

GIORGIA ZACCARIA

PERSONAL DATA

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🌐 Personal Page ◇ Institutional Page ◇ Google Scholar ◇ Research Gate ◇ ORCID
◇ Sapienza University of Rome (PhD page) ◇ LinkedIn

EMPLOYMENT

Postdoctoral Research Fellow *October 2022 – Present*
University of Milano-Bicocca, Milan, Italy
Department of Statistics and Quantitative Methods
Scientific Project Head: Prof. Francesca Greselin

Research Fellow *July 2021 – June 2022*
University of Rome Unitelma Sapienza, Rome, Italy
Department of Law and Economics
Scientific Project Head: Prof. Pasquale Sarnacchiaro

EDUCATION

Ph.D. in Methodological Statistics *November 2018 – February 2022*
University of Rome “La Sapienza”, Rome, Italy *Final evaluation: Excellent*
Department of Statistical Sciences
Thesis title: *Ultrametric models for hierarchical dimensionality reduction*
Supervisor: Prof. Maurizio Vichi

M.Sc. in Statistical and Decision Sciences *November 2016 – October 2018*
Curriculum: European Master in Official Statistics (EMOS) *Final score: 110/110 cum laude*
University of Rome “La Sapienza”, Rome, Italy
Department of Statistical Sciences
Thesis title: *Un modello gerarchico e parsimonioso per la costruzione di un indicatore composito di sviluppo sostenibile*
Supervisor: Prof. Maurizio Vichi

Internship *July 2018*
63 hours (a.y. 2017/2018), Alleanza per lo Sviluppo Sostenibile (ASviS), Rome, Italy

B.Sc. in Statistics, Economics and Society *November 2013 – October 2016*
University of Rome “La Sapienza”, Rome, Italy *Final score: 110/110 cum laude*
Department of Statistical Sciences
Thesis title: *Tecniche di ricampionamento per l'inferenza non parametrica: il metodo bootstrap*
Supervisor: Prof. Marco Perone Pacifico

RESEARCH VISITS

University of Catania, Catania, Italy *17 – 22 October 2024*
Department of Economics and Business

University of Valladolid, Valladolid, Spain *February 2024*
Department of Statistics and Operational Research

University of Valladolid, Valladolid, Spain *21-23 November 2023*
Department of Statistics and Operational Research

Tilburg University, Tilburg, The Netherlands *November 2021 – January 2022*
Department of Methodology and Statistics

RESEARCH INTERESTS

Ultrametric Models

Dimensionality Reduction

Model-Based Clustering

Hierarchical Models

Robust statistics

Latent Variable Models

AWARDS, GRANTS & SCHOLARSHIP

Erasmus+ for Professors and Research Fellows, a.y. 2023/2024

November 2023

University of Milano-Bicocca, Milan, Italy

Funding recipient

Research Grant for Junior Researcher, "Avvio alla ricerca"

October 2020

University of Rome "La Sapienza", Rome, Italy

Principal Investigator

Project title: *Hierarchical latent variable models for studying multidimensional phenomena in heterogeneous populations*

Funding: €1,700

Research Grant for Medium Projects

October 2019

University of Rome "La Sapienza", Rome, Italy

Investigator (Principal Investigator: Prof. Donatella Vicari)

Project title: *Models, methods and classification of transition data: analysis of the students mobility among degree courses of Italian universities*

Funding: €11,100

Excellent Graduate Award

May 2019

Fondazione Roma Sapienza, Rome, Italy

Excellent Graduate of the Faculty of Information Engineering, Computer Science and Statistics, a.y. 2017/2018

Scholarship

November 2018

University of Rome "La Sapienza", Rome, Italy

Ph.D. School of Statistical Sciences

Three years of Ph.D. scholarship

PUBLICATIONS

REFERRED JOURNAL ARTICLES

7. Bottazzi Schenone, M., Cavicchia, C., Vichi, M., **Zaccaria, G.** (2025) Ultrametric Factor Analysis for building hierarchies of reliable and unidimensional latent concepts. *Psychometrika*, doi: 10.1017/psy.2025.6 ([link](#)).

6. Greselin, F., **Zaccaria, G.** (2024) Studying hierarchical latent structures in heterogeneous populations with missing information. *Journal of Classification*, doi: 10.1007/s00357-024-09492-0 ([link](#)).

5. Cavicchia, C., Vichi, M., **Zaccaria, G.** (2024) Parsimonious Ultrametric Gaussian Mixture Models. *Statistics and Computing*, 34, 108 ([link](#)).

4. Cavicchia, C., Sarnacchiaro, P., Vichi, M., **Zaccaria, G.** (2024) A model-based ultrametric composite indicator for studying waste management in Italian municipalities. *Computational Statistics*, 39, 21-50 ([link](#)).

3. Cavicchia, C., Vichi, M., **Zaccaria, G.** (2023) Hierarchical Disjoint Principal Component Analysis. *AStA Advances in Statistical Analysis*, 107(3), 537–574 ([link](#)).

2. Cavicchia, C., Vichi, M., **Zaccaria, G.** (2022) Gaussian mixture model with an extended ultrametric covariance structure. *Advances in Data Analysis and Classification*, 16(2), 399-427 ([link](#)).

1. Cavicchia, C., Vichi, M., **Zaccaria, G.** (2020) The ultrametric correlation matrix for modelling hierarchical latent concepts. *Advances in Data Analysis and Classification*, 14(4), 837-853 ([link](#)).

MANUSCRIPT UNDER REVIEW OR IN PREPARATION

5. Cellwise outlier detection in heterogeneous populations (w. Garcia-Escudero, L.A., Greselin, F. and Mayo-Isacar, A.). *Revision required* ([arXiv](#)).
4. Social and cultural sustainability in Italy: a model-based hierarchical composite indicator (w. Di Nuzzo, C.). *Under second review*.
3. Cellwise Fuzzy TCLUS. (w. Garcia-Escudero, L.A., Greselin, F. and Mayo-Isacar, A.). *Manuscript in preparation*.
2. Mixtures of Disjoint Factor Analyzers. *Manuscript in preparation*.
1. Fuzzy Spectral Data Embedding (w. Di Nuzzo, C.). *Manuscript in preparation*.

ARTICLES EDITED IN VOLUMES AND PH.D. THESIS

3. Mingione, M., Vichi, M., **Zaccaria, G.** (2022) Complex Dimensionality Reduction: Ultrametric Models for Mixed-Type Data. In: L.A. Garcia-Escudero, A. Gordaliza, A. Mayo, M. Asunción Lubiano Gomez, M. Angeles Gil, P. Grzegorzewski, O. Hryniewicz (Eds.) *Building Bridges between Soft and Statistical Methodologies for Data Science. SMPS 2022. Advances in Intelligent Systems and Computing*, vol 1433. Springer, Cham. ISBN: 978-3-031-15508-6 ([link](#)).
2. **Zaccaria, G.** (2022) Ultrametric models for hierarchical dimensionality reduction. *Ph.D. thesis, XXXIV cycle* ([link](#)).
1. Cavicchia, C., Vichi, M., **Zaccaria, G.** (2020) Exploring hierarchical concepts: theoretical and application comparisons. In: T. Imaizumi, A. Nakayama, S. Yokoyama, S. (Eds.). *Advanced Studies in Behaviormetrics and Data Science. Behaviormetrics: Quantitative Approaches to Human Behavior*, vol. 5 (pp. 315-328). Springer, Singapore. ISBN: 978-981-15-2699-2 ([link](#)).

REFERRED CONFERENCE PROCEEDINGS

11. **Zaccaria, G.** (2023) Ultrametric Gaussian Mixture Models With Parsimonious Structures. In P. Coretto, G. Giordano, M. La Rocca, M.L. Parrella, C. Rampichini (Eds.). *Book of Abstract and Short Papers CLADAG 2023* (pp. 314-317). Pearson. ISBN: 978-88-9193-563-2.
10. Greselin, F., **Zaccaria, G.** (2023) Handling missing data in complex phenomena: an ultrametric model-based approach for clustering. In: F. M. Chelli, M. Ciommi, S. Ingrassia, F. Mariani, M. C. Recchioni (Eds.). *Book of the Short Papers SIS 2023* (pp. 961-966). Pearson. ISBN: 978-88-9193-561-8AAVV.
9. **Zaccaria, G.**, Sarnacchiaro, P. (2022) An ultrametric model for building a composite indicator system to study climate change in European countries. In: A. Balzanella, M. Bini, C. Cavicchia, R. Verde. (Eds.). *Book of Short Papers SIS 2022* (pp. 970-974). Pearson. ISBN: 978-88-9193-231-0.
8. Cavicchia, C., Sarnacchiaro, P., Vichi, M., **Zaccaria, G.** (2022) An ultrametric model to build a Composite Indicators system. In: R. Lombardo, I. Camminatiello, V. Simonacci (Eds.). *Book of Short Papers, 10th International Conference IES 2022 Innovation & Society 5.0: Statistical and Economic Methodologies for Quality Assessment, Department of Economics, University of Campania L. Vanvitelli, January 27th - 28th 2022* (pp. 208-211). Sesto San Giovanni: PKE - Professional Knowledge Empowerment s.r.l. ISBN: 978-88-94593-35-8.
7. Cavicchia, C., Vichi, M., **Zaccaria, G.** (2021) A parsimonious parameterization of a nonnegative correlation matrix. In: S. Ingrassia, A. Punzo, R. Rocci (Eds.). *MBC2 2020 Book of Short Papers of the 5th International Workshop on Models and Learning for Clustering and Classification, Catania* (pp. 21-26). Milano: Ledizioni. ISBN: 978-88-5526-539-3.
6. Cavicchia, C., Vichi, M., **Zaccaria, G.** (2021) Model-based clustering with parsimonious covariance structure. In: G. C. Porzio, C. Rampichini, C. Bocci (Eds.). *CLADAG 2021 Book of Abstracts and*

Short Papers. 13th Scientific Meeting of the Classification and Data Analysis Group, Firenze, September 9-11, 2021 (pp. 296-299). Firenze: Firenze University Press. ISBN: 978-88-5518-340-6.

5. Cavicchia, C., Vichi, M., **Zaccaria, G.** (2021) The ultrametric covariance model for modelling teachers' job satisfaction. In: C. Perna, N. Salvati, F. Schirripa Spagnolo (Eds.). *Book of Short Papers SIS 2021* (pp. 1319-1324). Pearson. ISBN: 978-88-9192-736-1.

4. **Zaccaria, G.**, Vichi, M. (2020) Exploring drug consumption via an ultrametric correlation matrix. In: A. Pollice, N. Salvati, F. Schirripa Spagnolo (Eds.). *Book of Short Papers SIS 2020* (pp. 372-377). Pearson. ISBN: 978-88-9191-077-6.

3. Cavicchia, C., Vichi, M., **Zaccaria, G.** (2019) Dimensionality reduction via hierarchical factorial structure. In: G. C. Porzio, F. Greselin, S. Balzano (Eds.). *Book of Short Papers, CLADAG 2019, 11-13 September 2019, Cassino* (pp. 116-119). Cassino: Centro Editoriale di Ateneo Università di Cassino e del Lazio Meridionale. ISBN: 978-88-8317-108-6.

2. Cavicchia, C., Vichi, M., **Zaccaria, G.** (2019) A new hierarchical model-based composite indicator on climate change. In: M. Bini, P. Amenta, A. D'Ambra, I. Camminatiello (Eds.). *Statistical Methods for Service Quality Evaluation, Book of Short Papers of IES 2019 in Roma, Italia, 4-5 July* (pp. 346-349). Cuzzolin. ISBN: 978-88-86638-65-4.

1. Cavicchia, C., Vichi, M., **Zaccaria, G.** (2019) Hierarchical Clustering and Dimensionality Reduction for Big Data. In: G. Arbia, S. Peluso, A. Pini, G. Rivellini (Eds.). *Smart Statistics for Smart Applications, Book of Short Papers SIS 2019* (pp. 173-180). Pearson. ISBN: 978-88-9191-510-8.

PRESENTATIONS AND SEMINARS

INVITED PRESENTATIONS

CLADAG 2025 15th Scientific Meeting Classification and Data Analysis Group University of Naples Federico II, Naples, Italy	<i>September 2025</i>
EYSM 2025 24th European Young Statisticians Meeting Collegio Carlo Alberto, Turin, Italy	<i>July 2025</i>
ICORS 2025 International Conference on Robust Statistics Stresa, Italy	<i>May 2025</i>
Seminar in the Robust Statistics and Data Science series KU Leuven, Leuven, The Netherlands	<i>April 2025</i>
BYMAT 2024 Plenary session (link) 6th BYMAT Conference: Bringing Young Mathematicians Together University of Valladolid, Valladolid, Spain	<i>November 2024</i>
Seminar (x2) at the Department of Economics and Business University of Catania, Catania, Italy	<i>October 2024</i>
MBC2 2024 7th Workshop on Models and Learning in Clustering and Classification University of Catania, Catania, Italy	<i>August 2024</i>
CMStatistics 2023 16th International Conference of the ERCIM WG on Computational and Methodological Statistics HTW Berlin, University of Applied Sciences, Berlin, Germany	<i>December 2023</i>
Seminar at the Department of Statistics and Operational Research University of Valladolid, Valladolid, Spain	<i>November 2023</i>

CLADAG 2023	<i>September 2023</i>
14th Scientific Meeting of the CLAssification and Data Analysis Group of SIS University of Salerno, Salerno, Italy	
CMStatistics 2022	<i>December 2022</i>
15th International Conference of the ERCIM WG on Computational and Methodological Statistics King's College London, London, United Kingdom	
ECDA 2022	<i>September 2022</i>
European Conference on Data Analysis University of Naples Federico II, Naples, Italy	
Colloquia Department Methodology and Statistics	<i>December 2021</i>
Tilburg University, Tilburg, The Netherlands	
Statistics Beyond 2020: challenges and risks	<i>October 2017</i>
European Statistics Day 2017, ESAC Lisbon, Portugal Panel Member as European Master in Official Statistics (EMOS) Student	
CONTRIBUTED PRESENTATIONS	
SIS 2023	<i>June 2023</i>
Conference of the Italian Statistical Society Marche Politecnica University, Ancona, Italy	
CESS 2022	<i>October 2022</i>
Conference of the European Statistics Stakeholders Sapienza University of Rome, Rome, Italy	
IFCS 2022	<i>July 2022</i>
17th Conference of the International Federation of Classification Societies University of Porto, Porto, Portugal	
SIS 2022	<i>June 2022</i>
51st Scientific Meeting of the Italian Statistical Society University of Campania Luigi Vanvitelli, Caserta, Italy	
IES 2022	<i>January 2022</i>
Innovation & Society 5.0: Statistical and Economic Methodologies for Quality Assessment University of Campania Luigi Vanvitelli, Capua, Italy	
8th Annual Workshop of the Ph.D. School in Statistical Sciences	<i>July 2021</i>
University of Rome "La Sapienza", Rome, Italy	
DSSV-ECDA 2021	<i>July 2021</i>
Data Science, Statistics & Visualisation and the European Conference on Data Analysis Erasmus University Rotterdam, Rotterdam, The Netherlands (Virtual)	
SIS 2021	<i>June 2021</i>
50th Scientific Meeting of the Italian Statistical Society University of Pisa, Pisa, Italy (Virtual)	
7th Annual Workshop of the Ph.D. School in Statistical Sciences	<i>February 2020</i>
University of Rome "La Sapienza", Rome, Italy	
IFCS 2019	<i>August 2019</i>
16th Conference of the International Federation of Classification Societies Thessaloniki, Greece	
IES 2019	<i>July 2019</i>
Statistical evaluation systems at 360°: techniques, technologies and new frontiers European University of Rome, Rome, Italy	
6th Annual Workshop of the Ph.D. School in Statistical Sciences	<i>June 2019</i>
University of Rome "La Sapienza", Rome, Italy	
ECDA 2019	<i>March 2019</i>
European Conference on Data Analysis	

TEACHING

TEACHING AS LECTURER

- Lecturer** *September 2024 – September 2024*
Department of Economics, Management and Statistics, University of Milano-Bicocca, Milan, Italy
Statistical Modelling II - Part II (PhD course, English, a.y. 2023/2024)
- Adjunct Lecturer** *September 2023 – September 2023*
Department of Economics, Management and Statistics, University of Milano-Bicocca, Milan, Italy
Statistical Modelling II - Part II (PhD course, English, a.y. 2022/2023)
- Adjunct Lecturer** *October 2022 – Present*
Department of Physics, University of Milano-Bicocca, Milan, Italy
Advanced Foundations of Statistics for AI (Master, English, a.y. 2022/2023, 2023/2024, 2024/2025)
- Lecturer** *March 2022 – March 2022*
Istituto Nazionale per l'Analisi delle Politiche Pubbliche (INAPP), Rome, Italy
Principal Component Analysis with R (Public Administration Training Course, Italian)
- Lecturer** *June 2022 – December 2024*
Department of Law and Economics, University of Rome Unitelma Sapienza, Rome Italy
Regression Models (II Level Master Course, Italian, a.y. 2021/2022, 2022/2023, 2023/2024)
Course, exams and thesis supervision
- Adjunct Lecturer** *February 2022 – October 2022*
Department of Law and Economics, University of Rome Unitelma Sapienza, Rome Italy
Statistical Models for Social and Economic Analyses (II Level Master Course, Italian, a.y. 2021/2022)
- Adjunct Lecturer** *November 2021 – September 2022*
Department of Law and Economics, University of Rome Unitelma Sapienza, Rome Italy
Basic Statistics and Mathematics (Master, English, a.y. 2021/2022)

TEACHING AS TEACHING ASSISTANT OR STUDENT TUTOR

- Student Tutor** *October 2022 – Present*
Department of Physics, University of Milano-Bicocca, Milan, Italy
Advanced Foundations of Statistics for AI (Master, English, a.y. 2022/2023, 2023/2024, 2024/2025)
- Teaching Assistant** *February 2022 – September 2022*
Department of Economics and Finance, LUISS Guido Carli, Rome Italy
Statistics, Prof. Marco Perone Pacifico (Bachelor, English, a.y. 2021/2022)
- Teaching Assistant** *March 2021 – July 2022*
Department of Medicine and Pharmacy, University of Rome “La Sapienza”, Rome Italy
Medical Statistics, Prof. Maurizio Vichi (Master, Italian, a.y. 2020/2021 and 2021/2022)
- Student Tutor** *January 2021 – Present*
Department of Law and Economics, University of Rome Unitelma Sapienza, Rome Italy
Statistics and Mathematics (Bachelor and Master, Italian and English, a.y. 2020/2021, 2021/2022, 2022/2023 and 2023/2024)
- Subject Expert** *October 2020 – October 2022*
Department of Law and Economics, University of Rome Unitelma Sapienza, Rome Italy
Statistics and Mathematics (a.y. 2020/2021 and 2021/2022)
- Teaching Assistant** *March 2020 – September 2020*
Department of Political Sciences, University of Roma Tre, Rome Italy
Statistics, Prof. Domenico Cucina (Bachelor, Italian, a.y. 2019/2020)
- Teaching Assistant** *September 2019 – June 2022*
Department of Statistical Sciences, University of Rome “La Sapienza”, Rome Italy

Advances in Data Analysis and Statistical Modelling, Prof. Maurizio Vichi (Master, English, a.y. 2019/2020, 2020/2021 and 2021/2022)

Teaching Assistant

September 2019 – June 2022

Department of Statistical Sciences, University of Rome “La Sapienza”, Rome Italy

Multivariate Statistics, Prof. Maurizio Vichi (Bachelor, Italian, a.y. 2019/2020, 2020/2021 and 2021/2022)

Teaching Assistant

September 2019 – December 2019

Department of Statistical Sciences, University of Rome “La Sapienza”, Rome Italy

Statistics, Prof. Maria Brigida Ferraro, Prof. Stefania Gubbiotti, Prof. Valeria Sambucini (Bachelor, Italian, a.y. 2019/2020)

Teaching Assistant

March 2019 – July 2022

Department of Medicine and Pharmacy, University of Rome “La Sapienza”, Rome Italy

Statistics for Research and Technology, Prof. Maurizio Vichi (Master, Italian, a.y. 2018/2019, 2019/2020, 2020/2021 and 2021/2022)

Teaching Assistant

February 2019 – September 2019

Department of Statistical Sciences, University of Rome “La Sapienza”, Rome Italy

Statistical Inference, Prof. Fulvio De Santis (Bachelor, Italian, a.y. 2018/2019)

SERVICE TO PROFESSION

EDITORIAL ACTIVITY

Editor of the Springer volume "High-quality and Timely Statistics - New Methods and Applications"

Springer book series of the CESS 2022 conference. ISBN: 978-3-031-63629-5 ([link](#))

POSITIONS IN ACADEMIC SOCIETIES

Elected member of the board of y-SIS (2023-2024)

January 2023 – December 2024

Young group of the Italian Statistical Society ([link](#))

Member of SIS, y-SIS and CLADAG-SIS Member

July 2019 – Present

Member of the Italian Statistical Society (Società Italiana di Statistica, SIS), Young SIS and CLAssification and Data Analysis Group (CLADAG)

Member of IAOS

January 2018 – December 2018

Member of the International Association for Official Statistics

ORGANIZATION OF SCIENTIFIC EVENTS

Member of the Scientific Program Committee of SIS 2024

52nd Scientific Meeting of the Italian Statistical Society

June 17-20, 2024, Bari, Italy

Organizer and member of the Scientific Program Committee of StaTalk2024@UniFi as member of the y-SIS board

Workshop organized by the young group of the Italian Statistical Society ([link](#))

May 30-31, 2024, Florence, Italy

Organizer and member of the Scientific Program Committee of StaTalk2023@DSS Sapienza as member of the y-SIS board

Workshop organized by the young group of the Italian Statistical Society ([link](#))

September 15, 2023, Rome, Italy

Member of the Local Organizing Committee of CESS 2022

Conference of European Statistics Stakeholders 2022 ([link](#))

October 20-21, 2022, Rome, Italy

Organizer of the 8th Annual Workshop of the Ph.D. School in Statistical Sciences

June 15-16, 2021, University of Rome “La Sapienza”, Rome, Italy

Organizer of the Invited Session “Cellwise outlier detection” of CLADAG 2025

15th Scientific Meeting Classification and Data Analysis Group ([link](#))

September 8-10, 2025, Naples, Italy

Organizer of the Invited Session “Advanced Methods for Assessing Environmental Impact and Green Innovation” of IES 2025

Innovation & Society: Statistics and Data Science for Evaluation and Quality ([link](#))

June 25-27, 2025, Bressanone-Brixen, Italy

Co-organizer of the Invited Session “y-SIS: Advances in statistical learning and clustering” of CMStatistics 2024

18th International Conference of the ERCIM Working Group on Computational and Methodological Statistics ([link](#))

December 14-16, 2024, London, United Kingdom

Organizer and chair of the Invited Session "y-SIS - Advances in Robust Statistical Methods for Complex Data" of CMStatistics 2023

16th International Conference of the ERCIM WG on Computational and Methodological Statistics ([link](#))

December 16-18, 2023, Berlin, Germany

Organizer and chair of the Solicited Session "Advances in Clustering" of SIS 2022

51st Scientific Meeting of the Italian Statistical Society ([link](#))

June 22-24, 2022, Caserta, Italy

THESIS SUPERVISION

Supervision of 9 theses of the II Level Master “Analisi e Modellazione dei Dati e dei Processi”

Department of Law and Economics, University of Rome Unitelma Sapienza, Rome, Italy

REFEREE SERVICE (alphabetical order)

Advances in Data Analysis and Classification, Annals of Operations Research, Australian & New Zealand Journal of Statistics, Computational Statistics, Journal of Classification, Metron, Proceedings of the Royal Society A, Soft Computing, SN Business & Economics (SNBE), Statistica Applicata, Statistical Methods & Applications, Statistics and Probability Letters, TEST, Book of Short Papers SIS 2022.

LANGUAGES

Italian	Mother tongue
English	Fluent
French	Good

COMPUTER SKILLS

Languages	R, R Studio, MATLAB, SAS, SAS Enterprise Miner 14, SPSS, LaTeX
Software	Microsoft Office
Certifications	SAS Predictive Modeler Using SAS Enterprise Miner 14 (October 8, 2018)

PUBLIC SOFTWARE

PUGMM: Parsimonious Ultrametric Gaussian Mixture Models

Author and Maintainer of the R package ([CRAN](#) - [Github](#))

OTHER EXPERIENCES

IELTS Invigilator

British Council

Rome, Italy

December 2015 – March 2019

INCREASE Delegate

XII International Human Right Council, OLMUN

Oldenburg, Germany

June 2012

Le dichiarazioni rese nel presente curriculum sono da ritenersi rilasciate ai sensi degli artt. 46 e 47 del D.P.R. 445/2000.

Milan, March 25th, 2025