Mikhail* Matrosov

C++ developer

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C++ jedi. Create software and know what teamwork is. Solve problems and optimize everything. Good at communicating with people and love to teach people. About me, in three words: C++, GIT, Visual Studio.

* Letter "k" is not pronounced in my name, it is [mʲɪxɐˈil], like Gorbachev.

Skills

Programming languages

primary **C++**: from 2005, image processing applications, multi-threaded applications, console utilities, GUI with Qt and MFC, 3D-graphics, CAD systems; making internal and public technical talks and seminars.
Matlab: from 2007 till 2014, algorithms and GUI prototyping, mex-interfaces.

secondary **Python**, **C#**, **JavaScript**, **SQL**: small utilities, home projects, simple web-applications.

Libraries and technologies

primary **STL**, **boost**, **OpenCV**, **Qt**, **Intel IPP**: multiple image processing projects, problems in areas of combinatorial theory, numerical analysis, graph theory, 2D and 3D geometry.

secondary **Microsoft ConcRT**, **Intel MKL**, **OpenSceneGraph**, **CGAL**, **ASP.NET**, **jQuery**: shallow knowledge, used only in several projects.

Applications and systems

primary **Windows**, **Visual Studio**, **SmartGit**, **GIT**, **SVN**, **Total Commander**, **Conan**

secondary **Unix**, **LaTeX**, **Photoshop**, **bash**

Scientific and fundamental knowledge

Image processing [1], color theory [2], computer vision, computer graphics, algorithms, data structures.

Productivity

Touch typing in both English and Russian layouts. To optimize movements of the right hand during typing, created a special utility called KeysRemapper (see "Contributions" section).

Experience

from 2019/09 till 2019/10 **Higher School of Economics**
Faculty of Computer Science
Bachelor's Programme "Applied Mathematics and Information Science"
Introduction to Programming (pilot stream)
Lecturer.
Practical lessons on C++ for the group 193-2. Basic language concepts, discussion of homework, basics of the modern CPU architecture, Q&A.

from 2019/01 **Align Technology Inc**, *Expert developer, BMS team.*
Extract a part of a monolith application developed by our team into a web service. The service is hosted in AWS and runs on Linux. The monolith application runs locally on Windows. Implement cloud logging with Splunk.

from 2018/02 till 2018/12 **Align Technology Inc**, *Expert developer, 3D platform team.*
Continue work in 3D platform team. Improve management of C++ third-party libraries: switching from a custom solution to Conan package manager. Technical guidance and mentoring of a team of junior developers working on cross-platform support for a subset of applications. Upgrade compiler from Visual Studio 2013 to Visual Studio 2017.

from 2017/01 till 2018/02 **Align Technology Inc**, *Technical manager, 3D platform team.*
Switch completely to global software problems, affecting all developers. Migration to 64-bit platform. Support for localization. Support for Unicode. Unification of code formatting. Architectural rework: model/view separation. Vision of the future software evolution. Plus enhancement of development process as before.

from 2016/02 till 2016/12 **Align Technology Inc**, *Technical manager, BMS team.*
Business analysis: gathering of requirements for new features from all positions including software end users and doctors. Cross-command communication for successful integration of features in all components. Company promotion: public talks and blog posts. Plus all the same as before.

from 2014/12 till 2016/02 **Align Technology Inc**, *Senior developer, BMS team.*
Developing CAD-application for orthodontic treatment planning. Managing development of features to enter teen segment of the market. Enhancing development process: code review, GIT workflow, coding standards, static analysis. Geometric algorithms on solid 3D bodies. Code base modernization.

from 2013/10 till 2014/10 **OctoNus Software Ltd, Digital Microscope project**, *Developer.*
Prototyped virtual navigation system through a number of photographs of an object, system has six degrees of freedom. Developed color correction algorithm, based on a color space continuous transform through a number of pivots. Did development and support of Qt-based application for visualization and processing of video-stream from network cameras. Elaborated plugins system and SDK. Improved application components interaction.

from 2008/08 till 2013/09 **OctoNus Software Ltd**, *Developer*
Analysis of problems in a jewelry images acquisition software. Image processing algorithms development and integration. Effectively implemented in C++ using Intel IPP and Microsoft ConcRT a number of algorithms of tone mapping, extended depth of field, color correction, image-based 3D-reconstruction and 3D-models stitching. Developed lens breath compensation algorithm. For all the algorithms collected relevant data from partners, analyzed state of the art methods, prototyped solutions in Matlab. Implemented algorithms work in real time and are used in jewelry industry for quality control tasks.

from 2009/10 till 2013/10 **Graphics and Media Lab, CMC MSU**, *Researcher*
Member as a PhD student, research activity in OctoNus projects (see above).

from 2011/02 till 2011/05 **CMC MSU**, *Lecturer*
C++ laboratory course for students.

from 2004 till 2006 **Summer Informatics School**, *Lecturer, Counselor*
Theoretical and practical courses for group C.

Public talks

Talks marked with ⋆ symbol deserve to be highlighted. Talks with captions in English were given in English.

⋆ 2019/11 **C++ Russia 2019 Piter**
"Спецификаторы, квалификаторы и шаблоны"

⋆ 2019/04 **C++ Russia 2019 Moscow**
"Как мы апгрейдили компилятор и поддерживали кроссплатформенность"

⋆ 2018/10 **SECR 2018**
"Как не потонуть в пучине легаси"

2018/02 **C++ Russia 2018**
"Versatile C++ applied"

⋆ 2017/10 **SECR 2017**
"Reverting a merge"

⋆ 2017/09 **CppCon 2017**
"Refactor or die"

2017/04 **SECON 2017**
"Повседневный C++: алгоритмы и итераторы"

⋆ 2017/02 **C++ Russia 2017**
"Повседневный C++: алгоритмы и итераторы"

2017/02 **C++ CoreHard Winter 2017 Conference**
"Повседневный C++: алгоритмы и итераторы"

⋆ 2016/02 **C++ Russia 2016 Conference**
"Повседневный C++: boost и STL"

2016/02 **C++ Corehard Conf 2016**
"Повседневный C++: boost и STL"

2015/10 **Conference CEE-SECR 2015**
"Повседневный C++"

⋆ 2015/02 **C++ Russia 2015 Conference**
"C++ without new and delete"

2014/10 **Meeting of C++ User Group, Russia**
"C++ без new и delete"

Personal projects and contributions

from 2019/02 till 2019/5 **Основы разработки на C++: чёрный пояс**, *Coauthor*

A coursera course created together with Yandex. Fifth out of five in the specialization Искусство разработки на современном C++. In my block I teach about undefined behavior and go through a big trainig problem of creating a spreadsheets engine (like Excel and backend for Google Spreadsheets).

from 2018/09 till 2018/12 **Основы разработки на C++: коричневый пояс**, *Coauthor*

A coursera course created together with Yandex. Fourth out of five in the specialization Искусство разработки на современном C++. Has 5.0 rating in three month after the launch. In my block I teach about Smart Pointers.

2017/05 **DllDispatcher**, *Author*

The tool that allows to associate dll files with different applications based on dll bitness. One application for 32-bit dlls and another for 64-bit dlls. Designed for associating dlls with corresponding versions of Dependency Walker.

2015/03 **boost.python**, *Contributor*

Pull request #15. Fix #11100 and #8058: binary compatibility and leaked file handle in exec_file().

2014/10 **KeysRemapper**, *Author*

When CapsLock is switched on, this utility turns a part of alphabetic keyboard into navigation buttons: arrows, Ins, Del, Home, End, etc. Such a simplified Vim, but working in the entire OS, not in text editor only.

from 2012/06 till 2013/07 **NativeViewer**, *Author*

A Visual Studio extension for visualization of OpenCV images during debug of native C++ applications. Opposed to Microsoft Image Watch, works with Visual Studio versions starting from 2003.

2012/02 **OpenCV**, *Contributor*

Patch #1641. Discrete Voronoi diagram: returning closest pixel instead of connected component in distanceTransform.

from 2010/01 **StackOverflow**, *Contributor*

Over 10k reputation, over 80 accepted answers.
Top 10% for tags `c++`, `algorithm` and `image-processing`.
Top 20% for tags `matlab` and `opencv`.

Trainings and certificates

2020/02 **SOLID Principles of Object-Oriented Design and Architecture**

Link to the certificate.

2019/04 **The Bits and Bytes of Computer Networking**

Networking basics from Google. Link to the certificate.

2014/06 **An Overview of the New C++ (C++11/14)**

Intensive technical training by Scott Meyers.

Education

from 2009 till 2012 — **Moscow State University**
Computational Mathematics and Cybernetics department
PhD student.

from 2004 till 2009 — **Moscow State University**
Computational Mathematics and Cybernetics department
Student, specialist.
Graduation work [1]. Won admission without matriculation because of I degree diploma in XVI Russian Olympiad in Informatics.

from 2001 till 2003 — **Summer Informatics School**
Student of groups C and A.
Studying a variety of algorithms and data structures.

Languages

English — Advanced.

Russian — Native speaker.

Publications

[1] Михаил Матросов. Методы построения изображений расширенной глубины резкости. *Сборник тезисов лучших дипломных работ ВМК МГУ 2009 года*, pages 12–13, 2009.

[2] Mikhail Matrosov, Alexey Ignatenko, and Sergey Sivovolenko. Locally adapted detection and correction of unnatural purple colors in images of refractive objects taken by digital still camera. In *Transactions on Computational Science XIX*, volume 7870 of *Lecture Notes in Computer Science*, pages 117–130. Springer Berlin Heidelberg, 2013.