MEHDI DAGDOUG

PERSONAL INFORMATION

Born on March 6, 1996
`Nationality`: French

Personal details
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CURRENT SITUATION

Postdoctoral researcher in the Department of Mathematics and Statistics at the University of Ottawa

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EDUCATION

2019–2022: Ph.D. in Mathematics, specialization in Statistics and Probability, under the supervision of the Professors Camelia Goga (Université de Bourgogne Franche-Comté) and David Haziza (University of Ottawa) at the University Bourgogne Franche-Comté. Thesis entitled "Statistical learning for high-dimensional sampling" defended on July 12, 2022.

2017-2019: Master of Science in Statistical Modeling, option research in statistics at the University of Franche-Comté.

2014-2017: Bachelor in Mathematics, option Applied Mathematics at the University of Franche-Comté.

PROFESSIONAL EXPERIENCE

Postdoctoral researcher in statistics 01/11/2022 - Present
Department of Mathematics and Statistics of the University of Ottawa *Ottawa, Canada*

Postdoctoral fellowship supervised by Professor David Haziza.

Attaché temporaire d'enseignement et de recherche 01/09/2022 - 31/10/2022
Laboratory of Mathematics of Besançon *Besançon, France*

Temporary professor position for teaching and research at the Université de Franche-Comté.

Ph.D. student with teaching contract 01/10/2019 - 31/08/2022
Laboratory of Mathematics of Besançon *Besançon, France*

Ph.D. scholarship funded by the Région Bourgogne Franche-Comté and Médiamétrie. Research and teaching activities for the Université de Franche-Comté.

Research internship Besançon, France
Laboratory of Mathematics of Besançon *01/03/2019 - 31/08/2019*

Redaction of a Master's thesis entitled "Model-assisted approaches and nonresponse in survey sampling" under the supervision of Professor Camelia Goga (Université de Bourgogne Franche-Comté).

Data scientist intern Toulouse, France
Airbus *01/04/2018 - 31/08/2018*

Research and development for anomaly detection for avionics data with semi-supervised statistical learning models.

AWARDS AND HONORS

– 2022: Laureate of the first edition of the Jean-Claude Deville Prize of the French Statistical Society. This prize rewards a young statistician, aged 35 maximum, who has produced an article in a statistical journal for its scientific and methodological qualities as well as its innovative aspects.

RESEARCH AREAS

My main research interests are focused on the following areas:

– Survey sampling theory: model-assisted estimators, high-dimensional asymptotic theory, variance estimation.

– Nonresponse in surveys: imputation, weighting methods, matrix completion, variance estimation.

– Statistical learning and its applications in survey sampling and missing data.

– Resampling methods and their applications in survey sampling and time series analysis.

PEER-REVIEWED ARTICLES

1. Dagdoug, M., Goga, C., & Haziza, D. (2022). Model-assisted estimation in high-dimensional settings for survey data. To appear in *Journal of Applied Statistics*.
2. Dagdoug, M., Goga, C., & Haziza, D. (2021). Model-assisted estimation through random forests in finite population sampling. To appear in *Journal of the American Statistical Association*.
3. Dagdoug, M., Goga, C., & Haziza, D. (2021). Imputation procedures in surveys using nonparametric and machine learning methods: an empirical comparison. To appear in *Journal of Survey Statistics and Methodology*.

ARTICLES IN WORK

– Dagdoug, M., Goga, C., & Haziza, D. Regression trees and random forests imputation in surveys with applications to data integration.

– Larbi, K., Haziza, D. & Dagdoug. M. Treatment of unit nonresponse in surveys through machine learning methods : an empirical comparison.

– Boubacar Maïnassara, Y. & Dagdoug, M. Cross-validated selection criteria for ARMA processes.

– Dagdoug, M. & Hasler, C. Nonparametric regression with complex survey data.

– Dagdoug, M., Eustache, E. & Haziza, D. Resampling methods for high-dimensional finite population sampling.

TEACHING CURRICULUM

Teaching in a Master of Science at the Université de Franche-Comté:

– 2022: Research in statistics in master 2. Lectures, exercise and coding sessions (15 hours).

– 2020-2022: Survey sampling in master 2. Lectures, exercise and coding sessions (18 hours) in 2023 and exercise and coding sessions (12 hours) in 2020 and 2021.

– 2021: Statistical learning in master 2. Exercise and coding sessions (6 hours, each year).

– 2020-2022: Python in master 2. Exercise and coding sessions (6 hours, each year).

– 2019-2021: Oriented-Object programming in master 1. Lectures, exercise and coding sessions (15 hours, each year).

– 2019-2021: Advanced R course in master 1. Lectures and coding sessions (12 hours, each year).

Teaching in a Bachelor of Science

– Elementary statistics in the third year of bachelor of mathematics. Coding sessions and final projects (25 hours).

– Mathematical tools in the first year of bachelor of biology. Mixed (40 hours in 2019-2020, 20 hours in 2020-2021).

PRESENTATIONS AT CONFERENCES AND SEMINARS

Invited Conferences

- Dagdoug, M., Goga, C. Haziza, D. (2023). Model-assisted estimation through random forests in finite population sampling. *12e Colloque International Francophone sur les Sondages*, Aubervilliers, France, 21-24 mars 2023.
- Dagdoug, M., Goga, C. Haziza, D. (2022). Analysis of regression tree and random forest imputation in surveys. *Summer School on Modern Methods in Survey Sampling*, Ottawa, Canada , 5 - 8 juillet 2022.
- Dagdoug, M., Goga, C. Haziza, D. (2022). Model-assisted estimation through random forests in finite population sampling. *Congrès annuel 2022 de la Société de Statistique du Canada*, Ottawa, Canada (online), 30 - 3 June 2022.
- Dagdoug, M., Goga, C. Haziza, D. (2022). High-dimensional convergence for model-assisted estimators. *ITACOSM2022*, Perugia, Italy, 8-10 June 2022.
- Dagdoug, M., Goga, C. Haziza, D. (2021). Random forests imputation in surveys. *Joint Statistical Meeting (JSM) 2021*, Seattle, United States (online), 7-12 August 2021.
- Dagdoug, M., Goga, C. Haziza, D. (2021). Model-assisted estimation through random forests in finite population sampling. *Statistics 2021 Canada*, Montreal, Canada (online), 15 - 18 July 2021.
- Dagdoug, M., Goga, C. Haziza, D. (2020). Model-assisted estimation through random forests in finite population sampling. *13th International Conference of the ERCIM WG on Computational and Methodological Statistics*, London, England (online), 19-21 December 2020.

Contributed Conferences

- Dagdoug, M., Goga, C. Haziza, D. (2022). Random forests in surveys: from model-assisted estimation to imputation. *Journées de Méthodologie Statistique de l'Insee 2022 (JMS2022)*, Paris, France, 29-31 March 2022.
- Dagdoug, M., Goga, C. Haziza, D. (2021). Random forests imputation in surveys. *Forum des Jeunes Mathématicien.ne.s*, Besançon, France, 8-10 December 2021.
- Dagdoug, M., Goga, C. Haziza, D. (2021). Model-assisted estimation through random forests in finite population sampling, presentation with Camelia Goga. *11e Colloque International Francophone sur les Sondages*, Bruxelles, Belgium, 6-8 October 2021.
- Dagdoug, M., Goga, C. Haziza, D. (2021). Random forests imputation in surveys. *11e Colloque International Francophone sur les Sondages*, Bruxelles, Belgium, 6-8 October 2021.

- Dagdoug, M., Goga, C. Haziza, D. (2021). Convergence rates of model-assisted estimators in high-dimensional settings. *63rd ISI World Statistics Congress*, The Hague, Netherlands (online), 11-16 July 2021.
- Dagdoug, M., Goga, C. Haziza, D. (2021). Model-assisted estimation through random forests in finite population sampling. *Conference in honor of Fred Smith and Chris Skinner*, Southampton, England (online), 7-9 July 2021.
- Dagdoug, M., Goga, C. Haziza, D. (2021). High-dimensional asymptotics for model-assisted estimation. *6ème Journée "Probabilités et statistiques Besançon-Dijon"*, Dijon, France, 5 July 2021.
- Dagdoug, M., Goga, C. Haziza, D. (2021). Model-assisted estimation through random forests in finite population sampling. *Congrès annuel 2021 de la Société de Statistique du Canada*, Ottawa, Canada (online), 7-11 June 2021.
- Dagdoug, M., Goga, C. Haziza, D. (2021). Model-assisted estimation through random forests in finite population sampling. *52ème Journées de Statistiques de la Société Française de Statistique*, Nice, France (online), 7-11 June 2021.
- Dagdoug, M. (2019). Imputation and calibration reweighting for surveys with missing data. *Sixième Journée des Jeunes Chercheurs en Mathématiques de l'UBFC*, Besançon, France, 12 April 2019.

Invited Seminars

- Dagdoug, M., Goga, C. Haziza, D. (2022). Imputation par arbres de régression et forêts aléatoires en théorie des sondages. *Séminaire de l'Institut de Statistique de Neuchâtel*, 28 April 2022.
- Dagdoug, M., Goga, C. Haziza, D. (2022). Analysis of regression tree and random forest imputation in surveys. *Séminaire des doctorants du Laboratoire de Mathématiques de Besançon*, Besançon, France, 3 March 2022.
- Dagdoug, M., Goga, C. Haziza, D. (2022). Analysis of regression tree and random forest imputation in surveys. *Séminaire des doctorants de l'institut mathématiques de Bourgogne*, Dijon, France, 24 February 2022.
- Dagdoug, M., Goga, C. Haziza, D. (2020). Model-assisted estimation through random forests in finite population sampling. *Séminaire de l'équipe Probabilités et Statistiques du Laboratoire de Mathématiques de Besançon*, Besançon, France (distanciel), 30 November 2020.
- Dagdoug, M., Goga, C. Haziza, D. (2019). Model-assisted estimation through random forests in finite population sampling. *Séminaire des doctorants du Laboratoire de Mathématiques de Besançon*, Besançon, France, December 2019.

RESEARCH VISITS

– University of Neuchâtel, Neuchâtel, Switzerland, may 2022, 2 weeks on the invitation of Professor Yves Tillé.

ADMINISTRATIVE RESPONSIBILITIES

– May 2020 - October 2022: Elected member of the Carnot Pasteur Doctorate School, representing Ph.D. students in mathematics.

– February 2021 - October 2022: Elected member of the BFC-Maths Federation, representing Ph.D. students of the Laboratory of Mathematics of Besançon.

SCIENTIFIC ANIMATIONS

- Co-organizer with Valentin Petit (LmB) of the Septième Journée des Jeunes Chercheuses et des Jeunes Chercheurs en Mathématiques de l'UBFC (50 participants); website: https://lmb.univ-fcomte.fr/Septieme-Journee-des-Jeunes-2332.
- Member of the organizing committee and webmaster of the Forum des Jeunes Mathématicien.ne.s 2021 (3 jours, 70 participants); website: https://jmb2021.sciencesconf.org.
- Co-organizer with Valentin Petit (LmB) of the Ph.D. seminar for the academic year 2021-2022 (14 seminars).
- Co-organizer with Valentin Petit (LmB) of the Ph.D. seminar for the academic year 2020-2021 (15 seminars).

INTERACTIONS WITH THE INDUSTRY

- Collaboration with the French company Médiamétrie during my Ph.D. and for the application of the methodology suggested in "Model-assisted estimation through random forests in finite population sampling" on real data collected by Médiamétrie.
- Participation at the *Semaine d'Etude Maths-Entreprises* (SEME) at Besançon, in 2019.
  Work in collaboration of Fabio Coppini (Université de Florence) and Émile Parolin (INRIA Saclay) for the Centre Régional De Lutte Contre Le Cancer Georges-François Leclerc in Dijon. This work resulted in the creation of a Python module and a report entitled "First steps in image registration".

INTERACTIONS WITH HIGH-SCHOOL STUDENTS

- Popularization workshop entitled "Titanic, entre expédition maritime et promenade en forêts aléatoires", for the "Journée de la recherche en mathématiques", November 17, 2021, Besançon (30 participants).
- "Les sondages: comment ça marche?", conference for the "Finale du rallye mathématiques des collégiens", June 2, 2022, Dijon (approximately 150 students).
- "Titanic, entre expédition maritime et promenade en forêts aléatoires", conference for the "Finale du rallye mathématiques des lycéens", June 2, 2022, Dijon (approximately 100 students).