

PERSONAL INFORMATION

Fulvio Di Fulvio



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Sex Male | Date of birth 15/10/1981 | Nationality Italian

SHORT PROFILE

Dr. Fulvio Di Fulvio is a researcher at the Ecosystems Services and Management (ESM) Program of the International Institute for Applied Systems Analysis (IIASA) in Laxenburg, Austria. His research experience stretches from biophysical modelling in forestry, to economics, land use, LULUCF, bioenergy, climate mitigation, and integrated assessment.

Dr. Di Fulvio joined the IIASA ESM Program in 2014 as a post-doctoral fellow for leading an international benchmarking and modelling of supply costs in forestry. During his post-doctoral period at IIASA he participated in a number of projects related to bioenergy, climate mitigation and land use change in collaboration with the European Commission and other national and International Institutions, providing science based policy advice using quantitative modelling techniques.

From 2010 to 2014 Dr. Di Fulvio was employed as post-doc and as a researcher at the Swedish University of Agricultural Sciences (SLU), where his research focused on innovative systems for biomass supply from management of young forests and where he contributed to a number of Regional and European projects dealing with supply of forest bioenergy in the Nordic Countries and in Europe.

Dr. Di Fulvio graduated as PhD in 2010 at the University of Tuscia (UNITUS), Italy, where he specialised in Sciences and Technologies for Forests and Environmental Management. His studies focused on systems for supply of woody biomass from forest management and dedicated energy wood plantations. During the last period of his PhD studies he was employed as Research Assistant at the Institute of Agricultural Engineering of the Italian National Council of Agricultural Research (CRA-ING) where he participated in national projects investigating innovative technologies for supply of energy crops and forest residues.

In 2006, Dr Di Fulvio graduated as MSs in Forest Sciences at the University of Tuscia (UNITUS), following a Bachelor in Forestry and Environmental Sciences.

WORK EXPERIENCE

August 2016 – Present

Research Scholar

International Institute for Applied Systems Analysis (IIASA), Ecosystems Services and Management Program (ESM), Laxenburg, Austria. Web: www.iiasa.ac.at/ESM

Leading a group of six international LULUCF experts in the support to 10 EU Member States within the Task1 of the EC DG CLIMA assignment “Support for the Capacity Building in MS to implement FRLs and improvements of GHG inventories as requested by the LULUCF Regulation”.

Leading international benchmarking of supply costs in forestry with experts involved from 15 countries. Modelling of employment, biodiversity impacts and carbon emissions in the supply of woody biomass from forests and plantations to be used in the G4M (Global Forest Model) and GLOBIOM (Global Biosphere Management Model).

Leading a task force for implementation of forest management regimes into the global land use model GLOBIOM.

<http://www.globiom.org/>

Business or sector International Research Institute

Project contributions:

- ALTERFOR: Alternative models and robust decision-making for future forest management H2020 <https://www.alterfor-project.eu/>
- EUCLIMIT IV: Development and application of EU economy-wide climate mitigation modelling capacity, Assignment for the European Commission <http://www.euclimit.eu/>
- BECOOL: Brazil-EU Cooperation for Development of Advanced Lignocellulosic Biofuels, funded by the European Union's H2020 Research and Innovation Programme <https://www.becoolproject.eu/>
- IMBALANCE P: Effects of phosphorus limitations on Life, Earth system and Society, funded by the European Research Council <http://imbalancep-erc.creaf.cat>
- RESTORE+: Addressing Landscape Restoration on Degraded Land in Indonesia and Brazil, funded by the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety of Germany <http://www.restoreplus.org/>

August 2014 – July 2016

Post Doctoral Research Scholar

International Institute for Applied Systems Analysis (IIASA), Ecosystems Services and Management Program (ESM), Laxenburg, Austria. Web: www.iiasa.ac.at/ESM

Leading an international benchmarking of production costs in forestry with experts participating from 15 countries.

Modelling of employment, biodiversity impacts and carbon emissions in the supply of woody biomass from forests and plantations to be used in the G4M (Global Forest Model) and GLOBIOM (Global Biosphere Management Model) <http://www.globiom.org/>

Project contributions:

- ILUC: the indirect land use change impacts of conventional and advanced biofuels consumed in the EU. Assignment for the European Commission, consortium of Ecofys, IIASA and E4tech " <http://www.globiom-iluc.eu/>
- AGRICISTRATE: "Exploring the potential for agricultural and biomass trade in the Commonwealth of Independent States" Project co-funded by the European Commission within the Seventh Framework Programme (2007-2013) <http://www.agricistrade.eu/>
- EUCLIMIT II-III: Development and application of EU economy-wide climate mitigation modelling capacity, Assignment for the European Commission <http://www.euclimit.eu/>
- S2BIOM: Delivery of sustainable supply of non-food biomass to support a "resource-efficient" Bioeconomy in Europe funded by the European Union's 7th Framework Programme <http://www.s2biom.eu/en>

Business or sector International Research Institute

April 2010- July 2014

Post Doctoral Fellow / Researcher

Swedish University of Agricultural Sciences (SLU), Department of Forest Biomaterials and Technology / Department of Forest Resource Management, Umeå, Sweden.

<http://www.slu.se/en/departments/forest-biomaterials-technology>

- Conducting researches on efficiencies of innovative biomass supply systems in thinning of young forests

Projects contributions:

- INFRES, innovative and effective technology and logistics for forest residual biomass supply in the EU funded by the European Union's 7th Framework Programme
- Forest Refine, Efficient forest biomass supply chain management for biorefineries funded by the Botnia-Atalntica Interreg Programme <http://biofuelregion.se/knowledge-results>
- Forest Power, Enhanced forest biomass utilization funded by the Botnia-Atalntica Interreg Programme
- Lecturer in the International SLU master course "Advancing Forest Technologies"

Business or sector University

November 2009- March 2010

Research Assistant

CRA –ING, Italian National Council of Agricultural Research Institute of Agricultural Engineering, Monterotondo (Roma), Italy

- Evaluation of innovative technologies for supply of energy crops and forest residues, National Research Projects “FAESI” and “SUSCACE”

Business or sector National Research Institute

September 2004- May 2008

Technical Assistant

UNIF, Italian National Union of Forest Research Institutes, Firenze, Italy

Technical collaborations:

- Organisation of international field fairs/demonstrations of forest equipment (DIMAF 2004/2006/2008)
- Editing of a safety guide for forest operators
- Collaboration in a training course for forest operators “AFOR” in the Calabria Region
- Collaboration in a civil jury for establishing the expected value of a beech forest in the Sicily Region

Business or sector No profit National Organization

July 2006- October 2006

Research Assistant

UNITUS University of Tuscia, DAF Department of Environment and Forests, Viterbo, Italy

- Survey of post-fire logging operations, National Research Project PRIN 2005

Business or sector University

EDUCATION AND TRAINING

November 2006- February 2010

Ph.D. in Forestry

ISCED6

UNITUS University of Tuscia, DAF Department of Environment and Forests, Viterbo, Italy

- PhD course “Sciences and Technologies for the Forest and Environmental Management”
Thesis title “Analysis of small diameter energy-wood harvesting machinery, equipment and systems”
- Visiting Researcher at the Department of Forest Resource Management , Section of Planning and Technology, Umeå, Sweden (February-July 2009) and attending the course “Advancing Forest Technologies”

November 2004-April 2006

Master of Science in Forestry

ISCED5

UNITUS University of Tuscia, Faculty of Agriculture, Viterbo, Italy

- Master course in Conservation and Restoration of the Forest Environment

November 2004-April 2006

Bachelor in Forestry and Environmental Sciences

UNITUS University of Tuscia, Faculty of Agriculture, Viterbo, Italy

ADDITIONAL INFORMATION

Honours and awards

Awarded of a postdoctoral scholarship to IIASA by the Kempe Foundation of Sweden in 2014

Memberships

- Member of the Italian National Association of Agronomist and Forestry Officers since 2007
- Member of the Editorial Board of the Croatian Journal of Forest Engineering since 2016
- Member of the Editorial Board of Silva Fennica since 2018

- Work management**
- Led a team of 19 experts from 15 countries in an international benchmarking of costs in forest operations in different global regions during the years 2013-2014.
 - Currently leading a group of six international LULUCF experts in the support to 10 EU Member States for a tender of the EC DG CLIMA.
- Student supervision**
- Main supervisor of the YSSP student “Orjan Gronlund” during the IIASA summer school for PhDs, title of YSSP report: “Nature Conservation Management Forests in Sweden; A Spatially Explicit Analysis of Current Management Potentials and Societal Trade-Offs”
 - Co-supervisor of a Licentiate student: Kalvin Kons, Licentiate Thesis title: “Forest Biomass Terminal Properties and Activities” February 2015, SLU
 - Co-supervisor of the PhD student Raul Fernandez Lacruz at SLU, Thesis title: Development of biomass supply chains for small tree harvesting from dense thinning forests and marginal land, SLU
- Scientific Reviewer**
- Biomass & Bioenergy, Silva Fennica, International Journal of Forest Engineering, Journal of Forest Economics, Croatian Journal of Forest Engineering, Journal of Sustainable Bioenergy Systems, Fuels, Applied Engineering in Agriculture, Journal of Renewable and Sustainable Energy
- Peer-Reviewed Scientific Publications**
- **Di Fulvio, F.**, Forsell, N., Korosuo, A., Obersteiner, M., Hellweg, S. 2019. Spatially explicit LCA analysis of biodiversity losses due to different bioenergy policies in the European Union Science of the Total Environment, 651, pp. 1505-1516. <https://www.sciencedirect.com/science/article/pii/S0048969718333941?via%3Dihub>
 - Grönlund, Ö., **Di Fulvio, F.**, Bergström, D., Djupström, L., Eliasson, L., Erlandsson, E., Forsell, N., Korosuo, A. 2019. Mapping of voluntary set-aside forests intended for nature conservation management in Sweden. Scandinavian Journal of Forest Research, 34:2, 133-144. <https://www.tandfonline.com/doi/full/10.1080/02827581.2018.1555279>
 - Kim, H., Rosa, I.M.D., Alkemade, R., Leadley, P., Hurtt, G., Popp, A., Van Vuuren, D.P., Anthoni, P., Armeth, A., Baisero, D., Caton, E., Chaplin-Kramer, R., Chini, L., De Palma, A., **Di Fulvio, F.**, Di Marco, M., Espinoza, F., Ferrier, S., Fujimori, S., Gonzalez, R.E., Gueguen, M., Guerra, C., Harfoot, M., Harwood, T.D., Hasegawa, T., Haverd, V., Havlík, P., Hellweg, S., Hill, S.L.L., Hirata, A., Hoskins, J., Janse, J.H., Jetz, W., Johnson, J.A., Krause, A., Leclère, D., Martins, I.S., Matsui, T., Merow, C., Obersteiner, M., Ohashi, H., Poulter, B., Purvis, A., Quesada, B., Rondinini, C., Schipper, A.M., Sharp, R., Takahashi, K., Thuiller, W., Titeux, N., Visconti, P., Ware, C., Wolf, F., Pereira, H.M. A 2018. A protocol for an intercomparison of biodiversity and ecosystem services models using harmonized land-use and climate scenarios. Geoscientific Model Development, 11 (11), pp. 4537-4562. <https://www.geosci-model-dev.net/11/4537/2018/>
 - Deppermann A., Balkovic J., Bundle S-C., **Di Fulvio F.**, Havlik P., Leclere D., Lesiv M., Prishchepov A., et al. 2018. Increasing crop production in Russia and Ukraine-regional and global impacts from intensification and recultivation. Environmental Research Letters 13 (2): <http://iopscience.iop.org/article/10.1088/1748-9326/aaa4a4/meta>
 - Abbas D., **Di Fulvio F.** & Spinelli R. 2018. European and United States perspectives on forest operations in environmentally sensitive areas. Scandinavian Journal of Forest Research 33(2): 188-201 <https://www.tandfonline.com/doi/full/10.1080/02827581.2017.1338355>
 - **Di Fulvio F.**, Abbas D., Spinelli R., Acuna M., Ackerman P., & Lindroos O. 2017. Benchmarking Technical and Cost Factors in Forest Felling and Processing Operations in Different Global Regions during the Period 2013-2014. International Journal of Forest Engineering: 1-12. <http://dx.doi.org/10.1080/14942119.2017.1311559>
 - **Di Fulvio F.**, Forsell N., Lindroos O., Korosuo A., & Gusti M. 2016. Spatially explicit assessment of roundwood and logging residues availability and costs for the EU28. Scandinavian Journal of Forest Research 31 (7): 691-707. <http://dx.doi.org/10.1080/02827581.2016.1221128>
 - Joelsson, J., **Di Fulvio, F.**, De La Fuente, T., Bergström, D. and Athanassiadis, D. 2016. Integrated supply of stemwood and residual biomass to forest-based biorefineries. International Journal of Forest Engineering. (In Press). <http://www.tandfonline.com/doi/full/10.1080/14942119.2016.1184955>
 - Bergström, D., **Di Fulvio, F.** and Nuutinen, Y. 2016. Effect of forest structure on operational efficiency of a bundle-harvester system in early thinnings. Croatian Journal of Forest Engineering, 37 (1): 37-49. http://www.crojfe.com/tri/crojfe_37-1_2016/bergstorm.pdf
 - Fernandez-Lacruz, R., **Di Fulvio, F.**, Athanassiadis, D., Bergström, D. and Nordfjell, T. 2015. Distribution, characteristics and potential of biomass-dense thinning forests in Sweden. Silva Fennica, 49 (5) article id 1377. 17 p. <http://www.silvafennica.fi/article/1377>
 - **Di Fulvio, F.**, Eriksson, G., Bergström, D. 2015. Effects of wood properties and chipping length on

- the operational efficiency of a 30 kW electric disc chipper. *Croatian Journal of Forest Engineering*, 36 (1): 85-100 http://hrcak.srce.hr/index.php?show=clanak&id_clanak_jezik=200731
- **Kons K., Bergström, D., Di Fulvio, F.** 2015. Effects of sieve size and assortment on wood fuel quality during chipping operations. *International Journal of Forest Engineering* 26 (2): 114-123 <http://www.tandfonline.com/doi/abs/10.1080/14942119.2015.1069173>
 - **Bergström, D., Di Fulvio, F.** 2014. Comparison of the cost and energy efficiencies of present and future biomass supply systems for young dense forests. *Scandinavian Journal of Forest Research*, 29 (8): 793-812. <http://dx.doi.org/10.1080/02827581.2014.976590>
 - **Bergström, D., Di Fulvio, F.** 2014. Evaluation of a novel prototype harvester head in early fuelwood thinnings, *International Journal of Forest Engineering*, 25(2):156-170 <http://dx.doi.org/10.1080/14942119.2014.945697>
 - **Spinelli R., Magagnotti N., Di Fulvio F., Bergström D., Danelon M., Alberti G.** 2014. Comparison of the cost efficiency of mechanized fuel wood thinning systems for hardwood plantations on farmland. *Croatian Journal of Forest Engineering*, 35 (2): 111-123 http://hrcak.srce.hr/index.php?show=clanak&id_clanak_jezik=187569
 - **Di Fulvio F., Bergström D.** 2013. Analyses of a single-machine system for harvesting pulpwood and/or energy-wood in early thinnings. *International Journal of Forest Engineering*, Volume 24 (1): 2-15 <http://www.tandfonline.com/doi/pdf/10.1080/14942119.2013.798935>
 - **Fernandez-Lacruz, R., Di Fulvio, F., Bergström, D.** 2013. Productivity and profitability of harvesting power line corridors for bioenergy. *Silva Fennica*, 47 (1) article id 904. 23 p. <http://www.silvafennica.fi/pdf/article904.pdf>
 - **Di Fulvio, F., Bergström D., Kons K. and Nordfjell, T.** 2012. Productivity and Profitability of Forest Machines in the Harvesting of Normal and Overgrown Willow Plantations. *Croatian Journal of Forest Engineering*, 33 (1): 25-37 http://hrcak.srce.hr/index.php?show=clanak&id_clanak_jezik=127991&lang=en
 - **Di Fulvio, F., Kroon, A., Bergström, D. and Nordfjell, T.** 2011. Comparison of energy wood and pulpwood thinning systems in young birch stands, *Scandinavian Journal of Forest Research*, Volume: 26, Number: 4, pp 339-349. <http://dx.doi.org/10.1080/02827581.2011.568951>
 - **Baldini, S., Di Fulvio, F. and Liberati, D.** 2010. Impacts of mechanized wood harvesting in chestnut coppices: a case study. *Acta Horticulturae (ISHS)* 866:605-610 http://www.actahort.org/books/866/866_81.htm
 - **Baldini S., Di Fulvio F., Laudati G.** 2010. Analysis of energy wood supply chain in thinning operations: a case study in a pine stand of Central Italy. *Forest@ 7*: 177-189 <http://www.sisef.it/forest@/?doi=10.3832/efor0631-007>

International Conferences Proceedings

- **Bergström, D., Di Fulvio, F. and Nuutinen, Y.** 2015. Effects of harvested tree size and density of undergrowth on the operational efficiency of a bundle-harvester system in early fuel wood thinnings. In: *Proceedings, 48th FORMEC Symposium 2015*, 4-8 October 2015.
- **Di Fulvio F., Bergström D.** 2011. Observations on the effects of rough-delimiting and load compression on harvesting system costs in fuel wood thinning. *Proceedings of FORMEC 2011*, 44th International Symposium on Forestry Mechanisation, October, 9th - 13th 2011, Graz, Austria. http://formec.boku.ac.at/images/proceedings/2011/formec2011_paper_difulvio_bergstroem.pdf
- **Di Fulvio, F., Bergström, D., Kons, K., Nordfjell, T.** 2011. Productivity and Costs of Forest Machine Systems in the Harvesting of Over-Grown Willow Plantations. *Proceedings of 19th European Biomass Conference and Exhibition*, Berlin 6-10 June 2011, Germany. ISBN 978-88-89407-55-7
- **Di Fulvio, F., Bergström, D., Nordfjell, T.** 2011. Energy-wood Thinning as an Alternative to Pulpwood in Young Birch Stands. *Proceedings of 19th European Biomass Conference and Exhibition*, Berlin 6-10 June 2011, Germany. ISBN 978-88-89407-55-7
- **Bergström, D. & Di Fulvio F.** 2010. Harvesting for energy or pulpwood in early thinnings?. *Proceedings: World Bioenergy 2010*, 25-28, Jönköping 25-27 maj 2010, Sweden. ISBN 978-91-977624-0-3
- **Baldini, S., Di Fulvio, F., Kellezi, M., Kortoci, Y., Laudati G.** 2009. Analysis of economic, energetic and environmental sustainability in biomass supply chain from *Robinia pseudoacacia* SRF plantations on abandoned agricultural lands. *Proceedings of 17th European Biomass Conference and Exhibition*, Hamburg 29 June – 03 July 2009, Germany. ISBN 978-88-89407-57-3
- **Baldini, S., Certini, G., Di Fulvio, F., Giovannini, G., Marchi, E.,** 2007. Environmental impact of postfire logging in a Maritime pine stand in Tuscany (Central Italy). *Proceedings of 4th International Wildland Fire Conference (Wildfire 2007)* Seville 13-18 Maj 2007 Spain. ISBN/ISSN: 978-84-8014-690-6

Technical Reports

- **Valin, H., Peters, D., van den Berg, M., Frank, S., Havlik, P., Forsell, N., Hamelinck, C., Pirker, J., Mosnier, A., Balkovic, J., Schmidt, E., Dürauer, M. and Di Fulvio, F.** 2015. The land use change

impact of biofuels consumed in the EU: Quantification of area and greenhouse gas impacts. ECOFYS Netherlands B.V. Utrecht. 241 pp. Available online at: https://ec.europa.eu/energy/sites/ener/files/documents/Final%20Report_GLOBIOM_publication.pdf

- Korosuo, A, **Di Fulvio F**, Forsell N, Kindermann G, Hanlík P. 2015. Report on forest biomass production potential. Project report for the AGRICISTRADe project, Deliverable 3.3. Available online at: <http://www.agricistrade.eu/wp-content/uploads/2015/11/Agricistrade-D3.3-201511.pdf>
- Matisons M., Holm J., Dong Y., Lassi U., Tuutila T., Lappi H., Läspä O., Nurmi J., Räisänen T., Athanassiadis D., Berg S., Bergström D., **Di Fulvio F**, Eriksson G., Fernandez-Lacruz R., Kons K., Nordfjell T., Örberg H., Hörnberg A., Joelsson J. 2014. Forest Refine, 2012-2014 – Efficient forest biomass supply chain management for biorefineries. Synthesis report. Editors: Dan Bergström & Magnus Matisons. Rapport 18 2014. Sveriges lantbruksuniversitet, Institutionen för skogens biomaterial och teknologi. Umeå. 116 pp. Available online at: http://pub.epsilon.slu.se/11689/7/bergstrom_d_matisons_m_141208.pdf
- Spinelli R., Laitila J, Nuutinen Y, López I, Rodríguez J, Navarro PJ, Bergström D, **Di Fulvio F**, INFRES: Innovative and effective technology and logistics for forest residual biomass supply in the EU. DEMO report 4-7, 2014. Available online at: http://www.forestenergy.org/observer:get_page/observer/action/details/itemid/691&viewportheight=919&viewportwidth=1680
- **Di Fulvio F**, Bergström D., Nordfjell T. 2011. Skörd av skogsbränsle och/eller massaved i förstagällningar, väggkanter och på igenväxt åkermark. [Harvesting of fuel wood and/or pulpwood in early thinnings, roadsides and on overgrown arable land] Institutionen för skoglig resurshushållning. Umeå 343-2011, 36pp. ISSN: 1401-1204 (In Swedish with English Abstract). http://publikationer.slu.se/Filer/Arbetsrapport_3431.pdf
- Bergström D., **Di Fulvio F**, Kons K., Nordfjell T. 2011. Skörd av övergrov salix med skogsbrukets maskiner [Harvesting of large diameter willow with forest machines]. Institutionen för skoglig resurshushållning, Sveriges lantbruksuniversitet. Umeå 334-2011, 50 pp. ISSN: 1401–1204 (In Swedish with English Abstract) http://pub.epsilon.slu.se/8214/1/bergstrom_D-_etal_110620.pdf

Presentations International Conferences

- **Di Fulvio F**, Lauri P., Forsell N., Mosnier A., Havlik P. 2018. Modeling the socioeconomic and environmental sustainability of forest plantations in climate change mitigation. Eucalyptus 2018 Managing Eucalyptus plantations under global changes 17-21 September 2018, Le Corum, Montpellier - France
- **Di Fulvio F**, Lindroos O. Benchmarking of Cost Rates in Forest Harvesting Operations in Different Global Regions, IUFRO 125th Anniversary Congress Freiburg, Germany, 18-22 September 2017
- **Di Fulvio F**, Lindroos O., Forsell N. Analyses of woody biomass supply systems costs in Europe, 16th SSAFR (Symposium for systems analysis in forest resources) august 19-21, 2015 Uppsala, Sweden.
- **Di Fulvio F**, Bergstrom D. Evaluation of a prototype harvester head for rough delimiting and compression in early energy wood thinning. 5th Forest Engineering Conference & 47th International Symposium on Forestry Mechanisation “Forest engineering: propelling the forest value chain” September 23-26, 2014 in Gerardmer, France.
- **Di Fulvio F**, Bergstrom, D., Analyses Of Biomass Supply Chain Cost- And Energy Efficiency For Early Thinnings In Fennoscandia; Analyses Of A Multifunctional One-Machine Harvesting System In Early Thinnings For Pulpwood And Energy-Wood. The Nordic Baltic Conference on Forest Operations, OSCAR 2012, 24 -26 October 2012, Riga Latvia.

PERSONAL SKILLS

Mother tongue(s) Italian

Other language(s)

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken interaction	Spoken production	
English	C1	C1	C1	C1	C1
French	B1	B1	A2	A2	A2
German	A2	A2	A2	A2	A2
Swedish	A1	A1	A1	A1	A1

Levels: A1/A2: Basic user - B1/B2: Independent user - C1/C2 Proficient user
Common European Framework of Reference for Languages

- Communication skills**
- Social skills gained by being elected member of a staff association committee in an International Research Organization
 - Good communication skills gained through collaborations with Universities and International Organizations in Italy, Sweden and Austria
- Organisational / managerial skills**
- Team work coordination of groups of researchers, technicians and forest operators gained in a number of projects, experiments and public demonstrations
 - Supervision skills gained through the supervision of PhD students at SLU and IIASA
- Job-related skills**
- Good knowledge of field and laboratory instruments used for acquisition of measurements in forestry
 - Professional qualification as Agro-Forestry Officer in Italy
- Computer skills**
- Good command of Microsoft Office tools, ArcGIS, R statistical package, GAMS (General Algebraic Modelling System), Extend Sim Simulation Package, Minitab Statistical Package, AutoCAD, Origin Pro, Adobe Photoshop
 - Attending an introductory course in Simulation for System Analysis (4.5 ECTS) using the Extend Sim Simulation Package at the Skogforsk of Sweden in September 2011
 - Attending introductory courses in GAMS at the IIASA in April 2015 and May 2018.
- Driving licence** B, Car driving licence