

Dr. Carlos O. Maidana

www.linkedin.com/in/maidanac • +66 9 1079 7061 • +1 (208) 904-4910 • carlos.omar.maidana@maidana-research.com

C-Level Executive & Program Manager

Senior Physicist & Research Engineer. University Faculty

Engineering | Physics | R&D | Management | Entrepreneurship | Education | Business Administration

Over 22 years of experience in scientific-technical R&D activities, project engineering, technical coordination, project management and business development mainly in the space, nuclear, scientific and defense domains at national and international level working for organizations such as NASA, CERN, U.S. Departments of Energy, Defense and Homeland Security, GISTDA as well as for small and medium size enterprises (SMEs) and universities. Over 19 years of experience in the design, modeling, simulation and optimization of advanced engineering components, scientific instruments and physical process. Over 25 years of hands-on experience in informatics and communications technology and over 13 years of experience in education at elementary, secondary, university and professional level including curriculum, e-learning and laboratory development activities.

Professional experience that spans cross disciplinary projects covering the whole design and development cycle: proposal writing, concept studies, design, modeling, simulation, fabrication, testing and optimization using different theoretical, computational and experimental techniques as well as managing working groups and test facilities. Supervision and guidance on the design, integration, testing, operation and maintenance of complex electronic and mechanical systems and sub-systems.

Able to integrate, develop and coordinate different types of knowledge and techniques that the modern cross-disciplinary projects require, with application of creative and proactive thinking beyond the standard discipline structures. A professional with experience in industry, academia, government and international organizations. A team leader who mentors with purpose and understands that strong working relationships create great teams and produce exceptional results.

CORE COMPETENCIES:

- Research and development
- Physics and Applied Physics
- Applied Engineering
- Design, modeling, simulation and optimization of engineering components and physical processes
- Management of scientific, engineering and R&D projects and facilities
- Large scale and complex international projects
- Innovation | Entrepreneurship
- Research commercialization
- Higher education / technical training
- Space Systems
 - Microsatellites
 - Scientific Payloads
 - Assembly, Integration and Testing
 - Mission Analysis
- Small Launching Vehicles:
 - Solid rocket propulsion
 - Hybrid rocket propulsion
 - Digital engineering
 - Avionics
 - GNC
- Space Nuclear Systems
 - Fission Surface Power
 - Nuclear Electric Propulsion
 - Nuclear Thermal Propulsion
- Nuclear Systems
 - Liquid metal reactors
 - Molten salt reactors
 - Particle Accelerators
- Defense Systems
- Project management
- Operations management
- Technical coordination
- Industrial organization
- Scientific - technical writing
- Public speaking
- Public administration
- Community management and public relations.
- Public engagement
- Technology transfer
- Business development
- Business administration
- Technical training
- Curriculum development
- E-learning
- Course management
- Teaching and counseling

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Languages: English (bilingual), Spanish (native), French (intermediate) – Several (survival level)
U.S. National - Permanent Resident – EB1/E11: Extraordinary ability in the sciences & engineering.
Citizenship: Argentina. Nationality: Argentina and United States. Residency: USA and Thailand

EDUCATION & TRAINING

POST-DOCTORATE IN APPLIED ENGINEERING (SPACE NUCLEAR SYSTEMS), 2009

Washington State University, Pullman, Washington – United States

DOCTOR IN ENGINEERING AND APPLIED SCIENCE, 2007

Idaho State University, Pocatello, Idaho – United States

MASTER OF SCIENCE IN PHYSICS, 2003

Michigan State University, East Lansing, Michigan – United States

BACHELOR'S DEGREE IN PHYSICS AND APPLIED PHYSICS, 1999

Universidad Tecnologica Nacional (INSPT), Buenos Aires – Argentina

ENTREPRENEURIAL LEAD,

Energy I-Corps, Cohort 2022, U.S. Department of Energy

The US Department of Energy's "Energy I-Corps for SBIR" allows participants to gain a practical understanding of fundamental principles and processes that support the successful management and discovery of innovations across the technology life cycle.

The program is intended to provide hands-on experience in customer development and business-model generation for DOE Small Business Innovation Research awardees.

AUTODESK CAD/CAM/CAE FOR MECHANICAL ENGINEERING SPECIALIZATION, 2021

AUTODESK CAD AND DIGITAL MANUFACTURING SPECIALIATION, 2022

PROJECT MANAGEMENT PRINCIPLES AND PRACTICES SPECIALIZATION, 2021

EMBEDDING SENSORS AND MOTORS SPECIALISATION

University of Colorado, Boulder (In Progress)

MATLAB SPECIALIZATION, 2022

Vanderbilt University and MathWorks Academy

SPACECRAFT DYNAMICS AND CONTROL SPECIALIZATION

University of Colorado (in progress)

CERTIFICATE IN RESEARCH COMMERCIALIZATION, 2013

U.S. Small Business Administration – United States

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CERTIFICATES IN SMALL BUSINESS ADMINISTRATION, 2013

U.S. Small Business Administration – United States

MODELING, EXPERIMENTATION AND VALIDATION SCHOOL, 2012

Oak Ridge National Laboratory and Idaho National Laboratory, United States

STRATEGIC INTELLIGENCE STUDIES, 2000

Argentinean Army War College “Lt. Gral. Campos”

COMMERCE AND TRADE SPECIALIZATION DIPLOMA

Instituto Rivadavia – Secondary School, Argentina

JR. NAVY RESERVE OFFICER TRAINING CORPS

Liceo Naval Militar “Alte. Storni”, 3 years full time - Argentina

OTHER PROFESSIONAL TRAINING

SHORT COURSES IN AERONAUTICS AND ASTRONAUTICS

American Institute of Aeronautics and Astronautics

- Hybrid Rocket Propulsion
- UAV conceptual design using computer simulations
- Overview of missile design and systems engineering
- Risk analysis and management
- Mission analysis (STK and microsattellites)

Technical University of Munich (TUM) and EdX

- Autonomous Navigation for Flight Robots

OTHERS

- **Safety, Security and Counter-Intelligence in National Security Technical-Scientific facilities**, training course: 11/2007, 6/2008, 1/2009, 9/2009 and 5/2010, Idaho National Laboratory, U.S. Department of Energy
- **Environmental protection and industrial hygiene, ISO 9000/14000**, training course: 11/2007, 6/2008 and 5/2010, Idaho National Laboratory, U.S. Department of Energy
- **Electrical Safety Awareness** training course; **radiation safety**, training course, **computer security**, training course and **industrial safety**, training course: 10/2010, 6/2011, CERN
- **LabView – Core 1**, 2011, CERN
- **COMSOL Multiphysics – Advanced Level**, 08/2017
- Six Sigma Fundamentals
- Project Management using Microsoft 365

Several others

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PROFESSIONAL EXPERIENCE

PROJECT MANAGER | ADVANCED NUCLEAR TECHNOLOGIES, 2015 – Current
MAIDANA RESEARCH and U.S. Department of Energy – Office of Nuclear Energy (Contractor)

Lead researcher and project manager with direct responsibility for completion of the funded project, directing the research and reporting directly to the funding agency. Responsible for the preparation, conduct, and administration of the sponsored projects.

Project Manager, Advanced Nuclear Technologies (RD&D)

- Thermo-hydraulics, liquid metal reactors
- Thermo-hydraulics, molten salt reactors
- Engineering Magneto-Hydro-Dynamics
- Software engineering: scientific computing, optimization, machine learning (AI)
- Multiphysics Analysis: Electromagnetics, thermo-fluids, structural, radiation
- Engineering design (CAD/CAE)
- Experimental loops design and fabrication
- Hybrid-manufacturing (3D printing, CNC)
- Instrumentation and Control
- Digital Twins
- IoT hardware and firmware for digital twins

(under contract for the U.S. Department of Energy)

Project Highlights

Software Development for the Multiphysics Analysis and Design of Liquid Metal Electromagnetic Pumps: Software development for the design and development of magnetofluid dynamics components for advanced nuclear reactors

Magnetic Field Mapping System (MFPS)

RD&D of the next generation of annular linear induction pumps for liquid metals and molten salts

- Software development for the analysis, design and fabrication of ALIPs
- Computer aided design and engineering of annular linear induction pumps (CAD/CAE)
- Digital monitoring and control systems: active flow control using machine learning and embedded systems
- Digital monitoring and control systems: thermal control and regulation using Arduino micro-controllers
- Advanced- and hybrid- manufacturing of annular linear induction pumps (metal 3D printing)

Development of a Small Electromagnetic Pump for Molten Salt Reactors

Computational methods for the design and fabrication of liquid metal thermomagnetic systems

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Reactivation of the transient reactor test (TREAT) facility: design of liquid metal electromagnetic pumps. In partnership with the Idaho National Laboratory – U.S. Department of Energy.

Conceptual design of a novel 3D tomosynthesis device for low-dose high-resolution industrial and medical imaging using a compact linear accelerator.

Space nuclear power and propulsion: thermal energy conversion systems. In Collaboration with the National Aeronautics and Space Administration (NASA)

(Nuclear) Fission Surface Power Technology Project.

In collaboration with OKLO, LLC for the U.S. Department of Energy and the National Aeronautics and Space Administration (NASA), 2020-2021.

Panel review member, Idaho National Laboratory (Battelle Energy Alliance) for the U.S. Department of energy and NASA.

Conceptual Design of Nuclear Fission MicroReactor Core.

Feasibility Studies on Advanced Space Propulsion Systems.

Keywords: Project Management | Principal Investigator | Project Director | Advanced Reactors | Magneto-hydro-dynamics | Thermo-Fluids | Electromagnetics | 3-Phase Power Systems | Instrumentation | Control Systems | Machine Learning | Arduino | High Temperature | Advanced- and Hybrid- Manufacturing | Structural Mechanics | Thermal Analysis | Radiation analysis | Modeling and Simulations | Multi-physics Analysis | Scientific Computing | Digital Prototyping | Software Engineering | Nuclear Power and Propulsion | Space Systems | Nuclear Engineering | Government – Industry partnership.

EQUATORIAL SPACE SYSTEMS

Singapore, Thailand, Australia and United states

<https://www.equatorialspace.com>

Equatorial Space is developing hybrid-propulsion rocket motors and launch vehicles tailor made for small- and micro- satellite operators complete with quick deployment, orbital flexibility and affordability in mind. In July 2021, MAIDANA RESEARCH transferred intellectual property and know-how to ESS providing new capabilities on the development of payloads for microgravity experimentation, cubesat platforms, rapid prototyping and in business development. Nowadays, ESS has offices in Singapore, Thailand, Australia and the United States.

VICEPRESIDENT, SPACE SYSTEMS

July 2022 – September 2022

Project management and chief engineering for the design, development, test, and production phases of space systems for low Earth orbit and/or deep space missions.

- Support the Propulsion and Space Vehicles Department on avionics, mission planning, and payloads integration.

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- Support the Commercial Department and corporate on business development and fund-raising related activities.
- Support and / or lead the design, development, operation and / or commercialization of defense and military systems.
- Develops and maintains professional working relationships with all project stakeholders across the company, and with members of the defense, intelligence and commercial space communities.
- Coordinate and lead University programs.

#microgravity #space #cubesats #smallsats #payloads #astrodynamics #mechatronics #instrumentation #management #hypersonics #missionanalysis #defense #business #newspace #rockets #avionics #hybrids #ASAT #F15 modification #KFIR modification #airlunch

HEAD - SPACE PAYLOADS and MISSION PLANNING

July 2021 – June 2022

Tasks

- Payload test system design, development, implementation and operations for satellites and suborbital payloads;
- Suborbital and Orbital payload design, prototyping, testing, manufacturing and operations, inclusive of integration with launch systems;
- Mission planning and analysis, inclusive of orbital parameters planning, optimization, and payload deployment;
- Spacecraft dynamics and control;
- Payload customer relations - business development, coordination of mission requirements and planning together with the client;
- Assist the propulsion group on the engineering analysis of hybrid rocket engines and vehicle integration
- Assist the propulsion and avionics groups on in-flight instrumentation, including data acquisition, sensors and embedded systems (mechatronics)

Research | Innovation | Space Payloads | Small Satellites | Instrumentation | Electronics | Circuit Analysis | Embedded Systems | Mechanisms | Data Acquisition | Control Systems Engineering | 3D Printing | Rapid Prototyping | Computer Aided Design (CAD) | Computer Aided Engineering (CAE) | Computer aided Machinery (CAM) | Design for Manufacturing | Modeling and Simulations | Mechatronics | Testing | Vibration Measurements and Analysis | Thermal Measurements and Analysis | Electromagnetic Measurements and Analysis (EMI/EMC) | Radiation Calculations | Radiation Shielding | Environmental Testing | Materials Testing, Treatment and Post-Processing | Manufacturing | Milli-fluidics | Systems Engineering | Integration | Engineering Management | Project Management | Mission Planning | Mission Analysis | Orbital Mechanics | Software Engineering | Scientific Computing | Algorithms | Optimization | Tracking Station | Communications Systems | Atmospheric Re-entry | Customer Relations | Flight Safety | Documentation | Training | Mentorship | Technical coordination | Leadership

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MANAGING DIRECTOR – EQUATORIAL SPACE THAILAND

July 2021 – September 2022

Manage Equatorial Space’s upcoming Thailand office and operations, including all necessary business, logistics and administrative duties.

Logistics and supply chain coordination and supervision, overseeing all activities involved in the identification, acquisition, production, and distribution of the company’s goods and materials.

Business development | Business management | Government relations | Legal and administrative affairs | Contracting | Human Relations | Public Relations | Marketing | Logistics |

BOARD OF DIRECTORS & UPPER MANAGEMENT – EQUATORIAL SPACE SYSTEMS

July 2021 – September 2022

With other directors, jointly supervise the activities of the organization. Shareholder.

BOARD OF ADVISORS – EQUATORIAL SPACE SYSTEMS

November 2020 – June 2021

Orbital mechanics, satellite and suborbital payload development and testing. Training of human resources. Business development.

Software development | Mission Analysis | Teaching | Business Development | Consulting

CONSULTANT – SUBJECT MATTER EXPERT, SPACECRAFT ENGINEERING

NASA – NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

FREELANCER.COM - OPEN INNOVATION SERVICES

Shockwave Propagation through Space Structures (Machine Learning emphasis)

January 2022 – June 2022

Shock definition on spacecraft and rockets are typically completed using semi-empirical techniques baselined in 1970. Progress in prediction methods needs to be validated against high quality data from known sources and structures. NASA has developed a ShockSat testbed to provide high quality data that can be used by the global community to assess their shock propagation tools. The goal of this challenge is to find shock propagation prediction techniques that are discipline-advancing.

- Mechanical vibrations (shockwave propagation)
- Experimental methods
- Signal processing
- Data analysis
- Software engineering
- Machine learning
- Performance and proposals evaluation

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This was a collaboration between the SME, NASA LaRC/ Structural and Thermal System Branch, LMI, and Harvard Laboratory for Innovation Science (LISH).

Keywords: shockwave | vibrations | spacecraft | payloads | modeling | evaluation | validation | experimentation | machine learning | computing | software | NASA challenge |

OWNER & CHIEF EXECUTIVE OFFICER

MAIDANA RESEARCH – Incorporation United States (Idaho) and Thailand
CONSULTING, ENGINEERING DESIGN & SCIENTIFIC RESEARCH, 2015 – Present
www.maidana-research.com

MAIDANA RESEARCH is a small business dedicated to engineering design and scientific research. Its main set of activities rely on computer aided design, engineering and manufacturing (CAD/CAE/CAM), basic and applied research in the engineering and physical sciences, and consulting in topics related to industries and advanced technologies deemed critical to national security and to long term economic development including aerospace, satellites, nuclear technologies, defense-related industries, and advanced energy systems.

MAIDANA RESEARCH also acts as a platform for research commercialization of new or disruptive technologies that can lead to the commercialization of specific products and services.

MAIDANA RESEARCH has been successfully registered before the US Small Business Administration getting the status of U.S. Federal Government Contractor (SBC # 000412360 / D-U-N-S # 079109504), before the European Commission as a research-intensive small company and a grant requestor organization (E.C. PIC # 952466766) and before the European Space Agency (ESABD # 24669).

Duties include managing, administrative and business development activities. Primary responsible in writing proposals, negotiating contracts, and financial transactions. Develop vital business relationships. Develop government relationships, local community relationships, and media relationships important to continued growth.

- Company incorporation, administration and management. Business development
- Technical, scientific and business consulting
- Technical and commercialization analysis in the energy, defense, industrial, scientific, medical and space sectors.
- Acquired status of U.S. federal government contractor
- Registered and recognized before the SBA, NSF, DoE, NIH, DoD, NASA, EU, ESA
- Acquired status of European Space Agency bidder / contractor
- Acquired recognition by the European Commission and the Swiss government as research SME start-up

The company was granted the small business innovation research awards 2015, 2016 and 2019 in advanced nuclear technologies; and it is a member of the U.S. Nuclear Industry Council.

- *Small Business Innovation Research award 2015 (U.S. Department of Energy), \$128,000*
- *Small Business Innovative Research award 2016 (U.S. Department of Energy), \$ 846,000*
- *Small Business Innovative Research award 2019 (U.S. Department of Energy), \$ 200,000*
- *Small Business Innovative Research award 2022 (U.S. Department of energy), \$ 200,000*

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In collaboration with other organizations worked on the technical and business analysis, and commercialization aspects, of launching vehicles for small satellites in Low Earth Orbit and SSO. Such vehicles include LM11 vectors and sub-orbital systems.

The activities performed in the energy and defense sector include plasma converters, nuclear pumped lasers, regulatory aspects on power generation and distribution, advanced nuclear reactors and components, hybrid solar-wind energy systems, utilization of UAVs and Satellites in S.E. Asia, CubeSats and sub-orbital flight, utilization of machine learning and quantum computing and others.

Consulting activities include tasks as expert reviewer for the European Commission's Research Executive Agency (Horizon 2020) and development of national policies for the space sector.

Sub-orbital space work outside the United States was merged with Equatorial Space Systems, Singapore (IP acquired 07/07/2021). Independent work regained in October 2022.

Keywords: engineering design | project engineering | engineering management | scientific research | research commercialization | product design | business development | business management | administration | operations management | strategic partnership | start up | product design | innovation | technology consulting | leadership

PROJECT MANAGER | SPACE SCIENCE & TECHNOLOGY, 2019 – 2021 MAIDANA RESEARCH and

**Geographical Information and Space Technology Development Agency (GISTDA) – Thailand
(Contractor)**

Lead researcher and project manager with direct responsibility for completion of the funded project, directing the research and reporting directly to the funding agency. Responsible for the preparation, conduct, and administration of the sponsored projects.

Scientific Payloads Development

- Electronics instrumentation
- Embedded software
- Mechanical systems
- Mechatronics Design
- CAD/CAE/CAM
- Design for manufacturing and assembly (DFMA)
- Rapid prototyping, testing and fabrication (3D printing, CNC)
- Environmental testing (vibrations, vacuum, thermal, electromagnetics)

Space Missions Coordinator

- Space launch vehicles (selection / utilization)
- International Space Station (utilization)
- Integration and verifications (payload testing and documentation)
- Transportation and logistics (ground, air, sea, space)
- Liaison and coordination (government agencies, private partners, academia)

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- Operations

(Under contract for the Geo-informatics and Satellite Technology Development Agency)

Fabrication and Testing Facilities Manager

(In-house Capabilities Developer)

Acquisition or Design, assembly and development of components, parts and machinery for space environment testing of small payloads for microgravity research aboard the International Space Station (ISS) and microsattellites, including

- Vibrations testing hardware and software
- Vacuum testing and material degassing equipment
- Thermal testing and thermal treatment equipment
- Thermography (Thermal Imaging)
- Additive manufacturing (3D printing -SLA and FDM) equipment for milifluidics and structural components
- Electronics instrumentation test benches

As well as development of production and manufacturing processes and methods.

Design and fabrication of experiments under microgravity conditions for plant biology, food in space, packaging, pharmacy, chemistry, biology, and others

Project, Engineering and Scientific Management | Research, Design and Development | Innovation | Advanced Concepts | Informatics & Communications Technology | Software engineering | Electronics, Instrumentation and Control Systems | 3D Printing Technologies | Fabrication Methods | Computer Aided Manufacturing (CAM) | Space Systems and Instrumentation | Government – Industry partnership | Proposal writing | Engineering design | CAD/CAE/CAM | Optimization.

OWNER

CubeSat Solutions

Micro-Satellites and Small Launching Vehicles,
Pre-Start-up Venture – June 2021 (merged / acquired)

www.cubesat-solutions.com

CubeSat Solutions has the goal of developing, launching and operating low weight satellites offering worldwide turnkey solutions for the small satellite industry. A unique integral low-cost service provider for the construction of small satellites and exploitation of satellite services for any business willing to gain access to orbit.

Task:

- Oversee the development of sub-orbital rockets and micro-satellites for missions to low-Earth Orbit.
- Company general management and strategic planning
- Examination of the short and long term needs of the organization, utilizing capital to make investments designed to help the organization reach its objectives

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Keywords: engineering design | R&D | small satellites | cubesats | tubesats | rockets | sub-orbital launching vehicles | project management | business administration | business management | government relations |

TENURED LECTURER IN MECHANICAL ENGINEERING, 2013 – 2016

Chiang Mai University, Faculty of Engineering, Chiang Mai - Thailand

RESEARCH

Basic and applied research on space, nuclear and mechanical systems engineering. Applied, industrial and engineering physics.

TEACHING

Course management, administration and teaching in mechanical and aerospace engineering:

- Mechanics of Machinery I: basic mechanisms, force analysis, balancing of rotating and reciprocating members.
- Mechanics of Machinery II: intermediate level kinematics and dynamics of machinery, basic rotodynamics analysis, modeling and simulation of mechanisms using MATLAB & Simulink.
- Mechanics of Solids I & II: stress, strain, and mechanics of materials. Structural and stress analysis using AutoDesk Inventor / Simulation Mechanical.
- Engineering Dynamics II: 3D dynamics of rigid bodies and its engineering applications. Multibody dynamics. Modeling.
- Rocket and Propulsion Engineering: aerospace propulsion - aircraft, rocket and spacecraft propulsion - mission analysis.
- Introduction to aerodynamics and aeronautical engineering

ACADEMIC DEVELOPMENT:

Curriculum and e-learning development in aerospace and mechanical engineering. Development of instructional laboratories. Participation and organization of seminars and conferences. Publication of research and review papers. Academic and professional guidance and advice of students and non-students. General outreach activities. ABET accreditation.

TECHNICAL COORDINATION & SUPERVISION

Supervision and guidance on the design, integration, testing, operation and maintenance of complex electronic and mechanical systems and sub-systems.

Capstone project coordination: Design and construction of unmanned aircraft vehicles (UAV).

BUSINESS DEVELOPMENT:

Funding acquisition. Administration of resources. Contracting, grant proposal writing and technical coordination. Development of academic, industrial and international collaborations.

PRINCIPAL INVESTIGATOR

Lead researcher and project manager with direct responsibility for completion of the funded project, directing the research and reporting directly to the funding agency.

INDUSTRY CONSULTANCY / TECHNOLOGY TRANSFER

Mid-career Investigator Research Grant Award 2015.

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Keywords: energy and propulsion | aerospace propulsion | unmanned aircraft systems | rocketry | cubesats | space nuclear systems | nuclear power | mechatronics | machinery | systems engineering | dynamical systems | thermo-fluids | electrodynamics | magnetohydrodynamics | modeling | simulation | multiphysics analysis | computer aided engineering design | optimization | software engineering | instrumentation and control | electronic interfaces | applied engineering | project management | technical coordination | procurement | higher education | e-learning | science writing | technology transfer |

AFFILIATE FACULTY IN MECHANICAL ENGINEERING, 2011 – Present

Idaho State University, Pocatello, Idaho – United States of America

Project consulting, public speech on science, technology, engineering, and mathematics (STEM), seminar guest speaker.

Graduate Thesis Committee Member: Kean Martinic

Program: Nuclear Engineering Masters Program

Topic: Nuclear Micro-Reactors for Space Applications | Accelerator Driven Sub-Critical Systems (ADSS)

Doctoral Dissertation Committee Member: Kean Martinic

Program: Engineering and Applied Science

Doctoral Research minor advisor: Magnetic Field Mapping System

University Space Initiative

- Funding and resources acquisition
- Spaceport America Club
- Rocketry Club advisor

SENIOR CONSULTANT, 2014 – 2016

AWR Lloyds, Bangkok, Thailand

Consulting services, primarily in the Asia-Pacific area, in topics related to industries and advanced technologies deemed critical to national security and to long term economic development including aerospace, remote sensing technologies, satellites, nuclear technologies, defense-related industries, advance energy and materials technologies and some natural resources (e.g. rare earths) and infrastructure-related sectors.

NUCLEAR & FUTURE FLIGHT PROPULSION TECHNICAL COMMITTEE

Senior Member – Former Treasurer and Liaison sub-committee Chair

American Institute of Aeronautics and Astronautics, AIAA – United States, 2010 – current

Conduct activities toward the understanding of physical mechanisms and associated technologies that lead to the implementation and design of nonchemical, high energy aerospace propulsion systems.

- Technical and political analysis
- Public policy and Community outreach
- Government and regulatory affairs
- Public speaker

SCIENTIFIC COMMITTEE MEMBER, 2011 – 2015

Mars Society Switzerland – Neuchatel, Switzerland

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Works to educate the public, the media and government of the benefits of exploring the red planet and outer space. Advice in questions related to space science and technology with emphasis in space nuclear systems, advanced propulsion systems and mission planning.

- Technical analysis
- Community outreach
- Public policy and administration
- Public speaker.

SENIOR RESEARCH FELLOW – APPLIED PHYSICIST, 2010 – 2013 **European Organization for Nuclear Research, CERN – Geneva, Switzerland**

Scientific and technical research in applied physics. Performance evaluation on machine protection and electrical integrity for large scale high energy physics facilities. Appointed scientific secretary in *Operations and Machine Protection* with co-responsibility over the organization of meetings and workshops, coordination of activities, review of technical documents, and scientific / technical presentations. Modeling and simulation of scientific instrumentation, advanced engineering components and physical process.

- Operation, protection and failure analysis for a future 50 km/31 mi long, 3 TeV energy, multi-billion euros large scale research facility (CLIC)
- Advanced software operation (alpha user) and benchmarking (beta tester) of software for the design of highly complex devices
- Scientific and technical writing of research papers, technical documents and participated in the elaboration of the technical design report
- Research involving electrodynamics, thermal and structural analysis, computational methods, electromagnetics, radiation damage and system integration (850+ modules valued 1 MEURO each, operating in the energy range 9 GeV to 3 TeV, high vacuum, high current, high magnetic fields, high radiation environment, 20 nano-meters alignment tolerance, high intensity electron / positron beams)
- Safety engineering. Risk and failure analysis. System safety and safety systems.
- Software Benchmarking and Analysis: PLACET Development Team – Alpha user.

RESEARCH ASSOCIATE – SPACE NUCLEAR SYSTEMS, 12/2007 – 10/2010 **Idaho National Laboratory, Idaho Falls, Idaho – United States**

National Aeronautics and Space Administration, NASA and U.S. Department of Energy, DoE

Research and development on space nuclear systems and associated technology for robotic and human space exploration missions in support of NASA and the Constellation program. Design engineer of thermo-magnetic systems for nuclear power based space missions (primary area: fission surface power, secondary area: nuclear propulsion).

- Design, modeling, simulation, fabrication, testing and optimization of advanced engineering devices.
- Scientific and technical writing of research papers, technical documents and reports. Participation in conferences and presentations. Public speaking.
- Research and technical activities involving computational and experimental electromagnetics, fluid dynamics, thermodynamics, heat transfer, stress analysis, magnetohydrodynamics (MHD), radiation damage, power electronics (e.g. 3-phase AC), mechanical and electric design, fabrication methods, system integration, thermo-hydraulics, measurements and instrumentation.

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- International expert on the design of liquid metal annular linear induction pumps.
Security Clearance: DoE / BEA "C – Confidential" – 5 years background check investigation. GS13.

RESEARCH ASSOCIATE – NUCLEAR FUELS & MATERIALS, 9/2009 – 9/2010

Idaho National Laboratory, Idaho Falls, Idaho – United States

Managed by Battelle Energy Alliance for the U.S. Department of Energy

Research and development on nuclear fuels and materials. Performance evaluation on projects for the Reduced Enrichment for Research and Test Reactors (RERTR) Program. The Reduced Enrichment for Research and Test Reactors (RERTR) Program develops technology necessary to enable the conversion of civilian facilities using high enriched uranium (HEU) to low enriched uranium (LEU) fuels and targets. The main technology components of the program are: the development of advanced LEU fuels; the design and safety analysis for research reactor conversion; and the development of targets and processes for the production of the medical isotope Molybdenum-99 with LEU.

- Nuclear Fuels and Materials Division
- Fuel Performance and Design
- Irradiation, phase reversion, heat treatment, stability and microstructural studies
- U - 10% Mo fuel alloys.

Security Clearance: DoE / BEA "C – Confidential" – 12 years background check investigation. GS-13.

INSTRUCTOR IN ELECTRONICS / Organization Liaison, 2010 – 2010

International Committee for Future Accelerators, ICFA – Fermilab / CERN

Instituto Balseiro, Bariloche – Argentina

School of Instrumentation 2010

Teaching of laboratory of electronics to professional and graduate students with emphasis in measurements and instrumentation. Co-instructor of laboratory of data acquisition and SCADA systems.

International organization and coordination of activities in the United States and in Argentina including logistics, resources availability, supervision of activities, air and ground transportation, security checks and medical services access.

The ICFA Instrumentation school offers to the students a unique formula that has, by now, become a tradition. Lecture courses in the morning, covering different topics in particle physics instrumentation. Courses are given by researchers who are actively involved in the field and who are recognized to be experts in detector development. The lecture courses are supported by afternoons of "hands-on" participation in laboratory experiments designed to demonstrate the material presented. ICFA school is a truly international school open to a maximum of 80 students from all over the world.

- Electronic measurements and development of instrumentation
- Technical coordination.
- Operations & personnel management (English / Spanish)

RESEARCH ASSISTANT – ENGINEER PHYSICIST, 1/2005 – 12/2007

Idaho State University, Pocatello, Idaho – United States

Research on applied physics and engineering for the U.S. DoE and the U.S. DHS.

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Cargo Inspection: Over the last several years, there has been a substantial research and development effort into active inspection technologies that can non-destructively detect, identify and quantify fissionable materials for advanced nuclear materials safeguards applications with the long-term goal of providing near real-time nondestructive quantification of fissionable materials that can be deployed in field settings.

Electron sources: Software development for the mechanical design and analysis of electron sources.

Reactor-Accelerator Coupling Experiments - Accelerator Driven Sub-critical Systems: The RACE Project, a university transmutation research project of the U.S. Advanced Fuel Cycle Initiative (AFCI), was a series of accelerator-driven subcritical systems (ADSS) experiments. In these experiments, an electron accelerator was used to induce bremsstrahlung photon-neutron reactions in heavy-metal targets producing a neutron source to initiate fission reactions in the subcritical systems.

- Software Benchmarking and Analysis: MCNPX Beta Team - Los Alamos National Laboratory (LANL), USA
- Software Benchmarking and analysis: ASTRA Alpha User - Deutsches Elektronen-Synchrotron (DESY), Germany
- Research and technical activities involving microwave linear accelerators, computational beam physics, computational & experimental electromagnetics, RF cavities, metrology, radiation transport / shielding, design engineering and measurements.
- Scientific software development
- Design, modeling and simulation
- Scientific and technical writing of research papers, technical documents and reports. Participation in conferences and presentations. Public speaking. Posters design and presentation.

GRADUATE DESIGN ENGINEER – Wind Tunnel Instrumentation, 1/2007 – 7/2007

Idaho State University, Measurements & Control Engineering Research Center, Pocatello, ID – USA

Research and development of measurement and control systems for thermo-fluids and vibrations. Construction and operation of a sub-sonic wind tunnel and its optical and electronic instrumentation.

- Design, development, integration and testing of advanced optical (3D PIV – Particle Image Velocimetry) and electronic (LiF - Laser Induced Fluorescence) instrumentation including, but not limited to, CCDs, pulsed lasers, optical elements, electronic components, and computer interfaces.
- Design of structural elements (mounting systems for instrumentation) and integration of operational elements (smoke generator).
- Software selection, installation, operation and benchmarking for data acquisition and image processing.
- Benchmarking of results and co-development of computational fluid dynamics (CFD) models and simulations.

ENGINEER PHYSICIST – Combustion, 6/2004 – 12/2004

Michigan State University, Depart. Of Mechanical Engineering, East Lansing, MI – USA

Research on microgravity combustion, spacecraft fire safety and diverse aspects of combustion physics under contract for NASA. Providing simplified descriptions of complicated phenomena for combustion in microgravity environments with applications in mission safety and propulsion.

- Image processing, pattern recognition, data analysis and computational fluid dynamics (CFD)

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- Combustion physics (including thermodynamics, heat transfer, fluid dynamics, thermo-chemistry, fluid-solid interaction)

**MECHANICAL ENGINEER & COMPUTER SCIENCE SPECIALIST –
SR TEACHER ASSISTANT /INSTRUCTIONAL SECTION LEADER, 8/2004 – 12/2004**
Michigan State University, Depart. Of Mechanical Engineering, East Lansing, MI – USA

Teaching of 2 sections of engineering thermodynamics (Dept. of Mechanical Engineering) and 1 section of computer science for non-engineering majors (in-loan to the Department of Computer Science).

Coordination of activities between teaching assistants, section leaders, students and the faculty (over 1200 persons).

- Supervision and coordination of activities
- Scheduler and controller. Administrative liaison
- Operations and personnel management (direct supervision on over 180 persons)

TECHNICAL CONSULTANT / INFORMATION ANALYST, 3/2004 – 8/2004
Enerficiency, LLC - East Lansing, MI – USA

Acquisition and analysis of data and information on renewable energy sources (Solar, Hydro-electric and PEM Fuel Cells) technology, local and regional market, business involved or with potential involvement, commercialization perspectives, parts and components providers. Industry Liaison.

- Business intelligence
- Information analysis

RESEARCH ASSISTANT – PHYSICIST, 2/2002 – 7/2004
Michigan State University, Depart. of Physics and Astronomy - East Lansing, MI – USA

Research on applied physics. Modeling, simulation, optimization and validation of scientific-technical designs for high energy physics. Scientific software benchmarking and analysis.

Virtual university system administration: Server administration and system operation. Networking and communications systems (10/100, 1Gbit, ISDN, fiber optics, video-conference, routers, hubs, cabling). Systems Engineering. Functional and system analysis. Web page design. Maintenance and installation of software and hardware.

Teacher assistant on advanced, specialized and professional subjects on physics and applied physics at masters and doctoral levels.

- Software benchmarking and analysis: COSY Development Team. Alpha User & Beta Tester.
- COSY INFINITY is simulation and analysis code which allows the study of particle accelerators, astrodynamics and control, guidance systems, electron microscopes, and many other devices.
- Design, modeling and simulation
- Scientific and technical writing of research papers, technical documents and reports. Participation in conferences and presentations. Public speaking. Posters design and presentation.
- Research and technical activities involving computational electromagnetics, dynamical systems, electrodynamics, and computational / mathematical physics.
- Virtual university system administration and e-learning

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- Informatics and Communications Technology

TECHNICAL INTERN – GUIDANCE, SIMULATION & CONTROL SYSTEMS, 1999 – 2000

Institute for Scientific and Technical Research of the Armed Forces, CITEFA - Argentina

The Institute for Scientific and Technological Research of the Armed Forces (CITEFA, Spanish: Instituto de Investigaciones Científicas y Técnicas de las Fuerzas Armadas), is an Argentine federal agency in charge of the research, development and homologation of armament. The Agency was moved under the orbit of the Ministry of Defense and renamed Institute for Scientific and Technological Research for the Defense - Instituto de Investigación Científicas y Técnicas para la Defensa- (CITEDEF). CITEFA has produced several air-to-surface missiles since late 1960s including the Albatros, the Martin Pescador and the AS-25K. In 2008 they refurbished the Aspide's missile engines in use in the Argentine Navy and Matra Magic air-to-air missiles.

- Software development, computational physics, modeling and simulation
- Flight mechanics. Guidance and control.
- Defense systems

INFORMATICS & COMMUNICATIONS TECHNOLOGY - INSTRUCTOR , 7/1994 – 11/2001

Several elementary, middle and high schools – Buenos Aires, Argentina

Teaching of informatics technology (IT) to high school students (junior and senior year/4th and 5th year) - Classroom and laboratory. (1999-2001). Teaching of basic computer operation concepts to elementary school students (1995 - 2000) and teaching of computer operation and administrative//office software to adults assisting evening school. (1994 - 1996).

Curriculum development: Creating a planned curriculum, pedagogy, instruction and presentation modes specifying the way content is delivered, including the structure, organization, balance, and presentation of content in the laboratory-classroom. (1995 & 1999).

- Informatics and communications technology (ICT)
- Curriculum development. Classroom education
- Personnel management and coordination of activities

INFORMATICS TECHNOLOGY & MANAGEMENT INFORMATION SYSTEMS - LABORATORY & OPERATIONS MANAGER, 4/1999 – 12/2001

Several district schools – Buenos Aires, Argentina

Performed administration, installation and maintenance of computers, computer networks (LAN/WAN) and software at elementary and secondary education schools for instructional tasks and for support of everyday operations. Management information systems.

- Informatics and communications technology (ICT)
- Management information systems
- Personnel management and coordination of technical, maintenance and instructional activities

APPLIED INFORMATICS SPECIALIST - AUTOMATION & ROBOTICS LABORATORY AND TEACHER ASSISTANT, 7/1999 – 11/1999

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Universidad Tecnologica Nacional, INSPT - Argentina

Laboratory and teacher assistant in computer programming for automation and robotics. Jr software developer (intern) for e-learning of technical, industrial and basic science subjects.

- Informatics and communications technology (ICT)
- Data acquisition and control using PCs
- Programming

TECHNICAL INTERN - MATERIALS ENGINEERING, 6/1999 – 9/1999

Argentinean Commission for Atomic Energy, CNEA – Argentina

Education and practical training in materials science and engineering.

VOLUNTEER EXPERINCE & CAUSES

Panel Member

U.S. Department of Energy (DOE)

Fission Surface Power (FSP) Technology Review Panel

(Jan 2023 - Present)

Returning to the Moon's surface for human and robotic missions is within reach with the assistance of the Fission Surface Power (FSP) project. This project works toward providing a power-rich environment supporting lunar exploration.

The FSP project seeks to bring about new capabilities supporting a lunar sustainable presence and crewed Mars exploration while providing near-term opportunities for fabrication, testing and flight of a space fission system. Additionally, this program aims to establish interdisciplinary industry teams to partner with NASA and the Department of Energy (DOE) and bring new concepts on fission surface power systems, and gain valuable insights into barriers and challenges faced by the industry in furthering space nuclear power and propulsion technologies.

Reviewer

U.S. Department of Energy (DOE)

Office of Nuclear Energy - Competitive Funded Projects (NEUP / CINR)

Apr 2016 - Present

The Office of Nuclear Energy (NE) is working to advance nuclear power to meet the nation's energy, environmental, and national security needs.

The Nuclear Energy University Program (NEUP) supports the integration of research performed at universities with other research performed for the Office of Nuclear Energy, as well as support the transfer of knowledge from an aging nuclear workforce to the next generation of workers.

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INFRASTRUCTURE & HEALTH MANAGEMENT SERVICES / EMERGENCY RESPONSE Public Health Organizations - Northern Thailand (5/2013 – 12/2014)

Assisting in infrastructure assessment and cost planning. Assisting in the development of presentations and policies before the local and regional governments. Assisting in health management services as requested and needed. Assisting in logistics and transportation during night-shift emergency cases. Security and safety assessment. Co-organization of social and professional development events. Technical consultant on medical technology, medical devices, health-care software, informatics and civil infrastructure.

STEM COUNSELOR / SCHOLARSHIP ADMINISTRATION Public schools and universities (August 2013 – December 2015)

Provided counseling in education and career options in science, technology, engineering and mathematics. I administered, provided and personally funded partial and total scholarships to economics and social disadvantaged students during critical periods of their studies (and life) in under-developed countries.

INTERNATIONAL DEVELOPMENT / SCIENCE, EDUCATION, ICT Public schools, community colleges, health centers and universities (April 2008 –2020)

International development is related to the concept of international aid, but is distinct from, disaster relief and humanitarian aid. While these two forms of international support seek to alleviate some of the problems associated with a lack of development, they are most often short term fixes — they are not necessarily long-term solutions. International development, on the other hand, seeks to implement long-term solutions to problems by helping developing countries create the necessary capacity needed to provide such sustainable solutions to their problems. A truly sustainable development project is one which will be able to carry on indefinitely with no further international involvement or support, whether it is financial or otherwise.

- Development of science, technology and international cooperation at universities in developing countries.
- Development of new and updated content for science, technology, and engineering (STEM) education at elementary, secondary, vocational and higher education institutions.
- Advice on the modernization and incorporation of technologies on the health and educative sector
- Public speech and counselling

INFORMATICS & COMMUNICATIONS TECHNOLOGY

RESOURCES MANAGEMENT – INFRASTRUCTURE PLANNING AND DEVELOPMENT

COMPUTER SOFTWARE & HARDWARE

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- Advanced computer programming
- Advanced software operation
- Multimedia technology
- Hardware assembly, maintenance and programming
- Multiplatform: PCs, workstations, servers, mainframes, clusters
- IT security at software and hardware level
- Web design

NETWORKING AND COMMUNICATION SYSTEMS:

- Structured cabling. Communication boards. Hubs & routers. Antennas.
- Installation, configuration and administration of computer networks
- Digital communication systems
- Point-to-point and Point-to-multipoint communication links
- Design, Maintenance and Management of integrated networks

MANAGEMENT INFORMATION SYSTEMS

- School information management systems
- Office automation systems
- Decision support systems
- Knowledge management systems
- Systems analysis, design, implementation, testing, conversion, documentation and maintenance

SCIENTIFIC COMPUTING

- Software engineering
- Mathematical modeling and simulation
- Data analysis. Optimization
- Benchmarking (Alpha user. Beta tester)
- Visualization. Graphical user interfaces, GUIs.
- High performance computing (HPC)
- Data Science

DATA ACQUISITION, PROCESS CONTROL & EMBEDDED SYSTEMS

- Supervisory control and data acquisition, SCADA
- PC data acquisition and instrumentation
- Computer controlled solutions
- Data analysis. Low level programming
- Embedded and control systems

Experience: 25+ years.

PROFESSIONAL AFFILIATIONS

- American Institute of Aeronautics and Astronautics, AIAA (Lifelong and Senior member)
- U.S. Naval Institute
- American Physical Society, APS (former)
- Institute of Electrical and Electronics Engineers, IEEE (former)
- Project Management Institute, PMI (former)
- Argentinean Navy Reserve (former)

TEACHING EXPERIENCE

Graduate level:

- Analytical mechanics
- Introductory beam physics
- Particle accelerators I & II

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- Non-linear beam dynamics (Dynamical systems. Optimization. High order non-linearities)
- Electronics laboratory.
- Control and data acquisition.

Professional level:

- Orbital mechanics
- Mission analysis
- Introduction to rocket engineering

Undergraduate level:

- Mechanics of machinery I & II
- Rocket & propulsion engineering (aerospace propulsion)
- Engineering dynamics II
- Mechanics of solids I & II (aka mechanics of materials and stress analysis)
- System analysis and control
- Engineering thermodynamics
- Fluid mechanics I
- Computer science I for non-engineering majors
- Computer programming for Automation and Robotics majors
- Theoretical physics I: mechanics
- Theoretical physics II: electromagnetics
- Applied electromagnetics
- General physics I, II & III

Secondary/High school/Vocational level:

- Informatics Technology I & II. Computer science laboratory.
- Physics. Mathematics. Electric circuits and machines.

Military instruction:

- Basic training

OTHERS

- Space Generation Advisory Council – U.N. Programme on Space Applications
- Korean TaeKwonDo Association, 2009/10
- International Taekwondo Federation
- American Pool Leagues Association (APA), 2009/10
- Top 24 LinkedIn profiles in research commercialization, Top 10% between peers
- Former international civil servant (with diplomatic status)
- Interests in billiards, martial arts, photography, international relations, political science
- Space exploration, exploitation and commercialization advocate
- Business development consultant

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PUBLICATIONS

BOOKS / BOOKLETS : 2 published, 2 in the making

1. “Thermo-magnetic systems for space nuclear reactors: an introduction” by Carlos O. Maidana. Springer briefs in applied sciences and technologies, Springer U.S., 2014. ISBN 978-3-319-09029-0.
2. “Design of a Cabinet Safe System for a portable particle accelerator – Electromagnetic optics and beam dynamics optimization. Basics, concepts and methods” by Carlos O. Maidana. VDM Verlag, Germany, 2009. ISBN 978-3-639-15901-1.

LECTURE NOTES / LECTURE PRESENTATION MATERIAL : 4

1. Title: “Mechanics of Machinery I”. Chapters: 12. Author: Carlos O. Maidana. Year: 2015
2. Title: “Mechanics of Machinery II”. Chapters: 8. Author: Carlos O. Maidana. Year: 2015
3. Title: “Engineering Dynamics II”. Chapters: 12. Author: Carlos O. Maidana. Year: 2015
4. Title: “Rocket and Propulsion Engineering”. Chapters: 18. Author: Carlos O. Maidana. Year: 2015

REFEREED SCIENTIFIC PAPERS & TECHNICAL ARTICLES : 27

Publications in Journals and Conferences cannot be done for a few years due to Intellectual Property protection, patenting regulations, confidential work and non-disclosure agreements in place.

NON-REFEREED PUBLICATIONS: 4

PUBLIC PRESENTATIONS: 24+

PATENTS: 10 Provisional Patent Applications / Patent Pending

1. Annular Linear Induction Pumps for Molten Salts and Liquid Metals
Patent date filed Jun 23, 2020
Patent issuer and number US 63/037,831
2. Active Flow Control of Linear Induction Electromagnetic Pumps using Machine Learning
Patent date filed Jun 17, 2020
Patent issuer and number US 63/038,813
3. Micro-Channel Cooling System for Electromagnetic Pumps
Patent date filed Jul 27, 2020
Patent issuer and number US 63/057,170
4. Software for the Design and Analysis of Annular Linear Induction Pumps
Patent date filed Jul 7, 2020
Patent issuer and number US 63/045,161
5. Experimental Module for the Investigation of Plant micro-Tuberization under micro-Gravity Conditions
Patent date filed April 2021 (v1.0 transferred to Equatorial Space Systems)
6. Experimental Module for the Investigation of Fluid Homogenization under micro-Gravity Conditions
Patent date filed April 2021 (v1.0 transferred to Equatorial Space Systems)
7. Experimental Module for the Investigation of Bacteria under micro-Gravity Conditions
Patent date filed April 2021 (v1.0 transferred to Equatorial Space Systems)
8. Experimental Module for the Investigation of Water-Meal Plants under micro-Gravity Conditions
Patent date filed April 2021 (v1.0 transferred to Equatorial Space Systems)

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9. 3D Printed Payload Enclosure for Space Science
Patent date filed April 2021 (v1.0 transferred to Equatorial Space Systems)

Protected Data rights Reports: several at www.osti.gov through the U.S. Department of Energy and Small Business Administration (5 and 20 years data rights)

OTHER PROFESSIONAL SERVICE

- Journal of Space Exploration. Reviewer/referee, 2013 - 2019
 - NASA - Experimental Program to Stimulate Competitive Research (EPSCoR), SME – Reviewer, 2015
 - NASA – U.S. National Aeronautics and Space Administration. Registered reviewer on NASA Innovative Space Concepts (NIAC), 2011
 - Annals of Nuclear Energy, Elsevier. Reviewer/referee, 2010-current
 - Journal of Nuclear Engineering and Technology (Elsevier)
 - U.S. Department of Energy – Office of Nuclear Engineering - Small Business Innovative Research
 - Journal of Radioanalytical and Nuclear Chemistry, Springer (2015)
 - International Science Grid this week, iSGTW. Collaborator. Consultant, 2012-2013. A U.S. National Science Foundation and E.U. FP7 publication
 - Nuclear Instruments and Methods in Physics Research, A. Reviewer/referee, 2010
 - European Union registered reviewer, 2014 - current
 - Several National & International Organizations. Project and grant proposals evaluation. Financing, risk and reliability analysis.
 - ICFA School on Instrumentation in Elementary Particle Physics. Co-instructor of Basic Electronics Laboratory, 1/2010
 - 6th International Conf. for Applications of Particle Accelerators – AccApp'07 (USA). Assistant to the organizing committee. Referee: 4 papers reviewed. Session co-chair (two sessions)
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