seminar*, University of Illinois Urbana-Champaign, Urbana, Illinois.

Sep. 2016 **Invariant homotopy theory in the univalent foundations**, *Short talks by postdoctoral members*, School of Mathematics, IAS, Princeton, New Jersey.

Jun. 2016 **Examples of closed natural numbers in homotopy type theory**, *Séminaire Chocola*, Lyon, France.

Dec. 2014 **Théorie des types cubiques**, *Séminaire Logique et Interactions*, Université d'Aix-Marseille, Marseille, France.

Oct. 2014 **Cubical homotopy type theory**, *Agda Implementors' Meeting XX*, Tallinn, Estonia.

Dec. 2013 **Introduction à la théorie des types homotopiques**, *Groupe de travail Algèbre supérieure*, Université de Nice Sophia Antipolis, Nice, France.
(series of 3 talks)

Oct. 2013 **A type-theoretic definition of weak infinity-groupoids**, *Stockholm Logic Seminar*, Sweden.

Oct. 2013 **Homotopy type theory and homotopy groups of spheres**, *Séminaire Chocola*, Lyon, France.

Sep. 2013 **What is missing for Agda to be suitable for Univalent Foundations?**, *Agda Implementors' Meeting XVIII*, Gothenburg, Sweden.

Apr. 2013 **Homotopy Theory in Type Theory**, *Seminar of the Institute for Advanced Study*, Princeton, New Jersey.
(together with Dan Licata and Peter Lumsdaine)

Mar. 2013 **The James construction and** $\pi_4(\mathbb{S}^3)$, *Seminar of the IAS special year*, Princeton, New Jersey.

Feb. 2013 $\pi_2(\mathbb{S}^2)$ **in HoTT**, *Seminar of the IAS special year*, Princeton, New Jersey.

Jan. 2013 **Weak infinity-groupoids**, *Seminar of the IAS special year*, Princeton, New Jersey.
(series of 2 talks)

Nov. 2012 $\pi_k(\mathbb{S}^n)$ **for** $k < n$, *Seminar of the IAS special year*, Princeton, New Jersey.

Oct. 2012 **Higher inductive types**, *Tutorial of the IAS special year*, Princeton, New Jersey.

May 2012 **Théorie des types homotopiques, fondations univalentes et types inductifs supérieurs**, *Mini-cours de l'équipe Analyse Algébrique de l'Institut de Mathématiques de Jussieu*, Paris, France.
(series of 2 talks)

Apr. 2012 **Introduction à la théorie des types homotopiques, fondations univalentes des mathématiques**, *Groupe de travail « Algèbre et topologie homotopiques »*, Université Paris 7, France.
(series of 2 talks)

Jan. 2012 **Théorie des types homotopiques**, *Groupe de travail d'élèves de logique de l'ENS*, Paris, France.
(series of 2 talks)

Oct. 2011 **Introduction à la théorie des types homotopiques**, *Groupe de travail « Catégories supérieures, polygraphes et homotopie »*, Laboratoire PPS, Paris, France.
(series of 3 talks)

Feb. 2009 **Le théorème de complétude de Gödel**, *Séminaire de mathématiques des élèves du lycée Louis le Grand*, Paris, France.