

David F. Gruber

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David Gruber is the Founder & President of Project CETI (Cetacean Translation Initiative), a nonprofit, interdisciplinary scientific and conservation initiative on a mission to listen to and translate the communication of sperm whales. He is a Distinguished Professor of Biology and Environmental Sciences at the City University of New York, Baruch College & The CUNY Graduate Center. His interdisciplinary research bridges animal communication, climate science, marine biology, microbiology, molecular biology and his inventions include technology to perceive the underwater world (“shark-eye camera”) from the perspective of marine animals. Dr. Gruber’s research led to the discoveries of the first biofluorescent sea turtle, more than 200 species of biofluorescent and bioluminescent organisms. His research group has identified and elucidated novel families of fluorescent molecules from eels, sharks, and corals. His long-standing collaboration with the Harvard Microrobotics Laboratory has led to the engineering of some of the gentlest and minimally invasive robots to better understand, interact with life in the deep ocean.

Professional Preparation

University of Rhode Island	Oceanography	B.S.	1991-1995
Duke University	Environmental Mgmt	M.E.M	1996-1998
Columbia University	Journalism	M.S.	2000-2001
Rutgers University	Biological Oceanography	Ph.D.	2001-2007

Honors

2020 TED Audacious Prize

Project CETI - Decoding the communication of whale with advanced machine learning and state-of-the-art robotics. <https://www.audaciousproject.org/grantees/project-ceti>

2019 Lagrange Prize – CRT Foundation

International recognition for complex systems science awarded for advancements “focused on the conservation of biodiversity, protection of resources and the safeguarding of ecosystems.”

Professional Appointments

2022-present	Distinguished Professor of Biology and Environmental Science, Baruch College, City University of New York & The CUNY Graduate Center, PhD Program in Biology & Macaulay Honors College
2020-present	President and Founder, Project CETI, New York, NY and Dominica
2022-2023	Associate, Harvard University, Harvard John A. Paulson School of Engineering And Applied Sciences
2017-2018	Radcliffe Fellow, Harvard University, Radcliffe Institute for Advanced Studies
2017-2022	Professor of Biology and Environmental Science, Baruch College, City University of New York, New York, NY
2014-present	Emerging Explorer, National Geographic Society, Washington DC
2016-present	Adjunct Associate Fellow, John B. Pierce Laboratory, Yale University School of Medicine, New Haven, CT
2009-present	Research Associate, American Museum of Natural History, Division of Invertebrate Zoology, New York, NY
2012-2017	Associate Professor of Biology and Environmental Science, Baruch College, City University of New York, New York, NY

- 2007-2012 Assistant Professor of Biology and Environmental Science, Baruch College, City University of New York, New York, NY
- 2007-2008 Post-doctoral associate, Division of Biology and Medicine, Brown University, Providence, RI
- 2002-2004 Lecturer, Tropical Marine Ecology, Rutgers University, Little Cayman Island, BWI
- 2001-2002 Lecturer, Marine Invertebrate Zoology, Duke University Marine Laboratory, Beaufort, NC
- 1999-2001 Marine Biologist, South Florida Water Management District, Key Largo, FL

Publications

- Burns JA, KP Becker, D Casagrande, J Daniels, P Roberts, E Orenstein, DM Vogt, ZE Teoh, R Wood, AH Yin, B Genot, **Gruber DF***, K Katija*, RJ Wood*, BT Phillips*. 2023. An integrated in situ digital synthesis strategy for the discovery and description of ocean life. *Science Advances* in review.
- Burns JA, **Gruber DF**, Gaffney JP, Sparks JS and MR Brugler. 2022. Transcriptomics of a Greenlandic Snailfish Reveals Exceptionally High Expression of Antifreeze Protein Transcripts. *Evolutionary Bioinformatics* 18:1-9.
- de Vargas C, Le Bescot N, Pollina T, Henry N, Romac S, Colin S, Haëntjens N, Carmichael M, Berger C, Le Guen D, Decelle J, Mahe´ F, Poulain J, Malpot E, Beaumont C, Hardy M, Guiffant D, Probert I, **Gruber DF**, Allen A, Gorsky G, Follows MJ, Pochon X, Trouble R, Cael BB, Lombard F, Boss E, Prakash M and the Plankton Planet core team. 2022. Plankton Planet: a frugal, Cooperative measure of aquatic life at the planetary scale. *Frontiers in Marine Science* 9:936972.
- Andreas J, Beguš G, Bronstein MM, Diamant R, Delaney D, Gero S, Goldwasser S, **Gruber DF**, de Haas S, Malkin P, Pavlov N, Payne R, Petri G, Rus D, Sharma P, Tchernov D, Tønnesen P, Torralba A, Vogt D and RJ Wood. 2022. Toward understanding the communication in sperm whales, *iScience* 25(6): 104393.
- Gruber, D.F.** and R.J Wood. 2022. Advances and future outlooks in soft robotics for minimally invasive marine biology. *Science Robotics* 7(66):eabm6807.
- Kvitt H, Malik A, Ben-Tabou de-Leon S, Shemesh E, Lalzar M, **Gruber DF**, Rosenfeld H, Shi T, Mass T and D. Tchernov and prolonged deoxygenation in the coral Stylophora pistillata. *Frontiers in Marine Science* 9, 999558.
- Verdes A, Álvarez-Campos P, Nygren A, San Martín G, Deheyn DD, **Gruber DF**, Holford M. 2022. Molecular phylogeny and evolution of bioluminescence in *Odontosyllis* (Annelida, Syllidae). *Invertebrate Systematics* 36, 622-630.
- Sparks, J.S., Chaloux, N., Schelly, B.C., **Gruber, D.F.**, Sparks, T.S., Phillips, B.T. 2021. Description of a New Species of Rariphotic Parapercis (Perciformes: Pinguipedidae) from the Solomon Islands, *American Museum Novitates*, 3987:1-12.
- Chaloux, N., Phillips, B., **Gruber, D.**, Schelly, R., & Sparks, J. 2021. A novel fish sampling system for ROVs. *Deep Sea Research Part I*. 167:103428

- Guarnaccia, A.M, Krivoshik, S.R., Sparks, J.S., **Gruber, D.F.**, and J.G. Gaffney. 2021. Discovery and Characterization of a Bilirubin Inducible Green Fluorescent Protein from the Moray Eel (*Gymnothorax zonipectis*), *Frontiers in Marine Science* 2021.678571
- Gruber, D.F.** and J.S. Sparks 2021. First report of biofluorescence in Arctic snailfishes and rare occurrence of multiple fluorescent colors in a single species. *American Museum Novitates* 3967:1-12.
- Hensley, N. M., Ellis, E. A., Leung, N. Y., Coupart, J., Mikhailovsky, A., Taketa, D. A., Tessler, M., **Gruber, D. F.**, De Tomaso, A. W., Mitani, Y., Rivers, T. J., Gerrish, G. A., Torres, E., & Oakley, T. H. 2021. Selection, drift, and constraint in cyprinid luciferases and the diversification of bioluminescent signals in sea fireflies. *Molecular Ecology* 30(8):1864-1879.
- Tessler, M., Gaffney, J.P.†, Oliveira, A.G., Guarnaccia, A., Dobi, K., Gujarati, N., Galbraith, M., Mirza, J.D., Sparks, J.S., Pieribone, V.A, Wood, R.W., **Gruber, D.F.†** 2020. A putative chordate luciferase from a cosmopolitan tunicate indicates convergent bioluminescence evolution across phyla. *Scientific Reports* 10, 17724.
- Dishon, G., Grossowicz, M., Krom, M., Guy, G., Gruber, D.F., Tchernov, D. 2020. Evolutionary Traits that Enable Scleractinian Corals to Survive Mass Extinction Events, *Scientific Reports*. 10:3903. <https://doi.org/10.1038/s41598-020-60605-2>
- Tessler M, Brugler MR, Burns JA , Sinatra NR, Vogt DM, Varma A, Xiao M, Wood R.J and **D.F. Gruber**. 2020. Ultra-gentle soft robotic fingers induce minimal transcriptomic response in a fragile marine animal, accepted, *Current Biology*. Feb 24 publication.
- Krivoshik, S.R., Guarnaccia, A.M., Fried, D.B., **Gruber, D.F.**, Gaffney, J.P. 2020. Disrupting Fluorescence by Mutagenesis in a Green Fluorescent Fatty Acid Binding Protein from a Marine Eel. *Protein J.* 1-7.
- Gruber, D.F** et al. 2020. The real and imminent extinction risk to whales, dolphins and porpoises: An open letter from [over 250] cetacean scientists.
- Bermant, P.C., Bronstein, M.M., Wood, R.J. Gero, S., **Gruber, D.F.** 2019. Deep Machine Learning Techniques for the Detection and Classification of Sperm Whale Bioacoustics, *Scientific Reports*. 9:12588.
- Sinatra, N.R., Teeple, C.B., Vogt, D.M., Parker, K.K., **Gruber, D.F.**, Wood, R.J. 2019. Ultra-Gentle Manipulation of Delicate Structures using a Soft Robotic Gripper. *Science Robotics*, 4(33):eaax5425.
- Gruber, D.F.**, Phillips, B.T., O'Brien, R., Boominathan, V., Veeraraghavan, A., Vasani, G., O'Brien, P., Pieribone, V.A., Sparks, J.S. 2019. Bioluminescent Flashes Drive Nighttime Schooling Behavior and Synchronized Swimming Dynamics in Flashlight Fish. *PLOS ONE*. 10.1371/journal.pone.0219852.
- Park, H.B., Lam, Y.C., Gaffney, J.P., Weaver, J.C., Krivoshik, S.R., Hamchand, R., Pieribone, V., **Gruber, D.F.†**, Crawford, J.M.† 2019. Bright-green biofluorescence in

sharks derives from bromo-kynurenine metabolism. *iScience*.
doi.org/10.1016/j.isci.2019.07.019.

- Phillips, B.T., Becker, K.P., Kurumaya, S., Galloway, K.C., Whittredge, G., Vogt, D., Teeple, C., Rosen, M.H., Pieribone, V.A., **Gruber, D.F.**, and R.J. Wood. 2018. A Dexterous, Glove-Based Teleoperable Low-Power Soft Robotic Arm for Delicate Deep-Sea Biological Exploration, *Scientific Reports*. 8:14779.
- Tessler, M., Gaffney, J.P., Crawford, J.M., Trautman, E., Gujarati, N.A., Alatalo, P., Pieribone, V.A. and **D.F. Gruber**. 2018. Luciferin production and luciferase transcription in the bioluminescent copepod *Metridia lucens*. *PeerJ* 6:e5506
- Vogt, D.M., Becker, K.P., Phillips, B.T., Graule, M.A., Rotjan, R.D., Shank, T.M., Cordes, E.E., Wood, R.J. and **D.F. Gruber**. 2018. Shipboard design and fabrication of custom 3D-printed soft robotic manipulators for the investigation of delicate deep-sea organisms. *PLoS ONE* 13(8): e0200386.
- Teoh, Z.E., Phillips, B.T., Becker, K., Whittredge, G., Weaver, J.C., Hoberman, C., **Gruber, D.F.** and R.J. Wood. 2018. Rotary-actuated folding polyhedrons for midwater investigation of delicate marine organisms. *Science Robotics*, 3, eaat5276.
- Kurumaya, S., Phillips, B.T., Becker, K.P., Rosen, M.H., **Gruber, D.F.**, Galloway, K.C., Suzumori, K., and R.J. Wood. 2018. A Modular Soft Robotic Wrist for Underwater Manipulation. *Soft Robotics*, 10.1089/soro.2017.0097.
- D.F. Gruber**, Phillips, B.T., Marsh, L., and J.S. Sparks. 2018. In situ Observations of the Meso-Bathypelagic Scyphozoan, *Deepstaria enigmatica* (Semaestomeae: Ulmaridae). *American Museum Novitates*, 3900, 1-14.
- Verdes, A. and **D.F. Gruber**. 2017. Glowing Worms: Biological, Chemical, and Functional Diversity of Bioluminescent Annelids. *Integrative and Comparative Biology*, doi.org/10.1093/icb/ix017, 1-15.
- Galloway, K.C., Becker K.P., Phillips, B., Kirby J., Licht S., Tchernov, D., Wood, R.J., **Gruber, D. F.** 2016. Soft Robotic Grippers for Biological Sampling on Deep Reefs. *Soft Robotics*. doi:10.1089/soro.2015.0019.
- Gruber DF**, Loew ER, Deheyn DD, Akkaynak D, Gaffney JP, Smith WL, Davis MP, Stern JH, Pieribone VA, Sparks JS. 2016. Biofluorescence in Catsharks (Scyliorhinidae): Fundamental Description and Relevance for Elasmobranch Visual Ecology. *Scientific Reports*. doi: 10.1038/srep24751.
- Phillips B, **Gruber DF**, Vasani G, Roman CN, Pieribone V, Sparks JS. 2016. Observations of in situ deep-sea marine bioluminescence with a high-speed, high-resolution sCMOS camera. *Deep Sea Research Part I: Oceanographic Research Papers*. 111:102-109.
- Phillips, B., **Gruber, D.**, Vasani, G., Pieribone, V., Sparks, J., & Pieribone, V. 2016. First Evidence of Bioluminescence on a "Black Smoker" Hydrothermal Chimney. *Oceanography*, 29(2), 1-2.

- Einbinder, S., **Gruber, D.F.**, Solomon, E., Keren, N., Tchernov, D. 2016. "Novel adaptive photosynthetic characteristics of mesophotic symbiotic microalgae within the reef-building coral, *Stylophora pistillata*." *Frontiers in Marine Science*. doi: 10.3389/fmars.2016.00195.
- Bhattacharya, D., S. Agrawal, M. Aranda, S. Baumgarten, M. Belcaid, J.L. Drake, D. Erwin, S. Foret, R.D. Gates, **D.F. Gruber**, B. Kamel, M.P. Lesser, O. Levy, Y.J. Liew, M. MacManes, T. Mass, M. Medina, S. Mehr, E. Meyer, D.C. Price, H.M. Putnam, H. Qiu, C. Shinzato, E. Shoguchi, A.J. Stokes, S. Tambutte, D. Tchernov, C.R. Voolstra, N. Wagner, C.W. Walker, A.P. Weber, V. Weis, E. Zelzion, D. Zoccola, and P.G. Falkowski. 2016. "Comparative Genomics Explains the Evolutionary Success of Reef-Forming Corals." *eLife* 5. doi:10.7554/eLife.13288.
- Gruber, D.F.** and J.S. Sparks. First Observation of Fluorescence in Marine Turtles. 2015. *American Museum Novitates*. 3845:1-8.
- Dishon, G., Fisch, J., Horn, I., Kaczmarek, K., Bijma, J., **Gruber, D.F.**, Nir, O., Popovich, Y. and D. Tchernov. 2015. A novel paleo-bleaching proxy using boron isotopes and high-resolution laser ablation to reconstruct coral bleaching events, *Biogeosciences*, 12, 5677-5687.
- D. F. Gruber**, J.P. Gaffney, S. Mehr, J.S. Sparks, J. Platisa, V.A. Pieribone. 2015. Adaptive Evolution of Eel Fluorescent Proteins from Fatty Acid Binding Proteins Produces Bright Fluorescence in the Marine Environment, *PLoS ONE*. 10(11): e0140972. doi:10.1371/journal.pone.0140972.
- Mehr, S.F.M., Verdes, A., DeSalle, R., Sparks, J., Pieribone, V. and **D. F. Gruber**. 2015. Transcriptome sequencing and annotation of the polychaete *Hermodice carunculata* (Annelida, Amphinomidae)", *BMC Genomics*, 16:445.
- Sparks, J. S., Schelly, R. C., Smith, W. L., Davis, M. P., Tchernov, D., Pieribone, V. A., and **D. F. Gruber**. 2014. The covert world of fish biofluorescence: a phylogenetically widespread and phenotypically variable phenomenon. *PLoS ONE* 9(1): e83259.
- Nir, O., **Gruber, D.F.**, Glasser, E., Shemesh, E. and D. Tchernov. 2014. Seasonal mesophotic coral bleaching of *Stylophora pistillata* in the northern Red Sea, *PLoS ONE* 9(1): e84968. doi:10.1371/journal.pone.0084968.
- Tchernov, D., Irwin, A. and **D. F. Gruber**. 2014. Isotopic fractionation of carbon in the coccolithophorid *Emiliana huxleyi*, *Marine Ecological Progress Series* 508:53-66.
- Olden, K., Lin, Y-S, **D. F. Gruber** and B. Sonawane. 2014. Epigenome: Biosensor of Cumulative Exposure to Chemical and Nonchemical Stressors Related to Environmental Justice, *American Journal of Public Health*, 104(10):1816-1821.
- Mehr, S.F.M., DeSalle, R., Kao, H-T, Narechania, A., Han, Z., Tchernov, D., Pieribone, V. and **D. F. Gruber**. 2013. De novo RNA-seq assembly and clustering of expressed proteins from uncharacterized corals, *BMC Genomics* 14:546.
- Sparks, J. S., **Gruber, D.F.** 2012. A new mesophotic clingfish (Teleostei: Gobiesocidae) from the Bahamas. *Copeia*. 2:251-256.
- Gruber, D.F.**, Mass, T., Tchernov, D. 2012. Symbiotic Transition of Algae-Coral Triggered by Paleo-Climatic Events? *Trends in Ecology and Evolution*, 27(4), 194-195.

- Nir, O., **Gruber, D.F.**, Einbinder, S. Kark, S., and D. Tchernov. 2011. Changes in scleractinian coral *Seriatopora hystrix* morphology and its endocellular *Symbiodinium* characteristics along a bathymetric gradient from shallow to mesophotic reef, *Coral Reefs*. 30:1089-1100.
- Ilagan, R. P., Rhoades, E., **Gruber, D. F.**, Kao, H.-T., Pieribone, V. A., and Regan, L. 2010. A new bright green-emitting fluorescent protein – engineered monomeric and dimeric forms. *FEBS J*. 277: 1967-1978.
- Kao, H.-T., Buka, S.L., Kelsey, K.T., **Gruber, D.F.**, Porton, B. 2010. The correlation between rates of cancer and autism: an exploratory ecological investigation. *PLoS One*. Feb 23; 5: e9372.
- Kuguru, B., Achituv, Y., **Gruber, D.F.** and D. Tchernov. 2010. Photoacclimation mechanisms of corallimorpharians on coral reefs: Photosynthetic parameters of zooxanthellae and host cellular responses to variation in irradiance, *J. Exp. Mar. Biol. Ecol.* 394:53-62.
- Gruber, D.F.**, DeSalle, R., Lienau, E.K., Tchernov, D., Pieribone, V.A. and H-T Kao. 2009. Novel Internal Regions of Fluorescent Proteins Undergo Divergent Evolutionary Patterns, *Molecular Biology and Evolution*. 26(12):2841-2848.
- Gruber, D.F.**, Kao, H.-T., Janoschka, S., Tsai, J., and V.A. Pieribone. 2008. Patterns of fluorescent protein expression in Scleractinian corals. *Biol. Bull.* 215:143–154.
- Gruber, D.F.**, Pieribone, V.A., Porton, B., Kao, H.-T. 2008. Strict regulation of gene expression from a high-copy plasmid utilizing a dual vector system. *Protein Expr. Purif.* 60:53-57.
- Kao, H.-T., Sturgis, S., DeSalle, R., Tsai, J., Davis, D., **Gruber, D. F.**, Pieribone, V.A. 2007. Dynamic regulation of fluorescent proteins from a single species of coral. *Mar. Biotechnol.* 9: 733-746.
- Gruber, D.F.**, Simjouw, J-P. Seitzinger, S.P. and G. L. Taghon. 2006. Dynamics and Characterization of Refractory Dissolved Organic Matter Produced by a Pure Bacterial Culture in an Experimental Predator-Prey System. *Applied and Environmental Microbiology* 72(6): 4184-4191.
- Pieribone, V., and **D. F. Gruber**. 2006. *Aglow in the Dark: The Revolutionary Science of Biofluorescence*. Harvard University Press, Cambridge, MA. 288 pp.

Patents

- D.F. Gruber**, Gaffney, J., and V.A Pieribone. 2018. Method for detecting bilirubin from a marine eel fluorescent protein. US Patent # US 9,952,227.
- Gruber, D.F.**, H.-T. Kao, and V.A. Pieribone. 2011. Isolated Australian Coral Reef Fluorescent Proteins and Cell-based Kinase or Phosphatase Platforms for Cancer Drug Development (PhosFluor™). International Patent PCT/US2010/049181, filed by CUNY.

Thesis Advisor and Postgraduate-Scholar Sponsor

PhD Thesis Advisor

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