

Corrado Lanera

Curriculum Vitæ

Dep. Cardiac, Thoracic, Vascular Science and
Public Health

—University of Padova

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Personal information

Date of birth : 1981/04/13

Place of birth : Gorizia (GO) —Italy

Nationality : Italian

Address : Via Savonarola 209, 35137 Padova (PD) —Italy

Fiscal code : LNRCD81D13E098C

Education

For post-graduate courses it is indicated the academic year, **type**, venue **title**, lecturer(s) (affiliation) *topic*.
Title of the final project, advisor.

Currently: II year **Ph.D. candidate** in Translational Specialistic Medicine "G.B. Morgagni" (XXXII), University of Padova (head of Ph.D. school: Prof. G. Thiene). Curriculum in Biostatistics and Clinical Epidemiology. Topic: **Development and application of Machine Learning and Phenomapping techniques in Clinical Research**, supervisor: Prof. D. Gregori;

2015/2016: **II degree Master** at the Department of Cardiac, Thoracic and Vascular Science (University of Padova - IT), **Advanced Biostatistics for Clinical Research**, I. Baldi (Univ. of Padova) *Design and analysis of adaptive designs*, P. Berchiolla (Univ. of Torino) *Bayesian designs for drug and device clinical trials*, E. Pagano (Univ. of Torino) *Cost analysis in clinical trials and observational studies*, D. Gregori (Univ. of Padova) *Methods for evaluating heterogeneity of treatment effects in clinical trials*, L. Finos (Univ. of Padova) *Multiplicity testing in clinical trials*. Title of the final project: *Use of Machine Learning Techniques to predict outcome in Clinical Trials*, Prof. D. Gregori (Univ. of Padova).

2014/10/16: **M.Sc.** (full marks) in Mathematics, University of Udine, title of the thesis: *Quasi-Polish spaces*, advisor: Prof. A. Marcone;

2010/03/24: **B.Sc.** in Mathematics, University of Udine, title of the thesis: *Teoria degli Insiemi Ereditariamente Disgiunti*, advisor: Prof. F. Parlamento.

Research fellow positions

The research activity has been supported with funds of the following research fellow positions and projects, for each of which it is indicated the period, type, **title** (original title), coordinator (coordinator affiliation).

2. 2015/02 - 2016/09, Grant at the Department of Cardiac, Thoracic and Vascular Science (Univ. of Padova), **Review and development of Machine Learning techniques applied in risk assessment related to food safety** (Rassegna e sviluppo di tecniche di intelligenza artificiale per l'analisi del rischio in ambito alimentare), D. Gregori (Univ. of Padova).

1. 2015/01, Fellowship with financial aid provided by ProChild, Associazione Protecting Children Onlus, **Evaluation of the risk of suffocation incident in Brazil** (Valutazione del rischio di incidente da soffocamento in Brasile), D. Gregori (Univ. of Padova)

Training

Workshops and Schools

For every workshop it is indicated period, lecturer(s) (affiliation): **title** (venue).

10. 2018/05/04-08, (University of Padova): **PhD Educational week on Transferable skills**, (Padova (IT));
9. 2018/01/11-02/28, G. Davies: **Ph.D. Academic English**, (Padova (IT))
8. 2018/01/31-02/01, H. Wickham (RStudio): **Extending the Tidyverse** (*RStudio::conf*, San Diego (CA) - USA);
7. 2017/10/02-06, M. Resche-Rigon and S. Chevret: **Survival Data Analyses for Cancer Data** (Torino (IT));
6. 2017/09/18-22, I. Baldi, A. Rampazzo, G.P. Fadini, G. Valle, G.P. Rossi, L. Lenzini, A.C. Frigo, V. Cavallin, F. Patrese, P. Braghetta, P. Bonaldo, L. Bello, T. Zaglia, F. Calabrese, R. Manganelli, S. Indracollo and A. Rosato (University of Padova Ph.D courses on medical topics): **Summer School** (Padova (IT));
5. 2017/08/07-11, K. Rothman: **Conceptual Foundation of Epidemiologic Study Design** (*Erasmus Summer Program*, Rotterdam (NL));
4. 2017/07/30, F. Harrell Jr.: **Regression Modeling Strategies** (*JSM 2017*, Baltimore (MD) - USA);
3. 2016/09/12-13, H. Wickham (RStudio): **Master R Developer** (NYC (NY) - USA);
2. 2016/03/08, D. Steinberg, M. Golovnya (Salford Systems): **Evolution of Classification: From Logistic Regression and Decision Trees to Bagging/Boosting and Netlift Modeling** (*JSM 2016*, Chicago (IL) - USA);
1. 2016/03/08, D. Steinberg, M. Golovnya (Salford Systems): **Introduction to Data Mining with CART Classification and Regression Trees** (*JSM 2016*, Chicago (IL) - USA).

On-line certificated courses

For every course it is indicated period, lecturer(s) (affiliation): **title** - *platform*, grade.

14. 2018/09, R. D. Peng, B. Anderson (Johns Hopkins Univ.): **Advanced R Programming** - *Coursera*, 98.3%;
13. 2018/08, R. D. Peng, B. Anderson (Johns Hopkins Univ.): **The R Programming Environment** - *Coursera*, 100.0%;
12. 2018/06, A. Ng (Stanford Univ.): **Machine Learning** - *Coursera*, 100.0%;
11. 2017/12, H. Wickham (RStudio): **Writing Functions in R** - *DataCamp*, 100.0%;
10. 2017/12, G. Grolemund (RStudio): **Data Manipulation in R with dplyr** - *DataCamp*, 100.0%;
9. 2017/11, R. Scavetta (Science Craft): **Data Visualization with ggplot2** - *DataCamp*, 100.0%;
8. 2016/02, B. Caffo, R. D. Peng, J. Leek (Johns Hopkins Univ.): **Statistical Inference** - *Coursera*, 100.0%;
7. 2015/11, B. Caffo, R. D. Peng, J. Leek (Johns Hopkins Univ.): **Exploratory Data Analysis** - *Coursera*, 100.0%;
6. 2015/09, C. Severance (Michigan Univ.): **Programming for Everybody (Python)** - *Coursera*, 100.0%;

5. 2015/06, B. Caffo, R. D. Peng, J. Leek (Johns Hopkins Univ.): **Reproducible Research** - *Coursera*, 100.0%;
4. 2015/05, A. Ng (Stanford Univ.): **Machine Learning** - *Coursera*, 87.4%;
3. 2015/03, B. Caffo, R. D. Peng, J. Leek (Johns Hopkins Univ.): **Getting and Cleaning Data** - *Coursera*, 100.0%;
2. 2015/03, B. Caffo, R. D. Peng, J. Leek (Johns Hopkins Univ.): **R Programming** - *Coursera*, 100.0%;
1. 2015/03, B. Caffo, R. D. Peng, J. Leek (Johns Hopkins Univ.): **The Data Scientist's Toolbox** - *Coursera*, 100.0%.

Research Activity

Abstract

The research activity is driven in the area of Machine Learning (ML) and Phenomapping techniques applied to clinical science, with special attention to text mining Electronic Health Record (EHR) both from clinical and computational point of view (preprocessing, dimensionality reduction, management of class unbalance and languages). It also reach the study and the development of ML algorithms applied to sensor data retrieved by wearable. Particular attention is addressed on the following topics:

- Text-mining** ✎ Use of social-media free-text by ML to detect and model the dynamics behind spontaneous population-based signals on Adverse Events Reaction to drugs and food-related events;
- ✎ Extraction of citation and clinical registries' entries automatically driven by the researcher interest, to support the Systematic Review and Meta-Analysis processes;
 - ✎ Classify free-text diagnosis of admittance reported in an Emergency Department database from developing countries;
 - ✎ Detection of infection diseases from free-text in EHR;
 - ✎ Application of early ML analyses on EHR to improve infection surveillance;
 - ✎ Study the impact, consequences and strategies to preprocess, reduce the dimensionality, manage class unbalance and different languages in clinical free text classification.
- Data-mining** ✎ Application of ML to evaluate the rate of quantity and quality of movement for surgical patient from pre- to post-surgical hospitalization using wearable devices;
- ✎ Application of ML to evaluate the caloric intake using wearable devices;
 - ✎ Embed ML procedure in cross-sectional clinical trial design.
- Other** ✎ Development of an R-based graphical and interactive tool to model the dynamics deriving from the Italian *National Protocol for the Management of Surpluses of all Transplantation Programs*.
- ✎ Development of an R-package and two related modules companions in collaboration with ARPAV for the REMEDIO (REgenerating mixed-use MED urban communities congested by traffic through Innovative low carbon mobility sOolutions.) *Integrated Modeling Tools* used to estimate health and cost outcomes when inputted with pollutants and climate historical and simulated data for some region.

Teaching Activities

For every activities it is indicated period, description with **title**, society/institution (duration).

2018/07/18: Course on Basic R programming for statisticians: **Fondamenti di R per Statistici**, Società Italiana di Medicina Farmaceutica (16h);

2017/11/27: Advanced course on R programming for statisticians: **Corso Avanzato di R per Statistici**, Società di Scienze Farmacologiche Applicate (8h);

2017/04/03: Course on Basic R programming for statisticians: **Fondamenti di R per Statistici**, Società di Scienze Farmacologiche Applicate (8h);

2017/02-03: Hands-on for the **Machine learning for outcome prediction** moduli of the II level master post graduate course in *Machine Learning for the clinical and surgical research and practice*, Department of Cardiac, Thoracic and Vascular Science, Univ. of Padova (4.5 h);

2017/01: Hands-on for the **Machine Learning overview** moduli of the II level master post graduate course in *Machine Learning for the clinical and surgical research and practice*, Department of Cardiac, Thoracic and Vascular Science, Univ. of Padova (2.5 h);

2017/01/12-13: Workshop on **Machine Learning Techniques usign R for R programmers, statisticians and quantitative epidemiologists**, European Food Safety Authority, Parma (6h).

Publications

Journal articles

For every publication it is indicated authors, **title**, (journal), volume, issue, pages (date of publication).

8. C. Lanera, C. Minto, A. Sharma, D. Gregori, P. Berchialla, I. Baldi **Extending PubMed Searches to ClinicalTrials.gov Through a Machine Learning Approach for Systematic Reviews** *Journal of Clinical Epidemiology*, Vol. 103 (November 2018), published on-line at <https://goo.gl/EkTJ3u> (June 2018)
7. G. Lorenzoni, D. Azzolina, C. Lanera, G. Brianti, D. Gregori, D. Vanuzzo, I. Baldi **Time trends in first hospitalization for heart failure in a community-based population** *International Journal of Cardiology* published on-line at <https://goo.gl/Vkb5CW> (June 2018)
6. E. Surkova, L.P. Badano, D. Genovese, et al. **Clinical and Prognostic Implications of Methods and Partition Values Used to Assess Left Atrial Volume by Two-Dimensional Echocardiography.** *J. of the American Society of Echocardiography.*, Vol. 30, Issue 11, 1119-1129 (November 2017)
5. I. Baldi, C. Lanera, P. Berchialla, D. Gregori, **Early termination of cardiovascular trials as a consequence of poor accrual: Analysis of ClinicalTrials.gov 2006-2015**, *BMJ Open*, Vol. 6, Issue 6, e013482 (June 2017)
4. G. Ru, M. I. Crescio, F. Ingravalle, C. Maurella, D. Gregori, C. Lanera, D. Azzolina, G. Lorenzoni, N. Soriani, S. Zec, P. Berchialla, S. Mercadante, F. Zobec, M. Ghidina, S. Baldas, B. Bonifacio, A. Kinkopf, D. Kozina, L. Nicolandi, L. Rosati, **Machine Learning Techniques applied in risk assessment related to food safety**, *EFSA Supporting Publications*, 14.7 (May 2017)
3. F. Folino, G. Buja, G. Zanutto, E. Marras, G. Allocca, D. Vaccari, G. Gasparini, E. Bertaglia, F. Zoppo, V. Calzolari, R.N. Suh, B. Ignatiuk, C. Lanera, A. Benassi, D. Gregori, S. Iliceto, **Association between air pollution and ventricular arrhythmias in high-risk patients (ARIA study): a multicentre longitudinal study.**, *The Lancet Planetary Health*, Vol. 1, Issue 2, e58-e64 (May 2017);
2. D. Gregori, C. Minto, C. Lanera, G. Lorenzoni, **Feasibility and Reliability of Wearable Devices in Measuring Caloric Intake: Results from a Pilot Study**, *The FASEB Journal*, Vol. 31, Issue 1 Supplement, 302.6 (April 2017)
1. E. Menti, C. Lanera, G. Lorenzoni, D.F. Giachino, M. de Marchi, D. Gregori, P. Berchialla, **Bayesian Machine Learning Techniques for revealing complex interactions among genetic and clinical factors in association with extra-intestinal Manifestations in IBD patients**, *AMIA 2016 Annual Symposium proceedings*, 884-893 (February 2017). 46:101–121, 2014.

Preprints

For every publication it is indicated authors, **title**, *status* (year).

9. C. Lanera, P. Berchialla, I. Baldi, G. Lorenzoni, L. Tramontan, A. Scamarcia, L. Cantarutti, C. Gi-aquinto, D. Gregori, **Use of Machine Learning techniques for case-detection of varicella zoster using routinely collected textual ambulatory records**, *submitted* (2018).

8. G. Lorenzoni, S. Bressan, C. Lanera, D. Azzolina, L. Da Dalt, D. Gregori **Analysis of unstructured text-based data using machine learning techniques: the case of pediatric emergency department records in Nicaragua** *submitted* (2018).
7. G. Lorenzoni, S. Swain, C. Lanera, M. Florin, I. Baldi, S. Iliceto, D. Gregori **High- and Low-Inpatients' Serum Magnesium Levels are Associated with In-Hospital Mortality in Elderly Patients. A Neglected Marker?**, *submitted* (2018).
6. D. Gregori, D. Azzolina, C. Lanera, M. Ghidina, C. Gafare, G. Lorenzoni **Impact of food labelling regulation on consumers' attitudes: an early investigation after the introduction of the Chilean law** *submitted* (2018).
5. J. Benjko, T. Bottio, F. Toto, C. Lanera, D. Gregori, G. Gerosa **Tricuspid Valve Repair with Ring or Suture Annuloplasty: Single Center Outcomes at Mid and Long Term** *submitted* (2018).
4. M. Carrozzini, J. Benjko, F. Toto, M. Comisso, V. Tarzia, C. Lanera, D. Gregori, C. M. Lombardi, M. Metra, G. Gerosa, T. Bottio **The impact of continuous-flow left ventricular assist device as bridge to transplant** *submitted* (2018).
3. S. Poli, D. Facchin, F. Rizzetto, L. Rebellato, E. Daleffe, M. Toniolo, A. Miconi, A. Altinier, C. Lanera, S. Indrigo, J. Comisso, A. Proclemer **Prognostic role of non-sustained ventricular tachycardia detected with remote interrogation in pacemaker population** *submitted* (2018).
2. E. López, E. F. Palomo, N. Liora, S. Kontos, M. Almedia-Silva, P. Baptista, F. Liguori, K. Lorenzet, R. Fernandez, C. Ortiz, A. Poupkou, Ch. Meleti, D. Melas, S. Patti, M. V. Faria, J. Ferreira, C. Lanera **Integrated modelling tool for the analysis of traffic-congested roads in urban centers** *submitted* (2018).
1. C. Lanera, P. Berchiarella, I. Baldi, D. Gregori, **A SuperLearner approach to predict run-in selection in clinical trials**, *submitted* (2017).

Contributions as a reviewer

For every contribution it is indicated period, number of review(s) (*topic(s)*), type (C = Congress, J = Journal): **congress/journal title** (venue, if pertinent).

3. 2018, four reviews (*biomedical informatics*), C: **AMIA 2018 Annual Symposium** (San Francisco, CA - USA).
2. 2018, one review (*food research*), J: **Elsevier: Food Policy**.
1. 2017, three reviews (*biomedical informatics*), C: **AMIA 2017 Annual Symposium** (Washington, DC - USA).

Conferences

Contributions

For every contribution it is indicated period, **congress title** (venue), contribution type (CT = Contributed Talk, IT = Invited Talk, PS = Poster Section): *title*.

11. 2018/07/09-11, **Data Science, Statistics and Visualizaiton** (Wien, A), CT + PS: *Current trans-plant sUrplus Management Protocol in R: the CLUMPER interface*;
10. 2018/05/22-23, **REMEDIIO forth partners meeting** (thessaloniki, GR), IT: *Health and Cost modules for IMT the imthcm R package*;
9. 2017/09/28, **IX Congresso nazionale BIAS** (Parma, IT), IT: *Statistical Relational Learning and uncertainty in trial data*;
8. 2017/09/13-16, **IX Congresso nazionale SISMEC** (Gargnano, IT), CT: *Building Comprehensive Searches Through a Machine Learning Approach for Systematic Reviews*;

7. 2017/07/29 - 2017/08/03, **Joint Statistical Meeting** (Baltimore (MD) - USA), CT + PS: *Building Comprehensive Searches Through a Machine Learning Approach for Systematic Reviews*;
6. 2016/11/12-16, **American Medical Informatics Association 2016 Annual Symposium** (Chicago (IL) - USA), CT: *Bayesian MLT for Revealing Complex Interactions Among Genetic and Clinical Factors in Association with Extra-Intestinal Manifestations in IBD Patients*;
5. 2016/11/4-6, **21st Young Statisticians Meeting** (Piran, Slovenia), CT: *Bayesian MLT for Revealing Complex Interactions Among Genetic and Clinical Factors in Association with Extra-Intestinal Manifestations in IBD Patients*;
4. 2016/10/20, **CDISC Italian User Network Day Data standard e loro applicazione** (Milano, Italy), IT: *Use of MLT to predict outcome in clinical trials*;
3. 2016/07/29 - 2016/08/04, **Joint Statistical Meeting** (Chicago (IL) - USA), CT + PS: *Maximizing Text Mining Performance: The Impact of Pre-Processing*;
2. 2015/10/16-18, **20th Young Statistician Meeting** (Vorau, Austria), CT: *Automated Text Classification in a Big-Data Context: Some Issues and Proposal Solutions*;
1. 2015/09/16-19, **VIII Congresso nazionale SISMEC** (Torino, Italy), CT: *A bibliometric analysis in food safety and nutrition*.

Participations

For every participation it is indicated period, **congress title** (venue).

5. 2018/02/2-3, **RStudio::conf** (San Diego (CA), USA);
4. 2017/10/27, **e-Healt in cardiologia - Presente e Futuro tra Innovazione e Regole** (Vicenza, Italy);
3. 2016/09/28-30, **"Early phase adaptive trial" Tutorial and workshop** (Politecnico di Torino, Italy);
2. 2016/06/29 - 2016/07/01, **VIII CONGRESSO NAZIONALE BIAS** (Verona, Italy);
1. 2016/04/14, **Workshop Data Linkage** (Milano Bicocca, Italy).

Working Activity

For every working activity it is indicated period, description/project-title, society/institution.

3. 2017, *Course on Advance R programming for statisticians*, Società di Scienze Farmacologiche Applicate;
2. 2017, *Data cleaning and Statistical Analyses*, Zetaresearch s.r.l.
1. 2017, *Course on Basic R programming for statisticians*, Società di Scienze Farmacologiche Applicate;

Language skills

Languages

For every language it is indicated **language** if (*Mother tongue(s)*) or else (*Listening, Reading, Spoken interaction, Spoken production, writing levels*) (*Levels: A1 and A2: Basic user - B1 and B2: Independent user - C1 and C2: Proficient user - Common European Framework of Reference for Languages*).

📎 **Italian** (*Mother tongue*);

📎 **English** (*Listening: C1, Reading: C1, Spoken interaction: B1, Spoken production: B2, Writing levels: B2*)

Digital skills

For every skill it is indicated **name**, (*Levels: Basic user - Independent user - Proficient user*: optional additional info)

General skills

- ✎ **Information processing** (*Proficient*: import, tidying, analyses of health data);
- ✎ **Communication** (*Proficient*: production of R Markdown and L^AT_EX documentations and templates);
- ✎ **Content creation** (*Independent*);
- ✎ **Safety** (*Independent*);
- ✎ **Problem solving** (*Proficient*);

Program languages

- ✎ **R** (*Proficient*: Statistical and Machine Learning, Text and Data mining, package develop);
- ✎ **MatLab** (*Independent*);
- ✎ **MonkeyC** (*Basic*);
- ✎ **Python** (*Basic*);
- ✎ **C++** (*Basic*);
- ✎ **L^AT_EX** (*Proficient*: package and class develop);

Operating Systems and softwares

- ✎ **MS Windows XP, 7, 8, 10** (*Proficient*);
- ✎ **OSX 10.5 - 10.12** (*Independent*);
- ✎ **Ubuntu 16.04 LTS** (*Basic*);
- ✎ **Git/GitHub** (*Proficient*);
- ✎ **RStudio** (*Proficient*);
- ✎ **GeoGebra** (*Independent*);
- ✎ **suite MS Office** (*Independent*);

In compliance with the GDPR and Italian Legislative Decree no. 196 dated 30/06/2003, I hereby authorize the recipient of this document to use and process my personal details for the purpose of recruiting and selecting staff and I confirm to be informed of my rights in accordance to art. 7 of the above mentioned Decree. September 10, 2018

Corrado Lanera