

UNIVERSITÀ DEGLI STUDI DI MILANO

Procedura di selezione per la chiamata a professore di I fascia da ricoprire ai sensi dell'art. 18, commi 1 e 4, della Legge n. 240/2010 per il settore concorsuale _____ 04/A4 - GEOFISICA _____,
(settore scientifico-disciplinare _____ GEO/12 - OCEANOGRAFIA E FISICA DELL'ATMOSFERA _____)
presso il Dipartimento di _____ Scienze della Terra Ardito Desio __, Codice concorso _5304__

Massimo Cassiani**CURRICULUM VITAE**

(N.B. IL CURRICULUM NON DEVE ECCEDERE LE 30 PAGINE E DEVE CONTENERE GLI ELEMENTI CHE IL CANDIDATO RITIENE UTILI AI FINI DELLA VALUTAZIONE.

LE VOCI INSERITE NEL FACSIMILE SONO A TITOLO PURAMENTE ESEMPLIFICATIVO E POSSONO ESSERE SOSTITUITE, MODIFICATE O INTEGRATE)

INFORMAZIONI PERSONALI

COGNOME	CASSIANI
NOME	MASSIMO
DATA DI NASCITA	27/11/1971

TITOLI**TITOLO DI STUDIO**

(indicare la Laurea conseguita inserendo titolo, Ateneo, data di conseguimento, ecc.)

Laurea in Scienze Ambientali, Indirizzo Terrestre Orientamento Chimico
Università Degli Studi di Urbino Carlo Bo, Urbino, Italia
Data 01/07/1998
Votazione finale di 110/110 e dichiarazione di Lode

TITOLO DI DOTTORE DI RICERCA O EQUIVALENTI, OVVERO, PER I SETTORI INTERESSATI, DEL DIPLOMA DI SPECIALIZZAZIONE MEDICA O EQUIVALENTE, CONSEGUITO IN ITALIA O ALL'ESTERO

(inserire titolo, ente, data di conseguimento, ecc.)

Dottorato di Ricerca in Scienze Ambientali, XIV ciclo
Università Degli Studi di Urbino Carlo Bo, Urbino, Italia
Data 11/01/2002

ESPERIENZA LAVORATIVA

4/2008-Presente. NILU - Norwegian Institute for Air Research, Kjeller, Norvegia. Senior Research Scientist (Forsker I dal 2016, Forsker II dal 2008 al 2016)

4/2013-1/2014. University of Tromsø, Tromsø, Norvegia. Adjunct Associate Professor (Forsteamanuensis II), Faculty of Science and Technology.

1/2005-3/2008. Duke University, Durham, North Carolina, USA. Research Associate, Department of Civil and Environmental Engineering.

10/2002-9/2004. Università degli studi di Urbino "Carlo Bo", Urbino, Italia. Docente a contratto, Facoltà di Scienze Ambientali.

3/2002-5/2004. Università degli studi di Urbino "Carlo Bo", Urbino, Italy. Contratto di ricerca, Facoltà di Scienze Ambientali.

3-6/2001 and 6-7/2000. George Mason University, Fairfax, Virginia, USA. Visiting Scientist, School of Computational Sciences.

11/1998-10/2001. Università degli studi Urbino "Carlo Bo", Urbino, Italia. Dottorato di Ricerca XIV ciclo con borsa di studio, Facoltà di Scienze Ambientali.

ATTIVITÀ DIDATTICA

INSEGNAMENTI E MODULI

(inserire anno accademico, corso laurea, numero di ore frontali, eventuale CFU)

A.A. 2002/2003. Professore a contratto di "Dinamica degli Inquinanti" (ICAR/03). Corso di Laurea in Scienze Ambientali vecchio ordinamento, Facoltà di Scienze Ambientali, Università degli Studi di Urbino Carlo Bo.

A.A. 2003/2004. Professore a contratto di "Dinamica degli Inquinanti" (ICAR/03). Corso di Laurea in Scienze Ambientali vecchio ordinamento, Facoltà di Scienze Ambientali, Università degli Studi di Urbino Carlo Bo.

ATTIVITÀ DI DIDATTICA INTEGRATIVA E DI SERVIZIO AGLI STUDENTI

ATTIVITÀ DI CO-RELATORE DI ELABORATI DI LAUREA, DI TESI DI LAUREA MAGISTRALE E DI TESI DI DOTTORATO

- **Attività di co-relatore per tesi di Laurea (Master of Sciences degree se all'estero) concluse:**

A.A. 2022-2023, Università di Oslo, Oslo, Norvegia, Facoltà di Scienze Matematiche e Naturali Dipartimento di Chimica, co-relatore per lo studente Jessie van Hooft. Relatore Prof. Armin Wisthaler

A.A. 2001-2002, Università degli Studi di Urbino "Carlo Bo", Urbino, Italia, Facoltà di Scienze Ambientali, co-relatore per lo studente Valerio Bisignanesi. Relatore Prof. Umberto Giostra

A.A. 2000-2001, Università degli Studi di Urbino "Carlo Bo", Urbino, Italia, Facoltà di Scienze Ambientali, co-relatore per lo studente Michela Tonucci. Relatore Prof. Umberto Giostra.

A.A. 2000-2001, Università degli Studi di Urbino "Carlo Bo", Urbino, Italia, Facoltà di Scienze Ambientali, co-relatore per lo studente Mara Federici. Relatore Prof. Umberto Giostra.

- **Attività di co-relatore per Dottorato ancora in svolgimento:**

A.A. 2022-2023, Politecnico di Torino, Torino, Italia. Dipartimento di Ingegneria Civile ed Ambientale. Co-relatore per lo studente Filippo Maccarini. Argomento: studio della turbolenza in ambiente urbano. Studente ospitato al NILU durante il 2023. Relatore Prof. Davide Poggi.

ATTIVITÀ DI CO-TUTORATO SCIENTIFICO DI DOTTORANDI DI RICERCA

- Attività di tutore per Dottorato di ricerca concluso:

A.A. 2004-2005. Università degli Studi di Urbino “Carlo Bo”, Urbino, Italia, Facoltà di Scienze Ambientali. Dottorato in Scienze Ambientali XVIII ciclo. Co-tutore per lo studente Alexandre Radicchi. Argomento: Modellazione della densità di probabilità della concentrazione in turbolenza generata da ostacoli. Relatore Prof. Umberto Giostra.

- Attività di tutore per Dottorato di ricerca ancora in svolgimento:

A.A. 2022-2023. École Centrale de Lyon, Lione, Francia, Laboratoire de Mécanique des Fluides et Acoustique. Co-tutore per lo studente Marilina Barulli. Argomento: studio della turbolenza in uno strato limite stabile. Studente ospitato al NILU durante il 2023. Relatore Prof. Pietro Salizzoni.

ATTIVITÀ DI ESAMINATORE PER TESI DI MASTER of SCIENCES E DOTTORATO, CON RESPONSABILITÀ LEGALE PER IL GIUDIZIO FINALE

A.A. 2023. Università di Bergen, Bergen, Norvegia. Istituto di Geofisica, Dipartimento di Meteorologia. Esaminatore principale per la discussione finale per la tesi di Master of Sciences in Meteorologia per lo studente Sander Løklingholm. Discussione tenutasi il 09/06/2023.

A.A. 2023. Wageningen University and Research, Wageningen, Olanda. Dipartimento di Scienze Ambientali, Divisione di Meteorologia e Qualità dell'aria. Membro del comitato di valutazione per il grado di Doctor of Philosophy per lo studente Anja Ražnjević. La discussione sarà tenuta in data 01/09/2023.

A.A. 2012. Università di Oslo, Oslo, Norvegia. Dipartimento di Geoscienze. Membro del comitato di valutazione per il grado di Doctor of Philosophy per lo studente Øivind Hodnebrog. Discussione tenutasi il 15/02/2012.

SEMINARI

(inserire titolo del seminario, luogo, data, ecc.)

8. Stochastic models, an effective tool for simulating atmospheric dispersion and mixing. International Centre for Theoretical Physics and University of Trento. Environmental Meteorology seminar series. Trento, Italia, 03/06/2021.

7. Turbulent mixing and fluctuations, physics and modeling. Center for International Climate Research (CICERO). Oslo, Norvegia, 31/05/2018.

6. Lagrangian particle models for dispersion, concentration fluctuations and chemical reactions in the atmospheric boundary layer. Université de Lyon, École Centrale de Lyon, INSA Lione, Francia, 06/06/2014.

5. Lagrangian particle models for dispersion, concentration fluctuations and chemical reactions in the atmospheric boundary layer. Norwegian Defense Research Establishment (FFI), Kjeller, Norvegia, 03/06/2013.

4. Lagrangian particle models for dispersion, mixing and chemical reactions in the atmospheric boundary layer. University of Oslo, Department of Geosciences, Oslo, Norvegia. 29/11/2012.

3. Modeling methods and theoretical aspects of turbulent dispersion. Penn State University, Department of Meteorology, State College, PA, USA. 31/01/2008.

2. Modeling methods and theoretical aspects of turbulent dispersion. Harvard University, School of Engineering and Applied Sciences, Boston, MA, USA. 14/03/2007.

1. Stochastic processes applied to turbulence modelling. Duke University, Nicholas School of the Environment. Invited to teach a series of lectures in the Environmental Fluid Dynamic course of Prof. Gabriel Katul, 2007.

ATTIVITÀ DI RICERCA SCIENTIFICA

INDICI BIBLIOGRAFICI al 19.07.2023 (SOURCE, NUMBER OF CITATIONS, H-INDEX, LINK)

GOOGLE SCHOLAR, 1799, 23: <https://scholar.google.it/citations?user=OlgP7QIAAAAJ&hl=en&oi=ao>

RESEARCH GATE, 1744, 22: <https://www.researchgate.net/profile/Massimo-Cassiani>

SCOPUS, 1279, 20: <https://www.scopus.com/authid/detail.uri?authorId=6603288024>

BREVE RIASSUNTO DEGLI INTERESSI DI RICERCA

Boundary-Layer and Air Pollution Meteorology. Turbulence and dispersion in the atmosphere with application to air pollution, moisture transport and ecological modelling. High-resolution meteorological (turbulence large eddies resolving) simulation of the atmospheric boundary layer and of complex environmental flows (e.g. Urban and Forest environments). Lagrangian multi-scale (microscale to global) modelling of the transport and mixing of substances (gaseous pollutants, particles, microplastics, moisture, heat). Stochastic modelling of chemical reactions in turbulent flows for atmospheric chemistry applications, based on statistical mechanics approaches. Experimental field measurements of turbulence and turbulent dispersion using sonic anemometers, open path gas analyzers, ground based remote sensing and drones.

PUBBLICAZIONI SCIENTIFICHE (peer-reviewed in riviste internazionali)

(Sono riportati i nomi degli autori, titolo completo, anno di pubblicazione, casa editrice, nominativo del giornale scientifico, numero del giornale, codice DOI con link se disponibile, o ISSN)

42. Axelsson J., Gao J., Eckhardt S., Cassiani M., Chen D., Zhang Q. (2023) A precipitation isotopic response in 2014-2015 to moisture transport changes in the central Himalayas. AGU publishing. Journal of Geophysical Research: Atmospheres, 128, e2023JD038568. <https://doi.org/10.1029/2023JD038568>

41. Pirk N., Aalstad K., Westermann S., Vatne A., van Hove A., Tallaksen L. M., Cassiani M., Katul G. (2022) Inferring surface energy fluxes using drone data assimilation in large eddy simulations. EGU publishing. Atmospheric Measurement techniques 15, 7293-7314. <https://doi.org/10.5194/amt-15-7293-2022>

40. Michel C., Sorteberg A., Eckhardt S., Weijenborg C., Stohl A., Cassiani M. (2021) Characterization of the atmospheric environment during extreme precipitation events associated with atmospheric rivers in Norway - Seasonal and regional aspects. Elsevier publishing. Weather and Climate Extremes 34, 100370. <https://doi.org/10.1016/j.wace.2021.100370>

39. Cassiani M., Bertagni M.B., Marro M., Salizzoni P. (2020) Concentration fluctuations from localized atmospheric releases. Springer publishing. Boundary-Layer Meteorology 177, 461-510. <https://doi.org/10.1007/s10546-020-00547-4>

38. Ardeshiri H., M. Cassiani, S. Y. Park, A. Stohl, I. Pizzo, A. S. Dinger (2020) On the convergence and capability of the large-eddy simulation of concentration fluctuations in passive plumes for a neutral boundary layer at infinite Reynolds number. *Boundary-Layer Meteorology*, 176, 291-327. <https://doi.org/10.1007/s10546-020-00537-6>
37. Kylling A., Ardeshiri H., Cassiani M., Dinger A.S., Park S.Y., Pizzo I., Schmidbauer N., Stebel K, Stohl A. (2019) Can statistics of turbulent tracer dispersion be inferred from camera observations of SO₂ in the ultraviolet? A modelling study. EGU publishing. *Atmospheric Measurement techniques*, 13, 3303-3318, 2020. <https://doi.org/10.5194/amt-13-3303-2020>
36. Pizzo, I., Sollum, E., Grythe, H., Kristiansen, N. I., Cassiani, M., Eckhardt, S., Arnold, D., Morton, D., Thompson, R. L., Groot Zwaafink, C. D., Evangeliou, N., Sodemann, H., Haimberger, L., Henne, S., Brunner, D., Burkhardt, J. F., Fouilloux, A., Brioude, J., Philipp, A., Seibert, P., and Stohl, A. (2019) The Lagrangian particle dispersion model FLEXPART version 10.4 Geoscientific Model Development, 12, 4955-4997. EGU publishing. <https://doi.org/10.5194/gmd-12-4955-2019>
35. Vogel, A., Durant, A. J., Cassiani, M., Clarkson, R. J., Slaby, M., Diplas, S., Krüger, K. Stohl, A. (2019) Simulation of volcanic ash ingestion into a large aero-engine: Particle-fan interactions. ASME (The American Society of Mechanical Engineers) publishing. *Journal of Turbomachinery*, 141, Vol. 141/ 011010-1. <https://doi.org/10.1115/1.4041464>
34. Dinger S., Stebel K., Cassiani M., Ardeshiri H., Bernardo C., Kylling A., Park S.-Y., Pizzo I, Schmidbauer N., Wasseng J., Stohl A. (2018) Observations of turbulent dispersion of artificially released SO₂ puffs with UV cameras. EGU publishing. *Atmospheric Measurement Techniques*, 11, 6169-6188. <https://doi.org/10.5194/amt-11-6169-2018>
33. Marro M., Salizzoni P., Soulhac, L., Cassiani M. (2018) Dispersion of a Passive Scalar Fluctuating Plume in a Turbulent Boundary Layer. Part III: Stochastic Modelling *Boundary-Layer Meteorology* 167 (3), 349-369. Springer publishing. <https://doi.org/10.1007/s10546-017-0330-6>
32. Eckhardt S, Cassiani, M., Evangeliou N., Sollum E, Pizzo I., Stohl A. (2017) Source-receptor matrix calculation for deposited mass with the Lagrangian particle dispersion model FLEXPART v10.2 in backward mode. EGU publishing. *Geoscientific Model Development*, 10, 4605-4618, 2017. <https://doi.org/10.5194/gmd-10-4605-2017>
31. Cassiani, M., Stohl, A., Olivié, D., Seland, Ø., Bethke, I., Pizzo, I., and Iversen, T. (2016) The off-line Lagrangian particle model FLEXPART-NorESM/CAM (V1): model description and comparisons with the on-line NorESM transport scheme and with the reference FLEXPART model. EGU publishing. *Geoscientific Model Development*, 9, 4029-4048. <https://doi.org/10.5194/gmd-9-4029-2016>
30. Duman T, Trakhtenbrot A. Poggi D., Cassiani M, Katul G. (2016) Dissipation Intermittency Increases Long-Distance Dispersal of Heavy Particles in the Canopy Sublayer. Springer publishing. *Boundary-Layer Meteorology* 159: 41. <https://doi.org/10.1007/s10546-015-0112-y>
29. Cassiani M., Stohl A., Brioude J. (2015) Lagrangian stochastic modelling of dispersion in the convective boundary layer with skewed turbulence conditions and a vertical density gradient: formulation and implementation in the FLEXPART model. Springer publishing. *Boundary-Layer Meteorology* 154, 367-390. <https://doi.org/10.1007/s10546-014-9976-5>
28. Duman T., Katul G., Siqueira M. B., Cassiani M. (2014) A velocity-dissipation Lagrangian stochastic model for turbulent dispersion in atmospheric boundary layer and canopy flows. Springer publishing. *Boundary-Layer Meteorology* 152, 1-18. <https://doi.org/10.1007/s10546-014-9914-6>
27. Brioude J., D. Arnold, A. Stohl, M. Cassiani, D. Morton, P. Seibert, W. Angevine, S. Evan, A. Dingwell, J. D. Fast, R. C. Easter, I. Pizzo, J. Burkhardt, and G. Wotawa (2013) The Lagrangian particle dispersion model FLEXPART-WRF version 3.1. EGU publishing. *Geoscientific Model Development*, 6, 1889-1904. <https://doi.org/10.5194/gmd-6-1889-2013>

26. Cassiani M., Stohl A., Eckhardt S. (2013) The dispersion characteristics of air pollution from the world's megacities. EGU publishing. *Atmospheric Chemistry and Physics*, 13, 9975-9996. <https://doi.org/10.5194/acp-13-9975-2013>
25. Eckhardt S., O. Hermansen, H. Grythe, M. Fiebig, K. Stebel, M. Cassiani, A. Baecklund, and A. Stohl (2013) The influence of cruise ship emissions on air pollution in Svalbard - a harbinger of a more polluted Arctic?. EGU publishing. *Atmospheric Chemistry and Physics*, 13, 8401-8409. <https://doi.org/10.5194/acp-13-8401-2013>
24. Cassiani M. (2013) The volumetric particle approach for concentration fluctuations and chemical reactions in Lagrangian particle and particle-grid models. Springer publishing. *Boundary-Layer Meteorology*, Volume 146, Issue 2, pp 207-233. <https://doi.org/10.1007/s10546-012-9752-3>
23. Porporato A., Kramer P.R., Cassiani M., Daly E., Mattingly J. (2011) Local kinetic interpretation of entropy production through reversed diffusion. American Physical Society publishing. *Physical Review E* 84, 041142. <https://doi.org/10.1103/PhysRevE.84.041142>
22. Huang J., Cassiani M., Albertson J.D. (2011) Coherent turbulent structures across a vegetation discontinuity. Springer publishing. *Boundary-Layer Meteorology*, 140, 1, 1-22. <https://doi.org/10.1007/s10546-011-9600-x>
21. Denby B., Cassiani M., De Smet P., De Leeuw F., Horálek J. (2011) Sub-grid variability and its impact on European wide air quality exposure assessment. Elsevier publishing. *Atmospheric Environment* 45, 2, 4220-4229. <https://doi.org/10.1016/j.atmosenv.2011.05.007>
20. Cassiani M., Vinuesa J.F., Galmarini S., Denby B. (2010) Stochastic fields methods for sub-grid scale emission heterogeneity in mesoscale atmospheric dispersion models. EGU publishing. *Atmospheric Chemistry and Physics* 10, 1, 267-277. <https://doi.org/10.5194/acp-10-267-2010>
19. Denby B., Sundvor I., Cassiani M., De Smet P., De Leeuw F., Horálek J. (2010) Spatial Mapping of Ozone and SO₂ Trends in Europe. Elsevier publishing. *Science of the Total Environment*, 408, 120, 4271-4922. <https://doi.org/10.1016/j.scitotenv.2010.06.021>
18. Cassiani M., Franzese P., Albertson J.D. (2009) A coupled Eulerian and Lagrangian mixing model for intermittent concentration time series. AIP (American Institute of Physics) publishing. *Physics of Fluids* 21, 085105. <https://doi.org/10.1063/1.3202534>
17. Huang J., Cassiani M. and Albertson J.D. (2009) The effects of vegetation density on coherent turbulent structures within the canopy sub-layer: A large-eddy simulation study. Springer publishing. *Boundary-Layer Meteorology*, 133, 2, 253-275. <https://doi.org/10.1007/s10546-009-9423-1>
16. Kim T.-Y., Cassiani M., Albertson J. D., Dolbow J., Guertin M. E. (2009) Impact of the inherent separation of scales in the Navier-Stokes-alpha-beta equations. American Physical Society publishing. *Physical Review E* 79, 045307. <https://doi.org/10.1103/PhysRevE.79.045307>
15. Huang J., Cassiani M., Albertson J.D. (2009) Analysis of coherent structures within the atmospheric boundary layer. Springer publishing. *Boundary-Layer Meteorology*, 131, 2, 141-171. <https://doi.org/10.1007/s10546-009-9357-7>
14. Poggi D., Katul G., Cassiani M. (2008) On the anomalous behavior of the Lagrangian structure function similarity constant inside dense canopies. Elsevier publishing. *Atmospheric Environment* 42 18 4212-4231. <https://doi.org/10.1016/j.atmosenv.2008.01.020>
13. Cassiani M., Radicchi A., Albertson J. D., Giostra U. (2007) An efficient algorithm for scalar PDF modeling in incompressible turbulent flows; numerical analysis with evaluation of IEM and IECM micro-mixing models. Elsevier publishing. *Journal of Computational Physics*, 223 (2): 519-550. <https://doi.org/10.1016/j.jcp.2006.09.023>

12. Cassiani M, Katul G., Albertson J. D., (2008) The influence of canopy leaf area index on the airflow across forest edges: Large Eddy Simulation and analytical results. Springer publishing. *Boundary-Layer Meteorology* 126, 3, 433-460. <https://doi.org/10.1007/s10546-007-9242-1>
11. Franzese P. and Cassiani M. (2007) A statistical theory of turbulent relative dispersion. Cambridge University Press publishing. *Journal of Fluid Mechanics*, 571, 391 - 417. <https://doi.org/10.1017/S0022112006003375>
10. Cassiani M., Radicchi A., Albertson J. D. (2007) Concentration fluctuations in canopy turbulence. Springer publishing. *Boundary-Layer Meteorology*, 122 (3): 655-681. <https://doi.org/10.1007/s10546-006-9122-0>
9. Cassiani M., Franzese P., Giostra U. (2005) A PDF micromixing model of dispersion for atmospheric flow. Part I: Development of the model, application to homogeneous turbulence and to neutral boundary layer. Elsevier publishing. *Atmospheric Environment*, 39(8), 1457-1469. <https://doi.org/10.1016/j.atmosenv.2004.11.020>
8. Cassiani M., Franzese P., Giostra U. (2005) A PDF micromixing model of dispersion for atmospheric flow. Part II: Application to convective boundary layer. Elsevier publishing. *Atmospheric Environment*, 39(8), 1471-1479. <https://doi.org/10.1016/j.atmosenv.2004.11.019>
7. Cassiani M., Radicchi A., Giostra U. (2005) Concentration PDF modelling in and above a canopy layer. Elsevier publishing. *Agricultural and Forest Meteorology*, 133(1-4), 153-165. <https://doi.org/10.1016/j.agrformet.2005.09.007>
6. Cassiani M. and Giostra U. (2002). A simple and fast model to compute concentration moments in a convective boundary layer. Elsevier publishing. *Atmospheric Environment*, 36, 4717-4724. [https://doi.org/10.1016/S1352-2310\(02\)00564-2](https://doi.org/10.1016/S1352-2310(02)00564-2).
5. Cassiani M. and Giostra, U., (2002). A semi-analytical model for mean concentration in convective boundary layer. Elsevier publishing. *Atmospheric Environment*, 36, 4707-4715. [https://doi.org/10.1016/S1352-2310\(02\)00565-4](https://doi.org/10.1016/S1352-2310(02)00565-4)
4. Mangia C., Rizza U., Giostra U., Cassiani M. and Degrazia G. A. (2001) A Lagrangian-Puff dispersion model: evaluation against tracer data. Inder Science publishing. *Int. J. of Environment and Pollution*, 16, 28-35. <https://doi.org/10.1504/IJEP.2001.000603>
3. Rizza U., Cassiani M., Giostra U., Mangia C. (2000) An Advanced puff model based on a mixed Eulerian-Lagrangian approach for turbulent dispersion in a Convective Boundary Layer. Springer publishing. *Boundary-Layer Meteorology*, 95, 319-39. <https://doi.org/10.1023/A:1002653406071>
2. Rizza U., Mangia C., Giostra U., Cassiani M. (2000) A mixed Lagrangian-Eulerian approach for turbulent dispersion in the PBL. Begell House publishing. *Hybrid Methods in Engineering*, 3, 249-259. DOI: 10.1615/HybMethEng.v2.i3.20
1. Cassiani M. and Giostra U. (1999) Eulerian-Lagrangian modelling of dispersion in a convective boundary layer. *Il Nuovo Cimento*, 22 C, 5. ISSN 2037-4909 (printed version)

ORGANIZZAZIONE, DIREZIONE E COORDINAMENTO DI CENTRI O GRUPPI DI RICERCA NAZIONALI E INTERNAZIONALI O PARTECIPAZIONE AGLI STESSI
(per ciascuna voce inserire anno, ruolo, gruppo di ricerca, ecc.)

Partecipazione a progetti di ricerca a finanziamento pubblico, coinvolgenti gruppi di ricerca Norvegesi o internazionali

Progetti in corso

- FuNitr (2023 - 2027). Future Drinking Water Levels of Nitrosamines and Nitramines near CO2 Capture Plants. Funded by the Research Council of Norway, coordinated by Norwegian Institute for Water Research (NIVA). Role: Co-Principal Investigator, Work Package (WP) leader and NILU leading investigator. Project partners: NILU, NIVA (Norwegian Institute for Water Research), University of Oslo, Technology Center Mongstad, Norwegian University of Life Sciences, Aker Carbon Capture.
- Magic (2023 - 2027). Airborne Microplastic Detection, Origin, Transport and Global Radiative Impact. Funded by the Research Council of Norway, coordinated by NILU. Role: Co-Principal Investigator and WP leader. Project partners: NILU, University of Oslo, University of Vienna, Czech Academy of Sciences.
- Spot-On (2020 -2023). Upscaling hotspots - understanding the variability of critical land-atmosphere fluxes to strengthen climate models. Research project coordinated by the University of Oslo (UiO), funded by the Research Council of Norway. Role: Co-Investigator, WP leader and NILU leading investigator. Project partners: UiO, NILU, Autonomous University of Madrid.
- UniChem (2021 - 2024). Updating and innovating NILU Atmospheric Chemical Transport Models. Funded by NILU after internal competition using the government basic scientific grant. Role: Principal Investigator. This project involves only NILU researchers.
- EMERALD (2019 - 2023) Terrestrial ecosystem-climate interactions of our EMERALD planet. A multi-institutional research project in Norway coordinated by University of Oslo, funded by the Research Council of Norway. Role: Co-Investigator and NILU leading investigator. The project involves 9 Norwegian and one international partners (NCAR, USA).

Progetti conclusi (dal 2008)

- MASTER (2018 - 2021) - Model Advancements for high Spatial and TEmporal Resolution simulation of environmental toxics. Funded by NILU after internal competition using the government basic scientific grant. Role: Co-Investigator and WP leader. This project involved only NILU researchers.
- COMTESSA (2015 - 2021) Camera Observation and Modelling of 4D Tracer Dispersion in the Atmosphere. European Research Council advanced grant, H2020, funded by the European Commission. Role: Co-Investigator and activities leader. I designed and led two activities, the activity related to studying the physical law of dispersion and that on turbulence modeling. I co-lead and co-designed the activity on the field measurement campaigns of controlled gas releases. Project partners: NILU and University of Vienna (PI Andreas Stohl, University of Vienna).
- EVA (2014 - 2018) - Earth system modelling of climate Variations in the Anthropocene. A multi-institutional research project in Norway coordinated by University of Bergen (UiB), funded by the Research Council of Norway. Role: Co-investigator. Project partners: UiB, University of Oslo, Meteorological Institute, UniResearch, NILU, NERSC, CICERO.
- EarthClim (2011-2015) - Integrated Earth System Approach to Explore Natural Variability and Climate Sensitivity. A multi-institutional research project in Norway coordinated by University of Bergen (UiB), funded by the Research Council of Norway. Role: Co-investigator. Project partners: UiB, University of Oslo, Meteorological Institute, UniResearch, NILU, Norsk Polar Institute, NERSC, Norsk Regnesentral, CICERO.
- MEGAPOLI (2008-2011) - Megacities: Emissions, urban, regional and Global Atmospheric POLLution and climate effects, and Integrated tools for assessment and mitigation. European Commission 7th Framework Programme research project coordinated by the Danish Meteorological Institute. Role: Co-investigator. The project involved 22 institutions in Europe.

Progetti in Corso di Valutazione (first evaluation stage passed)

- COASTLINE, Supporting and developing eCcosystem restoration Strategies through a digital twiNs model. Submitted to the "Sustainable Blue Economy Partnership" call, a Horizon Europe co-funded partnership call. Role: Co-Principal Investigator and Work Package (WP) leader. Project partners: Polytechnic of Turin, Italy; ISPRA, Italy; University of Valencia, Spain; NILU, Norway.

ATTIVITÀ QUALI LA DIREZIONE O LA PARTECIPAZIONE A COMITATI EDITORIALI DI RIVISTE SCIENTIFICHE (per ciascuna voce inserire anno, ruolo, rivista scientifica, ecc.)

12/04/2018 - presente. Membro del comitato editoriale per la rivista internazionale "Boundary-Layer Meteorology", edita da Springer dal 1971, ruolo: Editorial Board Member.
<https://www.springer.com/journal/10546/editors?detailsPage=+editorialBoard>

ATTIVITÀ DI REVISORE PER LE SEGUENTI RIVISTE SCIENTIFICHE INTERNAZIONALI

Atmospheric Chemistry and Physics
Atmospheric Environment
Agricultural and Forest Meteorology
Boundary-Layer Meteorology (Membro del Board Editoriale)
Environmental Fluid Mechanics
Geoscientific Model Development
International Journal of Heat and Fluid Flow
International Journal of Environment and Pollution
Physics of Fluids
Journal of Applied Meteorology
Journal of Engineering Mathematics
Journal of Fluid Mechanics
Journal of the Atmospheric Sciences
Water Air and Soil Pollution
Water Resources Research

ATTIVITÀ DI VALUTAZIONE DI PROPOSTE DI PROGETTI DI RICERCA SOTTOPOSTI A VALUTAZIONE PER AGENZIE DI FINANZIAMENTO PUBBLICHE

2023 - Revisore per lo **United Kingdom Research and Innovation**
2020 - Revisore per lo **European Research Council, Consolidator Grant Program**
2018 - Revisore per l'**Austrian Sciences Foundation**
2017 - Revisore per l'**Austrian Academy of Sciences**
2015 - Revisore per lo **European Research Council, Consolidator Grant Program**
2011 - Revisore per la **National Science Foundation of the United States of America**

PARTECIPAZIONE A COMITATI SCIENTIFICI E ORGANIZZATIVI DI CONFERENZE

2011 - AGU Chapman Conference on Advances in Lagrangian Modeling of the Atmosphere. Member of the scientific committee and chair for the session on Atmospheric Chemistry, Dispersion and Mixing in the Troposphere and Planetary Boundary Layer. Grindelwald, Switzerland, 9 - 14 October 2011.

PARTECIPAZIONE IN QUALITÀ DI RELATORE A CONGRESSI E CONVEGNI DI INTERESSE INTERNAZIONALE
(inserire titolo congresso/convegno, data, ecc.)

Poster contribution. "Modeling of concentration PDF from continuous releases using a Lagrangian PDF approach". The NOAA/EPA Golden Jubilee Symposium on Air Quality Modeling and Its Applications, Durham, NC, dal 19-09-2005 al 21-09-2005.

Oral contribution. "Lagrangian stochastic modeling of concentration fluctuations in atmospheric flows". 14th Joint Conference on the Applications of Air Pollution Meteorology with the Air and Waste Management Assoc. The 86th AMS Annual Meeting, Atlanta, Georgia at the Georgia World Congress Center, dal 29-01-2006 al 02-02-2006.

Oral contribution. "Probability density function (PDF) and filtered density function (FDF) methods for turbulent scalar dispersion in incompressible flows". ETC11 - 11th European Turbulence Conference, Porto (Portugal), dal 25-06-2007 al 28-06-2007. Published in "Advance in Turbulence XI", Springer-Verlag.

Oral contribution. "A coupled Eulerian and Lagrangian mixing model for intermittent concentration time series incorporating meandering". 15th Joint Conference on the Applications of Air Pollution Meteorology with the A&WMA, the AMS 88th Annual Meeting, New Orleans, LA, USA, dal 20-01-2008 al 24-01-2008.

Oral contribution. "A detailed modeling description of turbulent dispersion from continuous source: coupling Eulerian and Lagrangian stochastic models to simulate intermittent concentration time series incorporating meandering". European Geosciences Union General Assembly 2009, Vienna, Austria, dal 19-04-2009 al 24-04-2009.

Oral contribution. "Spatial mapping of Air quality trends in Europe". 30th ITM NATO/SPS International Technical Meeting on Air Pollution Modelling and its Application. San Francisco, CA, USA, dal 18-05-2009 al 22-05-2009.

Oral contribution. "Stochastic fields method for sub-grid scale emission heterogeneity in mesoscale atmospheric dispersion models". European Meteorological Society annual meeting, Toulouse, France, dal 28-09-2009 al 02-10-2009.

Oral contribution. "Applicazione del metodo dei campi stocastici alla rappresentazione sottogriglia delle emissioni con distribuzione spaziale eterogenea". Environment Including Global Change Conference, Palermo, Italy, dal 05-10-2009 al 09-10-2009.

Oral contribution. "A novel approach to model concentration fluctuations and chemical reactions in a dispersing plume based on Lagrangian particle and particle-grid methods". AGU Chapman Conference on Advances in Lagrangian Modeling of the Atmosphere. Grindelwald, Switzerland, dal 09-10-2011 al 14-10-2011.

Poster contribution. "Formulation of a Lagrangian stochastic model of dispersion in the convective boundary layer with skewed turbulence conditions and vertical density gradient". European Geosciences Union General Assembly 2014, Vienna, Austria, dal 27-04-2014 al 02-05-2014.

Oral contribution. "A large eddy simulation study of mean dispersion and concentration fluctuations from a point source". Lecture presented at the 18th International Conference on Harmonisation within Atmospheric Dispersion Modelling for Regulatory Purposes, Bologna, Italy, dal 09-10-2017 al 12-10-2017.

Poster contribution. "Large eddy simulation of plume dispersion and concentration fluctuations in a neutral boundary layer". European Geosciences Union General Assembly, Vienna, Austria, dal 08-04-2018 al 13-04-2018.

Oral contribution. "Effects of grid resolutions, source size and source elevation on dispersion in a neutral boundary layer; a LES study". 37th International Technical Meeting on Air Pollution Modelling and its Application, Hamburg, Germany, dal 23-09-2019 al 27-09-2019.

Oral contribution. "Investigation of Concentration Fluctuations for continuous point sources by high resolution Large Eddy Simulation and Stochastic Modeling". 2023 European General Assembly, Vienna, Austria. EGU23-15143 | Orals | AS2.1. Tue, 25 Apr 2023.

ATTIVITÀ GESTIONALI, ORGANIZZATIVE E DI SERVIZIO

INCARICHI DI GESTIONE E AD IMPEGNI ASSUNTI IN ORGANI COLLEGIALI E COMMISSIONI, PRESSO RILEVANTI ENTI PUBBLICI E PRIVATI E ORGANIZZAZIONI SCIENTIFICHE E CULTURALI, OVVERO PRESSO L'ATENEO O ALTRI ATENEI

(inserire incarico/impegno, ente, data, ecc.)

01/2023. **Membro della commissione esaminatrice per la selezione finale ed il finanziamento di progetti di ricerca sottoposti a valutazione.** Attività svolta per l'ente pubblico **United Kingdom (UK) Research and Innovation (UKRI)**. Bando finanziato da UK Natural Environmental Research Council (NERC) e UK Meteorological Office. Bando di finanziamento: "IMPROVING MODEL REPRESENTATION OF TURBULENT ATMOSPHERIC PROCESSES". Scopo del finanziamento come da descrizione: "This programme seeks to improve the understanding of atmospheric turbulent processes and their representation in kilometre and sub-kilometre scale weather and climate models to improve forecasts of extreme weather events...". Vedi anche: <https://www.ukri.org/opportunity/improving-model-representation-of-turbulent-atmospheric-processes/>

GESTIONE DI PROGETTI COMPUTAZIONALI (High Performance Computing)

2017 - present. Project manager for the Atmospheric Transport project (AtmoTra) for computational and storage resources on the Norwegian HPC system. More than 6 million CPU hours and 420TB of storage space were granted to the project.

ESPERIENZA in ORGANIZZAZIONE E PARTECIPAZIONE IN CAMPAGNE SPERIMENTALI DI MISURA

2017, 2018, 2019 - Ho partecipato alla ideazione, organizzazione e svolgimento di campagne di misura sperimentali in campo della durata di circa 3-4 settimane. Le attività personalmente svolte in campo hanno incluso: a) l'installazione e la gestione di anemometri sonici, sensori di umidità, temperatura e analizzatori di gas a cammino aperto per CO₂, b) la partecipazione all'installazione di grandi (60m) mast meteorologici, c) l'utilizzo di fotocamere nell'ultravioletto per la misura da remoto della dispersione.

2019- Ho partecipato alla ideazione, organizzazione e svolgimento di campagne di misura sperimentali in campo in ambiente urbano. Le attività personalmente svolte in campo hanno incluso l'installazione e la gestione completa di anemometri sonici, sensori di umidità, temperatura e analizzatori di gas a cammino aperto per CO₂ in ambiente urbano (installazione su ponteggi).

ESPERIENZA CON STRUMENTI DI LAVORO (HARDWARE, SOFTWARE, MODELLI) E LINGUAGGI

Software

- Systems: Linux, Windows
- Parallel computing: MPI, OPENMP, TotalView (parallel debugger for HPC)
- Programming Languages: Fortran, C, Python, MATLAB
- Integrated software development environment: Eclipse, Visual Studio, MATLAB
- Advanced data visualization: VisIt, Paraview, OpenDX, IDV
- Eddy Covariance analysis software: EddyPro (Licor)
- Geographic Information System: QGIS
- Others: Microsoft Office, LaTeX

Open-Source Meteorological, Atmospheric Dispersion/Chemistry Models

- WRF (Weather Research and Forecast), Mesoscale Meteorological model. Experience as User.
- PALM (Parallelized Large Eddy Model), Large Eddy Simulation Meteorological model. Experience as User and Developer.
- FLEXPART (Flexible Particle), Local to Global Dispersion model. Experience as User and Developer of all the FLEXPART model versions coupled to meteorological global scale (GFS, ECMWF), mesoscale (WRF), microscale (PALM) and climate projections (NorESM and CAM) simulations.
- EPISODE, 3D grid-based Chemistry Transport model with plume-in grid capability for reactive plumes. Experience as User and Developer, including full development of the plume-in grid capability.

Hardware for field measurements

- Campbell scientific instruments and data logger: CSAT3B and CSAT3A (3D Sonic Anemometers), EC150 (IR gas analyzer for CO₂ and H₂O), various sensors for atmospheric ambient temperature and pressure, CR6 data logger.
- Experience in assembling and equipping small meteorological mast (planning and leading mast and instruments installation), and large (60m) meteorological mast (planning and leading only the installation of the instruments). Experience in the installation of meteorological instruments in the Urban Environment (planning and leading the full Installation).

Spoken and written languages

Italian (native), English (fluent), Norwegian (basic use)

Data

19.07.2023

Luogo

Oslo, Norvegia