

**Alberto Hernández Espinosa**  
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## 1 Professional Summary

- AI researcher with over 10 years of experience leading scientific software development for universities and industry, specializing in artificial intelligence, cognitive science, and complexity science.
- Expertise in designing and deploying machine learning, deep learning, and causal AI models, with a proven track record of delivering impactful solutions (e.g., 53% cloud cost reduction).
- Published with Oxford University and Oxford Immune Algorithmics, contributing to advancements in artificial intelligence, integrated information theory and algorithmic complexity.
- Skilled in remote collaboration, having worked globally for 7 years, and prepared to work with interdisciplinary AI teams.
- AI Engineer Lead at K-Square Group, driving AI integration and fostering innovation through agentic platforms and research.

## 2 Skills & Expertise

- AI/ML Technologies: Python, TensorFlow, PyTorch, Scikit-learn, Keras, LangGraph, Ollama, RAG, Agents, Small Model Tuning
- Programming Languages: Python, R, C++, SQL, Mathematica, FastAPI, React
- Cloud & DevOps: GCP, AWS, Docker, FastAPI
- Data Science: Big Data, SQL/NoSQL, ETL, Pandas, NumPy, Matplotlib
- Domains: Artificial Intelligence, Complexity Science, Cognitive Science, Reinforcement Learning, Algorithmic Information Theory, Enhancing RAG with Complexity, Theoretical Limits on Intelligence of LLMs

## 3 Professional Experience

### 3.1 AI Engineer Lead, K-Square Group (Remote)

Nov 2024–Present

- Conduct and lead teams for implementation of AI-driven projects, enhancing team collaboration and project execution.
- Spearhead research and development of AI/ML applications tailored to specific industry challenges, focusing on innovation and efficiency.
- Design and oversee the integration of advanced AI technologies, including agentic systems and complex data processing pipelines.
- Develop and implement strategic frameworks for rapid prototyping and proof-of-concept development, aligning with organizational goals.
- Foster a culture of experimentation and continuous improvement, mentoring teams in leveraging AI tools effectively.

### **3.2 Chief AI Scientist, MilkStraw AI, San Francisco, CA (Remote)**

Oct 2022–Sep 2024

- Led research of AI-driven cloud resource optimization models on AWS, achieving up to 53% cost savings for clients.
- Designed and deployed ML pipelines using Python, TensorFlow, and PyTorch.
- Collaborated remotely with global teams to deliver scalable AI solutions.

### **3.3 Research Director, Laxford Capital (Remote)**

Jun 2019–Jul 2022

- Directed AI trading initiatives, developing reinforcement learning agents for financial markets.
- Oversaw model design and implementation in Python and PyTorch.
- Enhanced trading performance through causal AI approaches.

### **3.4 Research Collaborator, Oxford Immune Algorithmics & Oxford University, Oxford, UK (Remote with Visits)**

2015–Nov 2024

- Contributed to publications on integrated information theory and algorithmic complexity.
- Implemented models in Mathematica and Python.
- Co-authored papers with Oxford researchers, advancing cognitive science applications.

## **4 Education**

### **4.1 PhD in Philosophy of Science, UNAM, Mexico City, Mexico**

2015–2019 (Specialization: Artificial Intelligence and Cognitive science)

- Research focused on integrated information theory (Phi).
- CONACyT Scholarship.
- Education in association with University of Oxford, Computer Science Faculty.

### **4.2 Master in Computer Sciences, UNAM, Mexico City, Mexico**

2012–2014 (Specialization: Artificial Intelligence)

- Thesis on computational creativity models.
- CONACyT Scholarship.

## 5 Selected Projects

- Noesis: Agentic Agnostic Platform
  - Platform for creating AI/ML models (regression, classification, clustering, anomaly detection) using LangGraph, Ollama, local tuned models, FastAPI, and React.
  - Applied to Fraud Detection in financial and insurance institutions.
  - Code: <https://github.com/KSProjectX/test-xx> (restricted access).
- KS-Onboarding: Agentic Platform for Project Control and Onboarding
  - Deep agents for organizing projects, analyzing documentation/meetings, generating insights, and responding to questions using local/external information, OCR, and voice recognition.
  - Advanced RAG enhanced with complexity science based on high-level research (<https://arxiv.org/abs/2505.02581>).
  - Code: <https://github.com/KSProjectX/KS-onboarding> (restricted access).
- Agents for Automation of Running Tests
  - Agentic platform using user stories/use cases in natural language or code to dynamically create pytest test code and report coverage.
  - Code: <https://github.com/Sucharita8/KS-qe-platform> (restricted access).
- Stock Prices Prediction
  - Developed predictive and autonomous decision-making models for stock prices based on Deep Reinforcement Learning and advanced ML approaches.
  - Integrated time-series analysis and reinforcement learning.
  - Deployed on cloud platforms for real-time forecasting.
  - GitHub: [https://github.com/albertoHdzE/finance\\_1](https://github.com/albertoHdzE/finance_1), Detailed explanation: <https://sites.google.com/view/complexai/FINANCE>.
- Tononi’s Phi Implementation
  - Implemented Phi, a measure of integrated information for consciousness, in Mathematica. An approach to Algorithmic Artificial Intelligence.
  - Published findings in peer-reviewed journals, contributing to cognitive science.
  - GitHub: <https://github.com/albertoHdzE/Alpha>.
- MOSAICA: DNA Complexity Analysis
  - Investigated DNA sequence complexity using Machine learning with Python and Mathematica.
  - Correlated algorithmic complexity with DNA curvature.
  - Results published in academic papers.
  - GitHub: <https://github.com/albertoHdzE/MOSAICA>.

## 6 Publications

- 2025: “Neurodivergent Influenceability as a Contingent Solution to the AI Alignment Problem.” arXiv. <https://arxiv.org/abs/2505.02581>
- 2025: “SuperARC: An Agnostic Test for Narrow, General, and Super Intelligence Based On the Principles of Recursive Compression and Algorithmic Probability.” arXiv. <https://arxiv.org/abs/2503.16743>

- 2021: “Estimations of Integrated Information Based on Algorithmic Complexity and Dynamic Querying.” World Scientific. [https://www.worldscientific.com/doi/10.1142/9789811235726\\_0005](https://www.worldscientific.com/doi/10.1142/9789811235726_0005)
- 2017: “Is There Any Real Substance to the Claims for a 'New Computationalism'?” Springer. [https://link.springer.com/chapter/10.1007/978-3-319-58741-7\\_2](https://link.springer.com/chapter/10.1007/978-3-319-58741-7_2)
- 2013: “Does the Principle of Computational Equivalence Overcome the Objections Against Computationalism?” Springer. [https://link.springer.com/chapter/10.1007/978-3-642-37225-4\\_14](https://link.springer.com/chapter/10.1007/978-3-642-37225-4_14)

## 7 Certifications

- Mathematics for Machine Learning
- AI for Finance
- Google Cloud Specialization
- Reinforcement Learning
- Complexity Science

Full list of 47 certifications available here: <https://www.linkedin.com/in/alberto-hernandeze/details/certifications/>

## 8 Languages

- Spanish (mother language)
- English (advanced proficiency)
- German (Basic)
- French (Basic)
- Japanese (Basic)

Certifications available here: <https://www.linkedin.com/in/alberto-hernandeze/details/languages/>