OMB No. 0925-0001 and 0925-0002 (Rev. 10/2021 Approved Through 09/30/2024)

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.
Follow this format for each person. **DO NOT EXCEED FIVE PAGES.**

NAME: GROSSMAN, ARTHUR

eRA COMMONS USER NAME (credential, e.g., agency login): ARTHURG

POSITION TITLE: STAFF MEMBER (CARNEGIE INSTITUTION) & COURTESY PROFESSOR (STANFORD UNIVERSITY)

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
Brooklyn College	B.S.	06/1973	Biology
Indiana University	Ph.D.	09/1978	Plant Biology
The Rockefeller University	Post-doc	04/1982	Molecular Biology and Genetics

A. Personal Statement

I have been a Staff Scientist at The Carnegie Institution of Washington, Department of Plant Biology since 1982, and hold a courtesy appointment as Professor in the Department of Biology at Stanford University. I believe in working within a broad scientific context and developing a diversity of project that can be explored in more depth and scope and be used by postdoctoral fellows in the laboratory to help establish their own groups. The research that I do spans plant biology, microbiology, marine biology, ecology, genomics, engineering and photosynthesis and I have initiated large scale algal genomics projects; I was the lead on the Chlamydomonas genome project, which has had a extremely high impact on the field (Merchant et al., 2007 Science 318(5848):245-50.doi: 10.1126/science.1143609), and also developed the project to sequence the Porphyra genome with a steering committee of 5 investigators, including Susan Brawley who took the lead. I enjoy interacting with people in other disciplines, as can be seen by many of the people that I have developed collaborations with (including engineers, physicists and modelers). I also devoted significant efforts to establishing new and exciting projects with the support of Carnegie funds that I knew wouldn't be readily funded by granting agencies and interacted with industry to promote the biological/genetic/genomic aspects of their research programs (Phoenix Bioinformatics, Exelixis, Martek Biosciences, Solazyme/TerraVia, Checkerspot and Phycoil). Perhaps what I am most proud of is the group of postdocs and graduate students who have left my laboratory and have developed their own strong research programs at Universities and Research Centers including UC Berkeley, University of Toronto, North Carolina State University, UC Irvine, Georgetown, Indiana University, University of Konstanz, University of Western Ontario, Villanova University, Stony Brook and other Universities and industries throughout the world.

B. Positions, Scientific Appointments, and Honors

Positions and Employment

2021 Full Professor, Courtesy (from 2002)
2021 Carnegie Institution for Science, Dept Plant Biology (from 1982)
2015 Chief of Genetics, Solazyme/TerraVia (from 2007)
2000 Associate Professor, Courtesy (from 1989)
1989 Assistant Professor, Courtesy (from 1982)

Other Experience and Professional Memberships

2021 Co-editor-in Chief, Journal of Phycology (from 2012)
2021 Editorial Board, Current Genetics (from 2000)
2021 Advisory Board, Phycoil (from 2016)
2021 Advisory Board, Checkerspot (from 2016)
2021 Advisory Board, GEM Health (from 2020)
2021 Boyce Thompson Institute – Scientific Advisory Board (from 2014)
2021 Phoenix Bioinformatics – Advisory Board (from 2020)
2015 Review Panel for Genomics and Synthetic Biology Program, NYU, Abu Dhabi
2017 Steering Committee, University of Texas Culture Collection (from 2011)
2012 Editorial Board, Journal of Phycology (from 1997)
2009 Steering committee, Joint Genome Institute
2004 Editorial Board, Plant and Cell Physiology (from 2000)
2000 Scientific Advisory Board for the Wallenberg Consortium North (from 2000)
2000 Martek, Advisory Board (from 1993)
1987-93 Editorial Board, Plant Physiology
1985 Guest Editor Annu Rev Plant Physiology

Honors

2017 Edmond de Rothschild Chair Fellowship - Institut de Biologie Physico-Chimique, Paris
2017 Arnon Endowed Lecture – Berkeley
2014 Visiting Scientist International Scholar - Department of Life and Environmental Sciences, Università Politecnica delle Marche
2011 Recipient of Lady Davis Fellowship (Israel)
2009 Steering committee, Joint Genome Institute
2009 Recipient Gilbert Morgan Smith Medal (National Academy of Sciences)
2002 Darbaker Prize for work on microalgae (Botanical Society of America)
1992 Recipient-Nehru University, Dept of Biotechnology Fellowship
1977 Floyd Fellowship
1974-77 National Science Foundation Predoctoral Fellowship
1972 L. Whorley Award in Biology
1968-72 New York State Regents Scholarship Phi Beta Kappa

C. Contributions to Science

(Select Manuscripts; since 2019)

Algal Genomes and Symbiosis. This work has led to a better understanding of molecular adaptations that occurs when two organisms develop a symbiotic association and how the metabolisms of the organisms (especially photosynthetic metabolism) become modified and create an integrated, synergistic metabolic landscape. It has also revealed unusual packing of the genomic DNA in some of the symbiotic algae.

- Mashini, A.G., Oakley, C.A., Beepat, S., Peng, L., Grossman, A.R., Weis, V.M., Davy, S.K. (2023) The influence of symbiosis on the proteome of the symbiotic dinoflagellate Breviolum minutum. Microorganisms 11 (2), 292.
- Calatrava, V., Stephens, T.G., Gabr, A., Bhaya, D., Bhattacharya, D., Grossman, A.R. (2022) Retrotransposition Facilitated the Origin of a Primary Plastid in a Heterotrophic Amoeba. Proc Natl Acad Sci, USA, 119 (23), e2121241119.
- Marinov, G.K., Chen, X., Wu, T., He, C., Grossman, A.R., Kundaje, A., Greenleaf, W.J. (2022) The chromatin

organization of a chlorarachniophyte nucleomorph genome. Genome Biology, 23, 65. https://doi.org/10.1186/s13059-022-02639-5.

- Marinov, G.K., Trevino, A.E., Xiang, T., Kundaje, A., Grossman, A.R. Greenleaf, W.J. (2020) Transcription-dependent DNA supercoils determine the 3D organization of dinoflagellate genomes. Nature Genetics I 53(5):613-617. doi: 10.1038/s41588-021-00848-5.
- Xiang, T., Lehnert, E., Clowez, C., Pringle, J., DeNofrio, J.C., Grossman, A.R. (2020) Symbiont population control by host-symbiont metabolic interaction in Symbiodiniaceae-cnidarian associations. Nature Comm 11 (1) doi.org/10.1038/s41467-019-13963-z.
- Jinkerson, R.E., Russo, J.A., Newkirk, Kirk, A.L., Chi, R.J., Martindale, M.Q., Grossman, A.R., Hatta, M., Xiang, T. (2022) Cnidarian-Symbiodiniaceae symbiosis establishment is independent of photosynthesis. Current Biology, ISSN 0960-9822, https://doi.org/10.1016/j.cub.2022.04.021.

Field Code Changed

Chlamydomonas and Photosynthesis. We have identified specific proteins critical for the assembly of complexes of the photosynthetic apparatus, helped develop screens to identify novel functional components and key regulatory mutants in photosynthesis and have explored how light and nutrients impact photosynthetic processes. Understanding how metabolic processes and photosynthetic activities respond to both biotic and abiotic factors is important information for sustaining agricultural productivity in a rapidly changing environment.

- Huang, W., Krishnan, A., Plett, A., Meagher, M., Linka, N., Wang, Y., Ren, B., Findinier, J., Redekop, P., Fakhimi, N., Kim, R.G., Karns, D.A., Boyle, N., Posewitz, M.C., Grossman, A.R. (2023) Chlamydomonas Mutants Null for Chloroplast Triose Phosphate Transporter3 are Metabolically Compromised and Light Sensitive. **The Plant Cell**. doi: https://doi.org/ 10.1101/2022.07.25.501471.
- Vilarrasa-Blasi, J., Fauser, F., Onishi, M., Ramundo, S., Patena, W., Millican, M., Osaki, J., Philp, C., Kim, R., Nemeth, M., Salome, P., Li, X., Merchant, S., Grossman, A.R., Cutler, S., Pringle, J.R., Walter, P., Dinneny, J.R., Jonikas, M.C., and Jinkerson, R.E. (2022) Systematic characterization of gene functions in a photosynthetic organism. Nature Genetics. In Press. Nat Genet. doi: 10.1038/s41588-022-01052-9
- Ruiz-Sola, M.A., Flori, S., Yuan, Y., Villain, G., Sanz-Luque, E., Redekop, P., Tokutsu, R., Kueken, A., Tsichla, A., Allorent, G., Arend, M., Iacono, F., Finazzi, G., Hippler, M., Nikoloski, Z., Minagawa, J., Grossman, A.R., Petroutsos, D (2021) Photoprotection is regulated by light-independent CO_2 availability. **BioRxiv** 2021.10.23.465040; doi: https://doi.org/10.1101/2021.10.23.46504.
- Redekop, P., Sanz-Luque, E., Yuan, Y., Villain, G., Petroutsos, D., Grossman, A.R. (2022) Transcriptional regulation of photoprotection in dark-to-light transition – more than just a matter of excess light energy. **Sci Advances**. 3;8(22):eabn1832. doi: 10.1126/sciadv.abn1832.
- Nellaepalli, S., Kim, R.G., Grossman, A.R., Takahashi, Y. (2021) Interplay of four auxiliary factors is required for the assembly of photosystem I reaction center subcomplex. Plant Journal. Plant J. doi: 10.1111/tpj.15220.
- Sanz-Luque, E., Saroussi, S., Grossman, A.R. (2020) Metabolic control of acclimation to nutrient deprivation dependent on polyphosphate synthesis. Scientific Advances. Sep 30;6(40): doi: 10.1126/sciadv.abb5351.
- Saroussi, S., Karns, D., Thomas, D., Posewitz, P., Grossman, A.R. (2019) Alternative outlets for sustaining photosynthetic electron transport during dark to light transitions. Proc Natl Acad Sci USA 116(23):11518-11527. doi.org/10.1073/pnas.1903185116.

Engineering photosynthesis. Engineering the photosynthetic apparatus and developing technologies to better capture light energy, dissipate light energy (when appropriate) and develop bioinspired, mimetic systems will help us more efficiently generate 'green' energy and develop strategies for capturing CO_2 from the atmosphere. Aspects of this work are also leading to processing of biomass that is less energy intensive and that leads to reduced production of CO_2 during the processing.

- Halim, R., Hill, D.R.A., Hanssen, E.G. Webley, P.A., Blackburn, S, Grossman, A.R., Posten, C., Martin, G.J.O. (2019) Induction of autolytic cell-wall self-ingestion in lipid-rich Nannochloropsis under thermally coupled dark-anoxia incubation. Green Chemistry (Royal Society of Chemistry) DOI. 10.1039/C8GC03186J
- Kunz, L.Y., Redekop, P. Ort, D., Grossman, A.R., Cargnello, M., Majumdar, A. (2020) A Phytophotonic Approach to Enhanced Photosynthesis. Energy Environmental Science Vol. 13. DOI: 10.1039/d0ee02960b.