

# Nico Betterle

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## ● WORK EXPERIENCE

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01/12/2020 – CURRENT – Verona, Italy

**RESEARCH FELLOW – UNIVERSITÀ DEGLI STUDI DI VERONA**

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- Scientific activity

- **metabolic engineering of microalgae for the production of valuable commodities** (eg carotenoids with high nutraceutical value and monoterpenes for perfume industry)

- **implementation of a vertical farming pilot system** (host by **ONO Exponential Farming srl**) for the automated growth of high-value vegetables, sprouts and microalgae

- Staff supervisor (post-doctoral researchers and undergraduate students)
- Participation to the governance of the Department of Biotechnology at the University of Verona

01/01/2019 – 30/11/2020 – Berkeley, United States

**ASSISTANT PROJECT SCIENTIST (STEP III) – UNIVERSITY OF CALIFORNIA BERKELEY**

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- Scientific activity

- **metabolic engineering of photosynthetic microrganisms for the production of valuable commodities** (monoterpenes for perfume industry and cannabidiol)

- **overexpression of biotherapeutic proteins in photosynthetic microrganisms**

- Staff supervisor (post-doctoral researchers and undergraduate students)

20/06/2016 – 31/12/2018 – Berkeley, United States

**POST-DOCTORAL RESEARCH EMPLOYEE – UNIVERSITY OF CALIFORNIA BERKELEY**

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- Scientific activity

- **Metabolic engineering of photosynthetic microrganisms for synthesis of valuable commodities** (monoterpenes for parfum industry and cannabinoids)

- **Overexpression of proteins with pharmaceutical interest in photosynthetic microrganisms**

- Staff supervisor (PhD students and undergraduate students)

01/01/2011 – 31/05/2016 – Verona, Italy

**POST-DOCTORAL RESEARCHER – UNIVERSITÀ DEGLI STUDI DI VERONA**

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- Scientific activity

- **Study of photoprotective mechanisms in plants and microalgae**

- **Overexpression of cellulolitic proteins in bacteria and microalgae for the production of biofuels**

- **Production of magnetic nanoparticles in microaerophilic bacteria**

## ● EDUCATION AND TRAINING

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01/01/2008 – 31/12/2010 – Verona, Italy

**PHD IN MOLECULAR, INDUSTRIAL AND ENVIRONMENTAL BIOTECHNOLOGIES** – Università degli Studi di Verona

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PhD defense on the 5th of May 2011. Grade: Excellent

10/2004 – 11/2007 – Verona, Italy

**MASTER OF SCIENCE - AGRO-INDUSTRIAL BIOTECHNOLOGIES** – Università degli Studi di Verona

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Grade: 110/110 *cum laude*

Grade: 109/110

09/1996 – 09/2001 – Verona

**HIGH SCHOOL DEGREE** – Liceo Scientifico "Angelo Messedaglia"

## ● **LANGUAGE SKILLS**

**Mother tongue(s):** ITALIAN**Other language(s):**

	UNDERSTANDING		SPEAKING		WRITING
	Listening	Reading	Spoken production	Spoken interaction	
<b>ENGLISH</b>	C1	C1	C1	C1	C1
<b>FRENCH</b>	A1	A1	A1	A1	A1

Levels: A1 and A2: Basic user; B1 and B2: Independent user; C1 and C2: Proficient user

## ● **PUBLICATIONS**

### **Recombinant protein stability in cyanobacteria**

Zhang X\*, **Betterle N\***, Hidalgo-Martinez D\*, Melis A (2021) ACS Synth Biol. Accepted. (\*, First co-authors)

### **Cyanobacterial production of biopharmaceutical and biotherapeutic proteins**

**Betterle N**, Hidalgo D, Melis A (2020) Front Plant Sci. Mar 3;11:237. doi: 10.3389/fpls.2020.00237

### **Photosynthetic generation of heterologous terpenoids in cyanobacteria**

**Betterle N**, Melis A (2019) Biotechnol Bioeng. 116(8):2041-2051. doi: 10.1002/bit.26988

### **Design of a highly thermostable hemicellulose-degrading blend from *Thermotoga neapolitana* for the treatment of lignocellulosic biomass**

Benedetti M, Vecchi V, **Betterle N**, Natali A, Bassi R, Dall'Osto L (2019) J Biotechnol. 296:42-52. doi: 10.1016/j.jbiotec.2019.03.005

### **Downregulation of the CpSRP43 gene expression confers a truncated light-harvesting antenna (TLA) and enhances biomass and leaf-to-stem ratio in *Nicotiana tabacum* canopies**

Kirst H, Shen Y, Vamvaka E, **Betterle N**, Xu D, Warek U, Strickland JA, Melis A (2018) Planta. 248(1):139-154. doi: 10.1007/s00425-018-2889-7

### **Heterologous Leader Sequences in Fusion Constructs Enhance Expression of Geranyl Diphosphate Synthase and Yield of β-Phellandrene Production in Cyanobacteria (*Synechocystis*)**

**Betterle N**, Melis A (2018) ACS Synth Biol. 16;7(3):912-921. doi: 10.1021/acssynbio.7b00431

### **Deletion of the chloroplast LTD protein impedes LHCI import and PSI-LHCI assembly in *Chlamydomonas reinhardtii***

Jeong J, Baek K, Yu J, Kirst H, **Betterle N**, Shin W, Bae S, Melis A, Jin E (2018) J Exp Bot. 23;69(5):1147-1158. doi: 10.1093/jxb/erx457

## **The STN8 kinase-PBCP phosphatase system is responsible for high-light-induced reversible phosphorylation of the PSII inner antenna subunit CP29 in rice**

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**Betterle N\***, Poudyal RS\*, Rosa A\*, Wu G, Bassi R, Lee CH (2017) *Plant J.* 89(4):681-691. doi: 10.1111/tpj.13412. (\*, First co-authors)

## **High light-dependent phosphorylation of photosystem II inner antenna CP29 in monocots is STN7 independent and enhances nonphotochemical quenching**

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**Betterle N**, Ballottari M, Baginsky S, Bassi R (2015) *Plant Physiol.* 167(2):457-71. doi: 10.1104/pp.114.252379

## **Magnetic nanoparticles from *Magnetospirillum gryphiswaldense* increase the efficacy of thermotherapy in a model of colon carcinoma**

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Mannucci S, Ghin L, Conti G, Tambalo S, Lascialfari A, Orlando T, Benati D, Bernardi P, **Betterle N**, Bassi R, Marzola P, Sbarbati A (2014) *PLoS One.* 7;9(10):e108959. doi: 10.1371/journal.pone.0108959

## **Enhancement of non-photochemical quenching in the Bryophyte *Physcomitrella patens* during acclimation to salt and osmotic stress**

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Azzabi G, Pinnola A, **Betterle N**, Bassi R, Alboresi A (2012) *Plant Cell Physiol.* 53(10):1815-25. doi: 10.1093/pcp/pcs124

## **Arabidopsis mutants deleted in the light-harvesting protein Lhcb4 have a disrupted photosystem II macrostructure and are defective in photoprotection**

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de Bianchi S\*, **Betterle N\***, Kouril R, Cazzaniga S, Boekema E, Bassi R, Dall'Osto L (2011) *Plant Cell.* 23(7):2659-79. doi: 10.1105/tpc.111.087320. (\*First co-authors)

## **Identification of the chromophores involved in aggregation-dependent energy quenching of the monomeric photosystem II antenna protein Lhcb5**

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Ballottari M, Girardon J, **Betterle N**, Morosinotto T, Bassi R (2010) *J Biol Chem.* 285(36):28309-21. doi: 10.1074/jbc.M110.124115

## **Dynamics of zeaxanthin binding to the photosystem II monomeric antenna protein Lhcb6 (CP24) and modulation of its photoprotection properties**

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**Betterle N\***, Ballottari M\*, Hienerwadel R, Dall'Osto L, Bassi R (2010) *Arch Biochem Biophys.* 504(1):67-77. doi: 10.1016/j.abb.2010.05.016. (\*First co-authors)

## **Light-induced dissociation of an antenna hetero-oligomer is needed for non-photochemical quenching induction**

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**Betterle N\***, Ballottari M\*, Zorzan S, de Bianchi S, Cazzaniga S, Dall'osto L, Morosinotto T, Bassi R (2009) *J Biol Chem.* 284(22):15255-66. doi: 10.1074/jbc.M808625200. (\*First coauthors)

## **PATENT APPLICATIONS**

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### **Pending**

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- **Fusion constructs to express biopharmaceutical polypeptides in cyanobacteria.** Inventors: Nico Betterle, Andrew Saphire, Diego Hidalgo Martinez,Anastasios Melis (Provisional Application - US patent office - No. 62/898,891)
- **Production of cannabinoids using genetically engineered photosynthetic microorganisms.** Inventors: Nico Betterle, Diego Hidalgo Martinez,Anastasios Melis . (PCT Patent Application No. PCT/US2020/020512; )

## ● **CONFERENCES AND SEMINARS**

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### Seminar speaker

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- Betterle (2015) - "HETEROLOGOUS EXPRESSION OF THERMOPHYLIC CELLULASES FOR THE DEGRADATION OF PLANT CELL WALL". In: **Joint Congress SIBV-SIGA 2015**, 8th-11st Sep 2015
- Betterle (2015) - "A MONOCOT-SPECIFIC MECHANISM FOR PHOTOPROTECTION FROM EXCESS LIGHT BASED ON REVERSIBLE PHOSPHORYLATION OF THE PHOTOSYSTEM II ANTENNA PROTEIN CP29". In: 12th International Conference on Reactive Oxygen and Nitrogen Species in Plants: from model systems to field" (**POG 2015**), 24<sup>th</sup>-26<sup>th</sup> Jun 2015

## ● **HONOURS AND AWARDS**

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### Honours and awards

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- **Valeria Vincenzo Landi Foundation scholarship** from the Accademia dei Lincei for research in Plant Genetics (2014)
- **Thore Ben Amor award** from the Biophysics Italian Society for the best degree thesis in Biophysics (2007)

## ● **ORGANISATIONAL SKILLS**

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### Organisational skills

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- excellent organizational skills gained coordinating peers and students schedules to support projects execution
- excellent team-leading and mentoring skills gained as supervisor of a small team (currently 4 people)

## ● **COMMUNICATION AND INTERPERSONAL SKILLS**

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### Communication and interpersonal skills

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- excellent communication skills gained through my experience in students supervisory
- ability to synthesize information and report outcomes to partners/leadership/scientific community gained through my experience in academia

## ● **JOB-RELATED SKILLS**

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### Job-related skills

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- as a research fellow responsible for R&D projects in alignment with the principal investigator goals required to translate the scientific results to the principal investigator and funding partners
  - technical skills: molecular biology, biochemistry, microbiology
  - peer reviewer activities for scientific journal

## ● **RESIDENCY**

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### Residency

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- Italian resident (as of Dec 2020)
- Lawful permanent resident in the United States (green card holder)

*Nico Betterle*  
Verona, 24/02/2021