Massimiliano Russo

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	Current position
2024–	Assistant Professor, Department of Statistics, The Ohio State University.
Research interests	Analysis and design of clinical trials, analysis of categorical data, Bayesian statistics, causal Inference, computational statistics, decision theory, hierarchical models, models for latent variables, machine learning and data mining, tensor factorization models.
	Past positions
2022–2024	Associate Biostatistician and Instructor of Medicine , <i>Division of Pharmacoepidemiology and Pharmacoeconomics</i> , Department of Medicine Brigham and Women's Hospital & Harvard Medical School.
2019–2022	Postdoctoral research fellow , <i>Harvard Medical School program in Therapeutic Sciences</i> <i>within the Harvard-MIT Center for Regulatory Science</i> , I was also part of Prof. Lorenzo Trippa's group at the Dana-Farber Cancer Institute (DFCI) department of Data Science.
	Education
2015–2019	PhD in Statistical Sciences , University of Padova, Dept. of Statistical Sciences, Thesis: Bayesian inference for tensor factorization models. Advisor: Bruno Scarpa, Co-advisor: David B. Dunson
2013–2015	Master in Statistical Sciences, University of Padova, Dept. of Statistical Sciences, Final Mark: 110/110 cum laude, Thesis: Olfactory perception differences in Italian regions: a nonparametric Bayesian approach to tensor factorization. Advisor: Bruno Scarpa; Co-advisor: Giancarlo Ottaviano
2009–2013	Bachelor in Statistical and Actuarial sciences , Università degli Studi del Sannio, Benevento, Final Mark: 110/110 cum laude, Thesis: Multivariate robust estimation. Advisor: Luca Greco
	Awards
[2023]	Italian National Scientific Qualification for Associate Professor in Statistics (ASN II fascia $13/D1$ valid from 05, June 2023 to 05, June 2034).
[2022]	Young researcher travel award ISBA2022, Montreal, Canada.
[2020]	Best poster award, "Inference in Response-Adaptive Clinical Trials When the Enrolled Population Varies Over Time", ASA Biopharmaceutical Section Regulatory-Industry Statistics Workshop 2020
[2018]	Best paper award for "Bayesian Inference on Group Differences in Multivariate Categorical

Data", Dept. of Statistical Sciences, University of Padova (Research Prize 2018)
[2018] Winner of the *3 minutes thesis competition* selection of Dept. of Statistical Sciences, University of Padova, October 19, 2018.

- [2018] Young researcher travel award ISBA2018, Edinburgh, United Kingdom.
- [2017] Travel support for COBAL V (2017), Guanajuato, Mexico
- [2016] Young researcher travel award ISBA2016, Sardinia, Italy.

Publications

Theory and Walker, A. M., Russo, M., Schneeweiss, M., Glynn, R.J., Semiparametric Allocation methods of Subjects to Cohort Strata, Epidemiology 35(2):p 213-217, 2024. refereed journals DOI: 10.1097/EDE.000000000001698

> Aliverti, E, Russo, M., Dynamic modeling of the Italians' attitude towards Covid-19, Statistics in Medicine 41(26): 5189–5202, 2022. doi:10.1002/sim.9560

> Aliverti, E. and Russo, M., Stratified stochastic variational inference for high-dimensional network factor model, Journal of Computational and Graphical Statistics, 31(2), 502–511, 2022.

DOI: 10.1080/10618600.2021.1984929

Russo, M., Singer, B. H., and Dunson, D. B., Multivariate mixed membership modeling: Inferring domain-specific risk profiles, The Annals of Applied Statistics, 16 (1) 391 - 413, 2022.

DOI: 10.1214/21-AOAS1496

Russo, M., Ventz, S., Wang, V., and Trippa, L., Inference in response-adaptive clinical trials when the enrolled population varies over time, Biometrics, $00 \ 1 - 13$, 2021. DOI: 10.1111/biom.13582

Russo, M., Durante, D. & Scarpa, B., Bayesian Inference on Group Differences in Multivariate Categorical Data, Computational Statistics & Data Analysis. 126, 136-149, 2018.

DOI:10.1016/j.csda.2018.04.010

Collaborative refereed journals

Haff, N., Sreedhara, S. K.,.. Russo M, , ... & Choudhry, N. K., Testing interventions to reduce clinical inertia in the treatment of hypertension: rationale and design of a pragmatic randomized controlled trial, American Heart Journal, 268, 18-28, 2024. DOI:10.1016/j.ahj.2023.11.005

Feldman, W.B., Kesselheim, A.S., Avorn, J., Russo, M. and Wang, S.V., Comparative Effectiveness and Safety of Generic Versus Brand-Name Fluticasone–Salmeterol to Treat Chronic Obstructive Pulmonary Disease, Annals of Internal Medicine, Epub 8 August 2023 76:1047-1056.

doi:10.7326/M23-0615

Daval, C.J.R., Teng T.W., <u>Russo M.</u>, Kesselheim, A.S., Association of Advisory Committee Votes With US Food and Drug Administration Decision-Making on Prescription Drugs, 2010-2021, JAMA Health Forum, 2023; 4(7). doi:10.1001/jamahealthforum.2023.1718

Acuna, P., Supnet-Wells, M. L., Spencer, N. A., de Guzman, J. K., Russo, M., Hunt, **A., ... & Sharma, N.**, Establishing a natural history of X-linked dystonia parkinsonism, Brain Communications, 2023. doi:10.1093/braincomms/fcad106

Savage, J.T., Kronman, M.P., Sreedhara, S.K., Russo, M., Lee, S.B., Oduol, T, and Huybrechts, K.F., Trends in the Antibiotic Treatment of Acute Sinusitis: 2003–2020., Pediatrics, April 2023; 151 (4). 10.1542/peds.2022-060685

Feng, K., Kesselheim, A.S., Russo, M. and Rome, B.N., Patient Out-of-Pocket Costs Following the Availability of Biosimilar Versions of Infliximab, Clinical Pharmacology Therapeutic, in press, 2022.

https://doi.org/10.1002/cpt.2763

Konishi, Y., Sklavenitis-Pistofidis, R., Yue, H., Ferrari, F., Redd, R. A., Lightbody, E. D., Russo, M. & ..., Ghobrial, I. M., Attenuated response to SARS-CoV-2 vaccine in patients with asymptomatic precursor stages of multiple myeloma and Waldenstrom macroglobulinemia, Cancer cell, 40(1), 6-8, 2022.

Lauffenburger, J. C., K. Choudhry, N. K., Russo, M., Glynn, R. J., Ventz, S., Trippa, L., Leveraging adaptive trials to evaluate interventions in health services research, BMJ Medicine, 2022.

doi: 10.1136/bmjmed-2022-000158

Ottaviano, G., Nardello, E., Pendolino, A. L., Pozza, M. D., Russo, M., Savietto, E. Peter, J. A., Ermolao, A., Nasal Function Changes at High Altitude, American Journal of Rhinology & Allergy, 34(5) 618-625, 2020. DOI: 10.1177/1945892420916393

Ottaviano, G., Pendolino, A. L., Nardello, E., Maculan, P., Martini, A., Russo, M. and Lund, V. J., Peak nasal inspiratory flow measurement and visual analogue scale in a large adult population, Clinical Otolaryngology; 44: 541–548, 2019. DOI:10.1111/coa.13329

Cantone E., Ciofalo A., Vodicka J., Iacono V., Mylonakis I., Scarpa B., Russo, M., lengo M., de Vincentiis M., Martini A. and Ottaviano G., Pleasantness of olfactory and trigeminal stimulants in different Italian regions., European Archives of Oto-Rhino-Laryngology, 1-7, 2017.

DOI:10.1007/s00405-017-4722-5

Peer reviewed Hansen, B., Avalos-Pacheco, A., Russo, M., De Vito, R., A Variational Bayes proceedings Approach to Factor Analysis., Bayesian Statistics, New Generations New Approaches. BAYSM 2022. Springer Proceedings in Mathematics & Statistics, vol 435, Springer, Cham. https://doi.org/10.1007/978-3-031-42413-7_2

> Russo, M., Greco, L, Robust Bayesian Regression for Mislabeled Binary Outcomes, Building Bridges between Soft and Statistical Methodologies for Data Science. SMPS 2022, Advances in Intelligent Systems and Computing, vol 1433. Springer, Cham. https://doi.org/10.1007/978-3-031-15509-3_44

> Russo, M., Malaria risk detection via mixed membership models, CLADAG 2021 book of abstract and short papers.

DOI: 10.36253/978-88-5518-340-6

Russo, M., Detecting Group Differences in Multivariate Categorical Data, Proceedings the Italian Statistical Society, Firenze University Press, 2017. ISBN 9788891927361

Cabassi, A., Casa, A., Fontana, M., Russo, M., and Farcomeni, A., Three testing perspectives on connectome data, Springer Proceedings in Mathematics & Statistics, vol 257, 37-55. Springer, Cham, 2018. DOI:10.1007/978-3-030-00039-4_3

Book chapters Russo, M. and Scarpa, B., Learning in medicine: the importance of statistical thinking, and discussions Springer Nature, Method in Molecular Biology, vol 2486. Humana, New York, NY, 2022. https://doi.org/10.1007/978-1-0716-2265-0 11

> Rigon, T., Aliverti, E., Russo, M., and Scarpa, B., A discussion on: Centered partition processes: Informative priors for clustering by Paganin, S., Herring, A. H., Olshan, A. F. and Dunson, D. B., Bayesian Analysis 16(1): 301-370, 2021. DOI: 10.1214/20-BA1197

Aliverti, E., Paganin, S., Rigon, T. and <u>Russo, M.</u>, *A discussion on: Latent nested nonparametric priors by Camerlenghi, F., Dunson, D.B., Lijoi, A., Prünster, I. and Rodriguez, A.*, Bayesian Analysis, 14 (4) 1303 - 1356, 2019. DOI: 10.1214/19-BA1169

Papers **Russo, M.*, Paganin, S.*, and Scarpa, B.**, *Modeling students' ability: a generalized* under review *partial credit model for network dependent latent traits.*

Wyss R., van der Laan M., Gruber S., Xu S., Lee H., Dutcher S. K., Nelson J. C., Toh S., <u>Russo, M.</u>, Wang S. V., Desai R. J., Lin J. K., *Targeted Learning with an Undersmoothed Lasso Propensity Score Model for Large-Scale Covariate Adjustment in Healthcare Database Studies.*

Hansen, B., Avalos-Pacheco, A., De Vito, R*. & <u>Russo, M.</u>*, Fast Variational Inference for Bayesian Factor Analysis in Single and Multi-Study Settings, arXiv preprint arXiv:2305.13188.

* indicates equal contribution

Russo, M., Ventz, S., Trippa, L., A cautious decision-theoretic use of auxiliary outcomes in clinical trials.

Work in progress **Russo, M., Spencer N., Miller J. W.**, Bayesian bi-clustering for temporally heterogeneous high-dimensional longitudinal data.

Russo, M., and Wang, S.V., Assessing covariate balance in matched observational studies with high-dimensional categorical variables.

Russo, M., and Wang, S.V., Comparing tree-based scan statistics with different control of false positive results.

Presentations

Invited talks **Invited in the session "Faculty Speed Talks"**, *The Ohio State University Division of Biostatistic*, The Ohio State University, Columbus, OH, USA .

Invited in the session "Bayesian models and computations for complex bioenvironmental data", *Computational and Methodological Statistic*, (CMStatistics 2023), HTW Berlin, University of Applied Sciences (Wilhelminenhof campus), Berlin, Germany.

Invited in the session "Recent advances in R software development: innovative tools and practical applications", *the 36th New England Statistics Symposium*, (NESS: 2023), Boston, USA.

Invited in the session "Flexible Bayesian modelling for biostatistics", *Computational and Methodological Statistic*, (CMStatistics 2022), King's colledge, London, UK.

Invited speaker in the Biostatistics Seminars of the Fall 2022, *Department of Epidemiology, Biostatistics and Occupational Health*, McGill University, Online.

Invited in the session "Using external data in adaptive clinical trial design", at ISBA world meeting 2021, (ISBA 2021), Online.

Invited in the session "Bayesian non parametrics methods for classification", *Classification and Data Analysis Group*, (CLADAG 2021), Online.

Invited in the session "Recent developments in Bayesian methodology", *Computational and Methodological Statistic*, (CMStatistics 2020), Online.

Inference in clinical trials when the patient population is subject to changes over time, *Division of Pharmacoepidemiology and Pharmacoeconomics*, Brigham and Women's Hospital & Harvard Medical School.

Invited in the topic contributed session: "Statistical innovation in regulatory science", *Joint Statistical Meeting of the American Statistical Society*, (JSM 2020), Online.

Contributed talks Bayesian bi-clustering for temporally heterogeneous high-dimensional longitudinal data, at ISBA world meeting 2022, Accepted for contributed oral Presentation (selected among the top 9% of 580 submissions), Montreal, Canada, June 30, 2022.

> Bayesian optimal sequential futility decisions via auxiliary endpoints, International Biometric Conference, (IBC 2020), Accepted for contributed oral Presentation (selected among 700 submissions). canceled due to COVID-19

> Scalable inference for network factor model, Advanced Statistics for Physics Discovery, Padova, Italy, September 24, 2018.

> Multivariate mixed membership modeling: Inferring domain-specific risk profiles, IBC2018, Barcellona, Spain, July 10, 2018.

> Bayesian Inference on Group Differences in Multivariate Categorical Data, COBAL V, Cimat, Guanajuato, Mexico, June 8, 2017.

Assessing joint covariate balance in matched observational studies with high-Posters dimensional categorical variables, ICPE 2023, Halifax, Nova Scotia, Canada, August 25, 2023.

Inference in response-adaptive clinical trials when the enrolled population varies over time, 2020 Global Conference on Regulatory Science, Online.

Inference in response-adaptive clinical trials when the enrolled population varies over time, ASA Biopharmaceutical Section Regulatory-Industry Statistics Workshop 2020, Online.

Inference in response-adaptive clinical trials when the enrolled population varies over time, DIA Regulatory Science Forum 2020, Online.

Inference in clinical trials when the patient population is subject to changes over time, HiTS Annual Symposium, Boston, MA, USA, October 21, 2019.

Soft classification tree ensemble of Higgs pair production, Advanced Statistics for Physics Discovery, Padova, Italy, September 24, 2018.

Multivariate mixed membership modeling: Inferring domain-specific risk profiles, ISBA2018, Edinburgh, United Kingdom, June 29, 2018.

A multivariate mixed membership model for malaria risk detection, Obayes2017, Austin, Texas, December 11, 2017.

Detecting Group Differences in Multivariate Categorical Data, SIS2017, Florence, Italy, June 28, 2017.

Bayesian Inference on Group Differences in Multivariate Categorical Data, ISBA2016, Sardinia, Italy, June 16, 2016.

Service to profession

Organized

Advances in Bayesian Methods for Complex Data, the 36th New England Statistics Symposium, (NESS: 2023). sessions

> Advances in Bayesian methods for medical data, Bayesian Young Statisticians Meeting: Online, (BAYSM:O 2020).

Conference Member of the program committee of the workshop "Your Model is Wrong: Robustness and misspecification in probabilistic modeling" of the Thirty-fifth Conference on Neural committee Information Processing Systems NeurIPS (2021)

> Member of the scientific committee of the Bayesian Young Statisticians Meeting (BAYSM2022), Montreal, Canada.

Reviewer for: Applied Sciences; Bayesian Analysis, BMC Bioinformatics; Clinical Trials; Computational (alphabetical Statistics and Data Analysis (CSDA); Drug Safety (DRSA); Electronics; European Symposium on Artificial Neural Networks (ESANN) 2020; Intensive Care Medicine; International Journal of Environmental Research and Public Health (IJERPH); Journal of the American Statistical Association (JASA) Journal of Computation and Graphical Statistics (JCGS); Journal of Computational Methods in Sciences and Engineering (JCMSE); Journal of Open Source Software (JOSS); Mathematics; RJournal; Symmetry; Social Indicator Research; Statistical Methods & Applications (SMA); Trials.

Teaching & mentoring

Teaching Stat 7430: Generalized Linear Models, *Spring 2024*, The Ohio State University, Columbus, USA.

Translational Pharmacology, *January 2023*, Specialist two-hours lecture within the course of Translational Pharmacology, Harvard Medical School, Boston, USA.

Parallel Computing for big data analysis, *March 2018*, Specialist lectures during the class of *Statistical Methods for Big Data Analysis* of Prof. Bruno Scarpa, University of Padova, Dept. of Statistical Sciences, Padova, Italy.

Introduction to real analysis (B.Sc.), *Year 2014/2015*, Academic Tutor, University of Padova, Dept. of Statistical Sciences, Padova, Italy.

Advanced statistical inference (M.Sc.), Year 2014/2015, Academic Tutor, University of Padova, Dept. of Statistical Sciences, Padova, Italy.

Mentoring Claudia Stocchi, University of Padova, Italy, *Career stage: Master Student*, role: Thesis co-advisor, Accomplishments: Developed her master's thesis which has been discussed and evaluated with the highest score, 2021.

Lorenzo Chiurato, University of Padova, Italy, *Career stage: Master Student*, role: Thesis co-advisor, Accomplishments: Developed his master's thesis which was discussed in November 2022. Lorenzo has been awarded with magna cum laude for his thesis's work.

Blake Hansen, Brown University School of Public Health, Career stage: Biostatistics *Ph.D Student*, role: Member of the Ph.D committee.

Participation to research groups

- Biostatistical analysis of X-Linked Dystonia-Parkinsonism. The collaborative center for XDP, Massachusetts General Hospital.
- Characterizing Disease Evolution in Non-Alcoholic Steatohepatitis (NASH).
 Research project of the Harvard-MIT Center for regulatory science and the FDA Center for Drug Evaluation (CDER).
- Bayesian inference on brain network data. PRAT 2015 CPDA154381/15.
- Reproducibility and Robustness of Dimensionality Reduction, National Institutes of Health (NIH)

P.I. Ámy H. Herring. Grant R01ES027498

Outreach & events

- Regulatory Science Student & Faculty Mixer (October 2020)
 Online meeting with graduate and prospective students to discuss research opportunities.
- Regsci Forum: Fellows Showcase. What the Harvard-MIT Center for Regulatory Science actually does? Wonder no more! (January 2020)

	Research presentation to describe the world of regulatory science to students.
-	Big data Biosensori e Biobanche, December 2019
	Presentation of my research at Università degli Study del Sannio.
-	Harvard-MIT Center for Regulatory Science Open House: Learn about RegSci and research opportunity. (September 2019)
	Meeting with Harvard graduate students to discuss research opportunities.
-	Volunteer for Venetonight – La notte dei ricercatori, Padova, Italy. (2015,2016 & 2017) Developed an online app interfacing with twitter to track and display in real-time the sentiment of the event.
-	Volunteer for StatisitcAll, Treviso, Italy (2015) Statistical games and activities to show the magic of statistics to kids and adults.
-	Volunteer at orientation days for high schools students, Scegli con noi. Campus Agripolis di Legnaro, Padova, Italy. (2015 & 2016)
Workshops	NIMBLE short course, UC Berkeley, June 2020, (online).
& Summer Schools	3-day workshop on NIMBLE: a system for building and sharing analysis methods for statistical models, especially for hierarchical models and computationally-intensive methods.
	Start-Up Research , University of Siena, Italy, June 2017. A 2-day meeting where groups of young scholars, advised by senior researchers, were asked to develop innovative methods and models to analyze a common dataset from the Neurosciences.
Data Hackathons	- Duke Datathon, Durham, NC, USA, February 2017.
	- Stats under the stars-3, Firenze, Italy, June 2017.
	- Stats under the stars, Padova, Italy, September 2015.
	Work experience
Feb. 2019 Aug. 2019	Data Analyst , <i>WorkFor, WFIT CRM Services</i> , Roma. Data analysis and consulting.
	Study visits
Nov. 2016 June 2017	Visiting Research Scholar , <i>Duke University, Department of Statistical Science</i> , Durham, NC, USA, under the supervision of prof. David B. Dunson.
Sept. 2017 Mar. 2018	Visiting Research Scholar , <i>Duke University, Department of Statistical Science</i> , Durham, NC, USA, under the supervision of prof. David B. Dunson.
	Languages
	Italian: native; English: fluent; French: basic; Spanish: basic.
	Computing skills
Developed software	TBSS : an R package implementing the Tree Based Scan Statistics (TBSS). Available for download at https://gitlab-scm.partners.org/mi475/tbss/-/tree/main? ref type=headsl.

 $\label{eq:MMM} \begin{array}{l} \textbf{MMM}: \text{ an } R/C++ \text{ package with broad implementation of the multivariate mixed membership model algorithm. Available for download at https://github.com/rMassimiliano/MMM-tutorial.$

Programming	${ m R}$ (advanced knowledge of Rcpp, tidyverse and shiny libraries);
languages	$\mathrm{C/C}++$,Python, Julia, Matlab, JAVA.
Operative System	Linux (Fedora/Ubuntu), Windows, OSX and relative softwares.
Software	SPSS, PSPP, Office, $\mathrm{SQL}/\mathrm{MYSQL}, \mathrm{Bugs}, \mathrm{Jags}, \mathrm{Stan},$ and $\mathrm{Nimble}.$
Other	LATEX, git/github, vim & emacs, bash.

February 6, 2024