Massimiliano Russo

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Current position

Postdoctoral research fellow, *Harvard Medical School program in Therapeutic Sciences within the Harvard-MIT Center for Regulatory Science*, I am also part of Prof. Lorenzo Trippa's group at the Dana-Farber Cancer Institute (DFCI) department of Data Science.

Research interests: Analysis and design of clinical trials; Decision theory; Bayesian nonparametrics; Tensor factorization; Categorical data; Complex data; Hierarchical models; Models for latent variables; Machine learning and Data mining; Computational statistics.

Education

2015–2019 **PhD in Statistical Sciences**, *University of Padova, Dept. of Statistical Sciences*,
Thesis: *Bayesian inference for tensor factorization models*.
Advisor: Bruno Scarpa

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

- Best poster award, second place winner for "Inference in Response-Adaptive Clinical Trials When the Enrolled Population Varies Over Time", ASA Biopharmaceutical Section Regulatory-Industry Statistics Workshop 2020
- Best paper award for "Bayesian Inference on Group Differences in Multivariate Categorical Data" Dept. of Statistical Sciences, University of Padova (Research Prize 2018)
- Winner of the *3 minutes thesis competition* selection of Dept. of Statistical Sciences, University of Padova, October 19, 2018.
- Young researcher travel award ISBA2018, Edinburgh, United Kingdom.
- Travel support for COBAL V (2017), Guanajuato, Mexico
- Young researcher travel award ISBA2016, Sardinia, Italy.

Publications

Published papers refereed journals: **Russo, M., Ventz, S., Wang, V., Trippa, L.**, *Inference in response-adaptive clinical trials when the enrolled population varies over time*, Biometrics, accepted for publication, 2021. DOI: 10.1111/biom.13582

Aliverti, E. and Russo M., *Stratified stochastic variational inference for high-dimensional network factor model*, Journal of Computational and Graphical Statistics, accepted for publication, 2021.

Russo, M., Singer, B. H. & Dunson, D. B., *Multivariate mixed membership modeling: Inferring domain-specific risk profiles*, The Annals of Applied Statistics, accepted for publication.

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.

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.

Aliverti, E., Paganin, S., Rigon, T. and Russo, M., *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.

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.

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

Cantone E., Ciofalo A.,Vodicka J., Iacono V., Mylonakis I., Scarpa B.,Russo M.,Iengo 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.

Peer reviewed proceedings

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

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

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.

Book chapters

Russo M. and Scarpa B., *Learning in medicine: the importance of statistical thinking*, Springer Nature, Method in Molecular Biology, (accepted for publication).

Papers under review

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*, (submitted).

Aliverti, E. and Russo M., *Dynamic modeling of the Italians' attitude towards Covid-19*, arXiv preprint, arXiv:2108.01194 , (submitted).

Presentations

Invited talks **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" , (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 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.

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

Conference committee	Member of the program committee of the Thirty-fifth Conference on Neural Information Processing Systems NeurIPS (2021)
Reviewer for: (alphabetical order)	BMC Bioinformatics; Computational Statistics and Data Analysis (CSDA); Electronics, European Symposium on Artificial Neural Networks (ESANN) 2020; Journal of Computation and Graphical Statistics (JCGS); Journal of Computational Methods in Sciences and Engineering (JCMSE); Journal of Open Source Software (JOSS) Mathematics; RJournal; Social Indicator Research; Statistical Methods & Applications (SMA); Trials.
Memberships	International Society for Bayesian Analysis (ISBA); j-ISBA

Teaching & mentoring

Teaching	**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	**Item response theory for network data**, *Master thesis in statistical Science at the University of Padova of Claudia Stocchi*, 2021.

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 & Summer Schools	**NIMBLE short course**, UC Berkeley, June 2020, (online). 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	**Data Analyst**, *WorkFor, WFIT CRM Services*, Roma.
Aug. 2019	Data analysis and consulting.

Study visits

Nov. 2016	**Visiting Research Scholar**, *Duke University, Department of Statistical Science*, Durham,
June 2017	NC, USA, under the supervision of prof. David B. Dunson.
Sept. 2017	**Visiting Research Scholar**, *Duke University, Department of Statistical Science*, Durham,
Mar. 2018	NC, USA, under the supervision of prof. David B. Dunson.

Languages

Italian: native; English: fluent; French: basic; Spanish: basic.

Computing skills

Developed software	**MMM**: an $R/C++$ package with broad implementation of the multivariate mixed membership model algorithm. Available for download at https://github.com/rMassimiliano/MMM-tutorial.
	TrendUtilities: an $R/C++$ package implementing multi-arms and platform Bayesian adaptive designs. Available for download at https://github.com/rMassimiliano/TimeChangingPopulation.
Programming languages	R (advanced knowledge of Rcpp, tidyverse and shiny libraries); $C/C++$, Python, Julia, Matlab, JAVA.
Operative System	Linux (Fedora/Ubuntu), Windows, OSX and relative softwares.
Software	SPSS, PSPP, Office, SQL/MYSQL, BUGS, JAGS, STAN, and NIMBLE.
Other	LATEX, git/github, vim & emacs, bash.

October 28, 2021