

MEMOIR

“Burning bright, in the forests of the light”

Prasanna K. Mohanty

1 April 1934 – 9 March 2013



An informal portrait of Prasanna Mohanty taken in New Delhi, India. Photo, by Rajni Govindjee (~2010), published in Tiwari *et al.* 2014. This figure was obtained from Govindjee's archives, and is reproduced here with his permission.

*Professor Prasanna K. Mohanty, one of the distinguished plant physiologists of our time, and a pioneer in photosynthesis research, was a member of the Editorial Board of Photosynthetica. He was born on April 1, 1934 in a remote village in the State of Odisha (formerly Orissa) of India and died more than a year ago, on March 9, 2013, in Odisha. His education, academic advancement, and outstanding research achievements have been described in detail in two publications by his former students, J.S.S. Prakash and S. Tiwari (2013) and by S. Tiwari *et al.* (2014). Here, I shall outline briefly his scientific career and I shall add a few personal recollections that focus on particular facets of his truly rare personality.*

Prasanna received his primary school education in his village, which was so remote, as he told me once, that at the end of an election day they used pigeons to transmit the election results to the local center. For his secondary school education, he moved to Cuttack, Odisha, and he obtained his B.Sc. (1956) and M.Sc. (1958) degrees granted by Utkal University of Odisha. In 1964, he was married to Basanti, and in 1966 he was accepted as a graduate student in the Photosynthesis Laboratory of Eugene Rabinowitch and Govindjee at the University of Illinois at Urbana-Champaign (UIUC), Illinois, USA (Govindjee 2004). There, he worked under the supervision and guidance of Govindjee (Ghosh 2004).

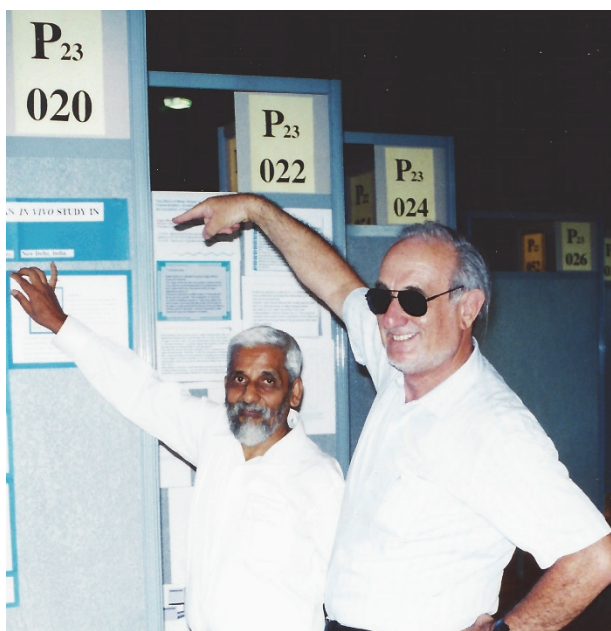
The Laboratory of Photosynthesis at UIUC was truly extraordinary at that time. In 1966, when Prasanna was accepted, there were more than 20 active researchers, at postdoctoral and graduate student levels, and many technical personnel. The researchers belonged to two subsets, one headed by the senior professor Eugene Rabinowitch, and the other by the junior professor Govindjee, all creating, collaborating, and competing in a co-operative sense. There was a regular weekly seminar for the entire group and frequent ad-hoc seminars. Many important scientists made a point to visit the Laboratory of E. Rabinowitch and Govindjee, when passing from Urbana, including the late Sir George Porter, the late Academician Alexander Krassnovsky, the late Warren Butler, and the late Zdeněk Šesták, the founder of Photosynthetica, today one of the two oldest scientific journals on the science of photosynthesis, the other being Photosynthesis Research. (For a history of the two journals, see Govindjee, Sestak and Peters 2002). The photosynthesis laboratory at Urbana, Illinois, was the highly fertile ground, in which Prasanna was planted. He made an excellent use of it, fulfilling his professor's expectations, as his subsequent scientific achievements testify.

In 1966, when Prasanna entered the world of photosynthesis, the main concepts that form today the pillars of its theory had been well established. These included the photosynthetic unit concept, the two photosystem – two photoreaction mechanism for transferring electrons from H_2O to CO_2 and the use of the absorbed light energy both for photosynthetic electron transport (PSET; H_2O to CO_2) and for phosphorylation of ADP to ATP. New technical developments made chlorophyll (Chl) a fluorometry the method of choice because, with it, one could probe minute photosynthetic samples rapidly and nondestructively. However, there were two serious problems with this method. First, fluorometers were not commercially available, at that time, so one had to construct one's own machine (as Govindjee did together with Jobie Spencer); and second, the interpretation of the Chl a fluorescence data, as pertaining to photosynthesis, was not always easy and straightforward.

One strongly supported concept, particularly by the work of E.D. McAlister and J. Myers (1940) and of L.N.M. Duysens and H. E. Sweers (1963), was that light-induced changes in Chl a fluorescence and in photosynthesis are complementary. In other words, any fractional change in Chl a fluorescence would reflect an equal but inverse change in PSET. The complementarity complex was proven untenable by Govindjee and coworkers (including the author) who showed that PSET modulates Chl a fluorescence not only directly, but also indirectly; by the mediation of electrochemical and conformational changes that PSET causes in the thylakoid membrane. Prasanna Mohanty's 1972 doctoral thesis was a substantial contribution in this area. Prasanna's Ph. D. thesis, Regulation of Chlorophyll a Fluorescence during Photosynthesis, can be downloaded from <http://www.life.illinois.edu/govindjee/theses.html>.

In 1973, Prasanna Mohanty was appointed as Associate Professor at the School of Life Sciences of the Jawaharlal Nehru University (JNU), in New Delhi, India, where he taught biochemistry, cell biology, membrane biology, and bioenergetics. In 1988, he was elected Fellow of the National Academy of Sciences in India. He retired from JNU in 1999, and soon thereafter he joined the Regional Plant Resource Center (RPRC) at Bhubaneswar, Odisha, India as Honorary Adjunct Professor.

As a research scientist, Prasanna Mohanty was highly prolific (for details, see Prakash and Tiwari 2013, Tiwari et al. 2014). He had published plant science – related research even before departing for the UIUC (in *Nature and Science*), then as a graduate student at UIUC, and as visiting scientist in the laboratories of leading photosynthesis researchers (J. Boyer at the UIUC, Bolton at London, Ontario, D.C. Fork at Carnegie Institute of Science, Stanford, N. Murata at Okazaki, Japan, to name a few). The main body of his research was done during his professorship at JNU, with the help of a host of emerging and highly competent younger research scientists, and then at RPRC, as well as at University of Hyderabad, India. He worked with all kinds of photosynthetic materials, plant leaves, algae, cyanobacteria, as well as subcellular and subchloroplast preparations thereof. His main research themes concerned (a) the effects of protons and metal cations on PSET and on excitation energy transfer (EET); (b) on the effects of various environmental factors on photosynthetic functions and structures, including drought, hyperosmosis, and hypersalinity, UV-B, UV-A, high intensity visible light, and singlet oxygen; (c) plant senescence; and (d) hydrogen production from water using cyanobacteria.



A photo of Prasanna Mohanty and George C. Papageorgiou taken by Govindjee in 2004 during the 13th International Congress on Photosynthesis, in Montreal, Canada.

Prasanna radiated a special charm (a “mystique”, according to Walter Mangel, a friend from our UIUC times), to people around him. Here are few recollections to illustrate it.

Once, in Okazaki, Japan (both Prasanna and I were visiting the famous Photosynthesis Laboratory of Norio Murata), he asked me to go with him to the once-a-week open-air market. There, to my great surprise, I found out that Prasanna knew many of the fruit and vegetable selling vendors by their names, and what was even more surprising, they knew him by his name. If this doesn't reflect personal charm, what else does?

Another time, in the course of a relevant discussion, he recited to me the opening stanza of Shelley's Skylark, to my great astonishment of course.

Prasanna was a total vegetarian and a teetotaler. He never swallowed not even one microliter of an alcoholic beverage. However, he, Norio Murata, and I would often visit a Robata (a type of grill used in Japanese hibachi restaurant for cooking food in front of the customers) in Okazaki, where Norio and I adhered to our endless ritual of saké, then beer, then saké again, while Prasanna stuck to his Coca Cola all the time. Discussions were lively and stimulating and, of course, photosynthesis-oriented.

To conclude, Prasanna was a sharp intellectual, with a creative, systematic, and analytical mind. At the same time, he radiated natural humility. An opinionated person, who would argue ceaselessly about issues and people, but whom I did never see blowing his top off, no matter how disappointed he could have been. Showing off, self-advertising, maximizing his personal noise, and similar practices, which many of us consider as essential for advancing to a higher professional stratum, were not evident in Prasanna. Humbly but persistently, he pursued and he achieved his goals.

We do all miss our valued colleague and dear friend Prasanna Mohanty.

G.C. PAPAGEORGIOU (Athens)

(e-mail: gcpap@bio.demokritos.gr)

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