europass Curriculum Vitae, detailed

## PERSONAL INFORMATION

# Gabriele RIZZO


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Sex Male | Date of birth 18 Dec 1982 | Nationality Italian

## PERSONAL STATEMENT

Professor Dr. Gabriele Rizzo, Ph.D., APF, is a visionary futurist and an enthusiastic innovator. He is currently NATO world-class expert ("Member at Large[1]") for Strategic Foresight and Futures Studies; professional futurist advisor for European Defense Agency (EDA), United Nations (UN), and both NATO Strategic Commands; Emerging Science & Technology counselor and Principal Futurist advisor for one of the top 10 Aerospace, Defense & Security companies globally; and NATO expert for Cyberspace and Cyber Defence. He is renown in EDA's TechWatch and NATO Allied Command Transformation's (ACT) Futures Work, where he is editor and co-author of NATO Technology Trends, co-author of Strategic Foresight Analysis and Framework for Future Alliance Operations, chairman of their Future Technology tracks, and full contributor to Longer-Term Aspects – this oeuvre framing deep futures out to 2040–2060, to inform $1T worth of Defense planning.

His creativity, resolve, and competence of a broader scope to "look over the horizon" are his *forte* and evince in his being lead author, and even demiurge in some cases, of strategic visions and deep futures for United States, Italy, Switzerland, EDA, NATO, UN, Fortune Global500 industries ranging from Defense & Security to Aerospace to Automotive, and international organizations with billion-sized budget, providing strategic innovation advice, shaping policy to direct, modify, or empower technology.

He holds an MSc in Theoretical Physics honored with a national award for excellence, and a Ph.D. in Physics – String Theory and Astrophysics – graded as top 1%. He held multiple positions over more than ten years in Engineering Research, Development & Innovation before moving to Strategy, winning the Innovation Award in 2017 and 2018, with an international, multinational, and multicultural scope within NATO and outside (Russia, Israel, South Africa, Japan, South Korea, Singapore). Gabriele has broad experience in land, air, sea, space and cyber assets, and vast, in-depth experience in Science & Technology complexes at different management levels. He planned technology roadmapping for strategy and innovation at top decision-makers' level, advised industrial and Ministry of Defense representatives in multiple NATO Von Karman Horizon Scanning, and led the technological innovation in a €10M FP7 European project, managing 65 experts from 40 universities and industries across 15 countries – an endeavor nevertheless concluded with honors from the EU.

When it comes to information security, information assurance, and cybersecurity, he is in this world since the roaring '90s, Usenet and IRC – and he is about to earn his CISSP[2]. Gabriele was in the Industrial Committee for the European Cyber PPP[3] SRIA[4], is co-author of its 2027 Vision and Strategic Outlook, and currently chairs the Sectoral Demand working group in the European Cyber Security Organization (ECSO)[5] – the second-largest, managing more than 350 experts from 130 entities spanning 27 countries, encompassing topics of industry 4.0, energy (oil, gas, power) and smart grids, transportation (rail, road, air,

[1] World-class experts drawn from academia, industry or government from the Nations may be nominated to join a Panel as Members at Large to bring a specific level of expertise into the Panel. *(From NATO STO Welcome Booklet)*
[2] (ISC)² Certified Information Systems Security Professional.
[3] Public-Private Partnership.
[4] Strategic Research and Innovation Agenda, the main strategic manifesto and political guidance document.
[5] The European Cyber Security Organisation is the industrial counterpart to European Commission's Cyber PPP, driving €1.8B in R&D&I.

sea, space), finance, eGovernment, healthcare, smart cities, and telecom – after being founding chair of two of its workstreams. This working group was a cornerstone for ECSO to exceed (even tripling) all targets by the EU in the latest review. He led the Major Challenge 1: "Safety, Security and Privacy by design" in the ECSEL[6] Joint Undertaking Core Team, and was the lead author of its 2017 SRIA and its Long Term Vision – evaluated "important pillars of strategy and implementation of R&I" by the EU. Moreover, he is chairman of ECSO Cyber Defense workstream, vice-chairman of 5G-PPP Security Working Group, EU industry rapporteur in EDA Cyber ad-hoc Working Group, and member of US DoD Cyber Group, and EDA CapTech Communication & Information Systems and Networks.

Strategist, trusted advisor, and author with more than 40 publications, Professor Gabriele Rizzo is a convinced Atlanticist active in NATO, being an invited national expert to several research groups and exploratory teams focused on future scenarios, future capabilities and concepts of operations, and innovative methodologies to scope deep futures. He is also Italy's Deputy National Industrial Representative in the NATO Science & Technology Board and has been awarded as NATO Early Career Scientist. Gabriele is member of the TECHCAST[7] Board of Experts for Technologies, Social Forecasts and Wild Cards, external advisor to Gartner Research, trusted advisor to Westlands Advisory, and voting member in IEEE[8] Global Initiative on Ethics of Autonomous and Intelligent Systems, besides having been member *ex officio* in 2017 in the Strategic Planning Committee of IEEE Technical Activities Board[9]. He is a co-author of Springer's Handbook of Anticipation[10], serves as Professor of Strategy in one of the top Universities in Italy (Sapienza University), and as Visiting Professor for Future Capabilities to NATO Defense College. Gabriele is also a judge in the Award Committee for the Most Significant Futures Work from Association of Professional Futurists. He wrote several capstone works on deep futures, for which was honored with national and international awards.

Trusted, dependable and energetic professional in innovation, foresight, and futures, he is member of the US Army "Mad Scientist" initiative, leads the US Air Force and US Space Force deep future vision (for which he has been presented the Space Force Chief Scientist's Medal), strengthens Switzerland in its foresight and tactical wargaming program. Professor Rizzo is a highly trusted advisor to the MoD, leading and facilitating the Italian Joint Staff's Transformation & Innovation Council and mentoring the Center for Defense Innovation, the forge of future military concepts and doctrine – gathering Italy's best strategy, foresight, and S&T excellence. With his guidance at their support, this organization achieved seven years of results in one. Gabriele led the foresight for the Italian national grand strategy in a forum with the coordination of the Prime Minister and with direct responsibility of the Cabinet of the Minister of Defense. He also leads foresight for the Industrial Technology Strategy in the Italian AIAD RITEC[11] high-level group.

Gabriele Rizzo is one of the few NATO Early Career Nuclear Strategists and one of the just four "Outstanding Stars" among the élite group of NATO Young Disruptors. He is a distinguished voting member of SIF (Italian Physical Society) and EPS (European Physical Society), and a proud member of WFSF (World Futures Studies Federation), APF (Association of Professional Futurists), IRTF (Internet Research Task Force), CFRG (Crypto Forum Research Group), QIRG (Quantum Internet Research Group), CESMA (Centre for Aerospace Military Studies), and US Naval Institute.

He is fond of complexity, strategy, and future, blending together award-winning international expertise, doctorate-level hard skills, a sound soft skill sector, substantial industrial experience, foresight thought leadership, and innovation. Has interests in the Convergence, the theory of war, cyberspace, and the quantum world – and he always brings CERN's PDG booklet with him!

[6] Electronic Components and Systems for European Leadership. The PPP keeping EU at the forefront of technological development, with investments for €2B.

[7] Founded at George Washington University, TECHCAST pools background data and the knowledge of 130 experts worldwide to forecast breakthroughs covering the entire strategic landscape and to assess their economic and social impact. The project has been recognized as possibly the best forecasting system in the world. The forecasts are also validated annually by comparing them to actual arrivals over the past 20 years, showing that results are accurate within ±3 years.

## WORK EXPERIENCE

Oct 2017–Present

### Member at Large, Strategic Foresight and Futures Studies

NATO, Neuilly-sur-Seine (France)

Member at Large in SAS Panel for Strategic Foresight and Futures Studies with an extraordinary broad mandate also in Cyberspace and Cyber Defence.

*(From NATO STO Welcome Booklet)* "Each Panel consists of up to three National Panel Members from each participating NATO Nation who must be chosen by their government from government, industry, or academia. Panel Members are expected to have a high degree of technical affinity relevant to the fields of interest of the Panel as indicated in the Panel's Terms of Reference, with an awareness of current technology issues and military needs in their area of expertise. Panel Members are also expected to have a substantial level of national authority and, in particular, should be able to arrange for the resourcing of national experts to the Technical Teams. They should be able to enter into commitments in Panel meetings that they will be able to implement nationally. World-class experts drawn from academia, industry or government from the Nations may be nominated to join a Panel as Members at Large to bring a specific level of expertise into the Panel."

Business or sector Government

Jan 2019–Present

### Principal Futurist, Deep Futures Vision

United States Department of the Air Force, United States

Leading the strategic long-term vision to 2060 for the U.S. Air Force, the U.S. Space Force, and the U.S. Air Force Research Laboratories.

An outstanding achievement: the work carried out in this role defined the Mission of the U.S. Space Force.

Business or sector Government

Dec 2019–Present

### Principal Futurist

HEC Lausanne – University of Lausanne

Principal Futurist at FUTURES Lab, a new organization at the heart of an exceptional campus comprising the seven faculties of University of Lausanne (UNIL) plus the Swiss Federal Institute of Technology (EPFL).

FUTURES Lab is the Foresight body of the UNIL –University of Lausanne, under the aegis of HEC Lausanne, UNIL's Executive Education and Business School.

We exist to empower individuals, entities and organizations to out-think uncertainty, out-imagine the unknown, and out-vision the status quo for them to own, shape, and design their futures — with a plan.

We design new portfolios of skills that individuals must develop today to thrive in the world of tomorrow.

As Principal Futurist, I champion state of the art foresight methodologies from the world of defense. I herald a diverse, interdisciplinary, and collaborative approach to anticipate how and where we should develop capabilities to surf the titanic waves of disruption incoming.

Business or sector Government

[8] Institute of Electrical and Electronics Engineers, now the world's largest technical professional organisation for the advancement of technology. Its motto is "Advancing Technology for Humanity".

[9] The Technical Activities Board (TAB) is the governing body of IEEE Technical Activities and the largest of six major boards within IEEE. Its vision is to inspire, foster, and empower technology-centric worldwide communities, and is responsible for developing and recommending strategic and long-range plans and goals for TAB, to anticipate and determine the direction of existing, new and emerging technologies, and related issues, and to spearhead their investigation and development by IEEE.

[10] The capstone "Reference Work" by Springer on Futures Studies, authored by all three UNESCO Chairs for Futures Studies.

[11] Italian Federation of Companies for Aerospace. Defence & Security, Military Research and Technology Group.

Oct 2017–Present

### Adjunct Professor, Strategy

Sapienza Università di Roma, Rome (Italy)

Professor of Strategy for the high-level Master in Geopolitics and Global Security, Faculty of Political Sciences.

Topics covered: Strategy, Cyberspace Strategy, Cyber Defence, Cyberwarfare. (SPS/04)

Business or sector Academia

Aug 2019–Present

### Emerging Science and Technology Counselor & Senior Principal Futurist Advisor

Leonardo, Rome (Italy)

We need to exploit the opportunities made possible by technology development to meet future operational challenges and threats in order to improve both effect and force protection. Considering the various emerging conventional and unconventional threats, which will also exploit the new technological opportunities, the future paradigm for mission effectiveness, force protection, survival, and conventional tactics must evolve to respond to new technological developments and be able to counter these threats.

From a military perspective, it is essential not just to understand the direct potential of possible game-changing technologies but also how they might influence, or even transform, the operational environment. Will it be possible to hide on the battlefield or not? What will be the role of soldiers in future conflicts? How will technology development affect professional military education? How will convergence phenomena, i.e. the intersection and confluence of new technologies, influence the battlefield? What kinds of decisions (if any) can AI-based autonomous systems be allowed to make without human involvement? What might the role of digital forces and cyber activities be?

Exploring these and other questions is of importance in military future planning. Whatever the answer, all of the DOTMLPFI elements will (or might) be challenged. It could be a significant challenge both for the Alliance and for nations.

My activity explores the content and consequences of game-changing technology developments on the future operational environment (FOE) in the 2040-2050 perspective and aims to improve the identification of game-changing technologies in the future. Game-changing technologies are defined as technological developments that significantly alter the conduct of conflict, force the adaptation of planning processes and change long-term goals, strategies, and plans. This endeavor would advise decision-makers on where to initiate changes in military capability development (using the DOTMLPFI framework) and how to direct investment in technology and capability development.

Business or sector Aerospace, Defence & Security

Apr 2019–Present

### Executive Board Member, Strategy

CTIF Global Capsule, Rome (Italy)

CTIF Italy Lab was opened on September 28, 2006, as a part of an international research network conceived by Prof. Ramjee Prasad (Aalborg University, Denmark).

The CTIF – Center for TeleInfrastructures network includes other selected centers in Europe, Asia, and the US, whose research is focused on the development of infrastructures, technologies, devices and *interdisciplinary* applications of the Information and Communication Technology (ICT).

CTIF nodes are in Denmark (University of Aalborg with a branch in Copenhagen, 2004 e 2008), Italy (University of Rome Tor Vergata, 2006), India (University of Kolkota e Mumbai, 2007 e 2009), Japan (at YRP, Yokosuka Park, 2008) and USA (Princeton, 2011), Southern-Eastern Europe in Greece (2012).

The CTIF Italy aims to coordinate heterogeneous research groups to push the limits of the applications of wireless communications and make the “ICT for life” paradigm a reality.

Nowadays, the CTIF Italy includes the Department with the core competencies on ICT (the Department of Electronic Engineering) but also the Department of Management Engineering and Departments from Faculty of Law, Faculty of Physics, Faculty of Medicine. So, ICT technology and all the applications leading towards the “Quality of Life” paradigm, are under the same “umbrella”.

Sep 2017–Present

### Member of the Board of Experts

TechCast Global, Washington, DC (United States)

Exclusive broad mandate on all three verticals – Technologies, Social Forecasts, and Wild Cards. Founded at George Washington University, TECHCAST pools background data and the knowledge of 130 experts worldwide to forecast breakthroughs covering the entire strategic landscape and to assess their economic and social impact. Results are subscribed to corporations and governments around the globe. The project has been recognized as possibly the best forecasting system in the world. The forecasts are also validated annually by comparing them to actual arrivals over the past 20 years, showing that results are accurate within ±3 years.

Business or sector Research & Strategic Advisory

Jan 2017–Present

### Member of the Research Circle

Gartner, Egham (United Kingdom)

Gartner's Research Circle is the most privileged partnership exchange with Gartner, where global end-user IT and business leaders participate in a two-way dialogue on mission-critical topics, key initiatives and industry developments with Gartner Research analysts, shaping thought leadership for the industry. I am contributing to Banking, Insurance, Transportation, Communications, Manufacturing, Utilities, Healthcare, Government, and Services verticals, addressing foresight, new business models, key enabling technologies, cybersecurity, and disruptive technologies.

Business or sector Research & Strategic Advisory

Sep 2019–Mar 2020

### Academic Mentor, Future Capabilities

NATO Defense College, Rome (Italy)

NATO Defense College (NDC) is the international military college for North Atlantic Treaty Organization countries. Its Mission is to contribute to the effectiveness and cohesion of Alliance by developing its role as a major center of education, outreach, and research on transatlantic security issues. To foster forward and creative strategic thinking on the key issues facing the Alliance, the NDC provides senior-level education and brings together senior-level military and civilian officials to interact on NATO issues in a unique, diverse and multicultural setting while cultivating multi-national consensus-building and providing opportunities for multinational networking; engages in comprehensive outreach in support of Alliance strategic objectives; and conducts strategic security studies and research in support of the Alliance's broader goals.

Gen. Eisenhower framed the College in his speech: "*There is a high priority requirement to develop individuals, both on the military and on the civilian side, who will have a thorough grasp of the many complicated factors which are involved in the problem of creating an adequate defense posture for the North Atlantic Treaty area. These considerations have brought me to the conclusion that it is highly desirable to establish in the near future a NATO Defense College for the training of individuals who will be needed to serve in key capacities in NATO Organizations*".

I am mentoring the study program on NATO Future and Strategic Capabilities Development in the Senior Course, framing threats, opportunities, disruptions, and game-changers in the horizon 2040-2060.

Business or sector Government

Dec 2016–Jan 2018

### Executive Board Member

IEEE Technical Activities Board, New York, NY (United States)

Board member ex officio in 2017 in the Strategic Planning Committee of IEEE Technical Activities Board, leading its long-term vision.

The Technical Activities Board (TAB) is the governing body of IEEE Technical Activities and the largest of six major boards within IEEE. Its vision is to inspire, foster, and empower technology-centric worldwide communities, and is responsible for developing and recommending strategic and long-range plans and goals for TAB, to anticipate and determine the direction of existing, new and emerging technologies, and related issues, and to spearhead their investigation and development by IEEE.

Business or sector Medicine

Sep 2012–Dec 2019

### Member of the Research Board

CERDO – Centre pour l'Étude, la Recherche et la Diffusion Ostéopathiques, Rome (Italy)

Research topics: scientific proof of the effectiveness of osteopathic manipulative treatment (OMT) in several environments, from chronic headaches to neonatology field. Mechanical properties of the fascial system and its influences on the biomechanics of the body and wellness.

Business or sector Medicine

Apr 2016–Aug 2019

### Lead Scientist, Strategic Innovation & Principal Futurist

Leonardo, Rome (Italy)

Strategic Innovation has the responsibility to act as a ligand and synergize in a multidisciplinary way all technological value creation assets in the company – internal, external and intangible – to guarantee the strategic and technology plan to hold in the long term and ensure competitiveness in the medium to the long horizon. To achieve this mission, the Strategic Innovation incentivizes, stimulates and acts towards CTO, Engineering, Marketing and Sales both in Division and in LoB, coordinating with Strategy and New Initiatives and being supported by Market Analysis and Competitive Assessment, besides the relevant organizational units at Corporate level.

Strategic Innovation:

- Is responsible for Technology and Innovation Strategy for the Division
- Assesses and validates the Technology Strategy of LoBs and Engineering
- Supports the Strategy in writing the Strategic Plan
- Supports the CTO in writing the Technology Plan and technology roadmaps of both LoBs and Engineering coordinating with their CTOs and Engineering Technology
- Participate in national and international fora to support and promote the Division's strategic and technological direction

In its mission, Strategic Innovation encompasses the constant use of Strategic Foresight. It is the ability to create and sustain a variety of high-quality forward views and to apply the emerging insights in organisationally useful ways; for example, to detect adverse conditions, guide policy, and shape strategy.

It encompasses activities such as:

- critical thinking concerning long-term developments,
- debate and effort to create more comprehensive participatory democracy,
- shaping the future, especially by influencing public policy.

Corporate strategic foresight is used to support strategic management, identify new business fields and increase the innovation capacity of a firm.

Foresight is not the same as strategic planning or futures research. It encompasses a range of approaches that combine the three components mentioned above, which may be recast as:

- futures (forecasting, forward thinking, prospectives),
- planning (strategic analysis, priority setting), and
- networking (participatory, dialogic) tools and orientations.

Business or sector Aerospace, Defence & Security

Oct 2010–Sep 2018

### Full Professor of Physics and Biophysics

CERDO – Centre pour l'Étude, la Recherche et la Diffusion Ostéopathiques, Rome (Italy)

Lectures for full-time students and postgraduates:

- Elements of Physics (2.5 ECTS).
- Physics and Biophysics (3 ECTS).
- Deconstructing OMT action in Physics (Post Graduate Course)

Since 2014 I have been involved in the KNORK project. I also wrote an article for the official blog, which you can find here.

Business or sector Medicine

Mar 2013–Apr 2016

### Military Research Scientist, Head of Innovative Solutions

Leonardo, Rome (Italy)

I headed the informal Innovative Solutions branch inside the Innovative Solutions, Applied Electromagnetics and Siting team. As such, I had to delve into and deeply understand all the programs currently carried on inside the unit, to foster and exploit all cross-synergies and to effectively counsel the team leader on our portfolio of knowledge assets, key enabling technologies, components, and products. I was also responsible for technology and innovation roadmapping. At the same time, thanks to my background in theoretical physics and advanced mathematics, I was involved in a variety of subjects in the team, including technical expertise and supervision for international projects submitted to United Nations, NATO, Italian National Grant on Military Research (PNRM), Italian Ministry of Defence, IT/US Technical Information Exchange Meeting, Innovation Award, Horizon 2020, and European Defence Agency (just to mention a few). I spanned on a broad landscape of topics, ranging from humanitarian demining to universal unconventional signatures, augmented reality, wireless energy, wireless power and directed energy techniques, additive layers manufacturing, secure ultra-wideband free-space laser communication, quantum key distribution, and post-quantum cryptography. I also led an active collaboration with the Italian Ministry of Defence to establish military research boards on strategic themes of interest. During my office here I was also head of the technological innovation for D-BOX, a €10m FP7 project on humanitarian demining, where I managed the work of 40 people up to the final demonstration which spanned five days and gathered 150 people from 3 continents.

Business or sector Aerospace, Defence & Security

Mar 2013–Jan 2015

### Senior Scientist

Leonardo, Pomezia (Italy)

I reported to the management as a subject matter expert in Advanced Optics and Matter Physics throughout the development of an innovative HUD for Aermacchi M346 and Dassault Mirage. In this role, I had to be side by side with the head of the project in contacting and managing external design authorities in Italy, France, Korea, and Germany, together with being always up to date with relevant academic research fields and with our internal research progress. This exploration led to really successful results, consistently beyond state of the art.

Business or sector Aerospace, Defence & Security

Feb 2012–Oct 2013

### Radar and Advanced Targeting Systems Engineer

Leonardo, Pomezia (Italy)

**In brief:** I was in charge of analyzing and simulate track-while-scan operative modes in Gabbiano Tactical Radar and NATO AGS. To this end, I was engaged in waveform design, radar antenna simulation and advanced tracking algorithms analysis using several programs with full custom environments, including IDL and Matlab. I also wrote tracking function specifications and design document for tracking and part of the track-while-scan mode design document. I worked in the team that developed real-time STAP analysis for SOSTAR-X program.

**Full details:** I worked on Gabbiano Tactical Radar for Hermes UAVs and Embraer KC390, and on NATO AGS Transportable General Ground Stations and Mission Operation Support. On the radar-theoretical side, I performed waveform design, analysis of PRF and range/doppler plane coverage. On the system engineering side, I was tasked on tracking algorithm analysis and simulation for track-while-scan functionalities of both air-to-air and air-to-surface (be it GMTI or SMTI). This duty encompassed the study of an appropriate Kalman filter dealing with standard LLH WGS-84, ECEF, NED frames, and non-standard ones as well with coordinate change issues, of course together with a suitable Singer-like maneuverability model, M-out-of-N confirmation logic, automatic tracking with fading and garbage-collection. In NATO AGS this set of features was complemented by Multiple Hypothesis models and convoy exploitation and tracking. This subset of the project was written as a part of a broader simulator in IDL with a full graphical interface. At the same time, I gave my contribution to code a performance model in Matlab considering antenna beam shape, hardware losses, clutter echo, foldings, Swerling models and so on to compute successful tracking probabilities

given our tracking model. All the software went through extensive testing in parallel with the C code loaded onto radars' main computer, comparing test structures extracted in different instants of the processing cycle. This software was highly customized and tailored onto customer needs so that I had to develop a profound insight into the software structure to be able to keep modifying it without disruptive effects. On Quality Assurance and product lifecycle management side, I wrote technical specifications and function design document for tracking function both in Word and Polarion ALM format (with full traceability and compliance matrices), and part of track-while-scan mode design document in Polarion ALM. Finally, Gabbiano on KC390 project was an high-priority company objective in 2012, and high-level executives recognized our team for the goals achieved.

Business or sector Aerospace, Defence & Security

Feb 2011–Feb 2012

### Innovative Algorithms Analyst

Leonardo, Pomezia (Italy)

**In brief:** I was designed to be the focal point in the company for improvement and innovation of tracking and control algorithms loaded into Leonardo line of electro-optics search and tracking turrets EOST. I was also endowed to research visual features recognition algorithms on a 1-year internal research campaign. I was also engaged in the analysis of targeting and search control algorithms in Leonardo OTS system.

**Full details:** I worked on Leonardo high performance passive Electro-Optical Surveillance and Tracking system EOST (EOST45, EOST46, and EOST47) and OTS weapon system for AgustaWestland A129CBT. For what concerns control algorithms, I delved deeply in stabilization matters with both of the systems, starting with a thorough knowledge of reference frames used (both standard LLH WGS-84, ECEF, NED, and custom) and line of sight control models (continuous time and discrete time models with control loops regulated with FIR or IIR). I also investigated georeferencing function accuracy and as a mean of improving CEP, developing a simulation environment with Wolfram Mathematica and GeographicLib accounting for all alignment errors both hardware and software. On tracking and visual recognition algorithms side, my research was both on non-integral visual features algorithms implementable on fixed-point platforms and more advanced visualization technologies. For the fixed-point platform, I explored image convolution, central image moments and Hu invariants; I also tried to use OpenCV, but it turned out to be too much bound to computational performance. The effort was more prominent on higher visual technologies: I studied phase correlation techniques merged with Mellin transform, delved deeply in scale-invariant feature transform (SIFT) (Lowe, 1999), studying scale-space theory and difference-of-gaussian techniques (Koenderink, 1984 and Lowe, 2004) together with a genetic, biologically inspired model (Mutch & Lowe, 2008), gained proficiency with speeded up robust features (SURF) models (Bay, Ess, Tuytelaars & Van Gool, 2006 and 2008) and ended with a very promising though more experimental recognition infrastructure, ReIn (Muja, Rusu, Bradski, & Lowe, 2011; Seo & Milanfar, 2010; Rusu, Bradski, Thibaux & Hsu, 2010; Felzenszwalb, McAllester & Ramanan, 2008; Dalal & Triggs, 2005). Advancements on this research were monitored and proven up to TRL 5.

Business or sector Aerospace, Defence & Security

Apr 2011–Jul 2011

### IGNITE Graduate Conference Communication Manager

SELEX Galileo Learning and Development, Rome (Italy)

I worked in the IGNITE Graduate Conference organizing team, composed of six graduates chosen among the whole company, to successfully build the 2-day IGNITE Final Conference (the ending gala event of the IGNITE program). Being already engaged in the program, in the frame of the Conference I then acted as both a participant and an organizer. The IGNITE program is a Transnational Graduate Development Program managed consistently across Italy and the UK, enriched by the contribution of internal first-level executive speakers, lecturers, and testimonials. As Communication Manager, I was ultimately responsible for working with SELEX Galileo Communications and HR team in a tight-scheduled back-office environment to safe Conference materials and had a leading role as well, providing the dinner event with communication tools and on-stage artistic direction. Conference material comprised standard objects like flyers, badges and gadgets, more specific objects like company walls and stands, and material entirely designed by me, like the graduates' photobook and a photo exhibition in situ on IGNITE initiatives. I also shot two trailers, on SELEX Galileo and on IGNITE to be projected during the gala dinner and for which HR Group Director himself congratulated.

Business or sector Aerospace, Defence & Security

Jul 2008–Feb 2011

### Optronics Engineer

Leonardo, Pomezia (Italy)

**In brief:** I worked on Leonardo electro-optics surveillance turrets programs EOST as human-machine interface manager, designing both hardware (the control grip) and software (the actual symbology and graphical interfaces) resources of the systems. I also managed, followed closely, and carried out Qualification Assurance procedures and tests together with the company's QA authority. I was also noticeably involved in product lifecycle management, acquiring much skill in this field. I was also involved in a bilateral proposal with Ural Optical and Mechanical Plant (UOMZ).

**Full details:** I worked on Leonardo high performance passive Electro-Optical Surveillance and Tracking system EOST (EOST45, EOST46, and EOST47). I designed and managed the human-machine interface both at the hardware level (the hand control grip itself), contacting subcontractors and maintaining professional relationships, and at the software level (the actual symbology and graphical interfaces). I was involved in all technical aspects of the system, however. At a system design level, I was engaged in sensors output synchronization (PAL vs. XGA), line communication design and checking (RS422, RS232, MIL-STD-1553, ARINC 429), thermal imaging integration (STANAG 4347, STANAG 4350). On Quality Assurance side, I planned, managed and carried out environmental tests MIL-STD-810, RTCA-DO-160/EUROCAE-ED-14) together with QA authority and specialist staff, caring for both the qualification of the first article and for the general acceptance test procedure with an eye to efficiency and effectiveness of procedures. I was also noticeably involved in product lifecycle management, backing the Product Engineering Manager and Product Engineering Leader in management of documentation and traceability both in a private custom repository and in SAP-PLM. As a transversal activity, I was involved in a bilateral proposal with Ural Optical and Mechanical Plant (UOMZ), endowed with writing the first full technical specification of our sensor pack aside from the system. Finally, EOST46-HD has been an high-priority company objective, and our team has successfully achieved the objective and was complimented by Head of Engineering for the agility and reactiveness to customer needs.

Business or sector Aerospace, Defence & Security

Nov 2007–May 2008

### Pre-doctoral Fellow

Università degli Studi di Roma Tor Vergata, Rome (Italy)

As a national excellence award grant winner, I wrote and finalized my Master's thesis project in close collaboration with the Theoretical Physics Department in Tor Vergata. My research was in the fields of Type IIB superstring theory (Polchinski, 2005), Higher Spin theory (Fradkin & Vasiliev, 1987 and Sezgin & Sundell, 2001), and their interconnection (Bergsoheff et al, 1988) especially in the light of the Maldacena AdS/CFT conjecture (Maldacena, 1998 and Aharony et al, 2000). I developed valuable expertise in custom calculus with Mathematica, due to the peculiar algebraic rules to be followed in our research. I was also in charge of teaching, as Teaching Assistant for "Lie Algebras Representations" class (Ph.D. Course in Mathematics), and "Elements of Mathematics" class (BSc Course in Computer Science).

Business or sector Academia

## EDUCATION AND TRAINING

2020–2021

### Postdoctoral Education, Political Science and Government

Princeton University, Princeton, NJ (United States)

In the frame of "Innovations for Successful Societies", a joint program of Princeton University's Woodrow Wilson School of Public & International Affairs and the Bobst Center for Peace & Justice. Building an effective and accountable government challenges many leaders around the globe. Innovations for Successful Societies supports public servants, policy makers, civic groups, and scholars who lead institutional reform under difficult conditions.

Topics covered: Accountability, Institutional Traps, Capability Traps, Social Expectations & Institutional Reform, Coordination across Government, Institutional Transformation.

2014–2018

### Ph.D., Physics

EQF level 8

Università degli Studi di Roma Tor Vergata, Rome (Italy)

**Grade: Excellent – top 1%**

Thesis titled “Stringy Penrose mechanism: a source of UHECRs, SQM, and insights on fuzzballs”.

Topics covered: String Theory, General Relativity, Astrophysics, Nuclear Physics.

Excerpts from evaluations:

Referee 1: "*This thesis is quite remarkable for the addressed topic, for the very unusual variety of its expertise components and for the clarity and competence of its presentation. [...] In all these quite separate areas of knowledge the candidate shows an unusual command of the fields its presentation being clear, fluent and, I venture to say, brilliant*".

Referee 2: "*This thesis shows the expertise and deep understanding of the fields [...] Regarding the astrophysical application, this work opens some roads that will take years to explore. It is impressive that it was possible to make this link which is highly nontrivial and ties in so much information from so many different fields. It's a wonderful endeavor*".

2018 **Alternative Analysis (Red Teaming)**

NATO, Oberammergau (Germany)

Alternative Analysis (AltA) is the deliberate application of independent, critical thought and alternative perspective to improve decision-making. It offers NATO staff the opportunity to inject additional knowledge – or knowledge perceived differently – into established decision-making processes alongside traditional problem-solving methods. In general, AltA reduces risk and expands opportunities for innovative solutions, creating space for more timely decisions. AltA provides a credible solution to tackling the current and future challenges of this extraordinarily complex and fast-changing world.

The keywords in this description are independent, critical thought, and alternative perspective. First, independent refers to being free from influence or control by others in matters of belief or thinking. Second, critical thought – also known as critical thinking – is the intellectually disciplined process of conceptualizing, applying, analyzing, synthesizing, and evaluating information. It is necessary for valid reasoning when drawing conclusions about goals, problems, assumptions, concepts, evidence, implications, and consequences. Finally, an alternative perspective is the result of looking at a situation, issue, or fact through a different mindset, cultural frame, or value and belief structure.
In other words, AltA is a capability to look at problems in a different way to make better-informed decisions. It aims to improve innovation and creativity and to broaden understanding within the staff. To this end, it provides a vehicle to comprehend better the scope of the problem for which staff officers are seeking solutions. Hence, AltA supports them in producing enhanced output more efficiently than relying on unstructured staff meetings or processes. Nevertheless, AltA is intended to supplement rather than duplicate functions performed by staff officers.

2018 **Postdoctoral Education, Quantum Information and Operator Algebras**

Istituto Nazionale di Alta Matematica “Francesco Severi”, Rome (Italy)

Quantum Information is a very active subject, both for what concerns the structural mathematical problems and in view of applications to quantum computing.

To this date, the investigations are mainly devoted to finite dimensional structures, but Quantum Field Theory suggests considering infinite dimensional situations too, and Operator Algebras provide a natural language for the description of quantum systems with an infinite number of degrees of freedom.

Aim of the course was to gather for the first time experts in the operator algebraic approach to Quantum Field Theory and in Quantum Information, in order to foster research using the new methods of Operator Algebras.

Topics covered: Entanglement and its implications in Thermodynamics, Modular Theory, Information Geometry, Entropy, Locality.

2017–2018 **Auditor, Senior Course 131**

NATO Defense College, Rome (Italy)

The Senior Course aims to better prepare OF5/4 level officers and equivalent level civilian officials of

the Alliance, the Euro-Atlantic area, Mediterranean Dialogue (MD), Istanbul Cooperation Initiative (ICI) and Selected Contact countries for senior appointments in NATO and multinational staffs or NATO-related duties in Capitals. It also contributes to the further education of officers and officials currently assigned to NATO or in NATO-related posts by opening selected modules of the Senior Course to their participation. The Senior Course also aims to contribute to the Alliance's outreach programs by including a limited number of representatives from partner nations, MD, ICI and Selected Contact countries for the full duration of the Senior Course, with an increased participation in the 2-week Integrated Partner Orientation Course, to further the interests of mutual understanding and respect.

The Senior Course objectives are to broaden Course Members' understanding of the relationship between NATO and the international security environment and to give an appreciation that there are often no simple solutions to the often complex issues emerging in the current dynamic security environment and that the challenges and opportunities that may be faced in NATO appointments will need to be approached with flexibility and an openness of mind.

Another objective of the Senior Course is to improve the knowledge and understanding of: the Alliance's shared values and interests, politico-military concept, policies, organization and working methods; the internal and external adaptations, and new missions of the Alliance including crisis management and conflict prevention; the potential risks to the security of the Alliance and its members; the Alliance's members' political, security, defense, and socio-economic systems and interests; their capability and limitations in international relations, particularly in the spheres of defense and security; and their cultural diversity; the key international organizations which have a role to play in Euro–Atlantic security, particularly the EU, and how they interact with the Alliance and each other; trends in world affairs in various fields which may influence the security of the Alliance and its members.

The Senior Course also increases the effectiveness of Course Members through a process of enhancing their ability to think strategically and analyze critically, and deepening their knowledge and developing new skills, particularly in decision-making/consensus building. To that end, the course provides an opportunity to work and build consensus with officers and officials, from different Alliance and Partner countries, with a wide variety of backgrounds and experience with a view to furthering cohesion within the Alliance and between the Alliance and its Partners.

2005–2008 **MSc, Theoretical Physics** EQF level 7

Università degli Studi di Roma "Tor Vergata", Rome (Italy)

**Grade: 110/110**

Thesis titled "Derivative Higher Spin interactions in AdS".

Topics covered: Advanced Probabilistic Theory, Particle Physics, Theoretical High Energy Physics, String Theory, Algebraic Topology.

2001–2005 **BSc, Physics** EQF level 6

Università degli Studi di Roma "Tor Vergata", Rome (Italy)

**Grade: 110/110, cum Laude**

Thesis titled "Strings, Loops and Holographic Principle: from Black Holes to Quantum Gravity".

Topics covered: Physics, Mathematics, Electronics, Chemistry, English.

## PERSONAL SKILLS

Mother tongue(s): Italian

Foreign language(s)

| | UNDERSTANDING | | SPEAKING | | WRITING |
|---|---|---|---|---|---|
| | Listening | Reading | Spoken interaction | Spoken production | |
| English | C2 | C2 | C2 | C2 | C2 |
| French | A2 | A2 | A2 | A1 | A1 |
| Persian | A2 | A1 | A2 | A2 | A1 |

Levels: A1 and A2: Basic user - B1 and B2: Independent user - C1 and C2: Proficient user
Common European Framework of Reference for Languages

Communication skills

Back office: pre-university counseling for high school students. Organization of conferences.

Public relations: efficiency, conciseness, and completeness in relating to a multitude of speakers.

Teamwork & management: effectiveness in teamwork and resources management. Leading large tasks (300-500 people from 130+ stakeholders) with indirectly managed resources or external, non-managed resources. Experienced facilitator in an international environment.

Public speaking: decades experience as a lecturer for technical seminars and scientific diffusion, often with a crowded audience (5000+ people), and 10+ years of teaching. Media training. Keynote speaker.

Organisational / managerial skills

Digital skills

| SELF-ASSESSMENT | | | | |
|---|---|---|---|---|
| Information processing | Communication | Content creation | Safety | Problem-solving |
| Proficient user | Proficient user | Proficient user | Proficient user | Proficient user |

Digital skills - Self-assessment grid

Excellent skills and extensive knowledge: Word, Excel, Powerpoint, Outlook.

Excellent data mining abilities (surface, deep and dark web).

Excellent skills: Adobe Photoshop, Illustrator, InDesign.

Very good: Adobe Lightroom, Premiere Pro, After Effects .

Can code in C/C++, Matlab, VBA, TensorFlow, Mathematica.

Driving licence

B

## ADDITIONAL INFORMATION

Honours and awards

2020 – NATO Outstanding Star Young Disruptor

2019 – Chief Scientist's Medal, Space Force

2019 – NATO Outstanding Star Young Disruptor

2018 – Innovation Award, Leonardo.

2018 – NATO Early Career Scientist.

2018 – NATO Outstanding Star Young Disruptor

2017 – Innovation Award, Leonardo.

2007 – FI.LA.S Award winner (a fellowship for STEM students based exclusively on academic merit).

2003 – Taekwondo National Championships, ranking: 3rd.

2002 – Taekwondo Regional Championships, ranking: 3rd.

2001-2007 – Merit Fellowship: 7 times winner of the Merit Fellowship at Università degli Studi di Roma "Tor Vergata" (based exclusively on academic merit).

2003-2006 – Collaboration Fellowship: 4 times winner of the internal Collaboration Fellowship at Università degli Studi di Roma "Tor Vergata" (based exclusively on academic merit).