

# Kathryn Hess Bellwald

## Curriculum Vitae

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## Education

- 1989 **PhD in mathematics**, *Massachusetts Institute of Technology*.
- 1985 **BSc with honors in mathematics**, *The University of Wisconsin-Madison*.

## Research interests

- Homotopy theory, category theory
- Applications of algebraic topology in the life sciences (in particular in neuroscience and cancer biology) and in chemical engineering.

## Academic positions held

- 2015–present **Associate professor**, *EPFL*.
- 2014 **Research professor in the algebraic topology program (one semester)**, *Mathematical Sciences Research Institute*.
- 1999–2014 **Adjunct professor**, *EPFL*.
- 1999–2000 **Visiting professor**, *University of Stockholm*, fellowship from the Swedish NSF.
- 1998–1999 **Scientific collaborator**, *EPFL*.
- 1994 **Visiting researcher (one month)**, *Université de Louvain-la-Neuve*.
- 1993 **Visiting researcher (one month)**, *Mittag-Leffler Institute*.
- 1993–1999 **Lecturer (Chargée de cours)**, *EPFL*.
- 1992–1998 **First assistant (position “relève académique”)**, *EPFL*.
- 1991–1992 **Assistant**, *EPFL*.
- 1991 **Visiting professor (one semester)**, *University of Toronto*.
- 1990 **Visiting researcher (one semester)**, *University of Nice*.
- 1989–1990 **Visiting researcher (one year)**, *University of Stockholm*, fellowship from the Swedish NSF.
- 1989, 1992 **Visiting researcher (one month)**, *University of Lille*.
- 1985–1989 **Teaching and research assistant**, *MIT*.

## Honors and awards

- 2018 Best teacher in the Faculty of Life Sciences
- 2017 Distinguished Speaker of the European Mathematical Society
- 2017 Fellow of the American Mathematical Society
- 2016 Individual member of the Swiss Academy of Engineering Sciences
- 2013 “Polysphère d’Or” (Agépoly prize for best teacher at the EPFL)
- 2012 Crédit Suisse prize for best EPFL teacher
- 2005 Agépoly prize for best teacher in the Faculty of Basic Sciences

## Research grants (since 2014)

- 2018 Co-PI on Innosuisse grant "Topological warning signals for critical system transitions" (500 KCHF over 18 months)
- 2018 PI on SNF-ANR grant "Operads, calculus, and homotopy theory methods in topology" (331 KCHF over four years)
- 2017 Co-PI on SNF Sinergia grant "Synergistic Approach to Capturing and Exploiting Microscopy Images" (2.1 MCHF over four years)
- 2017 PI on SNF grant "Signal processing on simplicial complexes" (488 KCHF over four years)
- 2016 Co-PI on INCITE grant "Biophysical principles of functional synaptic plasticity in the neocortex" (100 M core computing hours at Argonne National Labs for 2017, renewed for 2018)
- 2014 PI on SNF grant "Studies in algebraic homotopy theory" (290 KCHF over two and a half years)

## Conference and seminar presentations (since 2015)

### 2019

Colloquium, University of Warwick, UK  
Lecture series, Introductory workshop on derived algebraic geometry, MSRI, USA  
Colloquium, University of California-Merced, USA  
Colloquium, University of Cardiff, UK  
Colloquium, Paris XIII, France  
Colloquium, Ohio State University, USA  
Invited lecture, British Mathematics Colloquium, Lancaster, UK  
Symposium speaker, 2019 Congress of the Schizophrenia International Research Society, Orlando, USA  
Invited lecture, Combinatorial/Algebraic Topological Approaches to Nonlinear and Data Driven Dynamics, CRM, Montreal, Canada  
Colloquium, Zurich Colloquium in Mathematics, Switzerland  
Invited lecture, NeuroLeman Meeting, Les Diablerets, Switzerland  
Distinguished lecture seminar, Padova Neuroscience Center, Padova, Italy  
Invited lecture, Young Scientists Symposium, IST Vienna, Austria  
Plenary lecture, SIAM Conference on Applied Algebraic Geometry, Bern, Switzerland  
Invited lecture, Equivariant Topology and Derived Algebra, Trondheim, Norway  
Plenary lecture, Women in Geometry and Topology, CRM, Barcelona, Spain

### 2018

Colloquium, IST Vienna, Austria  
Invited lecture, Rational Homotopy Theory and its Applications, Lille, France  
Colloquium, University of Minnesota, USA  
Colloquium, Vanderbilt University, USA  
Invited lecture, Linking Topology to Algebraic Geometry and Statistics, Max Planck Institute, Leipzig, Germany  
Colloquium, UA Barcelona, Barcelona, Spain  
Lecture series, Topology in Korea and Australia, Pohang, South Korea  
Invited lecture, Applied Category Theory, Leiden, The Netherlands  
Invited lecture, Abel Symposium, Geiranger, Norway  
Invited lecture, BMI Research Symposium on Neural Circuits, EPFL, Switzerland  
Invited lecture, Higher structures in homotopy theory, Newton Institute, Cambridge, England  
Invited lecture, Conference in honor of Ieke Moerdijk, Utrecht, Netherlands  
Invited lecture, Kick-off meeting of the Centre for Topological Data Analysis, Swansea, Wales  
Invited lecture, Inauguration of the Centre for Geometry, Topology, and Applications, Southampton,

England

Invited lecture, Shape and structure of materials (Hot topics symposium), MSRI, USA

Seminar talk, Newton Institute, Cambridge, UK

Data Science Seminar, University of Oxford, UK

Colloquium, Instituto de Ciencias Matemáticas and UA, Madrid, Spain

## 2017

SYM lecture, Centre for Symmetry and Deformation, University of Copenhagen, Denmark

Seminar, University of Stockholm, Sweden

Invited lecture, Young Researchers in Homotopy Theory and Categorical Structures Workshop, Max Planck Institute, Bonn, Germany

Invited lecture, Conference on Algebro-Geometric and Homotopical Methods, Mittag-Leffler Institute, Stockholm, Sweden

Invited lecture, Summer School on Higher Invariants and Duality in Derived Algebraic Geometry and Homotopy Theory, Regensburg, Germany

Invited lecture, NRW Topology Meeting, Wuppertal, Germany

Colloquium, University of Nantes, France

Invited lecture, Cornell Topology Festival, Cornell University, USA

Minicourse, Axe interdisciplinaire de recherche en neurosciences, University of Nice, France

Plenary lecture, Meeting of the Catalan, Spanish, and Swedish Mathematical Societies, Umeå, Sweden

Invited lecture, Applied Topology in Będlewo, Będlewo, Poland

Invited lecture, Conference on Homotopy Theory: Tools and Applications, University of Illinois, USA

Invited lecture, Conference on Algebraic Topology and Noncommutative Geometry, Galapagos Science Center, San Cristobal, Ecuador

Colloquium and seminar, University of Amiens, France

Invited lecture, Challenges of Science and Technology in the 20th Century, Tel Aviv University, Israel

Seminar, University of Chicago, USA

Colloquium and seminar, University of Colorado, USA

Colloquium, University of Oregon, USA

Seminar, Stanford University, USA

## 2016

Invited lecture, Workshop on Algebraic and Topological Methods for Biological Networks, Warren Center, University of Pennsylvania, USA

Online seminar, Applied Algebraic Topology Research Network

Mini-course lecturer, Conference on Triangulated Categories in Algebra, Geometry, and Topology, Stuttgart, Germany

Colloquium, Mathematics in Science and Society, University of Illinois, USA

Topology seminar, University of Illinois-Urbana, USA

Invited lecture, Minisymposium on Applied and Computational Topology, British Applied Mathematics

Colloquium, Oxford, England

Topology seminar, University of Paris-Nord, France

Keynote speaker, Cascade Topology Seminar, Banff, Canada

Topology seminar, University of Regensburg, Germany

Colloquium, University of Osnabrück, Germany

Keynote speaker, Conference on Algebraic Topology: Computation, Methods, and Science, Turin, Italy

Invited lecture, Workshop on Applications and Statistics of Multidimensional Persistence, EPFL, Switzerland

Invited lecture, Annual meeting of the GDR "Topologie algébrique et applications," Amiens, France

Invited lecture, Conference in honor of Nils Baas's 70<sup>th</sup> birthday, NTNU, Trondheim, Norway

## 2015

Invited lecture, AWM workshop in homotopy theory at the Joint Mathematics Meetings, USA

Plenary lecture, 13th Graduate Student Topology Geometry Conference, University of Illinois-Urbana, USA

Plenary lecturer and mentor, The 2015 MIT Talbot Workshop, USA

5<sup>th</sup> Annual Meeting of the NCCR Synapsy, Switzerland

Invited lecture, Minisymposium on Algebraic Topology in Neuroscience, SIAM Conference on Applications of Dynamical Systems, USA

Invited lecture, Lehigh University Geometry and Topology Conference, USA

CNP Seminar, Centre de neurosciences psychiatriques, CHUV, Switzerland

Plenary lecture, 17th general meeting of the association of European Women in Mathematics, Italy

Invited lecture, Clay research workshop on algebraic topology, Oxford, England

Topology seminar, University of Stockholm, Sweden

Colloquium, Stockholms Matematikcentrum, Sweden

Symposium on data science and neuroscience, HKUST, Hong Kong

## Longterm research visits

### 2019

MSRI (one-month research membership)

### 2018

Newton Institute (one month visitor)

### 2015

Stockholm University (two weeks)

### 2014

MSRI (three-month research professorship)

### 2013

Newton Institute (three week visitor)

### 2012

University of Chicago (three weeks)

## Published articles and preprints

1. K. Hess, *A proof of Ganea's conjecture for rational spaces*, *Topology* **30** (1991), 205-214.
2. K. Hess, *Twisted tensor products of DGA's and the Adams-Hilton model for the total space of a fibration*, *London Mathematical Society Lecture Notes* **175** (1992) 29-51.
3. K. Hess, *Mild and tame homotopy theory*, *J. Pure and Applied Algebra* **84** (1993) 277-310.
4. K. Hess and J.-M. Lemaire, *Generalizing LS-category to model categories*, *J. Pure and Applied Algebra* **91** (1994) 165-182.
5. N. Dupont and K. Hess, *Twisted tensor models of fibrations*, *J. Pure and Applied Algebra* **91** (1994) 109-120.
6. K. Hess and J.-M. Lemaire, *Nice and lazy cell attachments*, *J. Pure and Applied Algebra* **112** (1996) 29-39.
7. K. Hess, *Perturbation and transfer of generic algebraic structure*, *Contemporary Math.* **227** (1999) 103-144.
8. K. Hess, *A history of rational homotopy theory*, *History of Topology*, ed. I.M. James, Elsevier Science B.V., 1999, pp. 757-796.
9. N. Dupont and K. Hess, *Noncommutative algebraic models for fiber squares*, *Math. Annalen* **314** (1999) 449-467.
10. N. Dupont and K. Hess, *How to model the free loop space algebraically*, *Math. Annalen* **314** (1999), 469-490.
11. N. Dupont and K. Hess, *Hochschild cohomology is topological*, *J. Pure and Applied Algebra* **165** (2001) 1-6.
12. K. Hess, *Model categories in algebraic topology*, *Applied Categorical Structures* **10** (2002) 195-220.
13. N. Dupont and K. Hess, *An algebraic model for homotopy fibers*, *Homology Homotopy Appl.* **4** (2002) 117-139.

14. K. Hess and P.-E. Parent, *Emergence of the Witt group in the cellular lattice of rational spaces*, Trans. Amer. Math. Soc. **354** (2002) 4571-4583.
15. K. Hess, *Review of "Rational Homotopy Theory" by Felix, Halperin and Thomas*, Bull. of the London Math. Soc. **34** (2002) 624-626.
16. N. Dupont and K. Hess, *Commutative free loop space models at large primes*, Math. Z. **244** (2003) 1-34.
17. G. Adagio (S. Blanc, R. Guerraoui, K. Hess, P. Kouznetsov, P.-E. Parent, B. Pochon and O. Sauvageot), *Using the topological characterization of synchronous models*, Electronic Notes in Theoretical Computer Science **81** (2003) 12 p.
18. K. Hess, P.-E. Parent, A. Tonks and K. Worytkiewicz, *Simulations as homotopies*, Electronic Notes in Theoretical Computer Science **100** (2004) 65-93.
19. K. Hess, P.-E. Parent, J. Scott, A. Tonks, *A canonical enriched Adams-Hilton model for simplicial sets*, Adv. in Math. **207** (2006), 847-875.
20. K. Hess, *An algebraic model for mod 2 topological cyclic homology*, in *String Topology and Cyclic Homology*, Advanced Courses in Mathematics CRM Barcelona, Birkhäuser, 2006, pp. 97-163.
21. K. Hess, P.-E. Parent, A. Tonks and K. Worytkiewicz, *A model structure la Thomason on 2-CAT*, J. Pure and Applied Algebra **208** (2007) 205-236.
22. K. Hess, P.-E. Parent and J. Scott, *A chain coalgebra model for the James map*, Homology Homotopy Appl. **9** (2007) 209-231.
23. K. Hess, *Rational homotopy theory: a brief introduction*, Contemporary Math. **436** (2007) 175-202
24. K. Hess, R. Levi, *An algebraic model for the loop space homology of a homotopy fiber*, Alg. Geom. Top. **7** (2007) 1699-1765.
25. K. Hess, P.-E. Parent and J. Scott, *CoHochschild homology of chain coalgebras*, J. Pure Applied Algebra **213** (2009) 536-556.
26. K. Hess, *Homotopic Hopf-Galois extensions: Foundations and examples*, Geometry and Topology Monographs **16** (2009) 79-132.
27. K. Hess and A. Tonks, *The loop group and the cobar construction*, Proc. Amer. Math. Soc. **138** (2010) 1861-1876.
28. E. D. Farjoun and K. Hess, *Normal and conormal maps in homotopy theory*, Homology Homotopy Appl. **14** (2012) 79-112.
29. K. Hess, *Multiplicative structure in equivariant cohomology*, J. Pure Applied Algebra **216** (2012) 1680-1699.
30. W. Dwyer and K. Hess, *Long knots and maps between operads*, Geometry and Topology **16** (2012) 919-955.
31. J.P.C. Greenlees, K. Hess and S. Shamir, *Complete intersections in rational homotopy theory*, J. Pure Applied Algebra **217** (2013) 636-663.
32. J. E. Harper and K. Hess, *Homotopy completion and topological Quillen homology of structured ring spectra*, Geometry and Topology **17** (2013) 1325-1416.
33. K. Hess and B. Shipley, *The homotopy theory of coalgebras over a comonad*, Proc. London Math. Soc. **108** (2014) 484-516.
34. W. Dwyer and K. Hess, *The Boardman-Vogt tensor product of operadic bimodules*, Contemporary Mathematics **620** (2014) 71-98.
35. M. Bayeh, K. Hess, V. Karpova, M. Kedziorek, E. Riehl and B. Shipley, *Left-induced model category structures and diagram categories*, Contemporary Mathematics **641** (2015) 49-81.
36. C. Brisken, K. Hess, and R. Jeitziner, *Progesterone and overlooked endocrine pathways in breast cancer pathogenesis*, Endocrinology **156** (2015) 3442-3450.
37. K. Hess, *The Hochschild complex of a twisting cochain*, J. Algebra **451** (2016) 302-356.
38. K. Hess and B. Shipley, *Waldhausen K-theory of spaces via comodules*, Adv. in Math. **290** (2016) 1079-1137.
39. K. Hess, M. Kedziorek, E. Riehl, and B. Shipley, *A necessary and sufficient condition for induced model structure*, J. Topology **10** (2017) 324-369.
40. Y. Lee, S. Barthel, S. Mohammad Moosavi, P. Dłotko, K. Hess, and B. Smit, *Quantifying similarity of*

*pore-geometry in nanoporous materials*, Nature Communications, 2017, DOI: 10.1038/ncomms15396.

41. M. W. Reimann, M. Nolte, M. Scolamiero, K. Turner, R. Perin, G. Chindemi, P. Dłotko, R. Levi, K. Hess, and H. Markram, *Cliques of neurons bound into cavities provide a missing link between structure and function*, Front. Comput. Neurosci., 12 June 2017, DOI: 10.3389/fncom.2017.00048.
42. L. Kanari, P. Dłotko, M. Scolamiero, R. Levi, J. C. Shillcock, K. Hess, and H. Markram, *A topological representation of branching morphologies*, Neuroinformatics, 2017, DOI: 10.1007/s12021-017-9341-1.
43. A. Beaudry, K. Hess, M. Kędziorek, M. Merling, and V. Stojanoska, *Motivic homotopical Galois extensions*, Topology and its Applications (Virtual Special Issue  $\checkmark$  Women in Topology II: Further collaborations in homotopy theory), **235** (2018) 290-338.
44. A. Berglund and K. Hess, *Homotopic Hopf-Galois extensions revisited*, Journal of Noncommutative Geometry **12** (2018) 107-155.
45. Y. Lee, S. Barthel, P. Dłotko, S. Mohammad Moosavi, K. Hess, and B. Smit, *High-throughput screening approach for nanoporous materials genome using topological data analysis: application to zeolites*, J. Chem. Theory Comput. **14**, 8, 4427-4437.
46. A. Berglund and K. Hess, *Homotopical Morita theory for corings*, Israel Journal of Mathematics **227** (2018) 239-287.
47. W. Dwyer, K. Hess, and B. Knudsen, *Configuration spaces of products*, arXiv:1710.05093, to appear in the Transactions of the AMS, 20 pages.
48. K. Hess and M. Kędziorek, *The homotopy theory of coalgebras over simplicial comonads*, arXiv:1707.07104, to appear in Homology, Homotopy, and Applications, 23 pages.
49. J.-B. Bardin, G. Spremann, K. Hess, *Topological exploration of artificial neuronal network dynamics*, arXiv:1810.01747, to appear in Network Neuroscience.
50. L. Kanari, S. Ramaswamy, Y. Shi, S. Morand, J. Meystre, R. Perin, M. Abdellah, Y. Wang, K. Hess, and H. Markram, *Objective classification of neocortical pyramidal cells*, available on bioRxiv, to appear in Cerebral Cortex.
51. K. Hess, *Topological adventures in neuroscience*, to appear in the Proceedings of the 2018 Abel Symposium, 20 pages.
52. R. Jeitziner, M. Carrière, J. Rougemont, S. Oudot, K. Hess, and C. Briskin, *Two-Tier Mapper, an unbiased topology-based clustering method for enhanced global gene expression analysis*, to appear in Bioinformatics.
53. K. Hess, P.-E. Parent, and J. Scott, *Twisting structures and morphisms up to strong homotopy*, submitted, 30 pages.
54. P. Sandoz, R. Denhardt-Eriksson, L. Abrami, G. Spremann, C. Maclachlan, B. Kunz, K. Hess, G. Knott, V. Hatzimanikatis, G. van der Goot, and S. Ho, *ZDHHC6-mediated palmitoylation tunes ER architecture*, available on bioRxiv, submitted.
55. K. Hess and B. Knudsen, *A Kunnet theorem for configuration spaces*, arXiv:1810.02249, submitted.
56. A. Doerig, A. Schurger, K. Hess, and M. H. Herzog, *The unfolding argument: why IIT and other causal structure theories of consciousness are empirically untestable*, submitted.
57. K. Hess and B. Shipley, *Invariance properties of coHochschild homology*. arXiv:1811.06508, submitted.
58. K. Hess, *A general framework for homotopic descent and codescent*, arXiv:1001.1556v3, 68 pages.

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## Teaching and supervision

### Courses taught

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|----------------------|--|
| 1 <sup>st</sup> year | Linear algebra (for engineers and for mathematicians and physicists)   |
| 2 <sup>nd</sup> year | Analysis (University of Toronto), general topology, abstract algebra   |
| Upper level          | Knot theory, Lie algebras, algebraic topology, homological algebra, algebraic K-theory   |
| Doctoral             | Game theory, symmetric spectra, homotopy theory (University of Stockholm), cyclic homology, homotopical algebra, topological data analysis, various working groups in algebraic topology |

## Projects supervised

- Over 70 semester projects at the EPFL personally directed since 1991, on topics including homotopy theory, knot theory, topological groups, homological algebra, Galois theory, category theory, K-theory, the Atiyah-Singer index theorem, mathematical physics,  $C^*$ -algebras, algebraic genetics and topological data analysis.
- Over 40 masters or diploma projects at the EPFL personally directed since 1993, on topics including category theory, homological algebra, homotopy theory, K-theory, knot theory (including applications to polymer science and dynamical systems), algebraic geometry, cryptography, mathematical physics (quantum gauge theory, quantum gravity, topological insulators), topological data analysis, triangulated categories.

## Doctoral students

- Adélie Garin, "Topological image processing," started Fall 2018
- Celia Hacker, "Topological biomarkers for psychiatric disease", started Fall 2018
- Stefania Ebli, "Signal processing on simplicial complexes," started Fall 2017
- Aras Ergus, "New directions in topological Hochschild homology", started Fall 2017
- Haoqing Wu, "Decomposing the homotopy theory of coactions", started Fall 2017
- Rachel Jeitziner, "Development of topological tools for the analysis of biological data," joint supervision with Cathrin Briskin (EPFL-SV), thesis defended July 2018
- Sophie Raynor, "Compact symmetric multicategories and the problem of loops," joint supervision with Ran Levi (Aberdeen), sponsored by the Blue Brain lab, thesis defended January 2018 (soon to start a postdoc at Macquarie University)
- Dimitri Zaganidis, "The  $(\infty, 2)$ -category of homotopy coherent monads in an  $\infty$ -cosmos," sponsored by FN grant 200020-144399, thesis defended May 2017 (currently postdoc at Blue Brain)
- Martina Rovelli, "Towards new invariants for principal bundles," sponsored by FN grant 200020-144399, thesis defended February 2017 (currently SNF postdoc at Johns Hopkins University)
- Marc Stephan, "Kan spectra, group spectra and twisting structures," thesis defended November 2014 (currently postdoc at MPI)
- Varvara Karpova, "Homotopic Hopf-Galois theory of commutative differential graded algebras," sponsored by FN grant 200020-132379, thesis defended February 2014 (currently training to become a gymnasium math professor)
- Patrick Müller, "Homotopic descent over monoidal model categories," sponsored by FN grants 200020-121864 and 200020-132379, thesis defended September 2011 (currently gymnasium math professor in St Gallen)
- Nicolas Michel, "Categorical foundations of K-theory," thesis defended September 2010, sponsored by FN grant 200020-121864 (currently working as a pastor in Lausanne)
- Ilias Amrani, "Catégories simpliciales et K-théorie de Waldhausen," thesis defended September 2010, sponsored by FN grants 200020-113707 and 200020-121864 (currently postdoc at Academic University of St. Petersburg)
- Théophile Naito, "Alexander-Whitney coalgebras: an algebraic model for topological spaces," thesis defended May 2009, sponsored by FN grant 200020-113707 (currently librarian at BCU Lausanne)

- Jan Brunner, "The link between the infinite mapping class group of the disk and the braid group on infinitely many strands," thesis defended June 2008, sponsored by FN grant 200020-105383 (currently math professor at the HES Bienne)
- Sylvestre Blanc, "Modèles tordus d'espaces de lacets libres et fonctionnels," thesis defended September 2004, sponsored by FN grant 2000-068137.02 (currently IT quant at Grammont Finance S.A)
- Orin Sauvageot, "Stabilisation de complexes croisés," thesis defended November 2002, sponsored by FN grant 21-061707.00 (currently Chief Operating Officer at Tetral SA)
- Chantal Oberson, "Etude des relations structure-propriété des polymères par des méthodes topologiques," thesis defended June 1999, sponsored by FN grant 21-43404.95 (currently working for a high-tech start up)
- Fabio Simoncini, "Autour de quelques invariants d'homotopie rationnelle," thesis defended October 1998, sponsored by FN grant 21-43406.95 (currently portfolio manager on Swiss Fixed Income at Banque Cantonale Vaudoise)

### Postdocs supervised

- Inbar Klang (Stanford, 2018): September 2018–present
- Daniela Egas Santander (Copenhagen, 2015): October 2017–present
- Beren Sanders (UCLA, 2014): September 2017–August 2018 (currently assistant professor at UC Santa Cruz)
- Nicolas Ninin (Paris XI, 2017): August 2017–present
- Dimitri Zaganidis (EPFL, 2017): July 2017–present
- Jean Verrette (Hawaii, 2016): March 2016–February 2017
- Gard Spreemann (NTNU, 2015): February 2016–present
- Senja Barthel (Imperial College, 2015): September 2015–present
- Katharine Turner (Chicago, 2015): September 2015–August 2017 (currently lecturer at Australian National University)
- Martina Scolamiero (KTH, 2015): July 2015–July 2018 (currently postdoc at KTH)
- Magdalena Kędziorek (Sheffield, 2014): February 2015–August 2017 (currently Veni postdoc at Utrecht University)
- Justin Young (Indiana, 2012): September 2012–August 2014 (currently lecturer at Ohio State University-Newark)
- Eric Finster (Virginia, 2010): August 2010–August 2012 (currently postdoc at Paris VII)
- Gavin Seal (VU Brussels, 2000): January 2009–December 2012 (currently employed by the Euler course and as a high school math teacher)
- John E. Harper (Notre Dame, 2008): August 2008–July 2010 (currently assistant professor at Ohio State University-Newark)
- Samuel Wüthrich (Bern, 2004): September 2006–July 2008 (currently employed by the CFF)
- Christine Vespa (Paris XIII, 2006): September 2006–August 2007 (currently maître de conférence at the University of Strasbourg)
- Sverre Lunøe-Nielsen (Oslo, 2005): September 2005–August 2006 (unknown employment status)
- Jonathan Scott (Toronto, 2000): September 2004–July 2006 (currently associate professor at Cleveland State University)
- Peter Bubenik (Toronto, 2003): September 2003–July 2005 (currently associate professor at the University of Florida)



- Paul-Eugène Parent (Louvain-la-Neuve, 2001): September 2001–August 2003 (currently associate professor at the University of Ottawa)

## Professional service

### Assessments and advisory roles

- 2018–present Member of the committee selecting Swedish universities to receive funding for establishing professorships in mathematics and AI
- 2018–present Member of the Advisory Board of the Centre for Topological Data Analysis at Oxford University
- 2018–present Vice-chair of the mathematics panel of Swedish Research Council
- 2017–2018 Member of the selection committee for the ICM 2018 Emmy Noether Lecture
- 2016–present Member of the international peer review panel on mathematics, statistics and computer science of the Danish Council for Independent Research
- 2016–present Member of the Standing Committee of the association of European Women in Mathematics
- 2016 Member of the Review Panel for the Mathematical Institute at Oxford
- 2015–2018 Member of the Association for Women in Mathematics Noether Lecture selection committee
- 2013–2017 Member of the selection committee for the Heidelberg Laureate Forum
- 2012–2015 Chair of the committee evaluating undergraduate mathematics education in all Swedish universities
- 2012 Member of the mathematics panel of the international commission evaluating KTH in its Research Assessment Exercise
- 2004–present Member of the selection committee for choosing a new professor for the mathematics departments of the Universities of Aalborg (2005, 2009, 2015), Bergen (2004), Copenhagen (2015), ETHZ (2014, 2018), Göteborg (2015, 2017), Lille (2012), Nantes (2017), Nijmegen (2012, 2014), Osnabrück (2012), Paris VII (2018), Paris XIII (2015), Stockholm (2014), Trondheim (2006, 2012, 2013, 2018), and Utrecht (2016) and for promotion to professor at KTH (2010) and Copenhagen (2012, 2014). Reviewer for creation of Junior Research Group at FU Berlin (2013)
- 2001 Member of the international commission evaluating the mathematics departments of all Swedish universities
- 2000–present Reviewer of grant applications for the U.S. National Science Foundation, the Norwegian Research Council, the Academy of Finland, the US-Israel Binational Science Foundation, the Netherlands Organisation for Scientific Research, the European Research Commission (EURYI prize), France's National Research Agency, Canada's National Science and Engineering Research Council, Georgia's Shota Rustaveli National Science Foundation, the Research Foundation-Flanders, the Centre de Recerca Matemàtica, and the UK's Leverhulme Trust.
- 1992–present Member of thesis and habilitation juries in Aalborg (3), Aberdeen, Copenhagen (3), ETHZ (1), Lausanne (5), Lille (6), Louvain-la-Neuve (2), Nantes, Nice (2), Nijmegen, Oslo, Paris (6), Sheffield, Singapore, Stockholm (3), Trondheim (2), and Utrecht (2). Reporter for theses in Angers and Paris.

### Service internal to EPFL

- 2018–present Member of the computational biology doctoral program committee
- 2017–present Member of the neuroscience doctoral program committee
- 2015–present Member of the mathematics doctoral program committee
- 2015–present EPFL representative on the board of the Fondation Erna Hamburger

- 2014–present Vice-president of the EPFL-WISH Foundation (for the promotion of women in science)
- 2012–2015 Director of the Doctoral program in mathematics
- 2010–2012 Member of the committee selecting the laureat of the EPFL doctoral prize
- 2010–present Member of the Bureau of the EPFL-WISH Foundation
- 2008–2015 Member of the Research Commission (chair of the mathematics and computer science panel starting in 2013)
- 2008–2012 Vice-director of the Doctoral program in mathematics
- 2006–2012 Member of the Teaching committee of the section of mathematics
- 2006–2012 Exchange coordinator for the section of mathematics
- 2004–2008 Member of the Evaluating Committee of the FSB (responsible for evaluating applications for internal promotion)
- 1995–present Numerous presentations to visiting high school and elementary school students (Journée des gymnasiennes, Journée des gymnasiens, Journée des classes)

### Conferences co-organized

- 2018 Workshop on topology and neuroscience (EPFL)
- 2018 General meeting of the association of European Women in Mathematics (Graz, Austria)
- 2018 Abel Symposium on Applied Topology (Geiranger, Norway)
- 2017 Women in Topology Workshop (MSRI)
- 2017 Conference in applied algebraic topology (Sapporo, Japan)
- 2017 Program “Applied and Computational Algebraic Topology” (Hausdorff Research Institute for Mathematics, Bonn)
- 2015 Workshop in category theory and algebraic topology (Louvain)
- 2014 Introductory Workshop, Emphasis semester in algebraic topology (MSRI)
- 2013, 2014 Summer schools in algebraic topology and category theory (Université Catholique de Louvain/EPFL)
- 2013, 2016 Women in Topology Workshop (Banff International Research Station)
- 2011 André Memorial Conference (EPFL)
- 2010 Workshop on Tannakian Categories (EPFL)
- 2007–present Young Topologists Meetings (held annually in Switzerland, Denmark, or Sweden since 2007)
- 2006 Alpine Operad Workshop (Villars)
- 2006 Emphasis semester in algebraic topology (Mittag-Leffler Institute)
- 1999–present Arolla Conferences on Algebraic Topology (1999, 2004, 2008, 2012, 2016)
- 2002 GDRE meeting (Lille)

### Editorial work

- Co-editor of the Proceedings of the 2013 and 2016 Women in Topology workshops, in the *Contemporary Mathematics* series of the AMS and in *Topology and its Applications*
- Co-editor of the Proceedings of the 1999, 2004, 2008, 2012, and 2016 Arolla Conferences on Algebraic Topology, in the *Contemporary Mathematics* series of the AMS
- Member of the editorial board of *Algebraic and Geometric Topology* (2001-present, chief editor from 2012), *Journal of Applied and Computational Topology* (2016-present), *Publicacions Matemàtiques* (2007-present), and *Theory and Applications of Categories* (2011-present)
- Member of the Steering Board of *Compositionality* (2018–present)

## Referee work

- Contributor to *Mathematical Reviews* (89 reviews since 1995)
- Referee for numerous journals, including *Acta Mathematica*, *Advances in Mathematics*, *Algebraic and Geometric Topology*, *Annals of Mathematics*, *Bulletin de la Soci t Mathematique de France*, *Commentarii Mathematici Helvetici*, *Communications in Algebra*, *Compositio Mathematicae*, *Documenta Mathematicae*, *Expositiones Mathematicae*, *Homology, Homotopy and Applications*, *Israel Journal of Mathematics*, *Journal of Algebra*, *Journal of the American Mathematical Society*, *Journal of K-theory*, *Journal of Pure and Applied Algebra*, *Journal of Topology*, *Journal of Topology and Analysis*, *K-Theory*, *manuscripta mathematica*, *Mathematica Scandinavica*, *Mathematische Annalen*, *Mathematische Zeitschrift*, *Network Neuroscience*, *PLOS Computational Biology*, *Pure and Applied Mathematics Quarterly*, *Proceedings of the American Mathematical Society*, *Theory and Applications of Categories*, *Topology*, *Topology and its Applications*, *Transactions of the American Mathematical Society*, and journals of the London Mathematical Society
- Manuscript reviewer for Springer Verlag, University of Chicago Press, the American Mathematical Society, and the MIT Press
- Referee for the Twenty-seventh Annual Computational Neuroscience Meeting CNS\*2018

## Outreach

- 2017 Invited talk at TEDxLugano
- 2016 Organizer of the mathematical activities at the "Portes Ouvertes" science festival at the EPFL
- 2013 Invited speaker at "Women Inspire Innovation", Swiss Embassy, Washington D.C.
- 2011–2013 Speeches given to sections of the Rotary Club, the Business and Professional Women's Club, the Lions Club, Kiwanis and the Equal Opportunity Office of the Canton of Valais
- 2010, 2011 EPFL coordinator of the Lausanne semi-final and the Swiss final of the Championnat de jeux math matiques et logiques
- 2009–2013 Regular (bimonthly) mathematical columnist in *Le Temps* (Swiss newspaper)
- 2007–present Founder of the Cours Euler, a fast-paced mathematics course for young students with very high potential in mathematics (<http://euler.epfl.ch>)
- 2007–2012 Talks at "Maths en Jeu" graduation ceremonies
- 2001 Translated (from Swedish to French), staged, and acted in a play about mathematical history for the EPFL open house "Science et Cit "
- 2000–2006 Acted (in Swedish) in plays about mathematical history, while on leave at the University of Stockholm and on various visits to Sweden

## Languages

- English **Native speaker**
- French **Fluent**
- Swedish **Fluent**
- Norwegian **Excellent oral and written comprehension**
- German **Very good oral and written comprehension**