

# Sergey Bashkirov

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## Summary

Application software engineer with R&D experience in software and firmware development for scientific devices with active open source community participation; experienced in GUI design, hardware to computer communication, firmware, RTOS, real time applications, motors control, pneumatics regulation, Atomic Force Microscopy, semiconductor Kelvin probe analysis, Raman TERS imaging, electrochemistry, actuators control; have experience in algorithms design, data acquisition and processing, computer vision, machine learning; rapid prototyping and electrical debugging; good project management abilities, problem solving R&D experience.

## Areas of expertise

**Programming:** Crossplatform, embedded programming, realtime algorithms, RTOS, embedded scripting, 2d/3d visualization

**AFM:** Contact, semicontact, Kelvin probe, MFM, PFM

**Math:** 2d/3d geometry, computer vision, machine learning, statistics, image processing

**Raman:** Confocal Raman, coupled mapping, TERS imaging

## Personal achievements

- Created from scratch software for controlling Atomic Force Microscope.
- Reduced AFM modes development time and eased prototyping by implementing scriptable GUI builder and hardware embedded real time scripting language.
- Reduced hardware design time by making expandable stackable PCB solutions consisting of identical PCBs. Made it for pneumatics control and stepper motors control.
- Simplified "find the same place" task for AFM after sample reinstallation by making video aligning and navigation by video mode.
- Reorganized production and supplies purchase processes by performing statistical predictive contracts analysis. Made business control software for warehouse keeping, product assembling, purchasing and contracts tracking.
- Achieved high precision with equipment made of low cost components by applying machine learning techniques to calibration process.

## Technical proficiencies

**Programming:** C, C++, Java, microcontroller assembler

**Platforms:** Linux, Windows, ChibiOs, FreeRTOS

**Frameworks:** Qt, Boost, Swing, WxWidgets

**Microcontroller series:** ST Cortex-M; Atmel AVR8; Analog Devices Shark DSP, NXP ARM7TDMI, Altera FPGA, CPLD

**Visualization:** Widgets design, Spatial, 3D geometry, 2D/3D visualization

**Scripting:** Lua, Ruby, Python, Maxima, SQL, R, Shell scripting

**Web technologies:** Ruby-on-rails4, Javascript, Bootstrap

**Various:** Hardware interfaces (I2C, SPI, USART, JTAG, TWI, SMBus), PCB design, Spice, electrical debugging, soldering skill

**Prototyping:** Capable to rapidly prototype electromechanical software and/or firmware controlled solutions

**Math:** Computer vision, Kalman filtering, machine learning, statistics, data, image processing

## Most recent work experience

**Aist-NT Inc.**

**Novato, CA**

*Software Engineer*

AFM software development, firmware development, image processing, AFM modes design, AFM-Raman coupling, actuators control, data acquisition and processing, production control

**Transmag**

**Santa Rosa, CA**

*Contract*

USB based BLDC motor controller's interface development. Designed firmware, user interface, suggested proper USB schematics.

**NT-Mdt**

**Moscow, Russia**

*Software engineer*

Scanning probe microscope and auxiliary devices programming. Designing drivers, firmware, user interface, algorithms.

## Education

**Moscow Institute of Physics and Technology**

**Moscow, Russia**

*Master of Science in Applied Mathematics and Physics*

- **Most recent courses taken:** Circuits & Electronics, Machine learning, Autonomous navigation, Kalman filtering, SAAS, Statistics with R, Node.JS, Angular.JS, Booststrap, JavaScript.

## Open source projects participation

**grambo-pi.com:** Created expandable stackable PCBs set for RaspberryPi computer for robot prototyping.

**xonotic.org:** Created Blend2map Blender3D to MAP exporter.

**chibios.org:** Submitted I2C slave mode driver, IWDG driver.

**QtLua:** Provided a patch making Object::connect() work in the same way as in Qt.

**Gaw:** Provided a patch fixing crashes with default configuration file for gaw waveform viewer.