

Christos Kolitsidas

Curriculum Vitae

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Department of Electromagnetic Engineering

Education

2012–Present **PhD student**, *KTH Royal Institute of Technology*, School of Electrical Engineering, Department of Electromagnetic Engineering.

Project title *Next Generation Antenna Arrays*

Description The focus of the project is to explore new possibilities in terms of antenna hardware for the future wireless networks. We have successfully developed a new class of wideband antenna arrays suitable for communication networks. We have named our approach the SCADA Array - Strongly Coupled Asymmetric Dipole Antenna Array. A novel Vivaldi array utilizing metasurfaces. A leaky lens antenna based on gap waveguide technology and the lens designed with transformation optics for Ka band. A novel transverse magnetic in substrate integrated waveguide - SIW technology has also been developed for Ka band using a band gap structure. The theory of the developed antenna array was also applied in radio astrophysics in the field of 21cm cosmology and a theoretical approach to extract the global epoch of reionization - EoR signal was developed.

Supervisors Professor Lars Jonsson - KTH, Dr. Eloy de Lela Acedo - Cambridge UK, Assistant Professor Oscar Quevedo-Teruel - KTH & Assistant Professor Andres Alayon Glasunov - Chalmers

2008–2012* **Postgraduate Master's of Specialization (2 year degree)**, *Democritus University of Thrace*, School of Electrical and Computer Engineering, GPA – 9.7/10.
Specialized in Communications and Satellite Telecommunication Systems

Thesis Title *Development and Design of Multilayer Wideband Microwave Beam Forming Networks*

Description This thesis successfully developed ultra wideband multilayer beamforming networks based on Butler matrix and a wideband linear vivaldi antenna array.

Supervisor Professor George Kyriacou

*Interruption Studies interruption to complete the compulsory military service in the Greek army

2002–2008 **Diploma of Electrical & Computer Engineer (5 year degree) - M.Sc Equivalent**, *Democritus University of Thrace*, School of Electrical & Computer Engineering, GPA – 7.3/10.

Specialized in Telecommunications and Space

Title *Development of a Full 360° Azimuth Coverage Direction of Arrival Measurement Unit Using a Butler Matrix and a Circular Array.*

Description In the frame of this thesis a full azimuthal direction of arrival measurement system was developed. The system was based on Butler matrix and circular array able to retrieve the direction of an impinging signal.

Supervisor Professor George Kyriacou

Awards

- 2016 Team mentor and project leader of the team that won the first prize in 2016 IEEE AP-S student antenna design competition for the project entitled "Wireless Sensor Network Utilizing RF Energy Harvesting for Smart Building Applications."
- 2014 Best Student Paper Award for the scientific work entitled "Edge effects in a strongly coupled dipole element array in triangular lattice" presented in PIERS August 2014 Guangzhou China.
- 2008 Best Student Paper Award for the scientific work entitled "Development of a Full 360° Azimuth Coverage Direction of Arrival Measurement Unit" presented in the 8th Mediterranean Microwave Symposium in Syria October 2008.

Research visit

- 2017 During February - May 2017 I was a research visitor in the Cavendish Laboratory of Cambridge University, United Kingdom, and I was located in the Battcock center of experimental astrophysics. During the research visit we designed a global epoch of reionization - EoR experiment and the pre and post processing pipeline developed in Python. The sky models were also evaluated and a novel approach for the radio sky scaling based on the synchrotron emission with an angular dependence was proposed. Finally, we have formulated a novel rigorous algorithm that follows the antenna temperature monotonicity for the global EoR detection.

Teaching Experience

Teaching activities in KTH

- 2015 **Teacher/Laboratory Assistant in the courses**, EI1222 Electromagnetic Theory Continuation course and EI2400 Applied Antenna theory.
- 2014 **Teacher Assistant in the course**, EI1240 Electromagnetic Field Theory.
- 2013 **Teacher/Laboratory Assistant in the courses**, EI1210 Wave Propagation and Antennas, EI2400 Applied Antenna Theory and EI1200 Electromagnetic Field Theory.

Teaching activities in Democritus University of Thrace

- 2008–2010 **Teacher and laboratory assistant**, *Assist the exercise sessions and the laboratory exercises in the courses Microwaves (7th Semester) and Microwave Circuit Design (8th semester).*
- 2008–2012 **Supervising thesis and projects**, As a post graduate Master student I have been involved in supervising several master thesis in the Microwave Laboratory.

Teaching activities in private tuition center "System"

- 2008–2010 **Part time teacher**, Teaching university courses for qualifying exams in the following fields: *Mathematical Analysis, Linear Algebra, Differential Equations, Complex Analysis, Numerical Analysis, Electrical Circuits, Electromagnetic Fields, Automatic Control Systems, Electronics, Digital Design, Telecommunication Systems, Algorithms, Programming Fortran, C, C++, Matlab.*

Thesis and project supervision

Thesis

- 2016 **Master thesis supervisor of Anton Gusarov**, "Aircraft antenna array for seamless direct air-to-ground communication system".
- 2016 **Master thesis supervisor of Petros Bantavis**, "'A Wideband Switched Beam Antenna System ".
- 2016 **Master thesis supervisor of Masahiro Wakasa**, "*Lower bounds on the Q-factor for small oversampled superdirective arrays over a ground plane*".
- 2016 **Bachelor thesis supervisor of Martin Matsson**, "*Differential Patch Antenna for RF Energy Harvesting*".
- 2016 **Bachelor thesis supervisor of Oskar Björkqvist**, "*Ambient Radio Frequency Harvesting for Stand Alone Sensors*".
- 2013 **Master thesis supervisor of Nizamudin Hussain**, "Performance Limitations and Estimates for Infinite Array Antennas".

Projects - Internships

- 2012–Present **Supervising projects and internships**, I have supervised several projects during the antenna course as well as exchange students for internship from ENAC France.

Work Experience

- 2003 **Summer Intern**, DATEC ELECTRONICS, Athens, Telecommunications engineer. Communications and sensors hardware development and installation for a vehicle telematics system.
- 2004 **Summer Intern**, DATEC ELECTRONICS, Athens, Telecommunications engineer. Wireless network engineer for a telematics system and hardware development for RFID tags.
- 2005 **Summer Intern**, ADAMSNET LTD, Athens, Automation Engineer. Smart building automation engineer and optical fiber network installation and configuration

Specialized Courses–Workshops

- 2012 **ESoA course**, *Arrays and Reflectarrays*.
- 2014 **ESoA course**, *Antenna Synthesis*.
- 2015 **Summer course in KTH**, *Complex Analysis and Passivity with Applications*.
- 2016 **Workshop in APS 2016**, Timmed Arrays.
- 2016 **Workshop in APS 2016**, Systematic Antenna Design with Characteristic Modes.

Other Activities–Services

2014–Present **PhD council member**, *servng in the committee responsible for research education (E2DOC) in KTH.*

2015–Present **Antenna Lab responsible**, *Smooth operation, manufacturing and measurements for in house devices for student activities in the Department in Electromagnetic Engineering.*

Military Service – Compulsory Conscription

2010–2011 **Reserve Second Lieutenant of the Corps Research and Informatics**, Specialized in Communications, Informatics and Surveillance Systems.

Military Schools I. Graduate of the School for officers of Research and Informatics of the Greek Army
II. Graduate of the School for officers of Communications of the Greek Army

Stationed *Commander of the Company of Computer Science of 473 Battalion of Supervision and Computer Science*

Description My duties included supervision and management of the army’s intranet and data transfer from UAVs via satellite links.

Selected to serve as officer due to higher education with degree in electrical engineering.

Languages

Greek	Mother-tongue	
English	Proficiency	<i>Full professional proficiency, level C2</i>
Spanish	Intermediate	<i>Level C1</i>
French	Basic	<i>Level B1</i>

Interests

- Cinema
- Badminton
- Cooking
- Dancing
- Running
- Hiking
- Latin Dances: Section of Appearances of the School of Latin American Dances Thessaloniki
- Greek Traditional Dances: Section of Appearances of the department of Xanthi’s traditional dances

Refereed Journal Publication

Jonsson, B.L.G., **C.I. Kolitsidas**, and N. Hussain, "Array Antenna Limitations," *Antennas and Wireless Propagation Letters, IEEE* , vol.12, pp.1539,1542, 2013.

O. Björkqvist, O. Dahlberg, G. Silver, **C. I. Kolitsidas**, O. Quevedo-Teruel and B.L.G Jonsson, "Wireless Sensor Network Utilizing RF Energy Harvesting for Smart Building Applications," under review at IEEE AP magazine.

Martin Mattsson, **C. I. Kolitsidas** and B.L.G Jonsson, "A Differential Dual Band Dual-Polarized Rectenna for RF Energy Harvesting," to be submitted in AWPL.

Petros Bantavis, **Kolitsidas, C. I.**, Tzihat Empliouk, Marc Le Roy, B.L.G. Jonsson and George Kyriacou, "A Hybrid Cost-effective Wideband Switched Beam Antenna System for a Small Cell Base Station ," to be submitted in TAP.

Kolitsidas, C. I. and B.L.G. Jonsson, "Theory, Design and Characterization of the Strongly Coupled Asymmetric Dipole Array (SCADA)," to be submitted in TAP.

Kolitsidas, C. I., Petros Bantavis, B.L.G. Jonsson and George Kyriacou, "A Vivaldi Antenna Array With an Integrated Soft Surface, a Matching Layer and Edge terminations," to be submitted in TAP.

Kolitsidas, C. I. and Eloy de Lera Acedo, "Antenna design and calibration for 21-cm global experiments," submitted in MNRAS.

Patents

Kolitsidas, C. I. B.L.G Jonsson and Stefan Engström, "A Broadband Antenna," PCT/SE2017/050482.

Kolitsidas C. I., Petros Bantavis, George Kyriacou, B.L.G Jonsson and Stefan Engström, "A Broadband Antenna,," PCT/SE2017/050483.

Papers in Preparation

Kolitsidas, C. I. and Oscar Quevedo-Teruel, "A Bespoke Leaky Lens Antenna Designed on Gap-waveguide Technology and Transformation Optics," in preparation for TAP.

Kolitsidas C. I. and Lei Wang, "A Transverse Magnetic Substrate Integrated Waveguide," in preparation for MTT.

Kolitsidas C. I. and B.L.G Jonsson, "A SCADA with an Integrated BaLun based on CPW technology," in preparation for TAP.

Refereed Conference Publication

Oskar Björkqvist, **Kolitsidas, C. I.**, Oskar Dahlberg, Gustaf Silver, Martin Mattsson and B. L. G. Jonsson, "A Novel Efficient Multiple Input Single Output RF Energy Harvesting Rectification Scheme," accepted APS 2017.

Petros Bantavis, **Kolitsidas, C. I.**, B.L.G. Jonsson, Tzihat Empliouk and George Kyriacou, "A Wideband Switched Beam Antenna System for 5G Femtocell Applications," accepted APS 2017.

Gustaf Silver, **Kolitsidas, C. I.**, Oskar Björkqvist, Martin Mattsson, Oskar Dahlberg and B.L.G. Jonsson, "Exploiting Antenna Array Configurations for Efficient Simultaneous Wireless Information and Power Transfer," accepted APS 2017.

Kolitsidas, C. I., Petros Bantavis, George Kyriacou and B.L.G. Jonsson, "Utilizing Periodic Structure Loading on Wideband Antenna Arrays for Next Generation Base Station Applications," accepted APS 2017.

Martin Mattsson, **Kolitsidas, C. I.**, Gustaf Silver, Oskar Björkqvist, Oskar Dahlberg and B. L. G. Jonsson, "A high gain Dual-Polarized Differential Rectenna for RF Energy Harvesting," accepted APS 2017.

Oskar Dahlberg, **Kolitsidas, C. I.**, Martin Mattsson, Gustaf Silver, Oskar Björkqvist and B. L. G. Jonsson, "A Novel 32 Port Cube MIMO Combining Broadside and Endfire Radiation Patterns for Full Azimuthal Coverage - A Modular Unit Approach for a Massive MIMO System," accepted APS 2017.

Kolitsidas, C. I. and B. L. G. Jonsson, "Cross-Polarization Degradation in Array Antennas Employing Asymmetrical Elements and Possible Improvements," APS 2016, abstract.

Kolitsidas, C. I. and B. L. G. Jonsson, "Polarization Aspects on a Wideband Antenna Array Based on Asymmetrical Elements," 2016 10th European Conference on Antennas and Propagation (EuCAP), Davos, 2016, pp. 1-3.

H.Frid, B. Beuerle, **C. I. Kolitsidas**, F. Töpfer, S. Schröder and J. Oberhammer, "Impact force actuator for active contact release and lifetime extension of rf-mems switches," IEEE MEMS 2016.

F. E. Fakoukakis, T. Empliouk, **C.I. Kolitsidas**, G. A. Ioannopoulos, and G. A. Kyriacou, "Ultra-wideband Butler Matrix Fed MIMO Antennas," PIERS Proceedings, 2815 - 2819, July 6-9, Prague, 2015.

Kolitsidas, C.I. and Jonsson, B.L.G., "Adaptive Null Steering Using Model Predictive Control Scheme," Antennas and Propagation Society meeting Vancouver 2015, abstract.

Kolitsidas, C.I., Jonsson, B.L.G., Persson, P. and Stjerma, A., "Exploiting asymmetry in a capacitively loaded strongly coupled dipole array," Antennas and Propagation Conference (LAPC), 2014 Loughborough, pp.723,726, 10-11 Nov. 2014.

Jonsson, B.L.G.and **C.I. Kolitsidas**, "On methods to estimate bandwidth performance for array antennas with ground plane," General Assembly and Scientific Symposium (URSI GASS), 2014 XXXIth URSI, pp.1,4, 16-23 Aug. 2014

Kolitsidas, C.I and Jonsson, B.L.G., "Rectangular vs. equilateral triangular lattice comparison in a T-slot loaded strongly coupled dipole array," General Assembly and Scientific Symposium (URSI GASS), 2014 XXXIth URSI, pp.1,4, 16-23 Aug. 2014

Kolitsidas, C.I. and Jonsson, B.L.G., "Edge Effects in a Strongly Coupled Dipole Element Array in Triangular Lattice," PIERS Proceedings, pp. 487 - 490, August 25-28, Guangzhou, 2014.

Kolitsidas, C.I. and Jonsson, B.L.G., "A Study of Partial Resonance Control for Edge Elements in a Finite Array," PIERS Proceedings, pp. 253 - 256, August 12-15, Stockholm, 2013.

Kolitsidas, C.I. and Jonsson, B.L.G., "Investigation of compensating the ground plane effect through array's inter-element coupling," Antennas and Propagation (EuCAP), 2013 7th European Conference on , vol., pp.1264,1267, 8-12 April 2013.

Kolitsidas, C.I., C.S. Lavranos, and G. A. Kyriacou "Design of a Wideband RF Front End Based on Multilayer Technology," PIERS Proceedings, 733 - 737, August 19-23, Moscow, RUSSIA 2012.

Paraskevopoulos, A.S., **C.I. Kolitsidas**, F.E. Fakoukakis and G. A. Kyriacou "Analysis and Design of Ferroelectric Phase Shifters Appropriate for Printed Phased Arrays," PIERS Proceedings, 407 - 411, August 19-23, Moscow, RUSSIA 2012.

Kolitsidas, C.I. F. E. Fakoukakis, D. G. Drogoudis, M. Chrysomallis and G. A. Kyriacou "Angular Localization of Interfering Sources Using a Butler Matrix Driven Circular Array," EMC Europe Workshop 2009, pp. 215-218, Athens, Greece.

Kolitsidas, C.I. F. E. Fakoukakis, D. G. Drogoudis, C. S. Lavranos and G. A. Kyriacou "Development of a Full 360o Azimuth Coverage Direction of Arrival Measurement Unit," 8th Mediterranean Microwave Symposium, pp. 35-39, 2008 Damascus, Syria.

Peer-reviewed Local Conference Publications

Kolitsidas, C.I., Jonsson, B.L.G., "Strongly Coupled Asymmetric Dipole Antenna (SCADA) Array," Swedish Microwave Days, March 2016, Linkoping, Sweden.

Kolitsidas, C.I., Jonsson, B.L.G., Oskar Björkqvist, Oskar Dahlberg and Gustaf Silver "Sensors Utilizing Intentional and Non - Intentional RF Sources for Energy Harvesting" Indo-Swedish Colloquium 2-5 December 2015, Chennai, India.

Kolitsidas, C.I.; Jonsson, B.L.G., "Bandwidth Enhancement through Structural Optimization in a Strongly Coupled Dipole Array" Swedish Microwave Days, March 2014, Goteborg, Sweden.

Kolitsidas, C.I. and G. A. Kyriacou "Ultra Wide Band Beamforming Networks for Switched Beam Phased Arrays," 5th Conference of Electrical Engineering and Compute Science, 2012 Xanthi Greece.

Technical reports

Nicolas Fagnoni, Eloy de Lera Acedo and **Kolitsidas, C.I.**, "Electromagnetic and electrical co-simulation of the HERA analogue system with CST-Delay spectrum response and sensitivity calculation," 2017.

Kolitsidas, C.I., "1st Test-Bed of a Wideband Antenna Array," 2016.

Kolitsidas, C.I., "Literature review: Wideband/Multiband Antenna Arrays for Base Station Applications," <http://urn.kb.se/resolve?urn=urn:nbn:se:kth:diva-140606>, pp.1-36, 2013.