Sergei **Tumanov**

About

I am a C++ full-stack developer with a PhD in material science and background in data processing UI/UX. Over the last two years I developed three native Windows desktop tools for scientific applications (X-Ray difraction). I delivered software solutions end-to-end, including design, implementation, automated testing and UI/UX research.

In my scientific career I developed several MATLAB solutions for acquiring and processing of spectroscopic data and published 12 articles over 5 years in the field of molecular magnetism.

Seeking a software engineer position that emphasizes technical expertise, visual development, and a strong impact on end users.

Skills

Programming: C++17, boost, OpenCV, OpenGL, Windows API, UI/UX design, Python, MATLAB, Visual Studio

Material science: EPR, FTIR-spectroscopy, Single-Crystal and powder XRD**,** DipTrace, Solidworks

Work Experience

2023-present **C++ full-stack developer** *STOE & Cie. GmbH, Darmstadt*

Main developer for:

- X-Area Poly *Scientific software for XRD data analysis, obtains 1D XRD powder patterns from 2D XRD frames*.
- X-Area Mask *Software for editing 2D frame mask files.*
- X-View *Camera accessing and polycrystal modeling software*
- Viewspace *3D voxel data viewer*

Key Achievements and Technical Contributions:

- Major performance improvements. Changed 4M-pixel frame loading pattern with cache optimizations - x100 faster data loading, added concurrency - x10 faster data processing
- Reworking of legacy systems (C / Fortran), including adding test coverage and migrating large codebases to modern C++
- UI design for intuitive workflow within a complex software solution with accessibility features
- New functionality - simultaneous multiple data frames handling employing concurrent processing
- New feature development - Drawing tools implementation: brush, shaper, polyline
- Complex geometry calculations - offset cylindrical to plane projection transformations
- Nelder–Mead optimization algorithm implementation for frame simulation / re-calibration
- Authored comprehensive user manuals and technical documentation
- Developed general-use static utility library which is used across multiple solutions

- Integrated a third-party library for Industrial Cameras for machine vision into our codebase through usage of synchronization primitives
- Low-level memory management - memory leaks, smart resource allocation, padding consideration, 32 to 64 bit project adaptation

2018-2023 **Engineer** *Group of terahertz-induced processes at the International Tomography Center, Siberian Branch of the Russian Academy of Sciences (ITC SB RAS), Novosibirsk*

- Developed embedded hardware control systems *C++, PID control loops, modular Arduino-based detectors, Modbus protocol*
- Designed models and blueprints for 3D printing and production*, complex THz light-focusing system, pressure detector, helium gasholder*
- Designed double sided PCBs *layout for manufacture of PCBs for modular Arduino-based detectors*
- Built hardware systems *control of pressure, temperature and irradiation in spectroscopic experiments*

2015-2023 **Researcher** *Electron Paramagnetic Resonance (EPR) laboratory ITC SB RAS, Novosibirsk*

- Developed and conducted complex experiments for studying properties of molecular magnetic materials *9 high-impact publications, 12 total. Key player in 6 scientific grants*
- Automated acquiring of spectroscopic data
- Developed MATLAB tools for general processing and modeling of spectroscopic data
- Worked with single-crystal XRD, parsed .cif files
- Optimized performance of vector operations in MATLAB scripts
- Worked with tensor calculus *Python/ Wolfram Mathematica, finding direction of the easy magnetization axis*
- Speaker at 8 international scientific conferences
- Designed scientific posters and presentations

2020-2021 **Teaching experience** "*Electricity and Magnetism" course at Novosibirsk State University (NSU)*

Education

2018-2021 - **PhD student** *NSU / ITC SB RAS, PhD thesis "Study of the effects of thermal and photo-switching in new magnetoactive complexes based on Cu(II), Fe(II), and Co(II) using EPR and IR spectroscopy"*

2016-2018 - **Master of Chemical Physics** *NSU, GPA 4.8/5, including Python, Wolfram Mathematica and Mechanical engineering courses*

2012-2016 - **Bachelor of Physics** *NSU, GPA 4.7/5, including C++, Linear algebra and Math courses*

2010-2012 - **High School** *The Specialized Educational Scientific Center on Physics and Mathematics of NSU*

Languages

English fluent, **German** intermediate, **Russian** native