

HISTORICAL LETTER

My turn to thank many around the World: For photosynthesis research in my life[#]

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“Only when photosynthesis was invented, about two and a half billion years ago, did oxygen become part of earth's air and, because oxygen is a dangerous, reactive chemical, this poisoning of the planet wiped out many creatures and forced others into hiding. These oxygen-haters live to this day in lake bottoms, in swamps, and deep in the soil, eking out an existence in oxygen-free environments. Other creatures adapted to the new pollutant and, using an elegant sidestepping maneuver, turned the toxic oxygen to their advantage. Thus was born respiration using oxygen, an energy-liberating biochemical trick that we have inherited. Our lives therefore depend on an ancient form of pollution.”

–David George Haskell (2012)

The Forest Unseen: A Year's Watch in Nature. Viking, pp 26–27.



PHOTO of the author *Govindjee*.
Source: College of Liberal Arts & Sciences, University of Illinois at Urbana-Champaign, January 1, 2019.

In this Letter, I honor and thank all with whom I have interacted with during my research career that began in the Department of Botany at Allahabad University, Allahabad, U.P, India, in 1954, and continued for another 60 years, starting in 1956, at the University of Illinois at Urbana-Champaign, Illinois, USA. I was fascinated by the primary events of photosynthesis from the time light is absorbed until water is oxidized and reducing power is made; we (i.e., those listed here) measured some of the key reactions and had great fun doing it. However, during the last 20 years of my retired life, the focus has changed to recognize the players (big and small) in the field of photosynthesis; to help younger scientists; and to write the history of photosynthesis research through contributions made by various researchers. The current *Letter* is merely to say “Thank You” to everyone I have published with in my academic life. I am grateful to all cyanobacteria, algae, mosses, ferns and higher plants for doing oxygenic photosynthesis.

Key words: Photosynthesis, Mentors and Professors, Graduate Students, Leaders, Collaboration, Team Work

[#]I am highly thankful to Robert (Bob) Blankenship, Thomas (Tom) Sharkey, George C. Papageorgiou and Sushma Naithani for reading this letter before its publication

PROLOG

As I look back on (and in) my research life, starting in the late 1954, until today, I realize that I have been very lucky to have had wonderful professors and mentors and many others who have contributed to my success in research and academics (Govindjee, 2019). I have listed these wonderful persons here in 5 sections (each section being alphabetically arranged):(A) professors and mentors; (B) other leaders in the field who have influenced me; (C) my former graduate students as well as those of the others who were associated with me in some manner; (D) senior scientists, visiting professors and post doc associates, who worked with me, or came to work with me at the University of Illinois at Urbana-Champaign, UIUC; and (E) other co-authors or co-editors (including professors & senior scientists, but excluding those listed above in sections A-D). Unfortunately, many of my former colleagues are no more* with us; their names are highlighted and are in italics. The list also includes many whom I never personally met, but they collaborated via others I knew, and are as important to me as the others. With help from many, I have provided the full names of all except just a couple that we have not found yet. Further, I have added parenthetically the years I have co-authored a paper, a review, a tribute or a news report. I provide a 2019 portrait of mine (see the previous page), and I invite you all to visit my web page at:

<http://www.life.illinois.edu/govindjee/>.

Information on publications (from where the list presented below was prepared) is at:

http://www.life.illinois.edu/govindjee/recent_papers.html and at :

<http://www.life.illinois.edu/govindjee/pubschron.html>. (A large number of publications can be downloaded from these two sites.) Since the following list may be incomplete, I request the readers to send an e-mail to me (gov@illinois.edu) if they find errors.

A. Professors & mentors

Robert Emerson*, University of Illinois at Urbana-Champaign (UIUC)
(Rabinowitch, 1961; Govindjee, 2004; Govindjee, 2018)

Eugene Rabinowitch*, UIUC (1960;1961; then as a colleague: 1961–1969)

(Bannister, 1972; Govindjee *et al.*, 2019)

Shri Ranjan*, University of Allahabad (1955)

(Laloraya, 1970)

Jan Bartholomeus Thomas*, Visiting Professor from the State University, Utrecht (1960; 1961)

(van Ginkel and Goedheer, 1991)

B. My favorite leaders in the field

William (Bill) Arnold*, Oak-Ridge, Tennessee (1983)

(Choules and Govindjee, 2004; Govindjee and Srivastava, 2004)

Louis (Lou) N.M.Duysens*, Biophysics, University of Leiden, Leiden (1976)

(Govindjee and Pulles, 2016)

C. Stacy French*, Carnegie Institution of Washington at Stanford

(Govindjee and Fork, 2006)

Herbert (Herb) S. Gutowsky*, School of Chemical Sciences, UIUC (1976;1978;1981;1983; 1984; 1987; 1988)

(Jonas and Slichter, 2006)

Martin D. Kamen*, University of California at San Diego (1969)

(Govindjee and Blankenship, 2018)

Bessel Kok*, Research Institute of Advanced Studies (RIAS), Martin Marietta Labs, Baltimore (Myers,1987)

Gregorio Weber*, when he was at UIUC, and had taught me “All I wanted to know about Fluorescence, but was afraid to ask”

(Jameson, 1998)

C. Former graduate students and a few others

(For details, see: <http://www.life.illinois.edu/govindjee/g/GraduateStudents.html>)

(Years of PhD, and years of published papers, are included; below, I have used Plant Biology for degrees that were either in “Botany” or in “Plant Physiology” or in “Cell and Molecular Biology” area, or program)

- Maarib D. L. Bazzaz (formerly Bakri) (PhD, 1972, Plant Biology; 1967; 1973; 1974)
- Glenn W. Bedell (PhD, 1972, Plant Biology; 1966; 1973)
- Danny J. Blubaugh (PhD, 1987, Plant Biology; 1984-1986; 1988; 1989)
- Jiancheng Cao (PhD, 1992, Plant Biology; 1988; 1990-1993)
- Carl N. Cederstrand (PhD, 1965, Biophysics; Jointly with Eugene Rabinowitch; 1960; 1961; 1963; 1966; 1967)
- Fredrick (Fred) Y. Cho*** (PhD, 1969, Biophysics; 1966; 1970)
(Govindjee *et al.*, 2017)
- Raymond (Ray) Chollet (PhD, 1972, Plant Biology; with Dominick Paolillo and William Ogren)
- Roger Chylla (PhD, 1990, Biophysics; Jointly with John Whitmarsh)
- William (Bill) Coleman (PhD, 1987, Plant Biology; 1984; 1985; 1987; 1988; 1990; 1993)
- Julian J. Eaton-Rye (PhD, 1987, Plant Biology; 1984-1988; 2012)
- Fatima El-Shintinawy (Plant Biology; PhD in Egypt; 1990)
- James (Jim) Fenton (Biophysics; 1979; 1980; 1987)
- Oliver (Olli) Holub (Biophysics; PhD under Robert Clegg; 2000; 2003; 2007)
- Paul A. Jursinic (PhD, 1977, Biophysics; 1972; 1976-1979; 1982)
- Rita Khanna (PhD, 1980, Plant Biology; 1977-1981; 1983; 2018)
- Anne Krey (MS, 1966, Biophysics; 1966)
- Ted Mar (PhD, 1971, Biophysics; 1969; 1971; 1972; 1974)
- Prasanna K. Mohanty*** (PhD, 1972, Plant Biology; 1970-1975)
(Tiwari *et al.*, 2014; Papageorgiou, 2014; Naithani and Govindjee, 2018)
- John C. Munday (PhD, 1968, Biophysics; 1967; 1969; 1970; 2017)
- George C. Papageorgiou (PhD, 1968, Biophysics; 1967-1969; 1971; 1973; 1998; 1999, 2004; 2007; 2009; 2011; 2012; 2014; 2016-2018)
- Ralph Schooley (Biophysics; 1976)
- Hyunsuk Shim (PhD, 1992, Biophysics; with Peter Debrunner; 1990)
- Paul Spilotro (Plant Biology; 1998; 2002; later MD from George's University, 2004)
- Alan (Al) J. Stemler (PhD, 1974, Plant Biology; 1973-1975)
- David (Dave) Lee Vandermeulen (PhD, 1977, Biophysics; 1973-1977)
- Willem (Wim) F. J. Vermaas (1981; 1982; 1991; Biology & Agriculture DSc in 1984, from The Netherlands)
- Daniel Wong (PhD, 1979, Biophysics; 1976-1981)
- Thomas (Tom) J.*Wydrzynski** (PhD, 1977, Plant Biology; 1974-1980)
(Conlan *et al.*, 2018; Govindjee *et al.*, 2018)
- Jin Xiong (PhD, 1996, Plant Biology; 1992; 1995-1998)
- Chunhe Xu (PhD, 1992, Biophysics; 1988-1992; 1995; 1997-2001)
- Louisa Yang (MS, 1965, Plant Biology; 1966)
- Barbara A. Zilinskas (PhD, 1975, Plant Biology; 1972-1976; 1987; 2018)
- D. Senior scientists/visiting profs/postdoc associates (who worked or came to work at UIUC)**
- Patrick (Pat) Breen (active participant in research of the group; provided a leadership role)
- Jean-Marie Briantais***, (1970; 1972; 1977; 1979)
(de Kouchkovsky and Cerovic, 2005)
- Christa Critchley (1982-1984)
- Mrinmoyee Das (1967; 1975; jointly with Eugene Rabinowitch)
- Ralphreed (Ralph) Ahadoglu Gasanov (1974; 1979)
- Ashish K. Ghosh*** (1966; jointly with Eugene

Rabinowitch): see an article by Ghosh (2004)

Adam Gilmore (1995; 1996; 1998-2000)

Elizabeth (Liz) Gross* (1975)

<<http://www.bio.net/mm/photosyn/2007-October/001914.html>>

Takeshi Kambara (1985; 1986)

Ashok Kumar (active participant in research of the group)

Shmuel Malkin* (1980)

(Herbert *et al.*, 2018)

Ismael Moya (1977)

Teruo Ogawa (1982)

Barbara Prezelin (1979)

G. Sarojini (1981) (now known as Sarojini G. Bose)

Manfredo J. Seuffereleld (2001; 2007; 2008; 2012; 2015)

Carmela Shimony(1967)

Beazy Sweeney* (1979)

(Vanden Driessche, 1990)

Karel Vacek (1977; 1978)

Jack J.S. Van Rensen (1978; 1981; 1982; 1984; 1989; 1991; 1993; 1995; 1997; 1999)

E. Other co-authors or co-editors (including professors & senior scientists, but excluding those in sections A-D)

Ziya Kagrananoglu Abilov (1979)

František Adamec (2003)

Alia Alia (2009)

Suleyman I. Allakhverdiev (2011—2014; 2016; 2018)

John F. Allen (2004)

Aikaterini Alygizaki-Zorba (1999)

Jan Amesz* (1996)

(Hoff and Aartsma, 2002)

Gennady M. Ananyev (2011; 2012)

Jessica M. Anna (2017)

Khalid Anwar (2018)

Paul A. Armond (1981)

Eva-Mari Aro (1997; 1998)

Chantal Astier (1990; 1995)

Julie Auger (1990)

Gerald (Jerry) T. Babcock* (1974; 1975)

(Yocum *et al.*, 2001)

Marcel Babin (2008)

Ion C. Baianu* (1982, 1983, 1984)

(Brown and Glazebrook, 2013)

Neil R. Baker (2005)

Horatio Bannister (2018)

Thomas (Tom) Turpin Bannister* (2017)

(Laws *et al.*, 2018)

James (Jim) Barber (1987; 2012; 2018)

Helen Bassham (2016)

Susan Bassham (2016)

J.Thomas (Tom) Beatty (2003; 2004)

Gerald A. Berkowitz (2007)

Gábor Bernát (2017)

Sudhakar Bharti (1998)

Devika Bhaya (2016)

Karl Y. Biel (2016; 2017)

Ajaya K. Biswal (2012)

Lars Olof Björn (2009; 2012; 2013; 2015-2018)

Clanton C. Black (2008)

L. Curt Blair (1988)

Robert (Bob) E. Blankenship (2007; 2009; 2013; 2018)

Hans J. Bohnert (1999; 2009)

Karolina Bosa (2011; 2012; 2014)

Salil Bose (1981)

Warwick Bottomley (1989)

John S. Boyer (1979; 1982)

- Jerry J. Brand (2017)
- Marian Brestic (2012; 2014)
- Vitezslav Brezina (2003)
- Winslow R. Briggs*** (1989; 2016)
- R. David Britt (2015; 2016)
- Donald (Don) Bryant (1989)
- Bob B. Buchanan (2015; 2016)
- Rosanna Caliendo (2011; 2012)
- Shiguo Chen (2012)
- Yi-Chun Chen (2011; 2012)
- Lucinda Choules (2014)
- Wah S. (Fred) Chow (2000)
- Chengcai Chu (2015; 2018)
- Robert (Bob) M. Clegg*** (2000; 2007; 2010–2012)
(Jovin, 2013; also see <https://physics.illinois.edu/people/memorials/bob-clegg>)
- Martin Cohen (2007)
- Brendon Conlan (2018)
- Jason Cooley (2013)
- Robert Cooney (2017)
- William (Bill) A. Cramer (1987, 2017)
- David Crisp (2007)
- Antony (Tony) R. Crofts (1983; 1989; 1991; 1998; 2008; 2016)
- John J. Cullen (2008)
- Anath Bandhu Das (2014)
- Hank de Klerk (1969)
- Oscar de Vos (1993; 1995)
- Peter Debrunner (1990; 1996)
- Sandor Demeter (1989)
- Tanaji S. Desai (1977; 1981; 1984)
- Eric deSturler (2005)
- Elsinraju Devadasu (2015)
- Don Charles DeVault*** (1983;1990)
(Seibert, 1991)
- Charles (Chuck) Dismukes (2018)
- Roberto Docampo (2001)
- Günter Döring (1970)
- Roland Douce*** (2015; 2016)
(http://www.academiesciences.fr/pdf/membre/DouceR_bio0210.pdf)
- Stephen R. Downie (1995)
- W. John S. Downton (1981)
- Dainis Dravins (2009)
- Jean-Marc Ducruet (1995)
- Susan Dutcher (2013)
- Gerald (Gerry) E. Edwards (2012)
- Peter Eggenberg (1992)
- Lutz A. Eichacker (2013)
- Sailaja V. Elchuri (2016)
- Anne-Lise Etienne (1990; 1995)
- Ulrich Finkele (1992)
- Darrell Fleischman (2012)
- David C. Fork (1980; 1981; 2006)
- Christine H. Foyer (2005)
- Susan Frenkel (2015)
- Georges Freyssinet (1980)
- Petra Fromme (2017)
- Christiane Funk (2000)
- Gyozo Garab (1988; 2014)
- Ernesto García-Mendoza (2013)
- Rafael Mikhaylovich Gazanchyan (1979)
- Howard Gest*** (2002; 2003)
(Bauer *et al.*, 2012)
- Christopher (Chris) Gisriel (2017)
- Joop H. C. Goedheer (1987)

- Christoph Gohlke (2000; 2007)
- Cindy S. Goldstein (1989)
- Vasilij Goltsev (2012;2014)
- Harriet H. Gorham (2007)
- Rajni Govindjee (1956 (as Varma); 1962; 1964; 1965; 1968; 1970; 1974; 1975; 1998; 2019)
- David Grantz (1982)
- Enrico Gratton (1990: 1993)
- Scott Greenfield (1995 - 1997)
- Arthur (Art) R. Grossman (2016)
- Brijesh K.Gupta (2018)
- William Hagar (2011)
- Behzad Haghighi (2012; 2013)
- Steven C. Halls (1995)
- Saber Hamdani (2015; 2018)
- Jack H. Hammond (1972; 1975)
- S. R. Hartman (1969)
- Theodore L. Hazlett (1995; 1996; 1998)
- Gregor J. Heiss (2007)
- David N. Hendrickson (1980; 1986)
- Steven (Steve) K. Herbert (2018)
- Arnd G. Heyer (2018)
- Jane F. Hill (2014)
- Rhoda Eleson Hirsch (2010)
- Joseph (Yossi) Hirschberg (1992)
- George Hoch (1962-1964; 2018)
- Arnold Hoff*** (1977)
(Gast *et al.*, 2002)
- Barry Holtz (2016; 2017)
- Peter Homann (1989)
- Alexander (Alex) Beaumont Hope*** (2000)
(Chow, 2010)
- Cai Xia Hou (1998)
- Harvey J.M. Hou (2014)
- Irada M. Huseynova (2011; 2013; 2016)
- Ron Hutchison (1995-1997)
- Shoji Ichimura (1960)
- Yorinao Inoue (1983-1985)
- Klaus-Dieter Irrgang (1999)
- Karen Jacobsen-Mispagel (2012)
- Anjana Jajoo (1998;2014)
- Jiangjun Jiang (2018)
- Douglas G. Johnson (1989; 1990)
- Pierre Joliot (2016)
- Douglas (Doug) Jordan (1980)
- Wolfgang Junge (1980)
- Hazem M. Kalaji (2011; 2012; 2014)
- Radek Kana (2009; 2012; 2016; 2017)
- Deepika Kandoi (2016)
- Navik V. Karapetyan***(2014)
(Yurina et al., 2017)
- Kenneth (Ken) Kaufmann (1979)
- Aron Keresztes (1981)
- Cheryl A. Kerfeld (2017)
- Jan F. Kern (2010)
- Mika Keränen (1998)
- Naveed Khan (2018)
- Yaser R. Khan (2014)
- Waqasuddin Khan (2018)
- Nancy Y. Kiang (2007)
- Hyunook Kim (2015; 2017)
- Diana Kirilovsky (1995)
- Karel Klem (2016)

- David Knaff*** (2006)
(Malkin, 2016; also see <https://cen.acs.org/articles/94/i28/David-B-Knaff.html>)
- Robert (Bob) S. Knox (1996; 2018)
- Sireesha Kodru (2015)
- Hiroyuki Koike (1985)
- Derrick R. J. Kolling (2008)
- Ondrej Komárek (2009; 2012)
- Janusz Kościelniak (2011; 2012)
- Eva Kotabová (2012)
- David (Dave) M. Kramer (1994)
- Alexander (Sasha) A. Krasnovsky Jr. (2017)
- David (Dave) W. Krognann*** (2002; 2004; 2006)
(Brand *et al.*, 2017)
- Johannes Kromdijk (2018)
- Jiri Kubásek (2018)
- Deepak Kumar (2010);
- Inna Musa gizi Kurbanova (1979)
- Agu Laisk (2003; 2009)
- Manmohan Manohar Laloraya (1955;1956)
- Margaret Gwyn Latimer (2017)
- Christoph Lauterwasser (1992)
- Jean Lavorel (1969;1970;1987)
- Edward (Ed) Laws (2018)
- Dusan Lazár (2018)
- Sadhu Leelavathi (2012)
- Hong Li (2012)
- Kuen Bao Li (1997)
- Ming Li (2018)
- Rong Li (1995; 1997; 1998; 2001)
- Hartmut K. Lichtenthaler (2015; 2016)
- Nianyun Lin (1997)
- Xinyu Liu (2018)
- Stephen (Steve) P. Long (2005)
- George Lorimer (2016; 2017)
- Pirkko Mäenpää (1995; 1997)
- Tirupathi Malavath (2015)
- Alize ´e Malnoe (2015)
- Mahir Mamedov (2015)
- Dominique Marcelle (2016)
- René Marcelle*** (1987)
(Govindjee and D. Marcelle, 2016)
- Norma Marchesini (2001)
- John L. Markeley (1984)
- Steve Marks (1978)
- Peter Maroti (1992; 2016)
- Paul Mathis (1979)
- Shizue Matsubara (2011; 2012)
- Leland Mayne (2012)
- Douglas C. McCain (1984)
- Victoria S.Meadows (2007)
- Henri Merkelo (1969;1972;1975;1978;1979;1981)
- Johannes Messinger (2009; 2010; 2018)
- Mamuro Mimuro*** (1998)
- Jun Minagawa (1998;2008)
- Teresa Miranda (1995)
- Tihana Mirkovic (2017)
- Anamika Mishra (2016; 2018)
- Kumud B. Mishra (2016; 2018)
- Amarendra M. Misra (2017)
- Atefeh Nemati Moghaddam (2012; 2013)
- Sasmita Mohanty (2016)
- Gary Moore (2012)
- John Mullett (1989)
- Paula Mulo (1997; 1998)

- Norio Murata (1983; 1998; 2014)
- Neti R. Murty (1967)
- Jason Musick (2013)
- J. Dirk Naber (1993)
- Victor Nadtochenko (2015)
- Sushma Naithani (2018)
- Mohammad Mahdi Najafpour (2011-2014)
- Herbert (Herb)Y. Nakatani (1984)
- Ladislav (Lada) Nedbal (2003; 2007; 2009; 2012)
- Sreedhar Nellaepalli (2015)
- Kärin Nickelsen (2011; 2012)
- Arthur M. Nonomura (2016; 2017)
- Constance G. Nozzolillo (2007)
- Michael P. O'Neil (1992)
- Hector Ocampo-Alvarez (2013)
- Dieter Oesterhelt (1992)
- William (Bill) Ogren (1984, 1989)
- Nir Ohad (1992)
- Vello Oja (2003)
- Larry Orr (1998; 2001; 2007; 2010; 2013: of "Photosynthesis and WWW" fame)
- Donald (Don) R. Ort (1987; 1991; 2005; 2015; 2016)
- Evgeny E. Ostroumov (2014; 2017)
- Olga v. H. Owens (1963)
- Sean Padden (2008)
- Subhash Padhye (1980;1986)
- Himadri Pakrasi (1989)
- Shiv S. Pandey (2012)
- Dominick J. Paolillo (1974)
- P. Pardha-Saradhi (2015; 2017)
- Ashwani Pareek (2009; 2018; 2019)
- Saya Patil (1998)
- Gopal K. Pattanayak (2012)
- Michael (Mike) Pellin (1979)
- Shahnaz Perveen (2018)
- Wil R. Peters (2002)
- Brigetta Peteri (1990;1995)
- Klaus Pfister (1981;1992)
- Roman Y. Pishchalnikov (2013)
- Vladimir O. Popov (2017)
- Robert (Bob) J. Porra (2007)
- Archie R. Portis Jr. (2006; 2007; 2012)
- Ondrej Prašil (2008; 2009; 2012; 2017)
- Christopher Preston (1989; 1990)
- Roger C. Prince (2015; 2016)
- M.P.J. (Tinus) Pulles (1976; 2016)
- Hope Punnett (2011) [See Hagar *et al.* (2011) for a Tribute to **Tom Punnett***]
- Laura Punnett (2011)
- Sheng Qiang (2012)
- Mingnan Qu (2015; 2018)
- S. Rajan (1981;1983)
- Tadimeti Rajarao (1955; 1956)
- Ravi Rajwanshi (2010)
- Silvia Ramundo (2017)
- Fabrice Rappaport***(2015)
- Constatin (Tino) A. Rebeiz (1980)
- Kevin Redding (2017)
- Vanga S. Reddy (2012)
- Gernot Renger*** (1977; 1983; 1985; 1993;1999) (Siggel *et al.*, 2016)
- Marvin Rich (2010)
- Galina Yu. Riznichenko (2014)
- Howie Robinson (1984;1989)
- Jean-David Rochaix (1991)
- Margarita V. Rodionova (2018)

- Robin Roffey (1994)
- Suzanne Marguerite Dethier Rogers (1988; 1989)
- J. C. Romijn (1977)
- Stuart Rose (2008)
- Guy Roy (1974)
- Cathy Royer (1993)
- Zsuzsa Rozsa (1988)
- Kang-Cheng Ruan (2000; 2001)
- Alexander B. Rubin (2014)
- Felix A. Ruiz (2001)
- Indumati (Indu) S. Rupassara, (2012; 2015)
- William (Bill) A. Rutherford (1984)
- Göran Samuelsson (2018)
- Prafulla Chandra Vishnu (Raj) Sane (1977; 1981; 1984; 2014)
- Sathon Saphon (1979)
- Sudhir Sopory (1999; 2009)
- Neera Bhalla Sarin (2010)
- Shai Saroussi (2017)
- Kazuhiko Satoh (1986)
- Kimiyuki Satoh (1983)
- Sergei Savikhin (2011)
- Richard (Dick) Sayre (1994-1997)
- Gert Schansker (1997; 2001;2003)
- Lance C. Schideman (2012; 2015)
- Paul G. Schmidt (1975; 1976; 1978)
- Greg D. Scholes (2014; 2017)
- Beatrice Schwarz (1991)
- Barbora Šedivá (2012)
- Antigona Segura (2007)
- Michael (Mike) Seibert (1989; 1990; 1992; 1994-1997; 2010)
- Ted C. Selig (1984)
- Alexy Semenov (2015)
- Melih Sener (2010)
- Zdenek Sestak*** (2002)
(Naus *et al.*, 2009; Lichtenthaler, 2018)
- Nisha Shabnam (2015; 2017)
- Ashutosh Sharan (2018)
- Thomas (Tom) D. Sharkey (2000-2018)
- Anuradha Sharma (2015)
- P. Sharmila (2015; 2017)
- Jian-Ren Shen (2012; 2018)
- Yun-Kang Shen (1995; 1997; 1998; 2000; 2001)
- Louis A. (Lou) Sherman (2012)
- Dmitriy (Dima) Shevela (2011-2013; 2017; 2018)
- Hyunsuk Shim (1990)
- Vladimir (Vlad) Shinkarev (1993; 1997; 1998)
- Robert (Bob) Shopes (1987; 1989; 2007)
- Vladimir (Vlad) A. Shuvalov (2018)
- Yona Siderer (2018)
- Janet Siefert (2007)
- Ulrich (Uli) Siggel (1977)
- Abhay Singh (2012)
- Gauri Shankar Singhal*** (1969; 1972; 1999)
(Andley *et al.*, 2005)
- Sneh Lata Singla-Pareek (2018)
- William R. (Bill) Smith (1974; 1975)
- Jan Snel (1993)
- Neelam Soda (2018)
- Chris Somerville (1989)
- Hong -Yu Song (1997)
- Sudhir K. Sopory (1999; 2009)
- Martin H.Spalding (1984)
- Marc Spector (1980)
- Jobie C. Spencer*** (1966)
(<http://www.news-gazette.com/obituaries/2015-07-20/jobie-spencer.html>)

- Alaka Srivastava (1995;1998;1999; 2003)
 Shyam Lal Srivastava (2010)
 Nupur Srivastava (2014)
 William T. Stacy (1971);
 Kostas Stamatakis (1998;1999; 2016)
 Gábor Steinbach (2017)
Katherine (Kit) E. Steinback* (1981)
 Hans Ulrich Stilz (1992)
 Alexandrina (Sandra) Stirbet (1998; 2011; 2012; 2014-2016; 2018)
 Bruno Strasser (1998)
 Reto Jörg Strasser (1991; 1992; 1995; 1998; 1999; 2001; 2003; 2010; 2012; 2014; 2015)
 Dalibor Stys (2003)
 Shankar Subramaniam (1996; 1998)
 Rajagopal Subramanyam (2015; 2018)
 David J. Suggett (2008)
 Roger E. Summons (2016)
 Bengt Svensson (2008)
 Charles Swenberg (1971)
Laszlo Szalay* (1967)
 (Maróti, 1998)
 Mahmoud Amouzadeh Tabrizi (2012; 2013)
 Widmar Tanner (2018)
 Shinichi Taoka (1991);
Vidyasagar G. Tatake* (1977; 1981; 1984)
 (Sane and Phondke, 2006)
 Alison Telfer (2007)
J. Philip (Phil) Thornber* (1972)
 (Cogdell, 1996)
 Giovanna Tinetti (2007)
 Swati Tiwari (2014)
Miklós Török* (1967)
 Tatsuya Tomo (2014; 2016; 2017)
 Stephen Toon (1992)
 Baishnab Charan Tripathy (2012; 2014; 2016)
 Merope Tsimilli-Michael (2010)
 Anatoly A. Tsygankov (2017)
 David H. Turpin (1991)
 Vijai Tyagi (2012)
 Esa Tyystjärvi (1995; 1998)
 Taina Tyystjärvi (1995)
 Otmar Urban (2018)
 Victor Vacquier (2016)
 Martin Van de Ven (1990; 1993)
 Hans J. Van Gorkom (1976)
 Rienk van Grondelle (2017)
 Imre Vass (1996)
 Claudie Vernotte (1979; 1990; 1995)
 Richard Wagner (1980)
 Hongru Wang (2018)
 Qing Jun Wang (2012)
 Xu-Tong Wang (1992)
 Joseph (Joe) Warden (1976)
 Mchael (Mike) R. Wasielewski (1987; 1989; 1990; 1995-1997)
 Harold G. Weger (1990)
 Alan Weidemann (2018)
 C. John Whitmarsh (2010; 2012)
 Jack Widholm (1988; 1989)
 Gary Wiederrecht (1994)
 Douglas (Doug) Winget (1980)
Colin A. Wraight* (1978; 1989; 1992; 1997)
 (Govindjee et al., 2015, 2016; Maroti and Govindjee, 2016)
 Chang-Peng Xin (2015)
 Chunlong Yang (2012)
 Ji-Yu Ye (2000)
 Christine (Chris) T. Yerkes (2016)
 Chunyan Yin (2012)
 Hyungshim Yoo (2007)

Hassan M. Younis (1979)
Hao Yu (1997)
Xin Jian Yu (1998; 2000)
Yong Yu (1998; 2000; 2001)
Nadezhda P. Yurina (2017)
Mohd. Aslam Yusuf (2010)
Sergey K. Zharmukhamedov (2018)
Xiao Hua Zeng (1997; 1998)
Guang-Yong Zheng (2018)
Yan Zhou (2012; 2015)
Xiaocen Zhu (2018)
Xin-Guang Zhu (2005; 2015; 2017; 2018)
Yong Zhu (1992)
Wolfgang Zinth (1992)
Marek Zivcak (2014)
Krystyna Zuk-Golaszewska (2011, 2012)
Nicholas (Nick) Zumbulyadis (1975, 1976)

EPILOG

My Family

I end this “Letter” by remembering (from early days in Allahabad till I came to Urbana in 1956) a large number of wonderful teachers and friends (without naming them), and my father (*Vishveshwar Prasad; he had passed away when I was a eleven year old boy), mother (*Savitri Devi), elder brothers (*Krishnaji & *Gopali), elder sister (*Malati Sahay), sisters-in-law *Bimla (wife of *Krishnaji) & Nirmala (wife of *Gopalji), and brother-in-law* Radha Krishna Sahay (husband of *Malati), who supported me when I was growing up in Allahabad, India (see Govindjee, 2007; Govindjee and Srivastava, 2010).

However, during most of my professional life in Urbana (since 1957- till now), I owe my life and ability to work primarily to my wife Rajni and our family (daughter Anita, son-in-law Morten Christiansen and their daughter Sunita; son Sanjay, daughter-in-law Marilyn, and their sons Arjun and Rajiv). (See Ebrey (2015) for a wonderful article on Rajni; and Ravi Sharma’s web site on both of us: <https://www.linkedin.com/pulse/govindjee-rajni-confluence-photosynthesis-dr-ravi-sharma>)

Photosynthesis group at UIUC

What has been crucial and important for my continued interest and excitement in photosynthesis research is the comradery of the “Photosynthesis Gang” at UIUC that has included (in no particular order) the following: Charles (Charlie) Joel Arntzen; Christiaan (Chris) Sybesma; Donald (Don) Richard Ort; Colin A. Wraight*, C. John Whitmarsh; William (Bill) Ogren; Anthony (Tony) Crofts; Constantin (Tino) Rebeiz; Archie R. Portis; Stephen (Steve) Long; Carl Bernacchi; Elizabeth (Lisa) Ainsworth; and Andrew Leaky. Amongst these, Tony Crofts and I have collaborated the most; Bill Ogren and I taught a course together; John Whitmarsh and I wrote educational articles together; and Colin Wraight and I discussed almost everything related to our academic life. I always rely (and relied) on Don Ort’s opinions on most things. He even interviewed me for the Annual Reviews Inc

<https://www.youtube.com/watch?v=cOzuL0vxEi0>.

Also see an interview, in India, by Rajya Sabha TV for EUREKA at:

<https://youtube/OBKusHcjMzw>, as well as a short article by Ananya Sen at:

<https://mcb.illinois.edu/news/article/512/>.

At the end, I wish to mention Rudolph (Rudy) Marcus, who was on the faculty in the Chemistry Department at UIUC, when I had the privilege of having him attend all my lectures on *Bioenergetics of Photosynthesis*, I learned a lot from him from the questions he asked during and after almost all my lectures; he taught me a lot. I was thrilled beyond any imagination when he received the 1992 Nobel Prize in Chemistry.

Acknowledgments

I am highly grateful to many around the World (see footnote 1 on page 81) who hosted me during my visits to their laboratories, whether it was a short or a long visit. Since the list is too long, and I am sure to miss many, I decided to thank them all without mentioning any names. However, I want to remember the hospitality of many who are no more; this includes: Warren Butler*, Lou Duysens*; Stacy French*; Bessel Kok*; Hartmut Metzner*; Prasanna Mohanty*; Gernot Renger*, Gauri Shankar Singhal*; and Jan B. Thomas*.

Any letter of thanks of any kind will be incomplete without mentioning the kindness of Julian Eaton-Rye who has remembered me, in great depth, at my 75th, 80th and 85th birthday (Eaton-Rye 2007a, 2007b, 2012, 2013, 2018, 2019; also see Soni, 2018; and Soni and Kaur, 2018). The last and not the least is the constant support of the past and the present Heads, the faculty members, and the staff of the Department of Plant Biology (Botany in earlier days),

Department of Biochemistry, and the Center of Biophysics & Quantitative Biology, as well as all the current and the past members of the Office of Information Technology in the School of Integrative Biology (SIB) & of Molecular & Cell Biology (MCB). Last, but not the least to thank are the plants around us (Figures 1 and 2), algae and Cyanobacteria. I end my “thank you” article with selected quotes from the past (Appendix 1).



Figure 1. A photograph of trees, doing photosynthesis, Key Largo, Florida. January 1, 2019, day time; photo by Govindjee



Figure 2. A photograph of trees, still doing photosynthesis, but at lower rates, in Key Largo, Florida. January 1, 2019, sunset time; photo by Govindjee

Appendix 1

Some selected quotes of general interest, arranged by the year of birth of the author cited.

Quintus Horatius Flaccus (Horace) (65BC-8BC): ‘When I find a bit of leisure, I trifle with my papers. This is one of the lesser frailties.’

Andrew Marvell (1621–1678):

*‘No white nor red was ever seen
So amorous as this lovely green.
Fond lovers, cruel as their flame,
Cut in these trees their mistress’ name:
Little alas! they know or heed
How far these beauties her exceed!
Fair trees! Where’er your barks I wound,
No name shall but your own be found.’*

Jonathan Swift (1657–1745): ‘And he [the King of Brobdingnag] gave it for his opinion, that whoever could make two ears of corn, or two blades of grass to grow upon a spot of ground where only one grew before, would deserve better of mankind, and do more essential service to his country, than the whole race of politicians put together.’

Jan Ingenhousz (1730–1799): ‘I observed that plants not only have a faculty to correct bad air in six to ten days, by growing in it...but that they perform this important office in a complete manner in a few hours; that this wonderful operation is by no means owing to the vegetation of the plant, but to the influence of light of the sun upon the plant.’

Johann Wolfgang von Goethe (1749–1832): ‘Everything reasonable has been thought of before. We just have to try to think it once anew.’

Samuel Taylor Coleridge (1772–1834): ‘The tree is more valuable than its fruits. The intellect itself –

has it evolved? The methods of discovery, the mental experiences, the hidden mechanism of intuition – have they not remained somewhat the same?’

Ralph Waldo Emerson (1803-1888): ‘Do not go where the path may lead, go instead where there is no path and leave a trail.’

James Prescott Joule (1818–1889): ‘The scientist must be humble, diligent, energetic, patient, and zealous. The first object of natural science is to elevate humanity in the scale of creatures, and the second is to promote well being.’

Ernst Waldfried Josef Wenzel Mach (1838-1916): ‘It is hardly possible to state any truth strongly without apparent injustice to some other.’

Wynwood Reade (1838-1875):

*‘Glorious Apollo is the parent of us all.
Animal heat is solar heat;
A blush is a stray sunbeam;
Life is bottled sunshine,
and Death the silent-footed butler
who draws out the cork’*

Albert Einstein (1879–1955) : ‘I am enough of the artist to draw freely upon my imagination. Imagination is more important than knowledge. Knowledge is limited. Imagination encircles the world.’

Chandrasekhara Venkata Raman (1888-1970): ‘Ask the right questions, and nature will open the doors to her secrets’; ‘Success can come to you by courageous devotion to the task lying in front of you.’

¹ During my academic career, I have interacted with scientists from a large number of countries, and this has certainly enriched my life. My list of countries includes: Australia; Azerbaijan; Belgium; Canada; China; Czech Republic; Egypt; Estonia; Finland; France; Germany; Greece; Hungary; India; Iran; Iraq; Israel; Italy; Japan; Korea (South); Mexico; Netherlands; New Zealand; Pakistan; Poland; Romania; Russia; Slovakia; Spain; Sweden; Switzerland; Taiwan; Tunisia; Turkey; UK (England and Scotland); and, USA.

C. Stacy French (1907–1995; see Govindjee and Fork, 2006): ‘In early 1928, a few lectures on photosynthesis by Robert Emerson, who had recently returned with a PhD from Otto Warburg’s laboratory in Berlin, got me interested enough to take Emerson’s course on photosynthesis the following year, and I have stayed with the subject ever since.’

May Sarton (1912–1995) : ‘...unable to disentangle truth from its web of prejudice. Discoveries are evanescent, because they are soon replaced by better ones. Discoveries may be important, but personalities are infinitely more so.’

Martin Kamen (1913–2002; see Govindjee and Blankenship, 2018): ‘Bone-tired and red-eyed, I shut down the machine, rescued the remaining fragments of carbon target, which resembled so many bits of intensely radioactive bird gravel, and shambled over to the ramshackle hut in which [Dr] Samuel Ruben, my collaborator, worked and would be appearing shortly. These precious bits of discouraged graphite hopefully contained evidence for the existence of a long-lived radiocarbon form of carbon.’

Andre Jagendorf (1926–2017; see Govindjee, 2017): ‘I had heard Peter Mitchell speak about chemiosmosis at a bioenergetics meeting in Sweden. His words went into one of my ears and out the other, leaving me feeling annoyed that they allowed such a ridiculous and incompetent speaker in. But Geoffrey (Hind) read Nature. During the discussion, it occurred to us that we might be able to see the pH in the medium rise during light driven electron flow. I stayed in the lab late the same evening and watched the needle of the pH meter rise in the light and fall in the dark. It was the first time I remembered an immediately successful test of a working hypothesis—it was fun.’

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