

Sasha (Augusto) Kielbowicz

Quantitative Systems Architect | Research Software Engineer

Buenos Aires, Argentina | augusto.kiel@gmail.com | saxa.xyz

[GitHub](#) | [LinkedIn](#) | [Talks](#)

Executive Profile

Scientific Architect with a Physics background and elite tenure at Tier-1 financial institutions (Qontigo, SimCorp, Mercado Libre). I specialize in **High-Performance Computing**, **Neural Stochastic Differential Equations (NeuralSDEs)**, and **Domain-Specific Languages**. I help firms bridge the gap between “Research” and “Production” by engineering systems that are mathematically rigorous and computationally efficient.

My Physics degree (Licenciatura, University of Buenos Aires) taught me to model complex problems by finding the right level of abstraction. Combined with production experience across tier-1 financial institutions, I deliver solutions that are both theoretically sound and operationally robust.

Core expertise: High-Performance Computing • Neural Stochastic Differential Equations • Multi-asset pricing systems • Risk analytics • DSL development • Numerical optimization • Python/C#/Julia • System Architecture

Engagement Focus: Performance Optimization Sprints, Deterministic AI Architecture, DSL Design, Architectural Design Sprints, Specialized Corporate Training.

Consulting Services

High-Performance Computing (HPC) Optimization

- Performance audit and optimization for numerical bottlenecks
- Vectorization, caching, and parallelism strategies
- 300% performance gains achieved in production systems
- Real-time computational finance optimization
- Multi-asset class pricing and valuation frameworks

Deterministic AI & Scientific Machine Learning

- Neural Stochastic Differential Equations (NeuralSDEs) implementation
- Math-aware RAG systems for financial documentation
- Integration of deep learning with physical laws and constraints
- Safe AI architecture for financial applications

- Model calibration and validation using RSE principles

Domain-Specific Language (DSL) Architecture

- Custom language design for complex pricing models
- Interactive UI development for quantitative libraries
- Democratizing access to sophisticated mathematical models
- Research Software Engineering (RSE) enablement: Standardizing analytical workflows from Jupyter to production

Training & Knowledge Transfer

- High-Performance Numerical Computing with Julia workshops
- Scientific and numeric software development training
- Corporate workshops on quantitative finance and computational methods
- Technical mentorship for quant and engineering teams
- Interactive educational materials using Jupyter notebooks

Signature Case Studies

1. The Performance Optimization Sprint (Qontigo)

The Challenge: Critical risk calculations were too slow for real-time reporting due to unoptimized convertible bond pricing engines.

The Solution: Led a forensic performance audit and implemented cache optimization strategies in the core C# numerical library.

Outcome: Achieved a **300% performance gain**, enabling real-time production risk reporting and significantly reducing Azure compute spend.

2. The Scientific AI Implementation (Research/SimCorp)

The Challenge: Traditional Monte Carlo simulations for European Option Pricing were computationally expensive; standard AI lacked mathematical constraints.

The Solution: Managed research into **Neural Stochastic Differential Equations (NeuralSDEs)** using **Julia**, combining deep learning with physical laws. Parallelly developed an LLM-based RAG system for querying complex financial documentation.

Outcome: Demonstrated superior convergence speeds over traditional solvers and established a framework for “Safe AI” in financial contexts.

3. The “Quant Experience” Architecture (SimCorp)

The Challenge: Quants struggled to interact with complex underlying pricing models, leading to errors and slow iteration.

The Solution: Designed and developed a Proof-of-Concept **Domain-Specific Language (DSL)** and integrated interactive Jupyter-based UIs (Voila/ipywidgets).

Outcome: Democratized access to complex models, allowing non-engineers to safely construct and test pricing logic.

Professional Experience

Independent Consultant | Quantitative Software & Scientific Computing

January 2026 - Present | Buenos Aires, Argentina

Providing specialized consulting services to financial institutions and technology companies in quantitative system architecture, scientific computing, and analytical software development.

Current Focus: Multi-asset pricing libraries, risk analytics systems, DSL development, performance optimization, team enablement.

Mercado Libre | Software Technical Lead, IT Staff / Financial Planning & Analytics

June 2025 - Present | Buenos Aires, Argentina

Leading technology strategy and managing 14 engineers across Financial Planning & Analytics for Latin America's largest e-commerce ecosystem.

Key Focus: Strategy, Standardization & AI Workflows - Architecting scalable financial planning and analytics platforms - Championing AI-assisted development workflows and clean architecture standards - Transforming ad-hoc Jupyter analyses into CI/CD-managed production systems

Impact: 90% reduction in forecasting pipeline errors through RSE principles; 15% velocity increase across engineering team

Technologies: Go, TypeScript, Python, BigQuery, Jupyter, CI/CD, distributed systems

SimCorp | Lead Software Engineer, Core Analytics

March 2024 - May 2025 | Buenos Aires, Argentina

Delivered strategic initiatives for institutional investment management platform serving global asset managers.

Key Projects: - **Quant UI Integration:** Integrated quantitative analytics UI with Axioma Risk UI, enhancing user interaction and analytical capabilities for institutional investors - **DSL Development:** Designed and developed POC for Domain-Specific Language enabling intuitive interaction with complex pricing models - **AI-Powered Documentation:** Created POC for interactive Q&A chatbot for product documentation using LLMs and Retrieval-Augmented Generation (RAG) - **Automatic Differentiation:** Redesigned core libraries to support AD and collaborated with third-party providers for AD tooling integration

Technologies: C#, Python, Jupyter, Azure, LLMs, ipywidgets

Qontigo (Axioma Risk) | Associate Principal, Core Analytics

September 2020 - March 2024 | Buenos Aires, Argentina

Led development of core quantitative analytical libraries for multi-asset risk management platform used by institutional investors globally.

Associate Principal (February 2023 - March 2024)

Leadership & Architecture: - Managed and mentored junior developers, providing technical guidance and career development - Architected and maintained core Quant Analytical libraries ensuring robustness and accuracy - Led cross-functional initiatives bridging Quants, DevOps, and Engineering teams

Major Deliverables: - **Curve Construction Library:** Designed and developed comprehensive library for rates, yields, discounts, and spreads with full market conventions support - **Interactive Quant UI:** Led development of web-based UI using ipywidgets and voila, enabling interactive usage of Quant libraries without installation requirements - **Azure Deployment:** Managed containerized application deployment to Azure with automated CI/CD pipelines

Associate (September 2020 - February 2023)

Research & Infrastructure: - **NeuralSDE Research:** Managed internship focused on NeuralSDE applications for European Option Pricing using Julia language, successfully applying RSE principles to ensure model robustness and computational reproducibility - **Monorepo Architecture:** Designed and developed C# Monorepo infrastructure for Analytical Libraries, extracting quant and numerical code from monolithic repository into reusable, testable components - **APL Development:** Core contributor to Axioma Pricing Library (APL), migrating complex financial components from legacy Phoenix system

Key Achievements: - Migrated DayCountConventions class with 100% accuracy despite extreme complexity—creating new classes, hierarchies, and comprehensive test coverage - Migrated BondMaths statistics requiring deep quantitative finance knowledge - Implemented symbolic simplification and plotting capabilities for APL expressions - **Optimized Convertible Bond Pricing Engine, resulting in a 300% performance gain** and enabling real-time risk calculations in production - **Drove the design and development of the core Quant Monorepo (C#)**, establishing architectural standards that supported simultaneous deployment of multiple asset pricing libraries - Built developer tooling that became standard across QPRA team

Performance Reviews: - 2023: “Exceptional Performance” - 2022: “Strong Performance” (achieved 85% of stretch goal on advanced C# development) - 2020: “Strong Performance” (learned C# and quantitative finance from scratch)

Technologies: C#, Python, Julia, Azure, Git, Visual Studio, GitHub Actions, Jupyter, ipywidgets

J.P. Morgan | Technology Analyst, Rates CIB

July 2018 - August 2020 | Buenos Aires

Developed critical infrastructure for interest rate derivatives trading desk serving global markets.

Key Projects: - **Reporting Migration:** Architected and delivered the migration infrastructure for mission-critical Rates CIB reporting services from Kapital to Python (Athena), ensuring zero-downtime compliance - **Quant Support:** Provided critical technical support to Rates Quant team, enhancing analytical capabilities and operational performance - **Production Systems:** Built and maintained production-grade financial reporting systems with zero-downtime requirements

Technologies: Python, Smalltalk (Kapital), Athena framework, Linux

Open Source Contributor & Content Creator

February 2016 - Present

[@akielbowicz](#) | [YouTube: @SCA314](#) | [GitHub: SCA314](#)

- Creator of **SCA314**, an educational YouTube channel focused on software craftsmanship, scientific computing with Julia, and automated testing practices in Spanish
 - Development of interactive educational materials based on Jupyter notebooks
 - Contributions to scientific computing and data visualization projects
 - Educational content bridging academic knowledge and industry best practices
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Education

University of Buenos Aires | Licenciatura in Physics | 2011 - 2017 - *Thesis:* Statistical Analysis and Numerical Modeling of Single Particle Trajectories: Diffusion and Confinement Mechanisms - Focus: Stochastic processes, numerical modeling, computational physics

Universidad del CEMA | Advanced Risk and Portfolio Management (ARPM) | 2021 - Comprehensive program in quantitative finance and risk management

10 Pines | Software Engineering Certificate | 2018 - 2019 - Object-oriented design, software architecture, professional development practices

Teaching Experience

University of Buenos Aires

- **Professor** of Calculus and Linear Algebra, CBC Engineering (December 2020 - July 2022)
- **Teaching Assistant** on Summer Course of Optics and Thermodynamics for Biology and Geology (February 2015 - March 2015)
- **Science Communicator** at Physics Department (March 2013 - December 2014)

Southern International School

- High School teacher of Physics, Mathematics and Information Technologies (2016)
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Technical Skills

Programming Languages Production: Python, C#, Julia Functional/Niche Languages: F#, Clojure, Smalltalk

Leadership & Consulting Technical Mentorship • Solution Design • Requirements Elicitation • Corporate Training

Quantitative Finance Multi-asset pricing • Derivatives valuation • Risk analytics • Curve construction • Model calibration • Day count conventions • Bond mathematics • Portfolio management • Stochastic processes • Numerical methods

Scientific Computing Numerical optimization • Automatic differentiation • Stochastic differential equations • Performance profiling • Parallel computing • Cache optimization • Algorithmic complexity analysis

Software Architecture Microservices design • DSL development • API design • Monorepo infrastructure • Component extraction • Refactoring • Design patterns • SOLID principles

Cloud & DevOps Azure (deployment, containers) • Docker • GitHub Actions • CI/CD pipelines • TeamCity

Development Tools Git • Visual Studio • Jupyter notebooks • ipywidgets • Voila • Linux/Windows environments

Publications

Kielbowicz, A., et al. (2023). “Shared Memory Semi-Implicit Solver for Hydrodynamical Instability Processes.” *Scientific Research Publishing*. [Link](#)

Kielbowicz, A., et al. (2017). “Photon Counting Module based on Avalanche Photo-Diodes.” *Anales AFA*. [Link](#)

Speaking & Community Engagement

Conference Presentations: - **SciPy Latinoamérica 2022** (Argentina): Workshop presenter on quantitative computing - **Python & Julia Meetups** (Buenos Aires): Regular speaker on scientific computing topics - **ECI UBA** (2023): Represented Qontigo at School of Information Sciences, University of Buenos Aires

All talks available: talks.saxa.xyz

Community Involvement: - Active participant in Python and Julia scientific computing communities
- Contributor to local tech meetups and conferences - Mentor for early-career developers in quantitative finance

Languages

Spanish: Native **English:** Professional working proficiency

Professional Highlights

- ✓ **Exceptional Performance** at Qontigo (2023) - Top rating for strategic contributions to APL library and team leadership
 - ✓ **3x Performance Improvement** - Optimized convertible bond pricing through innovative caching strategies
 - ✓ **Zero-Defect Migration** - Migrated complex DayCountConventions with 100% accuracy across thousands of test cases
 - ✓ **Team Enablement** - Mentored interns who became full-time hires; created tools used across entire quantitative team
 - ✓ **Cross-Team Impact** - Successfully bridged Dev, DevOps, and Quant teams to deliver integrated solutions
 - ✓ **Innovation Leader** - Pioneered POCs for LLM-powered documentation and DSL-based model interaction
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Consulting Approach

Discovery: Deep dive into business requirements, technical constraints, and organizational goals

Strategy: Architecture design, technology evaluation, risk assessment, roadmap development

Delivery: Hands-on implementation, code reviews, performance optimization, quality assurance

Enablement: Knowledge transfer, documentation, training, team mentorship

Engagement Models: Project-based, retained consulting, fractional leadership, training programs

References and detailed project portfolios available upon request

Open to consulting engagements globally (remote) and on-site in Buenos Aires
