Curriculum vitae

Alexander E. Pozhitkov, Dr. rer nat. (Ph.D)
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Professional history

Jun 2011 - present	**Dept. of Periodontology, University of Washington, Seattle** <u>Research Scientist</u> Quantitative and qualitative research on human oral microbiota; experimental and bioinformatic approaches; microarrays; next generation sequencing (454).
2009 – Jun 2011	**Max-Planck Institute for Evolutionary Biology, Germany** <u>Research Scientist</u> physical chemistry of hybridization on the microarray surface; new methodology for CNV analysis, inspired by physics; DNA melting experiments and analysis; analysis of zebrafish postmortem gene expression; development of bioinformatic tools (programming C++); electronic engineering of a mice activity monitor; experiments with the 454 technology; organized an international workshop on physical chemistry of DNA surface hybridization.
2006 – 2009	**Gulf Coast Research Laboratory, Mississippi, USA** <u>Research Scientist</u> microarray-based toxicogenomics; quantification of nucleic acid targets using microarrays; analysis of hybridization isotherms on various microarray platforms; mathematical modeling of nonequilibrium DNA thermal dissociation.
2004 – 2006	**Civil and Environmental Engineering, University of Washington, Seattle** <u>Postdoctoral fellow</u> microarray technology – physical chemistry of DNA duplex dissociation; engineering of a flow-through hybridization chamber; Windows programming: development of microarray image analysis software.
1998 –2000	**College of Chemistry, Moscow State University, Russia** <u>Research scientist</u> study of an effect of fluorophenylalanine on baker's yeast; isolation of total yeast protein; NMR detection of fluorine; HPLC quantification of amino acids; mathematical modeling of yeast growth kinetics.

Teaching

Kyle Bailey, master's degree student (ref 14).
Shuzhao Li, PhD student (refs, 3, 5, 12).
Rebecca Rule, master's degree student, co-supervisor (refs 10, 11, 17).

Education

2000 – 2004	**Institute for Genetics, University of Cologne, Germany**
	Dr. rer nat. (Ph.D) in Genetics
	Dissertation: "Molecular Taxonomy: Bioinformatics and Practical Evaluation". Supervisor: Prof. Tautz, currently director of Max Plank institute for Evolutionary biology
1993 –1998	**College of Chemistry, Moscow State University, Russia**
	MSc (honors) in Chemistry
	MSc thesis: "Identification of microorganisms using oligonucleotide microchips".
	Courses on inorganic, organic, analytical, physical and polymer chemistries; mechanics, electricity / magnetism, crystallography, quantum mechanics, molecular biology and chemical enzymology.

Awards

2007	**Noetic Technologies Inc, USA**
	Young investigator award
2003	**"Innovation Cologne", Germany**
	Co-author of a motion sensor for observing experimental animals
1997	**G. Soros foundation, Russia/USA**
	Stipend
1996	**G. Soros foundation, Russia/USA**
	Stipend

Inventions

2003   Gottstein, C., Pfizer, G., Statsewski, J., Stassen, F and **Pozhitkov**, A. Motion sensor for observing experimental animals. Patent granted in Germany.

Skills

Chemistry/molecular biology
Methods of molecular biology, experimental procedures of organic, inorganic and analytical chemistries.
Programming
C++, Visual Basic, Assembly language (Intel CPU, real/protected mode), Python, 3D graphics, Windows and UNIX APIs, parallel algorithms, SQL 92.
Software
Mathcad, Matlab, MS Access, MS SQL Server, CAD software (Eagle).
Microbiology
growing strict anaerobes, working with bioreactors.
Electrical engineering
design and assembly of electronic circuits, microcontroller programming,.

Languages

Russian – native language.
English – fluent.
German – speak, read, and write with basic competence.

Publications

1. Czypionka, T, Cheng J, **Pozhitkov** A.E, Nolte A. Transcriptome changes after genome wide admixture in invasive sculpins (Cottus) (2012) *Molecular Ecology.* in press.
2. **Pozhitkov** A.E, Beikler T, Flemmig T, Noble P.A. High-throughput methods for the analysis of human oral microbiome. *Periodontology* 2000. (2011), **55**, 70–86.
3. Li S, **Pozhitkov** A, Ryan RA, Manning CS, Brown-Peterson N, Brouwer M. Constructing a fish metabolic network model. *Genome Biology* (2010), **11**(11): R115.
4. Pirooznia, M., **Pozhitkov**, A., Perkins, E.J., Deng, Y., Brouwer, M. Generation, analysis and functional annotation of expressed sequence tags from the sheepshead minnow (Cyprinodon variegatus). *BMC Genomics* (2010), 11, S4.
5. Li, S., **Pozhitkov**, A.E., and Brouwer, M. Linking probe thermodynamics to microarray quantification. *Physical Biology* (2010), 7, 048001.
6. **Pozhitkov** AE, Boube I, Brouwer MH, Noble PA. Beyond Affymetrix arrays: expanding the set of known hybridization isotherms and observing pre-wash signal intensities. *Nucl Acids Res* (2010), **8**, e2
7. **Pozhitkov**, A.E. Scanner calibration revisited. *BMC Bioinformatics.* (2010), **11**, 361.
8. Kalyuzhnaya MG, Beck DA, Suciu D, **Pozhitkov** A, Lidstrom ME, Chistoserdova L. Functioning in situ: gene expression in Methylotenera mobilis in its native environment as assessed through transcriptomics. ISME J. (2010), **4**(3), 388-98.
9. **Pozhitkov** AE, Nies G, Kleinhenz B, Tautz D, Noble PA. Simultaneous quantification of multiple nucleic acid targets in complex rRNA mixtures using high density microarrays and nonspecific hybridization as a source of information. *J Microbiol Methods* (2008), **75**, 92-102.
10. Rule, R. A., **Pozhitkov**, A.E. and Peter A. Noble. Use of Hidden Correlations in Short Oligonucleotide Arrays Are Insufficient For Accurate Quantification of Nucleic Acid Targets in Complex Target Mixtures. *Journal of Microbiological Methods*, (2008), **76**, 188-95.
11. **Pozhitkov**, A., Rule, R.A., Stedtfeld, R.G., Hashsham, S.A. and Noble, P.A. Concentration-dependency of nonequilibrium thermal dissociation curves in complex target samples. *Journal of Microbiological Methods.* (2008), **74**, 82-8.
12. Li, S., **Pozhitkov**, A.E., and Brouwer, M. A Competitive Hybridization Model Predicts Probe Signal Intensity on High Density DNA Microarrays. *Nucleic Acids Research*, (2008), **36**, 6585-6591.
13. **Pozhitkov**, A.E., Tautz, D. and Noble, P.A. Oligonucleotide arrays: widely applied -- poorly understood. *Briefings in Functional Genomics and Proteomics.* (2007), **6**, 141-8.
14. **Pozhitkov**, A.E., Bailey, K.D., Noble, P.A. Development of a statistically robust quantification method for microorganisms in mixtures using oligonucleotide microarrays. *J. Microbiol. Methods.* (2007), **70**, 292-300.
15. **Pozhitkov**, A., Stedtfeld, R.G., Hashsham, S.A., Noble, P. A. Revision of the nonequilibrium thermal dissociation and stringent washing approaches for identification of mixed nucleic acid targets by microarrays. *Nucleic Acids Research.* (2007), **35**, e70.
16. **Pozhitkov**, A.E., and Noble, P.A. High variability associated with melting profiles obtained from gel-pad arrays. *Environmental microbiology.* (2007), **9**, 1865.
17. **Pozhitkov**, A., Noble, P.A. On discrimination of shifts in soil microbial communities using nonequilibrium thermal dissociation and gel pad array technology. *Environmental Science and Technology*, (2007), **41**, 1797-1798.
18. **Pozhitkov** A, Noble PA, Domazet-Loso T, Nolte AW, Sonnenberg R, Staehler P, Beier M, Tautz D. Tests of rRNA hybridization to microarrays suggest that

hybridization characteristics of oligonucleotide probes for species discrimination cannot be predicted. *Nucl. Acids Res.* (2006), **34,** e66.

19. **Pozhitkov**, A., Chernov, B., Yershov, G. and Noble, P.A. Evaluation of Gel-Pad Oligonucleotide Microarray Technology Using Artificial Neural Networks. *Appl. Environ. Microbiol.* (2005), **71**, 8663–8676.

20. **Pozhitkov**, A., Stemshorn, K., Tautz D. An algorithm for the determination and quantification of components of nucleic acid mixtures based on single sequencing reactions. *BMC Bioinformatics.*, (2005), **6**, 281.

21. Verkhusha, V., **Pozhitkov**, A., Smirnov, S., Borst, J., van Hoek, A., Klyachko, N., Levashov, A. and Visser, A. Effect of high pressure and reversed micelles on the fluorescent proteins. *Biochimica et Biophysica Acta. General Subjects*, (2003), **1622**, 192-195.

22. **Pozhitkov**, A. and Tautz, D. An algorithm and program for finding sequence specific oligo-nucleotide probes for species identification. *BMC Bioinformatics.* (2002), **3**, 9.

23. **Pojitkov**, A., Efremenko, E.N. and Varfolomeev, S.D. Unnatural Amino Acids in Enzymes and Proteins. *J. Mol. Catal. B-Enzym.*, (2000), **10**, 47-55.

24. Varfolomeev, S.D. and **Pozhitkov**, A. Active sites of hydrolases: structure types and catalytic mechanisms. Moscow State University Bulletin, (2000), **41**, 147-156.

25. **Pozhitkov**, A.E., Lavrik, I.N., Sergeev, M.M. and Kochetkov, S. N. Kinetic Analysis of the Reaction Catalyzed by BacteriophageCyberT7 T7 RNA Polymerase. *Molecular Biology (Moscow)*, (1998), **32**, 78-82.

26. Drozdov, A., **Pozhitkov**, A., Trojanov, S. and Pisarevsky, A. Synthesis and X-ray structures of barium complexes with pivaloyltrifluoroacetone, [Ba(pta)$_2$(H$_2$O)] and Ba$_4$(pta)$_8$. *Polyhedron*, (1996), **15**, 1731-1735.

Electrical engineering papers

27. **Pozhitkov**, A. (2012) The NakedCPU Part 2: Experimentation and Communication. Circuit Cellar, issue 260.

28. **Pozhitkov**, A. (2012) The NakedCPU Part 1: Hardware Experiments and a Roadmap for Navigating Documentation. *Circuit Cellar*, issue 259.

29. **Pozhitkov**, A. (2007) Retirement home for old alkaline batteries. *Elector Electronics*, issue 370.

30. **Pozhitkov**, A. (2007) E-dictator. *Elector Electronics*, issue 370.

31. **Pozhitkov**, A. (2003) Acoustic noise control device. *Elector Electronics*, issue 324.