

## 1 In a snapshot

Since 2002, I am professor of Statistics at the Université Libre de Bruxelles (full professor since 2010). I have been visiting professor at the Université Pierre-et-Marie Curie (Paris 6, from 2009 to 2014), in KULeuven (2015), and in Toulouse School of Economics (2015 and 2016). My main research fields are asymptotic statistics, nonparametric inference, high-dimensional statistics. I am the author of 70 published papers (among which 11 contributions in the *Annals of Statistics*, 7 in *Bernoulli*, and 3 in the *Journal of the American Statistical Association*). I am currently Associate Editor for 5 international journals, including the *Annals of Statistics* and the *Journal of the American Statistical Association*. From 2014 to 2016, I acted as (co-)Editor-in-Chief of *Statistics and Probability Letters*. I have acted as supervisor of 2 Ph.D. theses (both completed) and as co-supervisor for 8 Ph.D. theses (5 completed, 3 in progress). I obtained several awards, the most prestigious of which being the *Gottfried E. Noether Young Scholar Award* (from the American Statistical Association).

## 2 Personal information

**Name:** PAINDAVEINE Davy, Ludovic

**Born:** September 23, 1976 in Haine-Saint-Paul (Belgium)

**Citizenship:** Belgian

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**Languages:** French, English

## 3 Education

1994-1998: Licence en sciences mathématiques (Université Libre de Bruxelles).

- Première candidature (1994-1995): *la plus grande distinction* (highest grade).
- Seconde candidature (1995-1996): *la plus grande distinction* (highest grade).
- Première licence (1996-1997): *la plus grande distinction* (highest grade).
- Seconde licence (1997-1998): *la plus grande distinction* (highest grade).

1997-1998: Agrégation de l'enseignement secondaire supérieur (Université Libre de Bruxelles): *grande distinction*.

1998-2000: DEA en Statistique et Recherche Opérationnelle, spécialisation statistique (Université Libre de Bruxelles): *la plus grande distinction* (highest grade), with *félicitations du Jury*.

2000-2002: Doctorat en Sciences, orientation statistique (Université Libre de Bruxelles), with *félicitations du Jury* (highest grade).

**Title of the dissertation:** “Optimal invariant signed rank tests for elliptically symmetric location and time series problems”, defended September 3, 2002 (advisor: M. Hallin).

## 4 Full-time positions

1998-2002: Assistant at the Mathematics Department, Université Libre de Bruxelles.

2002-2006: Chargé de Cours (tenured junior professor) of Statistics at the Institute of Statistics and Operations Research (ISRO), Université Libre de Bruxelles (since October 1, 2002).

2007-2010: Professeur (associate professor) of Statistics at the Faculté des Sciences sociales et politiques, Solvay Brussels School of Economics and Management, Université Libre de Bruxelles.

2010 to present: Professeur ordinaire (full professor) of Statistics at the Solvay Brussels School of Economics and Management, Université Libre de Bruxelles.

## 5 Visiting positions

1999-2000: Visiting professor, Institut National de Statistique et d'Economie Appliquée, Rabat, “Introduction aux processus stochastiques”.

2005-2007: Visiting professor, ISUP, Université Pierre-et-Marie-Curie (Paris 6), “Statistique non paramétrique”.

2009-2014: Visiting professor, LSTA, Université Pierre-et-Marie-Curie (Paris 6), “Statistique fondamentale”.

2014-2015: Visiting professor, Department of Mathematics, KULeuven, “Multivariate ranks and statistical depth”.

2014-2016: Visiting professor, Toulouse School of Economics, Université Toulouse 1 Capitole, “Statistical depth”.

## 6 Academic service

- Associate editor for the *Annals of Statistics* (2013-).
- Associate editor for the *Journal of the American Statistical Association* (2017-).
- Associate editor for the *Journal of Statistical Planning and Inference* (2012-).
- Associate editor for the *ESAIM: Probability and Statistics* (2013-).
- Associate editor for the *Econometrics and Statistics* (2016-).
  
- Co-Editor-in-Chief for *Statistics and Probability Letters* (2014-2016).
  
- Associate editor for *Statistica Sinica* (2011-2014).
- Associate editor for *Statistics and Probability Letters* (2010-2013).
- Associate editor for *International Statistical Review* (2011-2015).
- Associate editor for *METRON International Journal of Statistics* (2007-2012).
  
- IMS Committee on New Researchers (2011-2013).
  
- Co-director of the European Centre for Advanced Research in Economics and Statistics (ECARES) (2006-2012).
- Member of the ECORE (ECARES + CORE) executive committee (2006-2012).
- President of the Jury for the Master in Statistics, ULB (2009-2014).
- Co-organizer of the Statistics Seminar at ECARES and Département de Mathématique, ULB (2008-present).
- President of the FNRS graduate school in Statistics and Actuarial Sciences (2009-2011).
- Co-organizer of the Econometrics and Statistics Seminar at ECARES, ULB (2002-2007).
- Secretary of the Jury for the Master in Statistics, ULB (2005-2009).
- Elected member of the board of the Belgian Statistical Society (2011-2013) - Elected member of the Conseil de la Société Française de Statistique (2006-2009).
- Representative of the Société Française de Statistique in the Conseil de la Société Mathématique de France (2006-2009).
- Vice-President of the FNRS graduate school in Statistics and Actuarial Sciences (2005-2009).

## 7 Research grants

2003-2006: crédit aux chercheurs F.N.R.S. (“*Développement d’un estimateur optimal de la matrice de forme d’une distribution elliptique, basé sur les rangs signés généralisés. Développement de méthodes de rangs basées sur des contours multivariés généralisés*”).

2007-2009: mandat d’impulsion scientifique du F.N.R.S. (“*extension of Koenker and Basset (1978)’s celebrated concept of regression quantiles to the multivariate setting (multiple output regression), and development of the corresponding multivariate rank scores*”).

2010: National Bank of Belgium (“*Principal component analysis for financial data*”).

2010-2015: A.R.C. (Action de Recherche Concertée) of the Communauté Française de Belgique

(“*Statistical methods for complex static and dynamic dependence models*”). Project coordinator.

2012-2017: I.A.P. (Interuniversity attraction poles) of the Belgian Science Policy Office. (“*Developing crucial Statistical methods for Understanding major complex Dynamic Systems in natural, biomedical and social sciences (StUDyS)*”). Scientist in charge for the Université libre de Bruxelles.

2016: National Bank of Belgium (“*Données multi-dimensionnelles et séries chronologiques en économie et en finance : estimateurs par test préliminaire, tests de contiguïté et sujets liés*”).

2016-2017: crédit aux chercheurs F.N.R.S. (“*Contiguity-robust inference, tests of contiguity and applications in pre-test estimation*”).

2017-2020: Francqui Research Professorship, from the Francqui foundation.

## 8 Prizes and awards

1997: **Sterpenich Prize**: annual prize for the best undergraduate student in Mathematics.

1998: **Médaille de l’Université Libre de Bruxelles**, promotion 1997-1998.

2003: **Prix Marie-Jeanne Laurent-Duhamel**, which is awarded every second year by the Société Française de Statistique to the best Ph.D. in Statistics defended in a French-speaking university in the previous three years.

2005: **Elected member of the International Statistical Institute**.

2005: **Prix du Concours annuel de la Classe des Sciences de l’Académie Royale de Belgique** for a dissertation entitled “*Sur l’Efficacité Asymptotique Uniforme des Procédures de Rangs Signés Multivariées*”.

2007: **Gottfried E. Noether Young Scholar Award**, for research accomplishments in nonparametric statistics, American Statistical Association.

2007: **Prix Adolphe Wetrems de la Classe des Sciences de l’Académie Royale de Belgique**. This price, created in 1926, is granted every year to a Belgian scientist rewarding “the most useful discovery or invention in physics, mathematics or the natural sciences,” made during the previous year.

2012: **Gumbel lecture**, Annual meeting of the German Statistical Association (Statistische Woche, Vienna).

2017: **Godeaux lecture**, Annual meeting of the Belgian Mathematical Society, Brussels.

2017-2020: **Francqui Research Professorship**, from the Francqui foundation.

## 9 Publications

### Published or in press:

1. Selecting a sequence of last successes in independent trials (coauthor: F. T. Bruss). *Journal of Applied Probability* **37**, 389–399 (2000).
2. R-estimation for ARMA models (coauthors: J. Allal and A. Kaaouachi). *Journal of Nonparametric Statistics* **13**, 815–831 (2001).
3. Optimal tests for multivariate location based on interdirections and pseudo-Mahalanobis ranks (coauthor: M. Hallin). *Annals of Statistics* **30**, 1103–1133 (2002).
4. Multivariate signed ranks: Randles' interdirections or Tyler's angles? (coauthor: M. Hallin). In Y. Dodge, Ed., *Statistical data analysis based on the  $L_1$ -norm and related methods*, Birkhäuser, Basel, 271–282 (2002).
5. Optimal procedures based on interdirections and pseudo-Mahalanobis ranks for testing multivariate elliptic white noise against ARMA dependence (coauthor: M. Hallin). *Bernoulli* **8**, 787–815 (2002).
6. Affine-invariant linear hypotheses for the multivariate general linear model with ARMA error terms (coauthor: M. Hallin). In M. Moore, S. Froda, and Chr. Léger, Eds, *Mathematical Statistics and Applications: Festschrift for Constance van Eeden*, I.M.S. Lecture Notes-Monograph Series, I.M.S., Hayward, California, 417–434 (2003).
7. Procédures optimales fondées sur les rangs multivariés. *Journal de la Société Française de Statistique* **144**, 25–66 (2003).
8. Rank-based optimal tests of the adequacy of an elliptic VARMA model (coauthor: M. Hallin). *Annals of Statistics* **32**, 2642–2678 (2004).
9. A unified and elementary proof of serial and nonserial, univariate and multivariate, Chernoff-Savage results. *Statistical Methodology* **1**, 81–91 (2004).
10. Multivariate signed rank tests in vector autoregressive order identification (coauthor: M. Hallin). *Statistical Science* **19**, 697–711 (2004).
11. Affine-invariant aligned rank tests for the multivariate general linear model with ARMA errors (coauthor: M. Hallin). *Journal of Multivariate Analysis* **93**, 122–163 (2005).
12. Optimal signed-rank tests based on hyperplanes (coauthor: H. Oja). *Journal of Statistical Planning and Inference* **135**, 300–323 (2005).

13. Asymptotic linearity of serial and nonserial multivariate signed rank statistics (coauthor: M. Hallin). *Journal of Statistical Planning and Inference* **136**, 1–32 (2006).
14. A Chernoff-Savage result for shape. On the non-admissibility of pseudo-Gaussian methods. *Journal of Multivariate Analysis* **97**, 2206–2220 (2006).
15. Semiparametrically efficient rank-based inference for shape. I. Optimal rank-based tests for sphericity (coauthor: M. Hallin). *Annals of Statistics* **34**, 2707–2756 (2006).
16. Semiparametrically efficient rank-based inference for shape. II. Optimal R-estimation of shape (coauthors: M. Hallin and H. Oja). *Annals of Statistics* **34**, 2757–2789 (2006).
17. Parametric and semiparametric inference for shape: the role of the scale functional (coauthor: M. Hallin). *Statistics & Decisions* **24**, 327–350 (2006).
18. Chernoff-Savage and Hodges-Lehmann results for Wilks’ test of multivariate independence (coauthor: M. Hallin). In M. Silvapulle, Ed., *Beyond Parametrics in Interdisciplinary Research: Festschrift in Honor of Professor Pranab K. Sen*, I.M.S. Lecture Notes-Monograph Series, 184–196 (2008).
19. Optimal rank-based tests for homogeneity of scatter (coauthor: M. Hallin). *Annals of Statistics* **36**, 1261–1298 (2008).
20. Optimal detection of Fechner-asymmetry (coauthors: D. Cassart and M. Hallin). *Journal of Statistical Planning and Inference* **138**, 2499–2525 (2008).
21. A general method for constructing pseudo-Gaussian tests (coauthor: M. hallin). *Journal of the Japan Statistical Society* **38**, 27–40 (2008).
22. Pseudo-Gaussian inference in heterokurtic elliptical common principal components models (coauthors: M. Hallin and T. Verdebout). *Annales de l’ISUP*, LII, 9-24 (2008).
23. A canonical definition of shape. *Statistics and Probability Letters* **78**, 2240–2247 (2008).
24. Optimal tests for homogeneity of covariance, scale, and shape (coauthor: M. Hallin). *Journal of Multivariate Analysis* **100**, 422–444 (2009).
25. Signed-rank tests for location in the symmetric independent component model (coauthors: K. Nordhausen and H. Oja). *Journal of Multivariate Analysis* **100**, 821–834 (2009).
26. Discussion of “Invariant Co-ordinate Selection”, by D. E. Tyler, F. Critchley, L. Dümbgen, and H. Oja. *Journal of the Royal Statistical Society, series B* **71**, 577-578 (2009).
27. Le Cam optimal tests for symmetry against Ferreira and Steel’s general skewed distributions (coauthor: Chr. Ley). *Journal of Nonparametric Statistics* **21**, 943–967 (2009).
28. On multivariate runs tests for randomness. *Journal of the American Statistical Association* **104**, 1525-1538 (2009).
29. Multivariate quantiles and multiple-output regression quantiles: From  $L_1$  optimization to halfspace depth (coauthors: M. Hallin and M. Šiman). *Annals of Statistics* **38**, 635-669 (2010).
30. Rejoinder: Multivariate quantiles and multiple-output regression quantiles (coauthors: M. Hallin and M. Šiman). *Annals of Statistics* **38**, 694-703 (2010).

31. On the singularity of multivariate skew-symmetric models (coauthor: Chr. Ley). *Journal of Multivariate Analysis* **101**, 1434-1444 (2010).
32. Optimal rank-based testing for principal components (coauthors: M. Hallin and T. Verdebout). *Annals of Statistics* **38**, 3245-3299 (2010).
33. On the estimation of cross-information quantities in R-estimation. In J. Antoch, M. Hušková and P.K. Sen, Editors: *Nonparametrics and Robustness in Modern Statistical Inference and Time Series Analysis: A Festschrift in Honor of Professor Jana Jurečková*, I.M.S. Monographs-Lecture Notes, 35-45 (coauthors: D. Cassart and M. Hallin).
34. Multivariate skewing mechanisms: a unified perspective based on the transformation approach (coauthor: Chr. Ley). *Statistics and Probability Letters* **80**, 1685-1694 (2010).
35. Testing for common principal components under heterokurticity (coauthors: M. Hallin and T. Verdebout). *Journal of Nonparametric Statistics* **22**, 879-895 (2010).
36. On Fisher information matrices and profile log-likelihood functions in generalized skew-elliptical models (coauthor: Chr. Ley). *METRON International Journal of Statistics* **68**, 235-250 (2010).
37. On directional multiple-output quantile regression (coauthor: M. Šíman). *Journal of Multivariate Analysis* **102**, 193-212 (2011).
38. A class of optimal tests for symmetry based on local Edgeworth approximations (coauthors: D. Cassart and M. Hallin). *Bernoulli* **17**, 1063-1094 (2011).
39. A stochastic analysis of some two-person sports (coauthor: Y. Swan). *Studies in Applied Mathematics* **127**, 221-249 (2011).
40. LAN property for lacunar wavelet series multifractal model (coauthor: J.M. Loubes). *ESAIM: Probability and Statistics* **15**, 69-82 (2011).
41. Semiparametrically efficient inference based on signed ranks in symmetric independent component models (coauthor: P. Ilmonen). *Annals of Statistics* **39**, 2448-2476 (2011). With a peer-reviewed [supplement](#).
42. Computing multiple-output regression quantile regions (coauthor: M. Šíman). *Computational Statistics and Data Analysis* **56**, 840-853 (2012).
43. Computing multiple-output regression quantile regions from projectional quantiles (coauthor: M. Šíman). *Computational Statistics* **27**, 29-49 (2012).
44. Runs tests (coauthor: Chr. Ley). In *Encyclopedia of Environmetrics*, 2nd edition, A. H. El-Shaarawi and W. Piegorsch (eds). John Wiley & Sons Ltd, Chichester, UK, 2474-2481 (2012).
45. Elliptical symmetry. In *Encyclopedia of Environmetrics*, 2nd edition, A. H. El-Shaarawi and W. Piegorsch (eds). John Wiley & Sons Ltd, Chichester, UK, 802-807 (2012).
46. Rank tests for elliptical graphical modeling (coauthor: Th. Verdebout). *Journal de la Société Française de Statistique* **153**, 82-100 (2012).

47. Pseudo-Gaussian and rank-based optimal tests for random individual effects in large  $n$  small  $T$  panels (coauthors: N. Bennala and M. Hallin). *Journal of Econometrics* **170**, 50–67 (2012).
48. From depth to local depth : a focus on centrality (coauthor: G. Van Bever). With a [supplement](#). *Journal of the American Statistical Association* **105**, 1105–1119 (2013).
49. Optimal rank-based tests for common principal components (coauthors: M. Hallin and Th. Verdebout). *Bernoulli* **19**, 2524–2556 (2013).
50. Inference on the shape of elliptical distributions based on the MCD (coauthor: G. Van Bever). *Journal of Multivariate Analysis* **129**, 125–144 (2014).
51. Efficient R-estimation of principal and common principal components (coauthors: M. Hallin and Th. Verdebout). *Journal of the American Statistical Association* **109**, 1071–1083 (2014).
52. Conditional quantile estimation through optimal quantization (coauthors: I. Charlier and J. Saracco). *Journal of Statistical Planning and Inference* **156**, 14–30 (2015).
53. Optimal rank-based tests for the location parameter of a rotationally symmetric distribution on the hypersphere (coauthor: Th. Verdebout). In M. Hallin, D. Mason, D. Pfeifer, and J. Steinebach Eds, *Mathematical Statistics and Limit Theorems: Festschrift in Honor of Paul Deheuvels*. Springer, pp. 249–270 (2015).
54. Nonparametrically consistent depth-based classifiers (coauthor: G. Van Bever). *Bernoulli* **21**, 62–82 (2015).
55. High-dimensional tests for spherical location and spiked covariance (coauthors: Chr. Ley and Th. Verdebout). *Journal of Multivariate Analysis* **139**, 79–91 (2015).
56. Local constant and local bilinear multiple-output quantile regression (coauthors: M. Hallin, Z. Lu, and M. Šiman). *Bernoulli* **21**, 1435–1466 (2015).
57. Conditional quantile estimation based on optimal quantization: from theory to practice (coauthors: I. Charlier and J. Saracco). *Computational Statistics and Data Analysis* **91**, 20–39 (2015).
58. Discussion of “Multivariate Functional Outlier Detection”, by Mia Hubert, Peter Rousseeuw and Pieter Segaeert (coauthor: G. Van Bever). *Statistical Methods and Applications* **24**, 223–231 (2015).
59. Discussion of “On families of distributions with shape parameters”, by M.C. Jones (coauthor: Chr. Ley). *International Statistical Review* **83**, 202–207 (2015).
60. Optimal rank tests for symmetry against Edgeworth-type alternatives (coauthors: D. Cassart and M. Hallin). In K. Nordhausen and S. Taskinen Eds, *Modern Nonparametric, Robust and Multivariate Methods, Festschrift in Honor of Hannu Oja*, Springer, 109–132 (2015).
61. Depth-based runs tests for bivariate central symmetry (coauthors: R. Dyckerhoff and Chr. Ley). *Annals of the Institute of Statistical Mathematics* **67**, 917–941 (2015).
62. QuantifQuantile: an R package for performing quantile regression through optimal quantization (coauthors: I. Charlier and J. Saracco). *The R Journal* **7**, 65–80 (2015).
63. On high-dimensional sign tests (coauthor: Th. Verdebout). *Bernoulli* **22**, 1745–1769 (2016).



64. Affine-invariant rank tests for multivariate independence in independent component models (coauthor: H. Oja and S. Taskinen). *Electronic Journal of Statistics* **10**, 2372–2419 (2016).
65. Probit transformation for nonparametric kernel estimation of the copula density (coauthors: G. Geenens and A. Charpentier). *Bernoulli* **23**, 1848–1873 (2017).
66. Tests of concentration for low-dimensional and high-dimensional directional data (coauthors: Chr. Cutting and Th. Verdebout). In S. Ejaz Ahmed Ed., *Big and Complex Data Analysis: Methodology and Applications*, Springer, Cham Heidelberg New York, 209–227.
67. Preliminary test estimation for multi-sample principal components (coauthors: J. Rasoafarainaina and Th. Verdebout). *Econometrics & Statistics* **2**, 106–116 (2017).
68. Inference on the mode of weak directional signals : a Le Cam perspective on hypothesis testing near singularities (coauthor: Th. Verdebout). *Annals of Statistics* **45**, 800-832 (2017).
69. Testing uniformity on high-dimensional spheres against monotone rotationally symmetric alternatives (coauthors: Chr. Cutting and Th. Verdebout). *Annals of Statistics* **45**, 1024-1058 (2017).
70. On the maximal halfspace depth of permutation-invariant distributions on the simplex. *Statistics and Probability Letters* **129**, 335-339 (2017).

**Submitted:**

71. Multiple-output quantile regression through optimal quantization (coauthors: I. Charlier and J. Saracco).
72. Halfspace depths for scatter, concentration and shape matrices (coauthor: G. Van Bever).
73. Tyler shape depth (coauthor: G. Van Bever).
74. On optimal tests for rotational symmetry against new classes of hyperspherical distributions (coauthors: E. García-Portugués and Th. Verdebout).

## 10 Talks in international meetings and conferences

1. XXXIIèmes Journées de Statistique, annual meeting of the French Statistical Society, Fès, Morocco, May 2000: *Sélection d'une suite de derniers succès dans une suite d'expériences aléatoires indépendantes.*
2. XXXIIIèmes Journées de Statistique, annual meeting of the French Statistical Society, Nantes, France, May 2001: *Tests optimaux pour le problème de position multivarié fondés sur les interdirections de Randles et les pseudo-rangs de Mahalanobis.*
3. XXXIVèmes Journées de Statistique, annual meeting of the French Statistical Society, Bruxelles, Belgium, May 2002: *Tests de bruit blanc multivarié optimaux fondés sur les interdirections de Randles et les rangs de Mahalanobis.*

4. International conference on current advances and trends in nonparametric statistics, Crete, Greece, July 2002: *Tests of randomness against VARMA dependence based on interdirections and Mahalanobis ranks*.
5. Fourth international conference on statistical data analysis based on the  $L_1$ -norm and related methods, Neuchâtel, Switzerland, August 2002: *Optimal tests of randomness based on interdirections and pseudo-Mahalanobis ranks for testing multivariate elliptic white noise against ARMA dependence*.
6. Fourth international conference on statistical data analysis based on the  $L_1$ -norm and related methods, Neuchâtel, Switzerland, August 2002: *Optimal one-sample testing procedures based on hyperplanes* (invited speaker).
7. Second Prague-Brussels seminar, Prague, Czech Republic, August 2002: *Affine-invariant linear hypotheses for the multivariate general linear model with ARMA error terms*.
8. XXXVèmes Journées de Statistique, annual meeting of the French Statistical Society, Lyon, France, June 2003: *Procédures optimales fondées sur les rangs multivariés* (invited plenary talk, for the Marie-Jeanne Laurent-Duhamel prize).
9. Meeting on mathematical statistics, C.I.R.M. (Centre International de Rencontres Mathématiques), Marseille-Luminy, France, December 2003: *Optimal rank-based tests for sphericity*.
10. Workshop on multivariate time series analysis, Heidelberg, Germany, February 2004: *Multivariate signed rank tests in vector autoregressive order identification*.
11. XXXVIèmes Journées de Statistique, annual meeting of the French Statistical Society, Montpellier, France, May 2004: *Tests de sphéricité optimaux fondés sur les rangs*.
12. Sixth ICSA (International Chinese Statistical Association) international conference, Singapore, July 2004: *Optimal rank-based tests for sphericity* (invited talk).
13. Journées MAS de la SMAI, Nancy, France, September 2004: *Inférence semi-paramétrique sur la forme des lois elliptiques* (invited talk).
14. Joint meeting of the Belgian, Dutch, Luxemburg, and French mathematical societies, Ghent, Belgium, May 2005: *A class of affine-equivariant rank-based estimators for the shape of an elliptical distribution* (invited talk).
15. Workshop on nonparametric statistical methods, University of Tampere, Finland, June 2005: *Rank-based inference on the shape of elliptical distributions* (invited talk).
16. Journées de la Statistique Rennaise, Université de Rennes, France, November 2005: *Rank-based estimation of shape* (invited talk).
17. International Conference on Robust Statistics (ICORS), Lisbon, Portugal, July 2006: *efficiency- and validity-robust tests for homogeneity of scatter matrices*.
18. Conference on nonparametric statistics and related topics, Ottawa, Canada, September 2006: *Optimal rank-based tests for homogeneity of scatter* (invited talk).

19. Workshop on robust and nonparametric statistical inference, Hejnice, Czech Republic, September 2007: *A new approach to R-estimation* (invited talk).
20. Nonparametric statistics and mixture models: past, present, and future, Penn State University, USA, May 2008: *Rank-based tests of multivariate independence in independent component models* (invited talk).
21. Joint Meeting of the Statistical Society of Canada and the Société Française de Statistique, Ottawa, Canada, May 2008: *Invariant methods for independent component models* (invited plenary talk).
22. Twenty-second Nordic Conference on Mathematical Statistics, Vilnius, Lithuania, June 2008: *Invariant semiparametric methods for independent components models* (invited talk).
23. Second Brussels-Waseda Seminar on Time Series and Financial Statistics, Brussels, Belgium, June 2008: *A new approach to R-estimation*.
24. Joint Statistical Meetings, Denver, Colorado, USA, August 2008: *A new approach to R-estimation* (invited talk, for the *Gottfried E. Noether Young Scholar Award*).
25. Workshop on “Nonparametric Statistics, Refined, Redefined, and Renewed”, the University of Texas at Arlington, USA, April 2009: *On multivariate runs tests for randomness* (invited talk).
26. International Conference on Robust Statistics (ICORS), Parma, Italy, June 2009: *On multivariate runs tests for randomness*.
27. Fourth Brussels-Waseda Seminar on Time Series and Financial Statistics, Brussels, Belgium, June 2009: *Multivariate quantiles, from  $L_1$  optimization to halfspace depth*.
28. European Meeting of Statisticians, Toulouse, France, July 2009: *On multivariate runs tests for randomness*.
29. Conference on Nonparametric Statistics and Statistical Learning, The Ohio State University, USA, May 2010: (invited talk).
30. Conference on time series, quantile regression and model choice, University of Dortmund, Germany, September 2010: *Local bilinear multiple-output quantile regression* (invited talk).
31. 4th CSDA International Conference on Computational and Financial Econometrics (CFE’10), University of London, UK, December 2010: *Rank-based inference in independent component models* (invited talk).
32. Waseda symposium on Theory and Applications for Time Series Analysis, Waseda university, Japan, March 2011: *Rank tests for PCA* (invited talk).
33. Atami seminar, Atami, Japan, March 2011: *Depth-based runs tests for multivariate central symmetry* (invited talk).
34. Wonder Research Afternoon, Tilburg, The Netherlands, April 2011: *Multivariate runs tests* (invited talk).

35. IMA's 3rd Conference on Mathematics in Sport, Manchester, United Kingdom, June 2011: *A stochastic analysis of some two-person sports*.
36. 19th Annual Meeting of the Belgian Statistical Society, Hasselt, Belgium, October 2011: *Rank-based ICA*.
37. 4th International Conference of the ERCIM Working Group on Computing & Statistics (ERCIM'11), University of London, UK, December 2011: *Semiparametrically efficient inference based on signed ranks in symmetric independent component models* (invited talk).
38. Workshop on robust methods for dependent data, Dortmund, Germany, February 2012: *Universally consistent depth-based classifiers* (invited talk).
39. First Joint Conference of the Belgian, Royal Spanish and Luxembourg Mathematical Societies, Liège, Belgium, June 2012: *Statistical depth and classification* (invited talk).
40. First Conference of the International Society for Nonparametric Statistics, Chalkidiki, Greece, June 2012: *R-estimation in independent component analysis* (invited talk).
41. 8th World Congress in Probability and Statistics, Istanbul, Turkey, July 2012: *Universally consistent depth-based classifiers* (invited talk).
42. International Conference on Robust Statistics (ICORS), Burlington, Vermont, USA, August 2012: *Testing linear constraints in IC models* (invited talk).
43. Statistische woche 2012, Vienna, Austria, September 2012: *Nonparametrically consistent depth-based classifiers* (Gumbel invited lecture).
44. 5th International Conference of the ERCIM Working Group on Computing & Statistics (ERCIM'12), Oviedo, Spain, December 2012: *Local Multiple-Output Quantile Regression* (invited talk).
45. 2ème Rencontre de Statistique Avignon-Marseille, June 2013: *Quantiles multivariés et profondeur conditionnelle* (invited talk).
46. 2013 edition of the Brussels Summer School of Mathematics (BSSM), August 2013: *Profondeur statistique et quantile* (invited talk).
47. 59th World Statistics Congress, Hong Kong, China, August 2013: *From Depth to Local Depth : A Focus on Centrality* (invited talk).
48. 6th International Conference of the ERCIM Working Group on Computational and Methodological Statistics (ERCIM'13), University of London, UK, December 2013: *Local Depth for Functional Data* (invited talk).
49. Meeting entitled "Advances in Directional Statistics", Université libre de Bruxelles, Belgium, May 2014: *Universal asymptotics for high-dimensional sign tests* (invited talk).
50. Second Conference of the International Society for Nonparametric Statistics, Cadiz, Spain, June 2014: *Universal asymptotics for high-dimensional sign tests* (invited talk).

51. Second Conference of the International Society for Nonparametric Statistics, Cadiz, Spain, June 2014: *Multiple-output Functional Quantile Regression* (invited talk).
52. 47èmes Journées de Statistique, annual meeting of the French Statistical Society, Lille, France, June 2015: *Tests d'uniformité sur la sphère unité de grande dimension*.
53. The Joint Statistical Meetings, Seattle, USA, August 2015: *Multiple-output Functional Quantile Regression* (invited talk).
54. 8th International Conference of the ERCIM WG on Computational and Methodological Statistics (CMStatistics 2015), London, UK, December 2015: *Testing for spherical location in the vicinity of the uniform distribution* (invited talk).
55. Third Conference of the International Society for Nonparametric Statistics, Avignon, France, June 2016: *Testing uniformity on high-dimensional spheres against symmetric and asymmetric spiked alternatives* (invited talk).
56. Seventh Workshop on “New developments in econometrics and time series”, October 2016: *Testing uniformity on high-dimensional spheres* (invited talk).
57. 24th Annual Meeting of the Belgian Statistical Society, Namur, Belgium, October 2016: *Inference on the mode of weak directional signals: A Le Cam perspective on hypothesis testing near singularities*.
58. 10th International Chinese Statistical Association, Shanghai, China, December 2016: *Testing uniformity on high-dimensional spheres against symmetric and asymmetric spiked alternatives* (invited talk).
59. 9th International Conference of the ERCIM WG on Computational and Methodological Statistics (CMStatistics 2016), Seville, Spain, December 2016: *Efficiency in the high-dimensional one-sample location problem* (invited talk).
60. 10th ICSA International Conference, Shanghai, China, December 2016: *Testing uniformity on high-dimensional spheres against symmetric and asymmetric spiked alternatives* (invited talk).
61. Nationale Wiskunde Dagen, Noordwijkerhout, The Netherlands, February 2017: *Statistics and cinema: the good, the bad and the ugly* (invited talk).
62. Godeaux lecture, Joint VVWL-BMS-SBPMef conference of mathematics, Brussels, Belgium, May 2017: *Hypothesis testing in non-standard situations* (invited talk).
63. 61st World Statistics Congress, Marrakech, Morocco, July 2017: *Efficiency in the high-dimensional one-sample location problem* (invited talk).

## 11 Other invited talks

1. Statistics seminar, KULeuven, Belgium, February 2002: *Optimal tests for multivariate location based on interdirections and pseudo-Mahalanobis ranks.*
2. Statistics seminar, Université de Lille I, France, December 2002: *Tests optimaux de bruit blanc multivarié fondés sur des rangs signés généralisés.*
3. Workshop on multivariate nonparametric statistics, Himos, Finland, January 2003: *Affine Invariant Linear Hypotheses for the Multivariate GLM with VARMA Error Terms.*
4. Statistics seminar, University of Jyväskylä, Finland, January 2003: *Hyperplane-based identification procedures for the order of a multivariate AR series.*
5. Statistics seminar, Université de Paris VI, February 2003: *Tests de bruit blanc multivarié optimaux fondés sur les interdirections de Randles et les rangs de Mahalanobis.*
6. Statistics seminar, Tilburg university, The Netherlands, March 2003: *Hyperplane-based procedures for testing elliptical randomness against VARMA dependence.*
7. GREMARS seminar, Université de Lille III, France, October 2003: *Optimal procedures based on interdirections and pseudo-Mahalanobis ranks for testing multivariate elliptic white noise against ARMA dependence.*
8. Statistics and Econometrics seminar, University of York, United Kingdom, October 2003: *Multivariate rank-based procedures for testing elliptical randomness against VARMA dependence.*
9. Statistics seminar, Université Catholique de Louvain, Belgium, December 2003: *Multivariate rank-based procedures for testing elliptical randomness against VARMA dependence.*
10. Statistics seminar, University of Orsay, Paris, France, January 2004: *Multivariate rank-based procedures for testing elliptical randomness against VARMA dependence.*
11. Statistics seminar, Université de Liège, Belgium, January 2004: *Optimal rank-based tests for sphericity.*
12. Statistics seminar, Institut für Mathematische Stochastik, Technical University of Braunschweig, Germany, May 2004: *Multivariate rank-based procedures for testing elliptical randomness against VARMA dependence.*
13. Statistics seminar, University of Dortmund, Germany, June 2004: *Optimal rank-based tests for sphericity.*
14. Stochastics colloquium, Institute for Mathematical Stochastics, University of Goettingen, Germany, October 2004: *Optimal rank-based tests for sphericity.*
15. Statistics seminar, Waseda University, Tokyo, Japan, January 2005: *Inference on the shape of elliptical distributions.*

16. Series of lectures on research in mathematics for first year Bachelor students in Mathematics, Vrije Universiteit Brussel, Belgium, March 2005: *Seeking the Holy Grail: ultimate estimators of multivariate location.*
17. Econometrics and Statistics seminar, Tilburg University, The Netherlands, April 2005: *On the shape of elliptical distributions. Rank-based estimators and tests.*
18. Statistics seminar, Universidad Carlos III de Madrid, Spain, May 2005: *Inference on the shape of elliptical distributions.*
19. Statistics seminar, University of Tampere, Finland, February 2006: *Rank-based tests for the equality of covariance matrices.*
20. Swiss Statistics Seminars, Institut für Exakte Wissenschaften, University of Bern, Switzerland, May 2006: *Rank-based tests of multivariate independence in independent component models.*
21. Statistics seminar, University of Dortmund, Germany, December 2006: *A class of affine-equivariant rank-based estimators for the shape of an elliptical distribution.*
22. Workshop on multivariate nonparametric statistics, Himos, Finland, janvier 2007: *Multivariate medians: A quick review and a new proposal.*
23. Statistics seminar, KULeuven, Belgium, February 2007: *Testing for multivariate independence in independent component models.*
24. Presentation for the Association of Belgian Science Journalists, Brussels, Belgium, janvier 2008: *Mathématique: Modèles et décision.*
25. ECORE seminar, Université catholique de Louvain, Belgium, February 2008: *Independent component models: new extensions of the multivariate normal model.*
26. Statistics seminar, School of Public Health, Université Libre de Bruxelles, Belgium, April 2008: *Independent component (IC) models: new extensions of the multinormal model.*
27. Statistics seminar, Columbia University, New York, USA, November 2008: *Optimal rank-based tests for homogeneity of scatter.*
28. Statistics seminar, the University of Texas at Dallas, USA, April 2009: *Rank-based tests of multivariate independence in independent component models.*
29. Statistics seminar, University of Tampere, Finland, May 2009: *On multivariate runs tests for randomness.*
30. Statistics Seminar, Università di Padova, Italy, September 2009: *Singularities in skew-symmetric models: characterization results and asymptotic implications.*
31. Statistics Seminar, University of Bayreuth, Germany, January 2010: *Multivariate quantiles and multiple-output regression quantiles: From  $L_1$  optimization to halfspace depth.*

32. Statistics Seminar, The Open University, Milton Keynes, United Kingdom, February 2010: *Multivariate quantiles and multiple-output regression quantiles: From  $L_1$  optimization to half-space depth.*
33. Econometrics and Statistics Seminar, EQUIPPE, Université de Lille III, France, March 2011: *Rank tests for PCA.*
34. Statistics Seminar, GREMAQ/TSE, Université des Sciences Sociales de Toulouse, France, May 2011: *Multivariate quantiles and multiple-output regression quantiles : from  $L_1$  optimization to halfspace depth.*
35. Seminar for Statistics, ETH Zurich, Switzerland, November 2011: *Rank-based inference for independent component analysis.*
36. Seminar for Statistics, University of Vienna, Austria, January 2013: *Local multiple-output quantile regression.*
37. Seminar for Statistics, University of Cologne, Germany, February 2013: *Local depth through depth-based neighborhoods.*
38. Seminar for Statistics, “point de vue” series, Université Paris-Diderot Paris 7, February 2013: *Quantiles multivariés et profondeur conditionnelle.*
39. Seminar for Statistics, University of Cambridge, UK, May 2013: *From depth to local depth : a focus on centrality.*
40. ULB-UCL Statistics seminar, Université catholique de Louvain, Belgium, November 2013: *From depth to local depth : a focus on centrality.*
41. Seminar for Statistics, Heinrich Heine Universität Düsseldorf, Germany, January 2014: *Rank-based inference for one-sample and multi-sample principal component analysis.*
42. Seminar for Statistics, TU Dortmund, Germany, January 2014: *Rank-based inference for one-sample and multi-sample principal component analysis.*
43. Institut des Hautes Etudes de Belgique, Brussels, Belgium, March 2015: *La statistique fait son cinéma : illustration de quelques méthodes statistiques sur des données cinématographiques.*
44. Mathematics colloquium, KULeuven, Belgium, March 2015: *Testing uniformity on high-dimensional spheres.*
45. Seminar for Statistics, Aalto university, Finland, April 2015: *Testing uniformity against contiguous rotationally symmetric alternatives on high-dimensional spheres.*
46. Seminar for Econometrics and Statistics, Toulouse School of Economics, Université Toulouse 1 Capitole, France, April 2015: *Testing uniformity against contiguous rotationally symmetric alternatives on high-dimensional spheres.*
47. Congrès annuel de la Société Belge des Professeurs de Mathématique d’expression française (SBPMef), Mons, Belgium, August 2015: *La statistique fait son cinéma : illustration de quelques méthodes statistiques sur des données cinématographiques.*



48. A path through probability, conference in honour of F. Thomas Bruss, Brussels, Belgium, September 2015: *Testing uniformity on high-dimensional spheres.*
49. Statistics seminar, Bocconi University, Milan, Italy, November 2015: *Testing uniformity on high-dimensional spheres against rotationally symmetric alternatives.*
50. Statistics seminar, University of Orsay, Paris, France, November 2015: *Testing uniformity on high-dimensional spheres against rotationally symmetric alternatives.*
51. Mathematics colloquium, Aalto University, Helsinki, Finland, January 2016: *Inference on the mode of weak directional signals: a Le Cam perspective on hypothesis testing near singularities.*
52. Journée organisée par la Régionale de l'APMEP (Association des Professeurs de Mathématiques de l'Enseignement Public) de Lorraine, Nancy, France, March 2016: *La statistique fait son cinéma : illustration de quelques méthodes statistiques sur des données cinématographiques.*
53. Statistics and probability seminar of the Institut Elie Cartan, Nancy, France, March 2016: *Testing uniformity on high-dimensional spheres against monotone rotationally symmetric alternatives.*
54. Seminar for Econometrics and Statistics, Toulouse School of Economics, Université Toulouse 1 Capitole, France, April 2016: *Inference on the mode of weak directional signals: a Le Cam perspective on hypothesis testing near singularities.*
55. Short course, Programme doctoral en statistique et probabilités appliquées, Villars-sur-Ollon, Switzerland, September 2016: *From statistical depth to multivariate quantiles.*
56. Séminaire de statistique, Université de Lille 1 - INRIA Modal, Lille, France, November 2016: *Testing uniformity on high-dimensional spheres against monotone rotationally symmetric alternatives.*
57. Statistics workshop at Tilburg University, The Netherlands, December 2016: *Testing uniformity on high-dimensional spheres against monotone rotationally symmetric alternatives.*
58. Statistics workshop at London School of Economics, London, UK, February 2017: *Testing uniformity on high-dimensional spheres against monotone rotationally symmetric alternatives.*
59. Adolphe Quetelet Seminar, Universiteit Gent, Ghent, Belgium, March 2017: *Inference on the mode of weak directional signals: a Le Cam perspective on hypothesis testing near singularities.*
60. Ecole Polytechnique, Paris, April 2017: *Testing uniformity on high-dimensional spheres.*
61. Lille Research Workshop on Statistics and Econometrics, Université Lille 3, Lille, France, May 2017: *Inference on the mode of weak directional signals: a Le Cam perspective on hypothesis testing near singularities.*
62. Workshop celebrating Peter Rousseeuw's 60th birthday, KULeuven, Leuven, Belgium, June 2017: *Halfspace depths for scatter, concentration and shape matrices .*
63. ADISTA17 (Workshop on Advances in Directional Statistics), Rome, Italy, June 2017: *On the asymptotic non-null behavior of high-dimensional spherical location tests.*

## 12 PhD Student Supervision

Maria-Caterina Bramati, *Some robust methods in the analysis of multivariate time series*, with M. Hallin, September 2005.

Delphine Cassart, *Optimal tests for symmetry*, with M. Hallin, June 2007.

Thomas Verdebout, *Optimal inference for one-sample and multisample principal component analysis*, with M. Hallin, October 2008.

Nezar Bennala, *Rank-based optimal tests in panel data models*, with M. Hallin, September 2010.

Christophe Ley, *Univariate and multivariate symmetry: statistical inference and distributional aspects*, November 2010.

Germain van Bever, *Contributions to nonparametric and semiparametric inference based on statistical depth*, September 2013.

Isabelle Charlier, *Conditional quantile estimation through optimal quantization*, with J. Saracco, December 2015.

Joséa Rasoafaraniaina, *Pre-test estimators in local and asymptotically normal families*, with Th. Verdebout, in progress.

Christine Cutting, *High-dimensional sign tests*, with Th. Verdebout, in progress.

Julien Rémy, *Asymptotic inference close to singularities*, with Th. Verdebout, in progress.

## 13 Research interests

Asymptotic statistics, high-dimensional statistics, directional statistics, nonparametric statistics, depth-based methods, multivariate quantiles.

## 14 Referee reports for...

*Annals of Statistics, Journal of the American Statistical Association, Journal of the Royal Statistical Society B, Probability Theory and Related Fields, Bernoulli, Scandinavian Journal of Statistics, Journal of Nonparametric Statistics, Annals of the Institute of Mathematical Statistics, Journal of Multivariate Analysis, Journal of Statistical Planning and Inference, Electronic Journal of Statistics, Canadian Journal of Statistics, Statistical Science, Statistics and Probability Letters, Computational Statistics and Data Analysis, Journal of Time Series Analysis, Test, Journal of Econometrics, Journal of Financial Econometrics, Communications in Statistics, Journal of Sta-*

*tistical Software, Austrian Journal of Statistics, Journal of the Korean Statistical Society, Journal of Applied Statistics, Journal of Statistical Computation and Simulation, Journal of Business & Economic Statistics, Biometrical Journal, Annals of Applied Probability, Sequential Analysis Journal, Statistical Papers, METRON International Journal of Statistics, IMS Collection Series, Stat.*