

# Roman Shcherbakov

Work authorization: US citizen

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<http://astroman.org>

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## SOFTWARE DEVELOPER

Looking for a challenging and stimulating software engineer/developer position to continue professional growth. Established academic researcher with Harvard education and a lifelong passion for learning and software development. Have strong background in object-oriented design, GUI programming, scientific code writing, high-performance computing, and data analysis.

## TECHNICAL SKILLS SUMMARY

**Languages:** Java, C/C++, SQL, Pascal, Delphi, TCL, HTML, CGI, Wolfram Mathematica, LaTeX

**Design/Concepts:** object-oriented design, code optimization, code testing, quality assurance, automatic code generation, OpenMP parallelization, cross-platform implementation

**Tools:** SVN, GIT, VMWare, GNU Scientific Library

**Platforms:** Windows, Linux, and UNIX in cluster environment

**IDEs:** Eclipse, Microsoft Visual Studio, KDevelop, Borland Delphi IDE

## SOFTWARE DEVELOPMENT EXPERIENCE

### 3yrs Delphi object-oriented programming, GUI programming

- ✓ developed Windows user application which tests guessing/extrasensory abilities
- ✓ developed a sorting aid application for visual selection of exam questions

### 5yrs C/C++ scientific code development

- ✓ developed a unique massively parallel ASTRORAY code (2700 lines) for ray-tracing near black holes, wrote code documentation, released to public
- ✓ published ASTRORAY code internal testing and convergence testing results for quality assurance
- ✓ developed fast and precise computation of Bessel functions using integral representation
- ✓ disseminated pieces of original C/C++ code to other research group members

### Java

- ✓ Oracle Certified Associate, Java SE 7 Programmer (93% exam score)

### Linux, UNIX

- ✓ used and maintained multiple distributions as primary desktop systems, in virtual machines (Ubuntu, Fedora, CentOS), integrated in Windows (Cygwin), and in supercomputer environment (UNIX)

### 15yrs Wolfram Mathematica

- ✓ automatic code generation for C
- ✓ test case design and execution
- ✓ scientific computations, model development and fitting, timing analysis
- ✓ visualization of results
- ✓ employed for each of 15 successfully completed projects
- ✓ gave presentations on best practices, introduced to homework for Harvard undergrad course

### Software version control

- ✓ SVN stand-alone and integrated in MVS; GIT
- ✓ employed for both code and reports/papers

### TCL scripting

- ✓ developed an envelope for a scientific software package employed in 2 research projects

### CGI web-scripting

- ✓ developed a server-based data-mining robot
- ✓ participated in building of ad-posting robot

### High-performance computing (national XSEDE facilities; Harvard, UMD, and Stanford clusters)

- ✓ OpenMP parallel code development, execution, and optimization

- ✓ finding parallelization setup optimal for CPU load, I/O load, intra- and inter-node memory bandwidth
- ✓ scripting for BSUB, QSUB schedulers
- ✓ scaling tests

### **BIG data**

- ✓ experience analyzing, reprocessing, and visualizing: 3TB fluid dynamic simulations data
- ✓ employed fluid simulations data as input for ASTORAY code

## **DATABASES**

### **SQL, MySQL, JDBC**

- ✓ basic experience: self-study course, executing/modifying queries in MySQL, integration w/ Java

## **PROFESSIONAL SKILLS**

### **Excellent ability to work both independently and in a team**

- ✓ finished 5 projects independently and 10 projects as a part of a team/collaboration
- ✓ worked with 5 different teams, initiated setting up teams
- ✓ co-advised 2 junior team members on projects

### **Code testing and quality assurance**

- ✓ published internal tests and convergence tests of C/C++ ASTORAY code
- ✓ performed automatic C code generation, test case design and execution in Wolfram Mathematica
- ✓ had extensive refereeing and judging experience
- ✓ finished one project on amending previous computations by others

### **Exceptional problem solving skills**

- ✓ completed 11 scientific projects as a lead
- ✓ recognized by 6 grant awards over 10yrs (e.g. NASA Hubble Postdoctoral Fellowship, NASA ESSF)
- ✓ aced standard tests (e.g. GRE Physics 990/top 5%, GRE General Quantitative 800/top 2%)
- ✓ absolute winner of MIT Undergrad Physics Olympiad for 4 years in a row
- ✓ a candidate for the International Physics Olympiad
- ✓ received multiple awards in Russian Physics, Math, and Chemistry Olympiads

### **Communication skills, teaching, coaching**

- ✓ written reports (papers) on 15 finished projects, all published in top refereed Astronomy journals
- ✓ oral presentations – 3 university colloquium talks, 3 invited conference talks, 25 conference presentations, 1 press-conference talk, and 3 public talks
- ✓ introduced Mathematica methods into homework for Harvard undergrad course
- ✓ teaching fellow for Harvard core undergrad, advanced undergrad, and grad courses
- ✓ coached National Russian teams for International Physics Olympiad, successfully implemented innovative teaching method
- ✓ worked in Jury of Russian Physics Olympiads as senior grader supervising a team of graders

### **Ability to work and multi-task in a dynamic high-energy team environment**

- ✓ worked on up to 3 projects simultaneously reporting to different team leads
- ✓ successfully completed projects by self-imposed deadlines

## **WORK AND EDUCATION**

University of Maryland, College Park, MD, USA	2011-2014
<b>Postdoctoral Research Associate</b> , Astronomy	
<b>Harvard University</b> , Cambridge, MA, USA	2006-2011
<b>PhD</b> , Astronomy, 2011; GPA 3.96/4.00, GRE Physics 990, GRE 800Q	
Moscow Institute of Physics and Technology (MIPT), Dolgoprudny, Russia	2001-2006
<b>Master w/ Honors</b> , Applied Mathematics and Physics, 2007; GPA 4.00/4.00	
Computer Science courses: computer architecture; Assembler; Linux; Object-Oriented Programming.	

## **PERSONAL ACHIEVEMENTS**

**Financial simulations** – developed successful code to become Round 1 Winner of 2010 degreeTrade competition by DC Energy (prize: Apple Ipad, retail value 629\$)

**Community contribution** to Google Maps – many problems with directions positively resolved

**Distributed computations** – participating in Einstein@home distributed computations (reached top100)

**Hardware** – assembled multiple workstations and servers from parts