

DASKALAKIS SPYRIDON NEKTARIOS

Ph.D. Research Fellow
School of Engineering and Physical Sciences,
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PERSONAL INFORMATION

- Date of birth: June 1991
- Citizenship: Greek

EDUCATION

- **Doctor of Philosophy** (3-year program)
School of Engineering and Physical Sciences,
Heriot-Watt University, Edinburgh, United Kingdom
(Mar. 2017 - Present)
Thesis: *“Additive Manufacturing of Millimetre Wave Wireless Sensors based on Nanoparticle Inks for Pervasive Internet of Things (IoT) Sensing and 5G Communications”*
Advisors: Honorary Prof. Apostolos Georgiadis - Prof. George Goussetis
- **Master of Science** (2-year program)
School of Electrical and Computer Engineering, Technical University of Crete, Chania, Greece,
(Oct. 2014 - Jul. 2016)
Thesis: *“Environmental Scatter Radio Sensors with RF Energy Harvesting”*
Advisor: Associate Prof. Aggelos Bletsas
GPA: 9.67/10.0
- **Diploma of Engineering** (5-year program)
School of Electrical and Computer Engineering, Technical University of Crete, Chania, Greece,
(Sep. 2009 - Sep. 2014)
Thesis: *“Energy Harvesting and Sensing for Backscatter Tags”*
Advisor: Associate Prof. Aggelos Bletsas
GPA: 8.66/10.0 (“Excellent”)
Class Ranking: 1st (out of 27)

AWARDS AND DISTINCTIONS

- **Winner of “1st ISSS Innovation Award”**, (£1.000) Project: VineSpy, A Battery-Free, Low-Cost WSN for Vineyard Smart Agriculture Applications. Heriot-Watt University, Jul. 2018.
- **Winner of “2018 Electronics Travel Awards”** (800 CHF), Electronics Open Access Journal, Feb. 2018.
- **1st Year Postgraduate Research Prize 2017**, School of Engineering and Physical Sciences, Heriot-Watt University, Oct. 2017.
- **Lloyd’s Register Foundation, International Consortium of Nanotechnologies, Doctoral scholarship**, University of Southampton, Oct. 2016, site: www.lrf-icon.com/projects/project-13.
- **Member of Group team ASTRAPI** wins contest “Seeding Ideas Harvesting the Future, Innovation & Entrepreneurship at TUC 2016”, Technical University of Crete, Jul. 2016.
- **Onassis Foundation M. Sc. Scholarship**, (5400 €) for the academic year 2015-2016.
- **3rd Student Paper Content Award**, “Soil moisture Wireless Sensor Network with Analog Scatter Radio Low, Ultra-Low Cost and Low Complexity”, COST WIPE, Thessaloniki, Greece, Sep. 2015.
- **Co-Founder of Kaloudia Project**, Chania, Crete, 2015.
- **Citation for 5 years Excellent Graduation**, Technical University of Crete, 2014.
- **Founder of Aristeos Project**: “Detection and population monitoring of olive flies with image processing technology.”
- **Clinton Global Initiative University (CGIU) & Angelopoulos Fellowship 2014**, (10000 €) Phoenix, Arizona, Mar. 2014.
- **Excellence Award** for the top of the class. Academic year 2012-2013, Technical University of Crete.
- **Undergraduate Fellowship Award**, Office of Sponsored Research, awarded to the top 10 of class (100€), for the academic year 2009-2010, Technical University of Crete.

RESEARCH INTERESTS

- Backscatter Radio Communication
- Sensing in Agricultural Applications
- RF Energy Harvesting
- Satellite Communications
- Low-cost and Low-energy Wireless Sensor Networks
- RF Engineering and Software-Defined Radios
- IC/MMIC Design

LANGUAGES

- Greek Native Speaker
- English B2 Language Certificate

JOURNAL PUBLICATIONS

1. S. N. Daskalakis, G. Goussetis and A. Georgiadis, “A 2.4 GHz Wilkinson Rectifier for RF Harvesting Capabilities Insensitive to the Angle of Incidence of Incoming Waves”, *IEEE Transactions on Microwave Theory and Techniques (TMTT)*, (under preparation) Oct. 2018.
2. 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”, *IEEE Transactions on Microwave Theory and Techniques (TMTT)*, (revised and submitted) Oct. 2018.
3. 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”, *IEEE Sensors Journal.*, vol. 18, no. 19, pp. 7889–7898, Oct. 2018.
4. 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”, *IEEE Transactions on Microwave Theory and Techniques (TMTT)*, Vol. 65, No. 12, pp. 5251 - 5262, Nov. 2017.
5. 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”, *RADIOENGINEERING*, Vol. 26, No. 1, Apr. 2017.
6. S. N. Daskalakis, S. D. Assimonis, E. Kampianakis and A. Bletsas, “Soil Moisture Scatter Radio Networking with Low Power”, *IEEE Transactions on Microwave Theory and Techniques (TMTT)*, Special Issue on RFID Sensing & Imaging, Vol. 64, No. 7, pp. 2338-2346, Jul. 2016.
7. S. D. Assimonis, S. N. Daskalakis and A. Bletsas, “Sensitive and Efficient RF Harvesting Supply for Batteryless Backscatter Sensor Networks”, *IEEE Transactions on Microwave Theory and Techniques (TMTT)*, Vol. 64, No. 4, pp. 1327-1338, Apr. 2016.

CONFERENCE PUBLICATIONS

1. 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”, *IEEE MTT-S International Microwave Symp. (IMS)*, Philadelphia, PA, USA, Jun. 2018. **(Student paper competition finalist)**
2. S. N. Daskalakis, G. Goussetis and A. Georgiadis “Low Bitrate Ambient FM Backscattering for Low Cost and Low Power Sensing”, 2nd *URSI AT-RASC*, Gran Canaria, Spain, May–June 2018.

3. S. N. Daskalakis, G. Goussetis and A. Georgiadis “A 2.4 GHz Rectifier Insensitive to the Angle of Incidence of Incoming Waves”, 2nd URSI AT-RASC, Gran Canaria, Spain, May–June 2018.
4. S. N. Daskalakis, A. Collado, A. Georgiadis, and M. M. Tentzeris, “Backscatter Morse Leaf Sensor for Agricultural Wireless Sensor Networks”, IEEE Sensors Conf., Glasgow, UK, Oct. 2017. **(Received a “Best paper distinction” and invitation for publication to the IEEE Sensors Journal.)**
5. 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”, IEEE European Microwave Week (EuMW), Nuremberg, Germany, Oct. 2017.
6. 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”, IMWS-AMP Int. Microwave Workshop Series on Adv. Materials and Processes, Pavia, Italy, Sep. 2017.
7. S. N. Daskalakis, J. Kimionis, A. Collado, M. M. Tentzeris and A. Georgiadis, “Ambient FM Backscattering for Smart Agricultural Monitoring”, IEEE MTT-S International Microwave Symp. (IMS), Honolulu, Hawaii, USA, Jun. 2017.
8. A. Servent, S. N. Daskalakis, A. Collado and A. Georgiadis, “A Proximity Wireless Sensor Based on Backscatter Communication”, International Applied Computational Electromagnetics Society (ACES) Symp., Firenze, Italy, Mar. 2017.
9. G. Vougioukas, S. N. Daskalakis and A. Bletsas, “Could Battery-less Scatter Radio Tags Achieve 270-meter Range?”, IEEE Wireless Power Transfer Conf. (WPTC), Aveiro, Portugal, Mar. 2016.
10. S. N. Daskalakis, A. Georgiadis, A. Bletsas, C. Kalialakis “Dual Band RF Harvesting with Low-Cost Lossy Substrate for Low-Power Supply System”, IEEE Europ. Conf. on Antennas and Propagation (EuCAP), Davos, Switzerland, Apr. 2016.
11. 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”, IEEE Sensors Conf., Valencia, Spain, Nov. 2014.
12. S. D. Assimonis, S. N. Daskalakis and A. Bletsas, “Efficient RF Harvesting for Low-Power Input with Low-Cost Lossy Substrate Rectenna Grid”, IEEE Conf. on RFID Technology and Applications (RFID-TA), Tampere, Finland, Sep. 2014.

INTERNSHIP AND WORK EXPERIENCE

- Research Fellow at ATHENA group
The School of Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta, GA 30332-0250, (Nov. 2018 - Present).
- ESA Academy, Ladybird Guide to Spacecraft Communication Training Course 2018.
ESA ESEC (European Space Security & Education Centre), Redu, Belgium, (Mar. 2018).
- COST WiPE Short Term Scientific Mission (STSM).
School of Electrical and Computer Engineering, Georgia Institute of Technology, Atlanta, GA 30332-0250, (Oct. - Dec. 2016).

- Fab Lab Manager.
School of Electrical and Computer Engineering Technical University of Crete, Chania, Greece,
(Sep. 2015 - Jul. 2016).
- International Spring School on Electromagnetics and Emerging Technologies for Pervasive Applications:
Internet of Things, Health and Safety.
Villa Griffone - Guglielmo Marconi Foundation, Bologna, Italy, (Apr. 2016).
- European School of Antennas - ESoA2015.
Centre Tecnològic de Telecomunicacions de Catalunya (CTTC), Barcelona, Spain,(Oct. 2015),
site: eso2015.cttc.cat.
- COST WiPE Short Term Scientific Mission (STSM).
Centre Tecnològic de Telecomunicacions de Catalunya (CTTC), Barcelona Spain, (Jun. - Jul. 2015),
site: www.cost-ic1301.org.
- Research Assistant in BLASE (Backscatter Networks for Large-Scale Environmental Sensing) Project.
School of Electrical and Computer Engineering Technical University of Crete, Chania, Greece,
(Dec. 2014 - Dec. 2015), site: blase.tuc.gr.
- Internship in Renewable Energy Company.
Aenaos Energy Systems, Heraklion, Greece, (Jun. 2011 - Aug. 2011).
- Internship in Maintenance Department of Wind Park.
IWEKO MV SA, Megali Vrysi, Heraklion, Greece, (Jun. 2012 - Aug. 2012).

ACADEMIC EXPERIENCE

- Laboratory Assistant, School of Engineering & Physical Sciences Heriot-Watt University,
Courses: Analogue Electronics B39EE (2018) and Praxis Electronic Design B37VA (2018)
- Teaching Assistant, Telecom Lab, Technical University of Crete.
Course: Synthesis and Analysis of Telecommunication Modules, academic year 2014 - 2015.

TECHNICAL SKILLS

- Programming Languages: Assembly, C, Java, MySQL, HTML, PHP.
- Software Development Tools: Mathworks MATLAB, Microsoft Visual Studio, Eclipse IDE, Keysight Advanced Design System (ADS), GNU Radio, Network Simulator NS-2.
- Application Software: TEX (LATEX, BibTEX), Microsoft Office, OpenOffice.
- Embedded Systems: Software and hardware development with MSU and DSP platforms (MSP430FR, PIC16LF1459 and C8051F320 MCU, CC2500 Chipcon Radio, ATmega2560, ARM1176JZF-S, nrf52832).
- Hardware Development Tools: VHDL language with Xilinx ISE and Embedded Systems prototyping with Xilinx EDK, Arduino, Raspberry Pi.
- Computer-Aided Design: CadSoft Eagle, Magic VLSI layout tool (Open Circuit Design).
- Operating Systems: Microsoft Windows, Linux (Ubuntu, Kali Linux, Raspbian, Debian).

- SCADA (Supervisory Control and Data Acquisition) for energy management:
Remote supervision and control of wind turbines and solar panel trackers.
- PLC (Programmable Logic Controller): Programming and installation.
(Software: SIEMENS SIMATIC STEP 7, PLC model: SIEMENS S7-1200)
- SDR (Software Defined Radio): USRP, RTL-SDR.

SELECTED COURSEWORK

Technical University of Crete

- Special Topics in Design of Analogue CMOS Circuits.
Instructor: M. Bucher, Grade: 10/10.
- Analysis and Synthesis (Design) of Telecommunications Modules.
Textbook: RF Microelectronics, by B. Razavi,
Instructor: A. Bletsas, Grade: 8.0/10.
- Modelling and Performance Evaluation of Communications Networks.
Textbook: Introduction to Stochastic Processes, by E. Cinlar,
Instructor: M. Paterakis, Grade: 8.5/10.
- Design of VLSI and ASIC.
Textbook: Instructor's Notes,
Instructor: E. Koutroulis, Grade: 9.5/10.
- Statistical Modelling and Pattern Recognition.
Textbook: "Pattern Classification", by R. O. Duda, P. E. Hart, D. G. Stork,
Instructor: V. Digalakis, Grade: 9.5/10.
- Electrical Measurements and Sensors.
Textbook: Instructor's Notes,
Instructor: K. Kalaitzakis, Grade: 9/10.

Other

- Data Acquisition and Signal Conditioning Seminar at Technical University of Crete,
National Instruments Certification, 17th May 2013.

OTHER INTERESTS - EXTRA CURRICULAR ACTIVITIES

- IEEE Student Member.
- IEEE Microwave Theory and Techniques Society Member.
- Member of IEEE Sensors Council, IEEE Nanotechnology Council and IEEE Council on RFID.

- Chair of IEEE TUC Student Branch (2014-2015). www.ieeesb.tuc.gr
- Old Member of TUC Radio Team (“Radio Entasi”). www.entasiradio.tuc.gr
- PCB Design & Fabrication, Inkjet & 3D Printing.
- Cycling & Swimming.

REFERENCES

- **Apostolos Georgiadis** (Ph.D. Supervisor)
Honorary Professor
School of Engineering & Physical Sciences; Sensors, Signals & Systems
Heriot-Watt University
Edinburgh EH14 4AS United Kingdom
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- **George Goussetis** (Ph.D. Supervisor)
Professor
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- **Manos M. Tentzeris** (Short Term Scientific Mission Supervisor)
Ken Byers Professor in Flexible Electronics
School of Electrical and Computer Engineering
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- **Matthias Bucher**
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School of Electrical and Computer Engineering
Technical University of Crete
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