

## CURRICULUM VITAE – MIKHAIL V MATZ, PH. D.

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### Education/training:

INSTITUTION AND LOCATION	DEGREE	YEAR(s)	FIELD OF STUDY
Moscow State University, Moscow, USSR	B.S.	1986-1989	Molecular biology
Moscow State University, Moscow, USSR	M.S.	1989-1991	Molecular biology, protein science
Institute of Bioorganic Chemistry, Moscow, Russia	Ph.D.	1995-1999	Biochemistry

**M.Sc Thesis:** “Cloning, sequencing and comparative analysis of carboxypeptidase T from *Thermoactinomyces vilgaris*,” Institute of Microbial Genetics, Moscow, 1989; advisor – Prof. Valentin M. Stepanov

**Ph.D. Thesis:** “Ordered Differential Display of cDNA”, Institute of Bioorganic Chemistry RAS, 1999; advisor – Dr. Sergey A. Lukyanov

### Professional Experience:

Assistant Professor – 08/06 – present, Section of Integrative Biology, the University of Texas at Austin  
Research Assistant Professor, 05/01 – 08/06, Whitney Laboratory for Marine Bioscience, University of Florida, St Augustine FL 32080 (joint appointment: Assistant Scientist, Department of Molecular Genetics and Microbiology, University of Florida)  
Postdoctoral associate, 10/00 – 05/01, Whitney lab, University of Florida, St Augustine FL 32080  
Research scientist 1/00-9/00, Institute of Bioorganic Chemistry RAS, Miklukho-Maklaya 16/10, Moscow, Russia  
Research scientist 9/99-12/99, Clontech Laboratories Inc., 1020 E. Meadow Cir., Palo Alto, CA, USA  
Junior scientist/Research scientist 9/95-9/99, Institute of Bioorganic Chemistry RAS, Miklukho-Maklaya 16/10, Moscow, Russia  
Junior scientist 9/91-9/95, Institute of Microbial Genetics, 1<sup>st</sup> Dorozhny pr., Moscow, USSR

### Awards:

FEBS research fellowship award, 1996; \$4,500  
NIH R01 GM066243, PI: Matz, “GFP-like proteins: diversity and determinants of color”, 2002-2007, \$1,115,000  
NIH Supplementary award RO1 GM6243-01 S1; \$21,930.  
US Department of Defense (SERDP program), PI: Falkowski (Rutgers University), “Analysis of biophysical, optical and genetic diversity of coral reef communities using advanced fluorescence and molecular biology techniques” 2003-2006; direct costs to Matz lab \$303,000.  
NOAA Ocean Exploration program, 2004; “Operation Deep Scope 2004”, 10 days ship and submersible time.  
NOAA Ocean Exploration program, 2005; “Operation Deep Scope 2005”, 14 days ship and submersible time.  
NOAA Ocean Exploration program, 2007; “Operation Deep Scope 2007”, 14 days ship and submersible time.  
NIH R01 GM078247, “Beyond GFP and aequorin: an ocean-wide study of fluorescent and luminous proteins”, PI: Matz, co-PI: Haddock (Monterrey Bay Aquarium Research Institute), 2006-2010, \$806,000.  
Dwight W. and Blanche Faye Reeder Centennial Fellowship in Systematic and Evolutionary Biology; 2009-2010, \$10,000  
NIH R01 GM087198, “Genetically encoded luminescence”, PI: Haddock (MBARI), co-PI: Matz, 2009-2013, UT direct costs \$225,000.

NOAA's Undersea Research Center, the Hawai'i Undersea Research Laboratory, "Genetic connectivity and adaptation to climate change in Micronesian corals", PI: Matz, co-PIs: T. Keitt (UT Austin), S. Palumbi (Stanford), 2009-2011, \$135,000.

### Peer reviewing:

*Nucleic Acids Research; Biotechniques* – differential display, cDNA amplification, fluorescent proteins  
*Biochemistry* – fluorescent proteins; protein evolution  
*Limnology and Oceanography* – coral fluorescence and coloration  
*Comparative Biochemistry and Physiology* – fluorescent proteins  
*PLoS ONE* – coral molecular biology  
*Biochimica et Biophysica Acta* – fluorescent proteins  
*Journal of Molecular Evolution* – evolution of gene families, adaptive evolution in proteins  
*Proc Natl Acad Sci USA* - adaptive evolution in proteins  
*Molecular Biology and Evolution* - resurrection of ancestral proteins  
*Science* - bioluminescence and biofluorescence  
*Binational Science Foundation* – molecular biology of Cnidaria  
*National Science Foundation (NSF)* – bioluminescence and biofluorescence, coral molecular biology  
*BMC Genomics* – coral molecular biology  
*Journal of Experimental Biology* - biofluorescence

### Teaching:

Invertebrate biology (undergraduate course, UT Austin)  
Issues in population biology (graduate seminar series, UT Austin)  
Marine conservation biology (undergraduate summer course, UT Austin)  
Gene expression biomarkers of coral stress and disease (workshop at Mote Tropical Research Station)

### Recent invited talks:

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- “**Family of the Green Fluorescent Protein: Journey to the end of the rainbow**”: keynote lecture at the Florida Marine Biotechnology Summit III, Fort Pierce, FL; October 7, 2002.
- “**How corals got their colors**”: keynote lecture at the Symposium on calcium-regulated photoproteins and fluorescent proteins, Friday Harbor Laboratories, August 29 - September 3, 2004.
- “**Convergent evolution of complexity in coral fluorescent proteins**”: seminar at the Hopkins Marine Station, Stanford University, October 29, 2004.
- “**Molecular paleontology of coral fluorescence**”: seminar at the National Center for Biotechnology Information, January 27, 2005.
- “**Replaying evolution of coral colors: diversity, complexity and natural selection**”: seminar at the Marine Biology Laboratory, Woods Hole, MA, September 16, 2005.
- “**Network accretion hypothesis and symbiotic origin of Metazoa**”: keynote lecture at the International Symposium on Networks in Bioinformatics, Amsterdam, Netherlands, April 18, 2007.
- “**Ecological genomics**”: invited lecture at Okazaki Biology Conference, OBC 6 on "Marine Biology", December 2 – 8, 2007.

### Patents and pending applications:

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Lukyanov, S. A., Fradkov, A. F., Labas, Y. A., **Matz, M. V.**, Terskikh, A. Novel chromophores/fluorophores and methods for using the same. US patent # 7,166,444 (awarded January 23, 2007, filed December 3, 2001). International publication # WO 00/34318.

**Matz, M. V.**, Kelmanson, I. V., Meleshkevitch, E. A., Salih, A. Fluorescent and colored proteins, and polynucleotides that encode these proteins. US patent # 7,160,698 (awarded January 9, 2007, filed May 20, 2004).

**Matz, M. V.**, Alieva, N.O., Konzen, K. A., Field, S. F., Salih, A. Fluorescent and colored proteins, and polynucleotides that encode these proteins. US patent # 7,230,080, (awarded June 12, 2007, filed February 16, 2005).

Salih, A and **Matz, M. V.** Photoactivatable Chromo/Fluorescent GFP-like proteins and imaging applications. Serial No. 60/705,042; filed August 3, 2005.

**Matz M.V.**, Meyer, E., Aglyamova, G. V. Improved methods and compositions for nucleic acids sequencing: preparation of cDNA samples for *de novo* transcriptome sequencing using 454 technology. Provisional application filed May 2008, UT Austin code 1202P.

### **Publications** (52 total, not including conference abstracts and proceedings):

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Meyer, E., Aglyamova, G. V., Wang, S., Buchanan-Carter, J., Abrego, D., Colbourne, J. K., Willis, B. L., and **Matz, M. V.** Sequencing and *de novo* analysis of a coral larval transcriptome using 454 GS-Flx. *BMC Genomics* 2009, 10: 219.

Matz, M. V., Frank, T. M., Marshall, N.J., Widder, E. A., and Johnsen, S. Giant deep-sea protist produces bilaterian-like traces. *Curr. Biol.* 2008, **18**: 1849-1854.

Wang, S., Zhang, L. and **Matz, M.V.** Microsatellite characterization and marker development from public EST and WGS databases in the reef-building coral *Acropora millepora* (Cnidaria, Anthozoa, Scleractinia). *Journal of Heredity* 2008, doi: 10.1093/jhered/esn100.

Vogt A, D'Angelo C, Oswald F, Denzel A, Mazel CH, **Matz MV**, Ivanchenko S, Nienhaus GU, Wiedenmann J. A Green Fluorescent Protein with Photoswitchable Emission from the Deep Sea. *PLoS ONE* 2008, **3**(11): e3766.

D'Angelo, C., Denzel, A., Vogt, A., **Matz M. V.**, Oswald, F., Salih, A., Nienhaus, G.-U. & Wiedenmann, J. Blue Light Regulation of GFP-Like Protein Expression in Reef-Building Corals. *Mar. Ecol. Prog. Ser.* 2008, **364**: 97-106.

Alieva, N.O., Konzen, K. A., Field, S. F., Meleshkevitch, E. A., Hunt, M., Beltran-Ramirez, V., Miller, D. J., Wiedenmann, J., Salih, A. and **Matz, M. V.** Diversity and evolution of coral fluorescent proteins. *PLoS ONE* 2008, **3**(7): e2680.

Cox, G., **Matz, M.** and Salih, A. Fluorescence lifetime imaging of coral fluorescent proteins. *Microscopy Research and Technique* 2007, **70**: 243-251.

Leutenegger, A., D'Angelo, C., **Matz, M. V.**, Denzel, A., Oswald, F., Salih, A., Nienhaus, G. U. and Wiedenmann, J. It's cheap to be colorful: Anthozoans show a slow turnover of GFP-like proteins. *FEBS Journal* 2007, 274: 2496-2505.

Oswald, F., Schmitt, F., Leutenegger, A., Ivanchenko, S., D'Angelo, C., Salih, A., Maslakova, S., Bulina, M.; Schirmbeck, R., Nienhaus, G. U., **Matz, M. V.** and Wiedenmann, J. Contributions of host and symbiont pigments to the coloration of reef corals. *FEBS Journal* 2007, **274**: 1102-1109.

**Matz, M. V.**, Marshall, N. J. and Vorobyev, M. Are corals colorful? *Photochem. Photobiol.*, 2006, **82**: 345-350.

Field, S. F., Bulina, M. Y., Kelmanson, I. V., Bielawski J. P. and **Matz, M. V.** Adaptive evolution of multi-colored fluorescent proteins in reef-building corals. *J. Mol. Evol.*, 2006, **62**:332-339.

Nielsen, R. and **Matz, M. V.** Statistical approaches for DNA barcoding. *Syst. Biol.* 2006, **55**:162-169.

**Matz, M. V.** and Meleshkevith, E. A. Ordered Differential Display. *Methods Mol Biol.* 2005, **317**: 59-74.

**Matz, M. V.** and Nielsen, R. Likelihood ratio test for species membership based on DNA sequence data. *Philos. Trans. Roy. Soc. B* 2005, **360**: 1969-1974.

- Chang, B. S. W., Ugalde, J. A. and **Matz, M.V.** Application of ancestral protein reconstruction in understanding protein function: GFP-like proteins. *Meth Enzymol.* 2005, **395**: 652-670.
- Lukyanov, K. A., Chudakov, D. M., Fradkov, A. F., Labas, Y. A., **Matz, M. V.** and Lukyanov, S. A. Discovery and properties of GFP-like proteins from nonbioluminescent Anthozoa. *Methods Biochem Anal.* 2006; **47**:121-138.
- Matz, M. V.**, Labas, Y. A. and Ugalde, J. Evolution of function and color in GFP-like proteins. *Methods Biochem Anal.* 2006; **47**:139-161.
- Ugalde, J. A., Chang, B. S. W. and **Matz, M. V.** Evolution of coral pigments recreated. *Science* 2004, **305**: 1433.
- Shagin, D. A., Barsova, E. V., Yanushevich, Y. G., Fradkov, A. F., Lukyanov, K. A., Labas, Y. A., Ugalde, J. A., Meyers, A., Nunez, J. M., Widder, E. A., Lukyanov, S. A., **Matz, M. V.** GFP-like proteins as ubiquitous Metazoan superfamily: evolution of functional features and structural complexity. *Mol Biol Evol.*, 2004, **21**: 841-850.
- Zhulidov PA, Bogdanova EA, Shcheglov AS, Vagner LL, Khaspekov GL, Kozhemyako VB, **Matz MV**, Meleshkevitch E, Moroz LL, Lukyanov SA, Shagin DA. Simple cDNA normalization using kamchatka crab duplex-specific nuclease. *Nucleic Acids Res.* 2004, **32**: e37.
- Kelmanson, I. K. and **Matz, M. V.** Molecular basis and evolutionary origins of color diversity in great star coral *Montastraea cavernosa* (Scleractinia, Faviida). *Mol Biol Evol* 2003, **20**: 1125-1133.
- Matz, M.V.**, Alieva, N. A., Chenichik, A and Lukyanov, S.A (2003) Amplification of cDNA ends using PCR-suppression effect and step-out PCR. In: *Generation of cDNA libraries: Methods and protocols* (Shao-Yao Ying Ed.) Humana press, Totowa, NJ, pp. 41-50.
- Matz, M.V.** (2003) Amplification of representative cDNA pools from microscopic amounts of animal tissue. In *Generation of cDNA libraries: Methods and protocols* (Shao-Yao Ying Ed.) Humana press, Totowa, NJ, pp. 103-116.
- Kelmanson, I. V., Shagin, D. A., Usman, N., **Matz, M. V.**, Lukyanov, S. A., Panchin, Y. V. Altering electrical connections in the nervous system of the pteropod mollusc *Clione limacina* by neuronal injections of gap junction mRNA. *Eur J Neurosci* 2002, **16**:2475-2476.
- Shagin, D. A., Barsova, E. V., Bogdanova, E. A., Britanova, O. V., Gurskaya, N. G., Lukyanov, K. A., **Matz, M. V.**, Punkova, N. L., Usman, N. Y., Kopantzev, E. P., Salo, E., Lukyanov, S.A. Identification and characterization of a new family of C-type lectin-like genes from planaria *Girardia tigrina*. *Glycobiology* 2002, **12**:463-472.
- Matz, M.V.**, Lukyanov, K. A. and Lukyanov, S. A. Family of the Green fluorescent Protein: Journey to the end of the rainbow. *BioEssays* 2002, **24**:953-959.
- Labas, Y. A., Gurskaya, N. G., Yanushevich, Y. G., Fradkov, A. F., Lukyanov, K. A., Lukyanov, S. A. and **Matz, M. V.** Diversity and evolution of the green fluorescent protein family. *Proc Natl Acad Sci U S A* 2002, **99**: 4256-61.
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- Lukyanov, K.A., Fradkov, A.F., Gurskaya, N.G., **Matz, M.V.**, Labas, Y.A., Savitsky, A.P., Markelov, M.L., Zaraisky, A.G., Zhao, X., Fang, Y., Tan, W., Lukyanov, S.A. Natural animal coloration can be determined by a non-fluorescent GFP homolog. *J Biol Chem* 2000, **275**: 25879-82.
- Matz, M.**, Fradkov, A., Labas, Y., Savitsky, A., Zaraisky, A., Markelov, M. and Lukyanov, S. Fluorescent proteins from non-bioluminescent Anthozoa species. *Nature Biotechnol.* 1999, **17**: 969-973.
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- Matz, M.**, Shagin, D., Bogdanova, E., Britanova, O., Lukyanov, S., Diatchenko, L., Chenchik, A. Amplification of cDNA ends based on template-switching effect and step-out PCR. *Nucleic Acids Res.* 1999, **27**: 1558-1560.
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