improving Children's Auditory REhabilitation (iCARE) – Marie Curie Initial Training Network

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ABSTRACT

improving **C**hildren's **A**uditory **RE**habilitation (iCARE) – Marie Curie Initial Training Network 2013-2107

Early screening for hearing loss and sophisticated technology has changed the educational landscape for young children with severe hearing impairment (HI) and a majority of them attend mainstream education. However, these children are not normally hearing and it is therefore essential that infrastructure is developed and put in place to reduce the possible negative effects of HI and to optimize both learning environments and remediation.

The first objective of iCARE is to train and create a new generation of researchers capable of exploiting the synergies between different disciplines to optimize the inclusion of children with HI (4-12 years of age) in an oral society. This will be achieved through an international consortium of full and associated partners from academia, industry and socio-economic agencies, each with its own expertise. The proposed training consortium is unique because the partners are specialized in a variety of disciplines, both technical and non-technical, ranging from audiology, medicine, psychology and neuroscience, engineering, education, and speech and language therapy. Nine full partners from different European countries will be involved in iCARE. In addition, seven associated partners from industry will be closely involved providing training on their expertise.

The second objective of iCARE is to combine research and training skills across disciplines in order to acquire knowledge and develop novel remediation methods, and products that will empower children with HI, their carers and educators, to communicate in a hearing world.

iCARE

improving Children's Auditory Rehabilitation

MISSION

The goals of iCARE are to:

- provide training to create a new generation of researchers capable of exploiting the synergies between different disciplines to optimize spoken communication in children with hearing impairment.
- combine research across disciplines to develop novel methods, training skills and procedures for improving auditory rehabilitation and use the generated knowledge, products and skills to empower children and adolescents with hearing disabilities as well as their parents, care givers, educators, speech therapists, medical professionals and other involved persons.

FULL PARTNERS

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SCIENTIFIC PROGRAM

The objectives of iCARE will be achieved through an international and intersectoral consortium of full and associated partners from academia, industry and socio-economic agencies, each with its own expertise. The proposed training consortium is unique because the partners are specialized in a variety of disciplines, both technical and non-technical, ranging from audiology, medicine, psychology and neuroscience, engineering, education, and speech and language therapy. Nine full partners from different European countries will be involved in iCARE, of which two are industrial. In addition, 7 associated partners from industry will be closely involved providing training on their expertise. See Figure 1 for the framework of the research program.

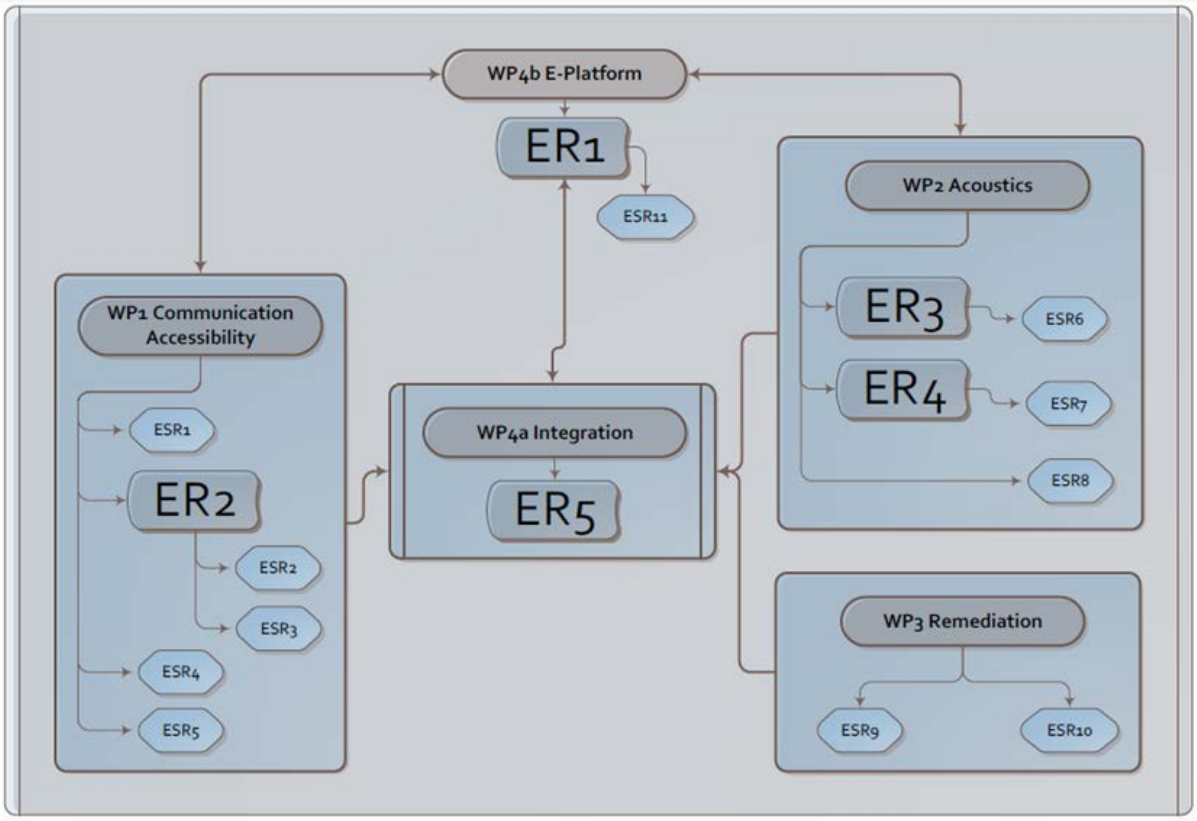

Figure 1: Framework of the iCARE research program

Four research workpackages (WP) will be carried out:

The main objective of **communication accessibility** (WP1) is to optimize inclusion for all children with a uni/bilateral, mild, moderate, severe or profound hearing loss in the oral society. The main objective of **improved acoustics** (WP2) is to ascertain optimal room acoustic conditions regarding understanding speech in complex acoustic environments. The main objective of **auditory remediation** (WP3) is to assist in building communication skills among children, teachers and caregivers. The main objectives of **integration and e-learning** (WP4) are to integrate knowledge of the previous WPs to develop a general protocol with regard to optimizing spoken communication.

The development and use of the e-learning platform is an important linkage between the research and training WPs. The iCARE e-learning system will be used 1) for training the ESRs and ERs, 2) to assist cross-pollination of expertise, 3) to provide training to the children with hearing impairment, and 4) for dissemination.

TRAINING

Traditional vocational training approaches tend to produce either speech/linguistic specialists who lack insight into the technology development requirements of actual products, or alternatively engineers who lack understanding of the real-world needs and developmental trajectories of children with hearing impairment. At completion of their training these fellows should be able to initiate and manage new research projects with an insight into both technological and child rehabilitation/developmental issues, both in academia and in industry. They should be able to work in an interdisciplinary team, demonstrate good communication skills and handle deadlines. The novelty and originality of the proposed training program lie in the interdisciplinary and intersectoral nature of the full and associated partners (Figure 2).

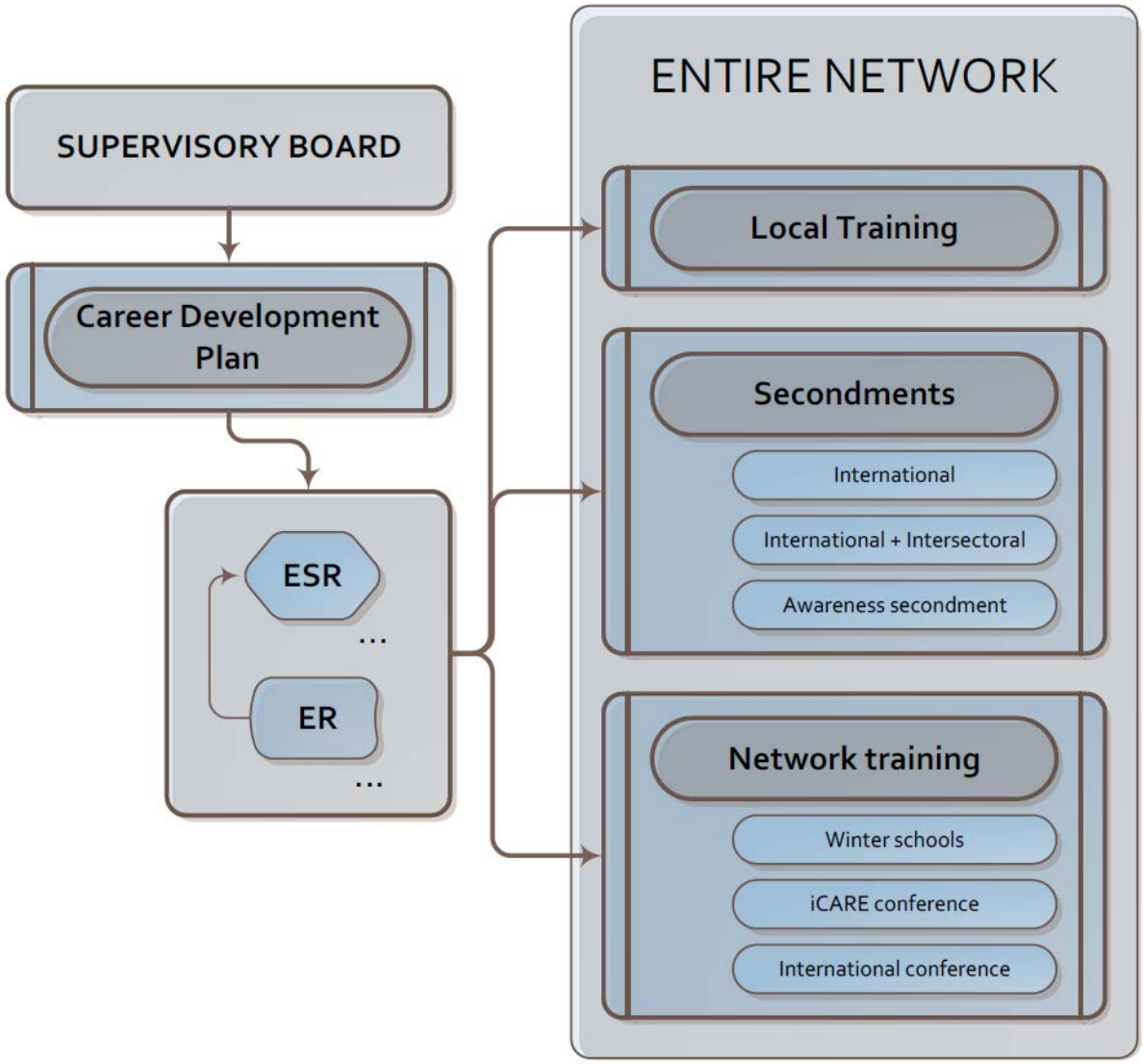

Figure 2: Framework of the iCARE training program

The network-wide training of Early Stage Researchers (ESRs) and Experienced Researchers (ERs) involves four components: 1. Local Training, 2. Secondments, 3. Network-wide training and 4. Career development plans.

INDIVIDUAL PROJECTS

Early Stage Researchers (ESR):

ESR-1: Cochlear, Optimizing fitting in poorly performing children with CI

ESR-2: UCL, Auditory processing in children with hearing impairment

ESR-3: KU Leuven, Auditory processing in children with unilateral hearing impairment with and without a CI or hearing aid

ESR-4: UOM, Speech processing cues in children with hearing loss

ESR-5: NOLDUS, Computer vision and human interaction

ESR-6: RWTH, Development of realistic test procedures for children with hearing impairment

ESR-7: RUN, Optimizing auditory scene analysis for the hearing impaired

ESR-8: Gävle, Learning in different acoustic scenes

ESR-9: LiU, Higher order remediation

ESR-10: Cochlear, Real-life benefits in children

ESR-11: Development and validation of a scientific model for the iCARE learning platform

Experienced Researchers (ER):

ER-1: LIMEL, Implementation of the iCARE e-learning platform

ER-2: UCL, Optimizing electrophysiological measures

ER-3: RWTH, Development of an audio-reproduction system

ER-4: RUN, Electrophysiological and NIRS imaging techniques

ER-5: LiU, Integration and protocol development

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Homepage: https//icareitn.eu/