



ANNEX I: WIT AREAS, RESEARCH LINES AND RESEARCH SUBLINES/GROUPS OFFER

WIT AREA	RESEARCH LINE	RESEARCH SUBLINE/GROUP
1. AUTOMOTIVE MECHATRONICS AND ADVANCED MANUFACTURING	1.A RF / Microwave devices for satellite communications by 3D printing	1.A.1 Microwave Components Group (MCG) / UPNA, Miguel Ángel Gómez Laso 1.A.2 Antenna Group / UPNA, Jorge Teniente
	1.B Development and manufacturing of multi-source energy harvesting systems	1.B.1 Communication, signals and microwaves Group / UPNA, Antonio López Martin
	1.C Development and advanced manufacturing of sensors	1.C.1 Development of new concepts and manufacturing techniques for fiber optic sensors for road traffic control / Optical Communications Group / UPNA, Manuel López-Amo Sainz 1.C.2 Metamaterial nanophotonic architectures for LIDAR technologies / Antenna Group / UPNA, Iñigo Liberal 1.C.3 Improved metasurface radar sensors/ Antenna Group / UPNA, Iñigo Ederra 1.C.4 Development and advanced manufacturing of sensors for continuous measurement of water quality in rivers and urban sanitation networks / Optical Communications Group / UPNA, Manuel López-Amo Sainz 1.C.5 Magnetic sensors for automotive and mechatronics applications / Physical properties and applications of materials Group / UPNA, Cristina Gómez Polo
	1.D Eco-efficient mobility management in sustainable urban transport	1. D.1. DECYL Group (Data, Statistics, Quality and Logistics) / UPNA, Francisco Javier Faulín Fajardo.



	1.E Advanced fuel cell manufacturing	1.E.1 Environmental Technologies and Applications Group (TAMA) / UPNA, Antonio Gil-Bravo
	1.F Systems for high capacity communications in THz	1.F.1 Tunable reduction of wideband RCS by liquid crystals / Antenna Group / UPNA, Juan Carlos Iriarte 1.F.2 Dual circular polarization Antennas / Antenna Group / UPNA, Jorge Teniente 1.F.3 Gap waveguide antennas / Antenna Group / UPNA, Miguel Beruete 1.F.4 Corrugated planar antennas / Antenna Group / UPNA, Miguel Beruete 1.F.5 Reconfigurable metasurfaces / Antenna Group / UPNA, Miguel Beruete 1.F.6 Design of array antennas based on CORPSS beam forming networks / Antenna Group / UPNA, Carlos del Río 1.F.7 Analysis of beam forming networks type ODIN (Overlapped Distribution Network) / Antenna Group / UPNA, Carlos del Río 1.F.8 THz Fabry-Perot cavity dual polarization antennas / Antenna Group / UPNA, Iñigo Ederra
2. HEALTH	2.A Hematology: advanced therapies and diagnostic innovation	2.A.1 Myeloma and other gammopathies Group / UNAV, Bruno Paiva 2.A.2 CAR T Therapies for Neoplasms hematological and solid tumors / Molecular bases of hematological malignancies Group / UNAV, Felipe Prósper Cardoso
	2.B Regenerative medicine	2.B.1 In vivo generation of pluripotent stem cells derived organs/ Stem cell biology group/ UNAV, Xabier Aranguren
	2.C Nanomedicine	2.C.1 Nanomedicines and Drug Delivery Group / UNAV, María José Blanco Prieto 2. C.2. Nanostructure for Therapy Application / UPNA, Manuel Algarra



	2.D Preventive medicine	<p>2.D.1 Prevention and treatment of hepatic steatosis in children with overweight or obesity / Nutrition and Physical activity for health, ELIKOS research Group / UPNA, Idoya Labayen Goñi</p> <p>2.D.2 Cellular mechanisms and molecular factors involved in the relationship between excess adipose tissue and colon cancer / Obesity and Adipobiology Group / UNAV, Gemma Frühbeck</p> <p>2.D.3 Health, diet and lifestyles in adults/ Epidemiology and Public Health Group / UNAV, Miguel Ángel Martínez González</p>
	2.E Ophthalmology	<p>2. E.1 Complement system and retinal diseases / Retinal diseases and therapies Group / UNAV, Patricia Fernández-Robredo.</p> <p>2.E.2 Histopathological and molecular analysis of the formation of the myopia biomarker CUVAF (Conjunctival Ultraviolet Auto Fluorescence) in comparison with pinguecula and pterygium / Laboratory of experimental Ophthalmology / UNAV, Sergio Recalde</p>
	2.F Cardiology	<p>2.F.1 Microbial pathogenesis Group / UPNA, Iñigo Lasa</p> <p>2.F.2 Translational Cardiology Group / UPNA, Natalia López-Andrés</p> <p>2.F.3 Myocardial remodeling and heart failure Group / UNAV-CIMA, Arantxa González Miqueo</p> <p>2.F.4 Tissue engineering and additive manufacturing / UNAV, Manuel Mazo Vega</p>
	2.G Gene Therapy and gene Regulation	<p>2. G.1 Gene therapy for rare diseases / Laboratory of gene therapy for liver diseases / UNAV, Gloria Gonzalez Aseguiñolaza.</p> <p>2. G.2 Gene Regulation in Cancer / Long non-coding RNAs and cancer genome Group / UNAV-CIMA Maite Huarte.</p>



	2.H Immunology / Immunotherapy	<p>2.H.1 Oncoimmunology Unit Group / UPNA-Navarrabiomed, David Escors Murugarren</p> <p>2.H. 2 Cancer signalling Unit Group / UPNA, Imanol Arozarena</p> <p>2.H.3 Protein crystallography and structural immunology Group / UPNA-Navarrabiomed, Jacinto López Sagaseta</p> <p>2.H.4 Cancer Immunotherapy Cytokine-based Therapies Laboratory Group / UNAV-CIMA, Pedro Berraondo</p>
3. ENERGY	3.A Energy Grid Integration	3.A.1 INGEPER, Renewable Energy Grid Integration / UPNA, Luis Marroyo Palomo
	3.B Development of advanced materials and technologies for energy production	<p>3.B.1 Physical properties and applications of materials Group / UPNA, Alberto López Ortega</p> <p>3.B.2 Quantum materials for energy applications / Antenna Group / UPNA, Iñigo Liberal</p> <p>3.B.3 Advanced wind turbine control / Dynamic Systems and Control Group / UPNA, Jorge Elso</p>
	3.C Valorization of natural resources and wastes	<p>3.C.1 Environmental Technologies and Applications (TAMA) / UPNA, Antonio Gil</p> <p>3.C.2 Circular strategy of fertilization from the recycling of organic waste: synthesis of highly efficient organ mineral sources as an alternative to current fertilization / Biological and Agricultural Chemistry Group / UNAV, José María García-Mina</p> <p>3. C.3. Valorization of vegetable organic wastes for health purposes / Vegetable wastes and health group / UNAV, Nieves Goicoechea</p>
4. ARTIFICIAL INTELLIGENCE	4.A Real-time data processing	4.A.1 Approximate reasoning and artificial intelligence Group (GIARA) / UPNA, Humberto Bustince, Jose Antonio Sanz Delgado



		<p>4.A.2 / New developments in information fusion techniques using interval and multidimensional data with applications in computer vision and machine vision and machine learning / Approximate reasoning and artificial intelligence Group (GIARA) / UPNA, Humberto Bustince, Daniel Paternáin</p>
	4.B Spatial statistical problems	4.B.1 Spatial Statistics Group / UPNA, María Dolores Ugarte
	4.C Applications in Health, Advanced Manufacturing and Energy	<p>4.C.1 Multifactorial analysis of Early Metabolic Syndrome using machine learning techniques / Approximate reasoning and artificial intelligence Group (GIARA) / UPNA; Humberto Bustince, Carlos López Molina, Idoya Labayen</p> <p>4.C.2 Automatic control of life cycles for in vitro neuron cultures using computer vision / Approximate reasoning and artificial intelligence Group (GIARA) / UPNA; Humberto Bustince, Carlos López Molina, Montserrat Arrasate</p> <p>4.C.3 Behaviour modelling and prediction in biological neuron networks / Approximate reasoning and artificial intelligence Group (GIARA) / UPNA; Humberto Bustince, Carlos López Molina, Andrea Serio</p> <p>4.C.4 Machine learning-based prediction of adverse effects in colonoscopy biopsies / Approximate reasoning and artificial intelligence Group (GIARA) / UPNA; Humberto Bustince, Eduardo Albéniz Arbizu</p> <p>4.C.5 Multifactorial study and profiling of oncological patients using Deep Learning and Big Data / Approximate reasoning and artificial intelligence Group (GIARA) / UPNA; Humberto Bustince, Ruth Vera</p> <p>4. C.6 Deep learning in brain-computer interfaces / Algebra. Applications Group / UPNA; Luis M. Ezquerro Marín, Marisol Gómez Fernández</p> <p>4. C.7 Approximate reasoning and artificial intelligence Group (GIARA) / UPNA, Humberto Bustince, Mikel Galar4.C.8. Personalized medicine determining optimal patient-driven treatments / Design statistics and data analysis group (StatData) in the Institute of Data Science and AI (DATAI) / UNAV, Jesús López-Fidalgo</p>



		4. C.9. Modelling and prediction of the impact of air pollution and climate change on population health using AI, machine learning and big data techniques / Environmental Analytics (BIOMA) / UNAV, Jesús Miguel Santamaría Ulecia
	4.D Image Processing	4.D.1 Improving deep learning-based computer vision methods using ensembles and advanced information fusion techniques / Approximate reasoning and artificial intelligence Group (GIARA) / UPNA, Humberto Bustince, Daniel Paternáin