

# Spyros Nektarios Daskalakis

Edinburgh, Scotland – EH11 1HJ – UK

☎ +44 (0) 7783153933 • ✉ daskalakispiros@gmail.com • 🌐 www.daskalakispiros.com

## Objective

---

As a 32-year-old Electrical and Computer Engineer with a Ph.D. degree, I currently work as an Electromagnetic Compatibility Engineer at Cirrus Logic in Edinburgh, UK. I possess 7+ years of experience in designing, integrating, fabricating, and testing hardware for wireless sensing devices and RF applications. My specialty lies in ultra-low-power and low-cost embedded systems and sensors.

## Technical Interests and Expertise

---

- $\mu$ Power consumption & low data rate embedded systems
- RFID/backscatter sensors, Bluetooth, cellular networks
- RF energy harvesting circuits
- Satellite communications
- Software defined radios (SDRs)
- Low-cost, wireless sensors for agriculture

## Selected Work Experience

---

More information and multimedia available at [www.daskalakispiros.com/projects.html](http://www.daskalakispiros.com/projects.html)

### Co-Founder

*Green IoT Solutions Ltd.*

**Edinburgh, UK**  
*Dec. 2022 - Present*

- Developing low-cost battery-free sensors.
- Developing smart large scale parking systems.

### Electromagnetic Compatibility (EMC) Engineer

*Cirrus Logic, Inc.*

**Edinburgh, UK**  
*Nov. 2021 - Present*

- Simulations and Design of RF immunity development boards.
- Developing software in Python for lab test campaigns.
- RF radiated & conducted immunity tests for ICs.

### Hardware Design Engineer

*Celestia UK*

**Edinburgh, UK**  
*Jan. 2021 - Oct. 2021*

- Work for Electronic scanning multi-beam antenna (eScan) Gateway for Mega-constellations.
- Development of monitor & control hardware for electronic scanning multibeam antennas.
- Developing front-end and back-end software in Python for controlling phase array antennas.

### Self-employed Electronics Engineer

*Mixed Signal Systems Limited*

**Edinburgh, UK**  
*Nov. 2020 - Dec. 2020*

- Design electronic circuits.
- Develop software for digital communication protocols (USB, I2C, UART).

### Telecommunications Engineer

*Mandatory Army Services*

**Greek Army, Greece**  
*Mar. 2020 - Nov. 2020*

- Maintenance of surveillance RADAR infrastructure.
- Developing server interfaces for UAV telemetry.

### PhD Researcher

*Microwaves and Antenna Engineering Research Group.*

**Heriot-Watt University**  
*Feb. 2017 - Feb. 2020*

- Developed millimeter wave wireless sensors using additive manufacturing based on nanoparticle inks for 5G communications.
- Developed real-time hardware and firmware for embedded sensor-tags to monitor environmental parameters, utilizing broadcast frequency modulated (FM) signals with backscatter communication.
- Developed sensitive & efficient RF harvesters for wireless power transfer and supply batteryless backscatter sensor nodes.

### Research Fellow

*Agile Technologies for High-performance Electromagnetic Novel Applications (ATHENA) Group.*

**Georgia Institute of Technology**  
*Oct. - Dec. 2016, Nov. 2018 - Mar. 2019*

- Research on smart agriculture systems with low energy wireless networks.

### Graduate Researcher, Telecom Lab

*ERC-04-BLASE research project "Backscatter Networks for Large-Scale Environmental Sensing"*

**Technical University of Crete**  
*Sep. 2014 - Jun. 2016*

- Designed and implemented low-power agricultural/environmental sensor network hardware, firmware, and custom physical layer communication, and signal processing; first demonstration of wireless backscatter sensor network in real-world application.
- Fab lab manager: Operated CNC etching machines, electroplate galvanizers, semi-automatic pick-and-place machines, reflow ovens.

### Internship in renewable energy companies

*Aenaos Energy Systems & IWEKO MV SA, Wind Farm*

**Heraklion, Crete, Greece**  
*Jun. 2011 - Aug. 2012*

- Supervised solar farm systems and provide maintenance at the electric circuits.
- Supervised wind farm through SCADA system and provide maintenance on the electronic parts of the wind turbines.

## Personal Projects

"Aristeos" & "Kaloudia"

Mar. 2014 - Jun. 2016

- "Kaloudia" - Find goodies, wherever you are in Greece! Be co-founder and part of the promotion of an electronic platform that brings together producers of traditional products and consumers throughout Greece. The system was giving the opportunity to local product producers of direct selling of their products to the visitors, using smartphones promoting also the tourism industry of the country.
- "Aristeos" - Be founder and part of a group that developed an electronic McPhail trap for automated detection and monitoring of the olive fly population. The system is useful for olive tree farmers for preventing possible plagues with timely sprays.

## Education

### Heriot-Watt University, School of Engineering & Physical Sciences

Edinburgh, UK

Ph.D., Thesis: "Ambient Backscatterers For Low Cost and Low Power Wireless Applications"

Feb. 2017 - Mar. 2020

Advisors: Honorary Associate Prof. A. Georgiadis, Prof. G. Goussetis, Prof. M. Tentzeris

### Technical University of Crete, School of Electrical & Computer Engineering (ECE)

Chania, Crete, Greece

M.Sc., Thesis: "Environmental scatter radio sensors with RF energy harvesting"

Oct. 2014 - Jul. 2016

GPA: 9.67/10.0. Advisor: Prof. Aggelos Bletsas

### Technical University of Crete, School of Electrical & Computer Engineering (ECE)

Chania, Crete, Greece

Diploma of Eng. (5 year program), Thesis: "Energy harvesting and sensing for backscatter tags"

Sept. 2009 - Sept. 2014

GPA: 8.66/10.0. ("Excellent"), Class Ranking: 1st (out of 27), Advisor: Prof. Aggelos Bletsas

## Technical Skills

**Embedded Systems:** 8051, MSP430FR, PIC16LF1459, ATmega2560, **Software Tools:** Python, Matlab, C, Java, HTML, PHP, Gnuradio, Cortex M0+, Chipcon Radios, NRF52832/NRF52811, Xilinx FPGA, UNIX Shell scripting, MySQL, LaTeX, Assembly, VHDL FT232H, Simcom A7672X/SIM7600X

**CAD & Simulation:** Kicad, Eagle, Magic VLSI, Multisim, TiNA, **Prototyping/Testing:** PCB Milling, RF & SMD Board Fabrication, LTSpice, CorelDRAW, CST, HFSS, ADS & RFPPro, HyperLynx, ns-2 InkJet & 3D Printing, Testing using VNA, SA, SG, Oscilloscope, DAQ

**Automation:** Wind/solar farms SCADA system supervisory, program- **SDR:** USRP, RTL-SDR, HackRF One  
ming and installation of PLC SIEMENS S7-1200

**Cloud:** AWS S3, SES, EC2, Route 53, Certificate Manager, IoT Core, **Databases:** InfluxDB, Graphana, Spotfire  
CloudFront, Lamda, Certificate Manager

## Leadership

**Teaching:** Teaching and lab assistant for 3 classes (2015-2018) at Technical University of Crete & Heriot-Watt University.

**Chairing:** Chair of Technical University of Crete IEEE Student Branch (2014 & 2015).

**Volunteering:** Volunteer in IEEE Int. Microwave Symposium (IMS), Philadelphia 2018, in European School of Antennas (ESoA), Edinburgh 2018 and in "open day" events in Heriot-Watt University and Technical University of Crete.

**Organizing:** Co-organizer of student design completion in IEEE IMS 2018 (Philadelphia) & IMS 2019 (Boston).

## Selected Awards/Achievements

[A1]: Total citations: 764 (Google scholar), H-index: 15, Reads: 25710 (Research Gate), Jan. 2023

[A2]: Winner of URSI GASS 2021 **Young Scientist Award** (Co-author), Commission B, Rome, Italy, Sep. 2021

[A3]: Winner of **2nd Year Postgraduate Research Prize 2018**, School of Eng. and Physical Sciences, Heriot-Watt University, Sep. 2019.

[A4]: Winner of **IEEE MTT-S Graduate Fellowship for 2019**, Grant: 6000 USD, IEEE Microwave Theory & Techniques Society, Feb. 2019.

[A5]: Winner of **Heriot-Watt University 1st ISSS Innovation Award**, Grant: 1000 GBP, Project: VineSpy, A Battery-Free, Low-Cost WSN for Vineyard Smart Agriculture Applications, Jul. 2018.

[A6]: Winner of **2018 Electronics Travel Awards**, Grant: 800 CHF, Electronics Open Access Journal, Feb. 2018.

[A7]: Winner of **1st Year Postgraduate Research Prize 2017**, School of Eng. and Physical Sciences, Heriot-Watt University, Oct. 2017.

[A8]: **Lloyd's Register Foundation, International Consortium of Nanotechnologies Doctoral scholarship.** Oct. 2016.

[A9]: **Member of Group team ASTRAPI** wins contest "Seeding Ideas Harvesting the Future, Innovation & Entrepreneurship at TUC 2016", Israeli embassy & Technical University of Crete, Jul. 2016.

[A10]: **Onassis Foundation M. Sc. Scholarship** for the academic year 2015-2016, Grant: 5400 €.

[A11]: **3rd Student Paper Content Award**, COST WIPE Action Conf., Thessaloniki, Greece, Sep. 2015.

[A12]: **Short Term Scientific Mission**, COST-WIPE-IC1301 ,CTTC, Barcelona, Spain, Jun.-Jul. 2015, Grant: 2500 €

[A13]: **Co-Founder of Kaloudia Project:** "An online platform/application for finding local products around Greece.", **Clinton Global Initiative University (CGIU) & Angelopoulos Fellowship 2015**, Grant: 20000 €, Miami, Florida, Mar. 2015.

[A14]: **Citation for 5 years Excellent Graduation**, Technical University of Crete, 2014.

[A15]: **Founder of Aristeos Project**: "Detection and population monitoring of olive flies with image processing technology." **Clinton Global Initiative University (CGIU) & Angelopoulos Fellowship 2014**, Grant: 10000 €, Phoenix, Arizona, Mar. 2014.

[A16]: **Excellence Award** for the top of the class. Academic year: 2012-2013, Technical University of Crete.

[A17]: **Undergraduate Fellowship Award**, awarded to the top 10 of class, Acad. year: 2009-2010, Grant: 100 €, Technical Univ. of Crete.

## Training

---

[T1]: **Keysight Technologies**, Training on 3DEM in ADS (Advanced Design System), Nov. 2021, Cirrus Logic Inc.

[T2]: **Python Training**, Advanced Python Programming, Dec. 2021, Cirrus Logic Inc.

[T3]: Trainee of **ECOST-TRAINING SCHOOL-IC1301**, Grant: 550 €, School on Electromagnetics for the IoE (Internet of Everything), University of Bologna, Italy, Apr. 2018.

[T4]: Trainee of **European Space Agency (ESA) Academy**, Ladybird Guide to Spacecraft Comms Course, ESA ESEC, Belgium, Mar. 2018.

[T5]: Trainee of **ECOST-TRAINING SCHOOL-IC1301**, Grant: 565 €, Wireless Networks: From Energy Harvesting to Information Processing, Centre Tecnologic de Telecom. de Catalunya (CTTC), Barcelona, Spain, Nov. 2015.

## Patents

---

[P1]: **S. N. Daskalakis**, G. Goussetis, IP Title: "Long Range Ambient Backscatter", Heriot-Watt University, Greece Patent Application No: 20200100416, 16 Jul. 2020.

[P2]: **S. N. Daskalakis**, G. Goussetis, IP Title: "Long Range Ambient Backscatter", Heriot-Watt University, UK Patent Application No: GB2016717.7, 21 Oct. 2020.

## Book Chapters

---

[CH1]: **S. N. Daskalakis**, R. Correia, J. Kimionis, G. Goussetis, M. M. Tentzeris, N. B. Carvalho, A. Georgiadis, "Ambient FM Backscattering Low Cost and Low Power Wireless RFID Applications", Book: Wireless Power Transmission for Sustainable Electronics: COST WiPE - IC1301, Wiley, Apr. 2020.

## Journal Publications

---

[J1]: **S. N. Daskalakis**, A. Georgiadis, M. M. Tentzeris, G. Goussetis and G. Deligeorgis, "The new era of Long-Range "Zero-Interception" Ambient Backscattering Systems: 130 m with 130 nA front-end consumption", in MDPI Sensors, May 2022 ).

[J2]: R. Torres, R. Correia, N. B. Carvalho, **S. N. Daskalakis**, G. Goussetis, Y. Ding, A. Georgiadis, A. Eid, J. Hester and M. M. Tentzeris, "Backscatter Communications", in IEEE Journal on Microwaves, Sep. 2021 (**Open Access**).

[J3]: J. Kimionis, A. Georgiadis, **S. N. Daskalakis** and M. M. Tentzeris, "A printed millimeter-wave modulator and antenna array for low-complexity Gigabit-datarate backscatter communications", in Nature Electronics, Jun. 2021 (**Open Access**).

[J4]: B. Couraud, R. Vauche, **S. N. Daskalakis** D. Flynn, T. Deleruyelle, E. Kussener and S. Assimonis, "Internet of Things: A review on Theory based Impedance Matching Techniques for Energy Efficient RF Systems", in MDPI Special Issue: Artificial Intelligence of Things (AIoT), Mar. 2021 (accepted for publication).

[J5]: B. Couraud, T. Deleruyelle, R. Vauche, D. Flynn, **S. N. Daskalakis**, "A Low Complexity Design Framework for NFC-RFID Inductive Coupled Antennas", in IEEE Access, vol. 8, pp. 111074–111088, Jun. 2020.

[J6]: D. Belo, R. Correia, Y. Ding, **S. N. Daskalakis**, G. Goussetis, A. Georgiadis, and N. B. Carvalho, "IQ Impedance Modulator Front-End for Low-Power LoRa Backscattering Devices", in IEEE Trans. on Mic. Theory and Techniques (TMTT), vol. 67, no. 12, pp. 5307-5314, Dec. 2019.

[J7]: **S. N. Daskalakis**, G. Goussetis, M. M. Tentzeris and A. Georgiadis, "A Rectifier Circuit Insensitive to the Angle of Incidence of Incoming Waves Based on a Wilkinson Power Combiner", in IEEE TMTT, vol. 67, no. 7, pp. 3210-3218, Jul. 2019.

[J8]: **S. N. Daskalakis**, R. Correia, G. Goussetis, M. M. Tentzeris, N. B. Carvalho and A. Georgiadis, "4-PAM Modulation of Ambient FM Backscattering for Spectrally Efficient Low Power Applications", in IEEE TMTT, vol. 66, no. 12, pp. 5909-5921, Dec. 2018.

[J9]: **S. N. Daskalakis**, G. Goussetis, S. D. Assimonis, M. M. Tentzeris and A. Georgiadis, "A uW Backscatter-Morse-Leaf Sensor for Low Power Agricultural Wireless Sensor Networks", in IEEE Sensors Journal, vol. 18, no. 19, pp. 7889-7898, Oct. 2018. **Top 25 most downloaded sensors Journal papers in Oct. 2018, Feb.-Mar. 2019.**

[J10]: **S. N. Daskalakis**, J. Kimionis, A. Collado, G. Goussetis, M. M. Tentzeris and A. Georgiadis, "Ambient Backscatterers using FM Broadcasting for Low Cost and Low Power Wireless Applications", in IEEE TMTT, vol. 65, no. 12, pp. 5251-5262, Nov. 2017.

[J11]: A. Collado, **S. N. Daskalakis**, K. Niotaki, R. Martinez, F. Bolos and A. Georgiadis, "Rectifier Design Challenges for RF Wireless Power Transfer and Energy Harvesting Systems", in RADIOENGINEERING, vol. 26, no. 1, Apr. 2017.

[J12]: **S. N. Daskalakis**, S. D. Assimonis, E. Kampianakis and A. Bletsas, "Soil Moisture Scatter Radio Networking with Low Power", in IEEE TMTT, Special Issue on RFID Sensing & Imaging, vol. 64, no. 7, pp. 2338-2346, Jul. 2016.

[J13]: S. D. Assimonis, **S. N. Daskalakis** and A. Bletsas, "Sensitive and Efficient RF Harvesting Supply for Batteryless Backscatter Sensor Networks", in IEEE TMTT, vol. 64, no. 4, pp. 1327-1338, Apr. 2016.

## Conference Publications

---

- [C1]: K. Kossenias, D. Comite, **S. N. Daskalakis**, P. Kontou, M. Kuznetsov and S. K. Podilchak, "A Remote Microwave Thermal Sterilization Approach for the Coronavirus and Other Pathogens by Wireless Power Transmission" in proc. URSI GASS 2021, Rome, Italy, Aug.-Sep. 2021. **Young Scientist Award.**
- [C2]: P. Kontou, S. B. Smida, **S. N. Daskalakis**, S. Nikolaou, M. Dragone and D. E. Anagnostou, "Heartbeat and Respiration Detection Using a Low Complexity CW Radar System" in proc. IEEE European Microwave Week 2020 (EuMW) conf., Utrecht, Netherlands, Jan. 2021.
- [C3]: **S. N. Daskalakis**, G. Goussetis and A. Georgiadis, "NFC Hybrid Harvester for Battery-free Agricultural Sensor Nodes" in proc. IEEE RFID Technology and Applications (RFID-TA) conf., Pisa, Italy, Sep. 2019.
- [C4]: B. A. Mouris, W. Elshennawy, P. Petridis, and **S. N. Daskalakis**, "Rectenna for Bluetooth Low Energy Applications" in proc. IEEE Wireless Power Transfer Conf. (WPTC), London, UK, Jun. 2019.
- [C5]: **S. N. Daskalakis**, A. Georgiadis, G. Goussetis and M. M. Tentzeris, "Low Cost Ambient Backscatter for Agricultural Applications" in proc. ICEAA-IEEE APWC 2019, Granada, Spain, Sep. 2019.
- [C6]: **S. N. Daskalakis**, S. D. Assimonis, G. Goussetis, M. M. Tentzeris and A. Georgiadis, "The Future of Backscatter in Precision Agriculture", in proc. IEEE AP-S/URSI 2019, Atlanta, Georgia, USA, Jun. 2019.
- [C7]: S. D. Assimonis, **S. N. Daskalakis**, V. Fusco, M. M. Tentzeris and A. Georgiadis, "High Efficiency RF Energy Harvester for IoT Embedded Sensor Nodes", in proc. IEEE AP-S/URSI 2019, Atlanta, Georgia, USA, Jun. 2019.
- [C8]: R. Correia, Y. Ding, **S. N. Daskalakis**, P. Petridis, G. Goussetis, A. Georgiadis and N. B. Carvalho "Chirp Based Backscatter Modulation" in proc. IEEE MTT-S International Microwave Symposium (IMS), Boston, Massachusetts, USA, Jun. 2019.
- [C9]: T.-H. Lin, **S. N. Daskalakis**, A. Georgiadis and M. M. Tentzeris "Achieving Fully Autonomous System-on-Package Designs: An Embedded-on-Package 5G Energy Harvester within 3D Printed Multilayer Flexible Packaging Structures" in proc. IEEE MTT-S International Microwave Symposium (IMS), Boston, MA, USA, Jun. 2019.
- [C10]: **S. N. Daskalakis**, R. Correia, G. Goussetis, M. M. Tentzeris, N. B. Carvalho and A. Georgiadis, "Spectrally Efficient 4-PAM Ambient FM Backscattering for Wireless Sensing and RFID Applications", in proc. IEEE MTT-S IMS, Philadelphia, PA, USA, Jun. 2018. **Student paper competition finalist.**
- [C11]: **S. N. Daskalakis**, G. Goussetis and A. Georgiadis "Low Bitrate Ambient FM Backscattering for Low Cost and Low Power Sensing", in proc. 2nd URSI Atlantic Radio Science Conf. (AT-RASC), Gran Canaria, Spain, May-Jun. 2018.
- [C12]: **S. N. Daskalakis**, G. Goussetis and A. Georgiadis "A 2.4 GHz Rectifier Insensitive to the Angle of Incidence of Incoming Waves", in proc. 2nd URSI Atlantic Radio Science Conf (AT-RASC), Gran Canaria, Spain, May-Jun. 2018.
- [C13]: **S. N. Daskalakis**, A. Collado, A. Georgiadis, and M. M. Tentzeris, "Backscatter Morse Leaf Sensor for Agricultural Wireless Sensor Networks", in proc. IEEE Sensors, Glasgow, UK, Oct. 2017. **"Best paper distinction" and invitation for publication to the IEEE Sensors J.**
- [C14]: **S. N. Daskalakis**, A. Georgiadis, A. Collado and M. M. Tentzeris, "An UHF rectifier with 100% bandwidth based on a ladder LC impedance matching network", in proc. IEEE European Microwave Week (EuMW), Nuremberg, Germany, Oct. 2017.
- [C15]: **S. N. Daskalakis**, J. Kimionis, J. Hester, A. Collado, M. M. Tentzeris and A. Georgiadis, "Inkjet printed 24 GHz rectenna on paper for millimeter wave identification and wireless power transfer applications", in proc. IMWS-AMP Int. Microwave Workshop Series on Adv. Materials and Processes, Pavia, Italy, Sep. 2017.
- [C16]: **S. N. Daskalakis**, J. Kimionis, A. Collado, M. M. Tentzeris and A. Georgiadis, "Ambient FM Backscattering for Smart Agricultural Monitoring", in proc. IEEE MTT-S International Microwave Symp. (IMS), Honolulu, Hawaii, USA, Jun. 2017.
- [C17]: A. Servent, **S. N. Daskalakis**, A. Collado and A. Georgiadis, "A Proximity Wireless Sensor Based on Backscatter Communication", in proc. International Applied Computational Electromagnetics Society (ACES), Firenze, Italy, Mar. 2017.
- [C18]: G. Vougioukas, **S. N. Daskalakis** and A. Bletsas, "Could Battery-less Scatter Radio Tags Achieve 270-meter Range?", in proc. IEEE Wireless Power Transfer Conf. (WPTC), Aveiro, Portugal, May 2016.
- [C19]: **S. N. Daskalakis**, A. Georgiadis, A. Bletsas, C. Kalialakis, "Dual Band RF Harvesting with Low-Cost Lossy Substrate for Low-Power Supply System", in proc. IEEE Europ. Conf. on Antennas and Propagation (EuCAP), Davos, Switzerland, Apr. 2016.
- [C20]: **S. N. Daskalakis**, S. D. Assimonis, E. Kampianakis and A. Bletsas, "Soil Moisture Wireless Sensing with Analog Scatter Radio, Low Power, Ultra-Low Cost and Extended Communication Ranges", in proc. IEEE Sensors, Valencia, Spain, Nov. 2014.
- [C21]: S. D. Assimonis, **S. N. Daskalakis** and A. Bletsas, "Efficient RF Harvesting for Low-Power Input with Low-Cost Lossy Substrate Rectenna Grid", in proc. IEEE RFID Technology and Applications (RFID-TA), Tampere, Finland, Sep. 2014.

## Selective Conferences - Events

---

- [E1]: Edinburgh Postgraduate Conference (PGCon), Edinburgh UK, Oct. 2019 (Presentation).
- [E2]: ICON Summer School 2019, Lloyd's Register Foundation Institute for the Public Understanding of Risk, Singapore, Jul. 2019 (Presentation).
- [E3]: IEEE International Microwave Symposium (IMS) 2019, Boston, Massachusetts, USA, Jun. 2019 (Presentation)
- [E4]: ICON & Lloyd's Register Foundation International Conference 2018, London, UK, May 2018 (Poster)
- [E5]: ICON Conference 2017, Athens, Greece, Apr. 2017 (Poster)

## Other Interests - Extra Curricular Activities

---

**Social:** Member of IEEE, IEEE Microwave Theory & Techniques Society and Entrepreneurs Social Club (ESC)-Edinburgh.

**Music:** Old Member and Music Producer of TUC Radio Team ("Radio Entasi"). [www.entasiradio.tuc.gr](http://www.entasiradio.tuc.gr)

**Hobbies:** Mountain biking & Swimming.

**Other:** PCB Design & Fabrication, Inkjet & 3D Printing, Cryptocurrency bots.