

# GEORGIOS VOUGIOUKAS, PH.D.

Test Engineer  
Airbus Defence and Space GmbH  
Homepage, Google Scholar, Youtube

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## PERSONAL INFORMATION

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- Date of Birth: December 8, 1993.
- Citizenship: Greek.

## EDUCATION

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- **Ph.D. in Electrical and Computer Engineering**, (4-year program)  
School of ECE, TUC, Chania, Greece,  
November 2016 - January 2021.  
Thesis Title: “*Scatter Radio Relaying and Applications*”.  
Advisor: Professor Aggelos Bletsas.
- **Diploma in Electrical and Computer Engineering**, (5-year program)  
School of ECE, TUC, Chania, Greece,  
September 2011 - July 2016.  
Thesis Title: “*Extended Range Scatter Radio Links with Embedded Radio*”.  
Advisor: Professor Aggelos Bletsas.  
GPA: 8.60/10.0 (“Excellent”, top 3 of year).

## AWARDS AND DISTINCTIONS

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- **Best Poster Award** in IEEE International Conference on RFID, Seattle, WA, June 2023.
- **Best Paper Award** in IEEE International Workshop on Wireless Communications and Networking in Extreme Environments (WCNEE), July 2021.
- **Winners (2nd place)** of the 2020 IEEE ComSoc “Communications Technology Changing the World” Student Competition.
- **Ph.D. Research featured in Scientific American**, June 2019 issue.
- **Best Student Paper Award** in IEEE International Conference on RFID Technology & Applications (RFID-TA), Warsaw, Poland, September 2017.
- **Exemplary reviewer award** in IEEE Transactions on Wireless Communications for years 2017,2018.
- **Student Travel Grant Award** in IEEE Wireless Power Transfer Conference (WPTC), Aveiro, Portugal, May 2016.

- **Student Travel Grant Award** for participating in “International Spring School on Electromagnetics and Emerging Technologies for Pervasive Applications: Internet of Things, Health and Safety”, Bologna, Italy, 18 - 20 April 2016. COST Action ”Wireless Power Transmission for Sustainable Electronics (WIPE).
- **Member of winning team ASTRAPI**, innovation contest “Seeding Ideas Harvesting the Future”, Title of the winning proposal: “ASTRAPI: Scatter Radio-Based, Zero-Power, Batteryless, Wireless Sensor Networks for Monitoring of Environmental Microclimate, Plant Interactions and Ambient Living”, June 2016.
- **Citation for 5 years Excellent Graduation**, Technical University of Crete, 2016.
- **Excellence Award** by the Technical Chamber of Greece for graduating in top 3 of class (2015-2016 graduation).
- **Scholarship for Ph.D. studies**, Hellenic Foundation for Research and Innovation (HFRI)’s fellowship for Ph.D. candidates.

## INTERESTS

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- Ultra-low-power wireless communication.
- Instrumentation and Sensors.
- RF, Analog, Digital & Mixed Signal Hardware Design, Implementation & Testing/Troubleshooting.
- Antennas, Arrays and Parasitic Arrays.
- Digital Signal Processing.
- Statistical Signal Processing.
- Detection & Estimation.

## ACADEMIC & WORK EXPERIENCE

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- April 2023 - Now, Test Engineer, Airbus Defence and Space GmbH. Worked on:
  - Galileo 2<sup>nd</sup> Generation Satellites, Payload, Signal Generation Module.
- Jan. 2021 - March 2023, Electrical & Computer Engineer, Worked on:
  - Dissemination of Ph.D. results in local farmer community. Built a number of ultra-low-cost, battery-less ambient backscatter sensors for measuring soil moisture. Sensors were deployed in local farms to aid adoption of precision agriculture techniques.
- Jan. 2021 - March 2023, Electrical & Computer Engineer, Researcher, Worked on:
  - “Batteryless, Ambiently-Powered Internet of Things That Think: An Asynchronous Message Passing Approach”, Hellenic Foundation for Research and Innovation (H.F.R.I.) under the “First Call for H.F.R.I. Research Projects to support Faculty members and Researchers and the Procurement of High-cost research equipment” (Project Number: 2846).

- Oct. 2016 - Jan. 2021, Electrical & Computer Engineer, Research Assistant. Worked on:
  - “Ambient Backscatter Sensor Networks under Nonlinear Energy Harvesting” (Apr. 2018 - Jul. 2019): Operational Program “Human Resources Development, Education and Lifelong Learning 2014-2020”,
  - “Scatter Radio Relaying and Applications” (Aug. 2017 - Aug. 2020): Ph.D. fellowship, Hellenic Foundation for Research and Innovation (HFRI), General Secretariat for Research and Technology (GSRT). (GA. no. 2263).
- Oct. 2016 - Dec. 2021, Teaching Assistant for:
  - “Communication Systems II” (Undergraduate Course, Feb. 2017 - Jun. 2017),
  - “Analysis and Design of Telecommunication Systems” (Cross-Listed Course).
- Oct. 2016 - Now, Journal Reviewer for:
  - IEEE Transactions on Wireless Communications, IEEE Transactions on Communications, IEEE Wireless Communication Letters, IEEE Transactions on Vehicular Technology.
- Oct. 2015 - May 2016, Team Member, TUC Eco Racing Team (TUCER), Technical University of Crete. Worked on:
  - Regenerative Braking,
  - Supercapacitor charging.
- Jul. 2015 - Aug. 2015, Summer Intern, Research Group of Spatial Informatics, Laboratory of Geodesy and Geomatics, School of Mineral Resources Engineering (MRED), Technical University of Crete, Greece. Worked on:
  - Simultaneous Localization and Mapping (SLAM) algorithms using mrpt, RPLidar and Raspberry Pi,
  - Drone control using MYO Armband,
  - Drone gimbal control using Oculus rift DK2.
- Mar. 2014 - Apr. 2015, Hardware Developer, Aristeos Project.

## JOURNAL PUBLICATIONS

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9. I. Vardakis, G. Kotridis, S. Peppas, K. Skyvalakis, G. Vougioukas and A. Bletsas, “Intelligently Wireless Batteryless RF-Powered Reconfigurable Surface: Theory, Implementation & Limitations”, IEEE Transactions on Wireless Communications, Vol. 22, No. 6, pp. 3942-3954, June 2023.
8. G. Vougioukas, N. Ntantidakis, E. Karatarakis, G. Apostolakis and A. Bletsas, “Batteryless Backscatter Sensor Networks-Part II: Lessons From Scalable Deployment”, IEEE Communications Letters, Vol. 27, No. 3, pp. 768-772, March 2023.
7. P. N. Alevizos, G. Vougioukas and A. Bletsas, “Batteryless Backscatter Sensor Networks-Part I: Challenges With (Really) Simple Tags”, IEEE Communications Letters, Vol. 27, No. 3, pp. 763-767, March 2023.
6. G. Vougioukas and A. Bletsas, “DoA Estimation with a Single Antenna and a Few Low-Cost Backscattering Tags”, IEEE Transactions on Communications, Vol. 70, No. 10, pp. 6849 - 6860, Oct. 2022.

5. G. Vougioukas, A. Bletsas and J. N. Sahalos, “Instantaneous, Zero-Feedback Fading Mitigation With Simple Backscatter Radio Tags”, in *IEEE Journal of Radio Frequency Identification*, Vol. 5, No. 4, pp. 451-464, Dec. 2021.
4. M. Ouroutzoglou, G. Vougioukas, G. N. Karystinos and A. Bletsas, “Multistatic Noncoherent Linear Complexity Miller Sequence Detection For Gen2 RFID/IoT”, in *IEEE Transactions on Wireless Communications*, Vol. 20, No. 12, pp. 8067-8080, Dec. 2021.
3. G. Vougioukas and A. Bletsas, “Switching Frequency Techniques for Universal Ambient Backscatter Networking”, *IEEE Journal on Selected Areas in Communications*, Vol. 37, No. 2, pp. 464-477, Feb. 2019.
2. A. Bletsas, P. N. Alevizos and G. Vougioukas, “The Art of Signal Processing in Backscatter Radio for  $\mu$ Watt (or less) Internet-of-Things (IoT)”, invited, *IEEE Signal Processing Magazine*, Vol. 35, No. 5, pp. 28-40, Sept. 2018.
1. G. Vougioukas, A. Dimitriou, A. Bletsas and J. Sahalos, “Practical Energy Harvesting for Batteryless Ambient Backscatter Sensors”, *Electronics* 2018, 7, 95.

## CONFERENCE PUBLICATIONS

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12. S. Peppas, E. Giannelos, G. Vougioukas and A. Bletsas, “Where is the Wall? Radar Imaging-Based Narrowband RFID and Reflector Localization”, *IEEE International Conference on RFID (RFID)*, May 2022, Las Vegas, USA.
11. I. Vardakis, G. Kotridis, S. Peppas, K. Skyvalakis, G. Vougioukas and A. Bletsas, “Intelligently Wireless Batteryless RF-Powered Reconfigurable Surface”, *IEEE Global Communications Conference (GLOBECOM)*, Dec. 2021, Madrid, Spain.
10. E. Andrianakis, G. Vougioukas, E. Giannelos, O. Giannakopoulos, G. Apostolakis, K. Skyvalakis and A. Bletsas, “Drone Interrogation (and its Low-Cost Alternative) in Backscatter Environmental Sensor Networks”, *6<sup>th</sup> International Conference on Smart and Sustainable Technologies (SpliTech)*, Sept. 2021, Split/Bol, Croatia.
9. V. Papageorgiou, A. Nichoritis, P. Vasilakopoulos, G. Vougioukas and A. Bletsas, “Towards Ambiently Powered Inference on Wireless Sensor Networks: Asynchrony is the Key!”, *5<sup>th</sup> IEEE International Workshop on Wireless Communications and Networking in Extreme Environments (WCNEE)*, July 2021. **Received Best Paper Award.**
8. G. Vougioukas and A. Bletsas, “DoA Estimation of a Hidden RF Source Exploiting Simple Backscatter Radio Tags”, *IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP)*, June 2021, Toronto, Canada.
7. M. Ouroutzoglou, G. Vougioukas, P.N. Alevizos, A.G. Dimitriou and A. Bletsas, “Multistatic Gen2 RFID over Ethernet with Commodity SDRs”, *IEEE International Conference on RFID-Technology and Applications (RFID-TA)*, Sept. 2019, Pisa, Italy.
6. G. Vougioukas and A. Bletsas, “Ambient Backscatter in Reality: Does Illuminator Signal Structure Matter?”, *53<sup>rd</sup> IEEE International Conference on Communications (ICC)*, May 2019, Shanghai, P.R. China.

5. P. N. Alevizos, G. Vougioukas and A. Bletsas, “Nonlinear Energy Harvesting Models in Wireless Information and Power Transfer”, 19<sup>th</sup> IEEE International Workshop on Signal Processing Advances in Wireless Communications (SPAWC), June 2018, Kalamata, Greece.
4. M. Vestakis, P. N. Alevizos, G. Vougioukas and A. Bletsas, “Multistatic Narrowband Localization in Backscatter Sensor Networks”, 19<sup>th</sup> IEEE International Workshop on Signal Processing Advances in Wireless Communications (SPAWC), June 2018, Kalamata, Greece.
3. G. Vougioukas, P. N. Alevizos and A. Bletsas, “Coherent Detector for Pseudo-FSK Backscatter under Ambient Constant Envelope Illumination”, 19<sup>th</sup> IEEE International Workshop on Signal Processing Advances in Wireless Communications (SPAWC), June 2018, Kalamata, Greece.
2. G. Vougioukas and A. Bletsas, “24 $\mu$ Watt 26m range batteryless backscatter sensors with FM remodulation and selection diversity”, 2017 IEEE International Conference on RFID Technology & Application (RFID-TA), Warsaw, Poland, September 2017. **Received Best Student Paper Award.**
1. G. Vougioukas, S.N. Daskalakis and A. Bletsas, “Could battery-less scatter radio tags achieve 270-meter range?”, 2016 IEEE Wireless Power Transfer Conference (WPTC), Aveiro, Portugal, May 2016. **Student Travel Grant Award.**

## BOOK CHAPTERS

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1. G. Vougioukas and A. Bletsas, “Smartphone Reception of MicroWatt Power, Meter-Kilometer Range, Backscatter Resistive/Capacitive Sensors with Ambient FM Remodulation & Selection Diversity”, chapter 10 in “Wireless Power Transmission for Sustainable Electronics”, John Wiley & Sons, Editor N. Carvalho, pp. 287-321, 2020.

## PATENTS

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3. G. Vougioukas and A. Bletsas, “Method for the recovery of analog backscattered information”, U.S. Patent & Trademark Office (USPTO), Under Examination, 2023.
2. G. Vougioukas and A. Bletsas, “Switching frequency methods and apparatus for ambient backscatter networking and jamming”, U.S. Patent & Trademark Office (USPTO) Patent 10763990, Sept. 1, 2020.
1. G. Vougioukas and A. Bletsas, “Ultra-low Power and Cost Purely Analog Backscatter Sensors with Extended Range Smartphone/Consumer Electronics FM Reception”, U.S. Patent & Trademark Office (USPTO) Patent 10395162, Aug. 27, 2019.

## ACTIVITIES, MENTORING, LEADERSHIP

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- Founding member, Former Vice President and Mentor of IEEE Technical University of Crete Student Branch.
- Co-Supervised and assisted in more than 10 undergraduate and master theses.

## LANGUAGES

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- Greek Native Speaker.
- English Strong, Michigan Proficiency Certificate.
- German Very Basic, Second language during secondary education.

## TECHNICAL SKILLS

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- Experience in embedded programming: Experience using Atmel's and Silicon Laboratories MCUs (8051 and ARM-based), experience acquired mostly through spare-time side projects and (under)graduate coursework.
- Experience in Printed Circuit Board design using Eagle Cad, very limited experience in Altium's Designer.
- Strong experience in using laboratory equipment: Current research activity heavily depends, among others, on the use of VNAs, spectrum analyzers, oscilloscopes, function & RF generators.
- Experience in programming with pure C: Experience acquired through various projects required by graduate & undergraduate courses.
- Experience in programming with Java: Experience acquired through undergraduate coursework & side projects.
- Strong experience in using MATLAB: Current research activity heavily depends on the usage of MATLAB (development and evaluation of signal processing algorithms).
- Experience in using Ettus's USRPs (N200s) with GNU Radio and Matlab.
- Design with reconfigurable logic: Experience in using VHDL acquired through undergraduate coursework and side-projects. Less experience in high level synthesis using Xilinx's tools (Vivado, Vivado HLS with C++, petalinux), acquired through graduate coursework.
- Experience with Dialog Semiconductor/Renesas GreenPAK one-time programmable matrices.
- Experience in using magic layout tool, irsim & ngspice simulators: acquired through undergraduate coursework.
- Some experience in C++, Python: acquired through last internship.
- Some experience in Dassault's Solidworks.
- Limited experience in using ANSYS HFSS, Keysight's ADS.

## SELECTED UNDEGRADUATE COURSEWORK

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- Measurement Systems & Sensors, Design of ASIC and VLSI Systems (cross-listed course), Statistical Signal Processing for Communications (cross-listed course), Wireless Communications, Digital Signal Processing, Electronics (Circuits, Microelectronic & Semiconductor Devices courses), Analysis and Design of Telecommunication Systems (cross-listed course).

## GRADUATE COURSEWORK

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- Completed: Detection and Estimation Theory, Special Topics in Electronics and Computer Architecture (Re-configurable Digital Systems course), Channel Coding, Probabilistic Graphical Models and Inference Algorithms, Nonlinear Systems, Quantum Technology (Quantum computing course).
- Attended: Special Topics in Measurements Systems, Probabilistic Robotics, Special Topics in Analog CMOS Integrated Circuit Design.

## OTHER INTERESTS - EXTRA CURRICULAR ACTIVITIES

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- Builds & Repairs:
  - Electronics: designing, building and debugging analog & digital circuits.
  - (vintage) Test & measurement equipment troubleshooting and repairing.
  - Reverse engineering: trying to make vintage stuff work with minimal documentation (“stuff” mainly refers to the above bullet).
  - Motorcycle repairs and restorations.
  - Small engine repairs.
  - Car repairs.
- Enduro, adventure motorcycling.
- Mountain biking.
- Building & flying RC aircrafts.
- Photography:
  - Won first prize in the 2022 EKOME photo contest. Prize category: urban landscape.

## REFERENCES

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- **Aggelos Bletsas** (Diploma Thesis Advisor, Ph.D. Advisor)  
Professor, Telecommunications Division  
School of Electrical and Computer Engineering  
Technical University of Crete  
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- Additional references available upon request.