

# Mikhail<sup>\*</sup> 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 [mʲixɐ'ɪl], 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**
- secondary **Unix, L<sup>A</sup>T<sub>E</sub>X, 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).

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## Experience

- from 2017/01 **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. Architectural rework: model/view separation, undo mechanism. Vision of the future software evolution.
- from 2016/02 **Align Technology Inc**, *Technical Manager*.  
till 2016/12 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 **Align Technology Inc**, *Senior developer*.  
till 2016/02 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 **OctoNus Software Ltd**, **Digital Microscope project**,  
till 2014/10 *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 **OctoNus Software Ltd, Developer**  
 till 2013/09 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 **Graphics and Media Lab, CMC MSU, Researcher**  
 till 2013/10 Member as a PhD student, research activity in OctoNus projects (see above).
- from 2011/02 **CMC MSU, Lecturer**  
 till 2011/05 C++ laboratory course for students.
- from 2004 **Summer Informatics School, Lecturer, Counselor**  
 till 2006 Theoretical and practical courses for group C.

## Personal projects and contributions

- 2017/04 **SECON'2017, Speaker**  
 Talk "Повседневный C++: алгоритмы и итераторы".
- 2017/02 **C++ Russia 2017, Speaker**  
 Talk "Повседневный C++: алгоритмы и итераторы".
- 2017/02 **C++ CoreHard Winter 2017 Conference, Speaker**  
 Talk "Повседневный C++: алгоритмы и итераторы".
- 2016/02 **C++ Russia 2016 Conference, Speaker**  
 Talk "Повседневный C++: boost и STL".
- 2016/02 **C++ Corehard Conf 2016, Speaker**  
 Talk "Повседневный C++: boost и STL".
- 2015/10 **Conference CEE-SECR 2015, Speaker**  
 Talk "Повседневный C++".
- 2015/03 **boost.python, Contributor**  
 Pull request #15. Fix #11100 and #8058: binary compatibility and leaked file handle in exec\_file().
- 2015/02 **C++ Russia 2015 Conference, Speaker**  
 Talk "C++ without new and delete".
- 2014/10 **Meeting of C++ User Group, Russia, Speaker**  
 Talk "C++ без new и delete".

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 **NativeViewer**, *Author*

till 2013/07 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 75 accepted answers.  
Top 10% for tags c++, algorithm and image-processing.  
Top 20% for tags matlab and opencv.

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## Trainings and certificates

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

Intensive technical training by Scott Meyers.

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## Education

from 2009 **Moscow State University**

till 2012 Computational Mathematics and Cybernetics department  
*PhD student.*

from 2004 **Moscow State University**

till 2009 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 **Summer Informatics School**

till 2003 *Student of groups C and A.*  
Studying a variety of algorithms and data structures.

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## Languages

English Advanced. Easy reading and writing about an arbitrary topic.  
Easy conversation about a technical topic.

Russian Native speaker.

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## 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.