

Dr. Juergen E.W. Polle

Department of Biology
Brooklyn College of the City University of New York
2900 Bedford Ave, 200NE
Brooklyn, NY 11210
(718) 951-5723
jpolle@brooklyn.cuny.edu

CURRICULUM VITAE

EDUCATION

Georg-August-University , Goettingen, Germany , 1994 - 1997
Doktor in Biology, 1997
Area of specialization: Plant Physiology and Biochemistry

Georg-August-University , Goettingen, Germany, 1989 - 1994
Diplom in Biology, 1994
Area of specialization: Plant Physiology and Biochemistry

University of Applied Financial Sciences, Rinteln, Germany, 1985 -1988
Diplom in Financial Sciences, 1988
Concentration: Tax Law

APPOINTMENTS

Assistant Professor

September 2002- current: Department of Biology, Brooklyn College of the City University of New York, 2900 Bedford Ave, Brooklyn, NY, USA

- ◆ Investigated regulation of secondary carotenoid accumulation in the unicellular green alga *Dunaliella*.
- ◆ Studies on the phylogeny of algal species of the genus *Dunaliella*.
- ◆ Examined processes involved in light-harvesting complex degradation in chloroplasts.

December 2002 – current: Faculty in Biology (MCD subprogram) at the Graduate Center of the City University of New York

RESEARCH EXPERIENCE

Postdoctoral Research

August 1997 – August 2002: Dept. of Plant & Microbial Biology, University of California, Berkeley, USA (advisor: Dr. A. Melis)

- ◆ Generated and isolated algal mutants: Characterized the photosynthetic apparatus organization and performance of the mutants.
- ◆ Investigated biosynthesis of high-value carotenoids in microalgae.
- ◆ Studies on maximizing the productivity of algal mass cultures.
- ◆ Investigated production of hydrogen by green algae.
- ◆ Analyzed the effect of different carbon sources on the photosynthetic apparatus organization and function.
- ◆ Studied acclimation of the photosynthetic apparatus to light stress.
- ◆ Investigated the recovery of the photosynthetic apparatus after light stress.

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Doctoral Research

August 1994 - July 1997: *Georg-August-University, Goettingen, Germany*
(advisor: Dr. W. Wiessner)

- ♦ Studied changes in the chlorophyll antenna size and inactivation of photosystem II upon dark incubation in green algae.
- ♦ Investigated the effect of DCMU on antenna and function of photosystem II.

Research Sabbatical

March and April 1996: *Biological Research Center of the Hungarian Academy of Sciences in Szeged, Hungary* (advisor: Dr. S. Demeter)

- ♦ Analysis of the effects of acetate on photosystem II and photosystem I.

Diplom Research

July 1993 - July 1994: *Georg-August-University, Goettingen, Germany*
(advisor: Dr. W. Wiessner)

- ♦ Studied the effect of different carbon sources on the photosystem II heterogeneity in unicellular green algae.
- ♦ Investigated the effect of translation inhibitors on the photosystem II heterogeneity in unicellular green algae.

RESEARCH INTERESTS

- ♦ Physiology of microalgae with an emphasis on regulation of photosynthesis:
 - Signal transduction between nucleus and chloroplast.
 - Regulation of light-harvesting complex formation and degradation.
 - Assembly of photosynthetic complexes.
- ♦ Microalgal biotechnology:
 - Microalgal metabolism (esp. regulation of secondary carotenoid biosynthesis).
 - Maximizing productivity of microalgal mass cultures.
- ♦ Phylogeny of the microalgal genus *Dunaliella*.

TEACHING EXPERIENCE

Instructor: *Brooklyn College, Brooklyn, USA, 2002- present*
- Introduction and supervision of high school, undergraduate and graduate students in the laboratory
University of California, Berkeley, USA, 1998 - 2002
- Introduction and supervision of undergraduate students in the laboratory

Lecturer: *Brooklyn College, Brooklyn, USA*
Spring 2003: “World of algal viruses”, Guest-Lecture
“Genetically modified Organisms”, Guest-Lecture in the ethics class of the MARC program

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Co-Lecturer: *University of California, Berkeley, USA, 2000 and 2001*
- Seminars on Photosynthesis and Plastid Development, Graduate Course

Teaching Assistant:

Georg-August University, Goettingen, Germany

1993 Advanced Botanical Practical I; Part: Plant Physiology and Cytology
- responsibility for laboratory introduction of undergraduate students

1994 Advanced Botanical Practical I; Part: Morphology and Development
of Algae and Fungi
- prepared and supervised experiments of undergraduate students

1995 & 1997 Advanced Botanical Practical II; Part: Photosynthesis
- supervised experiments and led discussion section for graduate
students

1996 Botanical Practical for Agricultural Students;
- prepared and supervised experiments of undergraduate students,
discussion section

Instructor: *Georg-August University, Goettingen, Germany, 1994 - 1997*
- responsible for laboratory introduction and supervision of graduate
students

SCHOLARSHIPS

- ♦ Education Abroad Program Fellowship (*University of California*), 1997 - 1998
- ♦ “Studienstiftung des Deutschen Volkes”, German Honors Society, 1995 - 1997

SOCIETIES

- ♦ German Botanical Society (DBG)
- ♦ American Society of Plant Biologists (ASPB)
- ♦ Phycological Society of America (PSA)

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SYNERGISTIC ACTIVITIES

- ◆ The PI initiated, organized and chaired a workshop on photosynthesis supported by the German Honors Society in Goettingen (Germany) 1997.
- ◆ Chair of the Light Harvesting session in the XIth Western Photosynthesis Conference 2002, Asilomar Conference Grounds, Pacific Grove, CA, USA.
- ◆ Co-organizer of the New York Area Meeting of Molecular Biologists 2004.

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PUBLICATIONS

1999

Polle JEW and Melis A (1999), Recovery of the photosynthetic apparatus from photoinhibition during dark incubation of the green alga *Dunaliella salina*. *Aust J Plant Physiol* 26 (7): 679-686

2000

Polle JEW, Benemann JR, Tanaka A and Melis A (2000), Photosynthetic apparatus organization and function in wild type and a Chl *b*-less mutant of *Chlamydomonas reinhardtii*. Dependence on carbon source. *Planta* 211(3): 335-344

Doltchinkova VR, Georgieva K, Kapchina-Toveta V, and **Polle JEW** (2000), Electrokinetic properties of thylakoids in *in vitro* cultured *Gyropsophila paniculata* plants. *Aust J Plant Physiol* 27 (11): 1085-1091

2001

Polle JEW, Niyogi KK and Melis A, (2001) Absence of lutein, violaxanthin and neoxanthin affects the functional chlorophyll antenna size of photosystem-II but not that of photosystem-I in the green alga *Chlamydomonas reinhardtii*. *Plant Cell Physiol* 42 (5): 482-491

Polle J, Kanakagiri S, Benemann JR and Melis A (2001), Maximizing photosynthetic efficiencies and hydrogen production by microalgal cultures. In, *Biohydrogen II: An Approach to Environmentally Acceptable Technology* (J Miyake, T Matsunaga and A San Pietro, Eds.), pp. 111-130. Pergamon Press, Oxford, UK

Jin ES, **Polle JEW**, and Melis A (2001) Involvement of Zeaxanthin and of the Cbr protein in the repair of photosystem II from photoinhibition in the green alga *Dunaliella salina*. *Biochim Biophys Acta*, 1506 (3): 244-259

2002

Masuda T, **Polle JEW**, and Melis A (2002) Biosynthesis and Distribution of Chl among the photosystems during recovery of the green alga *Dunaliella salina* from irradiance stress. *Plant Physiol*, 128: 603-614

Lokstein H, Tian L, **Polle JEW**, and DellaPenna D (2002) Xanthophyll Biosynthetic Mutants of *Arabidopsis thaliana*: Altered Nonphotochemical Quenching of Chlorophyll Fluorescence is due to Changes in Photosystem II Antenna Size and Stability. *Biochim Biophys Acta*, 1553: 309-319

Polle JEW, Kanakagiri S, Jin ES, Masuda T, and Melis A (2002) Truncated chlorophyll antenna size of the photosystems – A practical method to improve microalgal productivity and hydrogen production in mass culture. *Int J Hydrogen Energy*, 27: 1257-1264

2003

Jin ES, **Polle JEW**, Hyun SM, Lee HK, and Chang M (2003) Xanthophylls in microalgae: From biosynthesis to biotechnological mass production and application. *J Microbiol Biotechnol*, 13(2): 165-174

Polle JEW, Kanakagiri S, and Melis A (2003) *TLA1*, a *Chlamydomonas reinhardtii* nuclear gene regulates the chlorophyll antenna size of photosynthesis. *Planta*, 217: 49-59

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- Jin ES, Yokthokwattana K, **Polle JEW**, Melis (2003) Role of the reversible xanthophylls cycle in the photosystem-II damage and repair cycle in *Dunaliella salina* (green alga). *Plant Physiology*, 132: 352 - 364
- Yokthokwattana K, **Polle JEW**, Melis (2003) Cellular fractionation and carotenoid isolation in *Dunaliella salina* (green alga). *Planta*, submitted

INVITED SEMINARS

2000

University of Nevada, Reno, NV, USA

“Significance of light-harvesting complexes for maximizing the productivity of microalgal mass cultures.”

Humboldt-University, Berlin, GERMANY

“Photosynthetic apparatus organization in Chl-deficient and Chl *b*-less mutants of *Chlamydomonas reinhardtii*.”

Georg-August University, Göttingen, GERMANY

“Photosynthetic apparatus organization in Chl-deficient and Chl *b*-less mutants of *Chlamydomonas reinhardtii*.”

University of California, Davis, CA USA

“Efforts to improve productivity of algal mass cultures:
Dependence on light-harvesting.”

2001

Tokyo Institute of Technology, Yokohama, JAPAN

“Biogenesis of the photosynthetic apparatus: Biosynthesis and regulation of light-harvesting protein complexes.”

Long Island University, Southampton College, Southampton, NY, USA

“Maximizing the productivity of algal mass cultures: A biological approach.”

Biochemical Engineering Conference XII, Sonoma, CA, USA

“Genes for the enhancement of microalgal productivity.”

2003

Meeting of the International Network on Biofixation of CO₂ and Greenhouse Gas

Abatement with Microalgae, Berkeley, CA, USA

“Chlorophyll antenna size of the photosystems and the capacity of photosynthesis in green algae.”

Korean Ocean Research and Development Institute,

Sa-dong 1270, Ansan Kung-Gi Do, KOREA

“Improvement of microalgal productivity: A biological method.”