Ilia Sidorov

Mechatronics & R&D Engineer · Precision Equipment

Quy Nhơn, Vietnam · Open to relocation to Austin, TX

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Application: Senior Mechatronics Engineer, Precision Systems · fab2

PROFILE

Hands-on engineer with 5+ years in scientific instrumentation, combining precision mechanics, optics, industrial electronics integration and control software. Independently designed, assembled and debugged a working DMD-based maskless photolithography system, including its wafer process. Experience spans CAD, component sourcing, contractor manufacturing, system integration, calibration and testing, plus production support for a fluorescence tomography instrument.

SELECTED BUILD · MASKLESS PHOTOLITHOGRAPHY SYSTEM

Owned the complete build: requirements, architecture, mechanical and optical design, component selection, manufacturing coordination, assembly, control software, calibration and resist processing.

- **Electromechanical integration:** integrated Delta ASDA-A2 servo drives over CANopen, optical linear scales, a TI DLP4710 DMD projection head and a 440 nm LED into a working lithography tool.
- **Practical mechanical design:** designed parts for machining and assembly, worked with contractors and suppliers, and used industrial components to balance performance, cost and build complexity.
- **Calibration:** used a camera in the wafer plane to measure stage/projector rotation, axis scale and orthogonality, then applied geometric corrections in software. Illumination calibration raised field uniformity from 49–70% to 97–98%, depending on objective.
- **Control software:** built Python/PySide6 software for GDSII import and field tiling, step-and-repeat, CANopen motion, contrast autofocus, substrate height mapping and exposure interlocks.
- **Physical result:** established spin coating, exposure-dose sweeps and development; patterned a 25 × 25 mm silicon test chip using 1,869 exposure fields with no visible seams.
- **Next iteration — mechanical pre-assembly:** designed a modular XYZ platform using servo-driven ball screws, crossed-roller guides and optical scales. Mechanical components have been manufactured and trial-assembled; finished-system performance remains a design target.

Build evidence: iliasidorov.com/lithography#design-vs-result
Calibration data: iliasidorov.com/calibration · **Motion design:** iliasidorov.com/motion-platform

TECHNICAL SKILLS

Mechanical: precision mechanisms, optomechanics, DFMA, prototyping, assembly, CNC manufacturing coordination; Fusion 360, Autodesk Inventor, FreeCAD.

Integration & control: servo drives, CANopen, optical linear scales, camera integration, DMD projection, autofocus, geometric and illumination calibration; Arduino, PLCs.

PCB work: laid out custom single-layer, CNC-milled boards for power switching.

Software: Python, PySide6 / Qt, OpenCV; hardware control, image processing, GDSII workflows and engineering automation.

EXPERIENCE

Independent R&D Engineer · Maskless lithography project

2026–present · Quy Nhơn, Vietnam

- Brought the independently developed maskless lithography system to a working Prototype 1.0 and designed its modular successor; technical details and build evidence on page 1.
- Preparing the transition to production through specifications, manufacturing partner search, demonstrations and sample exposures.

Project Engineer · Abisense

Feb 2022–Aug 2026 · Sochi, Russia · Biomedical optical imaging

- Refined selected subassemblies of a fluorescence tomography device, then supported its serial production.
- Developed scientific instruments from requirements and prototypes through debugging, testing and implementation.

Mechanical Engineer · MIPT, Nanobiotechnology Laboratory

Feb 2022–Aug 2026 · Moscow Institute of Physics and Technology, Russia

- Developed optical and microscope subsystems for research in genomic technologies and optogenetics.
- Built and tested a prototype for controlled photoactivation of micro-samples.

Research Laboratory Assistant → Junior Specialist · Sirius University

Mar 2021–Dec 2023 · Sochi, Russia · Nanobiomedicine

ADDITIONAL BUILDS & ENGINEERING TOOLS

- **Microscopy and scanning:** fluorescence microscopes and a histology slide scanner with a motorized stage, autofocus, height mapping and image stitching; stage calibration using phase correlation and focus stacking.
- **Earlier lithography stepper:** approximately 500 nm lateral resolution over a 100 × 100 mm working area, stitched from fields up to 2 × 2 mm; used to fabricate microfluidic devices.
- **Selective photoactivation:** supervised assembly of a setup for neurons and cell cultures based on the earlier stepper; the setup supported a bachelor's thesis work.
- **CAD and layout automation:** HybridDesign workbench for FreeCAD, FusionMCP for AI-assisted Fusion 360 operation, and GDSII/microfluidic layout tools.

Portfolio: iliasidorov.com/projects · **Control software:** iliasidorov.com/software

EDUCATION

Master's degree · Applied Mathematics and Physics
Moscow Institute of Physics and Technology (MIPT), Phystech School of Biological and Medical Physics

Bachelor's degree · Applied Informatics
National Research University of Electronic Technology (MIET) · 2013–2017

LANGUAGES

English — Professional working proficiency · Russian — Native