

Maxim Y. Gorbunov, Ph.D.

Associate Research Professor

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EDUCATIONAL HISTORY:

- 1992** Ph.D. in Physics and Mathematics, Moscow State University. Ph.D. Thesis: *Diagnostics of Phytoplankton by Pulsed Laser Fluorometry*, Advisor: Drs. V.V. Fadeev and A.M. Chekalyuk.
- 1989** M.S. with Honors in Physics and Mathematics, GPE: 4.0 out of 4.0. Moscow State University, Moscow, Russia.

PROFESSIONAL EXPERIENCE:

2003 - present	Associate Research Professor	Rutgers University, New Jersey, USA
2004	Senior Scientist (sabbatical)	Satlantic Inc., Halifax, NS, Canada
1998 - 2003	Assistant Research Professor	Rutgers University, New Jersey, USA
1997 - 1998	Assistant Scientist	Brookhaven National Laboratory, New York, USA
1995 - 1997	Research Associate	Brookhaven National Laboratory, New York, USA
1995 - 1995	Post-Doctoral Visitor	Laboratory for Utilization of Synchrotron Radiation, University of Paris, Orsay, France
1994 - 1997	Research Scientist (with tenure)	Moscow State University, Russia
1992 - 1994	Research Associate	Moscow State University, Russia

ACADEMIC AWARDS/HONORS:

- 1989 Rem Khohlov Award at Moscow State University Competition of Student Theses
- 1992 International Science Foundation Award for Excellence in Science
- 1993,1994 International Science Foundation Conference Travel Grants
- 1993 EARSeL Conference Travel Grant
- 2002 International Who's Who of Professionals
- 2002 America's Registry of Outstanding Professionals

RESEARCH INTERESTS:

biophysics and physiology of photosynthesis, symbiosis, photoreceptors, benthic ecosystems, ocean optics, relationship between physical and biological processes in the ocean, global biogeochemical cycles, remote sensing

RESEARCH AND TECHNICAL EXPERTISE:

biological oceanography, remote sensing, LIDAR technology, scientific instrumentation, mathematical modeling, laser physics, optics, pico- and femtosecond laser spectroscopy, electronics, quantum radiophysics, software development.

RECENT GRANT SUPPORT:

- 1997 – 2002 Coastal Benthic Optical Properties (CoBOP): "Processes Affecting the Variability of Fluorescence Signals from Benthic Targets in Shallow Waters", ONR, \$652 K, Co-Investigator.
- 2001 – 2004 "Collaborative Research: Southern Ocean Iron Experiments (SOFeX): Real-time Biophysical Assessment of Iron Limitation of Phytoplankton Photosynthesis in the Open Waters of the Antarctic Ocean". NSF, \$359 K, Co-Investigator.

- 2003 – 2006 “Analysis of Biophysical, Optical and Genetic Diversity of DoD Coral Reef Communities using Advanced Fluorescence and Molecular Biology Techniques”. DoD/DoE/EPA Strategic Environmental Research and Development Program, \$981 K, Principal Investigator.
- 2003 – 2006 “Impacts of Eddies and Mixing on Plankton Community Structure and Biogeochemical Cycling in the Sargasso Sea”. NSF, \$363 K, Co-Investigator.
- 2003 – 2007 “Time Resolved Photosynthesis Energy Budget Combining Photoacoustics, Fluorescence and Oxygen”. US-Israel BSF, \$227 K, Co-Investigator.
- 2005 – 2008 “Development of Fluorescent Induction and Relaxation System for the Glider operation”. Collaborative project (Rutgers, Satlantic, Webb Research). NOPP, \$998K, Co-Investigator, Rutgers team leader.

MEMBERSHIP AND SERVICES:

Member, American Society of Limnology and Oceanography;
 Member, American Geophysical Union;
 Member, Optical Society of America;
 Member, American Association for the Advancement of Science;
 Reviewer, “Limnology and Oceanography” (since 1999);
 Reviewer, “Marine Biology” (since 2000);
 Reviewer, “Oecology” (2002).
 Reviewer, NSF Biological Oceanography Panel (since 2002)
 Reviewer, “Limnology and Oceanography: Methods” (since 2003);
 Reviewer, “Proceedings of the Royal Society: Biological Sciences” (since 2003);

CRUISE/EXPEDITION EXPERIENCE:

-	Kamchatka river	August 1989
R/V Vityaz	North-western Atlantic	March-July 1990
R/V Moscow University	Mediterranean Sea	April-May 1991
R/V Yuzhmoregeologia	Black Sea	August 1991
R/V Endeavor	Middle Atlantic Bight	March 1996
R/V Seward Johnson	Middle Atlantic Bight	July-August 1996
CoBOP Field Experiments	Lee Stocking Island, Bahamas	1998-2001 (3 months overall)
R/V Polarstern	EisenEx cruise, Southern Ocean	Oct.-Dec. 2000
R/V Melville	SOFEX cruise, Southern Ocean	January-February 2002
EarthWatch expedition	Lizard Island Research Station, Australia	May-June 2002
SERDP Field Experiment	Hawaii Institute of Marine Biology	November 2003
R/V Oceanus	EDDIES Cruise, Sargasso Sea	July 2004
R/V Atalante	BIOSOPE Cruise, South Pacific	Oct.- Nov. 2004

SELECTED PUBLICATIONS

1. Tchernov D, **Gorbunov MY**, de Vargas C, Yadav SN, Milligan AJ, Haggblom M, Falkowski PG. (2004) Membrane lipids of symbiotic algae are diagnostic of sensitivity to thermal bleaching in corals. – *Proc. Nat. Acad. Sci., U.S.A.*, **101** (37): 13531-13535.
2. Lesser MP, Mazel CH, **Gorbunov MY**, Falkowski PG. (2004) Discovery of symbiotic nitrogen-fixing cyanobacteria in corals. – *Science*, **305** (5686): 997-1000.
3. **Gorbunov M.Y.**, Kolber Z., and Falkowski P.G. (1999) Measuring photosynthetic parameters in individual algal cells by Fast Repetition Rate fluorometry. - *Photosynthesis Research*, **62**(2-3): 141-153.

4. **Gorbunov M.Y.**, Falkowski P.G. and Kolber Z. (2000) Measurement of photosynthetic parameters in benthic organisms *in situ* using a SCUBA-based fast repetition rate fluorometer. - *Limnol. Oceanogr.*, **45**(1):242-245.
5. **Gorbunov M.Y.**, Z. Kolber, M.P. Lesser, and P.G. Falkowski P.G. (2001) Photosynthesis and photoprotection in symbiotic corals. - *Limnol. Oceanogr.*, **46**(1):75-85.
6. **Gorbunov M.Y.** and Falkowski P.G. (2002) Photoreceptors in the cnidarian hosts allow symbiotic corals to sense blue moonlight. – *Limnol. Oceanogr.*, **47**: 309-315.
7. K.H. Coale, K.S. Johnson, F.P. Chavez, K.O. Buesseler, R.T. Barber, M.A. Brzezinski, W.P. Cochlan, F.J. Millero, P.G. Falkowski, J.E. Bauer, R.H. Wanninkhof, R.M. Kudela, M.A. Altabet, B.E. Hales, T. Takahashi, M.R. Landry, R.R. Bidigare, X.Wang, Z.Chase., P.G. Stratton, G.E. Friederich, **M.Y. Gorbunov**, V.P. Lance, A.K. Hiltling, M.R. Hiscock, M.Demerest, W.T. Hiscock, K.A. Sullivan, S.J. Tanner, R. M. Gordon, C.L. Hunter, V.A. Elrod, S.E. Fitzwater, S. Tozzi, M. Koblizek, A.E. Roberts, J. Herndon, J. Brewster, N. Ladizinsky, G. Smith, D. Cooper, D. Timothy, S.L. Brown, K.E. Selph, C.C. Sheridan, B.S. Twining, and Z.I. Johnson (2004) - Southern ocean iron enrichment experiment: Carbon cycling in high- and low-Si waters. – *Science*, **304** (5669): 408-414.
8. Lesser M.P. and **M.Y. Gorbunov** (2001) Diurnal and bathymetric changes in chlorophyll fluorescence yields of reef corals measured *in situ* with a fast repetition rate fluorometer – *Mar. Ecol. Prog. Ser.*, **212**:69-77.
9. **Gorbunov M.Y.**, Falkowski P.G. and Kolber Z. S. (2001) Primary productivity and photosynthetic response of phytoplankton to iron enrichment in the Southern Ocean – *The Reports on Polar and Marine Research*, **400**: 199-209.
10. Gervais, F., Riebesell U., and **Gorbunov M.Y.** (2002) Changes in primary productivity and chlorophyll a in response to iron fertilization in the Southern Polar Frontal Zone. - *Limnol. Oceanogr.*, **47**: 1324-1335.
11. Mazel C.H., Lesser M.P., **Gorbunov M.Y.**, Barry T.M., Farrell J.H., Wyman K.D., and Falkowski P.G. (2003). Green-fluorescent protein in Caribbean corals. – *Limnol. Oceanogr.*, **48**: 402-411.
12. Levy O., Dubinsky Z., Schneider K., Achituv Y., Zakai D., and **Gorbunov M.Y.** (2004) Diurnal hysteresis in coral photosynthesis - *Mar. Ecol. Prog. Ser.*, **268**: 105-117.
13. Lombardi, M.R., M.P. Lesser and **M.Y. Gorbunov** (2000) Fast repetition rate (FRR) fluorometry: variability of chlorophyll-a fluorescence yields in colonies of the corals, *Montastraea faveolata* (w.) and *Diploria labyrinthiformes* (h.) recovering from bleaching - *J. Exp. Mar. Biol. Ecol.*, **252**:75-84.
14. **Gorbunov M.Y.**, Fadeev V.V., and Chekalyuk A.M. (1991) Method of remote laser monitoring of photosynthesis efficiency in phytoplankton. - *Moscow University Physics Bulletin*. **46**(6): 59-65.
15. **Gorbunov M.Y.**, Fadeev V.V., and Chekalyuk A.M. (1992) The use of laser saturation fluorometry for the study of mechanisms of chlorophyll a fluorescence build-up in phytoplankton under condition of mineral nutrition shortage - *Moscow University Physics Bulletin* **47**(4): 47-53.
16. **Gorbunov M.Y.**, and Chekalyuk A.M. (1992) Mechanisms of light control of the quantum yield of *in situ* phytoplankton fluorescence as studied by pulsed laser fluorometry. - *Moscow University Physics Bulletin*, **47**(6): 46-52.
17. Chekalyuk A.M., and **Gorbunov M.Y.** (1995) Development of the LIDAR pump-and-probe technique for remote measuring the efficiency of primary photochemical reactions in leaves of green plants. - *EARSeL Advances in Remote Sensing*, **3**(3), 42-56.
18. **Gorbunov M.Y.**, and Falkowski P.G. 2004. Fluorescence Induction and Relaxation (FIRE) Technique and Instrumentation for Monitoring Photosynthetic Processes and Primary Production in Aquatic Ecosystems. In: In: “Photosynthesis: Fundamental Aspects to Global Perspectives” - Proc. 13th International Congress of Photosynthesis, Montreal, Aug.29 – Sept. 3, 2004. (Eds: A. van der Est and D. Bruce), Allen Press, V.2, pp. 1029-1031.

19. Tchernov, D.; Haramaty, L.; Bibby, T. S.; Gorbunov, M. Y.; Falkowski, P. G.: PROGRAMMED CELL DEATH IS A PART OF THE CELLULAR MECHANISM OF CORAL BLEACHING.

20. Huot, Y.; Bruyant, F.; Babin, M.; Bonnet, S.; Gorbunov, M. Y.; Morel, A.; Prasil, O.; Raimbault, P.; Tièche, F.; Claustre, H.: PHOTOSYNTHESIS IN THE ULTRA-OLIGOTROPHIC WATERS OF THE SOUTH-PACIFIC GYRE AND ORDERING WATERS DURING THE AUSTRAL SPRING

21. Bonnet, S.; Guieu, C.; Bruyant, F.; Gorbunov, M. Y.; Raimbault, P.; Prasil, O.; Van Wambeke, F.; Moutin, T.; Blain, S.; Grob, C.; Garczarek, L.; Duhamel, S.; Vaulot, D.; Ulloa, O.: COLIMITATION IN A GRADIENT OF TROPHIC REGIMES IN THE SOUTH EAST PACIFIC OCEAN: RESPONSES FROM MICROCOSM EXPERIMENTS.