Luca Dall' Osto

curriculum vitae et studiorum

1. CONTACT DETAILS

University of Verona
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2. EDUCATION

(2003 - 2006) PhD degree in "Environmental and Industrial Biotechnology" at the University of Verona, Faculty of Sciences, IT. Thesis title: "Plant carotenoids: functional genomics of xanthophylls biosynthesis and role in *Arabidopsis thaliana*"

(1996 - 2002) Master degree, summa cum laude in Biotechnology, University of Verona, IT. Thesis title: "Thermal energy dissipation in photosynthesis: a genetic, physiological and biochemical analysis"

3. ACADEMIC CURRICULUM

(2020 -) Full Professor in Plant Physiology (SSD BIO/04) at the University of Verona

(2011 - 2020) Associate Professor in Plant Physiology (SSD BIO/04) at the University of Verona

(2007 - 2011) Assistant Professor in Plant Physiology (SSD BIO/04) at the University of Verona

(2006) Post-doctoral fellow. Department of Science and Technology, University of Verona Fellowship from the FIRB project "Research on abiotic stress resistance of higher plants".

4. RESEARCH ACTIVITY

My research activity focuses on the molecular physiology of abiotic stress response in photosynthetic organisms, plant and unicellular algae, allowing counteracting adverse environmental conditions. These studies

include mechanisms of sensing overexcitation and transducing stress signals into tuning cell metabolism. These mechanisms are determinant for crop productivity and to the efficiency of light use in microalgal growth. I have used the knowledge obtained in these studies for implementing strategies for algal strains domestication for enhanced biomass yield in photobioreactors. This is part of the development of "2nd generation" biofuel products.

Research approach is multidisciplinary in that crosses over various disciplines and made use of combined analytical approaches including genetics, molecular biology, physiology, biochemistry and biophysics. Scale of study is wide: from isolated pigment-binding proteins to organelles, intact cells and whole organisms.

The biological systems currently employed for this research:

- *Arabidopsis thaliana* and *Nicotiana tabacum* (higher plants), useful for reverse genetics, photoprotection and excess-light acclimation analysis, and production of recombinant proteins
- *Chlorella vulgaris* and *Chlamydomonas reinhardtii* (green algae), for developing strains with enhanced light-use efficiency and for studying conversion of solar energy into CO_2-neutral biofuels

Detailed research subjects:

A. Reverse genetics of carotenoid biosynthesis pathway: elucidation of individual xanthophylls in the photoprotection.

- isolation of *Arabidopsis* mutant lines with altered xanthophylls composition and their physiological/biophysical/biochemical characterization
- effects of photoxidative stress on chloroplast biological structures, assessment of reactive oxygen species (ROS) release, ROS scavenging activity, excess energy dissipation by regulative quenching of chlorophyll excited states
- control of chloroplast mRNA translation by xanthophyll species

B. Differential role of the Lhc (light-harvesting complexes) gene family members in the defense of chloroplast against photoxidative stress.

- excitation energy transfer pathways in light-harvesting proteins and photosystem supercomplexes
- molecular mechanisms of non-photochemical fluorescence quenching
- structural organization of photosynthetic supramolecular complexes
- genome editing of Lhcb antenna proteins in *Arabidopsis* with particular reference to their role in resistance to abiotic stresses

C. Triggering molecular responses for chloroplast acclimation to excess light

- ROS effect in modulating expression of target genes, determinant for cell response to photoxidative damage
- comparative analysis of mechanisms by which plants undergo acclimation to different light and temperature conditions

D. Selection of algal strains optimized for biofuel production

- identification of genes controlling biomass yield in green algae
- focus on engineering light penetration in dense cultures typical of photobioreactors, and on modulation of photoprotective mechanisms responsible for resistance to excess light

E. Optimization of lignocellulose degradation processes by exploiting thermostable cell wall hydrolytic enzymes

- isolation of transgenic algal strains producing thermostable cell wall-degrading enzymes
- development of auto-catalytic transgenic tobacco plants accumulating high-temperature activated cell wall-degrading enzymes

Research projects

(2019 -)	Coordinator of research unit VR, PRIN 2017 "From natural to artificial light-harvesting systems: unveiling fundamental processes towards a bio-inspired materials design" (prot. 201795SBA3_004).
(2017 - 2019)	Project "HuntingLight" (Programma Ricerca di Base), granted by UniVR. Principal Investigator.
(2017 - 2018)	Project "Espressione di enzimi termostabili degradativi della parete cellulare nell'alga verde *C. reinhardtii* attraverso trasformazione cloroplastica" (FSE 2017), granted by Regione Veneto. Principal Investigator.
(2016 - 2017)	Project "Espressione di idrolasi termostabili della parete cellulare in *N. tabacum*" (FSE 2016), granted by Regione Veneto. Principal Investigator.
(2014 - 2017)	Project "HyperCell" (Joint Project 2014), granted by UniVR and Zuccato Energia srl. Principal Investigator
(2013)	Research activity – Project "Selection of unicellular algal strains optimized for biofuel production and CO_2 fixation in photobioreactors", granted by Algasoil srl.
(2010 - 2013)	Research activity – EU project (7th Framework Programme) **"**SunBioPath**",** grant agreement n. 245070, at the Department of Biotechnology, University of Verona. Supervisor: Prof. R. Bassi.

(2010 - 2012) Research activity on mechanism of photoprotection in higher plants, PRIN 2008 "Productivity and molecular mechanisms of photoprotection in photosynthetic organisms" (prot. 2008XB774B).

(2008 - 2010) Coordinator of research unit VR3, PRIN 2007 "Regulation of protein turnover in chloroplasts and chromoplasts" (prot. 20073YHRLE_003).

(2007 – 2008) Research on drought stress in higher plants, PRIN 2006 project "Structural and functional analysis of the photosynthetic apparatus on genotypes of *Z. mays* during cold and drought stress", (prot. 2006073258_002).

(2006 – 2007) Research within the framework of FIRB project "National laboratory of genomic and post-genomic of organisms of agricultural interest" (prot. RBLA0345SF_002) at the Department of Science and Technology, University of Verona.

(2006) Research fellow, research on abiotic stress resistance of higher plants - FIRB project "Research network on genomic of plant response to environmental stress" (prot. RBNE01LACT_002).

Research visits

(2014) Visiting scientist at the University of Lund, Sweden – Dept. of Chemical Physics (Prof. D. Zigmantas). Research on the roles of major light-harvesting complexes in the mechanism of thermal energy dissipation, measured through ultrafast transient absorption spectroscopy (funded by LaserLab Europe 7thFP and UniVR CooperInt 2014).

(2013) Visiting scientist at the Weizmann Institute of Science, Rehovot, Israel (Prof. Ziv Reich). The research dealt with the characterization of thylakoid membrane dynamics in a new Lhcb knock-out mutant in *A. thaliana.*

(2012 - 2013) Visiting scientist at the University of California, Berkeley – Dept. of Plant and Microbial Biology (Prof. K.K. Niyogi). Research on the roles of light-harvesting complexes in the modulation of the excitation energy dissipation, studied by means of transient absorption techniques (ps timescale) (funded by UniVR CooperInt 2012).

(2012) Visiting scientist at the University of Groningen, Faculty of Mathematics and Natural Sciences, The Netherlands (Prof. Egbert Boekema), and at the Laboratory of Biophysics, Wageningen University, The Netherlands (Prof. Herbert van Amerongen). Characterization of a new Lhcb knock-out mutant in *A. thaliana.*

(2009 - 2010) Visiting scientist at the Max Planck Institute of Molecular Plant Physiology Potsdam – Golm, Germany (Dr. Maria Piques). Characterization of a xanthophyll-mediated, post-transcriptional regulation of chloroplastic genes expression in *A. thaliana.*

(2005 - 2007) Visiting scientist at the LGBP (Laboratoire de Biophysique et Genetique des Plantes), Faculté des Sciences de Luminy, Marseille, France. Research on the spectroscopic

investigation of triplet excited states of carotenoids on both purified proteins and intact leaves, through techniques of transient absorption (ns timescale).

(2003) Visiting student at the Institute de Biologie Physico-Chimique, Paris, France. The project concerned the spectroscopic characterization of the mechanism of thermal energy dissipation on WT e mutant *Arabidopsis* plants.

Collaborations

Dr. Michel Havaux, Département de Ecophysiologie Végétale et de Microbiologie, Laboratoire d'Ecophysiologie de la Photosynthèse, Saint-Paul-lez-Durance, France.

Prof. Alexander Ruban, The School of Biological and Chemical Sciences, Queen Mary University of London

Dr. Emilie Wientjes, Laboratory of Biophysics, Wageningen University, The Netherlands.

Dr. Giovanni Giuliano, Ente per le Nuove tecnologie, l'Energia e l'Ambiente (ENEA), Unità Biotecnologie, Centro Ricerche Casaccia, Roma.

Prof. Krishna K. Niyogi, University of California at Berkeley, Dept. of Plant and Microbial biology, Berkeley, CA.

Prof. Alfred Holzwarth, Max Plank Institute for Bioinorganic Chemistry, Mülheim an der Ruhr, Germany.

Prof. Harry Frank, Department of Chemistry, University of Connecticut, Storr CT.

Prof. Christophe Robaglia e Dr. Reiner Hienerwadel, Laboratoire de Génétique et Biophysique des Plantes (LGBP), Département d'Ecophysiologie Végétale et Microbiologie –CEA-CNRS Université de la Méditerranée Aix-Marseille II, France.

Dr. Giovanni Finazzi, Institut de Recherches en Technologies et Sciences pour le Vivant, CEA Grenoble, France.

Prof. Roberta Croce, Department of Biophysical Chemistry, Groningen Bimolecular Sciences and Biotechnology Institute, University of Groningen, The Netherlands.

Prof. Donatas Zigmantas, Chemical Physics, Lund University, Sweden.

Prof. Herbert van Amerongen, Laboratory of Biophysics, Wageningen University, The Netherlands.

Dr. Shizue Matsubara, Forschungszentrum Jülich ICG-3 (Phytosphäre), Jülich, Germany

Prof. Ziv Reich, Weizmann Institute of Science, Rehovot, Israel

Prof. Masamitsu Wada, Department of Biology, Graduate School of Science, Kyushu University, Fukuoka, Japan

Prof. Donatella Carbonera, Dipartimento di Scienze Chimiche, Università di Padova, Italy

Prof. Massimo Maffei, Dipartimento di Scienza della Vita, Università di Torino, Italy

Prof. Joseph Hirschberg, Dept. of Genetics, The Hebrew University of Jerusalem, Israel

Dr Johannes Stuttmann, Martin-Luther-Universitat Halle-Wittenberg, Halle, Germany

Prof. Gabriela Schlau-Cohen, Massachusetts Institute of Technology, MA

5. PARTICIPATION TO INTERNATIONAL/NATIONAL MEETINGS

International/National congress participation as <u>invited speaker</u>

International

Dall'Osto L. "Complementary roles of LHCs in the rapid dissipative response to excess light". International Congress on Biophysics of Photosynthesis: from molecules to the field, Rome, October 2nd-4th, 2019. *Invited speaker.*

Dall'Osto L. "Searching for pigment clusters catalyzing photoprotective response in the antenna system of higher plants". 17th International Congress on Photobiology, Barcelona, August 25th-30th, 2019. *Invited speaker.*

Dall'Osto L. "*In vivo* functional architecture of carotenoid-chlorophyll clusters regulating fast photoprotection response in higher plants". Gordon Conference Research on Carotenoids, Newry (ME), June 17th-22nd, 2018. *Invited speaker.*

Dall'Osto L. "Improving light-use-efficiency and biomass yield of plants by modulating photoprotective mechanisms". 17th Congress of the European Society of Photobiology, Pisa, September 4th-8th, 2017. *Invited speaker.*

Dall'Osto L. "Green biotechnology: improving ROS resistance leads to improved light energy conversion efficiency for biomass and biofuels". 12th International Conference on Reactive Oxygen and Nitrogen species in plants, Verona, June 24th-26th, 2016. *Invited speaker.*

Dall'Osto L. "Domestication of *Chlorella sorokiniana* strains for improved light use efficiency in photobioreactors". 13th FISV Congress, Pisa, September 24th-27th, 2014. *Invited speaker.*

Dall'Osto L. "Control of thylakoid membrane composition by xanthophylls". 16th International Congress on Photosynthesis – St. Louis MI, August 11th-16nd, 2013. *Invited speaker.*

Dall'Osto L. "Plant xanthophylls: specific roles in the organization and photoprotection capacity of the photosynthetic apparatus". International Congress of Photosynthesis, Société Francaise de Photosynthèse, Paris - May 16th – 17th, 2011. *Invited speaker.*

Dall'Osto L. "Functional genomics of carotenoid biosynthetic pathway reveals specific function for xanthophylls species in photosynthesis and photoprotection". International Workshop on Photosynthesis, Ried bei Kochel am See - München, September 28th – October 1st, 2008. *Invited speaker.*

Dall'Osto L. "Identification of gene products involved in feed-back de-excitation". XIV International Congress on Photosynthesis – Glasgow, July 17th-22nd, 2007. *Invited speaker.*

Dall'Osto L. "Photosynthesis without Lutein". 14th International Symposium on Carotenoids – Edimburgh, July 17th-22nd, 2005. *Invited speaker.*

Dall'Osto L. "Photosynthesis without Lutein". Les journees de la société francaise de photosynthése (SFF), Paris – June 2nd, 2004. *Invited speaker.*

National

Dall'Osto L. "Biogas con enzimi termofili ricombinanti per la degradazione della cellulosa". Convegno Seci Energia / Gruppo Maccaferri "JCUBe – Open Innovation Call" – Zola Predosa (BO), April 6th, 2018. *Invited speaker.*

Dall'Osto L. "Prospettive della domesticazione di alghe unicellulari per la produzione di biocombustibili". Convegno dell'Accademia dei Lincei "La sfida dei Terawatt: quale ricerca per l'energia del futuro?" - Roma, November 5th-6th, 2013. *Invited speaker.*

Dall'Osto L. "Interaction between chloroplast relocation and xanthophyll cycle in regulation of photosynthesis and photoprotection of *Arabidopsis thaliana*". Congresso della Società Italiana di FotoBiologia – Pisa, June 13th – 14th, 2013. *Invited speaker.*

Dall'Osto L. "Functional genomics of carotenoid biosynthetic pathway reveals specific function for xanthophylls species in photosynthesis and photoprotection". XLVII Congresso della Società Italiana di Fisiologia Vegetale – Pisa, June 30th – July 2nd, 2008. *Invited speaker.*

International/National congress participation

15th FISV Congress - Roma, September 18th-21st, 2018

SIBV-SIGA Congress – Pisa, September 19th-22th, 2017

17th International Congress on Photosynthesis – Maastricht, August 7th-12th, 2016.

SIBV-SIGA Congress – Milan, September 8th-11th, 2015

12th FISV Congress - Roma, September 24th-27th, 2012

1st SIBV congress – Verona, June 30th – July 2nd, 2009

13th International Congress of Photosynthesis – Palais des Congrès, Montreal – August 29th – September 3rd, 2004.

6. SCIENTIFIC PUBLICATIONS

Global H-index: 34/37 (scopus.com/ Google Scholar, updated at 15/12/2020)

https://scholar.google.it/citations?user=QxFb_pEAAAAJ&hl=it

Luca Dall'Osto authored more than 60 articles in peer-reviewed journals and 3 book chapters. These were cited 3757/5072 times (according to Scopus/Google Scholar). He is part of the "Top Italian Scientists" category "Natural & Environmental Sciences" (www.topitalianscientists.org). Luca Dall'Osto has been included in the PLOS BIOLOGY publicly available database of 100,000 top-scientists "A standardized citation metrics author database annotated for scientific field" (top 2% for biology subfield).

1. Barera S., Dall'Osto L., Bassi R. (2021) Effect of *lhcsr* gene dosage on oxidative stress and light use efficiency by *Chlamydomonas reinhardtii* cultures. J. Biotech., In the press.

2. Benedetti M., Vecchi V., Guardini Z., **Dall'Osto L.**, Bassi R. (2020) Targeting of a hyperthermophilic cellobiohydrolase to the protein storage vacuole increases enzymatic saccharification in transgenic *Nicotiana tabacum*. ***Plants*** 9, 1799. ISSN: 2223-7747. PMID: 33353085.
3. Angstenberger M., De Signori F., Vecchi V., **Dall'Osto L.**, Bassi R. (2020) Cell synchronization enhances nuclear transformation and genome editing via Cas9 enabling homologous recombination in *Chlamydomonas reinhardtii*. ***ACS Synthetic Biology***, 9(10):2840-2850. ISSN: 2161-5063. PMID: 32916053.
4. Benedetti M., Barera S., Longoni P., Guardini Z,. Herrero Garcia N., Bolzonella D., Lopez-Arredondo D., Herrera-Estrella L., Goldschmidt-Clermont M., Bassi R., **Dall'Osto L.** (2021) A microalgal-based preparation with synergistic cellulolytic and detoxifying action towards chemical-treated lignocellulose. ***Plant Biotechnology J.***, 19(1):124-137. ISSN: 1467-7652**.** PMID: 32649019.
5. Cutolo E.A., Tosoni M., Barera S., Herrera-Estrella L., **Dall'Osto L.**, Bassi R. (2020) A phosphite dehydrogenase variant with promiscuous access to nicotinamide cofactor pools sustains fast phosphite-dependent growth of transplastomic *Chlamydomonas reinhardtii*. ***Plants***, 9(4):473. ISSN: 2223-7747. PMID: **3**2276527.
6. Guardini Z., Bressan M., Caferri R., Bassi R., **Dall'Osto L.** (2020) Identification of a pigment cluster catalyzing fast photoprotective quenching response in CP29. ***Nature Plants,*** 6(3):303-313. ISSN: 2055-026X. PMID: 32170280.
7. Vecchi V., Barera S., Bassi R., **Dall'Osto L.** (2020) Potential and challenges of improving photosynthesis in algae. ***Plants***, 9(1):67. ISSN: 2223-7747. PMID: 31947868.
8. Ordon J., Bressan M., Kretschmer C., **Dall'Osto L.**, Marillonnet S., Bassi R., Stuttmann J. (2020) Optimized Cas9 expression systems for highly efficient *Arabidopsis* genome editing facilitate isolation of complex alleles in a single generation. ***Functional & Integrative Genomics***, 20(1):151-162. ISSN: 1438-7948. PMID: 30796544.
9. **Dall'Osto L.**, Cazzaniga S., Zappone D., Bassi R. (2020) Monomeric light harvesting complexes enhances excitation energy transfer from LHCII to PSII and control their lateral spacing in thylakoids. ***Biochim. Biophys. Acta*** , 1861(4):148035. ISSN: 0005-2728. PMID: 31226317.
10. **Dall'Osto L.**, Guardini Z., Barera S., Benedetti M., Mannino G., Maffei M. M., Bassi R. (2020) Combined resistance to oxidative stress and reduced antenna size enhances light-to-biomass conversion efficiency in *Chlorella vulgaris* cultures. ***Biotechnology for Biofuels***, 12:211. ISSN: 1754-6834. PMID: 31534480.
11. Dikaios I., Schiphorst C., **Dall'Osto L.**, Alboresi A., Bassi R., Pinnola A. (2019) Functional analysis of LHCSR1, a protein catalyzing NPQ in mosses, by heterologous expression in *Arabidopsis thaliana*. ***Photosynthesis Research***, 142(3):249-264. ISSN: 0166-8595. PMID: 31270669.
12. Kondo T., Gordon J.B., Pinnola A., **Dall'Osto L.**, Bassi R., Schlau-Cohen G. (2019) Microsecond and millisecond dynamics in the photosynthetic protein LHCSR1 observed by single-molecule correlation spectroscopy. ***Proc. Natl. Acad. Sci. USA.***, 116(23):11247-11252. ISSN: 0027-8424. PMID: 31101718.

13. Benedetti M., Vecchi V., Betterle N., Natali A., Bassi R., **Dall'Osto L**. (2019) Design of a highly thermostable hemicellulose-degrading blend from *Thermotoga neapolitana* for the treatment of lignocellulosic biomass. ***J. Biotechnology***, 296: 42-52. ISSN: 0168-1656. PMID: 30885654.
14. Benedetti M., Vecchi V., Barera S., **Dall'Osto L.** (2018) Biomass from microalgae: the potential of domestication towards sustainable biofactories. ***Microbial Cell Factories***, 17(1): 173. ISSN:1475-2859 PMID: 30414618.
15. Pinnola A., Alboresi A., Nosek L., Semchonok D., Rameez A., Trotta A., Barozzi F., Kouril R., **Dall'Osto L.**, Aro E.-M., Boekema E.J., Bassi R. (2018) A LHCB9-dependent photosystem I megacomplex induced under low light in *Physcomitrella patens*. ***Nature Plants,*** 4(11): 910-919. ISSN: 2055-026X. PMID: 30374091.
16. Bressan M., Bassi R., **Dall'Osto L.** (2018) Light harvesting complex I is essential for Photosystem II photoprotection under variable light conditions in *Arabidopsis thaliana*. ***Environmental and Experimental Botany***, 154: 89-98. ISSN: 0098-8472. DOI: 10.1016/j.envexpbot.2018.03.003.
17. Bressan M., Bassi R., **Dall'Osto L.** (2018) Loss of LHCI system affects LHCII re-distribution between thylakoid domains upon state transitions. ***Photosynthesis Research***, 135(1-3): 251-261. ISSN: 0166-8595. PMID: 28918549.
18. Zhao L., Cheng D., Huang X., Chen M., **Dall'Osto L.**, Xing J.,Gao L., Li L., Wang Y., Bassi R., Peng L., Rochaix J.-D., Huang F. (2017) A Light Harvesting Complex-like protein in maintenance of photosynthetic components in *Chlamydomonas*. ***Plant Physiology***, 174(4): 2419-2433. ISSN: 0032-0889. PMID: 28637830.
19. Kondo T., Pinnola A., Chen W.J., **Dall'Osto L.**, Bassi R. and Schlau-Cohen G. (2017) Single-molecule spectroscopy of LHCSR1 protein dynamics identifies two distinct states responsible for multi-timescale photosynthetic photoprotection. ***Nature Chemistry***, 9(8): 772-778. ISSN: 1755-4330. PMID: 28754946.
20. **Dall'Osto L.**, Cazzaniga S., Bressan M., Paleček D., Žídek K., Niyogi K.K., Fleming G.R., Zigmantas D., Bassi R. (2017) Two mechanisms for dissipation of excess light in monomeric and trimeric light-harvesting complexes. ***Nature Plants***, 3:17033. ISSN: 2055-026X. PMID: 28394312.
21. Pii Y., Alessandrini M., **Dall'Osto L.**, Guardini K., Prinsi B., Espen L., Zamboni A., Varanini Z. (2016) Time-resolved investigation of molecular components involved in the induction of NO_3^- high affinity transport system in maize roots. ***Front. Plant Sci.*** doi: 10.3389/fpls.2016.01657. ISSN: 1664-462X. PMID: 27877183.
22. Bressan M., **Dall'Osto L.**, Bargigia I., Alcocer M. J. P., Viola D., Cerullo G., D'Andrea C, Bassi R., Ballottari M. (2016) LHCII can substitute for LHCI as an antenna for Photosystem I but with reduced light-harvesting capacity. ***Nature Plants***, 2: 16131. ISSN: 2055-026X. PMID: 27564313.
23. Cazzaniga S., Bressan M., Carbonera D., Agostini A., **Dall'Osto L.** (2016) Differential roles of carotenes and xanthophylls in Photosystem I photoprotection. ***Biochemistry***, 55(26): 3636-49. ISSN: 0006-2960. PMID: 27290879.

24. Ware A. M., **Dall'Osto L.**, Ruban A. (2016) An *in vivo* quantitative comparison of photoprotection in *Arabidopsis* xanthophyll mutants. ***Front. Plant Sci.*** doi: 10.3389/fpls.2016.00841 ISSN: 1664-462X. PMID: 27446097.
25. Borisova-Mubarakshina M., Ivanov B.N., Vetoshkina D.V., Lubimov V.Y., Fedorchuk T.P., Naydov I.A., Kozuleva M.A., Rudenko N.N., **Dall'Osto L.**, Cazzaniga S., Bassi R. (2015) Long-term acclimatory response to excess excitation energy: evidence for a role of hydrogen peroxide in the regulation of photosystem II antenna size. ***J. Exp. Bot.***, 66(22): 7151-7164. ISSN: 0022-0957. PMID: 26324464.
26. **Dall'Osto L.,** Bressan M., Bassi R. (2015) Biogenesis of Light Harvesting Proteins. ***Biochim. Biophys. Acta*** 1847(9): 861-871. ISSN: 0005-2728. PMID: 25687893.
27. **Dall'Osto L.,** Unlu C., Cazzaniga S., van Amerongen, H. (2014) Disturbed excitation energy transfer in *Arabidopsis thaliana* mutants lacking minor antenna complexes of Photosystem II. ***Biochim. Biophys. Acta*** 1837(12): 1981-1988. ISSN: 0005-2728. PMID: 25291424.
28. Cazzaniga S., **Dall'Osto L.***, Scibilia L., Szaub J., Ballottari M., Purton S. and Bassi R. (2014) Domestication of the green alga *Chlorella sorokiniana*: reduction of antenna size improves light-use efficiency in a photobioreactor. ***Biotechn. Biofuels*** 7(1): 157. E-ISSN: 1754-6834. PMID: 25352913.
29. Peterson R.B., Oja V., Eichelmann H., Bichele I., **Dall'Osto L.**, Laisk A. (2014) Fluorescence F_0 of photosystems II and I in developing C_3 and C_4 leaves, and implications on regulation of excitation balance. ***Photosynth. Res.*** 122(1): 41-56. ISSN: 0166-8595. PMID: 24817180.
30. **Dall'Osto L.**, Cazzaniga S., Wada M., Bassi R. (2014) On the origin of a slowly reversible fluorescence decay component in the *Arabidopsis npq4* mutant. ***Phil. Trans. R. Soc. B*** 369(1640): 20130221. ISSN: 0962-8436. PMID: 24591708.
31. Laisk A., Oja V., Eichelmann H., **Dall'Osto L.** (2014) Action spectra of photosystems II and I and quantum yield of photosynthesis in leaves in State 1. ***Biochim. Biophys. Acta*** 1837(2): 315-325. ISSN: 0005-2728. PMID: 24333386.
32. Cazzaniga S., **Dall'Osto L.***, Kong S.-G., Wada M., Bassi R. (2013) Interaction between avoidance of photon absorption, excess energy dissipation and zeaxanthin synthesis against photoxidative stress in *Arabidopsis*. ***Plant J.*** 76(4): 568-579. ISSN: 0960-7412. PMID: 24033721.
33. Pinnola A., **Dall'Osto L.**, Gerotto C., Morosinotto T., Bassi R., Alessandro Alboresi A. (2013) Zeaxanthin binds to light-harvesting complex stress-related protein to enhance nonphotochemical quenching in *Physcomitrella patens*. ***Plant Cell*** 25(9): 3519-3534. ISSN: 1040-4651. PMID: 24014548.
34. **Dall'Osto L.**, Piques M., Ronzani M., Molesini B., Alboresi A., Cazzaniga C., Bassi R. (2013) The *Arabidopsis nox* mutant lacking carotene hydroxylase activity reveals a critical role of xanthophylls in Photosystem I biogenesis. ***Plant Cell*** 25(2): 591-608. ISSN: 1040-4651. PMID: 23396829.
35. **Dall'Osto L.**, Holt N.H., Kaligotla S., Fuciman M., Cazzaniga S., Carbonera D., Frank H.A., Alric J., Bassi R. (2012) Zeaxanthin protects plant photosynthesis by modulating chlorophyll triplet yield in specific light-harvesting antenna subunits. ***J. Biol. Chem.*** 287(50): 41820-34. ISSN: 0021-9258. PMID: 23066020.

36. Cazzaniga S, Li Z, Niyogi KK, Bassi R, **Dall'Osto L**. (2012) The *Arabidopsis szl1* mutant reveals a critical role of β-carotene in Photosystem I photoprotection. ***Plant Physiol.*** 159(4): 1745-58. ISSN: 0032-0889. PMID: 23029671.

37. Fiore A, **Dall'Osto L.***, Cazzaniga S, Diretto G, Giuliano G, Bassi R. (2012) A quadruple mutant of *Arabidopsis* reveals a β-carotene hydroxylation activity for LUT1/CYP97C1 and a regulatory role of xanthophylls on determination of the PSI/PSII ratio. ***BMC Plant Biol.*** 12: 50. ISSN: 1471-2229. PMID: 22513258.

38. Fuciman M., Enriquez M.M., Polivka T., **Dall'Osto L.,** Bassi R., Frank H.A. (2012) Role of xanthophylls in light harvesting in green plants: a spectroscopic investigation of mutant LHCII and Lhcb pigment-protein complexes. ***J. Phys. Chem. B*** 116(12): 3834-49. ISSN: 1520-6106. PMID: 22372667.

39. Ballottari M., Girardon J., **Dall'Osto L.**, Bassi R. (2012) Evolution and functional properties of Photosystem II light harvesting complexes in eukaryotes. ***Biochim. Biophys. Acta*** 21817(1): 143-57. ISSN: 0005-2728. PMID: 21704018.

40. Miloslavina Y., de Bianchi S., **Dall'Osto L.**, Bassi R., Holzwarth A.R. (2011) Quenching in *Arabidopsis thaliana* mutants lacking monomeric antenna proteins of Photosystem II. ***J. Biol. Chem.*** 286(42): 36830-40. ISSN: 0021-9258. PMID: 21844190.

41. de Bianchi S., Betterle N., Kouril R., Cazzaniga S., Boekema E., Bassi R., **Dall'Osto L.** (2011) *Arabidopsis* mutants deleted in the light-harvesting protein Lhcb4 have a disrupted photosystem II macrostructure and are defective in photoprotection. ***Plant Cell*** 23(7): 2659-79. ISSN: 1040-4651. PMID: 21803939.

42. Alboresi A., **Dall'Osto L.***, Aprile A., Carillo P., Roncaglia E., Cattivelli L., Bassi R. (2011) Reactive oxygen species and transcript analysis upon excess light treatment in wild-type *Arabidopsis thaliana vs* a photosensitive mutant lacking zeaxanthin and lutein. ***BMC Plant Biol.*** 11: 62. ISSN: 1471-2229. PMID: 21481232.

43. Betterle N., Ballottari M., Hienerwadel R., **Dall'Osto L.**, Bassi R. (2010) Dynamics of zeaxanthin binding to the photosystem II monomeric antenna protein Lhcb6 (CP24) and modulation of its photoprotection properties. ***Arch. Biochem. Biophys.*** 504(1): 67-77. ISSN: 0003-9861. PMID: 20494647.

44. de Bianchi S., Ballottari M., **Dall'Osto L.,** Bassi R. (2010) Regulation of plant light harvesting by thermal dissipation of excess energy. ***Bioch. Soc. Trans***. 38(2): 651-60. ISSN: 0300-5127. PMID: 20298238.

45. **Dall'Osto L.,** Cazzaniga S., Havaux M., Bassi R. (2010). Enhanced photoprotection by protein-bound vs free xanthophyll pools: a comparative analysis of chlorophyll *b* and xanthophyll biosynthesis mutants. ***Molecular Plant***, 3(3): 576-93. ISSN: 1674-2052. PMID: 20100799.

46. van Oort B., Alberts M., de Bianchi S., **Dall'Osto L.**, Bassi R., Trinkunas G., Croce R., van Amerongen H. (2010). Effect of antenna-depletion in Photosystem II on excitation energy transfer in *Arabidopsis thaliana*. ***Biophys. J.*** 98(5): 922-31. ISSN: 0006-3495. PMID: 20197046.

47. Betterle N., Ballottari M., Zorzan S., de Bianchi S., Cazzaniga S., **Dall'Osto L.,** Morosinotto T., Bassi R. (2009) Light induced dissociation of an antenna hetero-oligomer is needed for non-photochemical quenching induction. ***J. Biol. Chem.*** 284(22): 15255-66. ISSN: 0021-9258. PMID: 19307183.

48. Frenkel M., Kulheim C., Johansson Jankanpaa H., Skogstrom O, **Dall'Osto L.**, Agren J., Bassi R., Moritz T., Moen J., Jansson S. (2009) Improper excess light energy dissipation in *Arabidopsis* results in a metabolic reprogramming. ***BMC Plant Biol.*** 9: 12. ISSN: 1471-2229. PMID: 19171025.

49. Ahn T. K., Avenson T. J., Peers G., Li Z., **Dall'Osto L.**, Bassi R., Niyogi K. K. and Fleming G. R. (2008) Investigating energy partitioning during photosynthesis using an expanded quantum yield convention. ***Chemical Physics*** 357: 151-158. ISSN: 0301-0104. DOI: 10.1016/j.chemphys.2008.12.003.

50. de Bianchi S., **Dall'Osto L.***, Tognon G., Morosinotto T. and Bassi R. (2008) Minor antenna proteins CP24 and CP26 affect the interactions between Photosystem II subunits and the electron transport rate in grana membranes of *Arabidopsis*. ***Plant Cell*** 20: 1012-1028. ISSN: 1040-4651. PMID: 18381925.

51. Mozzo, M., **Dall'Osto L.,** Hienerwadel, R., Bassi R. and Croce R. (2007) Photoprotection in the antenna complexes of Photosystem II: role of individual xanthophylls in chlorophyll triplet quenching. ***J. Biol. Chem.*** 283: 6184 - 6192. ISSN: 0021-9258. PMID: 18079125.

52. Dall'Osto L., Fiore A., Cazzaniga S., Giuliano G., Bassi R. (2007) Different roles of α- and β-branch xanthophylls in photosystem assembly and photoprotection. ***J. Biol. Chem.*** 282: 35056 - 35068. ISSN: 0021-9258. PMID: 17913714.

53. Havaux M., **Dall'Osto L.**, Bassi R. (2007) Zeaxanthin has enhanced antioxidant capacity with respect to all other xanthophylls in *Arabidopsis* leaves and functions independent of binding to PSII antennae. ***Plant Physiol.*** 145: 1506-1520. ISSN: 0032-0889. PMID: 17932304.

54. Tzvetkova-Chevolleau T., Franck F., Dall'Osto L., Carrière F., Bassi R., Nussaume L., Havaux M. (2007) The light stress-induced protein ELIP2 is a regulator of chlorophyll synthesis in *Arabidopsis thaliana*. ***Plant J.*** 50(5): 795-809. ISSN: 0960-7412. PMID: 17553115.

55. Dall'Osto L., Cazzaniga S., North H., Marion-Poll A., Bassi R. (2007) The *aba4-1* mutant of *Arabidopsis thaliana* reveals a specific function for neoxanthin in protection against photooxidative stress. ***Plant Cell*** 19(3): 1048-64. ISSN: 1040-4651. PMID: 17351115.

56. Ballottari M., **Dall'Osto L.**, Morosinotto T., Bassi R. (2007) Contrasting behaviour of higher plant Photosystem I and II antenna systems during acclimation. ***J. Biol. Chem.*** 282(12): 8947-58. ISSN: 0021-9258. PMID: 17229724.

57. **Dall'Osto L.**, Lico C., Alric J., Giuliano G., Havaux M., Bassi R. (2006) Lutein is needed for efficient chlorophyll triplet quenching in the major LHCII antenna complex of higher plants and effective photoprotection *in vivo* under strong light. ***BMC Plant Biol.*** 6: 32. ISSN: 1471-2229. PMID: 17192177.

58. Fiore A., **Dall'Osto L.***, Fraser P.D., Bassi R., Giuliano G. (2006) Elucidation of the β-carotene hydroxylation pathway in *Arabidopsis thaliana*. ***FEBS Lett.*** 580(19): 4718-22. ISSN: 0014-5793. PMID: 16890225.

59. Finazzi G., Johnson G., **Dall'Osto L.**, Zito F., Bonente G., Bassi R., Wollman F.A. (2006) Non-photochemical quenching of chlorophyll fluorescence in *Chlamydomonas reinhardtii*. ***Biochemistry*** 45: 1490-1498. ISSN: 0006-2960. PMID: 16445291.

60. Dall'Osto L., Caffarri S., Bassi R. (2005) A mechanism of non-photochemical energy dissipation, independent from PsbS, revealed by a conformational change in the antenna protein CP26**.** ***Plant Cell*** 17: 1217-32. ISSN: 1040-4651. PMID: 15749754.

61. Finazzi G., Johnson G., **Dall'Osto L.**, Joliot P., Wollman F.A., Bassi R. (2004) A zeaxanthin-independent nonphotochemical quenching mechanism localized in the photosystem II core complex. ***Proc. Natl. Acad. Sci. USA.*** 101: 12375-12380. ISSN: 0027-8424. PMID: 15304641.

62. Havaux M., **Dall'Osto L.**, Cuiné S., Giuliano G., Bassi R. (2004) The effect of zeaxanthin as the only xanthophyll on the structure and function of the photosynthetic apparatus in *Arabidopsis thaliana*. ***J. Biol. Chem***. 279: 13878 - 13888. ISSN: 0021-9258. PMID: 14722117.

63. Holt N.E., Kennis J. T. M., **Dall'Osto L.**, Bassi R., Fleming G.R. (2003) Carotenoid to chlorophyll energy transfer in light harvesting complex II from *Arabidopsis thaliana* probed by femtosecond fluorescence upconversion - ***Chem. Phys. Letters*** 379: 305-313. ISSN: 0009-2614. DOI: 10.1016/j.cplett.2003.08.039.

64. Morosinotto, T., Caffarri, S., **Dall'Osto, L.**, Bassi, R. (2003) Mechanistic aspects of the xanthophyll dynamics in higher plant thylakoids. ***Physiologia Plantarum*** 119: 347-354. ISSN: 0031-9317. DOI: 10.1034/j.1399-3054.2003.00213.x.

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Book chapters

1. **Dall'Osto L.**, Barera S. (2020) Domesticazione di microalghe per la produzione di biocombustibili di terza generazione. Fisiologia Vegetale Applicata, Chapter 5, Lionetti V and Bellincampi D. (eds.). Piccin Nuova Libraria, Padova. ISBN 978-88-299-3113-2.
2. **Dall'Osto L.**, Bassi R., Ruban A. (2014) Photoprotective mechanisms: carotenoids. *Plastid Biology,* Advances in Plant Biology 5, Chapter 15, S. Theg, F.-A. Wollman (eds.). Springer Science+Business Media New York 2014. ISBN 978-1-4939-1136-3.
3. Bonente G., **Dall'Osto L.**, Bassi R. (2008) In between photosynthesis and photoinhibition: the fundamental role of carotenoids and carotenoid-binding proteins in photoprotection. Biophotonic book, Chapter 3, L. Pavesi, P.M. Fauchet (eds), Springer-Verlag 2008. ISBN 978-3-540-76779-4.

Publications without peer-review

1. **Dall'Osto L.**, Bassi R. (2013) Prospettive della domesticazione di alghe unicellulari per la produzione di biocombustibili. ***Accademia dei Lincei***, Estratti dal Convegno Internazionale "La sfida dei Terawatt: quale ricerca per l'energia del futuro?".
2. Bassi R., Berteotti S., Ballottari A., Alboresi A., Betterle N., **Dall'Osto L.** (2012) Domesticazione delle alghe unicellulari per la produzione di biocombustibili in fotobioreattore. ***Accademia dei Georgofili***, Quaderni 2012-IX, 9 supp. 9, 69-85.

7. REVIEWER

International journals

PNAS, Plant Physiology, Plant Journal, BMC Plant Biology, BBA Bioenergetic, Plant BioSystems, Scientific Reports, Cell Research, Journal of Integrative Plant Biology, Environmental & Experimental Botany, New Phytologist, Plant Biology, J. Photochem. Photobiol., J. Plant Interaction, Molecular Plant, J. Phycology, Photosynthesis Research, Planta.

Review panel membership

(2019)	Chilean National Science and Technology Commission
(2018)	Academy of Finland
(2017)	Member of the scientific evaluation PLANT panel, Academy of Finland
(2016)	Agence Nationale de la Recherche, France
(2014)	Deutsche Forschungsgemeinschaft DFG, Germany
(2013 - 2020)	Czech Science Foundation
(2012 - 2020)	National Science Centre (NCN), Poland
(2012 - 2017)	MIUR / ANVUR, Italy

Editorial Board membership

(2019 -)	Review Editor, Frontiers in Plant Science
(2019 -)	Editorial Board member and Academic Editor for "Plants"

8. ACADEMIC TEACHING ACTIVITIES

(2016 - 2019)	Lecturer, ESP Photobiology School, Brixen

(2011 -) Lecturer in "Cell biology", bachelor's degree in Biotechnology L2, University of Verona. 6 CFU.

(2009 -) Lecturer in "Plant secondary metabolism and metabolic engineering", master degree in Biotechnology LM7, University of Verona. 6 CFU.

(2007 - 2009) Lecturer in "Plant Biochemistry", bachelor's degree in Biotechnology, Faculty of Science, University of Verona. 4 CFU.

(2002 - 2007) Member of examination committee for courses of "Plant Biochemistry" and "Biotechnology and abiotic stress", Faculty of Science, University of Verona.

(2002 - 2007) Teaching assistant, course of "Plant Biochemistry" and "Biotechnology and abiotic stress", Faculty of Science, University of Verona , held by Prof. Roberto Bassi.

Supervisor of undergraduate/PhD students

(2017 -) Main supervisor, Valeria Vecchi (PhD thesis) "Improving light-to-biomass conversion efficiency in wild type and mutant strains of *C. vulgaris*". Secondary supervisor, Zeno Guardini (PhD thesis). Main supervisor, Roberto Caferri (M.Sc. thesis); research activities of Mauro Bressan and Simone Barera (post-doc).

(2014 - 2017) Main supervisor, Mauro Bressan (PhD thesis) "Role of the PSI peripheral antenna in the acclimation of *Arabidopsis* to changing light conditions". Main supervisor, Ernesto Mitruccio (M.Sc. thesis), Gianluca Zorzi (Bachelor's thesis), Edoardo Righetti (Bachelor's thesis), Federico Aimi (Bachelor's thesis).

(2012 - 2013) Main supervisor, Mauro Bressan (M.Sc. thesis) "Antenna subunits of PSI: role in the regulation of light-use efficiency in *A. thaliana*". Grade: 110/110. Main supervisor, Massimo Leonardi (Bachelor's thesis), Zeno Guardini (Bachelor's thesis).

(2012 - 2015) Secondary supervisor, Stefano Cazzaniga (PhD thesis) "Improving microalga *Chlorella* to increase growth in bioreactor and biodiesel yield".

(2010 - 2014) Main Supervisor, Michela Ronzani (PhD thesis) "Role of protein turnover in plant chloroplast".

(2008 - 2009) Secondary supervisor, Michela Ronzani (M.Sc. thesis).

(2007 - 2010) Secondary supervisor, Silvia de Bianchi (PhD thesis) "The function of monomeric Lhcb proteins of Photosystem II analyzed by reverse genetics".

(2006 - 2017) Contributions to scientific training of bachelor's/M.Sc. thesis of Sara Frigerio, Sara Modena, Francesca Passarini, Nico Betterle, Enrico Rancan.

(2008) Co-supervisor of Silvia de Bianchi, who was awarded of the "Ben Amour" prize for the best thesis work, Italian Society of Photobiology.

(2006 - 2007) Co-supervisor, Silvia de Bianchi (M.Sc. thesis).

(2004) Organization and management of post-graduate training stage, Dr. Stefano Cazzaniga (Degree in Biomedical Biotechnology).

9. INSTITUTIONAL RESPONSABILITIES

(2015 -) Referente CdS (coordinator), MSc LM-7 Agri-food Biotechnology.

(2013 -) Member of Teaching staff, PhD in Biotechnology.

(2007 - 2013) Member of Teaching staff, Doctoral School in Molecular, Environmental and Industrial Biotechnology.

(2007 -) Member of Biotechnology Dept. Council.

10. OTHER ACADEMIC ACTIVITIES

(2018) Pre-examinator of PhD thesis: "Study of carbon metabolism in plants: from enzymes to the organism, from physiology to stress", Dr. L. Guerrieri (University of Bologna); "Defining the GUN1-FtsH interactions in chloroplast biogenesis in *Arabidopsis thaliana"*, Dr. C. Peracchio (University of Milano).

(2017 -) Supervisor, research activities of Ernesto Mitruccio, Dario Zappone, Mauro Bressan (post-doc), Simone Barera (post-doc), Manuel Benedetti (post-doc), Edoardo Cutolo (post-doc), Giulia Mandalà (post-doc), Max Angstenberger (post-doc).

(2017) Member, Organizing Committee – Winter School "Plant biotechnology and environmental sustainability", Canazei – January 15th-20th

(2016) Opponent in PhD defences: Dr. N. Di Giacinto, University of Bologna, "Cysteine-based redox modifications in the regulation of Calvin-Benson cycle enzymes from *Chlamydomonas reinhardtii*"; Dr. C. Pirone, University of Bologna ,"Disentangling the role of transitory starch storages in plant development and in osmotic stress response".

(2013 - 2017) Counsellor, Italian Society of Plant Biology.

(2007 - 2012) Lecturer at the "Research Days" organized by Faculty of Science, University of Verona, Degree in Biotechnology

11. OTHER ACTIVITIES

(2018 -) Co-founder and partner in the innovative start-up "Enerzyme srl"

(2017) Talk about photosynthesis and bioenergy, MEMEX interview series, Rai Scuola (http://www.univrmagazine.it/2017/11/22/la-ricerca-delluniversita-di-verona-su-rai-scuola/)

(2015 / 2017) Member, Scientific Committee – Joint Congresses SIBV-SIGA, Milan 2015 and Pisa 2017

Verona, January 10th, 2021

Luca Dall' Osto

Dichiarazione sostitutiva di certificazione (art. 46 e 47 D.P.R. nr 445 del 28/12/2000). Il sottoscritto Luca Dall'Osto, CF DLLLCU77A05H829P nato a Sandrigo (VI) il 05/01/1977, consapevole delle sanzioni penali, nel caso di dichiarazioni mendaci, di formazione o uso di atti falsi, richiamate dall'articolo 76 del D.P.R. 445/2000, dichiara che tutto quanto indicato nel presente curriculum vitae corrisponde a verità.

Verona, 10/01/2021 Luca Dall'Osto