

Humberto Sandmann



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Computer scientist specializing in bio-inspired neural computing, computational complexity and dynamics, pattern recognition, small-world theory, and banking knowledge. With a focus on understanding the foundations of human computation, I investigate biological neuronal approaches to replicate processing behaviors in computational intelligence.

In the realm of programming, I bring a strong background in highly complex domains, including modeling, software architecture, artificial intelligence, machine learning, deep learning, computer vision, cryptography, and high-performance computing, among others.

Research Interests

Computational for large-scale systems

Machine learning and artificial neural networks

Nonlinear systems and dynamics networks

Synchronization of coupled oscillators

Background

mar.2012 ↑	D.Sc. thesis	Polytechnic School of the University of Sao Paulo Spike patterns and computation in dynamical neural networks
mar.2007	doi advisor presentation supported by	10.11606/T.3.2012.tde-05092012-165022 Prof. Dr. Emilio Del Moral Hernandez slides CNPq - grant 140632/2007-7 (mar.2007 → dec.2009) \wedge (sep.2010 → feb.2011)
sep.2010 ↑	D.Sc. Internship advisor	Max Planck Gesellschaft für Dynamik und Selbstorganisation Prof. Dr. Marc Timme
aug.2009	supported by	CAPES - grant BEX 4076-09-5 jan.2010 → ago.2010 Pró-Reitoria da Pós-Graduação da USP aug.2009 \wedge dec.2009 (flight tickets GRU \rightleftharpoons FRA) José Humberto Sandmann - my father aug.2009 → dec.2009 (German language classes/exams) Max Planck Institute - Networks Dynamics Group aug.2009 → nov.2009 (accommodation in Goettingen)
jun.2006 ↑	M.Sc. dissertation	Polytechnic School of the University of Sao Paulo Prediction of time series using architecture based on neuro-fuzzy systems
feb.2003	doi advisor	10.11606/D.3.2006.tde-01042009-095125 Prof. Dr. Marco Túlio Carvalho de Andrade
dec.2002 ↑	B.Sc.	Faculdade de Engenharia Industrial Computer Science Bachelor
feb.1999		
dec.1998 ↑	Escola Técnica Jorge Street Technician in Industrial Computation	
feb.1996		



Lectures

now	Insper			
↑	Sao Paulo, Brazil			
jun.2018		now	Associate Professor	
		↑		
		feb.2020	Platform, Microservices and APIs	Spring Cloud, Spring Boot, PostgreSQL, Redis, RabbitMQ, Kafka, Docker, K8s 2025.1, 2024.1
			Cloud Computing	MAAS, Juju, OpenStack, K8s, IaaS, PaaS, Computer Networks 2025.1, 2024.2
			Design of Software	Python 2025.0, 2024.1, 2023.2, 2022.1, 2021.2, 2021.1
			Information System for Administration and Economy	Excel, VBA, Python, NumPy, Pandas, Stochastic Processes, ROI 2023.2, 2023.1, 2022.2
			Spreadsheet Automation in Excel	Excel, VBA 2021.1, 2020.1
		jan.2020	Assistant Professor	
		↑		
		aug.2018	Design of Software	Python 2019.2, 2019.1
			Foundations for Physical Communication	Python, Fourier Transform, Wavelet Transform, Signal Processing 2018.2
now	ESPM			
↑	Sao Paulo, Brazil			
jun.2014			Associate Professor	
			Applied Mathematics	Propositional Logic, Boolean Algebra, Set Theory, Polynomials, Functions, Sequences, Series, Logarithm, Combinatorial Analysis, Limits, Derivatives, Linear Algebra, Matrix Algebra, Graph Theory 2025.1, 2024.1, 2023.2, 2023.1, 2022.2, 2022.1, 2021.2, 2021.1, 2020.2, 2020.1
			Oriented Object Programming	Java, Design Patterns, Docker, Spring Cloud, Microservices 2025.1, 2024.1, 2023.1, 2022.1, 2021.1
			Statistics	Statistics, Probability, Random Variables, Distributions, Sampling, Estimation, Hypothesis Testing, Regression Analysis 2023.2
			Software Quality	Software Quality, Software Testing, Software Architecture, Software Engineering, Software Development Life Cycle, Agile Methodologies, Test-Driven Development, Behavior-Driven Development, Test Automation, Continuous Integration, Continuous Delivery 2024.2, 2022.2
			Architecture and Operating Systems	Computer Architecture, Operating Systems, Binary and Hexadecimal Number Systems, Number Representation, Data ESPM 16-bits 2021.1, 2020.2, 2020.1, 2019.2, 2019.1, 2018.2

		Representation, Assembly Language, Memory Management, Process Management, File Systems	2018.1, 2017.1, 2016.2, 2016.1, 2015.2, 2015.1, 2014.2
	Artificial Intelligence and Society	Artificial Intelligence, Machine Learning, Deep Learning, Neural Networks, Computer Vision, Natural Language Processing, PCA, KNN, K-Means, GANs, Transformers, LSTMs, BERT, Ethics, Bias	2022.1 (IR), 2021.1, 2020.2, 2020.1, 2019.2
	Introduction for Artificial Intelligence	Machine Learning, Deep Learning, Neural Networks, Computer Vision, Natural Language Processing, PCA, KNN, K-Means, GANs	2020.2, 2020.1, 2019.2, 2019.1
apr.2015	Toledo Prudente Centro Universitário		
↑	Presidente Prudente, Brazil		
mar.2015	Visiting Professor		
	MBA: Big Data and Machine Learning	Big Data, Hadoop, Hive, HBase, MongoDB, Neo4j, Solr, R, Octave, Self-Organizing Maps, Bayesian Decision Trees, Multilayer Perceptron	2015.1
dec.2015	FIAP		
↑	Sao Paulo, Brazil		
mar.2012	Associate Professor		
	Distributed systems	Sockets, RMI, SOAP, Microservices, J2EE, Design Patterns	2015
	MBA: Big Data and No-SQL Modelling	Big Data, Hadoop, Hive, HBase, MongoDB, Neo4j, Solr	2014.2
	Data Structure and Algorithm II	C, Data Structure, Algorithm, Complexity, Linked List, Stack, Queue, Tree, Red-Black Tree, AVL Tree, B-Tree, Hash Table, Graph, Dijkstra Algorithm, Prim Algorithm	2013
	Algorithms	C, Programming, Algorithm, Complexity	2013, 2012.2
	Database I and II	SQL, PL/SQL, Oracle, Transaction, Concurrency Control, Locking, Deadlock, Recovery, Normalization, ER Model, Relational Model, Object-Relational Model, Trigger, View, Index, Stored Procedure, Function, Package, Cursor, Sequence, Synonym	2013, 2012
	Programming III	Pointers, C, C++, Object-Oriented Programming, Inheritance, Polymorphism, Encapsulation, Abstract Class, Interface, Exception Handling	2012
jul.2013	Universidade Cruzeiro do Sul		
↑	Sao Paulo, Brazil		
mar.2012	Associate Professor		
	Mobile Programming	Android	2012.2
	Computer Architecture	Computer Architecture, Operating Systems, Binary and Hexadecimal Number Systems, Number Representation, Data Representation, Assembly Language, Memory Management, Process Management, File Systems	2012.1
	Software Engineering	Software Engineering, Software Development Life Cycle, Agile Methodologies, Test-Driven Development, Behavior-Driven Development, Test Automation	2012.1

	Introduction to Programming	C, Programming, Algorithm	2012.1
	Database II	SQL, PL/SQL, Oracle, Transaction, Concurrency Control, Locking, Deadlock, Recovery, Normalization, ER Model, Relational Model, Trigger, View, Index, Stored Procedure, Function, Package, Cursor, Sequence	2013.1, 2012.1
jul.2011	Universidade Nove de Julho		
†	Sao Paulo, Brazil		
mar.2011	Temporary Professor		
	Computer Architecture	Computer Architecture, Operating Systems, Binary and Hexadecimal Number Systems, Number Representation, Data Representation, Assembly Language, Memory Management, Process Management, File Systems	2011.1
	Introduction to Programming	C, Programming, Algorithm	2011.1
	Web Programming	HTML, CSS, JavaScript	2011.1
jul.2011	Polytechnic School of the University of Sao Paulo		
†	Sao Paulo, Brazil		
mar.2008	Teaching Assistant		
	Experimental Pattern Recognition, Modeling and Neurocomputing	Logic Gates, Linear Regression, Pattern Classification, UC Irvine Machine Learning Repository , NIST Data Gateway , Multilayer Perceptron, EEG Signals, PCA	2011.1*
	Modeling for Signal Processing: Neural Networks and Learning	Artificial Neural Networks, Multilayer Perceptron, Backpropagation, Forecasting, Time Series, Classification	2009.1 , 2008.1*
	Laboratory of the Foundations of Computing Engineering	Computer Architecture, Assembly Language, Memory Management, Process Management, Register, Stack, Turing Machine, Finite State Machines, Von Neumann Architecture, Java, Orientated Object Programming	2008.1†

* grants from CAPES (PAE)

† grants from FAPESP

Experiences

jun.2019	RockSpoon	POS, ERP, Payroll, JavaEE, Postgres, Software Architecture, OpenCV, Machine Learning, Computer Vision, GoLang, Android, Kotlin.
↑	Sao Paulo Area, Brazil - Palo Alto, United States	
may.2018	Senior Software Architect and Machine Learning Engineer	
jul.2016	Banco Votorantim	RoE, Banking Business, High-Performance Computing, J2EE, Spring Boot, Automating Testing, Jenkins.
↑	Sao Paulo Area, Brazil	
oct.2015	Contractor: Senior Consultant for Computational Optimization	
oct.2023	SelsanTech	Machine Learning, Software Architecture.
↑	Sao Paulo Area, Brazil	
mar.2012	Co-Founder	
nov.2011	TecBan	ATM, J2EE, InMemory Database, High-Performance Computing.
↑	Sao Paulo Area, Brazil	
aug.2011	Contractor: Senior Consultant for Computational Optimization	
jun.2007	ABN Amro Bank	Stock Market, Trading, Core Banking, Software Architecture, Cryptography, HSM, BouncyCastle, PKI, PCKS, Java, Servlet, Database.
↑	Sao Paulo, Brazil	
feb.2006	Contractor: Senior Software Engineer/Architect	
mar.2025	H-Sandmann	Machine Learning, Software Architecture.
↑	Sao Paulo Area, Brazil	
feb.2006	Founder	
jan.2006	Politec	J2EE, Software Quality, Software Architecture, Banking Business.
↑	Sao Paulo, Brazil	
aug.2005	Senior System Analyst	
jul.2005	EverSystems	PKI, BouncyCastle, Cryptography, HSM, Core Banking, Stock Market, Java, Servlet, Database, Communication Protocol, Synchronization and Replication.
↑	Sao Paulo, Brazil	
jul.2004	Senior Software Engineer/Architect - BankBoston - CitiBank - Elly Lilly	
mar.2003	Central Online	Object-Oriented Programming, LMS .
↑	Sao Paulo, Brazil	
sep.2002	Senior System Analyst	
sep.2002	Datamace	Payroll, ERP, Software Architecture.
↑	Sao Paulo Area, Brazil	
oct.1999	Senior System Analyst	
oct.1999	Heraeus Electro-Nite	Compliance, ERP, PCP.
↑	Sao Paulo Area, Brazil	
mar.1998	Computer Programmer	

Languages

Portuguese	native
English	advanced
German	B1

Publications

E. Del-Moral-Hernandez; H. Sandmann; G. Araujo; **Context dependent pattern recognition - A framework for hybrid architectures bridging chaotic neural networks based on Recursive Processing Elements and symbolic information**. IEEE Transactions on Neural Networks, 2009. doi: [10.1109/IJCNN.2009.5179061](https://doi.org/10.1109/IJCNN.2009.5179061).

L.A. da Silva; H. Sandmann; E. Del-Moral-Hernandez; **A self-organizing architecture of recursive elements for continuous learning**. IEEE Transactions on Neural Networks, 2008. doi: [10.1109/IJCNN.2008.4634190](https://doi.org/10.1109/IJCNN.2008.4634190).

E. Del-Moral-Hernandez; H. Sandmann; L.A. da Silva; **Pattern recovery in networks of recursive processing elements with continuous learning**. IEEE Transactions on Neural Networks, 2004. doi: [10.1109/IJCNN.2004.1379877](https://doi.org/10.1109/IJCNN.2004.1379877).

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