Dr. Vahram Martirosyan

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Teaching Profile

Doctor of Computational Mathematics with **nearly 20 years of classroom teaching** across universities in Armenia and the UAE, combined with **23+ years** of systems, compiler, and software engineering practice. I teach core computer science and mathematics from first principles to working implementations, and I bring production systems experience directly into the classroom: operating systems, Linux kernel modules and device drivers, POSIX/Win32 systems programming, LLVM/Clang compiler passes, automatic parallelisation, and binary lifting. Currently **Assistant Professor** (multi-campus) at Higher Colleges of Technology and **Course Team Leader** for System Architecture & Integration. Courses span programming (C, C++, Python, Java), data structures and algorithms, computer architecture, operating systems, discrete mathematics, statistics, machine learning, and data science.

Core CS & Mathematics

- **Programming:** C, C++, Python, Java, C#, .NET, JavaScript.
- **Systems:** Operating Systems, Linux/POSIX, Win32 API, Linux device drivers, system programming, computer architecture, IoT & security.
- **Foundations:** data structures & algorithms, discrete mathematics, applied discrete mathematics, computational thinking.
- **Data & Mathematics:** statistics & probability, database management systems, machine learning, data science, data analysis & visualisation.
- **Advanced:** high-performance computing in C++, GUI development (GTK+), compiler and parallel-computing concepts.

Books & Programming Tutorials

Programming tutorials for C/C++ and Linux/POSIX, from system calls to GUI applications.

- *Programming via Operating Systems*, 2nd ed. (2024); 1st ed. (2022).
- *Basics of Programming in OS Linux Environment* (MIPT, 2011); *Tutorial: Programming in GNU/Linux Environment* (RAU, 2010).

OS & Compiler Highlights

- **LLVM/Clang auto-vectoriser** for Xilinx ACAP at System View Armenia: **2009**× **peak GPU** and **32.1**× **CPU** speed-up.
- **Linux kernel verification** at ISP RAS / Russian-Armenian University: led the System Programming Laboratory; verified system libraries and kernel modules (Ext4, XFS, JFS, BTrFS); built the Spruce verification system.
- **HPC++**: LLVM-based automatic parallelisation for C++ with 7 strategies and zero source changes; 2009.4× GPU and 32.1× CPU peak.
- **LEAP**: lifts legacy x86-64 binaries to recompilable IR; 100% liftability at `-O0`, 98% at `-O1`..`-O3`; 3.7× geomean, 10.4× over `-O0`, 2.2× over `-O2`.
- **Systems engineering:** hand-written C++ inference engine, browser WebAssembly training, sub-millisecond inference, 0.88 ms on ESP32.
- **Teaching OS:** Operating Systems at YSU, RAU, and Armsoft; Linux/POSIX, Win32, device drivers, system programming; author of *Programming via Operating Systems* (2nd ed., 2024).

Selected Teaching Experience

Assistant Professor, Computer Information Science — Jan 2024 – Present
Higher Colleges of Technology, Abu Dhabi, UAE
Fundamentals of Programming (Java), System Architecture & Integration, IoT & Security, Data Structures & Algorithms, Machine Learning, Data Science, Statistics & Probability.

Course Team Leader — Jan 2025 – Jun 2026
Higher Colleges of Technology, Abu Dhabi, UAE
Led lecturers across multiple HCT campuses for System Architecture & Integration; developed course materials, assessments, and standardised delivery frameworks.

Senior Lecturer (Contract) — Feb 2021 – Dec 2023
Yerevan State University, Faculty of Informatics & Applied Mathematics
Operating Systems; supervised undergraduate research projects.

Faculty Lecturer (Contract) — Jan 2023 – Dec 2023
Université française en Arménie (UFAR), Yerevan
Computer Architecture I and C Programming.

Visiting Lecturer (Contract) — Aug 2022 – Jan 2023
American University of Armenia, Yerevan
Introduction to Computer Science.

Full teaching record, courses taught, education, systems/compiler experience, and selected publications on the following pages.

Full Teaching Experience

Assistant Professor, Computer Information Science Jan 2024 – Present
Higher Colleges of Technology, Abu Dhabi, UAE
Fundamentals of Programming (Java), System Architecture & Integration, IoT & Security, Data Structures & Algorithms, Machine Learning, Data Science, Statistics & Probability.

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Computer Architecture I and C Programming.

Visiting Lecturer (Contract) Aug 2022 – Jan 2023
American University of Armenia, Yerevan
Introduction to Computer Science.

Informatics Teacher (Contract) Sep 2023 – Dec 2023
PhysMath School After A. Shahinyan, Yerevan, Armenia
Taught Informatics at a specialist physics-mathematics secondary school.

Founder & Lecturer Jan 2019 – Jun 2023
MutEx School, Yerevan
Founded and ran an independent programming school; designed curricula and delivered public lectures.

Lecturer Sep 2013 – Dec 2019
Armsoft CS Learning Center, Yerevan
Operating Systems.

Lecturer Feb 2015 – Jun 2015
Armenian Code Academy, Yerevan
.NET / C# Programming.

Senior Lecturer Feb 2007 – 2014
Russian-Armenian (Slavonic) University, Yerevan
Linux/POSIX Programming, Win32 API, Linux Device Driver Development, GUI Software Development (GTK+), Operating Systems, System Programming, Database Management Systems.

Courses Taught

- **Programming:** Fundamentals of Programming, C Programming, C++ Programming, High-performance Computing in C++, .NET/C# Programming, Introduction to Computer Science.
- **Systems & Architecture:** System Architecture & Integration, Computer Architecture I, Operating Systems, Linux/POSIX Programming, Win32 API Programming, Linux Device Driver Development, System Programming.
- **Data & Mathematics:** Data Structures & Algorithms, Discrete Mathematics, Applied Discrete Mathematics, Database Management Systems, Statistics & Probability.
- **Machine Learning & Data Science:** Machine Learning, Data Science, Applied Machine Learning, Data Analysis & Visualisation.
- **Emerging Topics:** IoT & Security, Computational Thinking, GUI Development (GTK+).

Education

Doctor of Computational Mathematics 2006 – 2009
Yerevan State University
Dissertation: “Construction of an Algorithm for the Pseudoinversion of Bidiagonal Matrices and an Investigation of its Parallelization”.

M.Sc., Informatics and Applied Mathematics 2004 – 2006 Yerevan State University
B.Sc., Informatics and Applied Mathematics 2000 – 2004 Yerevan State University

Systems, Compiler & Research Experience

Chief Scientist Jan 2026 – Present
ExplainableAI.app
Directing scientific strategy and model architecture for a browser-first, no-code ML platform built on intrinsically interpretable polynomial regression models. Platform combines browser-side WebAssembly training, a hand-written C++ inference engine with sub-millisecond latency, and an app builder that turns trained models into shareable local web apps. Delivered 0.88 ms ESP32 inference, a 657 KB Sentinel-1 oil-spill detector at 11,500 tiles/s, and 99.7% compression of a 123M-parameter ECG classifier.

Chief Executive Officer Jun 2022 – Jul 2023
System View Armenia, Yerevan
Developed an LLVM/Clang-based auto-vectoriser for Xilinx ACAP (Visual System Integrator toolchain); peak speed-up 2009× on GPU and 32.1× on CPU.

Head of System Programming Laboratory Jan 2009 – Jul 2013
Russian-Armenian University / ISP RAS, Yerevan
Led the RAS System Programming Laboratory; directed Linux Foundation verification of system libraries and kernel modules; managed a team of researchers and engineers.

Junior Research Scientist 2003 – 2005
Institute of Mathematics, National Academy of Sciences of RA
Parallelisation of numerical algorithms for integral equations using MPI.

Selected Compiler & Systems Projects

- **LEAP — Lifting Legacy x86-64 Binaries to Recompilable IR for Automatic Parallelization** (ITCA 2026, accepted). 43-program liftability study: 100% at `-O0` and 98% at `-O1`/`-O2`/`-O3`; 3.7× geomean from source IR; uplifted binary 10.4× over `-O0` and 2.2× over `-O2`; 958× peak GPU offload; 377/377 tests pass.
- **HPC++ — LLVM-Based Automatic Parallelization for C++ with GPU Acceleration** (arXiv, 2025). Seven parallelisation strategies with zero source modification; 2009.4× GPU and 32.1× CPU peak; correctness across 134 unit and 18 integration tests.
- **Linux file-system driver verification** (ISP RAS, 2011–2012). Dynamic verification of Ext4, XFS, JFS, and BTrFS drivers; Spruce system for quality verification of Linux kernel modules.
- **Programming via Operating Systems**, 1st ed. 2022, 2nd ed. 2024 (Hilfmann Press); *Basics of Programming in OS Linux Environment* (MIPT, 2011); *Programming in GNU/Linux Environment* (RAU, 2010).

Selected Publications

- Martirosyan, V. "High accuracy, no signal: an identifiability and external-validation audit of climate and nitrogen response in China's cereal yield data." *Computers and Electronics in Agriculture* (submitted), 2026.
- Martirosyan, V., Martirosyan, N. "Interpretable polynomial surrogates for halide-perovskite screening: domain-cleaned bandgaps, ideal tandem limits, and the limits of forward prediction." *Solar Energy Materials and Solar Cells* (submitted), 2026.
- Martirosyan, V. *Programming via Operating Systems*, 2nd ed. Hilfmann Press, 2024.
- Martirosyan, V. *Programming via Operating Systems*. Hilfmann Press, 2022.
- Martirosyan, V., Shatokhin, E., Rubanov, V. *Basics of Programming in OS Linux Environment* (in Russian). MIPT, 2011.
- Martirosyan, V. et al. *Tutorial: Programming in GNU/Linux Environment — From System Calls to the GUI* (in Russian). RAU Publishing, 2010.
- Martirosyan, V. "LEAP: Lifting Legacy x86-64 Binaries to Recompilable IR for Automatic Parallelization." *ITCA 2026* (accepted).
- Martirosyan, V. "hpc++: An LLVM-Based Automatic Parallelization System for C++ with GPU Acceleration." *arXiv*, 2025.
- Tsyvarev, A. V., Martirosyan, V. A. "Testing of Linux File System Drivers." *Proceedings of the Institute for System Programming of the RAS*, vol. 23, pp. 413–426, 2012.
- Tsirunyan, K., Martirosyan, V., Tsyvarev, A. "The Spruce System: Quality Verification of Linux File Systems Drivers." *SYRCoSE 2012*.
- Martirosyan, V., Gishyan, S., Shatokhin, E. "Dynamic Verification of Linux File System Drivers." *CSIT 2011*, Yerevan.

Teaching, Technical & Professional Skills

- **Teaching & curriculum:** course design, assessment design, standardised multi-campus delivery, course-team leadership, undergraduate research supervision, curriculum development for programming schools.
- **Languages:** C/C++ (expert), Python, Java, C#, SQL, JavaScript/WebAssembly.
- **Systems:** Linux kernel modules, device drivers (Ext4, XFS, JFS, BTrFS), POSIX/Win32, GTK+, IoT/embedded systems.
- **Compilers & HPC:** LLVM/Clang, binary lifting, OpenCL, MPI, POSIX threads, SIMD auto-vectorisation, heterogeneous CPU–GPU execution, Xilinx ACAP.
- **Tools:** Git, Linux/Unix, LaTeX. **Languages:** Armenian (native), Russian (fluent), English (fluent).

Additional Industry Experience

Director of Software Engineering, Plat.AI (2023) · Associate Software Development Manager / Principal Software Engineer & Team Lead, HelpSystems Armenia (2017–2022) · Software Architect (contract), Priotix (2018–2020) · Principal/Senior Software Developer, Optym (2015–2017) · Senior Software Developer, ArdInnoTekh (2013–2015) · Software Developer, ISMoTech (2006–2008) · Software Developer, Lycos Europe (2005–2006).

References available on request. · Updated October 2026.