

Octavio Miguel Cabrera Morrone

Summary: Currently a researcher on passive radar systems at Sapienza University in Rome, I also consult on software and electronics developments, radar systems and applied mathematics, and coordinate scientific-technological projects.

The focus of my professional and personal motivation is in research, designing, planning, and fostering projects within the framework of science and technology, teamwork, and multidisciplinary projects.

CURRENT ACTIVITIES AND WORK HISTORY

Sapienza University, DIET Department, Rome, Italy

January 2019 to March 2022

- Researcher within the framework of passive radar systems.
- Coordinator of collaboration with INVAP S.E. to develop a research radar.

Principal Consultant activities on engineering projects

Last five years

- Contractor: Radar processing design, and software prototype for primary radars (for INVAP S.E).
- Contractor: Software development for radar analysis and design (for INVAP S.E).
- Contractor: Software development for ADSB-B receiver (for Stratum Labs S.A).
- Contractor: Software development for performance and debug detection in active radars (for INVAP S.E).

COLABORATIONS

Since 2012 to 2018

- INVAP S.E passive radar system project, working as the systems engineer and coordinating the team that developed a functioning technological demonstrator, currently installed at the INVAP S.E facility.
- INVAP S.E UAV project, junior designer of an aeronautical control system, having modeled the system (physically and mathematically) and control subsystem design.

TEACHING EXPERIENCE

Balseiro Institute, San Carlos de Bariloche, Argentina

- Assistant professor in Telecommunication Engineering (2015 to 2018)
 - Introduction to information theory
 - Information theory applications
 - Stochastic signal processing
 - Stochastic processing and probability theory
- Teaching as assistant professor and designer of the course program plan in “Applied Mathematical Elements for technology topics” (2017-2018)
- Assistant professor in Physics (2012 to 2014)
 - Partial-differential equations
 - Algebra for Physics

EDUCATION

I pursued my Bachelor's, Master's and Doctorate degrees at the renowned **Balseiro Institute**, in San Carlos de Bariloche, Argentina, where all students are awarded full scholarships with a rigorous selection process and an entry exam in Engineering or Physics, after a minimum of two years of study elsewhere.

2014 to 2019, five-year PhD program

- PhD under the direction of Damián H. Zanette (CONICET)
- Thesis Description: Passive radar systems, principles and applications
- Optional Courses:
 1. Parallel programming in GPU (**64 hs course**)
 2. Analog communications (**128 hs course**)
 3. Digital communications (**128 hs course**)
 4. Stochastic process and statistical of non-equilibrium (**128 hs course**)
 5. Graph theory (**128 hs course**)
 6. Introduction to topology (audited) (**64 hs course**)
 7. Stochastic signal processing (**64 hs course**)
 8. Advanced digital systems (VHDL in FPGA) (**64 hs course**)

MSc in Physics – 2013

- Thesis Description: Development of an autonomous landing control system for unmanned airplanes.
- Optional Courses:
 1. Introduction to Robotics **(128 hs)**
 2. Dynamical Systems **(128 hs)**
 3. Neural Networks **(128 hs)**
 4. Introduction to Information Theory **(64 hs)**
 5. Applied Information Theory **(64 hs)**
 6. Control Systems Theory **(128 hs)**

BSc in Physics – 2012

- Optional Courses:
 1. Group theory **(64 hs)**

Note: The first two years of the Balseiro Institute's 4 ½-year Bachelor's degree must be taken at a different university, in my case:

- Sábató Institute, Buenos Aires, Argentina
2009-2010 – Studies in MATERIALS ENGINEERING

Dedicated courses:

1. Instruction for materials engineering **(128 hs)**
2. Chemistry for materials **(128 hs)**

- National Technological University, Córdoba, Argentina
2007-2009 – Studies in ELECTRONIC ENGINEERING

Dedicated courses:

1. C language programming **(128 hs)**
2. C++ language programming **(128 hs)**
3. Digital electronic **(128 hs)**

High School Degree from Instituto Salesiano Villada, Córdoba, Argentina

- Specialization as Electronic Technician

LANGUAGES

- Spanish: Native
- Italian: Oral and written
- English: Oral and written

ADDITIONAL COURSES

- 2015: Mathematical Models in Biology, ICTP, São Paulo, Brazil
- 2014: Winter Telecommunications School, San Carlos de Bariloche
- 2014: GPU Parallel Programming, San Carlos de Bariloche

INTERNSHIPS

- 2010: INVAP, Study of Friction Welding Phenomena (Materials Department), San Carlos de Bariloche, Argentina

PRESENTATIONS AND WORKSHOPS

- 2021 – International Radar Conference , Oral Presentation “DVB-S based Passive Radar for Short Range Security Application”.
- 2020 – International Radar Conference, Oral Presentation “Exploitation of Long Coherent Integration Times to Improve Drone Detection in DVB-S based Passive Radar”
- 2020 – International European Radar Conference, Oral Presentation “Comparing phase-locked and non-phase-locked architectures for dual-channel DVB-S passive radar”
- 2020 – International Radar Symposium, Oral Presentation “Non-Coherent DVB-S Passive Radar Demonstrator”
- 2019 – International Radar Conference, Oral Presentation “Detecting drones and human beings with DVB-S based COTS passive radar for short-range surveillance”
- 2018 – INVAP, Oral Presentation “Signal Processing for Multi-Static Passive Radars” (Bariloche, Argentina)
- 2017 – INVAP, Oral Presentation “Signal Processing for Passive Radar Systems” (Bariloche, Argentina)
- 2016 – INVAP, Oral Presentation “Passive Radar Systems and Deterministic Clutter Models Analysis” (Bariloche, Argentina)
- 2016 – Balseiro Institute, Oral Presentation “Stochastics effects in bistatic clutter, an approach using Feynman Integrals” (Bariloche, Argentina)
- 2015 – INVAP, Oral Presentation “Simulation System and a model of bistatic clutter for Passive Radar Systems” (Bariloche, Argentina)
- 2014 – AFA (Argentine Physics Association), Poster Presentation “Passive radars, principles and applications” (Tandil, Argentina)
- 2013 – LAWNP Conference, Poster Presentation “Epidemic dynamics of pediculosis in social groups ” (Córdoba, Argentina)
- 2012 – AFA (Argentine Physics Association) Conference, Poster Presentation “ Dynamic model of pediculosis ” (Córdoba, Argentina)

- 2012 – AFA (Argentine Physics Association) Conference, Poster Presentation “Statistical characterization of photometer for ArSat Satellite project ” (Córdoba, Argentina)
- 2006 – FREESCALEELECTROCOMPONENTES S.A. Application note for domotics system using Motorola microcontroller device (Buenos Aires, Argentina)
- 2005 – EXPOTRONIC: Presentations of PID control system application for domotics (Córdoba, Argentina)

FELLOWSHIPS

- 2014-2018: CONICET, for PhD in Engineering at Balseiro Institute.
- 2012-2013: CNEA, for Master’s in Physics at Balseiro Institute.
- 2010-2012: CNEA, for Bachelor’s in Physics at Balseiro Institute.
- 2009: YPF, for Materials Engineering.

PROGRAMMING SKILLS

- MATLAB & Simulink (advanced level)
- MATHEMATICA (medium level)
- CUDA (medium level)
- C (medium-advanced level)
- C++ (medium level)
- VHDL (basic user)
- Basic (visual studio- xoyo) (medium level)
- Go (basic user)

PUBLISHED PAPERS

1. O. Cabrera, C. Bongioanni, F. Colone and P. Lombardo, "Comparing phase-locked and non-phase-locked architectures for dual-channel DVB-S passive radar," *2020 17th European Radar Conference (EuRAD)*, 2021, pp. 350-353, doi: 10.1109/EuRAD48048.2021.00096.
<https://ieeexplore.ieee.org/abstract/document/9337483>
2. F. Filippini, O. Cabrera, C. Bongioanni, F. Colone and P. Lombardo, "DVB-S based Passive Radar for Short Range Security Application," *2021 IEEE Radar Conference (RadarConf21)*, 2021, pp. 1-6, doi: 10.1109/RadarConf2147009.2021.9455242.
<https://ieeexplore.ieee.org/abstract/document/9455242>
3. O. Cabrera, C. Bongioanni, F. Filippini, O. Sarabakha, F. Colone and P. Lombardo, "Detecting drones and human beings with DVB-S based COTS passive radar for short-range surveillance," *2020 IEEE International Radar Conference (RADAR)*, 2020, pp. 37-42, doi: 10.1109/RADAR42522.2020.9114795
<https://ieeexplore.ieee.org/abstract/document/9114795>
4. O. Cabrera, C. Bongioanni, F. Colone and P. Lombardo, "Non-Coherent DVB-S Passive Radar Demonstrator," *2020 21st International Radar Symposium (IRS)*, 2020, pp. 228-231, doi: 10.23919/IRS48640.2020.9253805.
<https://ieeexplore.ieee.org/abstract/document/9253805>
5. T. Martelli, O. Cabrera, F. Colone and P. Lombardo, "Exploitation of Long Coherent Integration Times to Improve Drone Detection in DVB-S based Passive Radar," *2020 IEEE Radar Conference (RadarConf20)*, 2020, pp. 1-6, doi: 10.1109/RadarConf2043947.2020.9266624.
<https://ieeexplore.ieee.org/abstract/document/9266624>
6. Octavio Cabrera & Damián H. Zanette (2020) Functional integral approach to the transfer function of a stochastic scattering channel, *Waves in Random and Complex Media*, 30:4, 722-737, DOI: [10.1080/17455030.2018.1557353](https://doi.org/10.1080/17455030.2018.1557353)
<https://www.tandfonline.com/doi/abs/10.1080/17455030.2018.1557353>
7. Ignacio Gavier, Damián H. Zanette & Octavio Cabrera (2020) Stochastic effects on the bistatic transfer function of a planar scatterer distribution, *Waves in Random and Complex Media*, 30:4, 643-655, DOI: [10.1080/17455030.2018.1551643](https://doi.org/10.1080/17455030.2018.1551643)
<https://www.tandfonline.com/doi/abs/10.1080/17455030.2018.1551643>
8. O. Cabrera and D. H. Zanette, "Bistatic Transfer Function for a Planar Distribution of Stationary Scatterers: Analytical Results," in *IEEE Geoscience and Remote Sensing Letters*, vol. 12, no. 11, pp. 2326-2330, Nov. 2015, doi: 10.1109/LGRS.2015.2475635.
<https://ieeexplore.ieee.org/abstract/document/7274337>
9. Cabrera, O., & Zanette, D. H. (2015). Avoiding extinction by migration: The case of the head louse. *Advances in Complex Systems*, 18(01n02), 1550010.
<https://www.worldscientific.com/doi/abs/10.1142/S0219525915500101>

OTHER SKILLS AND ABILITIES

- Navigation license for sailboats and motor yachts (Prefectura Naval Argentina, San Carlos de Bariloche, Argentina).
- Lifeguard license (Prefectura Naval Argentina, Villa Carlos Paz, Córdoba, Argentina).
- First Aid (Red Cross, Córdoba, Argentina, and others).
- WSA (Red Cross, Córdoba, Argentina).

REFERENCES

- José Relloso, CTO of INVAP Satellite Division and full professor at Balseiro Institute.
- Darío Giussi, INVAP Security and Defense Manager.