

Nicola Falco, Ph.D | Curriculum Vitae

Lawrence Berkeley National Laboratory - Climate & Ecosystem Sciences Division
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Research Interests

Dr. Falco's research focuses on advancing the use of remote sensing (optical high-resolution data, hyperspectral imaging, LiDAR) and geophysics for environmental characterization and monitoring across different ecosystems and application areas, including mountainous watersheds, agriculture, and terrestrial-aquatic interface. Dr. Falco's research interests include:

- Novel machine learning and single/image processing techniques applied to remote sensing data for ecosystem characterization (land-cover mapping, multitemporal analysis, crop monitoring, multi-variate analysis).
- Development of remote sensing approaches for forest characterization and degradation.
- Hyperspectral imaging (ground/airborne/satellite) for ecosystem functioning and mapping (linking spectroscopy to plant traits, mapping species composition and biodiversity).
- Investigation of soil-plant interactions through above- and below-ground characterization.

Education Background

Ph.D. double degree 2015

University of Trento and University of Iceland *Trento (Italy), Reykjavik (Iceland)*

Field: Electrical and Computer Engineering and Information and Communication Technology

Advisers: Prof. Lorenzo Bruzzone and Prof. Jon Atli Benediktsson.

Master's Degree (M.Sc.) 2011

University of Trento *Trento (Italy)*

Field: Telecommunication Engineering

Visiting Scholar 2010

University of Iceland *Reykjavik (Iceland)*

Bachelor's Degree (B.Sc.) 2007

University of Trento *Trento (Italy)*

Field: Telecommunication Engineering.

Thesis: A multi-level technique for change detection on multi-temporal very high resolution images of province of Trento.

Adviser: Prof. Lorenzo Bruzzone.

Professional Appointments

Research Scientist (current position) 2020–Present

Lawrence Berkeley National Laboratory, Earth & Environmental Sciences Area *Berkeley (CA-USA)*

Senior Scientific Engineering Associate 2020–2020

Lawrence Berkeley National Laboratory, Earth & Environmental Sciences Area *Berkeley (CA-USA)*

Postdoctoral Researcher 2016–2020

Lawrence Berkeley National Laboratory, Earth & Environmental Sciences Area *Berkeley (CA-USA)*

Postdoctoral Researcher 2015–2016

University of Iceland, Electrical and Computer Engineering *Reykjavik (Iceland)*

Research Assistant 2011

University of Iceland, Electrical and Computer Engineering *Reykjavik (Iceland)*

Research Experience - Projects

(2016 - Present) Member of the project "*Watershed Function SFA 2.0*", funded by U.S. Department of Energy. My activity focuses on:

- Development of analytical methods based on image processing and machine learning for above surface characterization by using airborne hyperspectral imagery, satellite optical data, and airborne LiDAR;
- Investigation of above/below ground properties (linking remote sensing and geophysics) to investigate soil-plant interactions.
- Team leader for ground data collection: field spectrometer, RTK-GPS survey, soil sampling.

(2017 - 2019) Member and team coordinator of the project "*AR1K - smart farm*", funded by LBNL. My activity focuses on:

- Development of analytical methods for UAV-based technology for temporal crop monitoring (health, growth rate, sprout density, biomass);
- Data integration of remote sensing data and geophysical measurements (e.g., electromagnetic induction data) to investigate above/below ground properties;
- Team leader for ground data collection: RTK-GPS survey, field spectrometer for plant and leaf spectral characterization, soil and plant sampling;
- Installation of soil moisture and temperature sensors for continuous monitoring.

(2015 - 2016) Member, co-author, and team coordinator within the project "*Environmental Mapping and Monitoring of Iceland by Remote Sensing (EMMIRS)*", funded by the Icelandic Research Fund (RANNIS, under grant agreement no. 152266-051). The project aims at defining new methodology for mapping and monitoring areas of high geological interest in Iceland (Hekla volcano and part of the Vatnajökull glacier). My research activity focused on:

- Development of multi-temporal analysis to detect geological and ecological changes resulting from volcanic eruptions and vegetation dynamics.
- Vegetation mapping using airborne hyperspectral and LiDAR data.

(2013 - 2016) Member and team coordinator within the project "*Enabling Intelligent Copernicus Services for Carbon and Water Balance Modeling of Northern Forest Ecosystems (North State)*", funded by the European Union's Seventh Framework Programme (FP7/2007- 2013, under grant agreement no. 606962). My activity focused on:

- Estimating forest variables (land covers, plant functional types, etc.) using multi-/hyperspectral images (Landsat 8, Hyperion).
- Detecting of disturbances (logging) in forest areas (implementation and optimization of spectral-spatial methodologies).

(2011) Member and main developer within the project "*Change detection methods in optical remote sensing*", funded by the Icelandic Research Fund (RANNIS, under grant agreement no. 110043021). The project focused on the development of unsupervised change detection approaches in optical remote sensing (multi-/hyperspectral data), producing an open-source toolbox for MATLAB environment, able to perform pre-/post-processing strategies for a better radiometric normalization and to handle large remote sensing data. My research included:

- Development of unsupervised change detection approaches in optical remote sensing (multi-/hyperspectral data);
- Development of pre-/post-processing strategies for a better radiometric normalization;
- Development of an open-source MATLAB/C++ framework able to handle large remote sensing data.

Grants Proposals and Awards

2020-2021: DOE STTR "*Platform For Multi-Modal, Multi-Scale Data Integration for Sustainable Agriculture*" - USD 200K. (PI)

2020-2021: DOE STTR "*Spectral near-infrared and thermal infrared imaging for advanced estimation of thermal and geochemical soil-plant -water properties*" - USD 200K. (Sr. Scientist)

2017-2018: LBNL EESA Early Career Development Grant: "*Remote sensing to UAV-based digital farmland*" - USD 25K. (Co-PI)

2015-2016: Icelandic Research Fund (RANNIS), grant of excellence ID 1547154207, "*Environmental Mapping and Monitoring of Iceland by Remote Sensing (EMMIRS)*" - ISK 38.9M / USD 342K. (Co-PI)

2013-2016: FP7-SPACE-2013-1 ID 606962, "*Enabling Intelligent Copernicus Services for Carbon and Water Balance Modelling of Northern Forest Ecosystems (North State)*" - EUR 2M / USD 2.08M. (Sr. Scientist)

2015: Third prize in the Student Paper Competition of the 2015 IEEE International Geoscience and Remote Sensing Symposium (Milan, July 2015) with the paper "*Automatic Morphological Attribute Profiles*", G. Cavallaro (student), M. Dalla Mura, N. Falco, J. A. Benediktsson.

2014: Travel grant, IGARSS 2014, USD 800.

2013: Recipient of the recognition of IEEE Geoscience Remote Sensing Letters Best Reviewer.

2013: Student travel grant, SPIE 2013, EUR250 / USD 280.

2013: Student travel grant, University of Iceland, ISK 75K / USD 600.

2011: Doctoral research grant, University of Trento and University of Iceland (3 years), EUR 36.6K / USD 41K.

2010: Erasmus mundus scholarship for visiting scholars (6 months).

Professional Activities

Advisory Boards, Committees, and Councils.....

Member: Image Analysis and Data Fusion - IEEE Geoscience and Remote Sensing Society

Member: LBNL URGE Pod

Editorial.....

Guest Editor: MDPI Remote Sensing, Special Issue (2021): "Remote Sensing for Precision Agriculture"

Guest Editor: MDPI Remote Sensing, Special Issue (2020): "Multi-Modality Data Classification: Algorithms and Applications"

Reviewer (Journals).....

Elsevier: International Journal of Applied Earth Observation and Geoinformation, Pattern Recognition Letters, **IEEE:** Journal of Selected Topic in Applied Earth Observations and Remote Sensing, Geoscience and Remote Sensing Letters, Proceedings of the IEEE, Transaction on Geoscience and Remote Sensing, Transaction on Cybernetics, **MDPI:** Remote Sensing, Agriculture, Sustainability, **Nature:** Scientific Report, **Taylor & Francis:** GIScience Remote Sensing, International Journal of Remote Sensing, Remote Sensing Letters

Professional Memberships

2016-present: American Geophysical Union (AGU)

2011-present: The Institute of Electrical and Electronics Engineers, Inc. (IEEE)

2011-present: Geoscience and Remote Sensing Society, IEEE

Computer and Programming Skills

MATLAB, expert with more than 15 years of experience. Image/signal processing, machine learning

PYTHON, R, expert. Image/signal processing and machine learning

C++, intermediate. Image/signal processing

ENVI/IDL, QGIS, expert with several years of experience

Personal Accounts

LBNL, [LinkedIn](#), [Google Scholar](#), [Publons](#), [ResearchGate](#).

Publications

H-index: 9 (WoS), 11 (GS)

Book Chapters

1. **Falco, N.**, Xia, J., Kang, X., Li, S., and Benediktsson, J. A. (2020). **Supervised classification methods in hyperspectral imaging—Recent advances**. In *Data Handling in Science and Technology: Vol. 32. Hyperspectral Imaging* (pp. 247–279). <https://doi.org/10.1016/B978-0-444-63977-6.00012-2>
2. Benediktsson, J. A., Cavallaro, G., **Falco, N.**, Hedhli, I., Krylov, V. A., Moser, G., Serpico, S. B., Zerubia, J. (2018). **Remote Sensing Data Fusion: Markov Models and Mathematical Morphology for Multisensor, Multiresolution, and Multiscale Image Classification**. In *Mathematical Models for Remote Sensing Image Processing* (pp. 277–323). Springer International Publishing. https://doi.org/10.1007/978-3-319-66330-2_7

Peer-reviewed International Journals

1. Chen, J., Dafflon, B., Tran, A. P., **Falco, N.**, & Hubbard, S. S. (2020). A Deep-Learning Hybrid-Predictive-Modeling Approach for Estimating Evapotranspiration and Ecosystem Respiration [Preprint]. *Ecohydrology/Modelling approaches*. <https://doi.org/10.5194/hess-2020-322>
2. Wainwright, H. M., Uhlemann, S., Franklin, M., **Falco, N.**, Bouskill, N. J., Newcomer, M., Dafflon, B., Woodburn, E., Minsley, B. J., Williams, K. H., & Hubbard, S. S. (2021). Watershed zonation approach for tractably quantifying above-and-belowground watershed heterogeneity and functions [Preprint]. *Catchment hydrology/Remote Sensing and GIS*. <https://doi.org/10.5194/hess-2021-228> (In review - preprint available)
3. Yan, Q., Wainwright, H., Dafflon, B., Uhlemann, S., Steefel, C. I., **Falco, N.**, Kwang, J., & Hubbard, S. S. (2021). Hybrid data-model-based mapping of soil thickness in a mountainous watershed [Preprint]. *Cross-cutting themes: Critical zone processes*. <https://doi.org/10.5194/esurf-2020-110> (In review - preprint available)
4. Matheus Carnevali, P. B., Lavy, A., Thomas, A. D., Crits-Christoph, A., Diamond, S., Méheust, R., Olm, M. R., Sharrar, A., Lei, S., Dong, W., **Falco, N.**, Bouskill, N., Newcomer, M. E., Nico, P., Wainwright, H., Dwivedi, D., Williams, K. H., Hubbard, S., & Banfield, J. F. (2021). Meanders as a scaling motif for understanding of floodplain soil microbiome and biogeochemical potential at the watershed scale. *Microbiome*, 9(1), 121. <https://doi.org/10.1186/s40168-020-00957-z>
5. Hubbard, S. S., Schmutz, M., Balde, A., Falco, N., Peruzzo, L., Dafflon, B., Léger, E., & Wu, Y. (2021). Estimation of soil classes and their relationship to grapevine vigor in a Bordeaux vineyard: Advancing the practical joint use of electromagnetic induction (EMI) and NDVI datasets for precision viticulture. *Precision Agriculture*. <https://doi.org/10.1007/s11119-021-09788-w>
6. Falco, N., Wainwright, H. M., Dafflon, B., Ulrich, C., Soom, F., Peterson, J. E., Brown, J. B., Schaettle, K. B., Williamson, M., Cothren, J. D., Ham, R. G., McEntire, J. A., & Hubbard, S. S. (2021). Influence of soil heterogeneity on soybean plant development and crop yield evaluated using time-series of UAV and ground-based geophysical imagery. *Scientific Reports*, 11(1), 7046. <https://doi.org/10.1038/s41598-021-86480-z>
7. Chadwick, K. D., Brodrick, P. G., Grant, K., Goulden, T., Henderson, A., **Falco, N.**, Wainwright, H., Williams, K. H., Bill, M., Breckheimer, I., Brodie, E. L., Steltzer, H., Rick Williams, C. F., Blonder, B., Chen, J., Dafflon, B., Damerow, J., Hancher, M., Khurram, A., ... Maher, K. (2020). **Integrating airborne remote sensing and field campaigns for ecology and Earth system science. Methods in Ecology and Evolution**. <https://doi.org/10.1111/2041-210X.13463>.
8. Wainwright, H. M., Steefel, C., Trutner, S. D., Henderson, A. N., Nikolopoulos, E. I., Wilmer, C. F., Chadwick, K. D., **Falco, N.**, Schaettle, K. B., Brown, J. B., Steltzer, H., Williams, K. H., Hubbard, S., Enquist, B. J. (2020). **Satellite-derived foresummer drought sensitivity of plant productivity in Rocky Mountain**

headwater catchments: Spatial heterogeneity and geological-geomorphological control. Environmental Research Letters.

<https://doi.org/10.1088/1748-9326/ab8fd0>.

9. Devadoss, J., **Falco, N.**, Dafflon, B., Wu, Y., Franklin, M., Hermes, A., Hinckley, E.-L. S., Wainwright, H. (2020). **Remote Sensing-Informed Zonation for Understanding Snow, Plant and Soil Moisture Dynamics within a Mountain Ecosystem.** *Remote Sensing*, 12(17), 2733. <https://doi.org/10.3390/rs12172733>.
10. Hermes, A. L., Wainwright, H. M., Wigmore, O., **Falco, N.**, Molotch, N. P., and Hinckley, E.-L. S. (2020). **From Patch to Catchment: A Statistical Framework to Identify and Map Soil Moisture Patterns Across Complex Alpine Terrain.** *Frontiers in Water*, 2. <https://doi.org/10.3389/frwa.2020.578602>.
11. **Falco, N.**, Wainwright, H., Dafflon, B., Léger, E., Peterson, J., Steltzer, H., Wilmer, C., Rowland, J.C., Williams K., Hubbard, S. S. (2019). **Investigating Microtopographic and Soil Controls on a Mountainous Meadow Plant Community Using High-Resolution Remote Sensing and Surface Geophysical Data.** *Journal of Geophysical Research: Biogeosciences*, 6(124), 1618–1636. <https://doi.org/10.1029/2018jg004394>.
12. Hubbard, S. S., K. H. Williams, D. Agarwal, J. Banfield, H. Beller, N. Bouskill, E. Brodie, R. Carroll, B. Dafflon, D. Dwivedi, **N. Falco**, B. Faybishenko, R. Maxwell, P. Nico, C. Steefel, H. Steltzer, T. Tokunaga, P. A. Tran, H. Wainwright, and C. Varadharajan. (2018). **The East River, Colorado, Watershed: A Mountainous Community Testbed for Improving Predictive Understanding of Multiscale Hydrological–Biogeochemical Dynamics.** *Vadose Zone Journal*, vol. 17, no. 1. <https://doi.org/10.2136/vzj2018.03.0061>.
13. Kizel, F., Benediktsson, J. A., Bruzzone, L., Pedersen, G. B. M., Vilmundardottir, O. K., **Falco, N.** (2018). Simultaneous and Constrained Calibration of Multiple Hyperspectral Images Through a New Generalized Empirical Line Model. *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, 1–12. <https://doi.org/10.1109/JSTARS.2018.2804666>.
14. O. K. Vilmundardóttir, F. S. Sigurmundsson, G. B. Møller Pedersen, J. M.-C. Belart, F. Kizel, **N. Falco**, J. A. Benediktsson, G. Gísladóttir, (2018). **Of mosses and men: Plant succession, soil development and soil carbon accretion in the sub-Arctic volcanic landscape of Hekla, Iceland,** *Progress in Physical Geography: Earth and Environment*, vol. 42, no. 6, pp. 765–791. <https://doi.org/10.1177/0309133318798754>.
15. Pedersen, G. B. M., Montalvo, J., Einarsson, P., Kolbrún, O., Sigurmundsson, F. S., Belart, J. M.-C., **Falco N.**, Benediktsson, J. A. (2018). **Historical lava field flows at Hekla volcano, South Iceland,** *Jökull* (68), 26.
16. G. Cavallaro, **N. Falco**, M. Dalla Mura and J. A. Benediktsson, (2017). **Automatic Attribute Profiles,** *IEEE Transactions on Image Processing*, vol. 26, no. 4, pp. 1859-1872, April. <https://doi.org/10.1109/TIP.2017.2664667>.
17. J. Xia, **N. Falco**, J. A. Benediktsson, P. Du, and J. Chanussot, (2017). **Hyperspectral Image Classification with Rotation Random Forest via KPCA,** *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, vol. 10, no. 4, pp. 1601-1609, April. <https://ieeexplore.ieee.org/document/7805181>.
18. **N. Falco**, P. R. Marpu, and J. A. Benediktsson, (2016). **A Toolbox for Unsupervised Change Detection Analysis,** *International Journal of Remote Sensing*, vol. 37, no. 7, pp. 1505-1526, March. <https://doi.org/10.1080/01431161.2016.1154226>.
19. J. Xia, **N. Falco**, J. A. Benediktsson, P. Du, and J. Chanussot, (2016). **Class-Separation-Based Rotation Forest for Hyperspectral Image Classification,** *IEEE Geoscience and Remote Sensing Letters*, vol 13, issue 4, pp. 585-588, April. <https://doi.org/10.1109/LGRS.2016.2528043>.
20. **N. Falco**, J. A. Benediktsson, and L. Bruzzone, (2015). **Spectral and Spatial Classification of Hyperspectral Images Based on ICA and Reduced Morphological Attribute Profiles,** *IEEE Transactions on Geoscience and Remote Sensing*, vol. 53, no. 12, pp. 6223-6240, Nov. <https://doi.org/10.1109/TGRS.2015.2436335>.

21. **N. Falco**, J. A. Benediktsson, and L. Bruzzone, (2014). **A Study on the Effectiveness of Different Independent Component Analysis Algorithms for Hyperspectral Image Classification**, *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, vol. 7, no. 6, pp. 2183-2199, June. <https://doi.org/10.1109/JSTARS.2014.2329792>.
22. **N. Falco**, M. Dalla Mura, F. Bovolo, J. A. Benediktsson, and L. Bruzzone, (2013). **Change Detection in VHR Images Based on Morphological Attribute Profiles**, *IEEE Geoscience and Remote Sensing Letters*, vol. 10, no. 3, pp. 636-640, May. <https://doi.org/10.1109/LGRS.2012.2222340>.

Invited Talks.....

1. **07/2020**: Investigation of Soil-Plant Interaction Using High-Resolution UAV Imaging and Geophysical Measurements, *GARSS 2020 - 2020 IEEE International Geoscience and Remote Sensing Symposium*
2. **07/2019**: Engineering Agriculture using explainable AI, *Data science for Sustainability*, San Francisco, California.
3. **06/2018**: Integrated imaging of above and below ground properties and their interactions: A case study in East River Watershed, Colorado, *Society of Exploration Geophysicists 2018 Annual Meeting*, Anaheim, California.
4. **04/2018**: Precision agriculture 2.0: Multi-scale multi-source data integration framework, *Machine Learning for Science*, LBNL, Berkeley, California.
5. **10/2017**: AR1K Research Project, *Annual Arkansas Drone/Unmanned Aircraft Systems Summit*, University of Arkansas, Fayetteville, Arkansas.

Selected International Conference Proceedings and Abstracts (*presenting author).....

1. **Falco N.**, H. Wainwright , B. Dafflon , K. D. Chadwick , P. Brodrick, J. Chen , A. Balde , J. Lamb , A. Henderson , I Breckheimer , K. Maher , K. Williams , S. S. Hubbard, (2020), **The joint Use of Airborne Hyperspectral Data and Near-surface Geophysics Allows Above-Belowground characterization at Watershed Scale**. in *IGARSS 2020 - 2020 IEEE International Geoscience and Remote Sensing Symposium* (Accepted for Proceeding - oral presentation)
2. **Falco, N.**, H. Wainwright, C. Ulrich, F. Soom, B. Dafflon, J. Peterson, B. Brown, K. Schaettle, M. Williamson, J. D. Cothren, R. G. Ham, J. A. McEntire, S. S. Hubbard (2020), **Investigation of Soil-Plant Interaction Using High-Resolution UAV Imaging and Geophysical Measurements**. in *IGARSS 2020 - 2020 IEEE International Geoscience and Remote Sensing Symposium* (Accepted for Proceeding - oral presentation)
3. **Falco, N.**, *Wainwright, H.M., Dafflon, B., Chadwick, K.D., Maher, K., Breckheimer, I., Brodrick, P., Lamb, J., Balde, A., Chen, J. and Devadoss, J., (2019). **Toward watershed characterization: investigation of above-belowground interactions with hyperspectral remote sensing and near-surface geophysical measurements within the Upper Colorado Basin**. In *AGU Fall Meeting 2019*. AGU. (Abstract - Oral presentation)
4. *Schaettle, K.B., **Falco, N.**, Ulrich, C., Dafflon, B., Wainwright, H.M. and Brown, J.B., 2019. **Initial results and perspectives from the AR1K Project Consortium: machine learning for sustainable agriculture**. In *AGU Fall Meeting 2019*. AGU. (Abstract - Poster)
5. *Wainwright, H.M., **Falco, N.**, Devadoss, J., Dafflon, B., Uhlemann, S., Newcomer, M.E., Franklin, M., Varadharajan, C., Versteeg, R., Brodie, E. and Bouskill, N., (2019). **Combining Unsupervised and Supervised Machine Learning for Quantifying Watershed Organization and Functions Based on High-resolution Airborne Remote Sensing Data**. *AGUFM*, 2019, pp.H33A-02. (Abstract - Oral presentation)
6. ***Falco, N.**, H. Wainwright, C. Ulrich, B. Dafflon, S. S. Hubbard, M. Williamson, J. D. Cothren, R. G. Ham, J. A. McEntire, and M. McEntire. (2018). **Remote Sensing to UAV-Based Digital Farmland**. In *IGARSS 2018 - 2018 IEEE International Geoscience and Remote Sensing Symposium*, 5936–39. IEEE. <https://doi.org/10.1109/IGARSS.2018.8518365>. (Proceeding - Oral presentation)
7. ***Falco, N.**, Dafflon, B., Wainwright, H., Leger, E., Haedrich, C., Peterson, J., Williams, K., Hubbard, S.

- (2018). **Integrated imaging of above and below ground properties and their interactions: A case study in East River Watershed, Colorado**. In SEG Technical Program Expanded Abstracts 2018 (pp. 2647–2651). Society of Exploration Geophysicists.
<https://doi.org/10.1190/segam2018-2998456.1>. (Proceeding - Oral presentation)
8. *N. Falco, H. Wainwright, B. Dafflon, E. Léger, J. Peterson, H. Steltzer, C. Wilmer, K. Williams and S.S. Hubbard, (2017). **Hillslope characterization: Identifying key controls on local-scale plant communities' distribution using remote sensing and subsurface data fusion**, *AGU Fall Meeting*, New Orleans, Louisiana. (Abstract - Oral presentation)
 9. *Falco, N., Wainwright, H. M., Dafflon, B., Ulrich, C., Soom, F., Schaettle, K. B., Brown, J. B., McEntire, J., and Hubbard, S. S. (2018). **Estimation of Agricultural Plant Dynamics and Traits Through Integration of UAV and Other Datasets**. *AGU Fall Meeting Abstracts*, 2018, B24D-04. (Abstract - Oral presentation)
 10. *Ulrich, C., Falco, N., Dafflon, B., Wainwright, H. M., Soom, F., Schaettle, K. B., Brown, J. B., McEntire, J., and Hubbard, S. (2018). **Scaling Soil Hydro-Physical Properties with Time-lapse EM to Assess Controls on Soybean Crop Yields**. *AGU Fall Meeting Abstracts*, 2018, NS12A-08. (Abstract - Oral presentation)
 11. *N. Falco, G. Pedersen, O. K. Vilmundardóttir, J. M.-C. Belart, F. S. Sigurmundsson and J. A. Benediktsson, (2016). **Unsupervised Change Detection for Geological and Ecological Monitoring via Remote Sensing: Application on a Volcanic Area**, *AGU Fall Meeting*, San Francisco, California. (Abstract - Oral presentation)
 12. *N. Falco, G. Cavallaro, Prashanth R. Marpu and J. A. Benediktsson, (2016). **Unsupervised Change Detection Analysis to Multi-channel Scenario Based on Morphological Contextual Analysis**, in *Proceeding of IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, pp. 3374-3377. <https://doi.org/10.1109/IGARSS.2016.7729872>. (Proceeding - Oral presentation)
 13. *G. Cavallaro, M. Dalla Mura, E. Carlinet, T. Géraud, N. Falco and J. A. Benediktsson, (2016). **Region-Based Classification of Remote Sensing Images With The Morphological Tree of Shapes**, in *Proceeding of IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, pp. 5087-5090. <https://doi.org/10.1109/IGARSS.2016.7730326>. (Proceeding - Oral presentation)
 14. *N. Falco, G. Cavallaro and J. A. Benediktsson, (2016). **Supervised Classification Approach for Plant Functional Type Estimation Using Hyperspectral Remote Sensing Data**, *Living Planet Symposium - ESA*, Prague, Czech Republic. (Abstract - Poster)
 15. *T. Häme, T. Mutanen, S. Quegan, E. Kantzas, A. Mäkelä, F. Minunno, J. A. Benediktsson, N. Falco, K. Arnason, R. Storbvold, J. Haarpaintner, C. Davids, V. Elsakov, and J. Rasinmäki, (2016). **North State - Improving Carbon Balance Modeling of Northern Forest Ecosystems through Copernicus Data**, *Living Planet Symposium - ESA*, Prague, Czech Republic. (Abstract - Poster)
 16. *G. B. M. Pedersen, O. K. Vilmundardóttir, N. Falco, F. S. Sigurmundsson, R. Rustowicz, J. M.-C. Belart, G. Gisladóttir, and J. A. Benediktsson, (2016). **Environmental mapping and monitoring of Iceland by remote sensing (EMMIRS)**, *EGU General Assembly*, vol. 18, Vienna, Austria. (Abstract - Poster)
 17. *O. K. Vilmundardóttir, F. S. Sigurmundsson, G. B. M. Pedersen, N. Falco, R. Rustowicz, G. Gisladóttir, and J. A. Benediktsson, (2016). **Habitat mapping using hyperspectral images in the vicinity of Hekla volcano in Iceland**, *EGU General Assembly*, vol. 18, Vienna, Austria. (Abstract - Poster)
 18. *G. Pedersen, J. M.-C. Belart, O. K. Vilmundardóttir, N. Falco, F. S. Sigurmundsson, R. Rustowicz, S. Tarquini, M. de M. Vitturi, G. Gisladóttir, and J. A. Benediktsson, (2016). **The Landscape Evolution at Hekla Volcano, Iceland : Integrating Remote Sensing Data from the Past 70yr**, *EGU General Assembly*, vol. 18, Vienna, Austria. (Abstract - Poster)
 19. *G. Cavallaro, M. Dalla Mura, N. Falco, and J. A. Benediktsson, (2015), **Automatic Morphological Attribute Profiles**, in *Proceeding of IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, pp. 2604 - 2607. <https://doi.org/10.1109/IGARSS.2015.7326345>. (Proceeding - Oral presentation)
 20. P. Ghamisi, G. Cavallaro, J. A. Benediktsson, *N. Falco, (2015). **An Advance Classifier for the Joint Use of**

LiDAR and Hyperspectral Data: Case Study in Queensland, Australia, in *Proceeding of IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, pp. 2354-2357, 2015. <https://doi.org/10.1109/IGARSS.2015.7326281>. (Proceeding - Oral presentation)

21. *T. Häme, T. Mutanen, Y. Rauste, O. Antropov, M. Molinier, S. Quegan, E. Kantzas, A. Mäkelä, F. Minunno, J. A. Benediktsson, **N. Falco**, K. Arnason, R. Storvold, J. Haarpaintner, V. Elsakov, and J. Rasinmäki, (2015). **Enabling Intelligent Copernicus Services for Carbon and Water Balance Modeling of Boreal Forest Ecosystems-North State**, in *Proceeding of IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, pp. 2048-2051, 2015. <https://doi.org/10.1109/IGARSS.2015.7326203>. (Proceeding - Oral presentation)
22. *G. Cavallaro, **N. Falco**, M. Dalla Mura, L. Bruzzone, and J. A. Benediktsson, (2015). **Automatic Threshold Selection for Profiles of Attribute Filters Based on Granulometric Characteristic Functions**, in *Proceeding of 12th International Symposium on Mathematical Morphology (ISMM)*, pp. 169-181, 2015. https://doi.org/10.1007/978-3-319-18720-4_15. (Proceeding - Oral presentation)
23. ***N. Falco**, L. Bruzzone, and J. A. Benediktsson, (2014). **An ICA Based Approach to Hyperspectral Image Feature Reduction**, in *Proceeding of IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, pp. 3470-3473. <https://doi.org/10.1109/IGARSS.2014.6947229>. (Proceeding - Oral presentation)
24. ***N. Falco**, J. A. Benediktsson, and L. Bruzzone, (2013). **Extraction of Spatial Features in Hyperspectral Images Based on the Analysis of Differential Attribute Profiles**, in *Proceeding SPIE 8892, Image and Signal Processing for Remote Sensing XIX*, vol. 8892, p. 88920O-88920O-9. <https://doi.org/10.1117/12.2029199>. (Proceeding - Oral presentation)
25. ***N. Falco**, L. Bruzzone, and J. A. Benediktsson, (2013). **A Comparative Study of Different ICA Algorithms for Hyperspectral Image Analysis**, in *Proceeding of 5th Workshop on Hyperspectral Image and Signal Processing: Evolution in Remote Sensing (WHISPERS)*. <https://doi.org/10.1109/IGARSS.2012.6352610>. (Proceeding - Poster)
26. ***N. Falco**, P. R. Marpu, and J. A. Benediktsson, (2012). **Comparison of ITPCA and IRMAD for Automatic Change Detection Using Initial Change Mask**, in *Proceeding of IEEE International Geoscience and Remote Sensing Symposium (IGARSS)*, pp. 6769-6772. <https://doi.org/10.1109/IGARSS.2012.6352610>. (Proceeding - Oral presentation)
27. **N. Falco**, *M. Dalla Mura, F. Bovolo, J. A. Benediktsson, and L. Bruzzone, (2010). **Study on the Capabilities of Morphological Attribute Profiles in Change Detection on VHR Images**, in *Proceeding SPIE 7830, Image and Signal Processing for Remote Sensing XVI*, vol. 7830, pp. 783016-783016-10. <https://doi.org/10.1117/12.866178>. (Proceeding - Poster)

Developed Software (licensed).....

1. Falco, N., Wainwright, H., (2020). **Plant density and enhanced plant vigor estimation algorithms for high-resolution images**. (LBNL IP 2019-179)

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