Max Fomitchev-Zamilov

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Research Interests

High-risk/high-payoff research in physics; industrial and commercial applications.

Education

2000 - 2001 Moscow Institute of Electronic Engineering Moscow, Russia

Ph.D., Computer Engineering

- Researched and developed optimal-lag pulse-shaping system for ultrasound imaging (U.S. pat. no. 6167758)

1997 - 1998 University of Tulsa Tulsa, OK

Ph.D. Candidate, Computer Science

- Ph.D. program, 15 credit hours

1992 - 1997 Moscow Institute of Electronic Engineering Moscow, Russia

M.S., Computer Engineering

- Developed real-time ultrasound imaging software
- Graduated with Honorary Diploma

Professional Experience

2002 - present Quantum Potential Corporation State College, PA

Director

- Researching and investing in high-risk / high-payoff research and engineering projects with high potential for commercialization.

2006 - present Pennsylvania State University University Park, PA

Assistant Professor

- Teaching Software engineering (CSE420W) and Intermediate Programming (CSE122) courses.

2000 - 2006 Oden Insurance Services, Inc. Tulsa, OK

Software Development Consultant

- Principle developer / architect for Web Policy Terminator - large Intranet application for insurance compliance (C++, .NET, C#, COM, ASP, XML, SQL).
- Developed methodology for maximum code reuse and devised a scheme for 'clean' ASP programming.
- Educated company IT staff on .NET programming and OOP methodology.
- Achieved real-time insurance notice cancellation performance.

2000 - 2001 EnXnet, Inc. Tulsa, OK

Software Optimization Consultant

- Developed and optimized for maximum performance video compression software for ClearVideo ® codec (C++).

1999 - 2000 Advanced Micro Devices, Inc. Tulsa, OK

Performance Optimization Consultant

- Developed deformable 2D-surface demo-application showcasing the performance of AMD 3DNow!™ technology (C++, DirectX, Direct3D, 3DNow!™).
- Achieved 200% performance boost in comparison with the original C++ scalar code.

1997 - 2001 Leapnet, Inc. Tulsa, OK

Software Development Consultant

- Developed Electrical Equipment Management System for CSW, Inc. (C++, Win32, ODBC, ORACLE, PL/SQL).
- Developed auto-update methodology for corporate Intranet (C++, TCP/IP).
- Optimized Operation Outage Reporting System for CSW, Inc. by improving performance and eliminating redundant code (C++, ORACLE, PL/SQL).
- Developed System Outage Reporting system for CSW, Inc. (ASP, ORACLE).
- Developed workflow-tracking system for Williams Communications (ASP, SQL).
- Optimized legacy workflow-tracking system for Williams Communications (DHTML, XML, ASP).

Spring 2001 Helix Co. Ltd. Tulsa, OK

Principle Designer

- Developed low-cost hardware architecture for eSonic - electronic musical toy for children - based PIC 18-series microcontroller (8-bit, 12 MIPS, 32K RAM). The device features interactive autonomous music composition and real-time 4-channel sampled-based sound synthesis.
- Developed simulation software for real-time music composition and 4-channel sound synthesis (C/C++, DirectSound).
- Ported the software to PIC 18-series microcontroller and optimized C-code for performance to make real-time music synthesis possible with the low-MIPS 8-bit microcontroller architecture.

1997 - 1999 Ultrason Research Group Tulsa, OK

Senior Research Associate

- Participated software and hardware research and development effort aimed at delivering low-cost PC-based ultrasound imaging system.
- Researched and developed novel optimal-lag pulse-shaping system for ultrasound imaging (U.S. pat. no. 6167758).
- Designed and developed software for real-time ultrasound imaging optimized for super-scalar pipelined execution using Intel MMX™ instruction set.
- The developed MMX-optimized software yielded 600% performance boost in comparison with the original C++ scalar code.

1998 - 1999 Mountain Software, Inc. Tulsa, OK

Software Design Architect

- Designed and developed the core functionality of the *Lords of the Dawn* online role-playing game (C++, Win32, DirectX, Direct3D, TCP/IP, UDP).
- Devised server architecture for real-time multi-player request processing. Eliminated $100,000 Oracle Enterprise system by introducing custom DBMS architecture, which also achieved ~800% performance boost.
- Devised efficient multi-cast UDP protocol for client-server communication.
- Developed game player client software that featured real-time 3D graphics rendering of the virtual world maintained by the game system (C/C++, Direct3D).
- Developed an algorithm for real-time fractal landscape generation and efficient

landscape data storage.

1995 - 1997 AIMET Corp. Moscow, RU

Lead Developer

- Managed software development effort for flat polymer screen R&D project.
- Designed software for polymer LED modeling and luminosity visualization.
- Developed software for 3D crystalline structure dynamics modeling, simulation and visualization.

1992 - 1995 High-Temperature Superconductivity Lab. Moscow, RU

Junior Research Associate

- Researched principles for localization of magnetic field sources using superconductive magnetic field sensor grid.
- Developed software for magnetic field localization and 3D visualization.

Patents

U.S. Patent No. 6167758, *Ultrasound Imaging Device that Uses Optimal Lag Pulse Shaping Filters*, Fomitchev, Max I., filed 10/23/98, issued 01/02/2001.

Books

Enterprise Application Development with Visual C++ 2005, Thomson, 2006.

.NET Programming with Visual C++, CMP Media, 2003.

Columns

Daily *Software and Web Development* column for *TechSearch*, CMP Media.

Publications

Software (Peer Reviewed)

Fomitchev, Max I., *Discerning the Relationship between Unique Visitors and Unique IPs from Web Site / HTTP Traffic* Logs, IEEE Transactions on Computers, submitted December 30th, 2006.

Planetary Exploration (Peer Reviewed)

Fomitchev, Max I., *Transient Melt Water Ponding in Central Aram Chaos on Mars*, MARS, submitted March 24th, 2007.

Astrophysics (in preparation)

Fomitchev, Max I., *Quantum Potential of Gravity*.

Fomitchev, Max I., Grigorashvily, Yuri E., *Search for Gravity-Related Effects in High-Temperature YBaCuO Ceramics*.

Astrophysics (Conference Proceedings)

Fomitchev, Max I., *Quantum Potential as an Alternative to CDM Theory*, COSMO04 Conf. proc., 2004, CITA, Toronto.

Ultrasound Imaging (Dissertation)

Fomitchev, Max I., *Method and Apparatus for Controlling Transmitted*

Ultrasound Pulse Shape, Doctoral Dissertation, MIET, Moscow, March 2000.

Ultrasound Imaging (Peer Reviewed)

Fomitchev, Max I.; Grigorashvily, Yuri E.; Volkov, Svyatoslav, *Ultrasonic Pulse Shaping with Optimal Lag Filters*, International Journal of Imaging Systems and Technology, vol. 10, issue 5, 1999, pp. 397-403.

Grigorashvily, Yuri E.; Fomitchev, Max I., *Ultrasound System with Pulse-Shape Control*, Izvestia vuzov, Electronika, №2, 2000, pp.70-74.

Fomitchev, Max I., *Introduction into Wavelets*, Matematicheskaya Morfologiya, Smolensk, vol. 3, issue 1, 1998.

Ultrasound Imaging (Conference Proceedings)

Fomitchev, Max I.; Grigorashvily, Yuri E.; Volkov, Svyatoslav, *Cost-Effective Ultrasound Imaging Apparatus that Uses Optimal-Lag Pulse Shaping Filters*, 1999 IEEE International Ultrasonics Symposium Proceedings, 1999 Vol. 1, pp. 691-694.

Grigorashvily, Yuri E.; Fomitchev, Max I., *Ultrasound System with Pulse-Shape Control*, In Proceedings of International Conference “Sensor-2000”, Sudak, 2000, p.112.

Web Services

Fomitchev, Max I., *Mixing Managed and Unmanaged Code in XML Web Services*, DDJ, November 2004.

Fomitchev, Max I., *Integrating XML Web Services With VB6 Applications*, DDJ, vol. 402, 2004.

Fomitchev, Max I., *Wrapping C++ COM Components as XML Web Services*, CUJ, vol. 403, 2004.

Code Optimization

Fomitchev, Max I., *Digital Signal Filtering in C*, CUJ, vol. 22, no. 10, 2004.

Fomitchev, Max I., Hershberger Joe R., *Real-Time Music Synthesis and Embedded Applications*, DDJ, vol. 332, January 2002, pp. 55-60.

Fomitchev, Max I., *Optimizing 3DNow! Real-Time Graphics*, DDJ, vol. 315, August 2000, pp.40-46.

Fomitchev, Max I., *MMX Technology Code Optimization*, DDJ, September 1999, vol. 304.

3D Graphics

Fomitchev, Max I., *2D Surface Deformation*, Gamasutra, February 2000.

Fomitchev, Max I., *Building Versatile 3D Apps with Direct 3D*, VCDJ, vol. 3, no. 6, July 2000, pp. 20-25.

C/C++ Programming

Fomitchev, Max I., *Automatic Updates for Distributed Applications*, DDJ, vol. 314, July 2000.

Max I. Fomitchev, *Open a Window from a Console Application*, VCDJ, vol.6, no. 11, November 1999, pp. 1-4.

Fomitchev, Max I., *Enhanced Database Classes*, VCDJ, vol. 6, no. 10, October 1999, pp.1-4.

Fomitchev, Max I., *Automated Update for Distributed Applications*, Part 2, VCDJ, vol. 6, no. 9, September 1999, pp. 6-9.

Fomitchev, Max I., *Automated Update for Distributed Applications, Part 1*, VCDJ, vol. 6, no. 8, August 1999, pp. 1-6.

Fomitchev, Max I., *A Resizable Property Sheet that Uses Dialog Resource*, VCDJ, vol. 6, no. 7, July 1999, pp. 10-13.

Fomitchev, Max I., *Printing with List View Controls*, VCDJ, vol. 6, no. 5, May 1999, pp. 9-10.

Fomitchev, Max I., *Create AVI Files on the Fly*, VCDJ, vol. 6, no. 4, April 1999, pp. 13-15.

Fomitchev, Max I., *HTML Help in Distributed Environments*, DDJ, October 1998.

Online Publications

Fomitchev, Max I., *Video Codec on Fast Forward*, DDJ *Optimize to the Max* Column, May 2001.

Fomitchev, Max I., *Balancing 2D and 3D Game Graphics*, DDJ *Optimize to the Max* Column, April 2001.

Fomitchev, Max I., *Can Software Leasing Fix Bloatware?*, DDJ *Optimize to the Max* Column, March 2001.

Fomitchev, Max I., *The Price of Convenience*, DDJ *Optimize to the Max* Column, February 2001.

Fomitchev, Max I., *Winning the Passing Game*, DDJ *Optimize to the Max* Column, January 2001.

Fomitchev, Max I., *Room for Improvement*, DDJ *Optimize to the Max* Column, December 2000.

Awards

Winner of *Know the Code* contest sponsored by Advance Micro Devices, 1999.

Honorary Diploma, MIET, Russia, 1997.

Languages

English, Russian, some German.