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Oleg Prosekov

<p>Personal</p>	<ul style="list-style-type: none"> • Full name: Oleg V. (Valerevich) Prosekov • Date of birth: 16-th of April, 1980 • Citizenship: Russian Federation • Location: St. Petersburg, Russia • Civil status: Widower
<p>Summary</p>	<ul style="list-style-type: none"> • 14 years of experience in software engineering • 1 book (124 pages) • 7 publications (63 pages) • 4 reports at international and 1 report at Russian conferences (21 pages) • 13 reports at scientific-research seminar on “Discrete Harmonic Analysis and Computer Aided Geometric Design” (122 pages) (www.dha.spb.ru) • Strong expertise in discrete harmonic analysis • Extensive experience in research work • Extensive experience in fast DSP algorithms development (especially fast Fourier transform) • Extensive experience in code optimization and code porting • Extensive knowledge of several DSP platforms • Some knowledge of several video coding algorithms
<p>Education</p>	<p>Ph. D. in Computational Mathematics (phys. and math. sciences). Ph. D. thesis: “Parametric version of fast Fourier transform (multidimensional case)” St. Petersburg State University, Faculty for Mathematics and Mechanics, Operations Research department (www.spbu.ru) (2003–2006); scientific adviser: Malozemov V. N. (Professor, Doctor of Phys. and Math. Sci.)</p> <p>Mathematician-Engineer degree in Applied Mathematics. Diploma work: “Research on the fast Fourier transform of small orders” St. Petersburg Electrotechnical University “LETI”, Computer technologies and Informatics Faculty, Computer Science department (www.eltech.ru) (1997–2003); scientific adviser: Rybin S. V. (Associate Professor, Ph. D. in Mathematics)</p>

<p>Experience</p>	<p>April 2008 – Present: Synopsys, Inc. (formerly Virage Logic Corporation, ARC International), (Advanced Software Group), Saint-Petersburg, Russia (www.synopsys.com)</p> <p>Position held: Lead Software Engineer</p> <p>Responsibilities: Video research: video coding improvements, Algorithms development and software optimization for ARC platforms, expert conclusions, performance estimations, tasks planning and management of software projects, documentation.</p> <p>Projects: <i>High Efficiency Video Coding (ITU-T H.265) improvements:</i> Now in progress. Research and modify video coding algorithms which include: Predictors Elimination Technique (PET), Most Probable intra Modes (MPM). Modified MPM and arithmetic coder algorithms. Implemented by MATLAB representation of PET statistics and rate-distortion curves.</p> <p><i>Sample Rate Converter software library:</i> Project lead (tasks planning, performance estimations and management). Provided assistance in developing requirements. Development and implementation special version (A5, dual MAC 16x16, no XY-memory) of SRC for Synopsys customer «Altek». Provided assistance in discussion of «OKI Semi Rohm» requirements. Developed and implemented algorithms were highly optimized for ARC600 platform (16/24/32-bit and pseudo floating point arith ops versions). Project team of 3 software engineers.</p> <p><i>Dolby Digital Plus Decoders (part of Dolby MS11 Multistream Decoder (5 products are based on one source code):</i> Project lead (tasks planning, performance estimations and management, design data and code flow). Project team of 7 software engineers.</p> <p><i>DTS Encoder / Transcoder (part of Blue-Ray Home Audio Solution):</i> Project lead (tasks planning, performance estimations and management, design data and code flow). New DCT and bit allocation algorithms were successfully developed and implemented. All targets were archived. Project team of 2 software engineers.</p> <p><i>DCTs software library:</i> Implemented fast algorithms for DCT-II, DCT-III and DCT-IV were highly optimized for ARC600 platform (16/24/32-bit arith ops versions).</p> <p><i>Real-Valued FFTs software library:</i> Project lead (tasks planning, performance estimations and management). Implemented fast split-radix algorithms were highly optimized for ARC600 platform.</p> <p><i>Dolby Digital Plus Converter:</i> Successfully integrated new DCT algorithms. Implemented and optimized programs for Back-End decoder (part of Dolby Digital decoder) for ARC600 platform.</p> <p><i>AAC+ decoder (Advanced Audio Coding):</i> Successfully implemented and optimized programs for analysis and synthesis quadrature mirror filters (QMF) for SBR part of AAC+ (high quality and low power modes) for ARC600 platform.</p> <p>June 2006 – April 2008: Lanit-Tercom Corp., Telecommunication department, Saint-Petersburg, Russia (www.tercom.ru) (Reasons to leave: looking for career escalation abilities)</p>
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	<p>Position held: Lead Software Engineer</p> <p>Responsibilities: Programming of signal processors TMS320C6415 and ADSP-2185, development, porting, optimization, reengineering and programming support.</p> <p>Projects: <i>VOIP-gateway</i>: ported and optimized G729AB codec from x86 to TMS320C6415 DSP, developed testing methodology for DSP performance in real-time.</p> <p><i>DSP-manager</i>: added new features and optimized programs for telecommunication station (support for more number of channels, DTMF, teleconferences).</p> <p>November 2000 – August 2007: FSUE Central Research Institute “Morphyspribor”, Saint-Petersburg, Russia (www.oceanpribor.ru) (Reasons to leave: looking for career escalation abilities)</p> <p>Position held: Senior Software Engineer</p> <p>Responsibilities: Development of Fast Fourier transform algorithms and fast beam forming for different antenna arrays; Parallel programming for digital processing system BAGET; mathematical modeling in MATLAB</p> <p>Research Projects: “<i>Development of fast beamforming algorithm using small order FFT algorithms</i>” as part of FSTD (Fund of Scientifically Technical Development) CRI “Morphyspribor”.</p> <p>“<i>Non-traditional lengths FFT for digital signal processor DSP96002</i>” as part of FSTD CRI "Morphyspribor".</p> <p>Taken active part in development of fast algorithm for approximate beamforming for conform antenna arrays. In the course of development performed the following activities: developed software imitator for input data in frequency and time domains, developed beamforming software, developed software for forming directional diagrams and took part in implementation of beamforming using well-known fast algorithms.</p> <p>Lead software developer of projects group “<i>Fast beamforming for antenna arrays</i>”.</p>
<p>Scientific Activities</p>	<p>Books: Malozemov V. N., Prosekov O. V. <i>Parametric versions of fast Fourier transform</i>. LAP LAMBERT Academic Publishing, 2010. 124 pp. (www.morebooks.de ISBN 978-3-8433-0429-0)</p> <p>Published articles: Malozemov V. N., Prosekov O. V. <i>Parametric version of fast Fourier transform // Doklady Mathematical Sciences (Doklady Akademii Nauk)</i>. 2008. V. 421. No. 5. P. 593-595.</p> <p>Prosekov O. V. <i>Parametric version of multidimensional fast Fourier transform // St. Petersburg Math. Soc. electronic preprints archive</i>. Preprint No. 2007-07. 8 pp. (http://www.mathsoc.spb.ru/preprint/2007/index.html#07)</p> <p>Malozemov V. N., Prosekov O. V. <i>Parametric factorization of Fourier matrix // St. Petersburg Math. Soc. electronic preprints archive</i>. Preprint No. 2007-06. 10 pp.</p>

(<http://www.mathsoc.spb.ru/preprint/2007/index.html#06>)

Malozemov V. N., Prosekov O. V. *Parametric version of the prime factors method* // St. Petersburg Math. Soc. electronic preprints archive. Preprint No. 2007-05. 6 pp.

(<http://www.mathsoc.spb.ru/preprint/2007/index.html#05>)

Malozemov V. N., Prosekov O. V. *Factorization of reverse permutation matrices* // St. Petersburg Math. Soc. electronic preprints archive. Preprint No. 2007-04. 8 pp.

(<http://www.mathsoc.spb.ru/preprint/2007/index.html#04>)

Pakhomov S. N., Prosekov O. V. *Calculation aspects of the fast Fourier transform* // Vestnik SPbU. Ser. 1. 2004. Issue 4. P. 45-50.

Malozemov V. N., Prosekov O. V. *On the fast Fourier transform of small orders* // Vestnik SPbU. Ser. 1. 2003. Issue 1 (No. 1). P. 36-45.

Reports at international and the Russian conference:

Malozemov V. N., Prosekov O. V. *Parametric Fast Fourier Transform and Wavelet Expansions* // International Conference "Wavelets and Applications" (<http://www.pdmi.ras.ru/EIMI/2009/wa/>). June 14-20, 2009. St. Petersburg, Russia. P. 42-43.

Malozemov V. N., Prosekov O. V. *Parametric version of fast Fourier transform* // International science conference "Space, astronomy and programming" (<http://pub.math.spbu.ru/lavrov/>). May 20-22, 2008. St. Petersburg, Russia. P. 222-225.

Prosekov O. V. *Fast Fourier transformation algorithms for a non-traditional number of points* // Proceedings of the seventh international conference "Advanced technologies of hydroacoustics and hydrophysics". June 8-10, 2004. St. Petersburg, Russia. P. 394-399.

Antropov I. V., Melkanovich V. S., Pavlovskiy Yu. A., Prosekov O. V. *Realization of the procedure of beam forming using the fast Fourier transformation of small order* // Proceedings of the seventh international conference "Advanced technologies of hydroacoustics and hydrophysics". June 8-10, 2004. St. Petersburg, Russia. P. 390-394.

Prosekov O. V. *Development of FFT algorithms for a nontraditional number of points* // Collected reports of the CRI "Morphyspribor" young specialist's first scientific and technical conference. 2003, Apr. 22-25. St. Petersburg. P. 116-121.

Reports at scientific-research seminar on Discrete Harmonic Analysis and Computer Aided Geometric Design:

Malozemov V. N., Prosekov O. V., Sabaev A. N. *Vilenkin-Chrestenson discrete functions* // Seminar "DHA&CAGD". Selected reports. 2008, January 16. 8 pp.
(<http://www.dha.spb.ru/reps08.shtml#0116>)

Malozemov V. N., Prosekov O. V. *Tensor product of matrices and commutativity* // Seminar "DHA&CAGD". Selected reports. 2007, August 21. 3 pp. (<http://www.dha.spb.ru/reps07.shtml#0821>)

Prosekov O. V. *Parametric version of multidimensional fast Fou-*

	<p><i>rier transform</i> // Seminar “DHA&CAGD”. Selected reports. 2006, September 26. 8 pp. (http://www.dha.spb.ru/reps06.shtml#0926)</p> <p>Malozemov V. N., Prosekov O. V. <i>Parametric factorization of Fourier matrix</i> // Seminar “DHA&CAGD”. Selected reports. 2006, September 19. 9 pp. (http://www.dha.spb.ru/reps06.shtml#0919)</p> <p>Malozemov V. N., Prosekov O. V. <i>The general approach to calculation of the DFT</i> // Seminar “DHA&CAGD”. Selected reports. 2006, September 12. 6 pp. (http://www.dha.spb.ru/reps06.shtml#0912)</p> <p>Malozemov V. N., Prosekov O. V. <i>Parametric version of the prime factors method</i> // Seminar “DHA&CAGD”. Selected reports. 2006, September 5. 6 pp. (http://www.dha.spb.ru/reps06.shtml#0905)</p> <p>Malozemov V. N., Prosekov O. V. <i>Factorization of reverse permutation matrices</i> // Seminar “DHA&CAGD”. Selected reports. 2006, May 2. 8 pp. (http://www.dha.spb.ru/reps06.shtml#0502)</p> <p>Prosekov O. V. <i>On the fast Fourier transform of small orders</i> // Seminar “DHA&CAGD”. Selected reports. 2005, December 6. 29 pp. (http://www.dha.spb.ru/reps05.shtml#1206)</p> <p>Malozemov V. N., Prosekov O. V. <i>The fast computation of cyclic convolution of small orders</i> // Seminar “DHA&CAGD”. Selected reports. 2005, October 18. 11 pp. (http://www.dha.spb.ru/reps05.shtml#1018)</p> <p>Prosekov O. V. <i>Vector realization of the fast Fourier transform in MATLAB</i> // Seminar “DHA&CAGD”. Selected reports. 2004, September 28. 11 pp. (http://www.dha.spb.ru/reps04.shtml#0928)</p> <p>Malozemov V. N., Prosekov O. V. <i>Good's factorization of Fourier matrix</i> // Seminar “DHA&CAGD”. Selected reports. 2004, May 5. 5 pp. (http://www.dha.spb.ru/reps04.shtml#0505)</p> <p>Malozemov V. N., Prosekov O. V. <i>Cooley-Tukey's factorization of Fourier matrix</i> // Seminar “DHA&CAGD”. Selected reports. 2004, April 14. 10 pp. (http://www.dha.spb.ru/reps04.shtml#0414)</p> <p>Malozemov V. N., Prosekov O. V. <i>Permutations and tensor product of matrices</i> // Seminar “DHA&CAGD”. Selected reports. 2004, March 31. 8 pp. (http://www.dha.spb.ru/reps04.shtml#0331)</p>
Skills/Knowledge	<p>Programming languages: MATLAB, C/C++, Assembler, TeX, Pascal, Forth</p> <p>Platforms: Intel x86, Motorola DSP96xxx, Analog Devices ADSP-218x, Texas Instruments TMS320C64xx, ARC 600 series</p> <p>Technologies: VLIW, SIMD, RISC, STL, BLAS, OpenMP, MPI</p> <p>IDE & Compilers: GNU C Compiler, GNU Make, Intel C++ Compiler, Microsoft Visual Studio, Texas Instruments Code Composer Studio, Analog Device VisualDSP++, Metaware Tools</p> <p>OS: Linux, Windows, DSP/BIOS</p> <p>Professional and scientific interests: Discrete harmonic analysis, discrete transforms, fast algorithms especially fast Fourier transform, digital</p>

	signal processing, video and image coding, software optimization
Additional Information	<p>Awards: In 2009 was awarded by St.-Petersburg department of ARC International for excellent job in Real FFT project.</p> <p>In 2006 was awarded a premium by directive of director of CSI "Morphyspribor" for introducing new FFT algorithms in most important products of the institute.</p> <p>2004: as a post-graduate student, the applicant was awarded the Federal Education Agency grant (No. 04-2.8-415).</p> <p>2004: at the seventh international conference "Advanced technologies of hydroacoustics and hydrophysics" the applicant was rewarded for the report that had roused considerable interest of the conferees.</p> <p>2004: the monthly scientific grant in the name of leading Russian hydroacoustic scientists Aladyshkin E. A., Shelehov S. M. and Shenderov E. L., established by the scientific council of CRI "Morphyspribor" with the purpose of supporting young specialists, was awarded to the applicant.</p> <p>2003: the report at CRI "Morphyspribor" young specialist's first scientific and technical conference received an honourable mention in the director's order and the author was awarded a prize.</p> <p>2003: because of high results and active participation in research activities, the applicant received an award with the first degree diploma by competition for the best degree work at St. Petersburg Electrotechnical University.</p> <p>Activities: 24 April, 2007: the applicant took part in Texas Instruments Developer Conference, in Moscow, Russia.</p> <p>25-27 April, 2006: the applicant took part in Intel Developers Forum (IDF), in Moscow, Russia.</p> <p>6-13 February, 2005: the applicant took part in sessions of Winter School of young scientists and specialists "Parallel programming technology" in Nizhniy Novgorod, Russia.</p> <p>Managed diploma and course works for students of SPb. State University and LITMO.</p> <p>The applicant is an active member of scientific-research seminar "Discrete Harmonic Analysis and Computer Aided Geometric Design" and keeps the web site http://www.dha.spb.ru/</p> <p>English: Intermediate</p> <p>Hobbies/Leisure-time activities & interests: Heavy Metal music, books (Sci-Fi, fantasy), chess, table tennis, trips, ski and bikes</p>