#### For Govindjee\* Who turned 90 on October 24, 2022 Presented by Rita Khanna (RK) and Barbara Zilinskas (BAZ)

Five different shots of the Zoom meeting held on June 14, 2023, is at the end of this presentation

\* Govindjee has changed his name to Govindjee Govindjee to confuse us all



We present several photographs ofour "photosynthesis gang" from UIUC; also included are some lattars from the nast — of





"A teacher affects eternity; he can never tell where his influence stops."- Henry Adams



#### Govindjee's mentor: Eugene Rabinowitch

Govindjee G, Papageorgiou GC and Govindjee R (2019) Eugene I. Rabinowitch: A prophet of photosynthesis and of peace in the world. Photosynthesis Research 141(2): 143-150. : DOI 10.1007/s11120-019-00641-



Thanksgiving Day, 1974: Two very nice pictures of Barbara Zilinskas (white top) and Rita Khanna (orange top) doing an experiment together – with happiness on their faces. They wrote: "While most were enjoying Thanksgiving turkey, we two hardworking students were busy doing experiments."



# 1974-1975

Govindjee's Graduate Level Biophysics of Photosynthesis Class, ~ 1975

**Sitting:** Extreme right (front row): Daniel Wong; in the very back in the center (with beard and glasses): Ralph Schooley. In the 4<sup>th</sup> row on the extreme right is Tom Wydrzynski (?), and on the 3<sup>rd</sup> row (on the left) is Paul Armond, whereas Shirley Chan is 2<sup>nd</sup> from the right, and just behind ber is Ron Johnston (only part of his face is seen). [Thanks to R.Schooley and D.Wong for some of the names. ]

The facial expressions of the students gives the impression that Govindjee had just announced a "surprise quiz". He, however, says: "Not really - maybe they were surprised at the personal stories I was telling them about some of the top scientists!"

# Who will be in-charge when Govindjee will be on sabbatical?

"I asked my students if they wanted me to put any faculty member as in-charge of the lab--they said they will take care of themselves! They can get signatures etc from CJA [Charles J. Arntzen] or Colin Wraight ! Tom Wydrzynski will be in-charge of the Lab among the students since everyone likes him......"-- Govindjee



#### A photograph of Tom Wydrzynski

Tom looks very happy, and he has both of his feet up on the desk. He was in-charge of the Lab when Govindjee was on his sabbatical in Europe.

BAZ noted "Tom ran a tight ship that year. The students couldn't wait for Govindjee to return from sabbatical."

- From Bombay, India, 1975 October 10, 1975
  - To: Rita Khanna

"We are doing well. I am not working hard, and I am concerned about it. Perhaps, I need someone to tell me that I should. I am eagerly waiting to start experiments in Bombay (BARC - with P.V. Sane). I plan to look at "afterglow" in photosynthetic bacteria under condition of triplet accumulation."—Govindjee

## **October 10, 1975**

#### A letter from Govindjee about the research of some of his graduate students

"David VanderMeulen has success (a short note has been accepted by FEBS Letters; no protein fluorescence data were included) with his epsilon( $\varepsilon$ )-ADP and CF work:  $\varepsilon$ -AMP does not bind with CF, but ε-ADP and ε-ATP do. Mg<sup>2+</sup> is slightly better than Ca<sup>2+</sup> and both are much better than K<sup>+</sup>. Presence of phosphate reduces the binding of ε-nucleotides. Such a binding study has been extended to measurement of CF itself by looking at tyrosine fluorescence, and the data are consistent with  $\varepsilon$ - fluorescence data. Thus, David should have a good story by November when he takes his final examination. He already has an offer of postdoc position with [Jerry] Brandt at Johns Hopkins, as you know."

#### **October 10, 1975** A letter from Govindjee about the research

• "Rita Khanna is busy with her math and physical chemistry courses, teaching Biology 100 and learning to make LHPP, TSF II a, HiP700 particles, etc. She has not yet decided upon her thesis problem, but I hope that she will have some notion by the end of this semester. [I am not quite sure which one(s) she is concentrating on at this moment.] Her bicarbonate work done with Tom – no effect of bicarbonate on silicomolybdate system, but clear effect on DADox, DBMIB system proving biochemically that the site of bicarbonate action is between Q [Q<sub>A</sub>] and the PQ [pool] – will be completed by the end of this semester and ready for publication as a Letter. " [It was published as a regular paper.]

#### October 10, 1975 A letter from Govindjee

• "Paul Jursinic has completed the bicarbonate story by looking at DLE (Delayed Light Emission, microsecond region) also. The story is clear: Bicarbonate is needed for the flow of electrons out of  $Q_A^-$ . He is preparing a paper for Photochem & Photobiol. He has been able to borrow a laser from [someone in] Chemistry. Thus, he is now setting up his fast **DLE** instrument where the 'Emerson machine' was – which has been moved into a corner. Finally, he has written his thesis proposal. Tom Wydrzynski has also written his thesis proposal. I have looked at both the proposals and have given them back with lots of suggestions."

#### **October 10, 1975** A letter from Govindjee (continued)

"Tom Wydrzynski & Paul Jursinic intend to appear for their Prelims in November. Tom's first paper on NMR relaxation studies has been submitted to BBA; it shows that this method can monitor membrane-bound manganese. He is writing his second NMR paper for PNAS: it shows oscillations, with flash number, in water proton relaxation rate (proportional to manganese states, we believe); this oscillation has a period of four and it damps out confirmed now in six experiments. Our ABOVE data are consistent with the idea that manganese IS the charge accumulator for oxygen evolution. This is the best work of our laboratory this year."

## **October 10, 1975**

#### A letter from Govindjee about the research of some of his graduate students ( continued)

. Ralph Schooley hopes to write a paper on his C.D. work and complete a portion of the fluorescence review he has been writing for me. We can then give him a M.S. in Biophysics. There is a small possibility that he will stay if he gets motivated to work (i.e., do the suggested experiments—actually, very obvious ones).

## October 10, 1975

#### A letter from Govindjee about the research of some of his graduate students ( continued)

**"Daniel Wong has tested his instrument with known dyes and has just confirmed**  $\bullet$ Ted Mar's DCMU data as well as John Whitmarsh & Paul Levine's data on wavelength dependence of the DCMU effect. He is ready to begin his experiments. In 2 weeks he should obtain enough preliminary new data to appear for his Prelims—also before I leave for India. His thesis will deal with orientation of pigments and energy transfer among various pigment systems as studied by polarization of fluorescence. I hope he will include the phycobilisome work."

### Words of wisdom from the mentor (Govindjee) to a beginning faculty (in USA)

- If you are an assistant professor, you need to publish your work—publish as many good papers in refereed journals as possible and as early as possible (Of course, don't publish 'half-baked' stuff. You could collaborate with people and get more done too. .....
- I believe your personality has a lot to do with your success. How much interest you take in research, how cooperative you are and how flexible you are?
- I don't know what one calls "dirty politics". The "human factor" is often neglected. Quite often, 'dirty politics' is nothing else but the 'human factor'!"

#### What follows is a small section of one of Govindjee's letters to Tom Wydrzynski sent from The Netherlands

Note by Barbara Zilinskas

"Govindjee's students always listen to and heed his every word! Tom still has all those letters/Tom had shared (with me) one of the eleven letters he had received from Govindjee - dated March 17, 18 & 20; April 2, 5, 10, 21 & 27, and May 3, 9 & 14, 1976]."

## Leiden, April 27, 1976

**"Dear Tom:** 

(1) Enclosed please find some scribblings for a report for the 'Biomedical Grant' of last year—it must be written up [very brief, of course], typed and given to Dr. [Joe] Larsen. A similar report will be needed later for the URB [University Research Board].

(2) Enclosed please find abstract copies for the Rome meeting. If there are errors, please let me know."

**April 27, 1976** -- The letter to Tom Wydrzyski (continued) (3) It is now clear that first few [light] flashes are different, and one explanation is to suggest :  $S_1 \rightarrow S_2 \rightarrow S_3$  [ after 1<sup>st</sup> and 2<sup>nd</sup> flash], but the 3<sup>rd</sup> flash takes it to  $S_4$ , which for chemical purposes (reasons) is good enough to evolve oxygen. These states should not be confused with other [similarly written] states –[this] simply means that in complete darkness "Mn-containing enzyme" is in a slightly different conformation state and acc (access?) of water may be different.

(4) One must use a dye that gives "green light", and then you should get the most effect with thick suspensions of chloroplasts. Since you will be leaving Urbana next year, I want you to train someone so that this research may continue.."

## **July 24, 1976**

A selected part of a letter from Govindjee to Barbara Zilinskas

"Tom Wydrzynski's studies (presented at Gordon Conference, partially!) locate the site of bicarbonate effect between "Q" [Q<sub>A</sub>] and PQ [plastoquinone 'pool']. Paul Jursinic's paper is almost ready for submission to BBA. Rita Khanna's and Tom Wydrzynski's papers may be ready by January after a few more experiments. The bicarbonate problem is also being taken up by Norman Good in spite of "discouraging statements" from some famous people who don't understand or care to understand its importance. [Only the inexperienced pay attention to this.] I can only hope that Rita will be wise enough not to give this problem up! [I know she is really bright]. We have discussed several new experiments."

### July 24, 1976 – letter continued

"I already wrote about Tom Wydrzynski's success. His first NMR paper will be out in December 11, 1975 issue of BBA as I wrote to you earlier. The PNAS paper is still being worked at, but I hope it will go to press by the end of 1975. As I wrote to you, Tom passed his Prelims with flying colors. Paul Jursinic had no trouble at all – the fastest decision to pass him was made in [by] his committee. In Tom's Exam, it was said that he did much better than PhD students in biochemistry. In Paul Jursinic's exam, Gregorio Weber said "Hand me the card [to sign]- the guy knows what he is doing". There was no further discussion."



Letter from Govindjee, to Barbara Zilinskas (continued)

# Daniel Wong's work has picked up steam—he has new ideas and excellent results on "p" of salt effect (not reported at Am. Photobiol. Conference in Denver). I presented this data at an international symposium on excitation energy in condensed matter in Prague, Czech Republic. Only other *in vivo* person invited besides me was PAILLOTIN from France. Others presented work on *in vitro* systems. Prof. K. Vacek, Head of Chemical Physics at Prague, is coming to work with us in Urbana, in September for 6 months.
# Rita Khanna's work is going on slowly. She did all the experiments on PQ

(including "R") in Berlin. I have a grant, at least, to give everyone a research assistantship

# **July 24, 1976**

From Govindjee, to Barbara Zilinskas (continued)

\*I have written up the draft of our Leiden paper (Govindjee, Pulles, R. Govindjee and Duysens) and the data from Berlin has not yet been given to me! They did not even give me xerox copies; they said they will mail it to me after writing the details on it. I hope to receive these by September.

\*At Urbana, Tom W.'s work has received good attention. Am Chem Soc has invited Tom to give his talk at a symposium. In the Fall of 1977, Tom is going to Ken Sauer as a NSF Postdoc. Paul [J] is getting exciting and excellent results on fast DLE. David V's work is progressing. He, again, has obtained a postdoc position. All three should finish in 1977.



#### Letter from Govindjee, to Barbara Zilinskas : About research

\*Bombay: discovered a new TL (thermoluminiscence) peak in PS bacteria due to porphyrins; made a systematic investigation of chloroplast TL—several of [Raj] Sane's earlier ideas will have to be modified. Some of [Walter] Bertsch's and other's work will have to be corrected.

\*Leiden: Minus bicarbonate sample does not have DCMU- induced oscillations by 2 due to "R" 100 msec fluorescence; after  $3^{rd}$ ,  $4^{th}$  etc flashes (vs, 1st,  $2^{nd}$  flashes) is high in minus bicarbonate than in plus bicarbonate samples etc etc- $\rightarrow$  all data lead to one conclusion: the largest block due to the absence of CO<sub>2</sub> is between "R" and PQ.

\*Berlin: Minus bicarbonate samples show a 100 msec decay of "PQ" oxidation; here, only "R" (which is also a PQ) is being measured, X-320 and Q data are identical., Thus, X-320=Q.

# **1977: Greece**



A group photograph of an international photosynthesis gang in Spetses, Greece, 1977

Clockwise from the bottom left: Govindjee (dark black hair); James (Jim) Barber; Ismael Moya; Hans Rurainski, or Peter Horton (?); Alfred Holzwarth (?); and Jean-Marie Briantais<sup>+</sup> --discussing the structure and function of Photosystem II.

We thank John Allen and Yaroslav de Kouchovsky for their help in recognizing those present



## 1977-1978

A photograph of Rita Khanna (holding 'Brandy' – Rajni & Govindjee family dog) with Govindjee (extreme left) and Prasanna Mohanty (in the middle)

Photo taken in the back of Rajni and Govindjee's home (at 1101 McHenry Street, in Urbana, Illinois), where we also had our regular Lab meetings on our research in photosynthesis.

## November 9, 1979

To: Rita (Dr. R. Khanna), from: Govindjee (with his signature) Only the P.S. to this letter follows

• You have come a long way since Eugene Rabinowitch wrote his book [Photosynthesis (Volume I (1945), Volume II, Part 1(1951) & Volume II, Part 2 (1956))

- See pp. 69-78 (for chemicals in solution experiments); pp. 281-298 (for theory of  $O_2$  evolution in photosynthesis)
- It is still possible that we/you can still learn about O<sub>2</sub> system from these pages (see above); also see CO<sub>2</sub> ←->H<sub>2</sub>O equilibrium on pp. 173-179 (your note: p.198)
- You may also like to read about the early work on phycobilins: see pp. 476-479 & p. 557

## November 9, 1979

To: Rita (Dr. R. Khanna), from: Govindjee (with his signature) P.S. to this letter continues

- The present copy is of "historical value"; it was purchased by Bob Emerson on PS Indirect Funds; then, it was on Rabinowitch's desk; when he left Urbana, he gave it to me. I pasted Eugene's picture (taken when he received the Kalinga Prize in Paris, I believe).
- It is yours now. I draw your attention to the First Eight Quanta Hypothesis (i.e., the 2 light reaction hypothesis) see pp. 160-162.

# In the late

Hope you had a great mother's day—We are in Ithaca, N.Y, -→ Today is Sunita's birthday !!

#### P.S. My life is still the same→ Writing and editing What else can I do- I know nothing else!

See: <u>https://www.life.illinois.edu/govindjee/recent\_papers.html</u>

Govindjee
• gov@illinois.edu



A 1981 photograph after Rita Khanna's graduation (attended by her Lab friends)

Left to right: Rita Khanna ( with her "hood"); Daniel Wong (with her gown); and Tom Wydrzynski (with her "cap"). Is this correct?





A 1983 group photograph of an International Photosynthesis Gang, of men, in Japan (women scientists were in another hot tub) ;women scientists were in another hot tub

Those present in the hot tub include from the left to the right (back row) : Pierre Joliot; Govindjee (smiling in front of Joliot); Gernot Renger+ (smiling); Louis N. **M. Duysens+; Yorinao Inoue** (in front of Duysens); **CharlieYocum; Yuasa San; Tony Crofts; ThomasWydrzynski**+(with moustache); and **Teruo Ogawa**(top back row, extreme right). **K. Asada** (with Glasses) is in front of Wydrzynski ; M. Kusunoki (smiling) is on the right of Asada; Richard Radmer is between Kusunoki San and Yamagishi San; also, Akio Yamagishi is in the center upfront of the photograph (he is in front of Inoue San); Takaaki Ono (extreme right in the photo) is on the left of Asada.

We thank Teruo Ogawa and Charlie Yocum for help with names.

One Happy Lab Family



Newport, Rhade Island

# 1986

A group photograph of Our Happy Lab Family (in Newport, Rhode Island)

Sitting: Left to Right : Paul Jursinic; Alan Stemler; Barbara Zilinskas and George Papageorgiou<sup>+</sup>. Standing : Left to Right: Govindjee and Prasanna Mohanty<sup>+</sup>

VII<sup>th</sup> International Congress on Photosynthesis, Providence, RI, August 10-15, 1986, organized by John Biggins, at Brown University, Providence, RI



Another group photograph of our Happy smiling Lab Family (in Newport, Rhode Island)

Sitting: Left to Right : Paul Jursinic; Alan Stemler; Barbara Zilinskas and Prasanna Mohanty<sup>+</sup>. Standing : George Papageorgiou

VII<sup>th</sup> International Congress on Photosynthesis, Providence, RI, August 10-15, 1986, organized by John Biggins, at Brown University, Providence, RI



The great master teacher **Prasanna Mohanty**<sup>+</sup>(on the right) and his "apprentice" Barbara Zilinskas, as she described herself in this photograph (taken in Newport, Rhode Island, **1986; for further** information, see the previous page)



InfrontofanIndianrestaurantinBerlin,Germany(1991)duringaresearch trip totheTechnicalUniversity in Berlin

Sitting: Left to Right: Thomas (Tom) Wydrzynski ; Govindjee; and Johannes Messinger, enjoying lunch, and hoping for good results in their different respective experiments in the afternoon. Tom was working with Gernot Renger; Johannes was a PhD student there; and Govindjee was a Visiting Scientist.



A group photograph of some of us from Urbana, Illinois, taken in Nagoya, Japan, 1992

Back row: Left (L) to right (R): Danny Blubaugh and George Papageorgiou<sup>+.</sup>

Front row: L to R: Julian Eaton-Rye; Govindjee; Thomas Wydrzynski<sup>+</sup>; and Prasanna Mohanty<sup>+</sup>




A group photograph of the Photosynthesis Gang from Urbana, Illinois, in Montpellier, France, 1995

Clockwise from the bottom center front: George Papageorgiou+(in striped shirt, with folded hands), Thomas (Tom) Wydrzynski+; Jack van Rensen; William (Bill) Coleman; Julian Eaton-Rye; Christa Critchley; Alan (Al) Stemler ; Danny Blubaugh; and Govindjee.



A group photograph at the 1999 retirement of Govindjee

Left to right: Thomas J. Wydrzynski; Alan Stemler; Jin Xiong; Teruo Ogawa (visiting scholar from Japan); Paul Jursinic; Maarib Bazzaz; Govindjee; Rita Khanna; Barbara Zilinskas; Jack Van Rensen (visiting scholar from The Netherlands) ; Irene Van Rensen; and Julian Eaton-Rye.



Left to right: Julian Eaton-Rye; **Thomas (Tom)** Wydrzynski; **Rita Khanna; Rajni Govindjee; G.** Govindjee; and **Barbara Zilinskas** 



Two good 'Photosynthesis' friends Govindjee and Robert (Bob) Blankenship-together in 1999-at the University of Illinois at Urbana- Champaign

# 1999, Govindjee's "Photosynthesis family"

1999

A part of Govindjee's 'photosynthesis family', gathered in 1999 Left to right: Rajni Govindjee; Julian Eaton-Rye; Alan Stemler; Govindjee; Rita Khanna; Barbara Zilinskas; Thomas (Tom) Wydrzynski; and Paul Jursinic



A photograph of most of the PhD thesis – submitted under the guidance of Govindjee—beginning from Carl Cederstrand through that of Jin Xiong, the one's with yellow color are that of Prasanna Mohanty and that of Daniel Blubaugh

# **2000s**

Left: The Big Sign for "Morrill Hall" – where most of the work mentioned in this presentation took place; for the "earlier gang" in Natural History Building, readers need to write to Govindjee. Right: Rita Khanna With the sign of NMR – recognizing Herb Gutowsky with whom she as well as Tom Wydrzynski worked

# NUCLEAR MAGNETIC RESONANCE HERBERT S. GUTOWSKY SHOWED THAT NUCLEAR MAGNETIC RESONANCE COULD BE USED TO ESTABLISH MOLECULAR STRUCTURE IDIFCULAR BIOLOGY, AND ME INTERITY OF ILLENCIS



# May 14, 2012

### Letter from Govindjee to Rita Khanna and Amar Bhattacharya

### **Dear Rita and Amar**

It was great to see Rita although for a very short time in Delhi. Anita and Sunita came over for 5 days and we went to Corbett Park & Agra (Taj Mahal). I taught "Photosynthesis" at JNU for 3 months. Also, we had a holiday in Bangkok & Hong Kong in April.

Rajni and I are grateful for the donation you have given for the G & RG Award. We honor these students by displaying their photos at my web site.

https://www.life.illinois.edu/govindjee/photooftheyear2022.html

Letter from Rita – congratulating Govindjee on his 90<sup>th</sup> birthday

"Dear Govindjee,

**Congratulations on your 90th birthday!** 

It is time to cherish all the special memories and past achievements; live to the fullest in the present and look forward to many more exciting adventures in the future. You have been blessed with your companionship with Rajni and the happiness you have been able to share with Anita (& Morten) and Sanjay (& Marilyn) and your grandchildren (Sunita; Arjun & Rajiv). Your contribution and distinguished career in the field of photosynthesis has been truly legendary—you are regarded as one of the pioneers in the field. I am sure the field has and will continue to benefit from your deep and seminal knowledge.

Letter from Rita –congratulating Govindjee on his 90<sup>th</sup> birthday (continued)

I feel privileged to have had the opportunity to do my graduate studies under your guidance and be part of your research team.

I am ever so grateful to you and Rajni for providing a home away from home when I first came to Urbana in 1974 and I cherish the warmth and friendship that you continue to extend to me and my family. Wishing you good health and many more years of fun with photosynthesis.

With love and gratitude

Rita"

### We ask Govindjee: Don't forget the following letter he wrote on December 3, 1998 – Barbara Zilinskas

**Dear Barbara:** 

The Irish proverb on your card deserves to be read each morning by both you and I (should it be me?): "Good laugh and long sleep are the best ones—" Also, both of us should remember to enjoy the flowers each day. OK?

Thanks for your card, good wishes & love. What got me into trouble is work-related selforganized and self-propelled extra work as if I was still up for promotion. I hope I have learned my lesson. I keep promising each day that I will change my life style.

Please do not work when it is not necessary. It is necessary to take life easy and to avoid being a perfectionist. Well, I am telling all this to myself too, So, it is not a lecture addressed to you.

This 90<sup>th</sup> birthday "message' booklet from Rita Khanna and Barbara Zilinskas, ends with:

> "Have you ever really had a teacher?" One who saw you as a raw but Precious thing, a jewel that, with wisdom, could be polished to a proud shrine? If you are lucky enough to find your way to such teachers, you will aways find your way back" " Tuesdays with Morrie Mitch Albom"

### In Memory of those who did PhD in Govindjee's Lab

**Carl N. Cederstrand : See:** Cederstrand L and Govindjee G (2022) Carl Nelson Cederstrand (1927-2022): A Biophysicist, an Innovator and a Wonderful Person. International Journal of Life Sciences 11(1): 1-7; DOI 10.5958/2319-1198.2022.00002.1

**George C. Papageorgiou: See:** Prásil O, Kana R and Govindjee G (2022) Special issue in honor of Prof. George C. Papageorgiou. Photosynthetica 60 (SI): 1-2; and Stamatakis K, Allakhverdiev SI, Garab G and Govindjee G (2016) Honoring George C. Papageorgiou Photosynthetica 54 (1): 158-160; DOI 10.1007/s11099-015-0183-5

**Frederick (Fred) Y-T. Cho: See:** Govindjee, Munday JC Jr and Papageorgiou GC (2017) Frederick Yi-Tung Cho (1939-2011): His PhD days in Biophysics, the Photosynthesis Lab, and his patents in engineering physics. Photosynthesis Reseasrch 132:227-234; DOI 10.1007/s11120-017-0391-x

### In Memory of those who did PhD in Govindjee's Lab: Maarib; Prasanna & Tom

Maarib D.L. Bakri Bazzaz: See: Govindjee G, Zilinskas BA, Brereton RG, Khanna R and Govindjee R (2020) A tribute to Maarib (Darwish Lutfi Bakri) Bazzaz (1940-2020): the one who proved the existence of "new" chlorophylls in plants. Plant Physiology Reports 25 (3):377-385; DOI 10.1007/s40502-020-00534-4

**Prasanna Mohanty: See:** Tiwari S, Tripathy BC, Jajoo A, Das AB, Murata N, Sane PV and Govindjee G (2014) Prasanna K. Mohanty (1934-2013): a great photosynthetiker and a wonderful human being who touched the hearts of many. Photosynthesis Research 122: 235-260; DOI 10.1007/s11120-014-0033-5

**Thomas (Tom) Wydrzynski: See:** Govindjee G, Khanna R and Zilinskas B (2018) Remembering Tom Wydrzynski (1947-2018), one who had the guts to go after what he wanted and excelled at it. Current Plant Biology 16: 2-8; DOI 10.1016/j.cpb.2018.10.003



The NMR Buddies: Tom Wydrzynski and Rita Khanna An artist included Govindjee Govindjee with Donald (Don) Ort & Steven (Steve) Long with two astronauts in 'The Final Frontier" cartoon for "Photosynthesis" (From the door on his office at the University of Illinois)



Zoom Meeting 5 S (June 14, 2023; 2 PM- 4PM) **Present were (alphabetically) :** Julian Eaton-Rye; FNU Govindjee; Rajni Govindjee; Paul Jursinic; Rita Khanna; Alan Stemler; David Vander Meulen; Willem (Wim) F.J. Vermaas; **Daniel Wong; and Barbara Zilinskas** 

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