

# Spyros Nektarios Daskalakis

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## Objective

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Coming from Greece, i am 27 years old, PhD research scholar, student. I have 6+ years of experience in designing, integrating, fabricating and testing hardware for wireless sensing devices and networks. Specifically, I have focused on ultra low-power, low datarate backscatter communication systems and RF energy harvesting systems for wireless power transfer.

I'm seeking challenging system-level design internship starting Summer 2019.

## Technical Interests and Expertise

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- Low-cost sensing and wireless systems for agriculture
- System-level design and integration of industrial products
- $\mu$ Power consumption & low datarate embedded systems
- RF energy harvesting circuits design
- RFID/Backscatter, Bluetooth LE & satellite communication
- Circuit/board design for RF & analog applications

## Education

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### Heriot-Watt University

Ph.D., Thesis: "Additive manufacturing of mm-wave WSNs for IoT sensing and 5G communications"  
Advisors: Honorary Prof. Apostolos Georgiadis, Prof. George Goussetis

Edinburgh, Scotland, United Kingdom

Expected January 2020

### Technical University of Crete, Electronic & Computer Engineering

M.Sc. (2 year program), Thesis: "Environmental scatter radio sensors with RF energy harvesting"  
Advisor: Prof. Aggelos Bletsas

Chania, Crete, Greece

July 2016

Diploma of Eng. (5 year program), Thesis: "Energy harvesting and sensing for backscatter tags"  
Class Ranking: 1st (out of 149), Advisor: Prof. Aggelos Bletsas

September 2014

## Selected Work Experience

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

**Research Fellow, Advisors: Profs. Apostolos Georgiadis, George Goussetis and Manos M. Tentzeris** Georgia Institute of Technology  
Agile Technologies for High-performance Electromagnetic Novel Applications (ATHENA) Group Nov. 2018–present

- Developed mmWave wireless sensors using additive manufacturing based on nanoparticle inks for 5G communications. [C4]
- Developed real-time hardware and firmware for embedded ambient backscatter tags to monitor environmental parameters;. [J2, J3, J4, C1, C2]
- Developed sensitive & efficient RF harvesters for wireless power transfer and supply batteryless backscatter sensor nodes. [J1, J5, C3]

### Graduate Researcher, Telecom Lab, Advisor: Prof. Aggelos Bletsas

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; demonstration of wireless backscatter sensor network in real-world application. [J6,J7,C6,C7,C8]
- Fab lab manager: Operated high-speed CNC etching machines (for etching PCBs on materials), electroplate galvanizers (for accurate via construction), semi-automatic pick-and-place machines (for assembling miniature-package circuits), reflow ovens (for accurate soldering).

### Startup 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.

## Technical skills

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**Embedded Systems:** 8051, MSP430FR, PIC16LF1459, ATmega2560, Cortex M0+, Chipcon Radios, NRF52832, Xilinx FPGA

**CAD & Simulation:** Magic VLSI, Eagle Board Design, Multisim, TiNA, LTSpice, CorelDRAW, CST, ANSYS HFSS, ADS, ns-2

**Automation:** Wind/solar farms SCADA system supervisory, Programming and installation of PLC SIEMENS S7-1200

**Software Tools:** Matlab, C/C++, Java, HTML, PHP, Gnuradio, UNIX Shell scripting, MySQL, LaTeX, Assembly, VHDL, Verilog

**Prototyping/Testing:** PCB Milling, RF & SMD Board Fabrication, InkJet & 3D Printing, Testing using VNA, SA, SG, Oscilloscope, DAQ

**SDR:** USRP, RTL-SDR, HackRF

## Leadership

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**Mentoring:** Electronics systems mentor for 2 PhD students (2018-present) in Georgia Institute of Technology & Heriot-Watt University.

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

**Chairing:** Chair of IEEE TUC 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, Philadelphia 2018

## Selected Awards/Achievements

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[A1]: Winner of **Heriot-Watt University 1st ISSS Innovation Award**, Grand: 1.000 GBP, Project: VineSpy, A Battery-Free, Low-Cost WSN for Vineyard Smart Agriculture Applications, Jul. 2018.

[A2]: Winner of **2018 Electronics Travel Awards** Grand: 800 CHF, Electronics Open Access Journal, Feb. 2018.

[A3]: Winner of **1st Year Postgraduate Research Prize 2017**, School of Eng. and Physical Sciences, Heriot-Watt University, Oct. 2017.

[A4]: **Lloyd's Register Foundation, International Consortium of Nanotechnologies Doctoral scholarship**. Oct. 2016.

[A5]: **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.

[A6]: **Onassis Foundation M. Sc. Scholarship** for the academic year 2015-2016, Grand: 5400 €.

[A7]: **3rd Student Paper Content Award**, COST WIPE Action Conf., Thessaloniki, Greece, Sep. 2015.

[A8]: **Co-Founder of Kaloudia Project**: "An online platform/application for finding local products around Greece.", **Clinton Global Initiative University (CGIU) & Angelopoulos Fellowship 2015**, Grand: 20000 €, Miami, Florida, Mar. 2015.

[A9]: **Citation for 5 years Excellent Graduation**, Technical University of Crete, 2014.

[A10]: **Founder of Aristeos Project**: "Detection and population monitoring of olive flies with image processing technology." **Clinton Global Initiative University (CGIU) & Angelopoulos Fellowship 2014**, Grand: 10000 €, Phoenix, Arizona, Mar. 2014.

[A11]: **Excellence Award** for the top of the class. Academic year: 2012-2013, Technical University of Crete.

[A12]: **Undergraduate Fellowship Award**, awarded to the top 10 of class, Academic year: 2009-2010, Grand: 100 €, Technical University of Crete.

## Peer-reviewed Journal Publications

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[J1]: **S. N. Daskalakis**, G. Goussetis, M. M. Tentzeris and A. Georgiadis, "A Rectifier Array Insensitive to the Angle of Incidence of Incoming Waves Based on a Wilkinson Power Combiner", in IEEE Trans. on Microwave Theory and Techniques (TMTT), Nov. 2018. (under revision)

[J2]: **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.

[J3]: **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.

[J4]: **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.

[J5]: 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.

[J6]: **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.

[J7]: 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.

## Selected Peer-reviewed Conference Publications

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[C1]: **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 IMS 2018. **Student paper competition finalist**.

[C2]: **S. N. Daskalakis**, A. Collado, A. Georgiadis, and M. M. Tentzeris, "Backscatter Morse Leaf Sensor for Agricultural Wireless Sensor Networks", in proc. IEEE Sensors 2017. **Received a "Best paper distinction" and invitation for publication to the IEEE Sensors Journal**.

[C3]: **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.

[C4]: **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, Pavia, Italy, Sep. 2017.

[C5]: 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) 2017.

[C6]: 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) 2016.

[C7]: **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) 2016.

[C8]: 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) 2014.