

PAINLESS

An innovative training network (ITN) on
Energy-autonomous portable access points for
infrastructure-less networks

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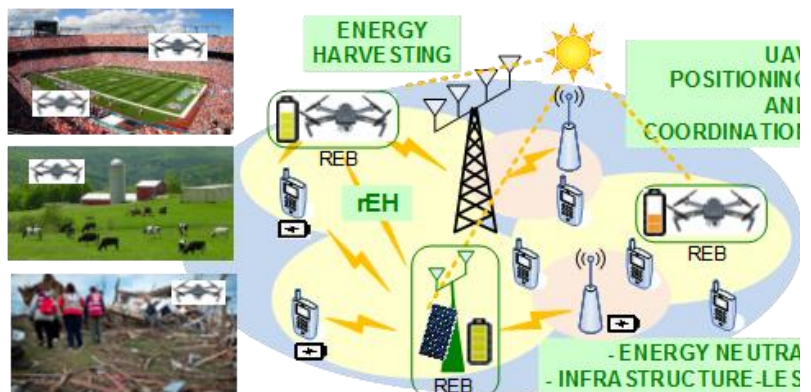
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The long-term vision of the project is to kick-start an innovation eco-system for high-impact players among the infrastructure and service providers of ICT to develop and commercialize autonomous, power-independent, and self-organizing networks of BSs

Project Overview

PAINLESS is a multi-partner European Training Network (ETN) project, within the framework of the H2020 Marie Skłodowska-Curie Innovative Training Networks (ITNs) under agreement No 812991.

The overarching aim of PAINLESS is to define and demonstrate green, energy-neutral, and infrastructure-less operation for the mid- and long-term future generations of wireless networks. The objectives of this project include *a)* the development and integration of models for energy generation, storage and consumption directly into the wireless transmission (access / backhauling) and resource allocation algorithms of telecommunications networks; *b)* the establishment of disruptive theoretical performance benchmarks, where currently none exist, for the combined power-and-information distribution in communication networks; *c)* the development of innovative optimization and signal processing algorithms for the wide range of UAV-oriented networks, where state-of-the-art techniques would fail in the new communication paradigms; *d)* the design of joint power-and-information management technologies; and *e)* the proof-of-concept demonstration of self-powered access points.





Partners

The network partners are all well-established institutions in their respective countries. The consortium includes 12 institutions: 6 academic partners, 1 research center and 5 private companies, distributed across 7 countries:

The University College London, UK,

<https://www.ucl.ac.uk/>

Athens Information Technology, Greece,

<https://www.ait.gr/>

The University of Manchester, UK,

<https://www.manchester.ac.uk/>

The University of Cyprus, Cyprus,

<http://ucy.ac.cy/en>

National Centre of scientific research, France,

<http://www.cnrs.fr/>

The University of Aalborg, Denmark,

<https://www.en.aau.dk/>

Lyra Electronics, UK,

<http://www.lyraelectronics.com/>

Bell Labs, Ireland,

<https://www.bell-labs.com/>

Reseiwe, Denmark,

<http://reseiwe.com/>

The University of Paris-saclay, France,

<https://www.universite-paris-saclay.fr/fr>

Orion, Greece,

<http://orioninnovations.gr/>

Rio systems, Israel,

<https://www.rio-system.com/>

The complementarity of PAINLESS extends to training, where each partner brings unique state-of-the-art technical training based on energy modelling and generation, RF design and implementation, wireless power transfer and energy harvesting, signal processing and wireless communication, UAV-based networking and optimization, and simulation and hardware implementation. A combination of transferable skills training offered by all partners gives the training network a full range of skills required to translate the research into commercialisation and exploitation.

Supervisory Board Members

The network partners offer over 20 internationally renowned leaders in the various aspects of PAINLESS with solid experience in successful PhD supervision having graduated over 160 PhD students between them.

The supervisory team includes:



Dr Christos Masouros, UCL

[Dr Christos Masouros](#), Beamforming and energy efficiency. (SMIEEE, MIET) received the Diploma degree in Electrical and Computer Engineering from the University of Patras, Greece, in 2004, and MSc by research and PhD in Electrical and Electronic Engineering from the University of Manchester, UK in 2006 and 2009 respectively. In 2008 he was a research intern at Philips Research Labs, UK. Between 2009-2010 he was a Research Associate in the University of Manchester and between 2010-2012 a Research Fellow in Queen's University Belfast. He has held a Royal Academy of Engineering Research Fellowship between 2011-2016. He is currently an Associate Professor in the Dept. Electrical and Electronic Engineering, University College London.



Prof Sarah Spurgeon, UCL

[Prof Sarah Spurgeon](#), Control theory and robust UAV control. received B.Sc. and D.Phil. degrees from the University of York, York, U.K., in 1985 and 1988, respectively. She has held previous academic positions at the University of Loughborough, the University of Leicester and the University of Kent in the UK. She was appointed as Professor of Engineering at the University of Leicester in 2002 and was Head of their Department of Engineering from 2006-2008. She was Professor of Control Engineering and Head of the School of Engineering and Digital Arts at the University of Kent from 2008-2016. She is currently Head of Department of Electronic and Electrical Engineering and Professor of Control Engineering at UCL.



Prof John Mitchell, UCL

[Prof. John Mitchell](#), Wireless Communications and radio over fibre. Receive first degree a BEng in Electronic and Electrical Engineering from the Department of Electronic Engineering, University College London in 1996 and my PhD in 2000. Have been director of the IGDP Communications for Industry programme and from 2010-2012 was the Postgraduate Tutor (Taught) for the department. From 2012 to 2016 I was seconded to the faculty office to be director of the Integrated Engineering Programme. Currently holds the post of Vice-Dean, Education in the Faculty of Engineering Sciences and lead on the development of Teaching and Learning Spaces in the new UCL EAST campus in Stratford.



Prof. Constantinos B. Papadias, AIT

[Prof Constantinos B. Papadias](#), PhD, Antennas and Propagation. is the Scientific Director of Athens Information Technology (AIT), in Athens, Greece, where he is also Head of the Broadband Wireless and Sensor Networks (B-WiSE) Research Group. He is also Adjunct Professor at Aalborg University. He received the Diploma of Electrical Engineering from the National Technical University of Athens (NTUA) in 1991 and the Doctorate degree in Signal Processing (highest honors) from the Ecole Nationale Supérieure des Télécommunications (ENST), Paris, France, in 1995. He was a researcher at Institut Eurécom (1992-1995), Stanford University (1995-1997) and Bell Labs (as Member of Technical Staff from 1997-2001 and as Technical Manager from 2001-2006).

Supervisory Board Members



Dr. Dimitrios Ntaikos, AIT

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Dr. George K. Papageorgiou, AIT



Prof. I. Krikidis, UCY



Dr. Marco Di Renzo, CNRS

[Dr. Dimitrios Ntaikos](#) (M), received his B.Sc. degree in Telecommunications from the Democritus University of Thrace (DUTH), Xanthi, in 2003. In 2004 he received his M.Sc. degree from the College of Engineering of Boston University (BU), MA, USA. Since 2014 he holds a Ph.D. diploma in Telecommunications (specialized in antennas) from Aristotle University of Thessaloniki (AUTH). Since 2015 he is a Senior Research Scientist at the B-WiSE Lab of AIT with special interest in future adaptive antenna technologies.

Dr. George K. Papageorgiou (M) received the M.Sc. degree in applied mathematics and the Ph.D. degree in Informatics and Telecommunications from the National and Kapodistrian University of Athens, Athens, Greece, in 2012 and 2016, respectively. He is currently a Researcher at the Broadband Wireless and Sensor Networks (B-WiSE) Laboratory of Athens Information Technology. His main field of interest is signal processing with applications to wireless systems (algorithms for collaborative sensing, receiver design, multi-antenna systems), as well as machine learning, pattern recognition, convex / constrained optimization, nonlinear estimation, adaptive and distributed learning and information theory.

[Prof. I. Krikidis](#) (M), is an Associate Professor at UCY and the director of the Mobile Communications and Networking (MCN) Laboratory. He has a constant presence in the international scientific community through publications in prestigious journals and conferences, participation in editorial boards of high impact journals as well as in programs and organizing committees of several scientific events and evaluation boards. He has published more than 150 journals and conference proceedings and his research work is well recognized with more than 4000 citations. He is the recipient of the research award Young Researcher Award 2013 from RPF, Cyprus, and IEEE ComSoc Best Young Professional in Academia Award, 2016. He is an IEEE Fellow (class 2019) and he has received the prestigious ERC consolidator grant.

[Dr. Marco Di Renzo](#) (M), was born in L'Aquila, Italy, in 1978. He received the Laurea (cum laude) and the Ph.D. degrees from the Department of Electrical and Information Engineering, University of L'Aquila, Italy, in 2003 and 2007. In 2013, he received the Habilitation à Diriger des Recherches (HDR) degree, from the University of Paris-Sud XI, France. Since January 2010, he has been a Tenured Academic Researcher with CNRS and a faculty member of the Laboratory of Signals and Systems (L2S). He is a recipient of several awards, including a special mention for the outstanding academic career; the 2008 Torres Quevedo Award; the 2012 IEEE CAMAD Best Paper Award;

Supervisory Board Members

**Dr. Emad Alsusa, UMAN**

[Dr. Emad Alsusa](#) (M), PhD, BEng, completed a PhD in Telecommunications from the University of Bath in the United Kingdom in 2000 and in the same year he was appointed as a research associate at Edinburgh University. He joined Manchester University (then UMIST) in September 2003 as a faculty member. His research interests lie in the area of Communication Systems with a focus on Physical, MAC and Network Applications of his research include cellular networks, IoT and Powerline Communications. Emad's research work has resulted in over 200 journals and refereed conference publications mainly in top IEEE transactions and conferences. Emad has supervised +20 successful PhDs to completion and currently responsible for several more.

**Dr. Daniel So, UMAN**

[Dr. Daniel So](#), Daniel Ka Chun So is a Reader in the School of Electrical & Electronics Engineering at the University of Manchester, where he joined in 2003 as a lecturer. He received the PhD degree in Electrical & Electronics Engineering from the Hong Kong University of Science and Technology, Hong Kong in 2003. He obtained the BEng degree in Electrical & Electronics Engineering (First Class Honor) from the University of Auckland, New Zealand in 1996. From 1997 to 1998, he joined the Orion Systems NZ (now Orion Health) as software engineer, and was later promoted to senior software engineer. His research interests includes green communications, 5G networks, non-orthogonal multiple access, content centric network, massive MIMO, D2D communications, cooperative MIMO schemes.

**Dr. Rebecca Todd UMAN**

[Dr. Rebecca Todd](#) (F), EngD, MEng, CEng, Energy storage solutions. Rebecca is a Senior Lecturer with the Power Conversion Research Group at The University of Manchester, UK. After completing her Engineering Doctorate (Eng.D.) in 2006, she was a Research Associate in the Rolls-Royce UTC conducting research on the Intelligent Electric Power Network Evaluation Facility. She was appointed to Lecturer in 2010, and Senior Lecturer in 2017. Since 2016, she is the Course Director for the Renewable Energy and Clean Technology (REaCT) MSc. This collaborative research has been funded from a variety of sources including, direct industry funding, consultancy, EU FP7, EPSRC and Innovate UK.

**Dr. Khairi Hamdi, UMAN**

[Dr Khairi Hamdi](#) (M), Khairi is graduated from Tripoli, Libya in 1981 with a BSc in Electronics Engineering. He then obtained the MSc (with Distinction) and the Ph. D. in Telecommunication Engineering from Technical University of Budapest in 1988 and 1993, respectively. Previously, he held research and academic posts at the department of Computer Science, University of Manchester and the department of Electronic Systems Engineering, University of Essex. Dr. Hamdi was a BT research fellow during summer 2002, and was a visiting assistant professor at Stanford University during the academic year 2007/2008.

Supervisory Board Members



Prof. Petar Popovski, AAU

[Prof. Petar Popovski](#) (M) a Professor in Wireless Communications at Aalborg University and a Fellow of IEEE. I am heading the Section on Connectivity which covers the broad area of wireless communications and networks, focusing on communication theory, connectivity for IoT systems, and 5G wireless systems. My general research interest is in the area of communication theory. My research activities deal with wireless system design (5G and beyond), ultra-reliable wireless communication, Internet of Things (IoT) connectivity and its integration with data analytics. Besides my university position, I am a co-founder of the startup company RESEIWE A/S.



Prof. Dezso Séra AAU

[Dezso Séra](#), Associate Professor, Department of Energy Technology, Associate Professor, The Faculty of Engineering and Science



Dr. Jimmy Jessen Nielsen AAU

[Jimmy Jessen Nielsen](#), M.Sc. in Computer Engineering, Ph.D. in Wireless Communications, Associate Professor, Department of Electronic Systems, Associate Professor, The Technical Faculty of IT and Design, Lektor, Connectivity.

Dr Pete James, Co-founder of Lyra Electronics Ltd is a small, dynamic group of highly skilled engineers supplying power electronics consultancy and products to green industries

Dr. Pete James, Lycra

Supervisory Board Members



Dr David Lopez-Perez, NOK

[David López-Pérez](#) (M'12 SM'17) is a Senior Research Scientist and a Distinguished Member of Technical Staff (DMTS) at Nokia Bell Laboratories, and his main research interests are on small cells, ultra-dense networks and unlicensed spectrum technologies, where he has pioneered work on LTE and Wi-Fi interworking. David is currently working on massive MIMO, future indoor networks and the next generation of Wi-Fi technology, IEEE802.11be. David has authored more than 135 research articles, holds over 49 patents applications, and has received a number of prestigious awards. He is an editor of IEEE TWC.



Dr Adrian Garcia-Rodriguez NOK

[Adrian Garcia-Rodriguez](#) received the Ph.D. degree in Electrical and Electronic Engineering from University College London (U.K.) in 2016. Since 2016, he is a Research Scientist in Nokia Bell Labs (Ireland) where he focuses on Wi-Fi and UAV communications. He has held research positions in the research institute for technological development and Communication Innovation (IDeTIC) at the University of Las Palmas de Gran Canaria (Spain) between 2010-2012, and in the RF group of Nokia Bell Labs (Ireland) in 2015. He is a frequent tutorial speaker on Wi-Fi and ICC 2019), and also delivered the industrial presentation "Drone Base Stations: Opportunities and Challenges Towards a Truly "Wireless" Wireless Network".



Dr. Lorenzo Galati Giordano. NOK

[Lorenzo Galati Giordano](#) (M'15) is currently Member of Technical Staff at Nokia Bell Labs, Ireland. Lorenzo received the M.Sc. and the Ph.D. degrees in wireless communication from Politecnico di Milano, Italy, in 2005 and 2010, respectively. He was also Marie-Curie Short Term Fellow at University of Bedfordshire (UK) in 2008, researcher associate with the Italian National Research Council in 2010 and R&D Engineer for Azcom Technology from 2010 to 2014. Recently, Lorenzo contributed to the Nokia F-Cell project, an innovative self-powered and auto-connected drone deployed small cell which received the CTIA Emerging Technology 2016 Award.



Latest News: Best Paper Awards

Project PIs Emad Alsusa and Christos Masouros receive two IEEE WCNC 2019 Best Paper Awards.

The awarded papers are entitled:

"Rate Splitting Approach Under PSK signaling Using Constructive Interference Precoding Technique"

&

"Reuse Maximization Using Multi-Level Interference Mapping in Small Cell Networks"

