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OBJECTIVE

Senior Research and Technology Development position in National Lab, Corporate R&D, Startup, Professor Position in the fields of Artificial Intelligence, Machine Learning, Computer Vision, Robotics, Computer and Information Sciences, Electrical, Computer, Space Engineering

EDUCATION

Professional Certification, **Functional Programming in Scala Specialization**
Swiss Federal Institute of Technology (EPFL), Lausanne, Switzerland   November 2018

Professional Certification, **Advanced Computer Security**
Stanford University, Palo Alto, CA   September 2017

Professional Certification, **VLSI Engineering**
University of California, Extension Silicon Valley, Santa Clara, CA   March 2015

Doctor of Philosophy Ph.D., **Computer Science**
Nova Southeastern University, Ft. Lauderdale, FL   February 2002
DISSERTATION - Contributions to Supervised Learning of Real-Valued
Functions Using Neural Networks, Advisor: W. Shane Bruce

Diplom-Ingenieur Dipl.-Ing., **Electrical Engineering**
Karlsruhe Institute of Technology (KIT), Karlsruhe, Germany   February 1986
THESIS - Analysis and Implementation of Heuristical Algorithms for Two-Level
Logic Minimization of Digital Circuits, Advisor: Utz G. Baitinger

Diplom-Ingenieur Dipl.-Ing., **Telecommunications Engineering**
University of Applied Sciences, Karlsruhe, Germany   July 1985
THESIS - Denition and Specication of a Domestic Satellite Communication
System, Advisor: Wolfgang Ritzert

PROFESSIONAL HIGHLIGHTS

- Youngest IEEE Fellow ("Nobel" Prize in Engineering) in history worldwide.

- Chief Scientist (15 yr, 50+ vol) of Elsevier Science journal in Machine Learning.
- Artificial Intelligence(AI) Machine Learning(ML) expert: Computer Vision, NLP (Gen AI), Robotics.
- Decade long tenure as civil servant (Senior Research Scientist, Program Manager) of the German Federal Government at the German NASA (DLR), Robotics: Computer Vision, AI, Machine Learning; Communications & Navigation, Satellite & Digital Networks.
- Space Technology & Mission Development at DLR (Germany), NASA (USA at JPL in Pasadena, CA & MSFC, Huntsville, AL), with ESA (ESTEC, Netherlands).
- Designed and developed classified US DoD GPS flying vehicle & real-time machine learning, neurochips (Lockheed Martin, SAIC).
- Designed and developed NASA's new generation of fully autonomous, flying space robotic systems & missions including next gen Mars helicopters (JPL, Raytheon).
- Designed and developed the Next Generation Overhead Persistent Infrared (OPI) program space vehicle avionics for the U.S. Space Force (Northrop Grumman, Lockheed Martin, Ball Aerospace, Raytheon), the world-best early missile warning satellite constellation as integral part of the United States Golden Dome.
- Designed and developed NASA's most powerful launch vehicle SLS avionics, flght software, IVV (MSFC), for the U.S. human spaceflight program and most powerful unmanned spacecraft ever built for the deep space exploration program (JPL).
- Designed and Developed secure operating system at the highest level of trust (NSA, Harris).
- Designed and developed encryption-multimedia-wireless Southern California, USA start-up technology, sold for $ 1/3 Billion within 1 year to Broadcom (Irvine, CA).
- Conceived and Defined an 8-yr Program in Machine Learning for the German Federal Ministry of Research and Technology BMFT.
- Designed and developed DLR's space robot technology (vision-base control) flown with NASA's Spaceshuttle & ESA's Spacelab.
- Designed and Developed the fastest mission-critical real-time Supercomputer (hardware, software, applications) of its time, a real-time parallel distributed architecture which processed data pipelines for performing real-time predictive analytics, computer vision, control of multimedia streaming data coming down from NASA's Spaceshuttle to perform from space telerobotics from earth and astronuats all the way to fully autonomous robotics in space, beat the Cray.
- Designed telecommunications satellite system and earth observation satellite system, both launched and operational in space.

PROFESSIONAL EXPERIENCE

Brilliant Brains   January 2011 – Present
Palo Alto, CA   Chief Technologist

- Space:
  - since 2023, currently, hands-on working on mil space fw & interfaces to hw and flight sw for a U.S. Space Force program, on the design & verification of space SoCs/FPGAs of the U.S. next generation overhead persistent infrared (OPI) program mission-critical vehicle/payload, geo later polar (NGG/NGP). Protection of U.S. & allies against incoming threats relies on accurate detection & tracking of ballistic & hypersonic missiles' signatures & the built-in vulnerabilities resiliency against counterspace & cyberattacks. Satellite constellation is an integral part of the U.S. Golden Dome.
  - since 2022 designing & developing NASA's next generation of fully autonomous space robotic systems & missions including deep space, Mars autonomous aerial vehicles based on advanced, innovative system design, operational flight software, mission-critical, real-time custom System on Chip (SoC, FPGA) and hardware algorithmics to be flown with multiple missions.

- Planetary Defense: research and development of technology, systems and missions to address, mitigate, eliminate, the NEO/PHO impact hazard.
  - Launch Vehicles: design of more powerful system architectures and research, analysis of necessary technology advancement incl. strategies, systems, components, in particular human-rated to transport multitudes of people to different celestial bodies beyond current NASA SLS capabilities.
  - Earth Observation Satellite System: launch of original design, built by Airbus, with Arianespace Vega (2016) which became operational.

- SoC, ASIC, FPGA Design and Verification:
  - Coded using UVM, UVMF, SystemVerilog, SystemC, C, C++ direct test, constrained random verification, formal methods (SVAs, ABV), VHDL, OSVVM, C/D-DDD, HD/CS, VVS. Code line, condition, toggle, FSM, functional coverage.
  - Developed entire UVM (OOP) testbenches-DUTs, MAC, Cores, 100GE, Tx, Rx, FIFO, IO, Reg, DMA, bridge, switch, CPU, PCIe, DDRx, BFM, VIP. Design RTL coded in Verilog & VHDL.
  - Tools: Cadence, Synopsys, Siemens, Mentor Graphics, Microchip, Aldec, Virtuoso, Incisive,VCS, DVE, Magellan, VC Formal, Synplify Pro, QuestaSim, Modelsim, Libero, Riviera Pro, Matlab, SimuLink, Icarus Verilog, GTKWave, Verilator, OrCAD, PSpice, PADS, ...
  - Xilinx, Microchip, Intel-Altera FPGA development, QualComm, Nvidia, Arduino incl. image processing, machine learning.

- Multi-cloud, Web, Big Data, IoT, Machine Learning, AI, Computer Vision, NLP (Gen AI), Robotics:
  - Developed low latency production software incl. micro-services, data analytics, log processing, fraud detection, recommendations, real-time streaming, data warehousing, business intelligence, statistics, deep networks, text & image processing-recognition projects, feature/insight extraction, performance improvement, random experimentation vs statistical methods incl. A/B testing, AI-ML predictiveness-correlation-causality analyses for decision making.
  - R&D, hands-on, Gen AI, NLP - Gen AI, LLMs, NLP, RESTful APIs, tokenization, lemmatization, casing, NER, document-term matrix, document similarity measures, Euclidian distance, cosine similarity, word counts, one hot encoding, TF-IDF, Vector-space & Probability models, PCA, ENA, LDA, LSA, distributional hypothesis, keyed vectors, dimensionality reduction, SVD, Word2Vec, GloVe, fastText, Gensim, word sense disambiguation, polysemy, principal components, eigenvectors, BERT, tokenizer, WordPiece, context-free and contextual models, input, token, segment, position embeddings, lexical units, morphemes, words, tokens, transfer learning, fine-tuning, zero-, one, few-shot tasks, Hugging Face models, tagging, data labeling software, Label Studio, transformer, chatbots, LaMDA, Palm, Gemini, Bard, BLOOM, GitHub Copilot, ChatGPT, Open AI API, GPT-4. R&D quantum machine learning.
  - Developed and integrated software, models, pipelines in Scala, Java, C#, F#, Visual Basic, Python, R, Octave, C++, C, bash, PowerShell, Node.js, Express, Pug, npm, MongoDB, Mongoose,ASP.NET, .Net, Ajax, Javascript, Html, Css, Xml, Json, Spark, Dask, Hadoop, Map Reduce, Sqoop, Hive, Pig, Hbase, Yarn, Oozie, Flume, Kafka, Zookeeper under Linux & Windows, IntelliJ, Eclipse, Sbt, Maven, Gradle, SQL, MS SQL Server, NoSQL, Cassandra, MySQL, Oracle, Mesos, Docker, Kubernetes, Hortonworks, Cloudera, AWS, EC2, Databricks, Weka, Mahout, Numpy, SciPy, sklearn, Pandas, TensorFlow, PyTorch, Caffe, Keras, Mllib, XGBoost, H2O-AutoML, DAGs, Airflow, Luigi, Prefect, DataBricks, Git, Jira, DevOps, Agile, Scrum.
  - Seasoned multi-cloud, big data, highly available, virtualization, integration, deployment, web using AWS, GCP, Azure, Cloudera, VSTS, Git, Visual Studio, Eclipse, DevOps, Microservices, continuous integration, delivery, deployment (CI/CD), Site Reliability Engineering (SRE), Virtualization platforms incl. VmWare Workstation Player, KVM, Virtual-

Box, Virtual PC, Hyper-V.

- – Developed/Simulated customized autonomous and teleoperated robots in dynamic environments using OpenCV, ROS, Gazebo, Rviz. Tasks incl. simulating sensors, actuators, mapping, planning, control, navigation and related architectures, algorithms, URDF models, forward & inverse kinematics, open & closed-loop control.

- Secure Computer Systems:

  - – Mitigated vulnerabilities, developed adequate policies and secure code.
  - – Installed robust VPN for secure, reliable development servers. Enforced proper authentication.
  - – Implemented policies and best practices to avoid intrusion into mission-critical IT and DB systems.

- Epidemiology, Public Health:

  - – conceived, designed and developed advanced algorithms for predictive modeling and control as global solution for any epidemic & pandemic including covid-19.
  - – for the epidemiological targeted solution, integrated multiple approaches of previous programs and projects incl. predictive control of space robots in real-time, multi-resolution in computer vision.
  - – tested solution with data sets from all over the world including the U.S.A., Europe, Asia confirming remarkable results nowhere obtained before.

MTA, Boeing-Group   January 2008 – December 2010
Location: NASA Marshall Space Flight Center (MSFC)   Subject Matter Expert (SME)
Huntsville, AL

- Led systems engineering and IVV&A strategy and efforts (Level 2/1 and connections to Level 3) of NASA Constellation Program (CxP, now SLS)'s entire next generation of spacecraft eet (MS, GS, ARES I/V, EDS, ORION, EVA, LSAM, DSS, future: MTV, DAV) for ISS Crew/Cargo, Lunar Sortie/Outpost, Mars Exploration Missions. Led efforts to secure additional NASA, DoD, DHS programs in contact with U.S. government and private industry partners.
- Co-designed NASA's ARES I main Avionics and Flight Software aspects including Flight Computer (FC) and Command and Telemetry Computer (CTC) RTOS, BSP, and I/O Drivers. The Upper Stage (US) Integrated Avionics Subsystem control vehicle subsystems in the CLV (Crew Launch Vehicle Ares I) First and Upper Stages providing abort/redundancy mgmt., telemetry downlink, GN&C, data acquisition & mgmt., vehicle command & control, fault detection & recovery, Thrust Vector Control (TVC) commanding, flight tracking/termination/safety, Orion/pre-launch ground communications.
- Generated/Analyzed requirements, designed using EDAC, MIL-STD-1553, HDLC, RFCS, Ethernet (Operational, CPU Test), IPv4, ICMP, SNMP, UDP, Uni/Multi/Broadcast, SNTP, TFTP, Interrupt/Exception Handling, External Synchronization, DMA, Discrete I/F, cPCI, Cross Channel Data Link (CCDL), ARINC-653, DO178B, PPC, ANSI C/C++, XML, RTOS (vxWorks, Integrity), special hw, BSP, device drivers, redundancy, latency, time accuracy, veriification, certification, documentation.
- Integral technology-oriented member of the main NASA-Boeing teams designing the most critical aspects of the launch vehicles incl. avionics, flight software, RTOS/BSP/DD, Flight Computer Operational Group(FCOG)/Triple Modular Redundant (TMR) spacecraft avionics.
- Defined advanced Mars/Lunar Mission for German NASA; advanced DARPA Nanotechnology Program.
- Designed, developed, simulated, scripted, tested in Windows/Linux/Android, gcc, Makefiles, C, C++, VC++, VC#, Java, NetBeans, Eclipse, Matlab, FPGA/ASIC/SoC, RTL synthesis, verification, Perl, Python, SVN, VHDL, Verilog, SystemVerilog, SystemC, ISE, Vivado, Quartus II, reusable testbenches, OVM, UVM, VMM components for control, image, signal processing, telecom, multimedia.

California Aerospace Enterprises, Inc.   January 2002 – December 2007
Pasadena and San Diego, CA   Chief Engineer

- Acted in advisory capacity to governments' and corporations' space programs and projects, as PI to NASA, DARPA, NSF, cooperation with NASA, MIT, UCB, GTRI, UFL, UMD, UME. GMU, USU. Built consortia, wrote and coordinated proposals on world-leading real-time control, perception, learning, autonomy (UAVs), spacecraft, missions. Planned and delivered initial design of a $ 1/4 Billion multipurpose earth observation satellite system.
- Cooperated with NASA, ASI, WRS, SGI for project proposals in space exploration and colonization, and homeland security. Interacted with potential funding sources, federal and private.
- Prepared Program Management for extremely advanced DoD technology programs beyond classi cation in military robotics and space applications.
- Analyzed requirements, researched state-of-the-art technologies, created solutions while protecting IP, wrote proposals and white papers, prepared presentations, meetings, supervised cooperation.
- Researched advanced collaborative environments in enterprise distributed systems incl. BPM, ASIC (nm) and SDR technology. Design of embedded, real-time systems (hw/fw/sw) using FPGA/ASIC/SoC, SystemVerilog, VHDL,Verilog, reusable test benches, RTL synthesis and veri cation, OVM, UVM, VMM components. Analysis of telecom, multimedia technologies: set-top boxes, DOCSIS, PacketCable, CableHome, VOIP, signal, image, autonomy processing.
- Designed, developed, simulated with C, Makefiles, C++, Qt, C#, .NET, Vstudio, Gnu, SVN, Matlab, C, Java, J2EE, scripting, UML, Doors, Rhapsody, Windows, Unix, RTOS (vxWorks, Linux, Integrity), special hw, device drivers.
- Held Professor position at Devry University and its Keller Graduate School of Management, in Pomona, CA and Long Beach, CA.

Broadcom Corp.   January 2000 – December 2001
Systems Engineering Division, Pasadena, CA   Senior (Head) Systems Engineer

- hands-on led and developed telecom and multimedia technology (SoC, ASIC), which was successful acquired for U.S.$ 1/3 Billion within one year.
- Analyzed requirements, developed solutions for the veriification and integration of results including test chips, software development, FPGA/ASIC/SoC (SystemC,Verilog,VHDL) implementation, RTL synthesis and verification, system integration, trade show demos.
- Cooperated with MIPS Technologies, Mountain View, CA in SoC designs and HP-Agilent, Silicon Valley, CA in SoC testing, participated in industry standardization efforts with Intel, Microsoft.
- as Chief Technology Officer (CTO) of Thuris Corporation, Newport Beach, CA, biotech industry recruited, designed system architecture (hw/sw), designed, developed, and integrated algorithms and systems.
- as Chief Consultant at Windriver Systems Inc., San Diego, CA developed intelligent SOHO router (hw&sw).
- as Chief Consultant at Fiberspace, Woodland Hills, CA developed start-up fiber-optic prototype (hw&sw).
- as Senior Principal Consultant at NASA JPL, Pasadena, CA designed, developed, tested, and integrated UNIX, vxWorks, C, C++, CORBA, tcl/tk, Perl, Python spacecraft avionics hardware and software for the most advanced unmanned spacecraft to the Jupiter moons and Pluto.

Falon, Inc.   January 1998 – December 1999
San Diego, CA   Director of Engineering

- Supervised, designed (PDR & CDR, UML, Rhapsody), developed & integrated advanced aircraft avionics based on multi-processor, multi-DSP, FPGA, RTOS, GPS/INS with SAIC, San Diego, CA & Lockheed Martin, Palo Alto, CA as subcontractors.
- Designed and developed R-T advanced multidimensional signal processing algorithms (hw/sw).
- Tested system at a DoD USN base in the East Coast.

- ACIS President in San Diego, CA, won NASA nation-wide award as Spacedev consortium partner.
- Analyzed requirements, designed Mars micro-missions and micro-spacecraft, and delvered technical and program assessment reports to NASA.
- as Senior Consultant at Conexant, San Diego, CA developed integration efforts for DOCSIS cablemodem hardware, firmware, and embedded software using MS VC++, vxWorks, FPGAs, ARM-based multi-core SoCs, test equipment including spectrum, logic, protocol analyzers.

EIS Cybernetics   January 1996 – December 1997
Software Development Division, Ft. Lauderdale &   Group Lead & Manager
Coral Gables, FL

- Supervised, designed, developed, and tested custom real-time systems and application modules for telecom industry, scripted source version control and automation routines.
- Integrated systems on multi-compilers (HP-UX, AUX, Windows) with HP/Nortel for final customers.
- as Senior Consultant developed NSA/DoD OS at the highest level of trust based on NightHawk, CyberGuard product lines at Harris Computer Systems (Real-Time & Secure), world 1st with OS&LAN evaluated at NCSC B1 level of trust.
- Held Associate Professor position at the University of Miami, Department of Mathematics and Computer Science in Coral Gables, FL.

German Aerospace Center (DLR)   January 1988 – December 1995
Institute of Robotics and Mechatronics   Senior Research Scientist, Program Manager
Oberpfaffenhofen by München, Germany

- Supervised, developed robot vision part of NASA's Spaceshuttle-ESA's Spacelab mission with DLR's Rotex space robotic manipulator aboard, STS-55 ight of the Columbia including mission and system conception, research, design, coding, test, integration, and operation.
- Conceived and managed advanced R&D programs for the German Minister of Research and Technology: space, Artificial Intelligence (AI), Machine Learning (ML), autonomy, control, robotics, image processing, computer vision, real-time supercomputing.
- Researched architectures and algorithms for real-time vision and control of space robots.
- Designed and developed with industry real-time, scala, heterogeneous, parallel distributed architecture, worldwide the fastest of its time, integrated it with real-time graphics (IRIX/OpenGL) and telecom of workstation.
- Designed and developed system, algorithmic, and application real-time parallel distributed software for the mission.

Siemens AG   January 1986 – December 1987
Automation Division, Karlsruhe, Germany   Development Engineer

- Designed machine code and developed ASIC-based redundant, real-time, multiprocessing & programmable controller special-purpose hardware.
- Developed advanced real-time, multitasking operating system and integrated it with custom hardware.

Karlsruhe Institute of Technology (KIT)   January 1985 – December 1985
Institute of Information Processing Technologies,   Research Scientist
Karlsruhe, Germany

- Designed and developed commercial ASIC design tool based on advanced AI for VLSI methodology, gate array design, with Institute Director and former IBM Executive Management.

German Aerospace Center (DLR)   January 1984 – December 1984
Institute of Communications and Navigation   Research Associate
Oberpfaffenhofen by München, Germany

- Designed domestic satellite communications system with Airbus Astrium (MBB, Dornier), which later was launched to space with the Ariane IV and became operational.

Hewlett Packard-Agilent   January 1983 – December 1983
Computer Division, Böblingen by Stuttgart, Germany   Engineer
- Provided analysis for improving production of desktop computers based on Motorola processor.

German National Nuclear Energy Research Center   January 1982 – December 1982
Nuclear Recycling Division, Leopoldshafen by   Engineer
Karlsruhe, Germany
- Supported design of advanced infrastructure.

Deutsche Telekom AG, formerly, German Federal Government   January 1980 – December 1981
Telecommunications Division, Ravensburg, Germany   Engineer
- Supported telecommunications equipment maintenance.

Pontifical Catholic University   January 1978–December 1979
Department of Mathematics, Lima, Perú   Teaching Assistant
- Mentored students and supported Mathematics faculty with course examination grading.

RESEARCH FUNDING

1. Multi-Million dollar funding, Spacelab-Spaceshuttle D2 Mission, consortium led by DLR and included numerous German government and industry research labs and universities including, e.g., MBB Bremen (today Airbus, Astrium), Kernforschungszentrum Karlsruhe, and the Bundeswehr Hochschule, Neubiberg.

2. Multi-Million dollar funding, German Federal Ministry of Research ad Technology (BMFT), Neuroinformatics program, consortium led by DLR and included Siemens Corporate R&D, Technical University of Munich, and the University of Dortmund.

3. Multi-Million dollar funding, U.S. Department of Defense (DoD), Advanced Classified GPS Avionics Program, executed as Director at Falon, Inc., San Diego, CA, subcontractors included Lockheed Martin, Advanced Technology Center (ATC), Palo Alto, CA and SAIC, HQ, San Diego, CA.

4. PI of research proposals to NASA, DARPA, NSF with Co-PIs at NASA, MIT, UCB, GTRI, UMD, UFL, UME, GMU, USU.

5. On-going personal interaction with world largest funding agencies including the Office of the Director of DARPA (Arlington, VA), ONR (Arlington, VA), NSF (Arlington, VA), SPAWAR (San Diego, CA), Government of the Russian Federation (Moscow) as well as the Venture Capital Community (VC).

SELECTED PUBLICATIONS

- Technical Reports, Conference Proceedings, Thesis Supervision:

  1. Artificial Intelligence World Models – for mission-critical and commercial applications –, V.D. Sánchez, Brilliant Brains, November 2025, abstract in https://profdrvdsaphd.lima-city.de/documents/ArtificialIntelligenceWorldModels.pdf
  2. Architecting Next-Generation Generative AI/ML Models and Agentic AI Solutions, V.D. Sánchez, Brilliant Brains, August 2025, abstract in https://profdrvdsaphd.lima-city.de/documents/ArchitectingNextGenAIMLAgenticAISolutions.pdf

3. Next Generation Missile Defense Systems including the Golden Dome, V.D. Sánchez, Brilliant Brains, May 2025, abstract in https://profdrvdsaphd.lima-city.de/documents/NextGenerationMissileDefenseSystemsInclGoldenDome.pdf

4. Artificial Intelligence and Machine Learning to address unsolved problems in Mathematics, V.D. Sánchez, Brilliant Brains, March 2025, abstract in https://profdrvdsaphd.lima-city.de/documents/ArtificialGeneralIntelligenceMachineLearningOnMathematics.pdf

5. On Artificial General Intelligence (AGI) and Artificial Super Intelligence (ASI), V.D. Sánchez, Brilliant Brains, January 2025, abstract in https://profdrvdsaphd.lima-city.de/documents/OnArtificialGeneralIntelligenceAndArtificialSuperIntelligence.pdf

6. AI/ML Methods to Develop Superior Next Gen Autonomous Learning Robot Systems for Industrial Terrestrial and Space Applications, V.D. Sánchez, Brilliant Brains, December 2024, abstract in https://profdrvdsaphd.lima-city.de/documents/AIMLNextGenAutonLearnRobots.pdf

7. Enabling Robots to become more human and obtain superhuman capabilities for terrestrial and space applications using advanced AI/ML, V.D. Sánchez, Brilliant Brains, November 2024, abstract in https://profdrvdsaphd.lima-city.de/documents/EnablingSuperhumanRobotsUsingAdvancedAIML.pdf

8. Advanced Automation for Mission-Critical Information Technology Past AIOps, V.D. Sánchez, Brilliant Brains, November 2024, abstract in https://profdrvdsaphd.lima-city.de/documents/AdvancedAutomationMisCriITPastAIOps.pdf

9. Advanced Gen AI & LLM Foundations and Applications – Paving the way to a more powerful and diverse ML –, V.D. Sánchez, Brilliant Brains, December 2023, abstract in https://profdrvdsaphd.lima-city.de/documents/AdvancedGenAILLMs.pdf

10. Very high-speed space communication networks for building the next generation of advanced exploration and military spacecraft, V.D. Sánchez, Brilliant Brains, November 2023, abstract in http://profdrvdsaphd.lima-city.de/documents/NextGenExplorationAndMilSpacecraft.pdf.

11. Deep Impact of Advanced AI Technology Developments – Government Regulatory Measures –, V.D. Sánchez, Brilliant Brains, September 2023, abstract in http://profdrvdsaphd.lima-city.de/documents/ArtificialIntelligenceRegulation.pdf.

12. Advanced Hypersonic Technologies for Space and Terrestrial Applications (in German), V.D. Sánchez, Brilliant Brains, August 2023, abstract in http://profdrvdsaphd.lima-city.de/documents/AdvancedHypersonic.pdf.

13. Designing and Building Advanced Quantum Computers, V.D. Sánchez, Brilliant Brains, June 2023, abstract in http://profdrvdsaphd.lima-city.de/documents/AdvancedQuantum.pdf.

14. Computational Data Science Research and Technology Development – State of the Art –, V.D. Sánchez, Brilliant Brains, January 2023, abstract in http://profdrvdsaphd.lima-city.de/documents/ComputationalDataScience.pdf.

15. Colonizing the Red Planet, V.D. Sánchez, Brilliant Brains, November 2022, abstract in https://profdrvdsaphd.lima-city.de/documents/MarsColonization.pdf.

16. Smart Cities in Space and on Earth, V.D. Sánchez, Brilliant Brains, August 2018, abstract in https://profdrvdsaphd.lima-city.de/documents/SmartCitiesinSpaceandonEarth.pdf.

17. Blockchain Technology – The Basis for Cryptocurrencies –, V.D. Sánchez, Brilliant Brains, January 2018, abstract in http://profdrvdsaphd.lima-city.de/documents/BlockchainTechnology.pdf.

18. Modern Machine Learning Technology, V.D. Sánchez, Brilliant Brains, December 2017, abstract in http://profdrvdsaphd.lima-city.de/documents/ModernMachineLearningTechnology.pdf.

19. Planetary Defense – Events, Technologies, and Missions – (in German), V.D. Sánchez, Brilliant Brains, January 2017, abstract in
http://profdrvdsaphd.lima-city.de/documents/PlanetareVerteidigung.pdf.

20. Continuous Big Data Applications in Industry – Modern Development Tools, Distributed Operational and Orchestration Systems, Internet of Things –, V.D. Sánchez, Brilliant Brains, December 2016, abstract in
http://profdrvdsaphd.lima-city.de/documents-ContinuousBigDataApplications.pdf.

21. Space Launch Vehicle Technology, V.D. Sánchez, Brilliant Brains, November 2016, abstract in https://profdrvdsaphd.lima-city.de/documents/SpaceLaunchVehicleTechnology.pdf.

22. Quantum Computing – Quantum Mechanics, Information Theory, Hardware, Software, Algorithmics, Perspectives –, V.D. Sánchez, ACIS, January 2015, abstract in
http://profdrvdsaphd.lima-city.de/documents/Quantumcomputing.pdf.

23. Human Space Flight – From Its Beginnings To The State of The Art –, V.D. Sánchez, CASE-2011-1, abstract in
http://profdrvdsaphd.lima-city.de/documents/HumanSpaceFlight.pdf.

24. Multi-Dimensional Moving Field Electrophoresis for Protein Separation and Molecular Docking, V.D. Sánchez and R. A. Burton, NSF-ACIS-2009-1, July 2009.

25. Frontiers in Nanoscale Science, Engineering, and Technology, V.D. Sánchez, ACIS, 2009, in http://profdrvdsaphd.lima-city.de/documents/Nanotechnology.pdf.

26. Autonomous Vehicles for Space Exploration and Terrestrial Applications, V.D. Sánchez, CalAerospace, 2008, in http://profdrvdsaphd.lima-city.de/documents/Autonomous.pdf.

27. Telerobotics for Space Colonization and Industrial Applications, V.D. Sánchez, CalAerospace, 2007, in http://profdrvdsaphd.lima-city.de/documents/Telerobotics.pdf.

28. Advances in Gravitation Research, V.D. Sánchez, CASE-2005-3, 2005.

29. Fission Power Systems in the Context of Space Exploration and Colonization, V.D. Sánchez, CASE-2005-2, 2005.

30. Fusion Research in the Context of Space Exploration and Colonization, V.D. Sánchez., CASE-2005-1, 2005.

31. Manned Mission to Mars, V.D. Sánchez, CASE-2004-2, 2004.

32. Manned Mission to The Moon, V.D. Sánchez, CASE-2004-1, 2004.

33. A Multifunctional Satellite System, V.D. Sánchez, Confidential, August 2004.

34. Self-Repairable, Learning Evolvable Spacecraft Technology, V.D. Sánchez, R.S. Michalski, and H. de Garis, NASA-ACIS-2003-1, April 2003.

35. Revolutionary Computing Approaches and Demonstrations to Overcome Long-Standing, Open Visuo-Control Problems, V.D. Sánchez, R. Boyle, W. Freeman, R. Kozma, and R. Newcomb, NSF-ACIS-2002-2, December 2002.

36. Advanced Computing Concepts and Demonstrations of Biologically-Inspired Flying Machines, V.D. Sánchez, J.-J.E.Slotine, W. Freeman, R.C. Michelson, and J.C. Principe, NSF-ACIS-2002-1, December 2002.

37. Independent Component Analysis and beyond in Brain Imaging: EEG, MEG, FMRI, and PET, J.C. Rajapakse, A. Cichocki, and V.D. Sánchez, Proceedings 9th International Conference on Neural Information Processing, ICONIP-2002, Singapore, November 18-22, 2002.

38. Evolutionary Foundations of Computation and Learning and Their Deep Implications Towards Building Artificial and Biological Brains, V.D. Sánchez, DARPA-ACIS-2002-1, July 2002.

39. Microspacecraft Mission to a Near Earth Object (NEO), V.D. Sánchez, NASA-CASE-2002-2, June 2002.

40. Advanced Next Generation Near Earth Object (NEO) Impact Detection, V.D. Sánchez, NASA-CASE-2002-1, June 2002.

41. Neurocomputational Flight Approaches and Technology, V.D. Sánchez, NASA-ACIS-2002-1, May 2002.

42. PP, ICA, and PCA in BSS, V.D. Sánchez, Proceedings 7th International Conference on Neural Information Processing, ICONIP-2000, Taejon, Korea, November 14-18, 2000, Vol. 2, 704-707.

43. Mars MicroSpacecraft Bus Feasibility and Concept Design Study, Final Report, vol. I Technical, V.D. Sánchez et al, JPL PO-No. 1202365, ISS No. 99-037-0, ACIS, March 1999.

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  2. Special Issue on Support Vector Machines, C. Campbell, C.-J. Lin, S.S. Keerthi, and V.D. Sánchez (Eds.), Neurocomputing, 55[1-2], 2003.
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  8. Special issue on RBF Networks, parts I-II, V.D. Sánchez (Ed.), Neurocomputing, 19 [1-3] and 20 [1-3], 1998.
  9. New Robust Learning Method, V.D. Sánchez, International Journal of Smart Engineering System Design, 1 [4], 223-233, 1998.
  10. The Design of a Real-Time Neurocomputer Based on RBF Networks, V.D. Sánchez, S. Sloat, J. Guerrero, D. Shullo, and M. Lefebvre, Neurocomputing, 20, 111-114, 1998.
  11. Advances Towards the Automatic Design of RBF Networks, V.D. Sánchez, International Journal of Knowledge-Based Intelligent Engineering Systems, 1 [3], 168-174, 1997.
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  17. Vision for Space Robots on a Parallel Distributed Architecture, V.D. Sánchez, Integrated Computer-Aided Engineering ICAE, 1 [5], 431-452, 1994.
  18. Parallel Three Dimensional Surface Reconstruction (in German), V.D. Sánchez, in J. Hektor and R. Grebe (Eds.), Parallele Datenverarbeitung mit dem Transputer, Berlin, Springer-Verlag, Reihe Informatik aktuell, 238-249, 1994.
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26. Recognition and Localization of a Free-Floating Object (in German), V.D. Sánchez, in W. Zorn and K. Bender (Eds.), Tagungsband RISC'91-Kongress, Berlin, VDE-Verlag, 789-800, 1991.

27. Neurocomputing – State-of-the-art –, V.D. Sánchez, in H. Adeli and R.L. Sierakowski (Eds.), Mechanics Computing in 1990's and Beyond, New York, ASCE, vol. 1, 23-42, 1991.

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31. Neurocomputers in Industrial Applications (in German), V.D. Sánchez, Technische Rundschau, 82 [25], 60-65, 1990.

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2. A New Era of More Powerful Space-Based Systems for Business, IEEE Collaborative Electronic Commerce Technology and Research, Videoconference from UCSD to Europe, 2005.
3. Advanced Mars Missions, KAIST Department of Aerospace Engineeirng, South Korea, 2003.
4. Intelligent BioSystems, KAIST Department of BioSystems, South Korea, 2003.
5. NASA/ESA Global Positioning Systems for Earth and Space, NASA JPL, Pasadena, CA, 2003.
6. Gravitation Research, Caltech, Pasadena, CA, 2003.
7. Increasing the Autonomy of Space Robots, NASA Ames Research Center, Moffett Field, CA, 2002.
8. Autonomous Navigation based on Biologically-inspired Computing, ANNIE 2002, St. Louis, MO, 2002.
9. The Key Role of Biologically-Inspired Computing and Learning in the Next Generation of Autonomous Robots, UNR, Reno, NV, 2002.
10. Biologically-Inspired Autonomous Robot Navigation, JPL/Caltech, Pasadena, CA, 2002.

11. Advanced Methods of Computational Intelligence in the areas of Brain Research, Autonomous Systems, and Space Research (in German), Universität Ulm, Abteilung Neuroinformatik, Ulm, Germany, 2002.
12. Mars Micro-Spacecraft, JPL/Caltech, Pasadena, CA, 2000.
13. Projection Pursuit, Independent Component Analysis, and Principal Component Analysis in Blind Signal Separation, ICONIP-2000, Taejon, Korea, 2000.
14. Smart Rovers for Mars, NASA/ARC, Moffett Field, CA, 1997.
15. A Novel Robust Learning Method, OAINN95, Athens, OH, 1995.
16. Some Advances Towards the Automated Design of a Class of Neural Networks, ANNIE95, St. Louis, MO, 1995.
17. Robot Vision Techniques for Grasping Floating Objects under u-Gravity, JPL/Caltech, Pasadena, CA and OAI, Brook Park, Ohio, 1993, ESA/ESTEC, Noordwijk, The Netherlands, 1993.
18. Neurocomputing – State of the Art –, ASCE Engineering Mechanics Specialty Conference, Columbus, OH, 1991.
19. Neurocomputing – Research and Applications – (in German), Forschungsinstitut fuer Anthropotechnik, Wachtenberg-Werthoven, Germany, 1990.

AFFILIATIONS

- Member, American Association for the Advancement of Science (AAAS), since 1997.
- Fellow Member, Institute of Electrical and Electronic Engineers (IEEE), Computer Society, since 1995.

TECHNICAL SKILLS

- Soft-Middleware Tools:
  - Weka, TensorFlow, Scikit-learn, Torch, cuDNN, GBM, Xgboost, Lasagne, Theano, Caffe, OpenCV, Docker, VM VirtualBox, Vmware Workstation, SBT, Maven, Gradle, Scala, Java, J2EE, Net-Beans, JSP, JSF, EJB, JDBC, JUnit, Ant, Hibernate, RMI, IDL, UML2, SysML, Corba, C++, STL, C#, C, VC++, MFC, COM, ATL, GUI, OOP, HTML, XML, UDDI, SOAP, shell, Javascript, Perl, Python, tcl/tkl, system architecture design, design patterns, client server, multithreading, containers, components, collection frameworks, encapsulation, inheritance, events, exceptions, packages, managed code, web services, microservices, Source ctrl, Assembly, MinGW, Qt, Qm, Gnu, Eclipse, IntelliJ Idea, VisualStudio, Tornado, Multi, ACE, SVN, CVS, SQL, SQLite, MySQL, Oracle, Access, Informix, SystemVerilog, SystemC,Verilog, VHDL, OSVVM, OVM, UVM, VMM, FORTRAN, PASCAL, OCCAM, cygwin, Objective Toolkit, Purify, Quantify, MS Office, Visio, Project, RCS, Doors, Rhapsody, OMT, CMMI, PSP, ARINC -653, DO-178B, DO-254, Agile, SCRUM, Xilinx-Alliance, Synplify, XRAY, CodeComposerStudio, Visual DSP++, CUDA, OpenCL, OpenGL, Mathematica, Matlab, Simulink, LabWindows, vDESKTOP, vCLICK, OpenMP, MPI, Spark, Dataframes, SQL, MLib, Yarn, Mesos, Kafka, Flume, GraphX, Sqoop, Hadoop, HDFS, HBase, MapReduce, Hue, Amazon AWS, Databricks, Cloudera, Pig, Hive, Hortonworks, R, Rstudio, OpenCV, ROS, Gazebo, Rviz. R&D, hands-on, Gen AI, NLP, LLMs, RESTful APIs, tokenization, lemmatization, casing, NER, document-term matrix, document similarity measures, Euclidian distance, cosine similarity, word counts, one hot encoding, TF-IDF, Vector-space & Probability models, PCA, ENA, LDA, LSA, distributional hypothesis, keyed vectors, dimensionality reduction, SVD, Word2Vec, GloVe, fastText, Gensim, word sense disambiguation, polysemy, principal components, eigenvectors, BERT, tokenizer, WordPiece, context-free and contextual models, input, token, segment, position embeddings, lexical units, morphemes, words, tokens, transfer learning, fine-tuning, zero-, one, few-shot tasks, Hugging Face models, tagging, data labeling software, Label Studio, transformer, chatbots, LaMDA,

Palm, Gemini, Bard, BLOOM, GitHub Copilot, ChatGPT, Open AI API, GPT-4, R&D quantum machine learning.

- Operating Systems:
  - general-purpose: Windows 98/NT/2000/XP/7/10, Linux (DSL, Knoppix, Ubuntu, Fedora, JVM, DVM, …), Unix (Solaris, HP-UX, AIX, ULTRIX, IRIX, SCO, secure B1/2), DOS, MacOS, VMS. Real-time/embedded: vxWorks, Android, Linux (RedHat, Fedora, Debian, Ubuntu, Knoppix, DSL, Kali), Integrity, ThreadX, SPOX, Diamond, COSMOS kernel. Board Support Packages (BSP) design, development, testing, integration.

- Hardware Systems:
  - Radio (HW, FW, SW), Wireless, Mobile, Command & Data Handling, Telecom, GNC, Spacecraft, VME, cPCI, PCI, PMC, PCMCIA, DSPs, parallel processors(SMP, MIMD, message passing, fabrics), neurochips, UNIX: SUN, HP, IBM RISC, Apollo, DEC, SGI, Harris; PC, Mac, Android, Qualcomm, Raspberry Pi.

- Processors:
  - microprocessors/-controllers: Intel, PIC, Motorola (68xxx, PPC 603, 604, 750, 7400, 850, 860, 8260). SoC, ASIC, Cores: MIPS, ARM, Micro/PicoBlaze, PPC, multi-cores; FPGAs: Xilinx Virtex, Altera, Actel. Parallel / DSPs: TI, Transputer, Zoran, Sharc.

- Networking/Interfacing:
  - OpenFlow, LAN, WAN, 1553 (GPS/INS), X.25, UDP, TCP/IP, IPSEC, TLS, RSA, SSL, Ethernet, DHCP, FTP, SNMP, HTTP, Sockets, SIP, SGCP, MGCP, ASN.1, QMS, RS232, Centronics, USB, SCSI, HP-IB, DVI, TMDS, LVDS, I2C, Bluetooth, IEEE 802.11, QoS.

- Test Equipment:
  - HP/Agilent, Tektronix scopes, Protocol, Logic, and Spectrum Analyzer, SerDes Chip Characterization, SmartBits, visionICEII, visionProbeII, Raven, Wiggler.

- Algorithms (sw/hw):
  - telecom, satellite, wireless, networking, databases, communications protocols, stacking, signal, video, and image processing, multimedia, computer vision, computer graphics, compression, security, parallel & neural proc., robotics, pattern recognition, big data, IoT, machine learning, artificial intelligence, generative ai, natural language processing, quantum, scheduling, encryption, numerical mathematics, advanced statistics.

LANGUAGES

Trilingual: 1. German – fluent, 2. English – fluent, 3. Spanish – fluent.

AWARDS

- ICONIP-2000 Outstanding Achievement Award, 2000.
- Nation-wide NASA Award winner, 1999. To design Mars Missions and Spacecraft.
- Fellow, Institute of Electrical and Electronic Engineers (IEEE), since 1995, citation: "for leadership in neural and parallel computation, and pioneering contributions to autonomous space robots".

HONORARY ACTIVITIES

- Founding Editor-in-Chief (vol. 1-54, 1989-2003) of the Neurocomputing journal, published by Elsevier Science, http://www.elsevier.com/locate/neucom, former Associate Editor of other

journals.
- World-wide referee for faculty search, promotion, tenure for universities and R&D centers.
- Program Committee member in numerous international conferences.

INTERESTS

Classical music, arts, fitness, soccer, yoga, swimming, dancing, biking, hiking.

REFERENCES

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