Lyuboslav Petrov

Full-Stack Researcher · Consultant

Sofia, Bulgaria · petrov.lyuboslav@gmail.com

Education

2011–2013

Doctoral Candidate, Complex Systems Simulation

Institute for Complex Systems Simulation (ICSS), University of Southampton · Southampton, UK

Integrated programme: MSc year 2011–2012, then doctoral research at the intersection of complexity science and high-voltage physics — emergent and chaotic behaviour of partial-discharge phenomena at the Tony Davies High-Voltage Laboratory, published in two IEEE papers. Departed at the preliminary stage; no thesis submitted.

2008–2011

BSc (honours), Renewable Energy Technologies

University of Dundee · Dundee, Scotland

1999–2003

Information Technologies

High School of Electronics "John Atanassov" · Kyustendil, Bulgaria

Experience — Vocational

06/2025–present

Solo Developer — Ontology-Based Query Systems

Independent · Sofia, Bulgaria

Independent research and development of ontology-based query systems: domain-agnostic data virtualisation, automated ontology inference from heterogeneous structured and unstructured data sources, and natural-language to structured-query translation, with an accompanying benchmark harness for evaluating query-generation quality.

11/2024–05/2025

AI Solutions Architect

Strypes LTD · Sofia, Bulgaria

Architect and lead engineer for AI-augmented software engineering initiatives: design and implementation of agent harnessing frameworks, development methodologies for human–agent collaboration, and applied research into agent memory, retrieval, and evaluation. Architected a domain-agnostic data-virtualisation

platform exposing unified query interfaces over heterogeneous structured and unstructured sources, with automated schema discovery, ontology inference, and benchmark-driven quality evaluation. Additional contributions to infrastructure upgrade management and scientific-instrument qualification procedures.

02/2024–09/2024

AI Projects and Infrastructure Consultant

PirinBit LTD · Sofia, Bulgaria

Project ideation and development, refinement and strategies, infrastructure and architecture development.

08/2015–01/2024

Python Developer, Technical Lead, Architect

Strypes LTD · Sofia, Bulgaria

Designed, developed, and maintained the software lifecycle-management system and automated backup solutions for the worldwide leading lithography systems provider. Moved up fast — from Python developer to architect and technical lead, holding that level for most of the nine-plus years.

01/2015–08/2015

Industrial R&D, CNC Control System Developer

Torgoterm AD · Kyustendil, Bulgaria

Designed and developed the control system for an innovative high-precision industrial welding machine.

2014–2015

Computer Vision & Machine Learning

Independent · Sofia, Bulgaria

Developed a tracking system for automated sports-video tracking, event detection, and analysis.

Experience — Research

2024–present

AI-Augmented Software Engineering

Applied research into human–agent collaboration for software delivery: agent harnessing patterns, long-horizon agent memory and retrieval, evaluation of agent reliability, and structured development methodologies that embed AI assistance into the engineering loop.

2024–present

Data Virtualisation and Natural-Language Query

Research into domain-agnostic ontology inference from heterogeneous data sources, natural-language to structured-query

translation, and benchmark-driven evaluation of query-generation quality across open datasets.

2024–present

Computer Vision for Sports Analytics

Ongoing research into AI-driven sports-video understanding, event detection, and fan-experience enhancement.

Projects

2024–present

Agent-Harnessing Toolkit

Designed and implemented a family of frameworks for AI-augmented development: a multi-phase engineering methodology, a mechanism for authoring and enforcing engineering standards through agents, and an advanced memory-retrieval layer for long-running agent sessions.

2024–present

Unified Query Platform

Architected and built a domain-agnostic platform that automatically introspects heterogeneous structured and unstructured data sources, infers an ontology, and exposes unified programmatic, graph, natural-language, and agent-tool query interfaces — with an accompanying benchmark harness for measuring query-generation quality.

Technical Skills

Programming Languages	Python, SQL, Bash
Web Frameworks & Tools	Django, Flask, FastAPI
Cloud & Containerization	Docker, AWS Services
Computer Vision	Hands-on experience with OpenCV, YOLO, Matlab CV System Toolbox
Python Tech-Stack	Proficient with the core Python data-wrangling stack incl. NumPy, SciPy, Matplotlib, Jupyter, Pandas, scikit-learn, scikit-image
Machine Learning	TensorFlow & Keras, PyTorch, scikit-learn

AI-Augmented Engineering	Agent harnessing, structured human–agent development methodologies, engineering-standards enforcement via agents, long-horizon agent memory and retrieval
Data & Query Systems	Automated schema discovery, ontology inference, natural-language to structured-query translation, graph and vector data stores, benchmark-driven evaluation of query-generation quality
LLM Integration	Multi-provider abstraction for local and hosted large language models, prompt caching, tool use, structured outputs, agent protocols

Publications

Journal Article	*L. Petrov, P. Lewin, T. Czaszejko, "On the applicability of nonlinear time series methods for partial discharge analysis," IEEE Transactions on Dielectrics and Electrical Insulation, vol. 21, no. 1, pp. 284–293, Feb. 2014.* 10.1109/TDEI.2014.6740751.
Conference Article	*P. L. Lewin, L. Petrov, L. Hao, "A feature based method for partial discharge source classification," 2012 IEEE International Symposium on Electrical Insulation, pp. 443–448.* 10.1109/ELINSL.2012.6251507.

Languages

English	Full professional
German	Full professional