ZHANG Xun
Ph.D. en électronique
Enseignant chercheur à ISEP
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Curriculum Vitae

ZHANG Xun
PhD, MSc, BEng, MIEEE senior
Né en 1980, marié, une fille
Numéro de téléphone : +33(0)6 47 86 80 11
Email: zhangxun@me.com

Research Expertise and Scholarly Interest

Research expertise in the primary area of electronic/digital/IoT system design, covering:
High performance and high-speed signal processing for electronic and digital design on FPGA
Software Defined Radio (SDR) on FPGA
Visible Light communication system: Visible Light Communication system and positioning application in 5G network
IoT positioning system and algorithm: 2D/3D Indoor positioning and robot tracking system for massive internet of things connection

Qualifications

Education:
September 2005 ~ September 2009, Doctor of Philosophy in Electronic Engineering (PhD director: Prof. Serge WEBER), School of Engineering and Design, Nancy University, Nancy, Fr

August 2003 ~ April 2005, Master of Engineering in Electronic Engineering (Master program director: Prof. Patrick GARDA), University Pierre et Marie Currie, Paris, France

August 1998 ~ July 2002, Bachelor of Engineering in Electronic Engineering , Department of Telecommunications, Wuhan University of technology, Wuhan, P.R. China

Work Experience

Jan. 2010 ~ Jan.2011
Post-doctorate in IETR/SCEE at CentraleSupélec in 2010
In 2010, I joined in the team of Professor Jacque Palicot for one year post-doc project.

Jan. 2011 ~ Present
Associate professor in ISEP, Institut Supérieur d'électronique de Paris (ISEP)
Current Research, Scholarship and Consultancy Activities
Leading the Sino-France international Fellowship project.
Establishing research cooperation projects with various world-leading institutes (recently H2020 IoRL European project: http://IoRL.5G-ppp.eu)
Supervising two PhD students and one post-doc in ISEP
Invited for keynote speech for various seminars (IEEE FTFC 2013, IEEE ISCAS 2016, IEEE BMSB 2019, and IEEE Young professional Workshop BTS 2019)
To pursue opportunities for academic research and publication at the highest possible level.
Organization of international conference (IEEE ICECS 2016, IEEE ISCAS 2016, IEEE BMSB 2020 and IEEE Young professional Workshop BTS 2020)
To maintain and develop international links and activities with oversea university partner in related academic areas. (collaboration with Chinese universities: NUAA, Tsinghua university, and HUST)

Membership of Professional Bodies and Learned Societies

Senior Member of Institute of Electrical and Electronic Engineering (IEEE) 2006
Organization committee member of association « Fédération d'électronique à Paris »
Member of IEEE CAS Technology Society 2006
Member of IEEE BTS
Member of a Council of Association des Scientifiques et des Ingénieurs Chinois en France (www.asicef.fr.fr)
General chair of IEEE conference BMSB 2020
General chair of IEEE young Professionals Workshop, 2020

Languages

Chinese
French
English

Academic experiences summary

I am interested and able to teach subject related to the area of Electronic, Signal processing, Digital and RF/IoT systems:
Electronic Technology and Circuit Design
Digital systems design using VHDL
Real-time embedded systems and interfacing with microprocessor/microcontroller, DSP and FPGA
Computer architecture and programming (low-level and high-level programming)
Digital signal processing and real-time Internet of things applications
Digital communication and software defined radio (SDR) technology

Administration and management skills

Responsible of BEng, MSc modules in the field of Electronic Engineering and communication systems. (detail in annex I)

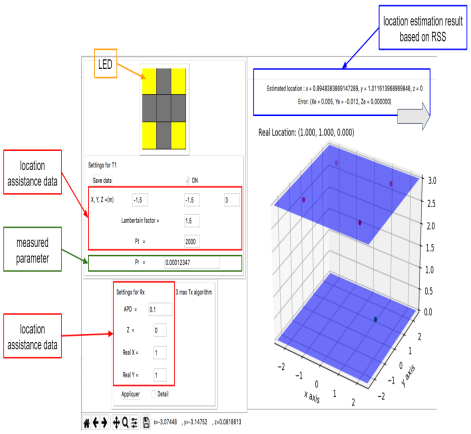
IoT electronic system	Engineering cycle second year (Master)	10h class, 20h project (5 groups)
Microelectronique system	Engineering cycle second year	10h class, 20h project (5 groups)
Digital electronic	CM1	4h class, 15h TP/TD
Learning based project	Engineering cycle first year	36h project (5 groups)

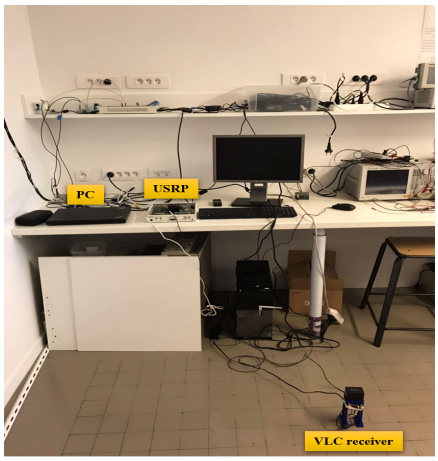
To contribute to teaching and learning at undergraduate and postgraduate levels and where appropriate on short/professional courses including BEng Electronic Engineering. (seen in annex II)
To develop innovative methods of teaching, learning and assessment as part of the international University's learner-centred approach to education.
To liaise closely with teaching, technical and administrative colleagues to ensure quality teaching.
To give advice and guidance to students to support their academic progress through the University.
To initiate, lead and manage the development of the curriculum and in Unit, Course and Degree updating
Course director for BEng Electronic Engineering
To liaise and assist others in the administration and management of Courses and Degrees

Academic student project examples (2018-2019):

Here you find two academic student projects with electronic engineering student in ISEP:

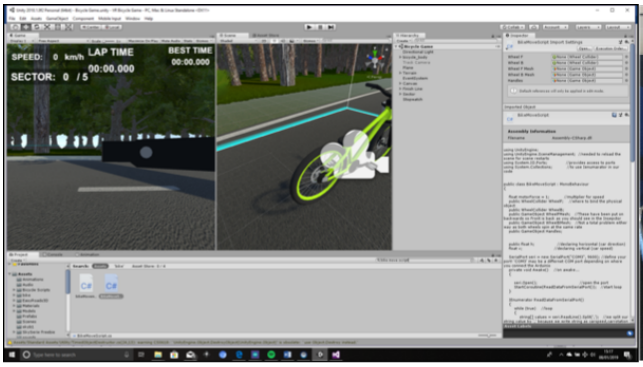
VLC based indoor positioning system:
Our currently developed VLC indoor positioning testbed which is used to demonstrate the feasibility of proposed IoRL VLC-based positioning system module in 5G network. This testbed provides an end-to-end experimental 5G facility for indoor positioning. It consists of a Dell server R740 in charge of the 5G NR signal processing, a USRP 2944R assembly with UBX 160 used as 5G RF front end, 4 VLC transmitters with LED lamps, a VLC receiver and a personal computer (PC) which allows the operator to remotely control local server and displays the measurement results through the GUI application.





Bike trainer via VR glass (demo link):

Project description: The IoRL VR bike game offers users the experience to cycle within different virtual environments for exercise or leisure. This initial demo presents a single environment to test the technology and control of the program. it is necessary that the game offers an online connectivity feature. For this, we at ISEP have developed a second multiplayer demo which is hoped that can be connected to the bikes developed at ISEP and Brunel's facilities in UK. This connectivity will allow for the European H2020 IoRL project to showcase the benefits of its 5G network.
Video demonstration:



Research activities

Funding and Consultancy Projects

Principle investigator & project leader in ISEP – 2017-2020, H2020 project on "Internet of Radio-Light" (540K for ISEP). The IoRL project is to provide a broadband radio-light communications solution that operates in unlicensed millimeter wave and visible light spectra, does not suffer from interference because of the propagation characteristics of EM waves in this part of the spectrum and provides universal broadband coverage within buildings from radio-light access points that are pervasively located within the light roses in buildings. This technology can be the network solution for the smart infrastructure and largescale sensor network applied to other indoor environments such as Tube Stations, Underground Pedestrian tunnels etc.
http://iorl.5G-ppp.eu

Principle investigator in RoBo: Education robot system design, funded by Orange Fondation RoBo project (30K), 2018-2019. RoBo project is a project which combines a small programmable robot and a visual programming language. Its goal is to provide a full-fledged system at a very low cost, targeting schools but also informal learning situations such as after-class activities. Through the programming and observation of the behavior of the robot, students can learn notions either related to Computer Science or Science, Technology, Engineering, and Mathematics. Since ISEP-R0B0 is still at an early stage, this article focuses on introducing the design of the system and two case studies we plan on conducting shortly. (PDF paper: Learning with Robots in CS and STEM Education: A Case Study with ISEP-R0B0. Available from:)
https://www.researchgate.net/publication/323734110_Learning_with_Robots_in_CS_and_STEM_Education_A_Case_Study_with_ISEP-R0B0.

Principle investigator – 2013-2015, Sino-France Innovation Funding project (CAIYUAN PEI program) on "VISIBLE LIGHT COMMUNICATION SYSTEM FOR UNDERWATER POLLUTION DETECTION " ($5,000). The purpose of this project is to understand the underwater optical channel, and its effect on the communication link. For this analysis, we apply Mie scattering theory. After gaining knowledge of the channel, a new system is proposed to adapt to several problems among underwater wireless optical channel. As a new system, we propose a multi-wavelength adaptive scheme combined with rate adaptive transmission using plural LEDs. Also, an experimental investigation has been conducted to compare the analyzed results with practical cases, in turbid water. Note that this paper is not interested in accurately modeling the underwater optical channel,but focusing on bonding the two areas; optical wireless communication theory and underwater optics.

Project leader in ISEP : Sino-France XUGUANG QI programme (3K) (chinese partner: Tisnghua University), 2012-2013

Project leader in ISEP : Sino-France XUGUANG QI programme (3K) (Chinese partner: National Sciense research center), 2011-2012

Post-doc project in Supélec Rennes: green communication system study (support by Motorola foundation)

Master, PhD and Postdoc student list:

Master student:
2019: Yanqi Huang (6 months internship)
2019: Shuo Li (6 months internship)

PhD student
2013-2016: Chen Chen
2016-2019: Ameur Chaabna (PhD student): 50% PhD defense on 10/10/2019
2017-2020: Lina Shi
2019-2022: Yanqi Huang

Postdoc

2018-2019: Zhan WANG (Post-doctorant): H2020 IoRL euoprean project

Publications (from 2011- now) (Complete list seen in : google scholar)

Journal:

Zhan Wang, A Lambert, Xun ZHANG, Dynamic ICSP Graph Optimization Approach for Car-Like Robot Localization in Outdoor Environments, in journal of Computer, 2019

Nawar Jawad, Mukhald SalihKareem, Lina SHI, Xun ZHANG, Smart Television Services Using NFV/SDN Network Management, in IEEE Transactions on Broadcasting, IEEE, 2019.

Ameur Chaabna, Abdesselam Babouri, Xun ZHANG, An Indoor Positioning system based on visible light communication using a solar cell as receiver, in Artificial Intelligence in Renewable Energetic Systems, Springer, 2018.

Hua Luo, Yue ZHANG, Wei Li, Li-Ke Huang, John Cosmas, Xun ZHANG, Low latency Parallel Turbo Decoding implementation for future terrestrial broadcasting systems, in IEEE transaction on Broadcasting, IEEE, 2017.

Wenbo Ding, Fang Yang, Hui Yang, JinTao Wang, Xiaofei Wang, Xun ZHANG, Jian Song, A hybrid power line and visible light communication system for indoor hospital applications, Journal articles, page(s) -, 2015.

Xun ZHANG, François-Benoît Vialatte, Chen Chen, Apurva Rathi, Gérard Dreyfus, Embedded Implementation of Second-Order Blind Identification (SOBI) for Real-Time Applications in Neuroscience, in Cognitive Computation, Springer, 2014.

Invited talk:
"Visible Light Communication Positioning and location-awareness in future 5G network", 3TH COLLOQUE DE LA FEDERATION D'ELECTRONIQUE "LOCALISATION SANS FIL DE PERSONNES ET D'OBJETS" 2018
Conference:
Manel Hentati, Amor Nafkha, xun ZHANG, Pierre Leray, Jean-Francois Nezan, The study of the

impact of architecture design on cognitive radio, in Proceedings of the 8th IEEE International Multi-Conference on Systems, Signals & Devices (SSD), 2011

Xun ZHANG, temperature-power consumption relationship and Hot-shot migration for FPGA-based systems, in Enery-aware systems and networking for sustainable initiatives, IGI-Global, 2012.

Apurva Rathi, xun zhang, Francois Vialatte, FPGA IMPLEMENTATION OF SOBI TO PERFORM BSS IN REAL TIME, in 4th International Joint Conference on Computational Intelligence, 2012.

Xiaofei Wang, JinTao Wang, Xun ZHANG, A multiple communication standards compatible IoT system for medical usage, in IEEE FTFC conference, IEEE, 2013.

Chen Chen, Xiu LIU, Adrien UGON, xun zhang, Amara Amara, Patrick GARDA, Jean-Gabriel, Dr. Carole, Andrea PINNA, Polysomnography Symbolic Fusion for Automatic Sleep Staging, in jetsan, 2015

Chen Chen, Xue Liu, Adrien UGON, xun zhang, Amara Amara, Patrick GARDA, Jean-Gabriel Ganascia, Carole Philippe, Andrea PINNA, Symbolic Fusion: A Novel Decision Support Algorithm for Sleep Staging Application, in Mobilhealth, ACM, 2015.

Rahma ABDAOUI, xun ZHANG, Fanfan XU, Potentiality of a Bi-directional System Based on 60GHz and VLC Technologies for E-health Applications, in IEEE ICUWB 2016, 2016.
Pablo Pe, Fernando Silveira, xun ZHANG, Amara Amara, Uplink Wireless Transmission Overview in Bi-Directional VLC Systems, in IEEE ICECS, IEEE, 2016

Jian Song, Amara Amara, xun ZHANG, A cost-Effective Approach for Ubiquitous Broadband Access Based on Hybrid PLC-VLC System, in IEEE ISCAS, IEEE, 2016.

Fanfan XU, Rahma ABDAOUI, xun ZHANG, Potentiality of a Bi-directional System Based on 60GHz and VLC Technologies for E-health Applications, in GDR SOC SIP 2016, 2016.

Chen Chen, Adrien UGON, xun zhang, Amara Amara, Patrick GARDA, Jean-Gabriel Ganascia, Carole Philippe, Personalized Sleep Staging System using Evolutionary Algorithm and Symbolic Fusion, in IEEE Engineering in Medicine and Biology Society, IEEE, 2016.

Chen Chen, Adrien UGON, xun ZHANG, Amara Amara, Patrick GARDA, Jean-Gabriel Ganascia, Amina KOTTI, Carole Philippe, Cross Entropy-based Automatic Thresholds Setting-Up Method for Sleep Staging System, in BioMedicial Circuits and Systems Conference, IEEE, 2016.

Chen Chen, Adrien UGON, xun ZHANG, Amara Amara, Patrick GARDA, Jean-Gabriel Ganascia, Carole Philippe, and Andrea, Personalized Sleep Staging System by combining Symbolic Fusion and Feedback System Control, in Colloque SoC-SiP 2016, 2016.

John Cosmas, Yue ZHANG, xun ZHANG, Internet of Radio-Light: 5G Broadband in Buildings, in EUROPEAN WIRELESS 2017, 2017.

Chuanxi HUANG, xun ZHANG, VLC based Indoor Positioning System Simulation Testbed, in GDR SoC, GDR-SoC, 2017.

Chuanxi HUANG, xun ZHANG, Impact and Feasibility of Darklight LED on Indoor visible light positioning system, in IEEE ICUWB, IEEE, 2017.

Chuanxi HUANG, xun ZHANG, LOS-NLOS idetification Algorithm for Indoor Visible Light Positioning System, in IEEE, the 2Oth international symposium on wireless personal multimedia communications, IEEE, 2017.

Ameur Chaabna, xun ZHANG, An indoor positioning system based on Visible light communication using a solar cell as receiver, Conferences, 2017.

John Cosmas, B Meunier, xun ZHANG, and a.l., A Scalable and License Free 5G Internet of Radio Light Architecture forServices in Train Stations, in European Wireless 2018 (EW 2018), Catania, Italy, 2018.

John Cosmas, Martin Ganley, Zion Hadad, Haluk Gokmen, Harilaos Koumaras, Eliron Salomon, Daniel Negru, Yue ZHANG, Li-Ke Huang, Rudolf Zetik, Krzysztof Cabaj, Adam Kapovits, xun zhang, Moshe Ran, A Scalable and License Free 5G Internet of Radio Light Architecture for Services in Homes and Businesses, in BMSB 2018, IEEE, 2018.

xun ZHANG, A Scalable and License Free 5G Internet of Radio Light Architecture for Services in Homes and Businesses, in IEEE BMSB, IEEE, 2018.

Lina SHI, xun zhang, Yue ZHANG, Gaojie Chen, Andrei Vladimirescu, Experimental 5G New Radio integration with VLC, in ICECS, IEEE, 2018.

Ameur Chaabna, Chuanxi HUANG, xun zhang, Performance Evaluation of Illuminance Based on LEDs Spacing in Indoor Positioning System Based on VLC, in ICTAEE18, IEEE, 2018.

Patrick Wang, Ilaria Renna, Frédéric Amiel, xun zhang, Learning with Robots in CS and STEM Education: A Case Study with ISEP-R0B0, in Workshop Robots4Learning @ Human Robot Interaction, 2018 .

Lina SHI, xun zhang, and Andrei, OFDMA-TDM Position Scheme for VLC indoor positioning system, in GDR SoC, GDR-SoC, 2018.

Lina SHI, xun zhang, Andrei Vladimirescu, PAPR reduction based on deep autoencoder for DCO-OFDM VLC system, in IEEE BMSB, IEEE, 2019.

Zhan WANG, wenxiao WANG, Chuanxi HUANG, xun ZHANG, Deep Convolutional Auto-Encoder based Indoor Visible Light Positioning Using RSS Temporal Image, in IEEE BMSB, IEEE, 2019.

Book:

Xun Zhang, Discrete Wavelet Transforms / Book 1- A scalable Architecture for Discrete Wavelet Transform on FPGA-Based System, in Discrete Wavelet Transforms, Intech, 2011.

Annex I: Teaching module description

Module « Electronique des objets »
Informations générales
Titre du module Electronique des objets
Identifiant du module : IE.2307 – IE2407
Responsable du module : Xun Zhang
ECTS : 5 crédits
Quantité de travail moyenne par élève : 150 Heures dont 46 heures encadrées
Travail en équipe : oui
Salle équipée des logiciels et matériel nécessaires
Mots clés : capteurs, microcontrôleurs, périphériques, communications I2C SPI, Protocoles radio, énergie,
Présentation
Le marché des IOT connait une croissance exponentielle avec des besoins et des services de plus en plus innovants. Ces objets connectés qui envahissent de plus en plus notre vie quotidienne sont composés du point de vue matériel, de nombreuses briques fonctionnelles indispensables comme les capteurs pour la collecte des données, les microcontrôleurs qui gèrent les données collectées, les batteries et les modules de transmission Radio Fréquence.
Ce module fournit à l'élève ingénieur toutes les bases qui concernent la conception électronique d'un objet communicant allant du capteur vers le module RF.

Objectifs pédagogiques
Ce module a pour objectif de sensibiliser les élèves à différentes problématiques essentielles lors de la conception des objets communicants.

Connaissances
Les enseignements donnés dans ce module permettent d'élaborer les concepts et savoir-faire suivants.
Concepts
Introduction sur les capteurs numériques et analogiques, les paramètres mesurés (physiques, chimiques ou biologique…)
Les capteurs et réseaux de capteurs, leurs applications
Interface capteur-électronique
Optimisation d'énergie (niveau capteur, niveau réseau, niveau système)
Les bus de communication I²C et SPI
Les protocoles de communications
Partitionnement de charge entre objets et serveurs
Savoir-faire
Conception et optimisation d'un nœud de mesure et de commande communicant
Optimisation et maitrise de l'énergie en fonction des différents critères de gestion des capteurs, de l'application, des moyens de communication…

Module « Microsystèmes électroniques »

Informations générales
Titre du module : Microsystèmes numériques
Identifiant du module : IE.2409
Responsable du module Xun Zhang
ECTS : 5 crédits
Quantité de travail par élève: 150 heures dont 46 heures encadrées
Travail par binômes et individuel
Mots clés : Architecture ordinateur, assembleur, registre, portes logiques, logique séquentielle
Salle de cours puis salle machine pour les TPs et le project

Présentation
Les systèmes numériques complexes sont aujourd'hui constitués de milliards de transistors. Seule la décomposition en sous-systèmes fonctionnels interconnectés permet de comprendre et de contrôler cette complexité. Ce module approfondit les connaissances en systèmes numériques. Il décrit également l'architecture interne des processeurs et approfondi et opère une jonction entre l'architecture des ordinateurs (point de vue fonctionnel) et les circuits numériques.
On introduit également les techniques de conception basse consommation.
Objectifs pédagogiques
Dans ce module, il est question de conception de systèmes électroniques numériques. Mais plus généralement, on cherche à comprendre la jonction entre matériel et logiciel. On approfondit le codage bas niveau en regard de l'implémentation matérielle.
En outre, il s'agit d'initier les élèves à la notion de qualité et de sûreté de fonctionnement des systèmes étudiés : recours à des techniques de conception basse consommation et mise en place d'architectures sécurisées.

Contenu/programme
Conception de systèmes numériques
Utilisation d'outils de développements de conception de circuits numériques
Implémentation d'algorithme sur microprocesseur
Programmation d'algorithmes
Evaluation des compromis logiciel / matériel
Concepts
Conception de circuits digitaux numériques VLSI
Architecture interne d'un microprocesseur RISC
Codage de programme sur microprocesseur
Réduction de la puissance dissipée

Outils utilisés par l'enseignant/intervenant
L'enseignant/intervenant utilisera les outils/méthodes suivants :
Programme de cross développement spécifique à la cible étudiée
Chaine de développement logicielle NIOS II sur FPGA.
Outils utilisés par l'apprenant
Simulateur spécifique, Logiciel de développement logiciel NIOS II sur FPGA.
Mobilisations ultérieures
Ce module de deuxième année est un module cœur pour le parcours Systèmes Embarqués