

# Anaïs Vergne

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Born March 16, 1986 • French  
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<b>Position</b>	Assistant professor at Télécom ParisTech, in the Network and Computer Science Department (INFRES) <i>Address:</i> Office I326, 23 avenue d'Italie, 75013 Paris, France <i>Email :</i> <a href="mailto:anaïs.vergne@telecom-paristech.fr">anaïs.vergne@telecom-paristech.fr</a>
<b>Education</b>	<i>PhD</i> from Télécom ParisTech, Paris, France 2010 - 2013 Subject: Algebraic topology applied to wireless sensor networks Advisors: Pr. Laurent Decreusefond and Pr. Philippe Martins Defense held on November, 28 2013 <i>First prize for the best PhD thesis funded by the Fondation Télécom</i> <i>Master of Engineering (MS)</i> from Télécom ParisTech, Paris, France 2007 - 2010 Major: Network engineering
<b>Skills</b>	Software: C, Matlab, Python, L <sup>A</sup> T <sub>E</sub> X Languages: French (mother tongue), English (fluent), Spanish (advanced)
<b>Research interests</b>	Algebraic topology, simplicial homology, probability, stochastic geometry, cellular networks, wireless networks

## Professional experience

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<b>Research</b>	<i>Assistant professor</i> at Télécom ParisTech, Paris, France 2014 - now <i>Postdoctoral fellowship</i> at Inria Saclay, Palaiseau, France 2013 - 2014 with Dr. Frédéric Chazal and Dr. Marc Glisse <i>1-month visit</i> at George Mason University, Fairfax, Virginia, USA July 2013 with Pr. Brian L. Mark <i>PhD</i> at Télécom ParisTech, Paris, France 2010 - 2013 with Pr. Laurent Decreusefond and Pr. Philippe Martins <i>6-month internship</i> at Orange Labs, Issy-les-Moulineaux, France 2009 - 2010 with Dr. Salah Eddine Elayoubi
<b>Teaching</b>	<i>Stochastic modeling for wireless networks</i> at Télécom ParisTech (2nd year and MS Radio-Mobiles) since 2011 <i>Queueing theory</i> for M2 MPRO (Master Parisien de Recherche Opérationnelle) since 2015 at Télécom ParisTech (2nd year and MS Radio-Mobiles) since 2017 <i>Cellular networks</i> at Télécom ParisTech (2nd year and MS Radio-Mobiles) since 2012 for M2 ACN (Advanced Communication Networks) since 2014 <i>Introduction to networks</i> at Télécom ParisTech (1st year) since 2018 <i>Data structures and algorithms</i> at Télécom ParisTech (1st year) since 2015 <i>Supervision of cellular network projects</i> at Télécom ParisTech (MS Radio-Mobiles) since 2011

## Publications

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### Articles

### Journals

*Random Abstract Simplicial Complexes Reduction*

Anaïs Vergne, Laurent Decreasefond, and Philippe Martins

Submitted, September 2017

[hal.archives-ouvertes.fr/hal-00864303](http://hal.archives-ouvertes.fr/hal-00864303)

*Stochastic Geometry: Boolean model and random geometric graphs*

Pierre Calka, David Coupier, Jean-Baptiste Gouéré, Arnaud Rousselle, and Anaïs Vergne

In ESAIM: Proceedings and Surveys, vol. 51, pp. 175-192, October 2015

[esaim-proc.org/articles/proc/abs/2015/04/proc145110/proc145110.html](http://esaim-proc.org/articles/proc/abs/2015/04/proc145110/proc145110.html)

*A note on the simulation of the Ginibre point process*

Laurent Decreasefond, Ian Flint, and Anaïs Vergne

In Journal of Applied Probability, Applied Probability Trust 52 (4), 2015

[hal.archives-ouvertes.fr/hal-00869259](http://hal.archives-ouvertes.fr/hal-00869259)

*Homology-Based Distributed Coverage Hole Detection in Wireless Sensor Networks*

Feng Yan, Anaïs Vergne, Philippe Martins, and Laurent Decreasefond

In IEEE/ACM Transactions on Networking, vol. 23, no. 6, pp. 1705-1718, December 2014

[hal.archives-ouvertes.fr/hal-01271091](http://hal.archives-ouvertes.fr/hal-01271091)

*A Case Study on Regularity in Cellular Network Deployment*

Jean-Sébastien Gomez, Aurélien Vasseur, Anaïs Vergne, Philippe Martins, Laurent Decreasefond, and Wei Chen

In IEEE Wireless Communications Letters, vol. 4, no. 4, pp. 421-424, August 2015

[hal-institut-mines-telecom.archives-ouvertes.fr/hal-01145527](http://hal-institut-mines-telecom.archives-ouvertes.fr/hal-01145527)

*Simplicial Homology for Future Cellular Networks*

Anaïs Vergne, Laurent Decreasefond, and Philippe Martins

In IEEE Transactions on Mobile Computing, vol. 14, no. 8, pp. 1712-1725, August 2015

[hal.archives-ouvertes.fr/hal-00914659](http://hal.archives-ouvertes.fr/hal-00914659)

*Simplicial homology of random configurations*

Laurent Decreasefond, Eduardo Ferraz, Hugues Randriambololona, and Anaïs Vergne

In Advances in Applied Probability 46(2):1-20, 2014

[hal.archives-ouvertes.fr/hal-00578955](http://hal.archives-ouvertes.fr/hal-00578955)

### International conferences

*Computing the  $k$ -coverage of a wireless network*

Anaïs Vergne, Laurent Decreasefond, and Philippe Martins

In VALUETOOLS 2019, Palma de Mallorca, Spain, 13-15 March 2019

[hal.archives-ouvertes.fr/hal-01966097](http://hal.archives-ouvertes.fr/hal-01966097)

*Building a coverage hole-free communication tree*

Anaïs Vergne, Laurent Decreasefond, and Philippe Martins

In ACM Q2SWinet 2018, Montréal, Canada, 28 October - 2 November 2018

[hal.archives-ouvertes.fr/hal-01715596](http://hal.archives-ouvertes.fr/hal-01715596)

*Cournot-Nash Equilibria for Bandwidth Allocation under Base-Station Cooperation*

Jean-Sébastien Gomez, Anaïs Vergne, Philippe Martins, and Laurent Decreasefond

In IEEE GLOBECOM 2017, Singapore, Singapore, 4-8 December 2017

[hal.archives-ouvertes.fr/hal-01296543](http://hal.archives-ouvertes.fr/hal-01296543)

*Optimize Wireless Networks for Energy Saving by Distributed Computation of Cech Complex*

Ngoc Khuyen Le, Anaïs Vergne, Philippe Martins, and Laurent Decreasefond

In IEEE WiMob 2017, Rome, Italy, 10-11 October 2017

[hal.archives-ouvertes.fr/hal-01580622](http://hal.archives-ouvertes.fr/hal-01580622)

*Distributed Simplicial Homology Based Load Balancing Algorithm for Cellular Networks*

Ngoc Khuyen Le, Anaïs Vergne, Philippe Martins, and Laurent Decreasefond  
In IEEE VTC 2017 Fall, Toronto, Canada, 24-27 September 2017  
[hal.archives-ouvertes.fr/hal-01550198](http://hal.archives-ouvertes.fr/hal-01550198)

*Simplicial homology based energy saving algorithms for wireless networks*

Ngoc Khuyen Le, Philippe Martins, Laurent Decreasefond, and Anaïs Vergne  
In IEEE ICC 2015, London, UK, 8-12 June 2015  
[hal.archives-ouvertes.fr/hal-01120497](http://hal.archives-ouvertes.fr/hal-01120497)

*Construction of the generalized Cech complex*

Ngoc Khuyen Le, Philippe Martins, Laurent Decreasefond, and Anaïs Vergne  
In IEEE VTC 2015 Spring, Glasgow, UK, 11-14 May 2015  
[hal.archives-ouvertes.fr/hal-01119948](http://hal.archives-ouvertes.fr/hal-01119948)

*Disaster Recovery in Wireless Networks: A Homology-Based Algorithm*

Anaïs Vergne, Ian Flint, Laurent Decreasefond, and Philippe Martins  
In Telecommunications (ICT), 2014 21st International Conference on, pp. 226-230, Lisbon, Portugal, 4-7 May 2014, *Best paper award*  
[hal.archives-ouvertes.fr/hal-00800520](http://hal.archives-ouvertes.fr/hal-00800520)

*Reduction algorithm for simplicial complexes*

Anaïs Vergne, Laurent Decreasefond, and Philippe Martins  
In INFOCOM, 2013 Proceedings IEEE, pp. 475-479, Turin, Italy, 14-19 April 2013  
[hal.archives-ouvertes.fr/hal-00688919](http://hal.archives-ouvertes.fr/hal-00688919)

*Evaluating the capacity gains from CoMP transmission and reception*

Anaïs Vergne and Salah Eddine Elayoubi  
In IEEE WCN3 2010, Avignon, France, May 2010  
[hal.archives-ouvertes.fr/inria-00499425](http://hal.archives-ouvertes.fr/inria-00499425)

**PhD manuscript** *Algebraic topology applied to wireless sensor networks*  
[perso.telecom-paristech.fr/avergne/files/These.pdf](http://perso.telecom-paristech.fr/avergne/files/These.pdf)

## **Presentations**

### **Conferences**

“Journées MAS 2014” 2014 de la SMAI, Stochastic geometry session, Toulouse, France, 27-29 August 2014

SGSIA 2013, 17th Workshop on Stochastic Geometry, Stereology and Image Analysis, Toruń, Poland, 10-14 June 2013

### **Seminars**

Seminar of the probability team, MAP5, Université Paris Descartes, France, 3 March 2017

Seminar, Orange, Issy-les-Moulineaux, France, 30 April 2015

Seminar of the INFRES department, Télécom ParisTech, France, 22 October 2014

Seminar of the GEOMETRICA Saclay team, Inria Saclay, France, 23 April 2013

Seminar of the probability team, Institut Mathématiques de Toulouse, France, 14 March 2013

Seminar LMAC, Université Technologique de Compiègne, France, 5 February 2013

## **Workshops**

Interactions between stochastic and computational geometry, Valberg, France, 3-7 June 2013