CHRISTINE THOMAS-AGNAN
9 mai 2022

1 Career

Birth date : 12-07-1956 (in Béziers, France)
Family : married, two children
Professional address : TSE-R, Université Toulouse 1 Capitole, 21 Allées de Brienne, 31000 TOULOUSE.
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1.1 Studies

1976-1980 Student of the Ecole Normale Supérieure de Jeunes Filles (Sévres)
1976-1977 Master 1 (maétrise) in Paris 7
1977-1978 Master 2 (D.E.A) of mathematics in Paris 6 under the direction of M. Marle (symplectic geometry applied to quantum mechanics)
1978-1979 Competitive exam Agrégation at ENSJF. Rank 45th
1979-1980 Master 2 (D.E.A) of Statistics at Paris 11 (Orsay), with a two months internship in the laboratory of Statistics of the agronomical institute in Rennes, under the direction of Jean Pierre Masson.
11 September 1987 PhD in Mathematics, UCLA.

1.2 Jobs

1980-1981 Intern for Agrégation in Clermont-Ferrand, with a six weeks internship in Paris(Régie Renault).
1981-1983 High school professor (Terminale C at Lycée de Mauriac, Cantal).
Summer 1983 Six weeks internship at IBM (summer school)
1983-1984 Professor in "classe de Mathématiques Supérieures TA" at the Lycée Amédée Gasquet in Clermont-Ferrand
1984-1987 Teaching assistant and research assistant at UCLA (University of California Los Angeles)
PhD defense September 11th 1987.
1987-1988 P.R.A.G. at Université de Toulouse II
1988-1993 Maitre de conférences at Université de Toulouse I
1993-1994 One year position at CNRS.
Habilitation à diriger des recherches January 14th 1994.
since 1994 Professor at Université de Toulouse I
2000-2001 Sabbatical at Bentley College, Boston, USA
2004-2005 One year position at CNRS

2 Pedagogical activities in 2017-2018

Master 2 Statistics and Econometrics :
- Scoring
- Spatial econometrics and Geomarketing
- Statistical consulting class

Master 1 Economics and Statistics : Statistical Mathematics 1 (half course) and Statistical Mathematics 2 (half course).

3 Administrative duties

- Director of Master 2 Statistics and Econometrics (between January 2004 and September 2015) (UT1-UT3)
- Director of Master 1 Economics and Statistics of TSE since September 2011.
- Director of Master 1 Mathematics and Economic Decision of TSE since September 2020.
- Member of the pedagogical committee of the "Ecole d'Economie de Toulouse" since the creation of the school.
- Member of hiring committee (UT1) of 26è section UT1.
- UT1 correspondent of Ecole doctorale de Mathématiques Appliquées and of M2R Applied Maths.

4 Research

Member of TSE-R (Toulouse School of Economics, UMR 5314)
My main research topics are
- Compositional data analysis
- Market share regression models
- Political economics statistical models
- Spatial point processes
- Spatial econometrics
- Non and semi parametric inference
- Conditional quantiles and expectiles, efficiency measures
- Applications to statistics and probability of reproducing kernels Hilbert space theory

4.1 PhD supervision

PhD supervision stipend from 2000 to 2003 and from 2006 to 2009.
List of supervised PhD :

a. Cheikh Diack (1997) Tests de convexité pour une fonction de régression. Actuellement dans l'industrie pharmaceutique (convexity testing for a regression function)

b. Sandrine Casanova (2000) Estimation non paramétrique des quantiles conditionnels. Actuellement maétre de conférences é l'université de Toulouse 1 Capitole.(non parametric estimation of conditional quantiles)

c. Abdelaati Daouia (2003) en codirection avec Yves Aragon, Analyse nonparamétrique des frontiéres de production et des mesures d'efficacité é l'aide de quantiles conditionnels non-standards. Actuellement maétre de conférences é l'université de Toulouse 1 Capitole. (Nonparametric production frontiers and efficiency measures with non-standard conditional quantiles)

d. Samuel Elogne (2004), en codirection avec Olivier Perrin. Estimation non paramétrique d'une fonction de covariance spatiale non stationnaire par des méthodes d'interpolation. (nonparametric estimation of an autocovariance function by interpolation methods)

e. Inés Heba (2005). Contributions é l'analyse statistique et économétrique des données géoréférencées, en codirection avecYves Aragon. Thése en cotutelle avec l'université de Tirana en Albanie (Pr. Ruseti). Actuellement é l'insitut national de statistique d'Albanie. (contributions to the statistical and econometric analysis of georeferenced data)

f. Lionel Cucala (2006). Espacements bidimensionnels et données entachées d'erreurs dans l'analyse des processus ponctuels spatiaux. Actuellement maétre de conférences é l'université de Montpellier II. (Bidimensional spacings and measurement error in spatial point processes)

g. Florent Bonneu (2009) Processus ponctuels spatiaux pour l'analyse du positionnement optimal et de la concentration. Actuellement maétre de conférences é l'université d'Avignon.(spatial point processes for optimal positionning and spatial concentration)

h. Do Van Huyen (2015) Areal interpolation methods.

i. Serge Somda (2015) Individualisation du suivi en fonction des facteurs pronostiques et du type de rechute. (individual follow-up of patients as a function of pronostic factors and type of relapse)

j. Joanna Morais (2017). CIFRE with BVA, co-direction with Michel Simioni. Impact of media investments on brands' market shares : a compositional data analysis approach.

k. Huong Trinh Thi (2018), co-direction with Michel Simioni. Adapting recent statistical techniques to the study of nutrition in Vietnam.

l. Nguyen Huong An, co-direction with A. Ruiz-Gazen, starting May 2017. Political economics statistical models.

m. Lukas Dargel, co-direction with A. Ruiz-Gazen, started in October 2020, completion expected during academic year 2022-2023. Statistical analysis of spatial interaction models for flow data in a general framework.

n. Thibault Laurent, co-direction with A. Daouia, started in September 2020. completion expected during academic year 2022-2023. Contributions to spatial econometrics.

Supervision of HDR (habilitation à diriger des recherches)
- A. Ruiz-Gazen (2004)
- O. Perrin (2005)
- N. Peyrard (2013)
- T. Filleron (2014)
- E. Leconte (2017)
- X. Gendre (2022)

4.2 Research contracts

- Participation to contract DAER/9408140 with Midi-Pyrénées region : Disparités démographiques et économiques dans la région Midi-Pyrénées.
- Participation to contract DAER/99008446 and DAER/01002735 with Midi-Pyrénées region : Modélisation, simulation et analyse des dynamiques spatiales de l'économie.
- Participation to contract DAER/03012074 with Midi-Pyrénées region : Spatialyse.
- Contract with "rectorat de l'académie de Toulouse" : " Etude des coéts salariaux dans les colléges et lycées de Midi-Pyrénées, Comparaison rural-urbain en 2003-2004. "
- research contract with DREAL Midi Pyrénées (2010 - 2011 - 2012)

4.3 ANR projects

I have been the coordinator of an ANR project entitled **ModULand** (Programme Blanc) : Usage des sols : modéles, dynamique et décisions. (ANR 2011 BSH1 005 01) from 2011 to 2016.
Since January 2012, this interdisciplinary project is constitued by a group of 5 statisticians (from Toulouse) and 8 econometricians (Toulouse, Paris, Besanéon, Dijon, Nancy). The modeling of land use is considered under its theoretical aspects with spatial econometrics methods and also under its economics aspects with its impact on natural resources and the impact of public policies on its evolution.

4.4 Conference organization

a. President of the scientific committee of the first "Spatial Econometrics Workhop" June 14th 2002 in UT1.

b. President of the scientific committee of the fourth "Spatial Econometrics Workhop" juin 27th 2005 in UT1.

c. President of the scientific committee of "Journées de Statistique de la SFDS" (Société Franéaise de Statistique), Angers June 2007.

d. Participation to the organizing committee of Franco-Danois SSIAB (Spatial Statistics and Image Analysis in Biology), Toulouse May 2008.

e. Scientific coordinator for the International School and Conference on Mathematical Methods in Finance and Economy, Hanoi, Vietnam, 24-30 May 2010.

f. Scientific coordinator for the International School and Conference on Mathematical Methods in Finance and Economy, DoSon, Vietnam, 24/10-01/11 2011.

g. President of the scientific committee of " Spatial Econometrics Society meeting " July 2011 in Toulouse.

h. President of the organizing committee of "Journées de Statistique de la SFDS" in May 2013 in Toulouse.

i. President of the organizing committee of the conference CodaWorks 2022 in Toulouse (June 27-July 1).

4.5 Editorial activities

— Chief editor of the Journal CSBIGS : Case Studies in Business, Industry and Government (http ://www.csbigs.fr), 2015-2020.
— Member of the publications committee of the SFDS.
— Associate editor of "Journal of Spatial Econometrics"
— Member of editorial board of "Journal of Geographical Systems"

4.6 Some recent oral communications

a. 6 hours intensive course on "Real Estate Pricing Models with spatial autocorrelation", DoSon, Vietnam, 2011.

b. invited for oral communication about "Outils et Modéles de statistique spatiale" at the séminar PEPI-INRA (november 2011, Paris)

c. invited for oral communication about "A unified framework for measuring industry location characteristics based on marked spatial point processes" at the weekly seminar of université de Pau et Pays de l'Adour (Juin 2012).

d. communication at the conference SSIAB 2012 (Avignon) "A unified framework for measuring industry location characteristics based on marked spatial point processes"

e. communication at the conference JdS 2012 é Bruxelles "Areal interpolation methods - Merging areal data at different spatial scales"

f. invitation for intensive course (14h) on "Analyse statistique des données spatiales", Vitoria-Gazteis, Espagne, 2012.

g. invited talk at the conference (6th Seminar "Jean Paelinck" of Spatial Econometrics, Madrid, November 2013) on "Measuring and testing spatial mass concentration of micro-geographic data".

h. invited talk at the 7th Seminar "Jean Paelinck" of Spatial Econometrics, Zaragoza, November 2014.

i. invited talk at the "Spatial statistics" international conference, Avignon June 2015 on "Areal interpolation methods : merging areal data at different spatial scales".

j. invited course "Introduction to spatial econometrics". VIASM Hanoi December 2021.

5 Publications

5.1 Books

a. A. Berlinet and C. Thomas-Agnan (2004), Reproducing kernel Hilbert spaces in probability and statistics, Springer.

b. J.-J. Droesbeke, G. Saporta et C. Thomas-Agnan (2013) Modéles à variables latentes et modéles de mélange, Editions Technip.

c. G. Arbia and C. Thomas-Agnan, Introduction : Advances in Cross-Sectional and Panel Data Spatial Econometric Modeling. Geographical Analysis, 46(2), 101-103.

d. J.-J. Droesbeke, M. Maumy-Bertrand, G. Saporta et C. Thomas-Agnan (2014) Approches statistiques du risque, Editions Technip.

e. J.-J. Droesbeke, G. Saporta et C. Thomas-Agnan. (2015). Méthodes robustes en statistique. Editions TECHNIP.

f. M. Maumy-Bertrand, G. Saporta et C. Thomas-Agnan. (2018) Apprentissage statistique et données massives. Editions TECHNIP.

g. Bertrand, Frédéric, Gilbert Saporta, and Christine Thomas-Agnan. (2021) Statistique et causalité. Editions Technip.

5.2 Published articles : 1989-2013

— P. Besse et C. Thomas-Agnan (1989), Le lissage par fonctions splines en statistique, Revue bibliographique, *Statistique et Analyse des Données*, vol 14 né1, pp.55-84.

— C. Thomas-Agnan (1989), Smoothing noisy data by two equivalent techniques, in : Data Analysis, Learning Symbolic Language and Numerical Knowledge, E.Diday eds, INRIA, Nova Science Publishers, Inc.

— C. Thomas-Agnan (1990), Smoothing periodic curves by a method of regularization, 1990, *SIAM Journal on Scientific and Statistical Computing*, vol 11 né 3, pp. 482-502.

— C. Thomas-Agnan (1990), A family of splines for nonparametric regression and their relationships with kriging, *Statistics*, vol 21 né 4, pp. 533-548.

— C. Thomas-Agnan (1991), Spline functions and Stochastic filtering, 1991, *Annals of Statistics*, vol 19 né3, pp. 1512-1527.

— C. Thomas-Agnan (1993), Computing a family of reproducing kernels for statistical applications, *Numerical Algorithms*, 13 (1996), pp. 21-32.

— M. Delecroix, M. Simioni, C. Thomas-Agnan (1995), A shape constrained smoother : simulation study, *Computational Statistics*, vol 10, pp. 155-175.
— M. Delecroix, M. Simioni, C. Thomas-Agnan (1996), Functional estimation under shape constraints, *Nonparametric Statistics*, vol 6, pp. 69-89.
— C. Diack and C. Thomas-Agnan (1998), A nonparametric test of the non convexity of regression, *Nonparametric Statistics*, vol 9, pp. 335-362.
— S. Casanova and C. Thomas-Agnan (1998), Quantiles conditionnels, *Journal de la Société Franéaise de Statistique*, vol 139, né4.
— E. Mammen and C. Thomas-Agnan (1999), Smoothing splines and shape restrictions, *Scandinavian Journal of Statistics* 26, pp. 239-252.
— S. Casanova and C. Thomas-Agnan (2000), About Monotone regression quantiles, *Statistics and Probability Letters*, vol 48, pp. 101-104.
— M. Delecroix and C. Thomas-Agnan (2000) Spline and kernel regression under shape restrictions, in : Smoothing and Regression. Approaches, Computation and Application, M. G. Schimek ed., Wiley..
— S. Casanova, E. Leconte and C. Thomas-Agnan (2002), Smooth conditional distribution function and quantiles under random censorship, *Lifetime Data Analysis*, 8, pp. 229-246.
— Y. Aragon, K.C. Li, K. Shedden and C. Thomas-Agnan (2003), Dimension Reduction for Multivariate Response Data, *J.A.S.A.* 98 (461), pp. 99-109.
— Y. Aragon, D. Haughton, J. Haughton, E. Leconte, E. Malin, A. Ruiz-Gazen, C. Thomas-Agnan (2003), Explaining the pattern of regional unemployment : the case of the Midi-Pyrénées Region, *Papers Regional Science* 82 (2003) 2, 155-174.
— Y. Aragon and A. Daouia and C. Thomas-Agnan (2005), Nonparametric frontier estimation : a conditional quantile based approach, *Econometric Theory* 21, pp. 358-389.
— Cressie N., Perrin O. and Thomas-Agnan C. (2005), Likelihood based estimation for Gaussian MRFs. *Statistical Methodology* 2, pp. 1-16.
— Cressie N., Perrin O. and Thomas-Agnan C., (2005). Doctors's prescribing patterns in the Midi-Pyrénées region of France : point process aggregation. In : "Case studies in spatial point process models", Lecture Notes in Statistics 185, Springer Verlag.
— S. Coelho, N. Lassabe, Y., C. Thomas-Agnan (2006), La plate-forme DynaSpat : Les dynamiques spatiales, *Revue RNTI* E-7, Visualisation en extraction des connaissances, Cépadués.
— Cucala, L. and Thomas-Agnan, C. (2006). Spacings-based tests for spatial randomness and coordinate-invariant procedures. *Annales de l'. I.S.U.P.*, 50, no 1-2, 31-45.
— Aragon Y., Daouia A. and Thomas-Agnan C. (2006). Efficiency Measurement : A Nonparametric Approach. *Annales d'Economie et de Statistique*, 82, No. 82, 217-242.
— Ruiz-Gazen A. and Thomas-Agnan C., 2007. A propos de l'ouvrage "Analyse statistique des données spatiales", de Jean-Jacques Droesbeke, Mi-

chel Lejeune et Gilbert Saporta, paru aux éditions Technip en 2006. *Courrier des Statistiques*, 121-122, 91-92.

— Elogne S., Perrin O., Thomas-Agnan C., 2008. Non parametric estimation of smooth stationary covariance functions by interpolation methods, *Statistical Inference for Stochastic Processes*, 12(2), 177-205.

— Bonneu F. and Thomas-Agnan C., 2009, Spatial point process models for location-allocation problems, *Computational Statistics and Data Analysis*, 53 (8), 3070-3081.

— Magrini, M. B., Bonneu, F., Thomas-Agnan, C., and Coelho, S. (2011). Educational planning : a simulation approach for the creation or closure of school classes. *Environment and Planning B : Planning and Design*, 38(4), 595-615.

— Laurent T., Ruiz-Gazen A. and Thomas-Agnan C. (2012) GeoXp : an R package for exploratory spatial data analysis, *Journal of Statistical Software*, 47(2).

— Céline Vignes, Sarah Rimbourg, Anne Ruiz-Gazen et Christine Thomas-Agnan (2013) " Fiches méthodologiques, méthodes statistiques d'allocation spatiale : interpolation de données surfaciques ", TSE Working Paper, 13-446, 19 novembre 2013.

5.3 Published articles : 2014-2020

— P. Filzmoser, A. Ruiz-Gazen, C. Thomas-Agnan (2014) Identification of local multivariate outliers, *Statistical Papers*, vol. 55(1), 29-47.

— LeSage J.P., Thomas-Agnan C. (2014) Spatial econometric OD-Flow models, in : Handbook of Regional Science, Fischer M.M. and Nijkamp P (eds), Springer, 1653-1673.

— LeSage, J. P., and Thomas-Agnan, C. (2015). Interpreting spatial econometric origin-destination flow models. *Journal of Regional Science*, 55(2), 188-208.

— Do Van Huyen, Thomas-Agnan C. and Vanhems A. (2014) Testing areal interpolation methods with US census 2010 data, *Région et Développement* 40-2014, Special issue : "Advances in Spatial Econometrics".

— Do Van Huyen, Thomas-Agnan, C., and Vanhems, A. (2015a). Spatial reallocation of areal data : another look at basic methods. *Revue d'économie Régionale et Urbaine*, (1), 27-58.

— Do Van Huyen, Thomas-Agnan C. and Vanhems A. (2015b) Accuracy of areal interpolation methods for count data, *Spatial Statistics*, 14, 412-438, doi :10.1016/j.spasta.2015.07.005.

— Bonneu, F., and Thomas-Agnan, C. (2015). Measuring and testing spatial mass concentration with micro-geographic data. *Spatial Economic Analysis*, 10(3), 289-316.

— Margaretic, P., Thomas-Agnan, C., and Doucet, R. (2015). Spatial dependence in (origin-destination) air passenger flows. *Papers in Regional Science*, 96(2), 357-380.

— Trinh T.H., Thomas-Agnan C. and Simioni M. (2016). Calorie intake and

income in China : new evidence using semi parametric modelling with generalized additive models. *Vietnam Journal of mathematical applications*, 14(1), 11-26.

— Chakir, R., Laurent, T., Ruiz-Gazen, A., Thomas-Agnan, C., and Vignes, C. (2016). Spatial scale in land use models : application to the Terutilucas survey. *Spatial Statistics*, 18, 246-262.

— Goulard, M., Laurent, T., and Thomas-Agnan, C. (2017). About predictions in spatial autoregressive models : Optimal and almost optimal strategies. *Spatial Economic Analysis*, 1-22.

— Chakir, R., Laurent, T., Ruiz-Gazen, A., Thomas-Agnan, C., and Vignes, C. (2017). Prédiction de l'usage des sols sur un zonage régulier é différentes résolutions et à partir de covariables facilement accessibles. *Revue Economique* (numéro spécial " Usage des sols ").

— Morais J.,Thomas-Agnan C. and Simioni M. (2018) Using compositional and Dirichlet models for market share regression. *Journal of Applied Statistics*. 45(9), 1670-1689.

— Morais J.,Thomas-Agnan C. and Simioni M. (2018) Interpretation of explanatory variables impacts in compositional regression models, *Austrian Journal of Statistics*, 47, 1-25. DOI :10.17713/ajs.v47i5.718

— Thi, H. T., Morais, J., Thomas-Agnan, C. and Simioni, M. (2018). Relations between socio-economic factors and nutritional diet in Vietnam from 2004 to 2014 : New insights using compositional data analysis, *Statistical Methods in Medical Research*, doi.org/10.1177/0962280218770223

— Thi, H. T., Simioni, M., and Thomas-Agnan, C. (2018). Assessing the nonlinearity of the calorie-income relationship : An estimation strategy with new insights on nutritional transition in Vietnam. *World Development*, 110, 192-204.

— Thi, H. T., Simioni, M., and Thomas-Agnan, C. (2018). Decomposition of changes in the consumption of macronutrients in Vietnam between 2004 and 2014. *Economics and Human Biology* 31, 259-275.

— T.H.A Nguyen, Anne Ruiz-Gazen, Christine Thomas-Agnan and Thibault Laurent (2019). Multivariate Student versus Multivariate Gaussian Regression Models with Application to Finance, Journal of Risk and Financial Management, 12(1), article 28, 2019.

— Nguyen, T. H. A., Thomas-Agnan, C., Laurent, T., and Ruiz-Gazen, A. (2020). A simultaneous spatial autoregressive model for compositional data. Spatial Economic Analysis, 1-15.

— Nguyen, T. H. A., Laurent, T., Thomas-Agnan, C., and Ruiz-Gazen, A. (2020). Analyzing the impacts of socio-economic factors on French departmental elections with coda methods. Journal of Applied Statistics, 1235-1251.

— Morais, J., and Thomas-Agnan, C. (2021). Impact of Covariates in Compositional Models and Simplicial Derivatives. Austrian Journal of Statistics, 50(2), 1-15.

— Laurent T., Margaretic P. and Thomas-Agnan C.(2021). Do neighboring countries matter when explaining bilateral remittances ? », TSE Working

Paper, n° 21-1221. To appear in Spatial Economic Analysis.
— Thomas-Agnan C., Laurent T., Ruiz-Gazen A., Chakir R. and Lungarska A. (2021). Spatial simultaneous autoregressive models for compositional data : application to land use. in : Filzmoser. Advances in Compositional Data Analysis. Springer International Publishing.

5.4 TSE working papers

— Beal, T., Le Danh, T., Nguyen, D. S., Simioni, M., Thomas-Agnan, C., and Trinh, T. H. (2018). Macronutrient balances and body mass index : a new insight using compositional data analysis with a total at various quantile orders (No. 18-921). Toulouse School of Economics (TSE).
— Do Thi Thuy, Thuy and Nguyen, Quang Dung and Nguyen Van, Huy and Thomas-Agnan, Christine and Trinh, Thi-Huong, 2018. "Measuring the progress of the timeliness childhood immunization compliance in Vietnam between 2006-2014 : A decomposition analysis," TSE Working Papers 18-920, Toulouse School of Economics.
— Laurent T., Thomas-Agnan C. and Ruiz-Gazen A. (2020). Covariates impacts in spatial autoregressive models for compositional data, TSE Working Paper, n° 20-1162, revised october 2021.
— Ruiz-Gazen A., Thomas-Agnan C., Laurent T. and Mondon C. (2022). Detecting outliers in compositional data using Invariant Coordinate Selection. TSE working paper, N. 22-1320.
— Dargel L. and Thomas-Agnan C. (2022), A generalized framework for estimating spatial econometric interaction models , TSE Working Paper, N. 22-1312.
— A. Ruiz-Gazen, C. Thomas-Agnan, T. Laurent et C. Mondon, « Detecting outliers in compositional data using Invariant Coordinate Selection », TSE Working Paper, N. 22-1320, mars 2022.

5.5 Articles in progress

a. Martin-Fernandez J.A., Palajea-Albaladejo J., Ruiz-Gazen A. and Thomas-Agnan C. (2021). Imputation of rounded zeros and missing values in compositional data through singular value decomposition.